REVIEW OF SAFETY IN RALLYING IN AUSTRALIA

NOVEMBER 2016

AIMSS REVIEW OF SAFETY IN RALLYING IN AUSTRALIA

November 2016

TABLE OF CONTENTS

Table of Contents 2

Abbreviations 5

Definitions 5

AIMSS Chairman Introduction to the Review 6

EXECUTIVE SUMMARY 8

BACKGROUND 8

DATA SOURCES FOR the REVIEW 8

FINDINGS OF THE REVIEW 9

CONCLUSIONS AND RECOMMENDATIONS 17

SECTION 1 - Preamble & Background 23

Background – Review of Safety in Rallying Australia 23

Terms of Reference 24

Prior Reviews of Incidents in Rally 24

Review Structure & Methodology 24

Organisation of Report and Recommendations 25

Acknowledgement of Contributions to the Review 25

The Sport of Rallying in Australia 26

Safety in Rallying 26

Understanding the Impacts of Serious Incidents 27

SECTION 2 – Review Findings 29

Rally Incidents and Injuries 29

Rally Fatalities 32

Speed in Rallying 34

Survey - Competitor Attitudes to Safety 44

Key Stakeholder Comments 48

CAMS Rally Regulations as Compared to FIA Best Practice 54

Future Directions in FIA Rally Regulations 62

Miscellaneous Observations 64

SECTION 3 – Recommendations 66

Preface to Recommendations 66

Recommendation 1 – advance competition seat regulatoin 68

Recommendation 2 - Improve and Advance all aspects of Side Impact and Intrusion Protection 74

Recommendation 3 - Engage Safety Cage Manufacturers 79

Recommendation 4 - Seat Mounting Integrity 81

Recommendation 5 - Review Appendix J Safety Cage Specifications/regulations 83

Recommencation 6 - Enhanced Use of Safety Cage Protective Padding 86

Recommendation 7 - Differentiate Between Circuit and Rally Safety Cage Requirements 87

Recommendation 8 - Implementation of Accident Data Recording (ADR) System 90

Recommendation 9 - Frontal Head Restraints 92

Recommendation 10 - Competitor Licensing 94

Recommendation 11 - Targeted Education 95

Recommendation 12 - Competition Training Opportunity 97

Recommendatoin 13 - Enforce Event Average Speeds 99

Recommendation 14 - Enforce a Maximum Speed of 190kph 101

Recommendation 15 - Wider Application/use of Rallysafe (or similar) System 102

Recommendation 16 - Wider Use of Artificial Chicanes 103

Recommendation 17 - Compulsory Reconnaissance on pace Noted Events 105

Recommendation 18 - Wider Use and Improved Selection of Course Warning Boards 107

Recommendation 19 - Black Spot Hay Bale Impact Protection 108

Recommendation 20 - Advanced Bump Logging for Hazard Warning 110

Recommendation 21 - Enhanced Pre Stage Warning System 111

Recommendation 22 - Restrict Publication/Circulation of Stage Times during Competition 112

Recommendation 23 - Creation/Implementation of a CAMS National Rally Manual 113

Recommendation 24 - Ensure the CAMS Tarmac Rally Standing Regulations are applied to any tarmac rally event in Australia 114

Recommendation 25 - Appoint and Empower Highly Qualified Course Checkers 115

Recommendation 26 - Vehicle Trajectory Modeling to Identify no-go Zones 117

Recommendation 27 - Medical & First Aid Updated at Lower Status Events 118

Recommendation 28 - Overhaul Accident/Incident Reporting, Collation, Analysis 120
Recommendation 29 - Event Competitor/Kms/Incident Database 122
Recommendation 30 - Philosophical Repositioning of What a Targa Event is, and Means. 123
Recommendation 31 - Dissemination of Meaningful, Interesting Safety Information 124
Recommendation 32 - Ongoing facilitation of Rally Vehicle Road Registration 126
Recommencation 33 - Rally Safety Plan Manual 127
Recommendation 34 - Government Regulation 129
Prioritising Recommendations 130
What to do with these Recommendations? 130
Coroners Recommendations Mansell Inquiry – AIMSS Rally Review position 131
SECTION 4 – Detailed Data, Supporting Information and Feedback 133
Review of CAMS Incident, Injury & Fatality Data in Rallying 133
AIMSS Rally Competitor Attitude Survey 141
Summary of Open-ended Comments from Survey Respondents 172
Responses Related FHR Device Use 174
Responses as to the First Vehicle Action of Incident 177
Open-Ended Comments from Respondents doing online survey 179
III. Key Stakeholder Comments 215
References 233
IV. Appendices 234
Appendix 1. Terms of Reference 234
Appendix 2. AIMSS Rally Incident Report Form 236
Appendix 3. Pace Note Entry Samples 241
Appendix 4. Road Book Entry Samples 242
Appendix 5. Other Research and Reviews Associated to Rallying Safety 243
Appendix 6. AIMSS On-line Rally Competitor Survey Template 245

ABBREVIATIONS

AIMSS – Australian Institute for Motor Sport Safety

ARCom – Australian Rally Commission

ARC – Australian Rally Championship

CAMS - Confederation of Australian Motor Sport

CCRG – Closed Car Research Group

FIA - Federation Internationale de l'Automobile

FIA I – FIA Institute for Motor Sport Safety and Sustainability

FIA SD – FIA Safety Department

GIMSS - Global Institute for Motor Sport Safety

NMAC – National Medical Advisory Committee

REVIEW – Rally Review conducted by AIMSS under the CAMS Terms of Reference

TAC – Targa Australia Championship

TOR – Review Terms of Reference

DEFINITIONS

PACE NOTES – Sometimes referred to as "Safety notes" these are prepared by the driver and co-driver or by some external party and describe in great detail, corner to corner, the features, including hazards, of each Stage of the rally. Pace notes in rallying are central to both competitiveness and safety. See Appendix 3 for a sample page from a set of Pace Notes.

ROAD BOOK – a booklet prepared by the Organisers and issued to competitors, which contains the instructions required to traverse the entire route of the event or one day of the event. See Appendix 4 for a sample page from a road book.

STAGE: A part of a rally where competitors race against the clock in order to achieve a certain base time, or to set as fast a time as possible. Stages (in gravel rallies referred to as "special stages") can vary in length for example, from 1km to 50kms. A rally is comprised of a number of stages linked by transport sections (see below).

SPECIAL STAGE RALLY: An event intended primarily to test the skill of the crew and the capabilities of the vehicle. It consists of several special stages each necessarily followed by a transport section

TARMAC RALLY: A rally event which includes 10km or more of total special stage distance on tarmac. 'Tarmac' is a surface that is sealed with either bitumen or concrete or other similar material. The stages which are exclusively tarmac stages shall be run under the Tarmac Rally Standing Regulations. Where more than 25% of total special stage distance is on a tarmac surface the complete rally shall run to the Tarmac Rally Standing Regulations.

TRANSPORT SECTION: A section with minimal driving and navigational demands designed to take vehicles to the start of the next section in a non-competitive fashion.

November 22, 2016

Dear CAMS Board Member,

On behalf of the AIMSS Board and its Rally Review Panel I have pleasure in attaching the FINAL version of our Report for your consideration.

As was pointed out in our draft version, the review has been extremely wide ranging as a consequence of the broad terms of reference, with many bases covered across a variety of competitors, participants, industry, key stakeholders and operational/governance. This breadth is compounded by the significant variables across both the gravel and tarmac disciplines covered.

It is reasonable to acknowledged that the time period and resource needed to conduct and complete a review of this magnitude were underestimated, perhaps even driven by differing initial visions as to the scope and levels of detail and diligence required. However, time has now allowed the development of what we trust the CAMS Board will consider a quality report within that resource framework.

The review document is essentially split into four sections;

1. Pre-amble & Background
2. The Review Findings
3. The Recommendations
4. Supporting Information & Data

The information contained within the review was for the express purpose of identifying and proposing the recommendations, of which there are 34.

In addition to the actual recommendations, the depth of information and the results of much of the research and survey work contained herewith, will provide an ongoing valuable resource in understanding competitors and key stakeholder views and attitudes, to assist CAMS and its Australian Rally Commission in the stewardship of an enjoyable and safe rally environment. In particular, the views of the 648 rally participants garnished via the AIMSS attitude survey provide great insight into the membership, including the need for education.

Further, a valuable and willing contribution was made by a range of what were considered 'key stakeholders' in rallying in Australia. We would encourage senior CAMS personnel to avail themselves to this groups more detailed commentary (grouped, toward the rear of the document), so as to assist shape the sport's future directions. This group consists of industry experts, highly experienced drivers and co-drivers, medical respondents and professionals including rescue personnel.

The AIMSS review panel encourages the CAMS Board to give the recommendations due consideration. It also suggests that CAMS, where appropriate, is strategic in the timely or phased in approach to its implementation, importantly, including competitor education, so as to strike the right balance between the ongoing and never ending pursuit of participant safety, and the viability for them to enjoy their sport.

I would personally like to thank the CAMS Board for engaging AIMSS to conduct the review, the review panel for their work and diligence toward it, and all those that participated in its content.

In particular I would like to pay tribute to the work of my predecessor, Bob Glindemann for his leadership not only of this project but of AIMSS and its achievement of safer motor sport in Australia.

Kindest regards
Garry Connelly AM
Chairman

EXECUTIVE SUMMARY

BACKGROUND

The Board of the Confederation of Australian Motor Sport (CAMS) has requested AIMSS to undertake a wide ranging review of the sport of rallying in Australia. The core focus of the review is to inquire into, consider, report and make recommendations on the following matters:

- The current engineering, management and safety response requirements applicable to all forms of Rallying in Australia; and
- Any existing or new developments or technologies which may be applicable to Rallying and the feasibility of introducing new or additional requirements to Rallying at each of its levels, from the introductory/novice level to Australian Rally Championship and Tarmac Rally levels.

The focus of concentration for the review and its report was on safety issues specific to rallies. Over-arching issues such as occupational health and safety were not part of the review.

The review report draws attention to the fact that serious incidents in rallies have effects that extend well beyond the competitor, including families, friends, crews and organisers. The perception of the sport in the wider community may be adversely affected.

The report was prepared in conjunction with, and in part relying on information provided by lead regulatory and research bodies including CAMS, the Australian Rally Commission (ARCom), and the FIA Institutive for Motor Sport Safety and Sustainability (FIAI).

DATA SOURCES FOR THE REVIEW

Several approaches were used to generate and/or collate data to form the background information on which recommendations could be based.

- Original research and data-gathering exercises
    - Review and analysis of 233 competition-related incidents resulting in 199 injuries reported to CAMS from 2006 to 2013;
    - Design and distribution of an AIMSS incident report template to 41 rally events during the February-July 2014 period of the review;
    - Review of fatal crashes from CAMS sanctioned rally events 1990 to 2013;
    - Design and analysis of an online survey of competitor opinions with regards to safety and safety regulation within the sport; a large sample of 648 CAMS rally licence holders responded to this comprehensive survey;
    - Analysis of raw competition event speed and distance data across a wide range of rally events (tarmac and gravel), including New Zealand and comparisons with other racing categories, across the 2011 to 2014 competition years.
- Current CAMS Australian rally regulations across all categories were tabulated for comparison with best practice as represented by the FIA World Rally Championship.
- Stakeholder engagement by personal interview and correspondence; key stakeholders included experienced rally competitors, event organisers, officials, medical, and rescue and intervention specialists.
- AIMSS personnel attended rally events in a first-hand observational capacity.
- Other observations including interviews, engagement and meetings with relevant industry groups, qualified engineers, safety cage manufacturers, safety equipment manufacturers and retailers.
- Work undertaken under the umbrella of the FIA by the FIA Institute and the Global Institute for Motor Sport Safety (GIMSS) was reviewed to assess the prospects for greater safety in the future.

- Review of published literature and reports of studies relevant to rally safety, including recent rally safety reviews (centring on spectators) in both England and Scotland.

FINDINGS OF THE REVIEW

RALLY INCIDENTS AND INJURIES

A total of 233 competition-related incidents resulting in 199 injuries were reported to CAMS between 2006 and 2013. No incident reports were available for 2009. The amount of CAMS data that could be extracted for each incident was highly variable due to incomplete reporting by competitors. The number of incidents reported to CAMS per year varied from 14 (2010) to 73 (2008). Almost one half of the incidents occurred during international or national events. Excluding 2009 there were 734 CAMS-permitted rally events during this period with an average of 0.34 incidents reported per event.

Although AIMSS developed and distributed a revised incident report directly to 41 events during 2014, and personally contacted several organisers encouraging support of the data collection exercise, only one AIMSS-generated incident report was returned directly from a competitor.

The frequency of significant incidents self-reported as part of the AIMSS competitor survey far exceeded the number of incidents reported to CAMS; 142 competitors indicated they had had a significant incident within the last two years compared to 26 CAMS reported incidents in 2013 and 29 in 2012. Within the CAMS data there appeared to be a bias toward incident reporting in national and international events, with a large gap in incidents at the lower levels.

The majority of incidents reported by competitors in the AIMSS survey involved impact with an earth bank, gully or creek (36%), a tree, stump or power pole (29%) or a roll-over (30%), with frontal impacts (42%) and side impact (40%) dominating.

INJURIES

Almost 40% of CAMS incident reports indicated there was no injury or did not contain injury information. The neck, spine, chest, torso or back were the most commonly reported areas of injury.

For the 406 competitor survey respondents who indicated they had had at least one significant incident:

- Incidents occurred across all event levels with a fairly uniform distribution.
- 53% indicated they were travelling at medium speed (60-100kmh) immediately prior to the incident, while 30% and 5% reported travelling “fast (100-160kmh)” or “very fast (>160kmh)”, respectively.
- 19% indicated that the incident resulted in injury to at least one crew member, and there was a significant association between the speed immediately prior to the incident and whether an injury occurred. Approximately 22% of injuries required either no medical attention or attention by the event first aid or medical team only.
- 36% of injuries were severe enough to warrant admission to hospital; injuries sustained in international or national events were four times more likely to result in hospital admission compared to state, multi-club or club event. Speed prior to incident, impact object, impact direction and road surface were not important factors for predicting hospital admission.
- Spinal and neck injuries were the most frequently reported types of injuries.

FATALITIES

Between 1990 and December 2013 there have been 21 competition related deaths during CAMS sanctioned rally events. These deaths arose from 18 independent incidents; 15 resulted in single fatalities and three caused the death of both the driver and co-driver/navigator.

Of the 21 deaths, 11 were of the driver of the vehicle, eight were the co-driver, and the role was unspecified for the remaining two individuals.

The number of fatalities per year has remained relatively constant since 1990. Prior to 2004 the majority of deaths occurred during gravel rallies. Since 2004, all deaths except one have occurred at tarmac events.

Two-thirds of all the 21 rally competition fatalities resulted from side-impact, from a variety of angles, and most commonly with a tree. Four deaths resulted from frontal impacts, one from a fire and one from a rollover.

Of the 18 incidents resulting in fatalities, detailed reports were available for the last nine incidents (2004-2013):

- All of these incidents except one occurred at tarmac events. The age and experience of the crews varied, with mean age of drivers and co-drivers being 52 and 38 years respectively.
- Three of the nine (33%) incidents occurred on either the first or second stage of Day 1 of the rally. In four of the nine incidents the crew had a note or caution in their safety notes at the location where the incident occurred; two had an instruction included in the road book at the incident location.
- Estimated speeds immediately prior to the incident were available for five incidents. Three incidents were reported to occur at speeds between 180 and 200 km/h, while the remaining two occurred at lower speeds of 90 and 100 km/h. The two incidents that occurred at estimated speeds of 190 and 200 km/h occurred on the first or second stage of the rally.
- Fatal incidents most often occurred at a bend (4/9), or a crest (2/9), or a crest/bend combination (2/9). Almost all incidents (8/9) involved impact with trees, with side-impact occurring in six of the nine incidents. The frequency of side-impact in fatal incidents was higher than the corresponding frequency in either the CAMS incident reports or the competitor self-reported incident survey, suggesting a vulnerability of the crew in these types of impacts.
- The cause of death of crew in the nine analysed fatalities was either severe head injury or internal injuries; Head impact with either the roll cage or intrusion of the tree into the crew compartment occurred in seven of the nine incidents.

VEHICLE DAMAGE

Over 20% of reported incidents resulted in damage to the vehicle that was not repairable. There was a statistical association between the speed immediately prior to the incident and the severity of damage to the vehicle.

SPEED IN RALLYING

The 321 stages forming part of the ARC between 2011 and 2014 had average speeds that varied between 55.5 km/h and 134.3 km/h. The majority (51.4%) of stages had average speeds between 80 and 100 km/h, while 37.4% were faster than 100 km/h. Only two stages (0.6%) recorded average speeds of 132 km/h or over, both occurring at the same event. Between 2011 and 2014 there has been little change in the average speeds of individual events.

Over this same time period 244 stages were contested as part of the Targa Australia Championship (TAC) with average speeds ranging from 45.4 km/h to 154.7 km/h for modern vehicles. These results exclude Targa Adelaide 2014 for which no data was available at the time of analysis, and Targa Adelaide 2013 where data for only two stages were available.

Caution is needed when interpreting the calculated average speeds for Targa events because in cases where the fastest competitor "cleaned" a stage, the average speed was calculated using the base time, not the competitors actual time. Hence the average speed on these stages is under-estimated.

The percentage of stages on individual Targa events that had a base time requiring an average speed of >132 km/h ranged from 33.3% to 92.0% (average 68.5%).

Overall 42.9% of contested stages on Targa events had an average speed >132 km/h; the average percentages for the events were 46.3% for Targa Tasmania, 39.8% for Targa High Country, 29.7% for Targa Adelaide and 49.0% for Targa Wrest Point. Of the 212 stages with a base time requiring an average speed >132 km/h, 16 (7.5%) were cleaned by the fastest competitor.

The average length of stages with an average speed >132 km/h was 14.8 km (range 4.6 km to 58.6 km). In 10 of the 14 events considered (71%) the first stage of the event had an average speed >132 km/h. For the remaining four events, the second (1) or third (3) stages were the first occurrence of average speeds >132 km/h. Thus in all events, stages with average speeds > 132 km/h featured early in the event.

The TAC events show patterns consistent with similar events conducted in New Zealand.

SURVEY OF COMPETITOR ATTITUDES

As part of the review AIMSS developed an online survey to capture the views of primarily past and present competitors' with regards to safety and safety regulations within the sport, as well as other information such as demographics, recent accident and injury history, use of frontal head restraints and perceived barriers to increased safety. Invitations to participate in the survey were sent to all CAMS rally license holders by CAMS via email, with a total of 648 individuals participating.

Respondents were predominantly male, and represented the range of competition with 28%, 45% and 27% competing in predominantly national/international, state and club/multi-club events, respectively. Likewise, both tarmac and gravel competitors responded; 53% competed only in gravel events, 23% competed only in tarmac events and 24% competing in a combination gravel and tarmac events.

Respondents were asked to rate their level of agreement on a 5-point Likert Scale to 15 statements related to rally events and safety. Seven statements elicited a clear dominant or majority opinion. The majority of respondents agreed that:

- current events provide a good mix of conditions, speeds and road types (85% agreement),
- when it comes to safety, it is the competitors responsibility to keep up-to-date with new technology (81% agreement),
- organisers should use course warning boards to indicate hazards, even in pact-noted events (81% agreement),
- CAMS should be more pro-active informing competitors of advances in safety equipment (65% agreement),
- competitor safety standards in Australia are good and don't require upgrading (56% agreement),
- in events allowing safety notes, reconnaissance should be compulsory (59% agreement), and
- every competitor should have first aid training and be competent at using the items in the first aid kit (54% agreement).

The remaining eight statements elicited mixed opinions from respondents, with differences noted between different competitor groups.

- Only 16% of respondents agreed with the statement “I prefer fast roads over slower, twisty roads”, while 43% disagreed. The highest disagreement rates occurred within the tarmac competitors (52%, n=135) and competitors of international/national events (50%, n=137). The highest rates of agreement occurred in respondents who competed in a combination of gravel and tarmac events (21%, n=137).
- 50% disagreed with the statement “Many of the roads used in current events are too fast”, while 21% agreed.
- 58% disagreed with the statement “Limiting the maximum permitted average speed for rally stages will improve safety”, while 25% agreed.
- 55% disagreed with the statement “Limiting the maximum terminal speed of vehicles will improve safety”, while 26% agreed.
- 47% disagreed with the statement “Improving competitor safety should be the highest priority for regulators, irrespective of cost”, while 26% agreed with this statement.
- 48% disagreed with the statement “In the past 2 years I have questioned the safety of some of the roads used for competition”, while 30% agreed with this statement.
- 51% disagreed with the statement that “The required vehicle safety standards for rallies should be the same across all competition levels”, while 33% agreed.
- 47% disagreed with the statement that “The required personal safety equipment of rallies should be the same across all competition levels”, while 40% agreed with this statement.

FRONTAL HEAD RESTRAINTS

Past and current competitors were asked whether they use a Frontal Head Restraint (FHR) device, with 47.8% (291/609) indicating they did wear such a device and 52.2% (318/609) indicating they did not.

RECONNAISSANCE

Drivers were asked about their use of safety notes (“pace notes”) and associated reconnaissance. Approximately one quarter of drivers (24.8%, 113/456) indicated they never used safety notes, while the remaining 75.2% (343/456) used them with different approaches to note preparation and course reconnaissance. Drivers in gravel events were more likely to not use safety notes at all (35.1%), or prepare their own notes during reconnaissance (52.4%). In contrast, tarmac competitors almost exclusively used safety notes, but most (65.4%) used notes written by another person rather than creating their own. In both types of events 3-4% of drivers indicated that they used safety notes written by another person and never drove the stages prior to competition.

KEY STAKEHOLDER COMMENTS

In addition to ARCom, 29 stakeholders were invited or contacted by AIMSS to submit their comments about safety in rallying. It is stressed that these are the views of the key stakeholders; they do not necessarily reflect the opinions or conclusions of the AIMSS Review Panel, although several are consistent with the panel’s view.

THE COMPETITION VEHICLE

Comments about competition cars focused on safety cages, safety features within vehicle (frontal head restraints, winged seats and window nets), high performance vehicles and classic rally cars. In general, stakeholders believed that existing roll cage standards were effective for frontal impact, but that more needs to be done in the area of side impact/intrusion.

Concerns were raised about the use of bolt-in cages, and roll cage standards being less stringent for tarmac rallies. Stakeholders recognised the importance of frontal head restraints (FHR) and recommended they be mandated at all levels of rallying. However they acknowledged the limited protection provided by FHR in side impacts, and there was general agreement that winged seats may provide some protection in these accidents.

Comments were received relating to concerns about the speeds of current rally cars. The overall consensus was that there needed to be some restriction either of vehicle speed, or accessibility to high powered vehicles by inexperienced competitors. ARCom indicated that they had become increasingly concerned by the very high terminal speeds of some of the unrestricted 4WD turbo cars.

Attention was also drawn to the classic rally car and the fact that these cars are continually increasing in speed due to improvements in transmission, suspension, tyres, brakes etc.

In some instances these terminal speeds are exceeding 200kmh on gravel, which everyone agrees is just too fast.

COMPETITORS AND CREW

Stakeholder comments were numerous and unanimous about competitor licensing and competency. All indicated concern that current licensing rules were too easy and there was no mechanism to prevent inexperienced or unskilled drivers from competing in high-powered cars.

It was suggested that improved training and a higher level of demonstrated competency was required and that a staged license system could be implemented in which competitors need to finish a certain number of events before they can step up to the next licence level. The vehicles able to be driven would be linked to the licence level to prevent inexperienced competitors driving over-powered vehicles.

There was recognition that many competitors preferred pace-noted events, but that creating and using notes was a skill that inexperienced competitors do not have. And even if safety notes are purchased, often they are more intense than required by new competitors.

Concerns were raised about the possible danger of competitors using road cars for reconnaissance, and the fact that some competitors mistake reconnaissance for practice.

Several stakeholders highlighted the negative attitudes of competitors to improvements in safety, either through CAMS rules and regulations or event-specific regulations. However all thought these improvements were necessary and would have dramatic influence on the outcome of future incidents.

RALLY STAGES AND COURSE

There was general agreement that ideally rally courses should be designed to limit prolonged periods at high speed where hazards are close to the road, and avoid roads that deteriorate badly in wet weather. Several stakeholders suggested that there was a greater need for highly experienced individuals to select roads and mark hazards to limit the “surprise” factor for drivers.

All stakeholders had favourable comments about the RallySafe system with the majority suggesting mandated use of the system at national and state events, at a minimum.

There was overwhelming consensus that speeds in rally were too fast and that regulations about maximum average speeds were constantly disregarded.

OPERATIONAL AND ORGANISATIONAL ASPECTS

Stakeholders were united in the view that the sport would benefit from improved training of officials and competitors in incident response. There was also strong support for establishing an incident and injury register.

It was also noted that organisers are not advised of the findings of CAMS enquiries into fatal accidents which does not help organisers improve their practices.

Several stakeholders were critical of CAMS with respect to communication in regard to critical incidents. One stakeholder suggested that the ability of an event to continue after a critical incident should be reviewed with a specific focus of the event's ability to respond to another incident should one occur.

Several stakeholders commented about activities at a start control. It was suggested that the minimum time in control be extended to allow more time for safety checks on the start line.

COMPARISON OF REGULATIONS

Current world's best practice for motor sport safety is predominantly developed at Formula One and World Rally Championship level. Over time these standards filter down through to the non-professional level of motor sport as cars, equipment and experience are sold on, as the top end of motor sport safety advances. The review examined the current CAMS safety regulations and completed a gap analysis using current FIA International Rally and World Rally Championship (WRC) regulation as the bench mark against the current CAMS regulations applied to Australian rally competitors and competitions. The gap analysis was broken down into four key areas; crew, competition vehicle, operational and organisation.

CREW

This section includes regulations applied to safety systems and items relevant to the crew (driver and co-driver), such as helmets, apparel, frontal head restraints (FHR), licensing and medical. All three rally disciplines (gravel, tarmac and Targa rallies) conducted at state level upwards generally used the same or similar regulation or safety standards as the FIA.

There is a step down in safety regulations in areas such as FHR and apparel where FIA standards are recommended (not mandatory) for Multi Club and Club level gravel and tarmac competitions, including Targa classes Vintage rally, TSD Trophy, Thoroughbred and Sports Trophy.

COMPETITION VEHICLE

This section includes the safety systems of the car such as seats, harnesses, roll cages and fire extinguishers etc.

The distinct gap in this section relates to seats. The latest FIA standard for seats is FIA 8862/2009. This type of seat is tested using new methods to higher standards and incorporates head and shoulder restraint features. Additionally it is back mounted to the chassis to minimise lateral movement and restrain the occupant's shoulders and head within the seat structure during side impacts. The earlier (and still current) FIA 8858-1999 specification seat also offers variants that include advanced design in lateral head/torso restraint.

The CAMS Manual of Motor Sport details the minimum requirements for seats. It recommends the FIA standard however the current regulation applied to all rally disciplines in Australia (non-international status) only requires seats to include head restraint (rearward, not lateral), upgraded mounting bolts and where required seat mount reinforcement of the floor pan with 75mm x 50mm x 3mm plates.

As such, this is a distinct gap in what has been identified as a critical area for improved safety. As the rally review has identified, there is a much higher risk of either serious or fatal injury from a side impact accident associated with gravel and tarmac rally events.

OPERATIONAL

This section includes regulations that cover the operational elements of a rally event and include the key areas medical and first aid, vehicle tracking, communications between stages and HQ, driver familiarisation with course (reconnaissance), competitor briefings and refuelling of cars.

There are similar requirements for these key areas at all rally competition levels however medical services and requirements and vehicle tracking and communication standards do vary, more specifically for competitions below state level status.

MEDICAL AND FIRST AID

Medical and first aid standards currently applied to rally events require a safety plan detailing medical staff and facilities, location and number of SOS points, medical intervention vehicles (MIV) and evacuation plan/routes etc to CAMS for approval, to obtain their event permit.

The standard of these services varies from FIA Appendix H (world championship level) to the medical services/requirements detailed in the CAMS Manual of Motor Sport – General Regulations.

CREW EMERGENCY PROCEDURES – ON STAGE

Crew emergency procedures are well documented and in most cases a copy of the procedure is included in the road book. There have been instances (noted in incident reports/investigations) where crew have not followed the correct protocols. Appropriate measures to improve crew adherence to emergency procedure such as routine education and reminders during crew briefings, should be implemented.

VEHICLE TRACKING

Vehicle tracking (positive tracking) via SOS radio points is defined in the National Rally Code. However specific requirements or mandatory use across all rallies is unclear.

Vehicle tracking relies on radio communication from the SOS point back to the stage command or HQ. There have been instances where a vehicle has left the road and crashed, and the following crew have not sighted the crashed vehicle, delaying the activation for medical response.

Radio and mobile phone communications are at times limited in their coverage due to the remote geographic locations of some course. New technology such as ‘Rally Safe’ is available to compliment the manual system which is being used in ARC and Targa and a number of state level events.

The regulations, requirements and standards applied to rally events are not clearly documented and require clarification.

RECONNAISSANCE

Reconnaissance or driver familiarisation with the course is generally allowed with the exception of blind rallies or where the regulations prohibit such. Crew familiarisation with the course is highly recommended particularly where pace notes are allowed. Road books issued by the organisers vary in standard and often lack the detail that competitive crews identify during reconnaissance.

The review has identified the significance of reconnaissance particularly for events where pace notes are allowed, competition amongst competitors is high, vehicle performance characteristics high and average stage speeds are high.

ORGANISATION

This section details the organisation of a rally with areas such as course special stages, course checkers, emergency procedures and safety of spectators, official and crew.

There are similar requirements for these key areas at all rally competition levels however standards, guidelines and procedures for Special Stages and Course Checker require clarification for Australian rallies.

SPECIAL STAGES

There are no clear standards, guidelines or procedures for the design or setting of special stages. Stage average speeds and lengths, chicane applications and location, course marking and cautions are generally left up to the event organiser.

Some rally disciplines apply an average speed limit. Where this limit is exceeded the stage is supposed to be reviewed and should not be approved for future rallies unless measures are in place to reduce the speed. The Review Panel notes that this regulation does not appear to be rigorously applied.

COURSE CHECKING

Course checking is required for all rallies. The standard of course checker and their ability to enforce any changes to a course has been identified in the review. These checkers, their experience and ability to affect necessary changes to the course or marking for safety reasons are critical for the safe conduct of a rally.

FUTURE DIRECTIONS FOR FIA RALLY REGULATIONS

The Terms of Reference required that the review report on existing, new or developing engineering and technologies applicable to rallying. The review report provides a brief overview and status of advances in safety systems, and current and future FIA regulation and research.

SIDE IMPACT PROTECTION

An advanced side impact system has been developed for the World Rally Championship (WRC) to meet the objective of surviving a 60km/h side impact into a tree. The main focal areas for side impact improvement are as follows.

- Advanced Racing Seats – This type of seat incorporates head and shoulder restraint features and is back mount to chassis to minimise lateral movement and restrain the occupant's shoulders and head within the seat structure during side impacts.

- Intrusion Space - maximizing space between the driver and safety cage by positioning the crew in board provides a valuable space that during a side impact allows the roll cage structure to deform and dissipate the impact energy before contacting the crew.
- Door cross bars – testing has demonstrated that the protective values of door cross bars can be improved, particularly when complemented with load spreading plates and door foams.
- Welding – sled testing demonstrated that the welded section of a roll cage and door cross structures often fail well before the natural elastic properties of the steel are exceeded under the loads generated during side impact.
- Load Spreading Plates – composite load spreading plates constructed of carbon/aluminium honey comb and fitted into the door cross area and the door frame void are used to spread the concentration of the impact into A and B pillar section of the roll cage structure.
- Energy Absorbent Foams – energy absorbent foams are the current focus of the FIAI testing. Properties of the selected foams and their ability to absorb the energy from the impact force are being tested to produce a list of approved foam types and specification.

Additional areas of relevant current FIAI/GIMSS safety focus are as follows:

- ROPS improvement - improved rollover protection, looked at the various steel materials currently used for safety cages.
- Fire Safety – Research and a new standard for homologation of fire extinguisher systems has very recently been implemented by the FIA.
- Course Design and Speeds –training and guidelines for organizers and course checkers to identify and avoid if possible or apply controls in areas where the combination of high speeds, changes of direction, crests and road surfaces that unsettle the car, have the potential to increase the risk of a high speed accident.
- Treatment of Black Spot Areas – the use of straw bales or tyre walls applied as barriers or speed arrestors or deflection devices. Common objects/areas for treatment are large trees, power poles, Armco ends etc .
- Tree impact barriers – straw bales tested, guidelines for specification drafted, but logistical issues – now with the FIA Circuits Commission.

CONCLUSIONS AND RECOMMENDATIONS

The review has identified a number of areas where, in its view, the long term health of rallying would be enhanced by way of consideration, further investigation or adoption/implementation of the following recommendations.

The review panel also accepts and understands it would be impractical and possibly detrimental to competitor numbers if too many recommendations (if and when adopted) were imposed too rapidly onto the rally community. The attitude of many competitors is clear upon review of the AIMSS competitor attitude survey. Accordingly, a prudent approach would be prioritisation and timely phased-in implementation. In addition, education would be of value in this regard.

Consistent with the review document structure, recommendations below have been grouped into one of the four key categories.

1. ADVANCED COMPETITION SEAT REGULATION

The review panel recommends the phasing in of accelerated and wider regulated use of FIA 8862-2009 advanced racing seats (including the education and promotion of), and/or at minimum, where cost remains prohibitive, the same or heightened regulated application of 'winged' (head restraint), laterally supportive variants of FIA 8855-1999 Spec.

FIA 8862-2009 or winged versions of FIA 8855-1999 seats should be made mandatory in all newly logged book vehicles, and those entering a tarmac rally for the first time. As a key recommendation, CAMS should consider timing it warrants as appropriate for the wider implementation of these specifications.

2. IMPROVE AND ADVANCE ALL ASPECTS OF SIDE IMPACT AND INTRUSION PROTECTION

The review panel recommends an expanded facilitation of policy, regulation, education, awareness and a culture for improved side intrusion protection & energy absorption in rallying, with maximum initial focus on tarmac events and competitors.

3. ENGAGE SAFETY CAGE MANUFACTURERS

CAMS to host a Safety Cage manufacturer forum to explore, in particular, latest developments in safety cage design as applied to rallying (specifically side intrusion and latest FIA findings), and issues around fitment of FIA spec winged racing seats. The intended outcome of the forum should be that safety cage manufacturers play a greater role in influencing better than minimum specification outcomes, and wider use of latest developments.

4. SEAT MOUNTING INTEGRITY

The review panel recommends in concert with other recommendations in this review around improving racing seat and side intrusion standards, that higher standards, specification and scrutineering of seat mountings be considered.

5. REVIEW APPENDIX J SAFETY CAGE SPECIFICATIONS/REGULATIONS

The Rally Review Panel recommends a review of minimum specifications for safety cage design as per Appendix J, specifically applied to rally competition, embracing modern design aspects, particularly side intrusion. This recommendation includes the need to revise the current requirement to fully recertify a safety cage following modification.

6.ENHANCED USE OF SAFETY CAGE PROTECTIVE PADDING

The Rally Review Panel recommends amendment to the wording in Schedule J – General Requirements for Cars and Drivers – Protective Padding to highly recommend or regulate the need for broader application of safety cage padding, particularly in the not so obvious regions of a cage susceptible to head strikes in a severe vehicle or cage deformation.

7. DIFFERENTIATE BETWEEN CIRCUIT AND RALLY SAFETY CAGE REQUIREMENTS

Investigate and design recommendations for safety cage construction that allows for the substantially different impact scenarios between circuit racing and gravel/tarmac rallying where trees are the pre-eminent impact source creating cockpit intrusion and deformation typically not possible in circuit racing, where safety cage standards are shared.

8. IMPLEMENTATION OF ACCIDENT DATA RECORDING (ADR) SYSTEM

The review panel recommends a wide ranging phasing in of accident data recorders into National and State rally competition.

COMPETITORS AND CREW

9. FRONTAL HEAD RESTRAINTS

The review panel recommends implementation of Frontal Head Restraint devices into sub-state level competition.

10. COMPETITOR LICENSING

The review panel recommends reviewing Competition licencing so as to apply more relevance to level of competition via a competency and experience-based system for new rally licenses.

11. TARGETED EDUCATION

The review panel recommends in addition to any other competitor education envisaged, a targeted exposure to influence attitudes across three primary areas of competition:

1. Higher degree of exposure to the confronting reality of a competition incident (particularly tarmac rally).
2. Understanding the tangible benefits of enhanced side impact protection.
3. Better education around appropriate vehicles, vehicle types, and suspension settings for different road speeds and types

12. COMPETITION TRAINING OPPORTUNITY

The review panel recommends the creation of opportunities for inexperienced competitors (drivers and crew together), to train, learn, and to critique their skills in an authorised, safe environment outside of competition, in their own vehicle at up to competition speed.

13. ENFORCE EVENT AVERAGE SPEEDS

The review panel recommends the enforcement of average speeds as envisaged in competition, including readily achievable zero times across all Targa events.

14. ENFORCE A MAXIMUM SPEED OF 190KPH

The review panel recommends the introduction of a maximum terminal speed of 190kph during any Australian rally competition.

15. WIDER APPLICATION/USE OF RALLYSAFE (OR SIMILAR) SYSTEM

The review panel recommends the wider implementation and broadened use of the 'RallySafe' (or similar) system, gaining further efficiency from the available technology as applied to safety.

16. WIDER USE OF ARTIFICIAL CHICANES

The review panel recommends the wider use and increased strategic placement of artificial Chicanes, in particular to arrest speed approaching areas of potential high risk to the broad competency of competitors, provided these can be safely installed and maintained during competition.

17. COMPULSORY RECONNAISSANCE ON PACE NOTED EVENTS

The review panel recommends consideration be given to regulating reconnaissance for events allowing pace notes.

18. WIDER USE AND IMPROVED SELECTION OF COURSE WARNING BOARDS

The review panel recommends that organisers broaden and enhance the use of course warning boards to indicate hazards, including on pace noted events.

19. BLACK SPOT HAY BALE IMPACT PROTECTION

The review panel recommends adoption of hay bale impact protection on known or likely black spots.

20. ADVANCED BUMP LOGGING FOR HAZARD WARNING

The review panel recommends using readily available current motorsport technology, to develop a system of more advanced 'bump and undulation' logging of tarmac stages for the purpose of identifying and logging hazards at a repeatable and understood threshold.

21. ENHANCED PRE STAGE WARNING SYSTEM

The review panel recommends investigating for Targa events, the enhanced use of a standardised pre-stage competitor warning system to better highlight and update anticipated hazards (including wet/damp conditions) on the upcoming stage.

22. RESTRICT PUBLICATION/CIRCULATION OF STAGE TIMES DURING COMPETITION

The review panel recommends investigating for Targa events (and for consideration for other tarmac events) whether the publishing and/or circulation of competitors stage times should be prohibited during competition, or during a time where doing so would unnecessarily heighten the sense of competition, and risk taken by competitors.

OPERATIONAL AND ORGANISATIONAL MATTERS

23. CREATION/IMPLEMENTATION OF A CAMS NATIONAL RALLY MANUAL

The review panel recommends the production of a CAMS National Rally Manual that brings together all elements specific to Rally competition and organisation.

24. ENSURE THE CAMS TARMAC RALLY STANDING REGULATIONS ARE APPLIED TO ANY TARMAC RALLY EVENT IN AUSTRALIA

The review panel recommends that CAMS, to the extent possible, does not allow any tarmac rally event to be conducted outside the governance of the CAMS Tarmac Rally Standing Regulations, specifically including average stage speeds and speed reduction measures.

25. APPOINT AND EMPOWER HIGHLY QUALIFIED COURSE CHECKERS

The review panel recommend the appointment of a highly qualified small pool of course checkers, trained under the new CAMS checker training module, to have authority and responsibility (to CAMS, not the organisers) for the signing off of events/stages in preparation for competition and for the general oversight of the event.

26. VEHICLE TRAJECTORY MODELING TO IDENTIFY NO-GO ZONES

The review panel recommends utilising basic vehicle trajectory modelling in gravel rallying to better identify no-go spectator zones.

27. MEDICAL & FIRST AID UPDATED AT LOWER STATUS EVENTS

The review panel recommends that base Medical and First Aid standards at lower status rally events be raised/updated.

28. OVERHAUL ACCIDENT/INCIDENT REPORTING, COLLATION, ANALYSIS

The review panel recommends an overhaul of accident and incident reporting, collation and analysis, against a background of intended future safety reviews, including comprehensive information from all types and levels of competition.

29. EVENT COMPETITOR/KMS/INCIDENT DATABASE

The review panel recommend that CAMS establish a database for events detailing numbers of competitors, number of competitive kilometres, and number of defined incidents.

30. PHILOSOPHICAL REPOSITIONING OF WHAT A TARGA EVENT IS, AND MEANS

The review panel recommends that CAMS over time, in concert with organisers, undertake a philosophical repositioning of 'Targa' type competition, to move away from the high end competition it has become, back toward its foundation as a performance vehicle social motoring event.

31. DISSEMINATION OF MEANINGFUL, INTERESTING SAFETY INFORMATION

The review panel recommends the development of a targeted rally safety education strategy to disseminate interesting, meaningful safety information and updates and reinforcement of key messages with a human and technical interest skew, (not regulatory) to ensure engagement.

32. ONGOING FACILITATION OF RALLY VEHICLE ROAD REGISTRATION

The review panel recommends CAMS continue to liaise with State Government vehicle registration authorities to ensure ongoing facilitation of road registration for competition vehicles with enhanced safety features.

33. RALLY SAFETY PLAN MANUAL

The review panel recommends the development of a 'one stop' Rally Safety Plan Manual to include the wide range of organisational and management guides, schedules, standards and procedures.

34. GOVERNMENT REGULATION

The review panel recommend CAMS lobbies Government to propose endorsement of a single set of regulatory standards for safety in rallying in Australia, so as no entity can operate at safety standards at a levels lower than those set by CAMS as supported by the FIA.

SECTION 1 - PREAMBLE & BACKGROUND

BACKGROUND – REVIEW OF SAFETY IN RALLYING AUSTRALIA

Motor sport by its very definition is, in most forms, the exploring of performance limits by both man and machine. As a consequence there will be incidents and accidents and sadly these will on occasion result in injury and death.

There exists a strong acceptance of risk by competitors, as borne out in parts of this review, however the term 'save them from themselves' can very much be applied in motor sport competition, and as such the industry and its governance has a responsibility to continue to explore and implement appropriate safety practices in rally competition.

The Australian Institute for Motor Sport Safety (AIMSS) welcomes the opportunity to participate in this process.

AIMSS is the peak body for motor sport safety and related research in Australia. AIMSS works in conjunction with the Confederation of Australian Motor Sport (CAMS) in an advisory role, and with FIA Institute for Motor Sport Safety and Sustainability.

The CAMS Board has requested AIMSS undertake a wide ranging review of safety in Rallying in Australia. The core focus of the review is to inquire into, consider, report and make recommendations on;

- The current engineering, management and safety response requirements applicable to all forms of Rallying in Australia and;
- Any existing or new developments or technologies which may be applicable to Rallying and the feasibility of introducing new or additional requirements to Rallying at each of its levels, from introductory/novice level to Australian Rally Championship and Tarmac Rally level

From the commencement of the review, AIMSS invited a number of experienced motor sport personnel to be part of the review panel. The panel formalised the review structure and processes in order to meet the terms of reference.

The nature of the review required the cooperation of a broad range of organisations, competitors, officials and individuals to provide information or assist to gather information relating to the review subject matter, regulations, data and personal opinion. The resources available to AIMSS and personnel appointed to conduct the review were of a casual nature and as a result the review has spanned some 24 months in duration.

AIMSS has prepared this report in conjunction with, and relying on information provided by the Confederation of Australian Motor Sport (CAMS), Australian Rally Commission (ARCom), FIA Institutive for Motor Sport Safety and Sustainability (FIAI), rally competitors, event organisers, industry specialists, officials, medical, rescue and intervention specialists, and other key stakeholders,. The review panel has reviewed published literature relevant to rally safety. AIMSS has also attended rally events in an observation capacity.

It should be noted that the review remained focused on rally specific safety issues, and as such the report does not cross over into more general work and occupational health and safety and broader event type risk management issues.

AIMSS accepts no responsibility for use of the information contained in the report and makes no guarantee nor accepts any legal liability whatsoever arising from or connected to the accuracy, reliability, currency or completeness of any material contained in this report. AIMSS and all other parties involved in the preparation and publication of this report expressly disclaim all liability for any costs, loss, damage, injury or other consequence which may arise directly or indirectly from use of, or reliance on, this report.

TERMS OF REFERENCE

CAMS provided AIMSS with a Terms of Reference (TOR) that outlined the critical aspects around safety in rallying for consideration. AIMSS believes it has conducted the review within the spirit of the TOR and in this report has addressed the key items and purpose as intended by the TOR.

A copy of the Terms of Reference can be found in Appendix 1.

PRIOR REVIEWS OF INCIDENTS IN RALLY

Overall there is a dearth of published literature focused on safety in rally. A small number of studies into rally safety have been undertaken previously, and there have also been a number of relevant presentations at the various FIA Institute conferences.

Studies conducted by the FIA Institute on matters relevant to rally safety, have been reported in public Institute documents, however, formal scientific papers are not routinely published by the Institute, and research reports are not generally released outside the research working groups. Hence there is little peer-reviewed literature on the topic. Appendix 5 provides a list of some of the relevant research, studies and articles of interest that were analysed or used as resource as part of review investigations.

REVIEW STRUCTURE & METHODOLOGY

To give structure to such a wide ranging review, data was gathered from the following sources allowing the application of both qualitative and quantitative research.

1) Incident and Accident Reports from 2006 to 2013
2) AIMSS created incident reports for 2014
3) Incident reports for fatalities occurring between 1990 and 2013, and CAMS Investigative Reports for a subset of these fatalities
4) Coroners Reports
5) Key stakeholder input from ARCom, experienced tarmac and gravel rally competitors, event organisers and officials, medical experts, first respondents and rescue personnel with rally experience, industry representatives including those who build and/or prepare rally cars, and manufacturers.
6) Self-administered survey of competitors focused on incidents and attitudes toward safety conducted in May/June 2014
7) Event speed data for a range of tarmac and gravel rallies in Australia and New Zealand
8) Current CAMS and FIA regulations relevant to the competition vehicle, crew and operational/organisational elements
9) Information from FIA and FIA Institute on current and future safety projects
10) Findings from MSA/Scottish Rally Safety Reviews
11) Observation of rally events

ORGANISATION OF REPORT AND RECOMMENDATIONS

All of the information collated during this review was considered against a backdrop of four key 'pillars' or themes, all of which collectively and individually play a significant role in rally safety. This report and recommendations is structured around this framework with the four pillars being:

A. The Competition Vehicle

B. Competitors & Crew

C. Rally Stages & Course

D. Operational/Organisational

ACKNOWLEDGEMENT OF CONTRIBUTIONS TO THE REVIEW

AIMSS wishes to express its sincere thanks for the contribution and support to the review provided by;

- Confederation of Australian Motor Sport (CAMS)
- Australian Rally Commission (ARCom)
- AIMSS Rally Review Panel
    - Bob Glindemann – AIMSS and Rally Review Chairman
    - Dr Michael Henderson - AIMSS Board Member
    - Garry Connelly – AIMSS Board Member, Deputy President FIA Institute for Motor Sport Safety
    - Mark Larkham – AIMSS Board Member
    - Adam Perry – AIMSS General Manager (former)
    - Dr Michelle Gatton

THE SPORT OF RALLYING IN AUSTRALIA

Rallying in Australia cemented its place in Australian motor sport in the founding years through the very popular reliability trials such as Redex, Ampol, BP and Repco Trials and the more traditional rally events such as Australia's Alpine Rally, the Southern Cross and Castrol Rallies. In modern times The Australian Rally Championship (ARC) which commenced in 1968 has become the principal national gravel rally championship in Australia and includes a round of the World Rally Championship (WRC).

Tarmac rallies are largely represented today by Targa style events. Targa Australia boasts that it runs one of the "world's largest, longest and hardest tarmac rally event, Targa Tasmania" which is complimented with numerous other popular targa rallies such as Targa West and Targa High Country.

Additionally States Championships Club and Multi Club series are conducted annually throughout Australia catering for all levels of competition.

BACKGROUND STATISTICS

- Each year in Australia there are over 16,600 entries from people participating in rally events (source; CAMS);
- 160 rally clubs/organisations organise and conduct some 250 separate rally events (source; CAMS).
- There are approximately 2520 rally participants who hold a valid CAMS rally licence, of which about 1400 (56%) are of National level status (source; CAMS).
- In 2014 there were 4516 rally cars issued with a CAMS log book.
- Figures from the 2013 CAMS commissioned economic impact study (EIS) of motor sport in Australia indicate the sport of Rally in Australia contributes approximately $250M annually in direct industry output, with approximately 1500 people permanently employed in rally jobs, in Australia (Ernst and Young, 2014).
- The EIS indicated that 61% of motor sport participants were aged between 31 to 64 years and predominately of male gender.

SAFETY IN RALLYING

Whilst advances in motor sport safety have had a profoundly positive effect in the modern era, rallying has been unable to keep pace with the reduction of fatalities in motor sport as compared to circuit type based activities. The research, development and implementation of wide ranging safety initiatives really took hold in the mid-late 90's and started to have a measurable impact shortly thereafter (Figure 1). Rallying was slower to respond with the number of fatalities peaking between 2006 and 2008.

Much has being done in more recent years, particularly at the international competition level, to improve safety in gravel rallying, with many of the advances flowing to sub level categories and championships as those initiative become more widely available and affordable for lower level competitors. However not all advances have automatically translated to tarmac rally events.

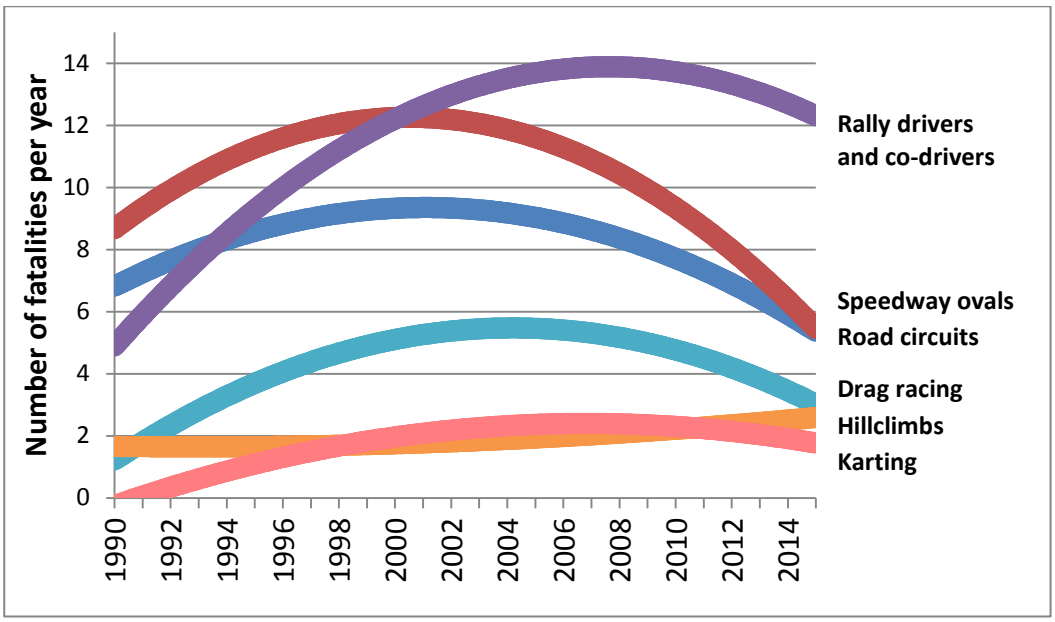
An earlier version of Figure 1 was prepared in 2008 – using AIMSS resources – for the FIA Institute in order to plot trends in motorsport fatality numbers on a world-wide basis. It was seen as justification for the Institute's placing a high priority on improving rally safety, in that annual deaths up to 2008 among rally drivers and co-drivers were shown to be rising, contrary to trends in other categories. Updated by post-2008 figures, the graph now shows an improving trend in rally deaths, although the numbers remain relatively high and the improvements appear to lag most other categories.

It should be stressed, of course, that these are absolute numbers, not rates. But the fact remains that public understanding of "safety" most often depends on numbers rather than more sophisticated measures. It should also be noted that the demonstrated trends are from world-wide data; the numbers of deaths in Australian motor sport are, as in most individual countries, too small to demonstrate statistically useful trends.

Later in this report will be described what the data available to the Review Panel do reveal in terms of Australian deaths and injuries in local rallying. It does need to be acknowledged that rallying by its definition and competition environment, will always present challenges in implementing the same level of safety controls as circuit type motor sport. In addition there are two occupants in each competition vehicle, thus doubling the potential for serious injury or death.

However, the review panel is of the view that, as presented via the recommendations contained within, more can be done, particularly with respect to tarmac rally events.

Figure 1. Number of annual fatalities recorded between 1990 and 2015, according to motor sport category



Data Source: www.motorsportmemorial.org

UNDERSTANDING THE IMPACTS OF SERIOUS INCIDENTS

The consequences of serious incidents in motor sport are often underestimated. The pursuit of enhanced safety in motor sport, including recommendations from this review, should be considered against the backdrop of the wider personal, organizational and societal implications (Box 1).

It is the opinion of the review panel that some competitor views, including views collated during this review, that "it is my life and I will take whatever risks I judge to be acceptable to me", ignores the fact that a serious incident:

- May involve injury or death to others (e.g. co-drivers, spectators)
- Will progressively undermine the reputation of the sport to the extent that government or other social pressures may ultimately make it unsustainable.

BOX 1. INDIRECT IMPACTS OF SERIOUS RALLY INCIDENTS

IMMEDIATE FAMILY AND FRIENDS, CREW AND ORGANISERS

- Direct impacts in terms of health, physical functioning, financial costs and potential loss of income
- Psychological impact on crew members if accident a result of error, or on car preparer/service crew if mechanical cause
- Psychological impact on organisers
- Psychological impact on volunteer officials
- Potential legal and even criminal liability for organisers
- CAMS/FIA
- Mission statements/objectives concerning negative publicity of incidents
- Costs (time and money) to review incidents and (potentially) legally defend organisers
- Long-term impact on insurance and risk grading

PERCEPTION OF THE SPORT IN WIDER COMMUNITY

- Media and social media coverage of incident usually attached to negative commentary about the sport
- The community and government perception of rallying will influence government (and private) funding/sponsorship
- Community negativity can impact ability to obtain necessary permits, particularly from local councils, police, forestry and land authorities and government in general.

IMMEDIATE FAMILY AND FRIENDS, CREW AND ORGANISERS

- Direct impacts in terms of health, physical functioning, financial costs and potential loss of income
- Psychological impact on crew members if accident a result of error, or on car preparer/service crew if mechanical cause
- Psychological impact on organisers
- Psychological impact on volunteer officials
- Potential legal and even criminal liability for organisers

CAMS/FIA

- Mission statements/objectives concerning negative publicity of incidents
- Costs (time and money) to review incidents and (potentially) legally defend organisers
- Long-term impact on insurance and risk grading

PERCEPTION OF THE SPORT IN WIDER COMMUNITY

- Media and social media coverage of incident usually attached to negative commentary about the sport
- The community and government perception of rallying will influence government (and private) funding/sponsorship
- Community negativity can impact ability to obtain necessary permits, particularly from local councils, police, forestry and land authorities and government in general.

SECTION 2 – REVIEW FINDINGS

RALLY INCIDENTS AND INJURIES

INTRODUCTION

As part of the review AIMSS was requested to consider trends over time in rally incidents and specifically investigate these trends by crash types, road surface, speed, crew experience level and types of vehicle being driven. This type of analysis is fundamental to establish baseline patterns. As part of this analysis, injuries arising from incidents were also considered.

The first source of data on rally incidents were CAMS Incident and Injury forms, or data previously extracted from these forms, occurring between February 2006 and November 2013. These data were supplied by CAMS in a combination of electronic and hard copy.

As part of this review AIMSS designed a more comprehensive and specific incident report form in December 2013 for the purpose of collecting detailed data for a 6-12 month period. A copy of this form is included in Appendix 2.

This new incident form was distributed directly to all event organisers in 2014 with a cover letter explaining the purpose of the form and reason for data collection. Organisers were asked to return forms for all incidents (regardless of severity) directly to AIMSS. In some cases, AIMSS directly contacted event organisers to verbally request their assistance with this data collection exercise.

An online self-administered competitor survey was also designed by AIMSS. While the primary aim of the survey was to obtain competitor opinions regarding safety, some questions were also included regarding significant rally incidents. This survey was conducted in May 2014. All CAMS rally licence holders were directly emailed by CAMS with an invitation to participate and the link to the survey. Current and past competitors were asked for specific details of their last significant incident including when it occurred, injury information, type of event, vehicle details, incident details (e.g. speed and direction of impact) and contributing factors.

SUMMARY AND KEY FINDINGS

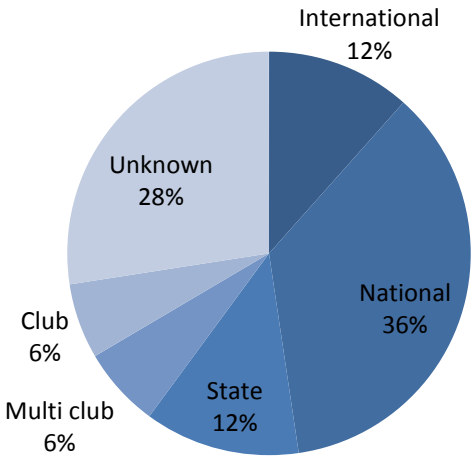
A total of **233** competition-related incidents, resulting in **199** injuries were reported to CAMS between 2006 and 2013. No incident reports were available for 2009. Only one AIMSS incident form was returned, after follow-up by AIMSS directly with the competitor, with no completed forms returned by any event organiser.

The amount of data that could be extracted from the CAMS Incident and Injury forms for each incident was highly variable due to incomplete reporting by competitors. It should also be noted that the voluntary self-report process has likely resulted in under-reporting and a bias towards reporting of more severe incidents. These limitations need to be considered when interpreting the data contained on the standard CAMS incident form.

Key findings from analysis of the CAMS Incident and Injury reports are summarised below.

- The number of incidents from all rally events reported to CAMS per year varied from **14 (2010**) to **73 (2008)**. Almost one half of the incidents occurred during international or national events. (Figure 2).
- Excluding 2009 there were **734** CAMS-permitted rally events during this period resulting in an average of **0.34** incidents reported per event.

Figure 2. Profile of CAMS reported competition-related incidents according to level of competition



- Vehicle rollovers were the most commonly reported incident (39.4%), followed by frontal impact (33.1%); trees and earth banks were the dominant impact objects.
- Almost 40% of incident reports indicated there was no injury or did not contain injury information. The neck, spine, chest, torso or back were the most commonly injured areas.

The information extracted from the CAMS Incident and Injury forms suggests a bias of reporting towards national and international events. Future analysis and review of rally safety would benefit greatly from an increase in incident reporting and incident detail from state, club and multi-club level events where participation rates, vehicle and occupant safety equipment, and access to medical and rescue may not mirror that of higher profile competition.

Key findings from online survey of competitors:

- 596 current and past competitors answered questions asked about their last significant incident, with almost 32% reporting they had never had a significant incident and 43% had 1 or 2 significant incidents in their competition history.
- The main factor found to increase the odds of having had **3** or more significant incidents during the respondent's competition history was having competed in 10 or more rallies. The type of event, use of safety notes and motivation for competing also influenced the odds of having had 3 or more significant incidents. Event level was not an important factor.
- Overall, gravel rally competitors who have done 10 or more events, who write their own notes and are competing to win have the highest odds of having had 3 or more significant events in their competition history.
- For the 406 respondents who indicated they had had at least one significant incident:
    - Incidents occurred across all event levels with a fairly uniform distribution.
    - 65% indicated their last incident was more than 2 years ago.
    - 53% indicated they were travelling at medium speed (60-100kmh) immediately prior to the incident, while 30% and 5% reported travelling "fast (100-160kmh)" or "very fast (>160kmh)", respectively.
    - Over 20% of reported incidents resulted in damage to the vehicle which was not repairable.
    - There was a statistical association between the speed immediately prior to the incident and the severity of damage to the vehicle.

- The majority of incidents involved impact with an earth bank, gully or creek (36%), a tree, stump or power pole (29%) or a roll-over (30%), with frontal impacts (42%) and side impact (40%) dominating (Table 1).
- 19% of respondents indicated that the incident resulted in injury to at least one crew member, and there was a significant association between the speed immediately prior to the incident and whether an injury occurred.
- There was no apparent difference in the proportion of incidents resulting in injury according to vehicle age.
- Approximately 22% of injuries required either no medical attention or attention by the event first aid or medical team only.
- 36% of injuries were severe enough to warrant admission to hospital; injuries sustained in international or national events were 4 times more likely to result in hospital admission compared to state, multi-club or club event. Speed prior to incident, impact object, impact direction and road surface were not important factors for predicting hospital admission.
- Spinal and neck injuries were the most frequently reported types of injuries.
- 47% of respondents specified team error as the most important factor contributing to the incident.

Table 1. Incident details for object first impacted and direction of impact.

	Direction/type of impact				**Total**	% Resulting in injury
	Frontal	Rear	Side	Other		
Impacted with tree, stump or power pole	78	9	45	4	**136**	23.5
Impacted with earth bank, gully or creek	78	16	63	14	**171**	18.8
Impacted with Armco	2	0	4	0	**6**	16.7
Impacted with gate or fence or signpost	5	1	7	0	**13**	15.3
Roll-over	34		66	33	**142**	14.9
Fire	3	0	3	1	**7**	14.3
Total	**200**	**35**	**188**	**52**	**475**	
% Resulting in injury	21.1	5.7	17.6	23.1		

The frequency of significant incidents self-reported as part of the online survey of competitors far exceeded the number of incidents reported to CAMS:

- 142 competitors indicated they had had what they considered a significant incident within the last two years compared to 26 and 29 CAMS reported incidents in 2013 and 2012, respectively.

As a result of the poor quality data available on individual incidents, the obvious bias in reporting of incidents and lack of specific details on incident type and crew experience, it is not possible to reliably or comprehensively establish trends over time in rally incidents to the level of detail requested in the review terms of reference, or to glean maximum benefit for best outcomes. Further, it has been difficult to establish incident detail from the lower levels of

the sport. Several key stakeholders raised their desire to see the sport better grasp the opportunity for information in serious incidents where fatality or serious injury did not necessarily occur.

The failure to receive **any** incident reports (despite requests to a large number of event), from event organisers approached during 2014 highlights a potential systemic or cultural problem with obtaining reliable data on rally incidents.

RALLY FATALITIES

INTRODUCTION

A review of the data available for rally fatalities was conducted to investigate trends over time and the characteristics associated with the incident leading to the death. All data was obtained from CAMS in the form of incident reports. The confidential and privileged CAMS Investigative Reports for nine of the fatal incidents were also made available. These reports were reviewed by AIMSS staff and key points summarised in an effort to identify any emerging patterns.

SUMMARY AND KEY FINDINGS

Between 1990 and December 2013 there have been 21 competition related deaths during CAMS sanctioned rally events. These deaths arose from 18 independent incidents; 15 resulted in single fatalities and 3 caused the death of both the driver and co-driver/navigator.

Of the 21 deaths, 11 were of the driver of the vehicle, 8 were the co-driver, and the role was unspecified for the remaining 2 individuals.

The number of fatalities per year has remained relatively constant since 1990, with no more than 2 fatalities in any one year (Figure 3). The only notable change has been in the type of event at which fatalities occurred. Prior to 2004 the majority of deaths occurred during gravel rallies. Since 2004, all deaths except one have occurred at tarmac events (Figure 4).

Ideally the number of fatalities should be normalised by the number of events conducted each year, especially as there may be changes in the ratio of the number of gravel to tarmac rallies which explain the observed in pattern of fatalities. However this data was not available to this review.

The long-term expected number of fatalities per year is 0.99, arising from an average of 0.95 fatal incidents. It is expected that in any year there is a 37% chance of having no fatality, 37% chance of having one death, 18% chance of having 2 deaths, and 8% chance of having 3 or more deaths[1].

[1] Probability of fatalities calculated assuming a Poisson distribution which is a discrete probability distribution that expresses the probability of a given number of events occurring during a fixed interval or time and/or space.

Figure 3. Number of rally fatalities by year (1990-2013).

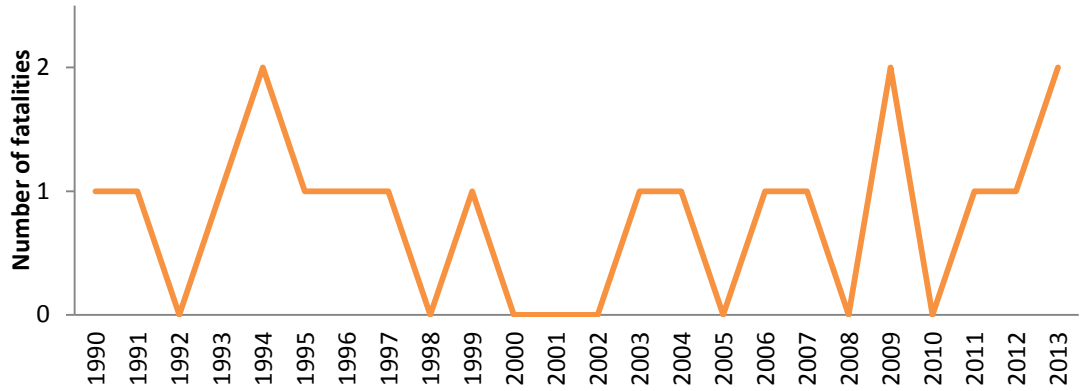
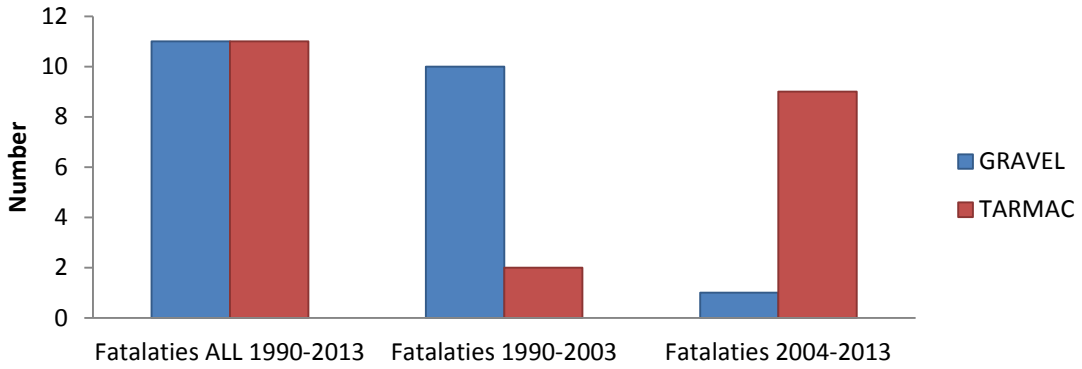


Figure 4. Number of rally fatalities according to type of rally.



Two thirds of all the 21 rally competition fatalities resulted from side-impact, from a variety of angles, and most commonly with a tree. Four deaths resulted from frontal impacts, one from a fire and one from a rollover.

Detailed reports were available for the last 9 incidents resulting in fatalities (2004-2013). Key findings for these incidents were:

- All of these incidents except one occurred at tarmac events. The age and experience of the crews was varied, however the large majority of the crews had prior competition experience. The mean age of drivers and co-drivers was 52 and 38 years, respectively. The incidents involved six different makes of vehicle.
- Three of the nine (33%) incidents occurred on either the first or second stage of Day **1** of the rally. In four of the nine incidents the crew had a note or caution in their safety notes at the location where the incident occurred; two had an instruction included in the road book at the incident location.
- Estimated speeds immediately prior to the incident were available for five incidents. Three incidents were reported to occur at speeds between 180 and 200 kph, while the remaining two occurred at lower speeds of 90 and 100 kph**.** The two incidents that occurred at estimated speeds of 190 and 200 kph occurred on the first or second stage of the rally.
- Fatal incidents most often occurred at a bend (4/9)**,** or a crest (2/9), or a crest/bend combination (2/9). Almost all incidents (8/9) involved impact with trees, with side-impact occurring in six of the nine incidents.

The frequency of side-impact in fatal incidents was higher than the corresponding frequency in either the CAMS incident reports or the competitor self-reported incident survey, suggesting a vulnerability of the crew in these types

of impacts. The cause of death of crew in the nine analysed fatalities was either severe head injury or internal injuries; head impact with either the roll cage or intrusion of the tree into the crew compartment occurred in seven of the nine incidents.

SPEED IN RALLYING

INTRODUCTION AND METHODOLOGY

As part of this rally review there was a desire to obtain data related to vehicle speeds during gravel and tarmac events. There is a general perception that tarmac rallies are faster than gravel events, and that vehicle speeds are increasing over time.

To investigate this aspect of competition, data were obtained from ARCom for events in the Australian Rally Championship (ARC) and the published stage results of Targa Australia Championship (TAC) for years 2011 to 2014. To calculate average speed, the stage distance was divided by the time taken. For Targa events it is important to note that the published time taken may represent the actual time or the "base time[2]", dependent on whether a competitor's real time was above or below the target time, respectively. The analysis of speed focused on the following parameters;

1) **Highest Average Speed** - the highest average speed obtained by a competitor on a stage for the relevant event.
2) **Event Average Speed** - the mean of the highest average speeds achieved for every timed stage of an event.
3) **Top 15 Average Speed** – derived from averaging all the stage speeds from an event across the fastest 15 competitors

It is important to note that vehicle average speed only represents the average speed of the vehicle traversing the entire special stage. Within a stage there are likely sections where vehicle speed will be considerably higher or lower than the average. As such average speed has no bearing or representation of maximum speed. There are also a variety of alternate statistics which could be used to describe average speed (eg median speed). Any value which is adopted to represent average speed is subject to methodological limitations, the most dominant being the skewed distribution of speed across competitors and variability in competitor composition between different events. To address this problem, the Top 15 Average Speed was selected as the statistic of choice in this report as it is expected that the composition of the top 15 competitors would be fairly consistent across the Championships, thus providing some robustness to the measure.

It should be noted that references in this document to "average speed" only refers to speeds in competition stages and **not** the overall distance of the event, which would include transport sections.

A number of rally categories stipulate the recommended maximum average stage speed in their regulations. For instance Article 5.5 of the CAMS Tarmac Rally Standing Regulations states: "AVERAGE SPEED: Course design should take into account the principle that no stage on a tarmac rally should exceed 132kph in average speed." New Zealand has similar regulations which relate to all rallies:

"***Motor Sport New Zealand Schedule R, All Rallies*** *– The maximum achievable average speed over a special stage will not exceed 132kph."*

[2] The base time is a pre-established time set by organisers for each stage. Penalty time is applied when a competitor exceeds the base time, and no advantage or penalty is applied for being under the base time.

The FIA also applied a top average speed of 132 km/h (120kph ± 10%) until a change in regulations in 2007. Australia followed the FIA lead by removing similar speed restrictions for gravel rallies, which are now not part of their documented regulations.

The 2015 CAMS Rally Code – Tarmac Standing Regulations 5.5 are prescriptive about not only the maximum average speed, but also action which should be taken when the average speed regulation not be adhered to:

> *If the maximum permitted average speed in a tarmac rally stage is exceeded, then that stage will not be approved for inclusion in the event the following year unless some measure has been taken that would likely result in the reduction of the average speed of any competing car to below the maximum allowed.*
>
> *ARCom flags that, in the future, penalties may apply or stages will need to be cancelled for the purpose of competition, if the average speed limit be exceeded.*

It is noted that Targa Australia events do not use or enforce Tarmac Rally Standing Regulations and as such do not administer or enforce speed restriction or average stage speeds.

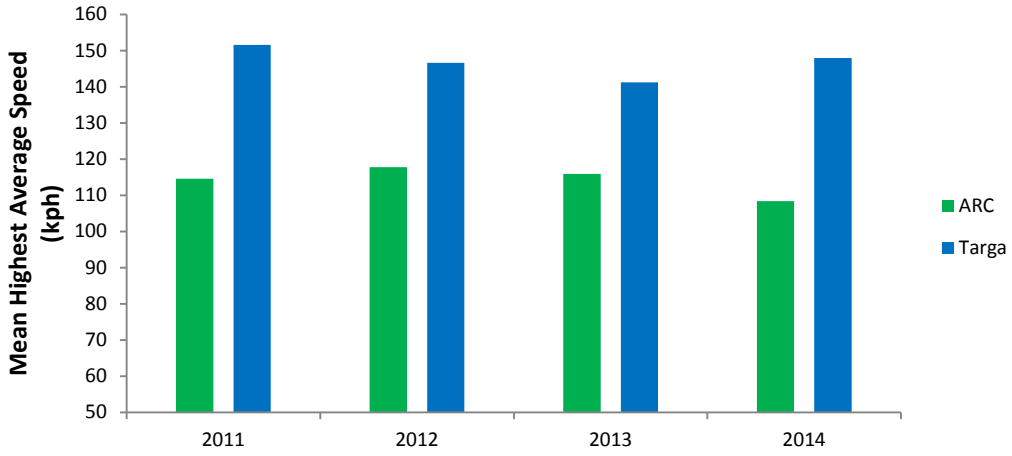
For this analysis the review chose to use the recognised 132kph average speed limit to demonstrate the variation and magnitude when analysing the speed data.

SUMMARY AND KEY FINDINGS – GRAVEL VERSUS TARMAC

Given the similar safety considerations across rallying more generally, the review panel wanted to examine the magnitude of difference in highest average speed between gravel rallying at ARC level and the tarmac Targa Australia Championship, averaged over the season.

Figure 5 shows the comparison of the highest speeds averaged from all events included each year for the Australian Rally Championship (ARC) representing gravel rallies and Targa Australia Championship (Targa) representing Targa rallies. Targa events had a higher average speed than gravel rallies, somewhat expected considering the performance advantage of the more powerful cars and surface grip for tarmac. The average speed difference between ARC and Targa was 32.6kph higher for Targa events, with 2014 recording the highest speed difference of 39.5kph.

Figure 5. Mean of the Highest Average Speeds for each year calculated for gravel (ARC) and tarmac (Targa) events.



TARGA AUSTRALIA AVERAGE SPEEDS FOR MODERN CLASS COMPETITORS

Stage times from Modern Class competitors were analysed to further understand average speed trends in tarmac events, and compare them to the CAMS regulated 132km maximum. Four events, Targa Wrest Point, Targa Tasmania, Targa High Country and Targa Adelaide, were selected as they have been part of the current Targa Australia Championship from 2011 to 2014 with the exception of Targa Adelaide, which did not take place in 2014.

Stage times for the highest placed competitor from the Modern class were used to determine the highest average speed of the vehicle over the duration of the stage. Stages known to be affected by wet or intermittently wet conditions were excluded from the data set.

All targa events analysed had at least one modern class competitor exceed the average of 132 kph (Figure 6). Targa Tasmania 2011 and Targa High Country 2013 both recorded the highest average speed of 154.7kph, followed by Targa Tasmania 2013 with 154.5kph. Targa Wrest Point recorded the lowest average speed of 137.5kph.

The event average speed was lower than the highest average speed, with Targa Wrest Point 2011 recording the highest average speed of 137.2kph**,** closely followed by Targa Adelaide 2012 (132.5kph) (Figure 7). It should be noted that Targa Adelaide 2013, which recorded the lowest average speed of 116.8kph was affected by wet weather conditions, with only 2 dry stages included in the analysis, and the 2011 event did not have a Modern Class.

Figure 6. Highest Average Speed for a competitor in the Modern Class in selected Targa events (2011-2014).

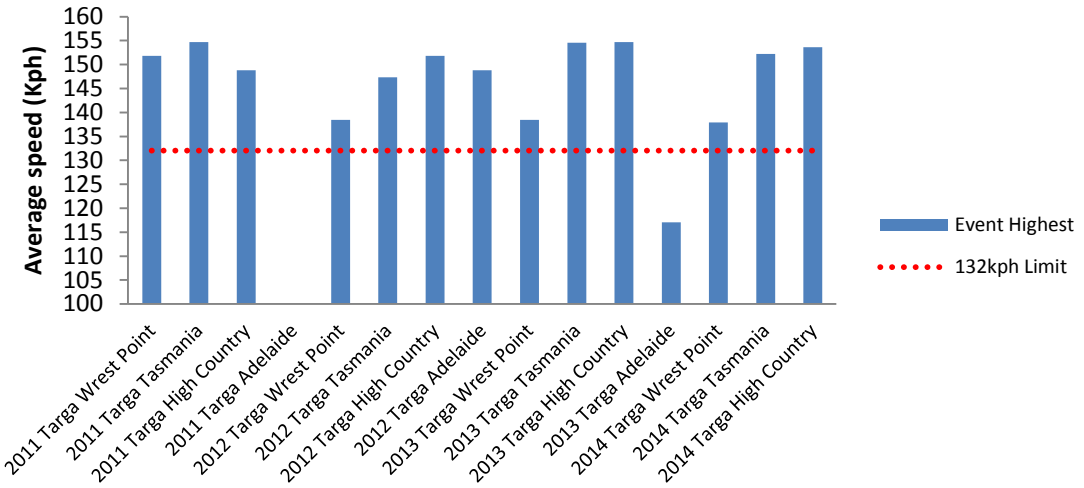
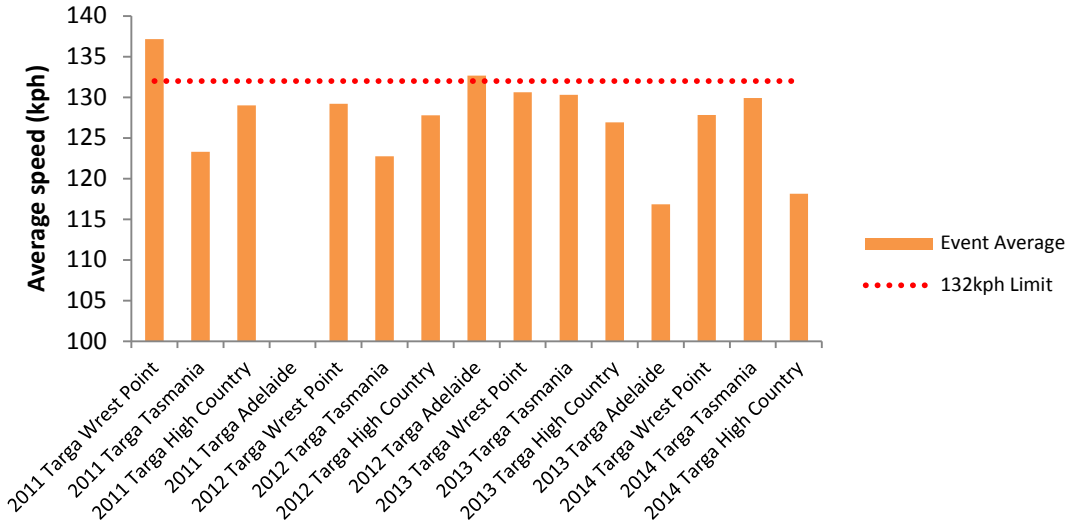
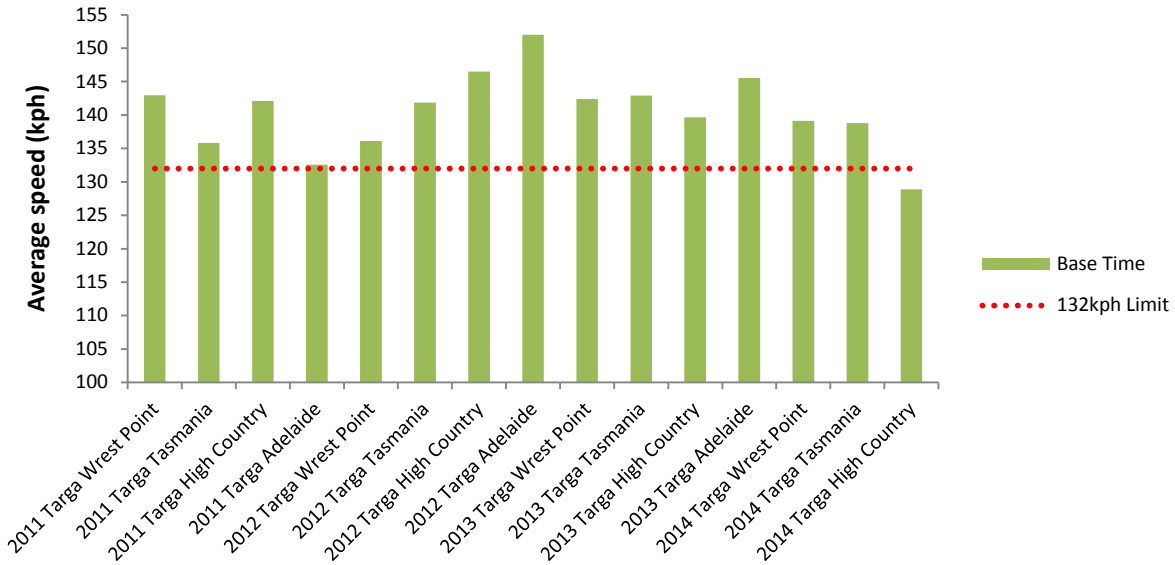


Figure 7. Event Average Speed for the Modern Class in selected Targa events (2011-2014).



As mentioned above, there are regulations for Tarmac Rally which state that no stage on a tarmac rally should exceed 132kph in average speed. The philosophy of a Targa rally is to obtain the lowest penalty score, where penalty points are obtained for each second a competitor is over the organiser-nominated base time. Competitors who complete the stage quicker than the base time receive 0 penalty points, and there is no advantage obtained for the amount a competitor is under the base time. This suggests the base time nominated by the organisers is an important aspect of Targa events, not only in deciding the event winner, but also potentially influencing the behaviour of drivers. Figure 8 displays the average speed required in the nominated Targa events to achieve zero penalty points (ie meet the base time). Targa Adelaide 2012 demonstrated the highest average speed, exceeding 150 kph, averaged across all competition stages.

Figure 8. Average speed required to meet the base times for selected Targa events (2011-2014).

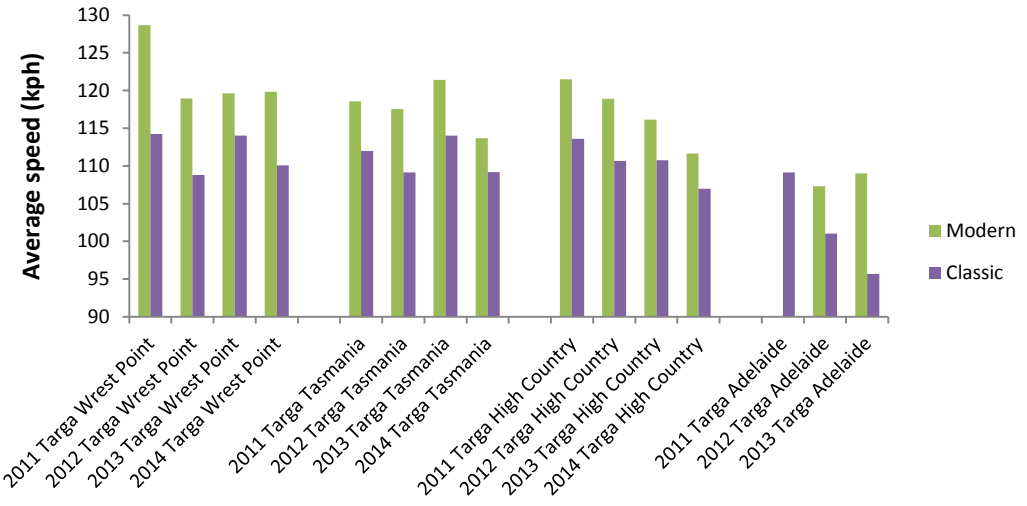


TARGA AUSTRALIA EVENT AVERAGE SPEEDS FOR MODERN VERSUS CLASSIC COMPETITORS

Event results for the top fifteen placed Modern Class and Classic Outright Class competitors from the Targa Australia website were compiled and analysed to understand the speeds and trends during four Australian Targa rallies from 2011 to 2014 (Figure 9). It should be noted that Targa Adelaide 2013 was affected by wet weather conditions, with only 2 dry stages included in the analysis, and there was no Modern Class in 2011 at this event.

There was a dramatic drop in the average speed of Modern Class competitors between the 2011 and 2012 Targa Wrest Point events, with little change thereafter (Figure 9). No similar change was observed for Classic competitors. There is no evidence of increasing speeds in either the Modern or Classic classes. Targa High Country has shown a consistent decline in average speed between 2011 and 2014 for both the Modern and Classic competitors, indicative of changes in course design.

Figure 9. Comparison of event average speeds for top 15 placed competitors in Modern Class and Classic Class for four Australian Targa events.



Comment by the Review Panel

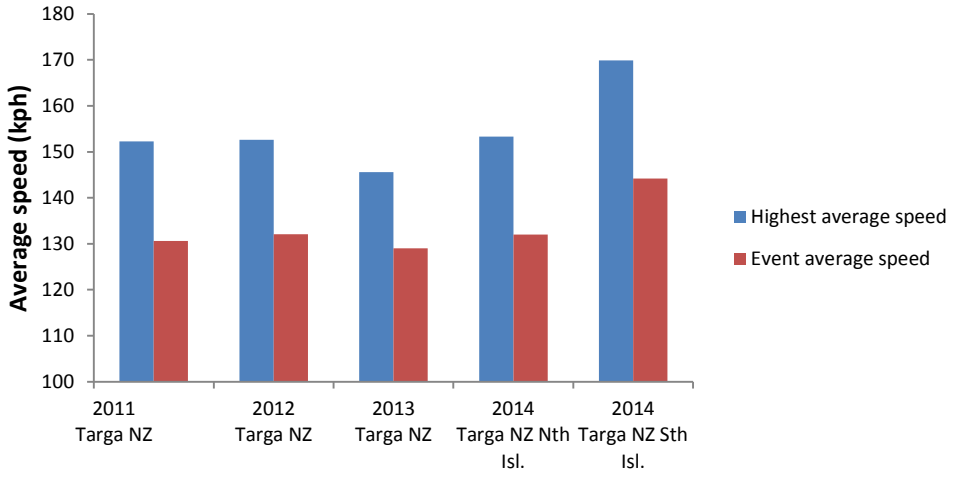
The relative impact or influence on individual competitors vehicle speeds, associated with the Zero times applied by the events, is not fully understood. However stages which have such a high mathematical average speed of **196 kph** including actual average speeds attained of **154 kph** on public roads should raise concerns as to their suitability for a Targa stage, considering the increased risk of losing control of the vehicle and potential serious accident and injury at such very high speeds.

Whilst averaging speed across many competitors paints a more palatable picture, it can be seen that event organisers who may not be bound by tarmac rally standing regulations or may choose to avoid the important speed management aspects within, including setting unachievable Zero times, thus allowing high average speeds well above the regulated 132kph, and potentially propagating the risk around this issue by publishing results.

TARGA NEW ZEALAND HIGHEST AVERAGE SPEEDS

The highest average speeds for a stage and average across all stages are displayed in Figure 10. Targa South Island 2014 recorded the highest stage average speed of 169.9kph and also the highest average highest speed (144.2 kph).

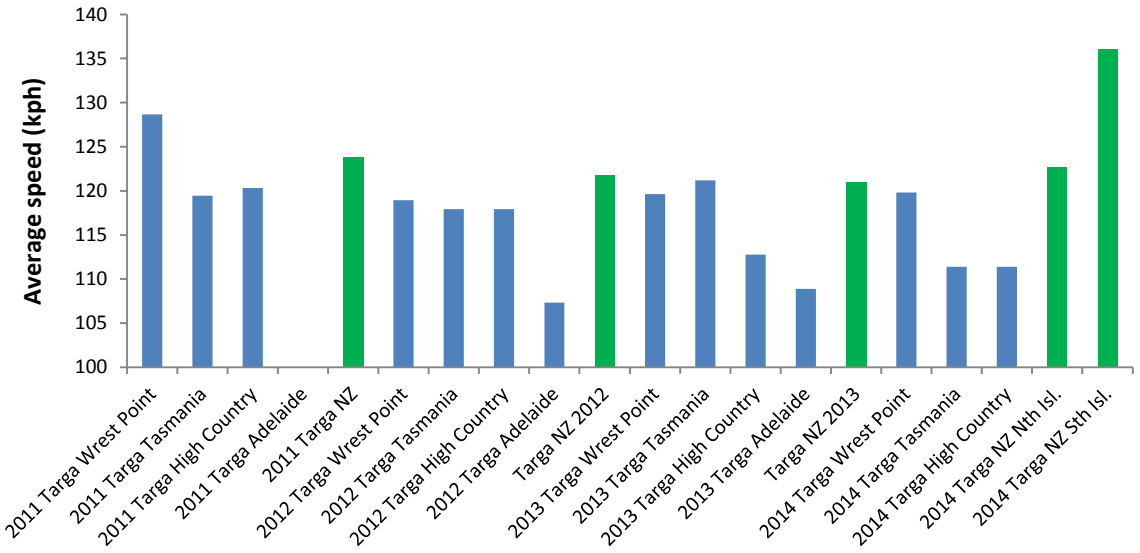
Figure 10. Highest average speed and event average speed of competitors in Targa New Zealand events (2011-2014)



AUSTRALIA AND NEW ZEALAND AVERAGE SPEED COMPARISON FOR TOP 15 COMPETITORS

The event average speeds for the top 15 competitors in targa events conducted in Australia and New Zealand are displayed in Figure 11. When interpreting the data it is important to acknowledge that Targa New Zealand the does not have a Modern Category so the data relates to all classes. Also Targa Adelaide 2011 did not have a Modern Class so has been excluded from the analysis so as to not distort the results. Overall, the Australian targa events typically have slower average speeds than Targa New Zealand.

Figure 11. Average speeds of fastest 15 competitors in Targa events in Australia and New Zealand (2011-2014)



COMPARISON OF TARGA EVENTS IN AUSTRALIA AND NEW ZEALAND

There are some fundamental differences in the way Targa events in Australia and New Zealand are conducted.

Firstly, Targa New Zealand imposes an event maximum speed limit of 200kph and a stage maximum average speed of 135kph. As mentioned previously, Targa events in Australia do not run under the CAMS Tarmac Rally regulations and as such do not have a prescribed maximum terminal or average speed.

The second point of difference is that in Targa New Zealand pace notes and reconnaissance are not permitted, with event organisers issuing a 'Road Book' which must conform with the standard road book detailed in Schedule R1 of the Motor Sport New Zealand Manual. In Australia, event organisers issue a road book, but pace notes and reconnaissance is routinely permitted, and the purchase of pace notes from rally businesses (Smoothline) or other competitor notes (with the previous year/s competition experience for a specific event) is encouraged.

Finally in New Zealand competitor's stage times, plus penalties, are used to determine a competitor's position/place in the competition. Targa New Zealand does not use a base time system as used in Australia.

The Targa New Zealand website boasts zero fatalities in its 20 years of operation. Given the average speed data presented in Figure 11, it is clear that this safety record is not due to the stages being slower than those in Australia. Other factors which may contribute to the difference in rate of fatalities between Australia and New Zealand include:

- Overall measure of 'competitors at risk'. A combined measure which captures the number of competitors, number of competitor kilometres travelled and number of events is required to better quantify the difference in risk of fatality.
- Differences in landscape/terrain which could contribute to the outcome of accidents, particularly the presence of large immovable objects in runoff areas.
- Differences in how events are conducted, specifically the imposition of a maximum speed limit in New Zealand, the setting of sometimes unachievable base times in Australia, and the use of a road book versus pace notes.

The Review Panel believes further study into these differences may be beneficial to investigate reasons why Targa New Zealand has had no fatalities compared to Australia's many.

SUMMARY AND KEY FINDINGS – GRAVEL EVENTS

AUSTRALIAN RALLY CHAMPIONSHIP AVERAGE SPEEDS

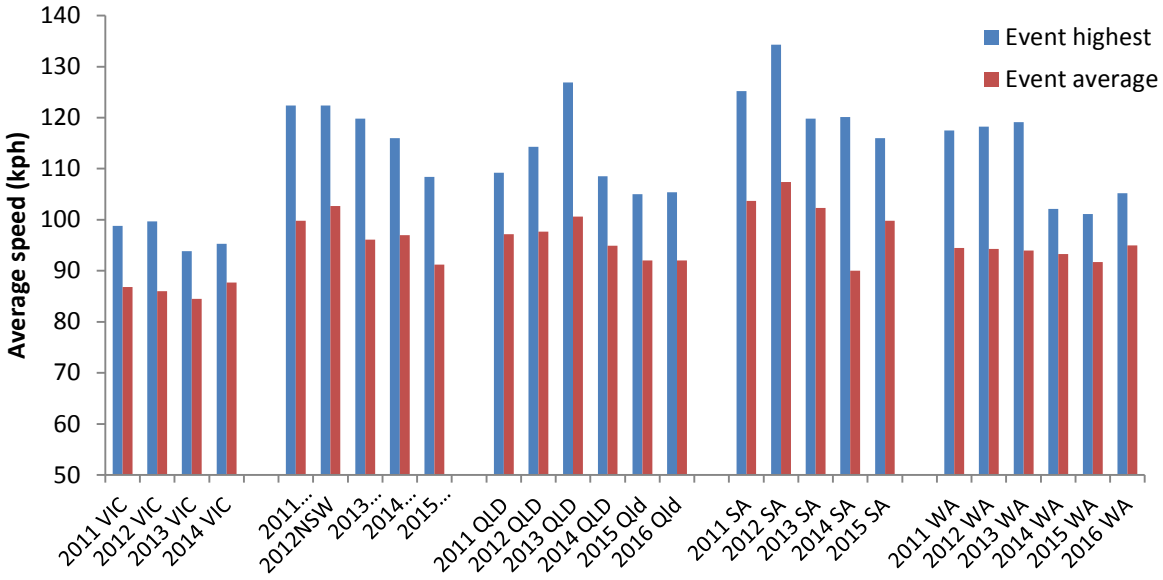
Event results provided for the review by ARCom for the Australian Rally Championship (ARC) were compiled and analysed to understand what type of speeds are experienced during ARC stages. The ARC consists of multiple events held each year, in various States of Australia. Annual data for was available for the states of Vic, NSW, Qld, SA and WA, which provided a sample of 20 separate ARC events over the four years 2011 to 2014. Additional data for 2015 and 2016 for selected events was also obtained.

Australian Rally Championship is regulated via the National Rally Code and ARC Sporting and Technical Regulations. Reconnaissance and the development of Safety Notes or Pace Notes are encouraged. Event organisers issue competitors "Route Instructions" (Road Book) which must conform to minimum standards detailed in code.

Accident records provided by CAMS to the Rally Review indicate one fatality associated with gravel type rally events since 2004, occurring in 2013 International Rally of Queensland a round of the ARC.

Figure 12 displays the highest average speed achieved by a competitor in any stage for each of the five selected ARC event for years 2011 to 2016. The 2012 Scouts Rally in South Australia recorded the highest average speed of 134.3 kph, followed by Queensland in 2013 with 126.9kph. Victoria recorded the lowest average speeds with all four of the Victorian events having highest average speeds under 100kph. Event average speeds showed a similar pattern to the event highest average speeds (Figure 12). It should be noted that the trends in average speeds displayed in Figure 12 are influenced by a range of factors such as changes in course design, weather conditions and vehicle regulations.

Figure 12. Event highest average speeds for selected rounds of the Australian Rally Championship (2011-2016).



One of the disadvantages with using average speed is that it provides no indication of the maximum speeds obtained on stages. The use of RallySafe, a GPS tracking system, provides additional information such as the maximum speed obtained by competitors to help fill this information gap. A sample of data from two ARC events in 2016 indicates that while the highest stage average speeds were lower than 115 kph, the maximum speeds obtained during the stages approached 200 kph (Table 2). It was impossible from the data provided to determine how long competitors were actually at these speeds.

Table 2. Average and maximum speeds on stages for 2 ARC events in 2016. Super special stages have been excluded from the analysis.

	Minimum and maximum values for maximum average speeds of stages (kph)	Minimum and maximum values for maximum speeds obtained on stages (kph)
2016 National Capital Rally (ACT)	91.2 – 112.5	155.1 – 195.3
2016 International Rally of Queensland (Qld)	84.1 – 105.4	159.9 – 199.6

WRC V ARC HIGHEST AVERAGED SPEEDS

Given all domestic gravel rally categories sit beneath the Australian Rally Championship (ARC), the review sought to understand from a speed perspective where the ARC sat relative to its 'parent' the WRC. Table 3 lists the highest average speed achieved by a single competitor over any stage of randomly selected events from the 2014 WRC and all six rounds of the 2014 ARC, along with the average of the highest recorded average speeds for each stage. Rally Poland recorded the highest average speed on any stage of 136.9 kph. This event also recorded the highest average across the entire event. The combined highest average speed in the six WRC events was 114.8 kph, compared to 107.6 kph for the ARC events.

Table 3. Maximum and average speeds from randomly selected events in the World Championship and the Australian Rally Championship

	Highest average speed (kph)	
	Maximum	**Average**
Monte Carl Rally	101.44	88.72
Rally Poland	136.88	123.45
Rally Mexico	103.99	72.57
Rally France	125.21	110.04
Rally Wales	104.21	98.15
Rally Australia	117.07	98.15
ARC - ACT	103.40	89.20
ARC - Victoria	95.30	87.70
ARC - NSW	116.00	97.00
ARC - Qld	108.50	94.90
ARC - SA	120.10	90.00
ARC - WA	102.16	93.30
Average for WRC events	114.80	98.51
Average for ARC events	107.58	92.02

AVERAGE SPEED COMPARISON - CIRCUIT RACING VERSUS RALLY

The purpose of this speed comparison is to demonstrate fastest lap average speed for a number of circuit racing categories compared to the Australian Rally Championship and Targa Australia.

Safety systems and design integrated into modern motor sport venues have significantly reduced the incidence of serious and fatal injuries from racing accidents at these types of venues. In significant contrast rally courses often traverse remote and changing road conditions lined with trees, power poles, culverts, earth banks and cliffs.

Figure 13, Figure 14 and Figure 15 indicate that Targa based rallies experience high average speeds, comparable to, or exceeding, the average speeds of similar vehicles competing in, Australian GT Championship and Carrera Cup Australia, but without the benefit of the circuit safety systems.

Figure 13. Average speeds of fastest lap for selected vehicle categories at the Australian Grand Prix Circuit Albert Park Melbourne, compared to the overall average stage speeds for the 2014 ARC and Targa Australia.

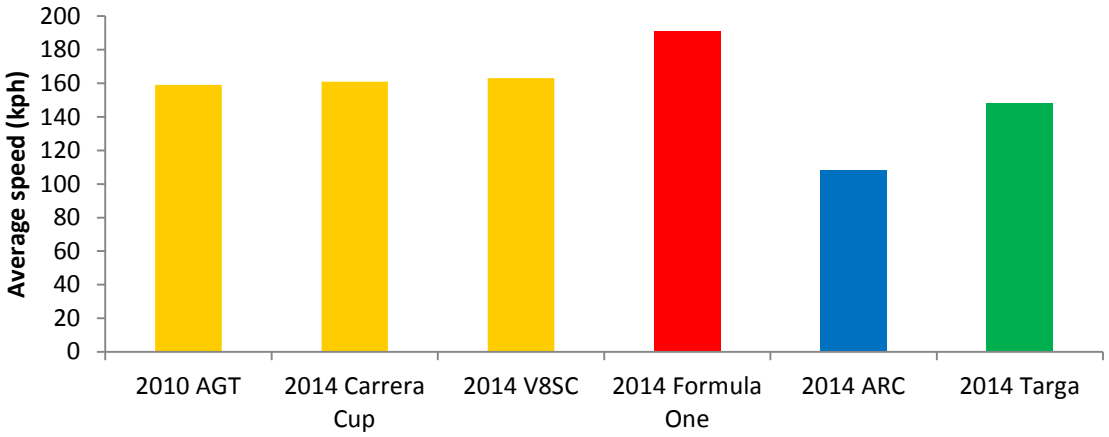


Figure 14. Average speeds of fastest lap for selected vehicle categories at Sydney Motorsport Park, Eastern Creek Sydney, compared to the overall average stage speeds for the 2014 ARC and Targa Australia.

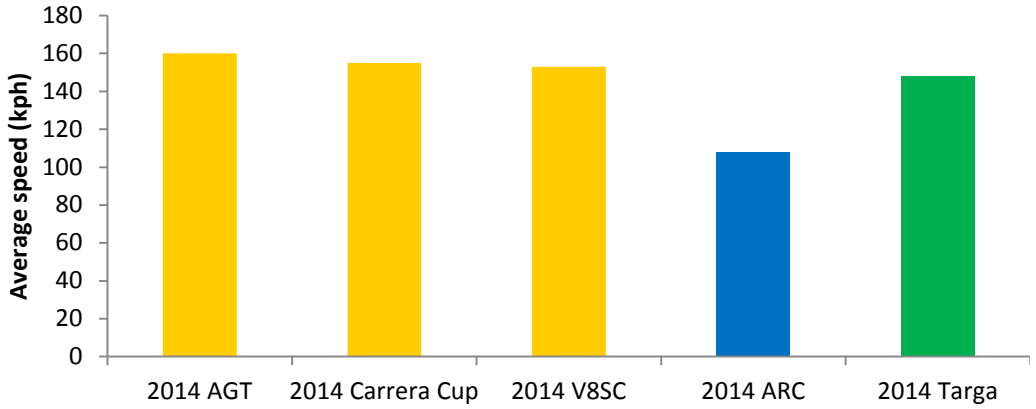
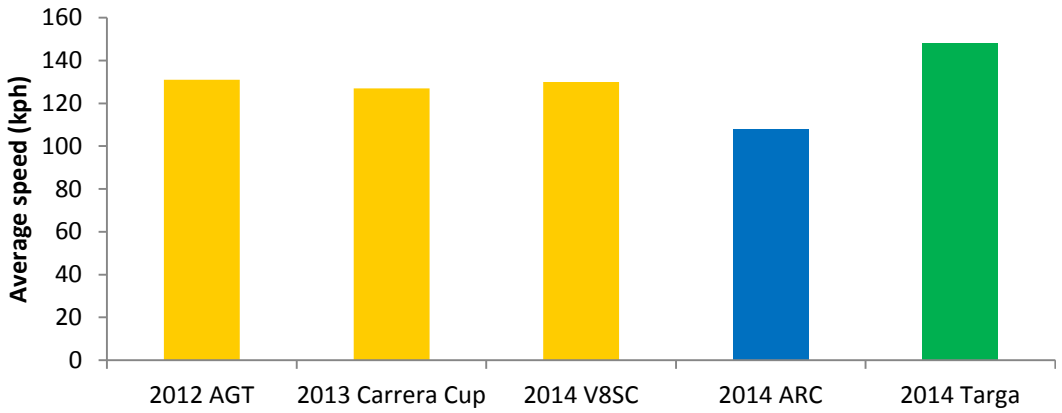


Figure 15. Average speeds of fastest lap for selected vehicle categories at Winton Motor Raceway, compared to the overall average stage speeds for the 2014 ARC and Targa Australia.



OVERALL SUMMARY AND KEY FINDINGS ON SPEED IN RALLYING

The results presented above indicate that:

- Overall the 321 stages forming part of the ARC between 2011 and 2014 had average speeds that varied between 55.5 kph and 134.3 kph.
- The majority (51.4%) of ARC stages had average speeds between 80 and 100 kph, while 11.2% were slower than 80 kph and 37.4% were faster than 100 kph.
- Only two ARC stages (0.6%) recorded average speeds of 132 kph or over, both occurring at the same event. Since 2013 there has been an overall decrease in the average speeds of most ARC events.

Over this same time period (2011-14) 244 stages were contested as part of the Targa Australia Championship with average speeds ranging from 45.4 kph to 154.7 kph for modern vehicles. However these averages may be misleading for stages where the fastest competitor 'cleaned' the stage. When this occurred, the time recorded was not that actual time to complete the stage, but rather the base time. Hence the true average speed would exceed that reported.

The percentage of Targa Australia stages on individual events that had a base time requiring an average speed of >132 kph ranged from 33.3% to 92.0% (average 68.5%). There was little change in these values over time, with the exception of Targa High Country and Targa Wrest Point which both had a lower percentage in 2014 compared to earlier years. Of the stages with a zero time requiring an average speed >132 kph, 7.5% were cleaned by the fastest competitor. The average length of stages with an average speed >132 kph was 14.8 km (range 4.6 km to 58.6 km). In 10 of the 14 events considered (71%) the first stage of the event had an average speed >132 kph. For the remaining four events, the second (1) or third (3) stages were the first occurrence of average speeds >132 kph. Thus in all events, stages with average speeds > 132 kph featured early in the event.

A comparison of Targa Australia Championship fastest average speeds was with made with fastest average speeds in Targa NZ over the same time period. Targa NZ had 38%, 47% and 40% of stages with average speeds >132 kph in the 2011, 2012 and 2013 events, respectively. In all Targa NZ events since 2012 the first stage of the event has returned an average speed > 132 kph. Thus the TAC events show patterns consistent with a similar style of event conducted in New Zealand.

SURVEY - COMPETITOR ATTITUDES TO SAFETY

INTRODUCTION

As part of the review AIMSS developed an online survey to capture the views of primarily past and present competitors' with regards to safety and safety regulations within the sport, as well as other information such as demographics, recent accident and injury history, use of frontal head restraints and perceived barriers to increased safety (Appendix 6). Invitations to participate in the survey were sent to all CAMS rally license holders by CAMS via email. The self-administered survey was conducted between 20th May and 9th June 2014. A total of 648 respondents participated in the survey, although not all answered every question.

SUMMARY AND KEY FINDINGS

Respondents were predominantly male, aged 31 to 64 years, with representation from all states of Australia; 94% of respondents were either current or past competitors (with intention of competing again in the next 5 years). Over 90% of respondents have competed in at least five events and 63% had competed within the past 6 months.

Respondents represented the spectrum of competitors with 28%, 45% and 27% competing in predominantly national/international, state and club/multi-club events, respectively (Figure 16). Likewise, both tarmac and gravel competitors responded; 53% competed only in gravel events, 23% competed only in tarmac events and 24% competing in a combination gravel and tarmac events. There was a clear trend towards tarmac rallies in older respondents (Figure 17).

Figure 16. Distribution of survey respondents according to level of competition and recent rally experience.

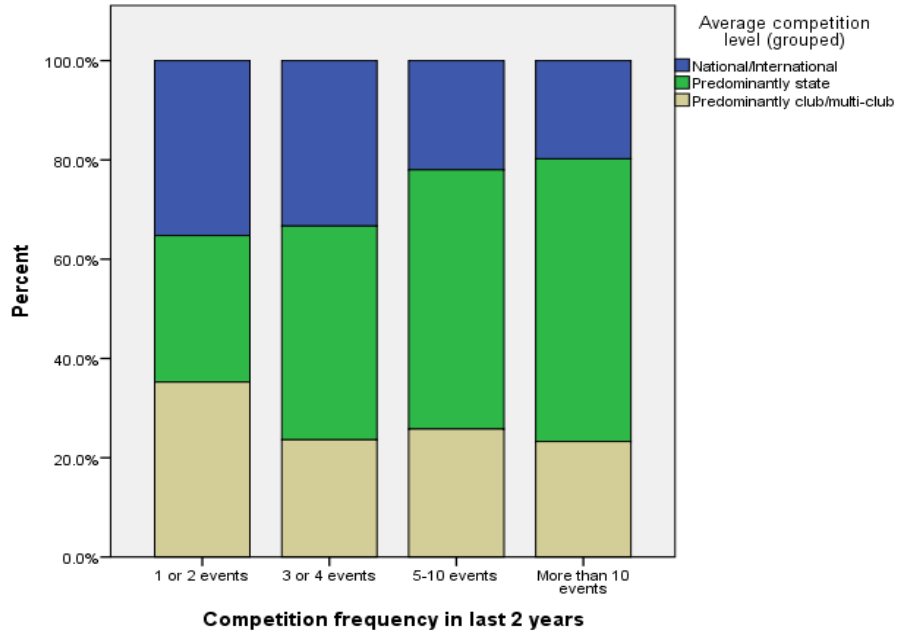
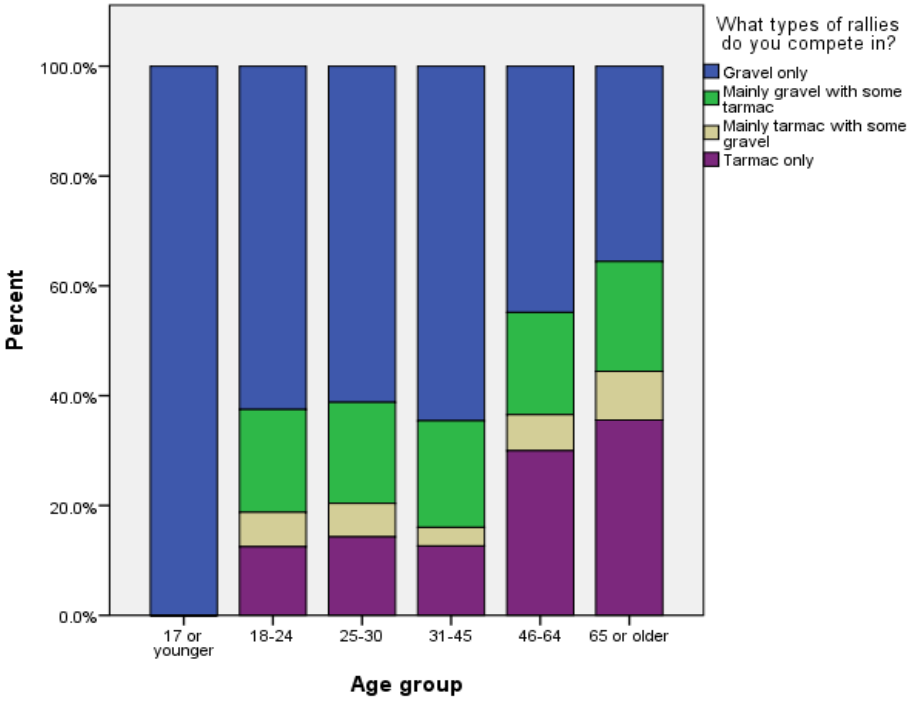


Figure 17. Distribution of rally competitors according to age and type of rallies.



Respondents were asked to rate their level of agreement on a 5-point Likert Scale to 15 statements related to rally events and safety. Seven statements elicited a clear dominant or majority opinion. The majority of respondents agreed that:

- current events provide a good mix of conditions, speeds and road types (85% agreement),
- when it comes to safety, it is the competitors responsibility to keep up-to-date with new technology (81% agreement),
- organisers should use course warning boards to indicate hazards, even in pact-noted events (81% agreement),
- CAMS should be more pro-active informing competitors of advances in safety equipment (65% agreement),
- competitor safety standards in Australia are good and don't require upgrading (56% agreement),
- in events allowing safety notes, reconnaissance should be compulsory (59% agreement), and
- every competitor should have first aid training and be competent at using the items in the first aid kit (54% agreement).

The remaining eight statements elicited mixed opinions from respondents, with differences noted between different competitor groups:

- 43% disagreed with the statement "I prefer fast roads over slower, twisty roads", while 16% agreed. The highest disagreement rates occurred within the tarmac competitors (52%, n=135) and competitors of international/national events (50%, n=137). The highest rates of agreement occurred in respondents who competed in a combination of gravel and tarmac events (21%, n=137).
- 50% disagreed with the statement "Many of the roads used in current events are too fast", while 21% agreed. The highest rate of agreement was from the 22 non-competitors (50%), then tarmac competitors (37%, n=134). Gravel competitors and club / multi-club competitors had the lowest rates of agreement at 20% (n=295) and 19% (n=125), respectively.
- 58% disagreed with the statement "Limiting the maximum permitted average speed for rally stages will improve safety", while 25% agreed. Non-competitors (n=20) and club/multi-club competitors (n=126) had the lowest rates of disagreement, 45% and 52% respectively. The lowest rate of agreement was 21% (n=130) in the least experienced competitor group (those who had done 10 events or less).
- 55% disagreed with the statement "Limiting the maximum terminal speed of vehicles will improve safety", while 26% agreed. Competitors who had not competed within the last 5 years had the highest rate of disagreement (64%, n=25), while non-competitors had the lowest rate (38%, n=21). Differences were noted in agreement rates between gravel and tarmac competitors; 21% of the 295 gravel competitors agreed with statement compared to 36% for the 134 tarmac competitors.
- 47% disagreed with the statement "Improving competitor safety should be the highest priority for regulators, irrespective of cost", while 26% agreed with this statement. Disagreement was highest amongst competitors who had not competed for the past 5 years (67%, n=24), and also in gravel club/multi-club competitors (55%). The highest rate of agreement was in non-competitors (50%, n=22), then tarmac competitors (37%, n=137) and competitors who last competed 2-5 years ago (37%, n=35).
- 48% disagreed with the statement "In the past 2 years I have questioned the safety of some of the roads used for competition", while 30% agreed with this statement. The highest rates of agreement were from non-competitors (40%, n=20) and co-drivers (38%, n=131). Respondents who had competed in 10 events or less had the lowest rate of agreement at 22% (n=133).
- 51% disagreed with the statement that "The required vehicle safety standards for rallies should be the same across all competition levels", while 33% agreed. Gravel only competitors (n=301) had the highest rate of disagreement at 59%. There was a trend according to level of competition with club and multi-club competitors having a higher rate of disagreement than state competitors, than national or international competitors. Agreement with this statement was highest amongst the 132 tarmac competitors (53%).
- 47% disagreed with the statement that "The required personal safety equipment of rallies should be the same across all competition levels", while 40% agreed with this statement. There were large differences of

opinion between tarmac only competitors (n=135) and gravel only competitors (n=301); 66% of tarmac competitors agreed compared to 29% for gravel competitors. The highest rate of disagreement (68%) occurred in the 25 competitors who last competed more than 5 years ago and in club / multi-club competitors (62%, n=130).

FRONTAL HEAD RESTRAINTS

Past and current competitors were asked whether they use a Frontal Head Restrain (FHR) device, with 47.8% (291/609) indicating they did wear such a device and 52.2% (318/609) indicating they did not. The lowest rate of FHR device use was 21.5% (23/107) in respondents who only competed in gravel events, or events that were predominantly gravel, at club/multi-club level. Of the 318 respondents who indicated they did not use a FHR device, 114 (35.8%) listed cost as a factor, 68 (21.4%) indicated that their seats and harnesses are not compatible with use of a FHR device and 168 (52.8%) indicated that they did not use a FHR device because it was not a required safety item for the events they compete in. One-hundred and thirteen respondents listed 'other' factors that influenced their decision not to use a FHR. Within these responses, 28 respondents indicated they owned a FHR device but hadn't used it as yet, or were planning on purchasing one in the near future. There were also competitors who questioned the benefits of FHR devices in rally accidents (particularly side-impact), or commented on a) FHR devices making exit of vehicle harder in case of accident, b) problems with restricted space within some vehicles, c) problems with restricted head movement (and therefore range of vision) on road sections and d) informed personal choice.

RECCONNAISSANCE

Drivers were asked about their use of safety notes and associated reconnaissance. Approximately one quarter of drivers (24.8%, 113/456) indicated they never used safety notes, while the remaining 75.2% (343/456) used them with different approaches to note preparation and course reconnaissance. There was a stark difference between safety note preparation and use between drivers competing in gravel events compared to tarmac events. Drivers in gravel events were more likely to not use safety notes at all (35.1%), or prepare their own notes during reconnaissance (52.4%). In contrast, tarmac competitors almost exclusively used safety notes, but most (65.4%) used notes written by another person rather than creating their own. In both types of events 3-4% of drivers indicated that they used safety notes written by another person and never drove the stages prior to competition. The use of safety notes was highest in national and international events where over 95% of crews used safety notes; 18% of these drivers used notes prepared by another person but did not always drive the route prior to competition.

OPEN ENDED COMMENTS

All survey respondents were provided the opportunity to add any additional comment or thoughts at the end of the survey. Comments from 292 respondents were assessed for their overall theme. Highlighting the need for education around implementation of safety initiatives or developments, the two most prevalent themes in the open-ended comments were:

1) that safety equipment costs were too high for grass roots competitors and;

2) concern that the sport of rally has been damaged by too much red tape.

KEY STAKEHOLDER COMMENTS

INTRODUCTION

In addition to ARCom, various stakeholders (29) were invited or contacted by AIMSS to submit their comments about safety in rallying.

The stakeholders approached included;

- ARCom
- Highly experienced competitors (Tarmac and Gravel)
- Event organisers and officials
- Medical Experts
- First Response and Rescue personnel with rally experience
- Professional car builders/preparers

Because of the depth of knowledge and experience of those that contributed to this component of the review, significant consideration was given to the views and comments provided. All submissions were reviewed by AIMSS, with key points summarised and grouped according to topic. A more complete list of comments by the group is contained in Section 4, Part III of this report.

It is important to note the following is a summary of the views of the Key Stakeholders; they are not the findings, nor necessarily the views of the Review Panel.

SUMMARY AND KEY FINDINGS

Formal submissions or engagement was received from 19 stakeholders. Additionally, other stakeholders have been part of discussions that have influenced or supported findings. Comments from these stakeholders were categorised into the reviews 4 main categories:

A. The Competition vehicle

B. Competitors & Crew

C. The Rally Course & Stages

D. Event Operational/Organisational

A. THE COMPETITION VEHICLE

Comments about competition cars focused on safety cages, safety features within vehicle (frontal head restraints, winged seats and window nets), high performance vehicles and classic rally cars. Many of the views of the stakeholders were in general concert with opinions that the Review Panel had formed.

In general, stakeholders believed that existing roll cage standards were effective for frontal impact, but more needs to be done in the area of side impact/intrusion.

Concerns were raised about the use of bolt-in cages, and roll cage standards being less stringent for tarmac rallies, particularly the compromised design in expensive sports cars where there is a desire to preserve the integrity of the

dash and interior. These concerns focused on structural integrity and also ease of extrication in an accident. Suggested improvements to roll cages included:

- Double-intrusion bars being mandatory;
- A cross-bar at the base of the roll cage from one leg to another to protect against intrusion of stumps and trees;
- Better firewall and toe-pan reinforcement, and;
- Simplifying the process for competitors to augment pre-existing cages in older cars. This is a topic that has surfaced several times during the review.

Stakeholders recognised the importance of frontal head restraints (FHR) and recommended they be mandated at all levels of rallying. However they acknowledged the limited protection provided by FHR in side impacts (for which they are not designed). As such there was general agreement that winged seats may provide some protection in these accidents. Several stakeholders raised practical issues with the use of FHR and winged seats in rally including limited mobility and visibility, and restricted access for medical treatment.

Five comments were received relating to concerns about the speeds of current rally cars. The overall consensus was that there needed to be some restriction either of vehicle speed, or accessibility to high powered vehicles by inexperienced competitors.

Attention was also drawn to the classic rally car and the fact that these cars are continually increasing in speed due to improvements in transmission, suspension, tyres, brakes etc. There were concerns that the structural integrity of the vehicles was not as advanced as current vehicles, even though many competitors thought older cars were stronger.

The Australian Rally Commission has become increasingly concerned by the very high terminal speeds of some of the unrestricted 4WD turbo cars. In some instances these terminal speeds are exceeding 200kmh on gravel, which everyone agrees is just too fast.

Stakeholders also suggested that fire and entrapment remain potential areas for concern, and suggested that new developments in vehicle design to allow easier access for medical treatment could be pursued.

It was also suggested that rally look to other areas of motor sport (e.g. drag racing) where vehicle safety standards were intrinsically linked to vehicle speed as a way of ensuring safety but also catering for the low budget competitor.

A sample of Key Stakeholder comments on Competition Vehicle...

"With side intrusion being the biggest cause of severe injury in the sport we should be looking at the effect that good wing seats have in the prevention of injury"

"Vehicle engineering for protection in frontal and rollover crashes is pretty good now, although side impacts with trees without offset will remain highly lethal, and roll cages are of limited benefit"

"The Rally Commission has become increasingly concerned by the very high terminal speeds of some of the unrestricted 4WD turbo cars"

"Turbo 4WD cars are now readily available at prices that make them fun and affordable at lower ends of the competition spectrum"

"The biggest single accident type that leads to injury and death is the side impact, specifically between the A and B pillars"

"Tarmac rallies are demonstrably more dangerous than gravel rallies, yet the safety cage and vehicle regulations are less stringent"

"With side intrusion being the biggest cause of severe injury in the sport we should be looking at the effect that good winged seats have in the prevention of injury"

"Winged seats reduce the likelihood of head strikes and lateral head and neck movement in the vehicle but make access for medical treatment more difficult"

"Why is it that the FIA restrict the world's best cars and the world's best drivers to around 200kph, yet in Australia we believe it is OK to have no restriction on the cars or drivers".

B. COMPETITORS & CREW

Stakeholder comments were numerous and unanimous about competitor licencing and competency. All indicated concern that current licensing rules were too easy and there was no mechanism to prevent inexperienced or unskilled drivers from competing in high-powered cars.

It was suggested that improved training and a higher level of demonstrated competency was required and that a staged license system could be implemented in which competitors need to finish a certain number of events before they can step up to the next licence level. The vehicles able to be driven would be linked to the license level to prevent inexperienced competitors driving over-powered vehicles.

There was recognition that many competitors preferred pace-noted events, but that creating and using notes was a skill that inexperienced competitors do not have. And even if safety notes are purchased, often they are more intense than required by new competitors.

Concerns were raised about the possible danger of competitors using road cars for reconnaissance, and the fact that some competitors mistake reconnaissance for practice.

Several stakeholders highlighted the negative attitudes of competitors to improvements in safety, either through CAMS rules and regulations or event-specific regulations. However all thought these improvements were necessary and would have dramatic influence on the outcome of future incidents.

A sample of Key Stakeholder comments on Competitor & Crew...

"A few of the fatalities in the past few years have been when a driver steps up to a fast vehicle when they have had very little experience."

"Improved training and a higher level of demonstrated competency by drivers in general and also of more powerful cars could be considered. A review of how people obtain a rally license... it is simply too easy."

"A strong selling point of rallying is that anyone can compete at any level without prior experience... buy an exotic high powered car that can do 250kph and do a tarmac rally..."

"Have we come to a time when we need to start grading drivers on their experience and ability before we allow them to drive certain cars or drive the cars at their full capability?"

"Licence competency test – rally is the most dangerous but the easiest to get a licence."

"Gravel competitors are passionate, keen, applied, good car prep. Tarmac/Targa competitors are fly by night racers. Fundamental attitude and competency issue between gravel and Targa."

"There seems to be a higher incidence of lesser experienced drivers in more powerful cars on the tarmac events than in gravel."

"We have no structure in place to stop in-experienced or non proven crews driving in any vehicle at any speed the vehicle is capable of running at."

"Check out many in car footage of crews reading Pacenotes and there are varied abilities of the crew, sometimes scarily dangerous as they have no idea what they are doing"

C. RALLY STAGES & COURSE

There was general agreement that ideally rally courses should be designed to limit prolonged periods at high speed where hazards are close to the road, and avoid roads that deteriorate badly in wet weather. However this was not always practical for event organisers.

Rather, several stakeholders suggested that there was a greater need for highly experienced individuals to select roads and mark hazards to limit the "surprise" factor for drivers (e.g. sharper bend than expected, hidden rock or ditch, unexpected deviation over crest, unexpected change in available grip). The importance of highly experienced road marking crews who install course warning signage was also cited.

It was suggested that better resources or guidelines for organisers in relation to preparing an accurate road book be provided, rather than the generic literature currently available. It was also suggested that further training for course cars was warranted.

All stakeholders had favourable comments about the RallySafe system with the majority suggesting mandated use of the system at national and state events, at a minimum. It was recognised that the system can fail so it cannot replace human tracking. One competitor noted that in a stage the co-driver has very little time to watch the RallySafe monitor so there was a need to develop a way to attract the co-drivers attention when required.

There was overwhelming consensus that speeds in rally were too fast and that regulations about maximum average speeds were constantly disregarded. In the view of the stakeholders, speed was directly attributed to severity of accidents. Long technical stages were also highlighted as areas of concern. Suggestions to address the problem included:

- Re-assessing what defines a 'safe road' that can be used for rallying;
- Imposing a maximum speed limit (not average speed but actual top speed);
- Splitting long technical stages into shorter stages;
- Installing course marker boards at locations that had previously had a reasonable number of incidents, and;
- Introducing a procedure whereby stages that experience significant incidents are reviewed.

There were several negative comments about the use of chicanes to reduce maximum or average speeds. The general theme of these comments was that chicanes were often inappropriately placed to reduce average speeds, not increase safety, and that sometimes the location of the chicanes caused accidents.

It was suggested that posting stage times at the end of stages increases competitiveness, encouraging crews to take more risk.

A Sample of Key Stakeholder Comments on Rally Stages & Course...

"Rally safe – support the use of this system. Has the potential to provide solutions to some safety issues"

"Could Rallysafe be adapted for recce to provide advice/warnings that are currently included in the road books (which are used by most co-drivers for navigating from junction to junction without looking at any of the advisory notes in the road book)? This could be particularly relevant in SA with trees on exits e.g. rally safe for recce displays "Danger - next 500 metres trees close to road" or " next three corners slippery if wet" or "high accident zone next 500 metres"

"Course selection needs to include;

- *Minimising excessively fast roads*
- *Avoiding roads where trees and cliffs are very close to the road*
- *Avoiding roads that deteriorate badly or become very slippy in wet weather"*

"In my opinion there are two reasons – first and foremost it is the massive change in available grip when a vehicle gets out of shape or off-line on tarmac as compared to gravel. Hence a greater need for highly experienced road marking crews and the use of Black Spot or similar markers"

"No matter whether tarmac or gravel – the choice of which road to use for a stage should be heavily influenced by an experienced person looking for things that will surprise a driver"

"Tarmac rallying is out of control. Power and speed has been deemed more important than driving ability. This has to be addressed"

"The concept of a rally is that sustained maximum high speed is not a core attribute of the sport that adds to the enjoyment, spectacle, marketability or sporting context of the event. We should be seen to be acting to eliminate this aspect of unnecessary risk in the sport. Defining the appropriate envelope that is an acceptable level of risk is difficult and consensus is unlikely"

"Most think an average stage speed above 120kmh exceeds what they regard as demonstrating a responsible approach to event design (many think this is too high - though there will be exceptions e.g.: race circuit stages)"

"There is a need for Maximum Speed Limits to be imposed on rallying in this country. When are we going to say the cars are going fast enough and go back to deciding the winners on crew ability rather than vehicle speed? The Maximum Speed does not have to be a set speed, but can be by default of road selection or artificial barriers like chicanes"

"When we brought in the maximum speed for Rally Tasmania and Targa West about 6 years ago, the drivers were talking about 230kph maximum speeds, the talk is now over 250kph (even heard 270kph)"

D. OPERATIONAL/ORGANISATIONAL

With regards to SOS vehicle tracking, it was noted there are currently very few formal requirements. It was suggested that a standard should be set for tracking of vehicles.

It was also suggested that there be a mandated minimum level of acceptable communications at all events to resolve issues of control points not being able to communicate directly with headquarters.

Likewise the lack of requirement for medical and ambulance at state events was highlighted as an area for concern.

Stakeholders were united in the view that the sport would benefit from improved training of officials and competitors in incident response. It was suggested that:

- a standard incident response system be implemented,
- a national training system for Command Centre staff be developed,
- there be improved training, role definition and resource materials for event checkers and event safety personnel,
- a separate and consistent safety team be constructed to assist events at ARC level,
- a safety video be produced to show at drivers briefings that teaches all competitors what needs to happen upon arrival at an accident scene, and;
- the current drivers briefing be discontinued and that the crew be trained in safety requirements as part of obtaining their rally licence.

There was also strong support for establishing an incident and injury register, possibly in conjunction with New Zealand. The lack of reliable data was highlighted as a hurdle in informed decision making and continuous quality improvement.

It was suggested the information requested on the incident form needed to have obvious value and benefit to the sport otherwise it will not be completed, and the possibility of a simpler incident report form with triggers for more detail was one suggestion.

It was also noted that organisers are not advised of the findings of CAMS enquiries into fatal accidents which does not help organisers improve their practices.

Several stakeholders were critical of CAMS with respect to communication around critical incidents. Issues highlighted included lack, or significant delay, of information about incidents on official sites even though traditional media had picked up the news story, and problems with communication within the previous senior leadership within CAMS.

One stakeholder suggested that the ability of an event to continue after a critical incident should be reviewed with a specific focus of the event's ability to respond to another incident should one occur.

It was noted that rally organisation and administration was fragmented between the states. This not only effected the organisation of events, but also regulatory aspects such as rally car registration.

Several stakeholders commented about activities at a start control. It was suggested that the minimum time in control be extended to allow more time for safety checks and noting of key issues or last minute changes in the stage, and that officials should be actively checking competitor safety equipment (e.g. helmets done up, belts tight) on the start line.

One stakeholder felt that CAMS would benefit from publically defending the rights of participants to take part in motor sport with full knowledge of the risks, rather than try to present an image that all risks are managed and treat every fatality as a failure of the system.

A Sample of Key Stakeholder Comments on Organisational/Operational issues...

"The adoption of improved training, reviewing roles and responsibilities and resource materials such as manuals, for event checkers and others with responsibilities around event safety should be considered"

"Course checkers to be thoroughly trained, appointed independently and not over-ruled by event organisers"

"A better educated competitor could help to save lives, and certainly impact positively on rally safety in general"

"There is a lack of detailed data on rally related incidents involving injury making informed decision making based on hard evidence challenging"

"A system of record keeping of all serious incidents is implemented and maintained"

"Investigations are conducted into non-fatal, serious incidents – we can learn a great deal from incidents where it was miraculous a fatality did not occur"

"I believe there is interest from a number of directions in setting up an injury registry and I think this enquiry could be the catalyst for getting it up and running"

"Rally car registration systems are implemented in each state and that cars must be on the registration system to be allowed to start an event"

CAMS RALLY REGULATIONS AS COMPARED TO FIA BEST PRACTICE

INTRODUCTION

Current world's best practice for motor sport safety is predominately developed at Formula One and World Rally Championship level. The FIA play a significant role through the FIA Institute for Motor Sports Safety and Sustainability, working with key stake holders to develop, test and implement best practice safety initiatives, systems and training for motor sport applications.

FIA proven safety system standards and procedures are adopted by FIA championships and their affiliated ASN's. These are usually applied to the higher championship and international levels of motor sport competition. Over time these improved standards filter down through to the non-professional level of motor sport as cars, equipment and experience are sold on, as the top end of motor sport safety advances.

The review examined the current CAMS safety regulations and completed a gap analysis using current FIA International Rally and World Rally Championship (WRC) regulation as the bench mark against the current CAMS regulations applied to Australian Rally competitors and competitions. The three focal rally disciplines, for this review being gravel rally, tarmac rally and Targa. The analysis also looked at the level (status) of competition, International, National, State, Multi Club and Club.

FIA, World Rally Championship and FIA International status rally events set the standard for rally safety technically, sporting and event organisation. WRC cars are modern, current model cars with the latest safety systems, purposely designed in to the cars. There are subtle differences between the regulations for these two main FIA rally categories, however for the purpose of the gap analysis we have used the WRC as the bench mark but have referred to as the FIA in this summary.

The gap analysis was broken down into 4 key areas; crew, competition vehicle, operational and organisation.

CREW

The various regulations related to crew apparel, helmets, licensing and medical checks are displayed for gravel (

Figure 18) and tarmac rallies (Figure 19). All three rally disciplines (gravel, tarmac and Targa rallies) conducted at state level upwards generally used the same or similar regulation or safety standards as the FIA.

There is a step downwards in safety regulations in areas such as FHR and apparel where FIA standards are recommended (not mandatory) for Multi Club and Club level gravel and tarmac competitions, including Targa classes Vintage rally, TSD Trophy, Thoroughbred and Sports Trophy.

Apart from FHR not being required for competitions below state level, there is little evidence gleaned from the review investigation that supports enforcing higher apparel regulations such as driver suits, gloves, balaclava and boots etc for these lower status competitions.

Figure 18. Comparison of regulations related to the crew for gravel rallies.

		FIA		Gravel rallies			
Item		**WRC**	**International**	**National**	**State**	**Multi-club**	**Club**
Crew							
Helmets		FIA 8860-2010 (All - see Tech List 2)	FIA 8860-2010 (All - see Tech List 2)	FIA 8860-2010 AND CAMS Sched D Level B	FIA 8860-2010 AND CAMS Sched D Level B	FIA 8860-2010 AND CAMS Sched D Level B	FIA 8860-2010 AND CAMS Sched D Level B
Apparel							
	Overalls / outer wear	FIA 8856-2000	FIA 8856-2000	FIA 8856-2000 AND FIA 8856-1986 see CAMS Sched D 2.2 Level	FIA 8856-2000 AND 1986 AND SFI 3.2A Single Layer	Non-Flammable Neck to ankle - no nylon - see CAMS Sched D 2.2 Level	Non-Flammable Neck to ankle - no nylon - see CAMS Sched D 2.2 Level
	Gloves	FIA 8856-2000	FIA 8856-2000	FIA 8856-2000	FIA Recommended	FIA Recommended	FIA Recommended
	Boots	FIA 8856-2000	FIA 8856-2000	FIA 8856-2000	FIA Recommended	FIA Recommended	FIA Recommended
	Underwear	FIA 8856-2000	FIA 8856-2000	FIA Recommended	FIA Recommended	FIA Recommended	FIA Recommended
	Socks	FIA 8856-2000	FIA 8856-2000	FIA 8856-2000	FIA 8856-2000	FIA Recommended	FIA Recommended
	Balaclava	FIA 8856-2000	FIA 8856-2000	FIA 8856-2000 (except if FIA Helmet worn) see CAMS Sched D 2.2/3.5 Level B	FIA 8856-2000 (except if FIA Helmet worn) see CAMS Sched D 2.2/3.5 Level B	FIA Recommended	FIA Recommended
Frontal head restraint		FIA 8858-2010	FIA 8858-2010	FIA 8858-2010	FIA 8858-2010 - from Jan 2015	FIA 8858-210 Recommended	FIA 8858-210 Recommended
Googles & Visors		Not Applicable to Rally	Not Applicable to Rally	Not Applicable to Rally	Not Applicable to Rally	Not Applicable to Rally	Not Applicable to Rally
Competition license		FIA INT	FIA INT	National Rally Licence	National Rally Licence	Clubman Rally Licence	Clubman Rally Licence
Requirement for medical check		Annual	Annual	NIL (Declaration)			
Alcohol tolerance				0.00	0.00	0.00	0.00

Figure 19. Comparison of regulations related to the crew for tarmac rallies

		Tarmac rallies				
		National	**State**	**Multi-club**	**Club**	**Changes**
Crew						
Helmets		FIA 8860-2010 AND CAMS Sched D Level B	FIA 8860-2010 AND CAMS Sched D Level B	FIA 8860-2010 AND CAMS Sched D Level B	FIA 8860-2010 AND CAMS Sched D Level B	Follow FIA changes
Apparel						
	Overalls / outer wear	FIA 8856-2000 AND FIA 8856-1986 see CAMS Sched D 2.2 Level	FIA 8856-2000 AND FIA 8856-1986 see CAMS Sched D 2.2 Level	FIA 8856-2000 AND 1986 AND SFI 3.2A Single Layer	FIA 8856-2000 AND 1986 AND SFI 3.2A Single Layer	Follow FIA changes
	Gloves	FIA 8856-2000	FIA 8856-2000	FIA Recommended	FIA Recommended	
	Boots	FIA 8856-2000	FIA 8856-2000	FIA Recommended	FIA Recommended	
	Underwear	FIA Recommended	FIA Recommended	FIA Recommended	FIA Recommended	
	Socks	FIA 8856-2000	FIA 8856-2000	FIA Recommended	FIA Recommended	
	Balaclava	FIA 8856-2000 (except if FIA Helmet worn) see CAMS Sched D 2.2/3.5 Level B	FIA 8856-2000 (except if FIA Helmet worn) see CAMS Sched D 2.2/3.5 Level B	FIA 8856-2000 (except if FIA Helmet worn) see CAMS Sched D 2.2/3.5 Level B	FIA 8856-2000 (except if FIA Helmet worn) see CAMS Sched D 2.2/3.5 Level B	
Frontal head restraint		FIA 8858-2010	FIA 8858-2010 - from Jan 2015	FIA 8858-210 Recommended	FIA 8858-210 Recommended	
Googles & Visors		Not Applicable to Rally	Not Applicable to Rally	Not Applicable to Rally	Not Applicable to Rally	
Competition license		National Rally Licence	National Rally Licence			
Requirement for medical check						
Alcohol tolerance		0.00	0.00	0.00	0.00	NO CHANGE

COMPETITION VEHICLE

This section includes the safety systems of the car such as seats, harnesses, roll cages and fire extinguishers (Figure 20 and Figure 21).

The distinct gap in this section relates to seats. The latest FIA standard for seats is FIA 8862/2009. This type of seat is tested using new methods to higher standards and incorporates head and shoulder restraint features. Additionally it is back mount to chassis to minimise lateral movement and restrain the occupant's shoulders and head within the seat structure during side impacts. The earlier (and still current) FIA 8858-1999 specification seat also offers variants that include advanced design in lateral head/torso restraint.

The CAMS Manual of Motor Sport details the minimum requirements for seats. It recommends the FIA standard however the current regulation applied to all rally disciplines in Australia (non -international status) only requires seats to include head restraint, upgraded mounting bolts and where required seat mount reinforcement of the floor pan with 75mm x 50mm x 3mm plates.

As such, this is a distinct gap in what has been identified as a critical area for improved safety

The rally review has identified, there is a much higher risk of either serious or fatal injury from a side impact accident associated with gravel and tarmac rally events. It is acknowledged the retrofitting of a FIA 8862-2009 seat into some cars may be problematic and costly, however FIA 8858-1999 offers very suitable options.

Figure 20. Comparison of regulations related to the competition vehicle for gravel rallies

		FIA		Gravel rallies			
Item		**WRC**	**International**	**National**	**State**	**Multi-club**	**Club**
Competition Vehicle							
Harnesses		FIA	FIA	FIA	FIA or SFI from Jan 2015	FIA or SFI from Jan 2016	FIA or SFI from Jan 2017
Seats		FIA	FIA	FIA	FIA 8855-1999 0r 8862-2009 or CAMS SchC Art7.	FIA 8855-1999 0r 8862-2009 or CAMS SchC Art7.	FIA 8855-1999 0r 8862-2009 or CAMS SchC Art7.
Safety Cage Structure		FIA	FIA	CAMS	CAMS	CAMS	CAMS
	Required to have Safety Cage	YES	YES	YES	YES	YES	YES(1)
	Design	FIA	FIA	CAMS Type 3 Full min J11	CAMS Type 3 Full min J10	CAMS Type 3 Full min J7	CAMS Type 3 Full min J7
	Material	CDS/CDW (2)	CDS/CDW	CDS/CDW	CDS/CDW	CDS/CDW	CDS/CDW
	Installation (how and who)	FIA Homologation	FIA Homologation	All levels - cage manufacturer must registered or certified by CAMS from 2001 for log book			
Fire extinguishers	Type			FIA Bomb/Plumbed in Fire Extinguisher for ARC except if only competing in			
	Lifespan & inspection process			FIA Homologated serviced every 2 years.AS1841 serviced every 3 years, other standard every 2 years. Inspected by Scrutineer every 6 months			
Window nets				Optional	Optional	Optional	Optional
Fuel tanks	Type			Production/'FT3'	Production/'FT3'	Production/'FT3'	Production/'FT3'
	Lifespan & inspection process			5 years after validation date / Event checked			
Fuel lines		FIA		CAMS Sched R			
Fluid lines under pressure		FIA		CAMS Sched R			

_(1)	EXCEPT INTRODUCTORY RALLIES
_(2)	FIA - Must be STEEL Cold Drawn Welded or Cold Drawn Seemless
_(3)	EG refuelling fire marshals

Figure 21. Comparison of regulations related to the competition vehicle for tarmac rallies.

		Tarmac rallies			
		National	**State**	**Multi-club**	**Club**
Competition Vehicle					
Harnesses		FIA	FIA or SFI from Jan 2017	FIA or SFI from Jan 2018	FIA or SFI from Jan 2019
Seats		FIA 8855-1999 0r 8862-2009 or CAMS SchR Art6.	FIA 8855-1999 0r 8862-2009 or CAMS SchR Art6.	FIA 8855-1999 0r 8862-2009 or CAMS SchR Art6.	FIA 8855-1999 0r 8862-2009 or CAMS SchR Art6.
Safety Cage Structure		CAMS	CAMS	CAMS	CAMS
	Required to have Safety Cage	YES	YES	YES	YES
	Design	CAMS Type 3 Full min J11	CAMS Type 3 Full min J10	CAMS Type 3 Full min J7	CAMS Type 3 Full min J7
	Material	CDS/CDW	CDS/CDW	CDS/CDW	CDS/CDW
	Installation (how and who)	All levels - cage manufacturer must registered or certified by CAMS from 2001 for log book			
Fire extinguishers	Type	FIA Bomb/Plumbed in Fire Extinguisher for ARC except if only competing in			
	Lifespan & inspection process	FIA Homologated serviced every 2 years.AS1841 serviced every 3 years, other standard every 2 years. Inspected by Scrutineer every 6 months			
Window nets		Optional	Optional	Optional	Optional
Fuel tanks	Type	Production/'FT3'	Production/'FT3'	Production/'FT3'	Production/'FT3'
	Lifespan & inspection process	5 years after validation date / Event checked			
Fuel lines		CAMS Sched R			
Fluid lines under pressure		CAMS Sched R			

OPERATIONAL

This section includes regulations that cover the operational elements of a rally event and include the key areas medical and first aid, vehicle tracking, communications between stages and HQ, driver familiarisation with course (reconnaissance), competitor briefings and refuelling of cars.

There are similar requirements for these key areas at all rally competition levels however medical services and requirements, and vehicle tracking and communication standards do vary, particularly for competitions below state level status (Figure 22 and Figure 23).

MEDICAL AND FIRST AID

Medical and first aid standards currently applied to rally events require a safety plan detailing medical staff and facilities, location and number of SOS points, medical intervention vehicles (MIV) and evacuation plan/routes etc to CAMS for approval, to obtain their event permit. The standard of these services varies from FIA Appendix H (world championship level) to the medical services/requirements detailed in the CAMS Manual of Motor Sport – General Regulations.

Feedback from key stake holders, specifically current and former Chief Medical Officers and medical service providers to rally events, suggest that competitions at state level and below should have an improved level of medical and first aid provisions.

CAMS nominate three levels below the FIA standard, level A, B and C. Level B is the nominated requirement for competitions levels of state and below.

It is not clear within the various CAMS published documents what standard is applied with the responsibility for determining the requirements falling to a number of bodies including ARCom, National Medical Advisory Committee (NMAC) and/or State Council.

CREW EMERGENCY PROCEDURES – ON STAGE

Crew emergency procedures are well documented and in most cases a copy of the procedure is included in the road book. There have been instances (noted in incident reports/investigations) where crew have not followed the correct protocols. Appropriate measures to improve crew adherence to emergency procedure such as routine education and reminders during crew briefings, should be implemented.

VEHICLE TRACKING

Vehicle tracking (positive tracking) via SOS radio points is defined in the National Rally Code. However specific requirements or mandatory use across all rallies is unclear. Vehicle tracking relies on radio communication from the SOS point back to the stage command or HQ. It is also reliant on the competing crews 'buddy system' where the crews following are responsible for the crew of the vehicle (on stage) in front, should there be a SOS situation. There have been instances where a vehicle has left the road and crashed, and the following crew have not sighted the crashed vehicle, delaying the activation for medical response. Radio and mobile phone communications are at times limited in their coverage due to the remote geographic locations of some course. New technology such as 'Rally Safe' is available to compliment the manual system which is being used in ARC and Targa and a number of state level events. The regulation, requirements and standards applied to rally events are not clearly documented and require clarification.

RECONNAISSANCE

Reconnaissance or driver familiarisation with the course is generally allowed with the exception of blind rallies or where the regulations prohibit such. Crew familiarisation with the course is highly recommended particularly where pace notes are allowed. Road books issued by the organisers vary in standard and often lack the detail that competitive crews identify during reconnaissance.

The review has identified the significance of reconnaissance particularly for events where pace notes are allowed, competition amongst competitors is high, vehicle performance characteristics high and average stage speeds are high.

Mandating reconnaissance is problematic due to the time periods and limits applied by and/or on the event organisers and availability of competitors to conduct reconnaissance.

Figure 22. Comparison of regulations related to operational aspects of gravel events.

		FIA		Gravel rallies			
Item		**WRC**	**International**	**National**	**State**	**Multi-club**	**Club**
Operational							
Provision of medical or first aid services	Service park	Required	Required	Optional	Optional	Optional	Optional
	On route	Required	Required	Required	Required	Required	Required
	Spectator areas	Required	Optional	Optional	Optional	Optional	Optional
Tracking of vehicles during competition		Required	Expected	Required	Required	Required	Required
Communication between stages and HQ		Required	Required	Required	Required	Required	Required
Driver familiarisation with course (recce)		Required	Optional	Required	Optional	Optional	Optional
Competitor briefing		Team manager meeting	Optional	Required			
Refuelling of vehicles	Location	Designated by Organisers	Designated by Organisers	Designated by Organisers	Designated by Organisers	Designated by Organisers	Designated by Organisers
	Safety equipment required	Yes	Optional	Yes	Yes	Yes	Yes

Figure 23. Comparison of regulations related to operational aspects of tarmac events.

		Tarmac rallies			
		National	**State**	**Multi-club**	**Club**
Operational					
Provision of medical or first aid services	Service park	Optional	Optional	X	X
	On route	Required	Required	Required	Required
	Spectator areas	Optional	Optional	Optional	Optional
Tracking of vehicles during		Required	Required	Required	Required
Communication between stages and		Required	Required	Required	Required
Driver familiarisation with course		Required	Required	Required	Required
Competitor briefing		Optional	Optional	Optional	Optional
Refuelling of vehicles	Location				
	Safety equipment required				

ORGANISATIONAL

This section details the organisation of a rally with areas such as course special stages, course checkers, emergency procedures and safety of spectators, official and crew. There are similar requirements for these key areas at all rally competition levels however standards, guidelines and procedures for Special Stages and Course Checker require clarification for Australian rallies (Figure 24 and Figure 25).

SPECIAL STAGES

There are no clear standards, guidelines or procedures for the design or setting of special stages. Stage average speeds and lengths, chicane applications and location, course marking and cautions are generally left up to the event organiser.

Some rally disciplines apply an average speed limit, Tarmac Rally impose a limit of 132kph. Where this limit is exceeded the stage is supposed to be reviewed and should not be approved for future rallies unless measures are in place to reduce the speed. The Review Panel notes that this regulation does not appear to be rigorously applied.

COURSE CHECKING

Course checking is required for all rallies. The course checker is responsible for ensuring that the course is sufficiently marked for the competitors relative to the road book and the course proper. Prior to the commencement of the stage, the checker is responsible for checking that the stage/road is positively closed and spectator areas are correctly located and controlled.

The standard of course checker and their ability to enforce any changes to a course has been identified in the review. These checkers, their experience and ability to affect necessary changes to the course or marking for safety reasons are critical for the safe conduct of a rally.

Figure 24. Comparison of regulations related to organisational aspects of gravel events.

		FIA		Gravel rallies			
Item		**WRC**	**International**	**National**	**State**	**Multi-club**	**Club**
Organisation							
Special stages	Length			55km	In series regs		
	Speed			No limit	No Limit		
Evacuation routes				Required	Required	Required	Required
Availability of emergency contact details				Required	Required	Required	Required
Route checking & approval		On paper except for new events/stages		Required	Required	Required	Required
Spectator safety		Required		Required	Required	Required	Required
Officials safety	Apparel	No requirements		Varies- Risk based(2)			
	Alcohol & drug tolerance	WADA requirements		Advisory no compliance checking	Advisory no compliance checking	Advisory no compliance checking	Advisory no compliance checking
Service crew safety	Apparel	Advisory		Advisory	Advisory	Advisory	Advisory
	Alcohol & drug tolerance	WADA requirements		Advisory no compliance checking	Advisory no compliance checking	Advisory no compliance checking	Advisory no compliance checking

Figure 25. Comparison of regulations related to organisational aspects of tarmac events.

		Tarmac rallies			
		National	**State**	**Multi-club**	**Club**
Organisation					
Special stages	Length				
	Speed				
Evacuation routes		Required	Required	Required	Required
Availability of emergency contact		Required	Required	Required	Required
Route checking & approval		Required	Required	Required	Required
Spectator safety		Required	Required	Required	Required
Officials safety	Apparel				
	Alcohol & drug tolerance				
Service crew safety	Apparel				
	Alcohol & drug tolerance				

SIDE IMPACT PROTECTION

An advanced side impact system has been developed for the WRC to meet the objective of surviving a 60km/h side impact into a tree. The system is designed to provide a direct energy-management load-path from the outside of the car to the occupant's seat, whilst decoupling the lateral (roll) motion of the seat from the chassis. The main features for an optimised rally safety package are as follows.

ADVANCED RACING SEATS

This type of seat incorporates very effective head, shoulder and pelvis restraint features. Although they are designed to be mounted to a *circuit* car with stiff brackets and may have the option of a seat back attachment, they should be mounted to a *rally* car chassis using "soft" seat supports* to allow lateral (roll) movement relative to the chassis during tree impacts, whilst restraining the occupant's shoulders and head within the seat structure.

** in accordance with Appendix J, Article 253, ART. 16 (3 mm steel or 5 mm light alloy)*

LATERAL SPACE

Maximizing the space between the occupants and the outside surface of the car by positioning the seats as in board as practicable can provide valuable additional space. This space shall be filled with the energy absorbing foam as detailed below.

DOOR CROSS BARS

Testing has demonstrated that the protective value of door cross bars during impacts with aggressive structures such as rocks and fence posts can be improved, particularly when complemented with load spreading plates and door foams.

ROLL CAGE JOINTS

Sled testing demonstrated that the welded joints of a roll cage and door cross structures often fail before the intrinsic strength and energy management of the structure have been realised. The performance can be enhanced by optimising joint design with gussets and best practise weld techniques.

LOAD SPREADING PLATES

Composite load spreading plates constructed of carbon/aluminium honey comb and fitted into the door cross area and the door frame void are used to spread the concentration of the impact into A and B pillar section of the roll cage structure. This may be more relevant for circuit cars to protect during T-bone accidents.

ENERGY ABSORBENT FOAMS

Energy absorbent foams are the most significant aspect of the side impact package. They have been the focus of recent FIAI testing. Properties of the selected foams have been specified to maximise energy absorption at non-injurious load levels and over a range of temperatures to cover hot and cold race events. The FIA will publish the new specification together with a list of approved foam types.

RACING NETS

Note: these should not be fitted to rally cars because of egress issues and relative lack of effectiveness during tree impacts. However they provide significant protection for circuit cars during side and angled side impacts. They should be fitted, on both sides of the seat, with a purpose to limit side head and shoulder movement. As they are wrapped around the seat back, these nets also help support the seat during rear impacts.

ADDITIONAL AREAS OF RELEVANT CURRENT FIAI/GIMSS SAFETY FOCUS

ROPS improvement - improved rollover protection, looked at the various steel materials (their strength and ductile properties) currently used for safety cages. Welding types MIG and TIG processes and techniques were assessed in the crash tests.

Fire Safety – Research and a new standard for homologation of fire extinguisher systems has very recently been implemented by the FIA. The aim of this standard (8865-2015) is to provide objective performance requirements for plumbed-in and hand-held fire extinguisher systems in competition cars.

Course Design and Speeds –Training and guidelines for organizers and course checkers to identify and avoid if possible or apply controls in areas where the combination of high speeds, changes of direction, crests and road surfaces that unsettle the car, have the potential to increase the risk of a high speed accident.

Treatment of Black Spot Areas – The use of straw bales or tyre walls applied as barriers or speed arrestors or deflection devices. Common objects/areas for treatment are large trees, power poles, Armco ends etc . Tree impact barriers – straw bales tested, guidelines for specification drafted, but logistical issues – now with Circuits Commission.

Below is the current status of key FIA safety related standards or reviews;

- FIA Standard 8853/98 - Safety Harnesses - updated: 28.09.2012 - currently under review by Institute
- FIA Standard 8854/98 - Safety Harnesses - updated: 28.09.2012 - currently under review by Institute
- FIA Standard 8855-1999 - Competition Seats - updated: 27.09.2013
- FIA Standard 8856-2000 - Protective Clothing for Automobile Drivers - updated: 28.09.2012 – currently under review by Institute
- FIA Standard 8857-2001 - Rollcage Padding - updated: 01.01.2007
- FIA Standard 8858-2002 - HANS® System - updated: 28.07.2005
- FIA Standard 8858-2010 - Frontal Head Restraint (FHR) System - updated: 05.12.2012 (to include Hybrid system)
- FIA Standard 8860-2010 - Advanced Helmet - updated: 28.09.2012
- FIA Standard 8862-2009 - Advanced Racing Seats - updated: 05.12.2012
- FIA Standard 8863-2013 – Racing Nets – updated 02.12.2015
- FIA Standard 8865-2015 - for Plumbed-in Fire Extinguisher Systems in Competition Cars - updated: 15.12.15
- FIA Standards - Safety Fuel Bladders (FT3-1999, FT3.5-1999, FT5-1999 Standards) - updated: 28.09.2012

MISCELLANEOUS OBSERVATIONS

THE CHALLENGE OF UNINFORMED COMPETITORS OR THOSE THAT 'ACCEPT THE RISK'

From the perspective of good governance, risk management and social responsibility, it is essential that the sport uses its best endeavors to educate "uniformed" competitors of the potential dangers of the sport of rallying, or in the case of those who are well aware but seek to "accept the risk" without taking suitable precautions, use every practical resource available to alter their attitude.

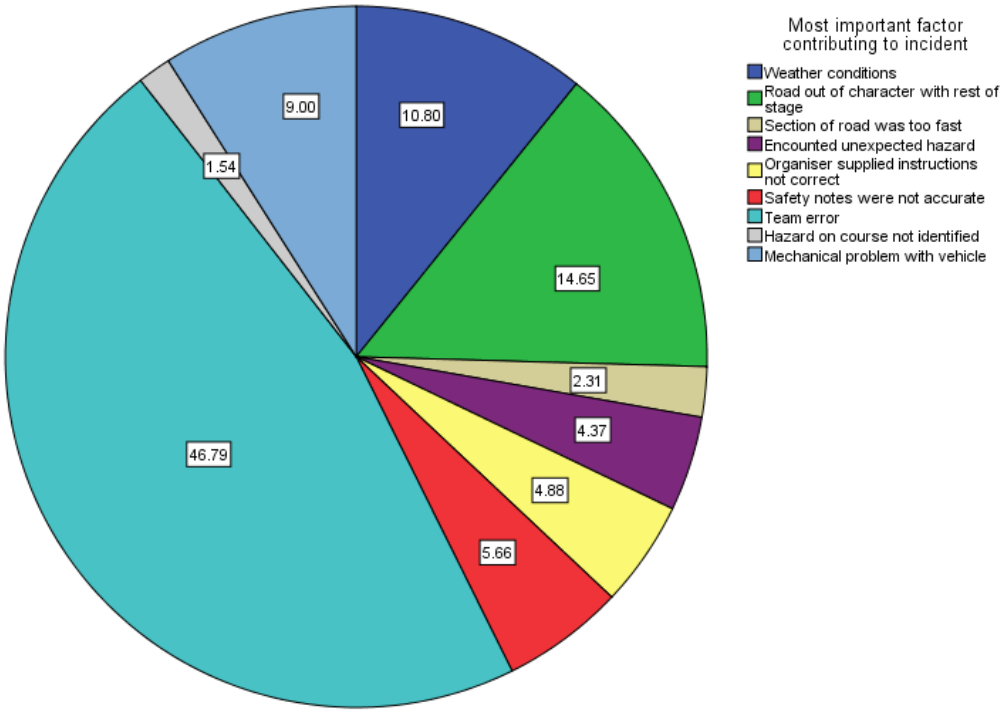
It is the opinion of this review panel that the sport of rally in Australia is not over-regulated, and that given the legal, insurance and wider social implications of serious crashes, that the argument of accepting the risk is no longer acceptable.

LICENSING – COMPETENCY – EDUCATION

Figure 26 represent the opinion of competitors (from the online survey) on what they consider the most important factor contributing to their last "significant incident". Almost half of respondents indicated that team error was the main factor. The term "team error" can generally be interpreted as driver error which encompasses many possibilities, some of which could be exacerbated by the road being out of character with the rest of the stage, weather conditions, the section of road being too fast, the Safety Notes not being accurate, the crew being inexperienced or simply pushing too hard, etc.

Issues with the road being out of character with the rest of the stage were noted by 15% of respondents as the main reason for the accident (Figure 26). It was not possible to determine whether these respondents were using Safety Notes or not when the incident occurred.

Figure 26. Competitor nominated reasons for most important factor contributing to their last serious incident.



PHILOSOPHICAL POSITIONING OF TARGA

There is no doubt that Targa rallies have developed their own competition "culture", in many instances the levels of competition effort, including risk taking, mirrors that of professional rallying or racing on permanent circuits. Understandably the growth, heightened exposure and status associated with success in Targa type rallying are amongst the key drivers. It is the opinion of the Review Panel that CAMS should, in conjunction with the event promoters, re-examine the philosophical positioning of these events, keeping in mind the original objectives of the first Targa Tasmania. It is possible that somewhat 'easing' competitive pressure, including perceptions and expectations may in fact grow participation amongst a wider audience. Fun, joy, and returning home to the family on Sunday night remained cornerstones of Targa participation among the many conversations held with competitors.

COMPETITION LEVEL VERSUS CAMS PERMIT

This review has considered a variety of safety issues and regulations, many of which vary between levels of competition. It is important to note that 'level of competition' is used in this report to refer to the CAMS permit level. However it has become evident during the review that the permit level of the event is not always indicative of the competitiveness of crews or vehicles at events, and that some organisers are flaunting the permit system by running large, highly competitive rallies as club events, presumably to avoid higher fees and safety requirements. This appears to be a major flaw in the current permit system. It also highlights the need to avoid imposing barriers in the sport which could lead to perverse outcomes in terms of improved safety.

DUAL STATUS EVENTS AND SAFETY STANDARDS

During this review it has been noted that many events run multiple competitions under the one event umbrella to increase the financial viability of the event. For instance, ARC rounds often include a state championship event and sometimes also a lower status competition. Likewise, state championship rounds often include a more introductory competition or series. In the majority of cases these competitions are run at the same time, on the same roads and using the same officials. But they are conducted under different permit levels, and as such competitors in the respective competitions may run under different safety regulations. This is currently the case for FHR where national and state competitors are required to use FHR, but lower level events are not.

While the rationale for dual safety standards is based around affordability and preserving entry level participation, it is difficult to justify from a risk and safety perspective when competitors are using the same roads in the same conditions and there is no restriction on types of vehicles.

Figure 27. Vehicles competing in the Border Ranges Rally in the State Championship section (left) and Clubman series (right).Competitors use the same roads on the same day with the same roadbook and reconnaissance rules, but competitors in the State Championship event are required to use FHR while those in the Clubman series are not.

SECTION 3 – RECOMMENDATIONS

PREFACE TO RECOMMENDATIONS

Today the sport of Rallying in Australia is a broadly participated motor sport discipline. The spectrum of competition levels and standards are wide ranging throughout the Australian rally scene which hosts a round of the World Rally Championship, the Asia-Pacific Rally Championship, Australian Rally Championship events, Targa Championships, various State Championships and numerous club/multi club series. Events range from international to club/multi club series, over gravel and tarmac road surfaces.

One of the challenges for the review is that these competitions cater for all levels of competitors, from 'all comers' and grass roots level, through to Australian Championship and World Rally Championship level.

The capabilities of the organisers, the competency of the officials and competitors, and the standard of rally vehicles vary substantially.

The review acknowledges that Australian motor sport under the stewardship of CAMS has fostered a strong culture of safety, and CAMS should be applauded for instigating a review to receive recommendations to move the sport further ahead. The review panel also accepts that rally is unique to many other sports in that currently anyone is able to compete directly against national and world champion crews.

The review has identified a number of areas where, in its view, the long term health of rallying would be enhanced by way of consideration, further investigation or adoption/implementation of the following recommendations. It is noted that some recommendations follow directly from the data collected during this review. However in some areas where no data exists, weight has been given to expert opinion in the development of recommendations.

It may be argued that 'data' presented in this report may be, in some instances, insufficiently strong to support relevant conclusions and recommendations. The Review Panel responds by proposing that for advances in motor sport safety it is often necessary to rely on predictive data that appear at first to be only peripherally related to the problem at hand. Such data are customarily drawn from hard sciences such as medicine, biomechanics, engineering and statistics, and will normally be supported by advice from individuals and organisations with wide experience and depth of knowledge in such fields and in motor sport. Examples include the design, fitting and use of six-point competition harnesses and forward head restraints. Both were genuine innovations based on good science from the above fields and both faced some initial opposition to their use. Obviously, for both examples it was only after they came into general use that their effectiveness could be proved in the real world and reported as advances.

The review panel also accepts and understands it would be impractical and possibly detrimental to competitor numbers if too many changes were pushed too rapidly onto the rally community. The attitude of many competitors is clear upon review of the AIMSS competitor attitude survey. As such, a prudent approach would be prioritisation and timely phased-in implementation. At most risk of impact from such changes are lower level competitors who clearly articulate that cost is a major obstacle. However this review panel believes that it is possible to develop strategies to address this such as lengthy sunset clauses about phased implementation, or innovative changes to the way events are permitted. For instance, consideration may be given to pricing competitor permits or establishing insurance surcharges based on the safety features of the vehicle/crew, rather than simply the event level, with higher levels of safety equating to reduced permit fees. In addition, education to 'bring the competitors with you', which would include the quashing of misinformation regarding safety features, would be of value in this regard.

The review panel has identified a range of barriers to each recommendation. CAMS should use the expertise within its organisation to minimise the potential for perverse outcomes in terms of safety where organisers/competitors deliberately structure events to avoid additional safety requirements. Additional changes or oversight may be needed by CAMS to prevent such outcomes.

In concert with the review document structure, recommendations below have been grouped according to the four key pillars. There are:

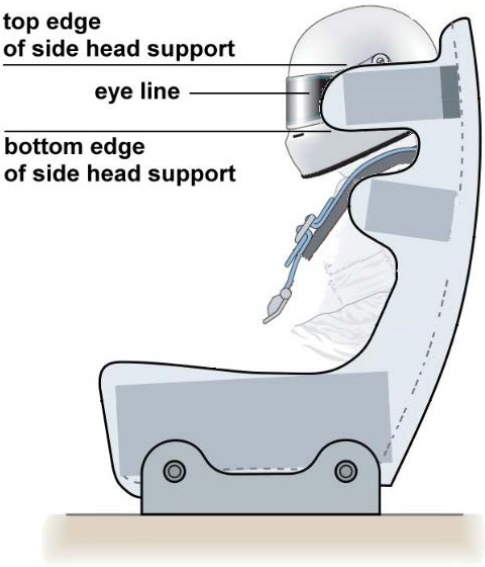
- 8 recommendations related to the competition vehicle
- 4 recommendations related to competitor and crew
- 10 recommendations related to rally states and course
- 11 recommendations related to operational/organisational issues

RECOMMENDATION 1 – ADVANCE COMPETITION SEAT REGULATOIN

The review recommends that the minimum standards for all crew seats in rally vehicles be revised with the goal of phasing in regulated use of FIA 8862-2009 advanced racing seats, initially at National level, (which currently calls for FIA spec, which includes non-head restraint versions), and at minimum, approved 'winged' variants of earlier spec, more affordable FIA 8855-1999 spec, for all competition rally disciplines.

FIA 8862-2009 or winged versions of FIA 8855-1999 seats should be made mandatory in all newly logged book vehicles, and all tarmac rally cars.

In light of the fatality and injury trends as identified by the review, coupled with the known benefit of occupant head and upper torso restraint as used in seat technology widely available and used today, the review panel puts particular weight on this recommendation as a simple and relatively cost effective safety measure that will make a difference. Hence the detail in this recommendation.



BACKGROUND, RATIONALE AND SUPPORTING DATA

- Currently, there are recommendations for National level competition, but little or no regulation around the use of FIA standard seating (new or old spec), which is proven to offer an improved safety environment for occupants.
- Advance Racing Seats (winged seats) are designed to better restrain the upper body and head within the wings of the seat, particularly during side impact.

- Of the 10 rally related fatalities reviewed between 2004-2013, where 9 provided information as to cause of death, all were associated in some way to head strike with cage or object (usually tree), or a dislocation around the base of the skull. Of relevance, 6 of the 9 were the consequence of side impact.
- 116 fatal accidents in rally events (internationally) recorded between 2004 and 2009 are analysed and presented. The results show that side impact accidents against a tree or post are nowadays among the most dangerous accident scenarios in rally cars with a high number of casualties every year underlying the necessity for research and improvements in this area. During this time 52% of occupant fatalities were due to crashes against a tree whilst among them more than 60% considered side impacts (Nassiopoulos & Njugun 2010).
- The review findings reinforce the head and neck as vulnerable in potentially fatal rally type impacts.
- The design of racing seats has rapidly evolved, even in the modern era. From providing an appropriately restrained and competitive driving position, to now, encompassing all that, and also becoming an energy absorbing integral component of the driver safety restraint system. In particular great advances have been made in lateral upper torso/head restraint, an area often aligned with competition incident trauma.
- In the case of the CAMS fatality data, whilst it cannot be factually known if more advanced safety systems would have specifically changed any of these outcomes, there are instances where it is likely increased lateral head/upper torso restraint would have had a positive effect.
- The modern environment of Tarmac Rallying in Australia appears particularly vulnerable to incidents that may benefit more so than any other group from the use of advanced racing seats. To that end, if other initiatives are not undertaken to minimise the heightened risk in current Targa type events, or even if they are, CAMS should seriously consider the quite rapid introduction of winged variant **FIA 8868-1999** specification seats into tarmac rallying competition.
- The review panel is conscious of the balance between the pursuit of ultimate safety and the cost of competition, to the extent that it can discourage or prevent participation in the first instance. However, in recent years, the significant advances in seat design including lateral head and upper torso restraint simply cannot be ignored as a potentially significant contributor to reducing death and injury. This is particularly so when coupled to other features like FHR and head/shoulder safety nets as part of a 'whole of safety system'.
- The review panel acknowledges that in a select few vehicles it may not be possible to achieve the desired targets in terms of retro fitting large size FIA spec 'winged' (upper body/head support).
- **FIA 8862-2009** is the most current spec of racing seat and offers a substantial increase in strength including lateral and rearward support, and incorporates seat mountings within its homologation. Initially, it is quite expensive, and retrofitting in some instances may prove problematic or require local modification, however it is the standard the sport should migrate to.
- **FIA 8855-1999** is the previous (but still current) specification seat, considerably more affordable, which has both 'winged' (lateral head restraint) and 'non-winged' versions. In light of the pursuit of increasing lateral impact protection, it is the 'winged' variants, and those that offer improved head/upper torso support that should be identified and regulated as a minimum spec in rallying beneath National level, under this proposed recommendation.
- In **CAMS Schedule C**, it should be considered that the single reference to recommended use of **FIA 8862-2009**, should include an additional recommendation (alternative) for the use of approved 'winged' versions of **FIA 8858-1999.** The seat regulation below for **Group 3C 'Production Rally cars**' is an instance where both standards are recommended.
- The panel accepts that newer **FIA 8862-2009** is a safer, stronger seat that **FIA 8858-1999**, however **FIA 8858-1999** in summary provides current spec, affordable 'winged' variants, that are substantially safer than what is currently regulated in most rallying in Australia.
- Covered elsewhere in this document, a safety cage 'design culture', more amenable to winged variants of **FIA 8858-1999** and fitment of **FIA 8862-2009** spec seats will be of significant benefit to safety in rallying in future years.

- The concept of using a group or variant from within an **FIA** standard is not a new concept. The **FIA Institute** after conducting studies into side intrusion/impact in rallying, proposed draft regulations for the **2008 WRC** stipulating use of head support seats variants from the **8868-2009** standard...

  2. SEATS

  Driver and Co-Driver seats shall comply with FIA 8855-1999 and shall incorporate head supports.

- Figure 28 illustrates the style of seat currently permitted and widely used in rally competition in Australia. The safety benefits of upgrading to a winged seat (Figure 29) are obvious.

Figure 28. Image of a seat widely used in rally competition in Australia.

Figure 29. Winged seat design.

CURRENT CAMS SEAT REGULATION OVERVIEW

Extract from CAMS 2015 Manual of Motor Sport Schedule C – 'General Requirements of Automobiles, Item 7'...

Automobiles must be fitted; only with such replacement seat which in closed cars first registered with CAMS after 1 January 1980, and in which the relevant regulations permit the replacement of the driver's seat:

1. *incorporates a head restraint; (Ed. meaning rearward not lateral)*
2. *does not incorporate adjustment of the rake of the squab.*

The use of a seat to the FIA 8862-2009 Advanced Racing Seat standard is recommended.

Schedule C applies to most rallying in Australia aside from classes competing at National level.

From the range of categories and competitions at state, club and multi-club level, typically the regulation that points to Schedule C, sets out two regulation options for rally competition that are meaningless. The example provided below is from the regulations for Group 3C Production Rally Cars;

For rallies of State Championship status or above, the seats provided for the occupants shall:

(i) be homologated by the FIA to the 8855/1999 or 8862/2009 standard, or

(ii) comply with Schedule C.

Both these options do no more than to promote the use of FIA spec seats, but neither option actually regulates its use. The actual 'regulated' rule here *(ii)* Schedule C**,** is a long way short of the promoted FIA spec. Further, in this example, the context of applying the regulation to 'state championship status or above', makes little sense as it proposes moving up from one regulation to the same regulation at the next (state) level.

Note: Several rally category/class regulations require compliance with appropriate schedules from the **'**General Requirements of Automobiles'. Schedule C is singled out as it has seat regulations, (Schedules A, B or R do not raise seating), however Schedule C is headlined 'Each Vehicle in a Circuit Race...' The **NCR's** distinguish the difference between a **Rally** and a **Circuit Race**, so it would appear this is an anomaly that requires rectification or certainly clarity for competitors.

From the comparison of regulations conducted as part of this review, the only additional specification apportioned to seats above the CAMS Schedule C requirement (non FIA), is for tarmac rally cars which points to specification around seat mounting in ADR compliant cars.

Targa Australia's Specific Regulations only require that any replacement seat must be from a recognised manufacturer - a very broad definition.

Essentially, in our most vulnerable competitions, tarmac rallying and all forms of gravel rallying below National competition, provided the seat is from a recognised manufacturer, is not a 'low back' and is not adjustable, it is allowed. As such, there is no regulation around the compulsory use of any of the known/modern safety features of modern competition seats, which seems unusual when measured against safety related regulation in other areas.

AFFORDABILITY...

High end lightweight versions of FIA 8868-2009 can cost broadly between $4,000-$10,0000, and as such are more applicable at this time to National level competition (Figure 30).

In contrast, 'winged', FHR compatible FIA 8855-1999 standard seats are considerably cheaper. Each of the seats displayed in Figure 31, typically in the range of $750-$1300.

At the base level of FIA 8855-1999 approved competition seats, there are two general options; a non-head restraint seat and a head restraint (winged) seat. The retail difference in Australia between these options is approximately $350.
Seat manufacturers are also offering winged seat versions with narrower head restraint to accommodate easier fitment.

Figure 30. Images of lightweight versions of FIA 8868-2009 seats.

Figure 31. Examples of 4 winged FIA 8855-1999 standard seats.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

The latest spec **FIA 8868-2009** seats start at around **$4000,** with **$10,000** readily spent on the latest lightweight high tech carbon fibre versions, which include homologated mounts. Across two seats, this level of cost is significant, even at the National level.

The retrofitting costs due to the homologated floor brackets and back mount will add to the overall costs for a **FIA 8868-2009** advanced racing seat. (Note: However CAMS does allow that existing CAMS homologated mounts may be used with this spec.)

As an alternative for lower levels of competition (and potentially as an interim option at National level) **FIA 8855-1999** spec'd winged variant racing seats prices typically range from approximately **$750** to over **$3000**. This is not an insignificant cost which, based on sentiment in the competitor feedback will encompass some resistance.

A key here will be education. Looking at the AIMSS survey respondents comments, resistance to something as proven as a Frontal Head Restraint is often driven by ignorance or a lack of understanding. A simple to understand insert in Speed Read (or similar) relating to the benefits of seats that offer upper torso and head lateral restraint (and the understood hazards of non use) will assist in laying the groundwork for the way forward.

Existing Cage Design could be an impediment. There are variations in width of wings on available seats, and a culture change is required from industry to ensure cage design and installation allows for future advanced racing seat fitment.

There may be entry and egress issues around larger human frames in smaller vehicles incorporating windscreen pillar reinforcement.

Reduction in visibility – some comment during the review survey suggest that the winged seat caused reduction in visibility which could increase the potential for an accident during transport stages. Whilst there could be some effect on extreme peripheral vision, the review has not become aware of any evidence that indicates any accident in a transport stage has been caused by any reduction in visibility. Figure 32 illustrates that winged variants of FIA-spec laterally supportive seats typically have little impact on vision.

Figure 32. Photographs illustrating positioning of head relative to winged seat.

RECOMMENDATION 2 - IMPROVE AND ADVANCE ALL ASPECTS OF SIDE IMPACT AND INTRUSION PROTECTION

The review panel recommends an expanded facilitation of policy, regulation, education, awareness and a culture for improved side intrusion protection & energy absorption in rallying, with maximum initial focus on tarmac events and competitors.

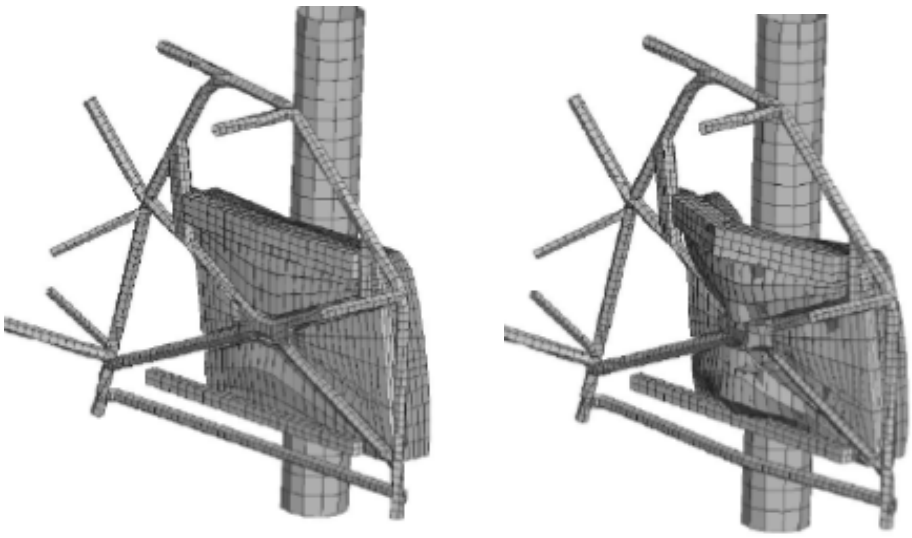


Figure 33. Increasing side intrusion protection has been identified as a key area of focus for increased safety in rallying.

RATIONALE AND SUPPORTING DATA

- There is arguably no single element that has greater potential to prevent serious injury and save lives in rally incidents (which are often particular to rallying), than advancing the cause of side impact protection.
- In a side impact crash the most vulnerable part of the rally vehicle and injury risk to crew is the driver and co-driver door area.
- There is more known, and more that can be done than is currently regulated or recommended in rally competition around side impact safety
- The frequency of side-impact in fatal incidents was higher than the corresponding frequency in either the CAMS incident reports or the competitor self-reported incident survey, suggesting a vulnerability of the crew in these types of impacts. From CAMS incident data we see that side impacts make up 21% of impacts identified in the incident reporting, yet account for 66% of rally fatalities
- It is the opinion of the review panel that both the style of competition, and the terrain encountered in Targa type rallying in Australia has genuine potential for ongoing serious side impact incidents, so increased awareness and measures should be put in place to minimise the very real threat of negative outcomes.
- Acutely aware of risk associated with side impact, the FIA introduced a suite of side impact protection measures into the WRC in 2008 that were recognised via testing with the capability of survival without serious injury in up to 100g side impacts.
- The FIA has continued work in this area with advanced side impact system developed for the World Rally Championship (WRC) to meet the objective of surviving a 60km/h side impact into a tree.
- In Australia, of the 10 rally related fatalities reviewed from the CAMS and associated data between 2004-2013, where 9 provided information as to cause of death, no fewer than 6 were the consequence of impact predominately from a side angle, and all of which were a tree.

- Reviewing rally fatalities in CAMS sanctioned events back to 1990, where details are less specific, it can still be reasonably established that no fewer than 14 of the 21 fatalities in competition to 2013 were associated to side impact, with 13 impacting a tree, and 1 a pole.
- Side Impact injury or fatality is not necessarily associated to high speed at the point of impact. Side impacts can be incredibly difficult to manage from a safety perspective from 60kph and slower.
- Looking at worldwide rally fatality trends between 2004 and 2009 52% of occupant fatalities were due to crashes against a tree, whilst among them more than 60% were side impacts (Nassiopoulos & Njuguna, 2010).
- Following analysis of incident data, and in light of feedback from the AIMSS competitor survey and key stakeholders, combined with current regulation requirements, the review panel does not believe there is appropriate awareness or sufficient focus on side intrusion across the wider rallying community, associated industry, including education and regulation. It tells the story that those who compete more frequently, and at a more professional level, appear significantly more in tune and typically accepting of safety advances in this area.
- Rally competitors at all levels, particularly those embarking on Targa type event participation, need from the outset to be more acutely aware of;
    1. The reality of injury and fatality directly attributed to side impact in rallying
    2. What enhanced side intrusion protection actually means
    3. What side intrusion protection enhancements are available to them, and suitable to their circumstance.
- It may be considered prudent to develop a flyer (possibly an AIMSS task), targeted at rally competitors with a strong skew toward Targa event participants, which confronts them with a degree of reality and provides suitable solutions in a positive way to minimise risk in side impact incidents. The review panel would consider this supplementary to this recommendation.
- The review panel supports the recommendation made in the 2010 CAMS report of inquiry (for Coroner) into the Classic Adelaide tarmac rally fatalities of Gary Tierney and David Carra, regarding side intrusion;

    > *7. RECOMMENDATIONS*
    >
    > *Competitors should carefully consider the construction of their vehicle and the selection of its safety features in respect of side impact. In that regard there should be further education of competitors in respect of the measures that can be taken, including dissemination of information regarding the World Rally Championship measures and also developments emanating from the FIA Closed Car Research Group. Whilst the impact in this incident is deemed to have been unsurvivable, at lower speeds the outcome could potentially be altered, particularly for the crew member opposite the impact side.*

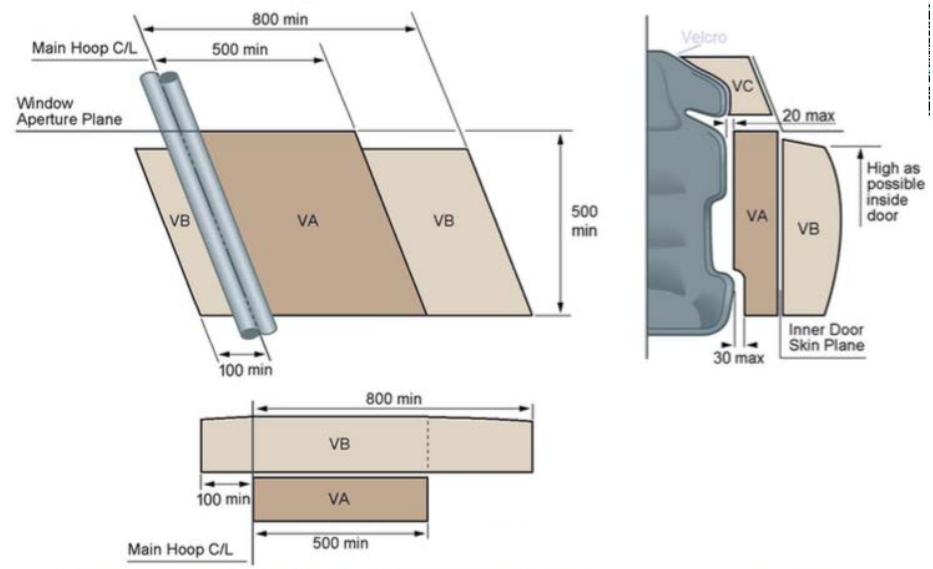
- Based on the coroners recommendation the review panel suggests CAMS should develop a strong predisposition around best practice with regards side intrusion in rallying, with a heightened propensity for regulation, recommendation and education implementation in such areas as, (but not limited to);
    - Seat regulation
    - Safety cage, in particular door bar regulation
    - Safety cage materials and joining techniques
    - Use of racing nets
    - Door sill bars
    - Unimpeded local modification allowance
    - Composite side intrusion panel (load spreading plates)
    - Door and Sill infill foam
    - Seat to B Pillar energy absorption pad
    - Seat positioning (more centralised and rearward)

    - Outer vehicle skin to occupant shoulder measurement
- Concepts such as ‘competition doors’ (allowing more substantial modification and use of Perspex window replacement - saving standard doors on more exotic cars), could be investigated/encouraged. This may more readily allow convex door bar design, load spreading plates and energy absorbing door foam infill.
- Whilst it is accepted or anticipated that the FIA may be at the forefront of safety in this area, it is for CAMS to recognise that enhanced side impact protection is an issue for attention in its domestic competition, particularly in the tarmac rallying or ‘Targa’ events that have become so popular in Australia. As such the potential for saving lives and reducing serious injury is perhaps more acute in such competition compared to other FIA competition.
- A side impact is rarely absolutely square on, that is, at 90 degrees to the longitudinal axis of the car. Whilst appropriate and minimum bar structure should be regulated in rallying to better absorb energy in a direct side-on tree type impact, perhaps of more importance and achievability is to prevent a significant cabin intrusion in the first instance where angled impact is encountered. Forces encountered by occupants, resulting from increased impact deflection (as opposed to energy absorbing but dangerous cockpit intrusion), can be better managed as a result of the development of driver restraint systems including FHR’s (predominately frontal min. angle), laterally supportive seats, cage nets, seat mounting positioning, and the like, offering improved restraint of head/torso movement under impact.
- Key stakeholders were acutely aware of the need and the benefit of improved side impact protection, with comments made by several contributors.
- Energy absorbing foams. In 2016 the FIA released details of the specification, guideline and fitment for energy absorbing foams designed to create a more favourable decelleration of an ocupant, and improved energy management in a lateral impact with a tree . The system incorporates both door foams, and foam in the area approx. between upper seat and b-pillar. The review panel notes that ARCom has provided feedback on the guidelines via CAMS and AIMSS and that there appears little by way of obstacle to implementation. It is possible initial fitments will better suit newer and FIA championship spec cars, however it is intendend that ASN’s apply further regulatory support to encourage the use or retrofit of this system in domestic applications. The energy absorbing foam is anticipated as one of the most significant recent safety advancements in lateral type tree impacts and as such the review panel strongly support CAMS adoption and promotion of it’s use as soon as practical, and consider any suitable amendment to the FIA guidelines or regulations to promote fitment or retrofitment in Australian rally competition.
- Best results from use of this energy absorbing foam system will be associated to appropriate roll stiffness of seat brackets/mounting. As such CAMS should now monitor developments in this area as GIMSS develops new standards for this particular fitment.
- Figure 34 illustrates the results of side impacts in rallying, typically with a tree or pole, resulting in a fundamentally different intrusion to other forms of motorsport impact: This figure is not dissimilar to images obtained during testing of side impact strength (Figure 35).

Figure 34. Ford World Rally car of Francois Duval after a side impact at Rally Japan 2008.

Figure 35. FIA Institute research into side impact with pole (or tree) at 60 km/h

Figure 36. GIMSS has just released initial guidelines and specifications for energy absorbing foams, designed specifically for energy management in a lateral impact with a tree



ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Cost (requiring, where appropriate, phased-in application)
- Attitude/Education – As can be evidenced via comments in the review attitude survey of rally competitors, there will be resistance from some, where any further safety regulation is imposed on them. Education will be the key to changing attitudes
- The engineering to accomplish best practice side intrusion would be difficult and costly to achieve in many road registered cars.
- General compliance with Australian Design Rules and implications for registration.
- Diminished resale of the vehicle caused by the further modification to improve side intrusion safety
- Not all cars would be suitable to adopt the full range of energy absorption options detailed above. However educating competitors of the potential risks of serious injury or death and the options available to increase survivability could develop a culture where the competitor chooses to maximise the range of safety features for the vehicle or chooses a vehicle that has a higher level of side intrusion protection

RECOMMENDATION 3 - ENGAGE SAFETY CAGE MANUFACTURERS

CAMS to host a Safety Cage manufacturer forum to explore, in particular, latest developments in safety cage design as applied to rallying (specifically side intrusion and latest FIA findings), and issues around fitment of FIA spec winged racing seats. The intended outcome of the forum should be that safety cage manufacturers play a greater role in influencing better than minimum specification outcomes, and wider use of latest developments

RATIONALE AND SUPPORTING DATA

- Four prominent Australian safety cage manufacturers were consulted as part of the review to understand their views on current regulation, and the interaction between customer and cage manufacturer and how that may influence seating/cage specifications.
- Safety cage manufacturers have a significant influence over the specification of safety cage installed in a competition vehicle and should be engaged as part of a plan to improve side intrusion protection in rallying.
- Many customers first buy a basic spec seat, potentially based on cost or lack of understanding, and deliver it with the competition vehicle to a safety cage manufacturer and request a safety cage design that accepts the seat purchase. In some instances this can hinder the ability to make any subsequent 'up-spec'
- If both the customer and the manufacturer were more aware and more in sync with best practice trends, the pathway to improved safety via appropriate cage and seat fitment and interaction, and allowance for (even future) fitment of modern spec 'advanced racing seats' would be progressed.
- The critical point that is missed in this typical exchange is the lack of understanding/appreciation of the opportunity that exists at the build stage
- Based on the plethora of competition vehicles in rallying with absolute minimum spec door bars as part of their safety cage, it is reasonable to assert that neither regulation nor the safety cage manufacturer are progressing the issue sufficiently. As such, the manufacturer should be engaged and harnessed as a key tool in highlighting the need for better than minimum standards in rallying.
- In instances of fatality and serious injury, the review has noted heavy deformation of the sill area, in particular during tree side impact scenarios. The outcome of a high level of intrusion at the sill level can be profound on seat and seat mount integrity and hence occupants. It would appear in most instances there is little or no supplementary intrusion protection in close alignment to seat mounting
- A shift in thinking and change of culture to include a better understanding of occupant exposure versus latest developments (particularly the customer) could see a higher quality of dialogue around this issue resulting in enhanced safety cage design, including the ability for fit and fitment of typically larger FIA spec 8858-1999 'winged' or 8858-2009 advanced racing seats.
- Importantly, safety cage manufactures were all amenable to the concept of a manufacturers safety cage forum, where ideas can be discussed and debated to progress a new culture.

The correct approach during the build-phase of a car provides opportunities to adopt the latest safety developments in almost any car (Figure 37)

Figure 37. Nissan Micra built to allow installation of current spec FIA winged seats.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

All Safety cage manufacturers spoken to were very amenable toward the concept of participating in a forum.

RECOMMENDATION 4 - SEAT MOUNTING INTEGRITY

The review panel recommends in concert with other recommendations in this review around improving racing seat and side intrusion standards, that higher standards, specification and scrutineering of seat mountings be considered.

RATIONALE AND SUPPORTING DATA

- Against an increasing and rapidly developed capacity for seat design to accept significantly greater loads, particularly laterally, seat mounting must progress in concert
- In a high speed side or oblique impact, the loads on the seat mounting brackets/rails are very high. Some mounts, including some sliding rails available, are not designed to handle these loads and may deform or break, increasing chances of injury during an accident.
- The review is aware of one rally fatality where failed seat mountings appeared to have been a contributing factor.
- Current Tarmac Technical Regulations for Modern Class vehicles state that it is the responsibility of the competitor to ensure seat mountings are engineered with adequate strength to withstand the forces that may be experienced during a sudden stop.
- In an impact, it is widely acknowledged that the mounting of the racing seat to the chassis of the competition vehicle is an area that typically comes under significant stress, and where failure or distortion through inadequate engineering or best practice fitment.
- Additionally, intrusion of trees and poles into the driver or passenger door aperture, typical of rally impacts, can transfer heavy load and deformation to the seat mount area putting it under enormous stress.
- It is the opinion of the review panel that this risk is heightened in events or circumstances where cars are prepared for less than “full on” competition or the participant is an infrequent or leisure type competitor. Such circumstances do not diminish the forces at impact and the review is aware of at least one tarmac rally fatality where poor fitment caused failure of seat mounts and potentially contributed to this outcome.
- If you support the human body well enough in the right places and keep all parts of the body in the same relationship to each other, a body can withstand enormous decelerations with minimal or no injuries. The four parts of the body which need this support are the head, shoulders, pelvis and thighs.
- Seats combined with the race harness (seat belts) are designed to restrain the upper body and head within the seat, during the deceleration period of the chassis. The proper mounting of the seat and seat mount brackets are essential for minimising seat deformation and deflection under accident impact loads and maximising retention of the body.
- The Review also recommends elsewhere the wider implementation of advanced racing seats FIA 8862/2009 (recommendation 1). Seat-brackets are approved as part of this specified seat system. The seat-brackets must, therefore, be able to carry the loads prescribed by this standard without excessive deformation, as are complimentary to the driver safety restraint system.
- The review panel suggests that where a replacement seat or seats do not use the original seat, seat mount design, structure and mounting points, the completed replacement seat and installation should be inspected by a suitably qualified engineer and noted in the logbook of the car.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Large number of cars will require certification
- Selection and endorsement of suitably qualified scrutineers to check and certify the seats

- Reasonable access to vehicle for a unhindered view of the seat and mountings
- Costs to competitors

RECOMMENDATION 5 - REVIEW APPENDIX J SAFETY CAGE SPECIFICATIONS/REGULATIONS

The Rally Review Panel recommends a review of minimum specifications for safety cage design as per Appendix J, specifically applied to rally competition, embracing modern design aspects, particularly side intrusion.

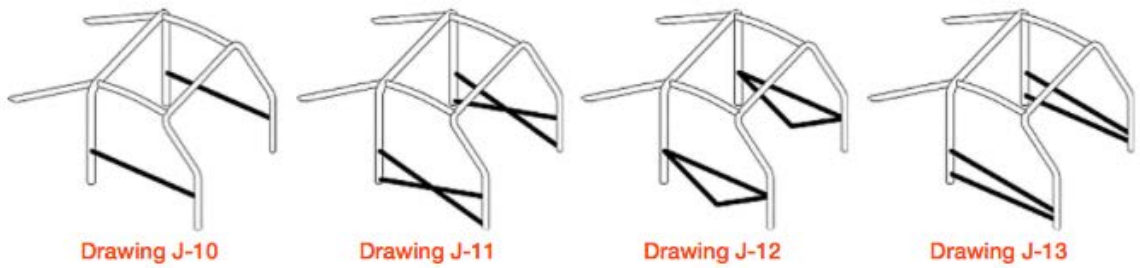
This recommendation includes the need to revise the current requirement to fully recertify a safety cage following modification.

RATIONALE AND SUPPORTING DATA

- There can be no simpler statement to make as part of this review than side intrusion impacts are the single biggest threat in an incident, yet at the same time the minimum standard of safety cage door bar required, as so often used by competitors, appears inadequate in its capacity to optimise occupant protection.
- As has been outlined in previous recommendations, if more can be done to enhance side intrusion protection in rallying, there is a high likelihood that serious injury and/or fatalities can be reduced.
- Of the **9** fatal Australian rally incidents reviewed, **6** were a consequence of side impact. Very significant intrusion by the struck object was observed in some cases.
- It is the view of the review panel that no class or category of rally vehicle should be restricted in applying greater than minimum specifications of a safety cage, as a result of any regulation limiting local modification.
- Whilst minimum specification is the baseline for all competitors, this specification should be put into the background, with enhanced specification cages 'more visual' as the accepted standard.
- It is understood that CAMS rightfully fall into line with FIA safety cage specification, however it is also right for CAMS to recognise the potential shortfall in side impact protection as applied to its specific mandated events and the domestic environment, particularly where minimum standards are used
- Tarmac rallying, particularly Targa events, are popular and becoming more so, requiring a higher standard of side intrusion cage specification as identified by incident types.
- From CAMS Schedule J 2015 – Safety Cage Structures – Doorbars, rally competitors must have one or more doorbars fitted at each side of the vehicle according to Drawings J-10m J-11, J-12 or J-13 (
- Figure 38). In international competition the safety cage structure in each vehicle homologated from 1 January 2007 shall comply with Drawing J-11, J-12 or J-13.
- It should be noted that these safety cage specifications are similar between circuit and rally competition, yet the typical perceived impact they are designed to withstand, deflect or absorb, is very different.
- It could be reasoned that drawing J10 in particular is not adequate protection for a typical competition vehicle/tree side impact
- CAMS Appendix J stipulates that the safety cage structure shall not unduly impede the entry or exit of the driver/crew, and that unless category regulations permit, complete parts of upholstery or trim shall not be removed, but the interior trim and dashboard may be modified locally (eg, by cutting or distorting) in order to fit a safety cage structure. A fuse box may be relocated to enable a safety cage structure to be fitted. Discussion with various cage manufacturers identified a desire for regulations to allow some freedoms.
- Several stakeholders highlighted the current need to recertify safety cage additions/modifications and highlighted the costs associated with doing this as a barrier to improvements, particularly around side intrusion.
- Safety cage design is rapidly evolving and there is no shortage of innovative approaches to improving side intrusion protection (Figure 39)
- This review encourages a seminar (or Webinar) with key cage manufacturers (who, of those consulted were in agreeance with that concept), to both explore regulation improvement and commence a cultural shift to increased side impact protection in rallying, including cage fabricators influence on competitor decisions like appropriate seat selection and positioning. AIMSS would be willing to conduct this seminar.

- The review is aware that the FIA Institute had been researching and progressing development of roll cage design, materials and welding techniques, along with other side intrusion developments/initiatives as outlined elsewhere under 'Future Directions for FIA Rally Regulations'. This is an ongoing "work in progress" and CAMS is encouraged to monitor and promote latest developments.

Figure 38. CAMS Safety cage structures illustrating options for doorbars



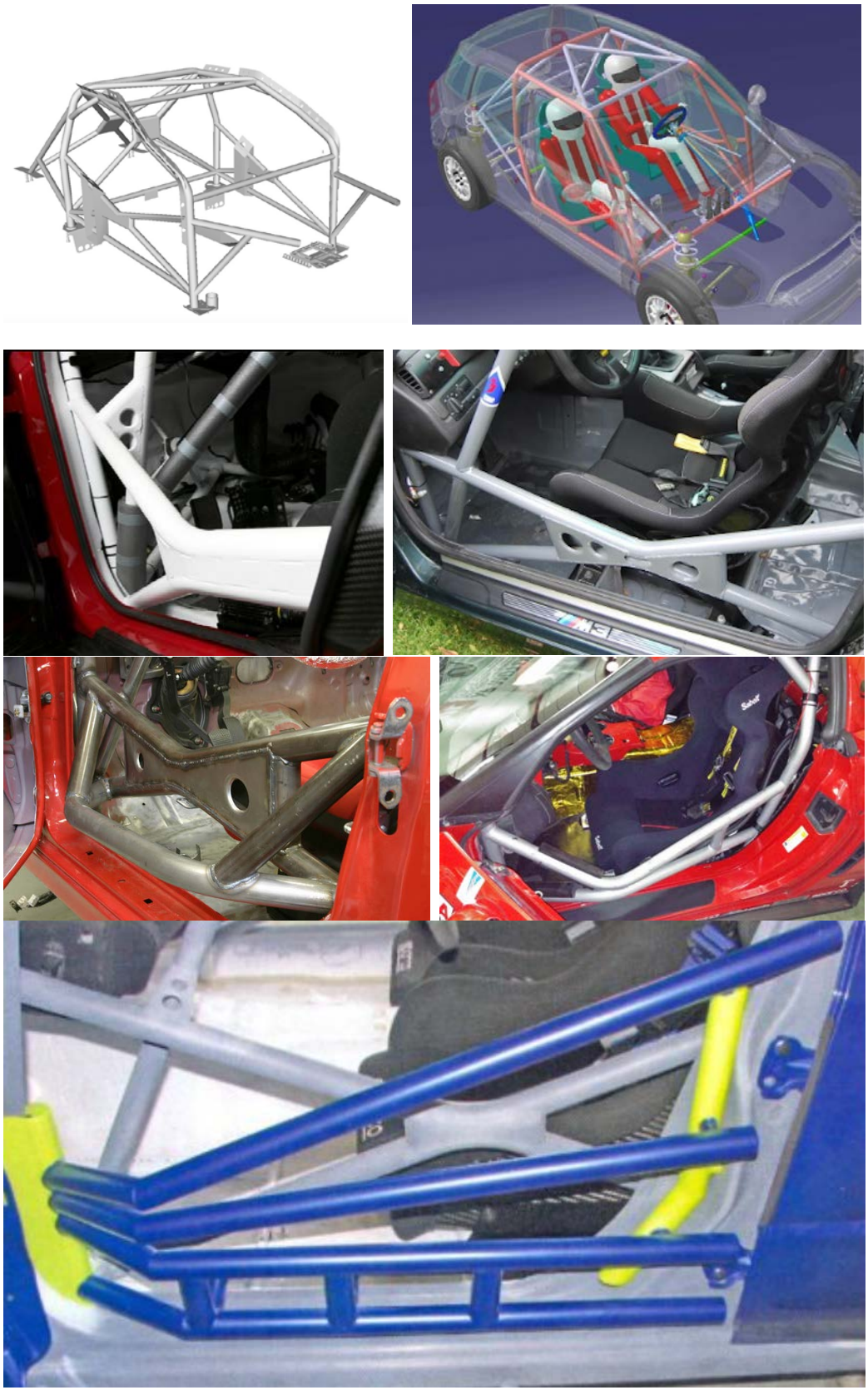
ISSUES AND/OR BARRIERS TO IMPLEMENTATION

Lack of current education, understanding or awareness of the benefit of increased side impact protect as applied to rallying competition, and similarly, limited or no exposure to the traumatic results of a serious side intrusion impact.

Cost associated with implementation of improved protection

Difficulties (sometimes regulatory) in fitting or retro-fitting improved safety features

Figure 39. Samples of variety of safety cage designs focused on improved side protection



RECOMMENCATION 6 - ENHANCED USE OF SAFETY CAGE PROTECTIVE PADDING

The Rally Review Panel recommends amendment to the wording in Schedule J – General Requirements for Cars and Drivers – Protective Padding to highly recommend the need for broader application of safety cage padding, particularly in the region susceptible to head strikes.

RATIONALE AND SUPPORTING DATA

- This recommendation was driven as a consequence of head/helmet strikes sighted as part of the review, and/or the obvious and enhanced ability for head/helmet strike in incidents where there is cage deformation, seat or seat mount deformation, floor deformation, and/or harness loosening or displacement. These conditions are prevalent in heavy impacts, particularly 'intrusion' type impacts (common with tree) or heavy sill damage deforming floor/mounts, and have the potential for head strike to occur well beyond what is contemplated in the regulation below.
- Extract from 2015 CAMS Manual of Motor Sport...

  PROTECTIVE PADDING

  HELMET AND HEAD PROTECTION:
  For vehicles subject of a safety cage structure as per Article 3; Application: where the helmet of an occupant could come into contact with the safety cage structure, protective padding shall be fitted to that area, which complies with:

  (i) International Competition and below, FIA standard 8857-2001, type A (see FIA Technical List No 23 "Roll Cage Padding Homologated by the FIA"); or...

- Upon assessment of incident reports it is clear that in significant impacts helmets can and will strike a safety cage much farther away than a competitor will have accounted for in the fitment of regulated protective padding, or outside of the proximity the CAMS recommendation contemplates.
- Logically, competitors will pad the cage in the proximity of their upper seat and helmet relative to their driving or navigators position whilst seated correctly. It is not at all unusual in significant impacts that;
  - The seat's fixed position is moved as its mounts are compromised or fail;
  - The divers head, particularly in the absence of FHR, winged spec seat and/or safety cage net, may move a significant distance from the driving position;
  - The safety cage may be heavily distorted (there is at least one fatality where the drivers head struck the heavily deformed safety cage on the passenger side of vehicle);
- The current rule is somewhat onerous and open to interpretation. A more appropriate rule may be that as recommended in the FIA drivers safety guide which states "Pad every tube of the roll cage closer than 50 cm forwards and sideways of the head with stiff foam to FIA specification".
- It is the view of the review panel that whilst further research could be conducted to establish a definitive measurement, 50cm (from the exterior of the helmet) would at minimum be a positive step forward, and cheap insurance in the event of a substantial incident.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Lack of education/understanding as to the scope or range of potential head strike when factors such as harness and body stretch/movement are considered. Additionally the adverse effect of seat mount or floor deformation as a result of impact and/or the consequential belt loosening may not be understood.
- Modest increase in cost to competitors.

RECOMMENDATION 7 - DIFFERENTIATE BETWEEN CIRCUIT AND RALLY SAFETY CAGE REQUIREMENTS

Investigate and design recommendations for safety cage construction that allows for the substantially different impact scenarios between circuit racing and gravel/tarmac rallying where trees are the pre-eminent impact source

RATIONALE & SUPPORTING DATA

In rally incidents reviewed (gravel and tarmac), including fatalities, it is often the case that there is a catastrophic, acute, and/or well defined intrusion of the impacted object (usually a tree) into the cockpit (Figures 40, 41 and 41a). In closed cockpit circuit racing accidents the 'impact load spread' is typically across a broader area, with the impacted object usually being another vehicle or barrier.

- Against this background, regulated safety cage specification, including side intrusion requirements do not differentiate between disciplines.
- This review would propose that if successfully modelled, the energy absorption characteristics and load paths/force distribution would differ between disciplines sufficient to suggest that 'rally specific' cage minimum specifications would differ to those applied to circuit racing.
- This may include enhancements and different standards to bar work, gusseting, door bar and cross sheeting, sill bars and/or sill strengthening.
- It should be recognised that few side impact incidents would be at exactly 90 degrees to the longitudinal axis of the car. As such, a greater level side impact strength from the safety cage elements would not only provide greater protection in those instances, but provide potential for a greater level of deflection, which in some instances may prevent tree/pole intrusion in the first instance, from the variety of side impact angles.

Figure 40. Modelled safety cage deformation following side impact with tree.

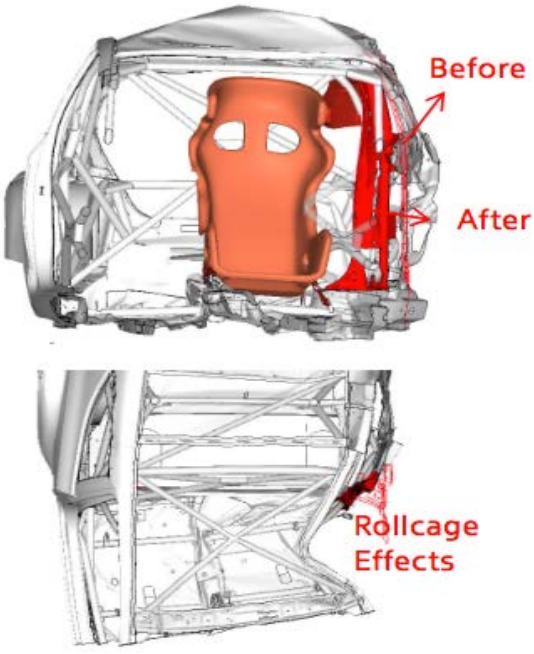


Figure 41 , 41a, 41b. The two impact images below, both fatalities, demonstrate the vey unique cockpit intrusion and deformation typically only seen in rally events as a result of tree strike. Whilst the review panel does not suggest either incident may or may not have been survivable, the significance of intrusion does raise the question of the suitability of very base cage designs approved for use in this style of competition. In the case of pic 41, it appears a single diagonal door bar offering very little lateral force resistance or 'deflection' potential, that is, the vehicles ability to deflect rather than destruct on impact. Looking at image 41b, whilst this was also a fatality, with the report citing possible result of driver head strike in the lateral impact with a tree, it is likely the more substantial side impact cage design pictured may have contributed to the lack of deformation and cockpit intrusion by the tree as opposed to basic specification, resulting in a high force deflection of the vehicle. It would seem logical with the advances in driver restraint systems, including lateral restraint seat development and increased integrity in seat mounting, that a high energy deflection (as a result of increased side impact cage design), which may have previously caused trauma, such as internal/head/neck (as a result of reduced vehicle deformation/energy absorption), would become increasingly preferable and potentially increase survivability.

Figure 41 and 41a. Two individual incidents demonstrating catastrophic cockpit intrusion by tree strike. Fig.41 vehicle has single diagonal door bars only.

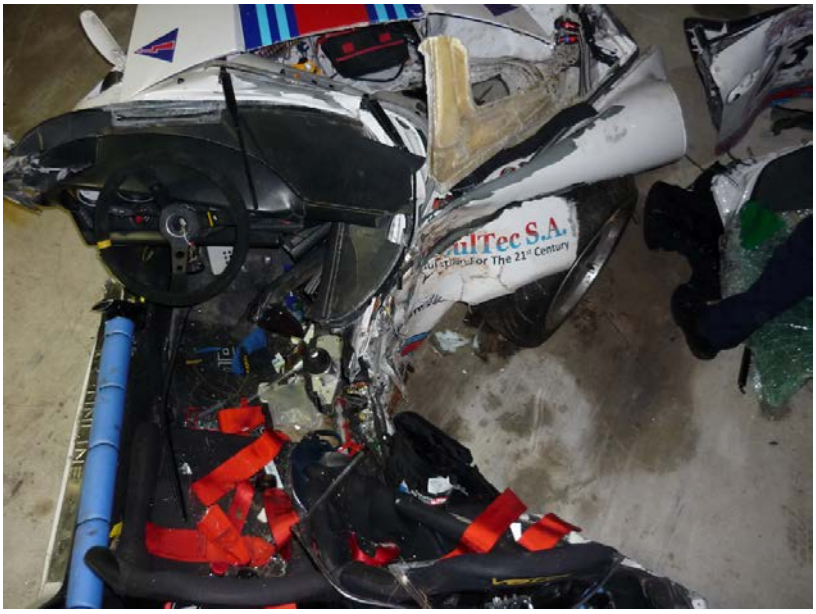


Figure 41(b). Whilst the incident pictured was also a fatality, it does potentially demonstrate the increased ability for deflection from lateral tree strike, as opposed to cockpit intrusion, as a result of a cage design that is well beyond minimum specification with regards side intrusion. Advances in side impact protection including lateral restraint should see high energy impacts and deflections such as this increasingly survivable.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- This recommendation may benefit from co-operation with the FIA Institute

RECOMMENDATION 8 - IMPLEMENTATION OF ACCIDENT DATA RECORDING (ADR) SYSTEM

The review panel recommends a wide ranging phasing in of accident data recorders (ADR's) into National and State level rally competition, to allow an objective and accurate capture of impact data.

RATIONALE AND SUPPORTING DATA

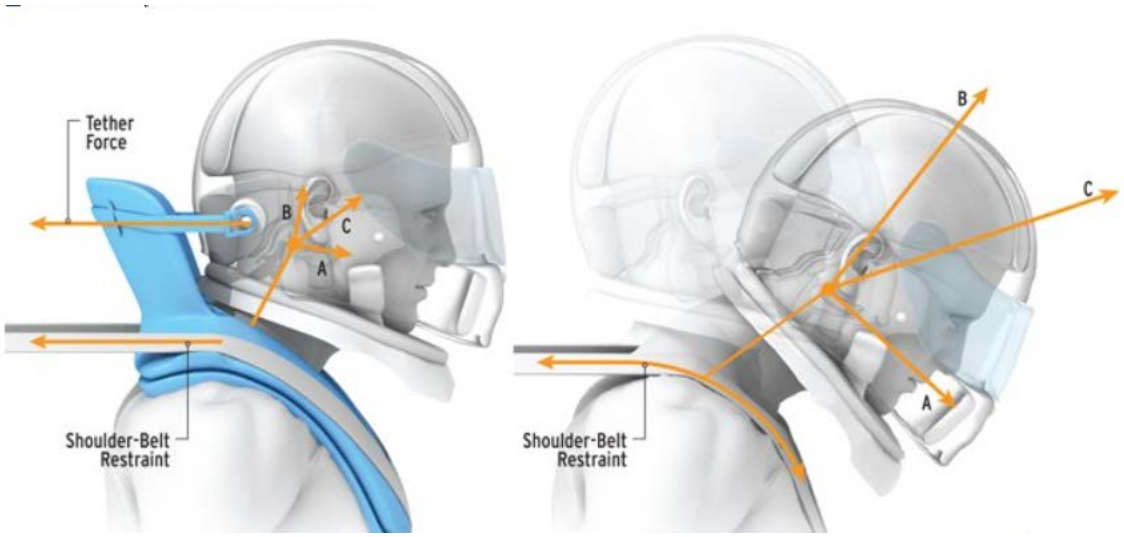
- A significant asset toward future advances in rally safety would be the procurement of 'actual' incident data, in addition to written and photographic data, much of which is anecdotal, any future review would benefit from understanding the actual forces attributed to an incident, both in terms of force values, timing, frequency and direction.
- Not limited to just incidents associated with fatality or serious injury, this data would be of great value when understanding loads attributed to both the failure and/or the success of safety features, components or systems, particularly when viewed within a matrix of competition information such as safety regulation or recommendations for given classes, categories and types of competition.
- Over time, a picture will emerge that will allow more targeted application of safety systems and a better defined and improving delineation between survivable/non survivable incidents. Such data would be of significant value to a future review.
- The review acknowledges that the FIA has mandated for ADRs in all major international categories. In Australia they are compulsory for V8 Supercars and Formula 4.
- The review panel commends CAMS for participation in the FIA World Accident Data base (WADB), however, important incident information, often specific to rally and targa type incidents, will not be captured under the current scheme.
- It is possible the not too distant future will see ADR's (specifically providing vehicle accident/force data) supplemented by crew member worn in-ear accelerometers, to better understand actual forces inflicted on the body of occupants during a rally accident. This currently occurs in F1 and is being introduced into other categories.
- MoTeC has designed an ADR for motorsport to the meet the requirements of the FIA accident data recorder program. This unit uses vehicle power to charge its capacitors so the unit can be used over time without the need for maintenance. This allows the ADRs to filter into lower level competitions as cars get sold, thus increasingly providing accident data at lower levels of competition.
- Current estimates of cost are approximately $1400per unit (including GST), although bulk prices may be negotiated. Lease options may also be available and attractive to lower level competition or event promoter/regulators.
- AIMSS has made preliminary investigations as to the fuller capability of the Rallysafe system/device. As it's technology/capability continues to expand, and given it's widespread use and positive support by rally competitors, CAMS should also investigate the extent to which RallySafe may develop it's system to collect the information required.
- At a minimum, the information collected by any ADR should include parametres in sync with the FIA WADB approved ADR's.
- Raw data on its own is of little use. The implementation of ADR's for the purpose of understanding incidents and contributing toward advancing rally competition needs to recognise the need for engineering, academic and motor sport expertise, to overview the data, analysis, interpret and report so as to be useful. Such, information would be valuable to any future review.
- It is noted that CAMS is considering establishment of a Centre of Excellence. If such a Centre involves academic and engineering research capacity, this is a project that is deserving of priority consideration.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

Cost

RECOMMENDATION 9 - FRONTAL HEAD RESTRAINTS

The review panel recommends implementation of Frontal Head Restraint devices into sub-state level competition



RATIONALE AND SUPPORTING DATA

- Frontal Head Restraints were mandated by CAMS for use in all National and State level competition, including gravel and tarmac rallying, commencing January 2015. However use of a FHR is recommended but not required in Club or Multi-Club rally competition.
- Use of a FHR is not required in Club or Multi-Club competition, yet this level of competition can be conducted on similar, or in some instance on the same (or part thereof) stages used in State or National events. Therefore the currently level of distinction between event levels does not parallel the risk to competitors.
- In consideration of the points below, it is the opinion of the review panel that mandated use of a FHR should be extended to include Club/Multi Club participants in speed or special stage related rally competition.
- The known and undisputed safety benefit of FHR use now widely accepted in motorsport. From Volume#1 of the FIA's Auto+Medical publication, "(the use of HANS)..."has had a profound effect in the reduction of basilar skull fractures in frontal impacts"
- Misconceptions (particularly at the non-professional level) regarding impediments associated to its use are largely unfounded (see note below in "Barriers to Implementation")
- The subsequent popularity of FHR's and reduction in costs to $500 for a 'club level spec' option means the FHR is now is widely available and affordable.
- The current requirement for Club and Multi-Club competitors to wear approved helmets and fit multi-point harnesses to properly restrain the torso, should further endorse a move to FHR use at this level
- CAMS currently highly recommend the use of a FHR in Club and Multi-Club competition
- Previous Coroners report from a rally fatality has recommended use of FHR.
- Should a forward impact head/neck related fatality occur now at the Club or Multi Club levels of competition without regulated FHR, such circumstance in light of the above points would challenge the logic as to why FHR is not regulated
- WRC is about to enter its 12th year of compulsory FHR use in competition

- Underscoring the relevance of FHR use at all levels of competitive rallying, Table 1 clearly demonstrated that 'frontal impact' (just ahead of side) was the most common type of accident of all impact directions, and also the most likely to generate injuries.
- Spinal and neck injuries were the most frequently reported types of injuries reported by competitors
- The review has identified the need for quality competitor education around FHR use.
- Encouragingly, there is also a groundswell of rally competitors that are happy to use it or would now not compete without it.
- It is acknowledged, in part due to lack of data, that grass roots rallying has not been highlighted in this review as particularly problematic, supporting a phasing in of regulation.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Requiring FHR at lower level competition will increase costs at the grass roots level which could impact participation
- Many helmets compliant with use in Club and Multi-Club competitions such as popular **SNELL SA2000** and **BSI 6658-1985** standard helmets (including open face variants), can be properly retro-fitted with FHR tether inserts very cost-effectively. Additionally, those Club competitors who have voluntarily up-spec'd to popular **SNELL SA2005** non FHR tether insert helmets can also be similarly retro-fitted. The cost of FHR tethers is approx. $100 plus any fitment cost. This will cover a broad range of popular helmets purchased over many years. However there will be instances where helmets will need to be replaced to accept use with a FHR, in addition to the cost of the FHR itself.
- Note: Whilst the review has not conducted an audit of helmet standards used exclusively by Club level competitors, the above listed FHR retro-fit capable helmet standards (and appropriate for regulated use in Club/Multi-Club competition), is anticipated would capture a large portion of popular motor sport helmets.
- When providing for the Term of Reference for this review which state "that the suggested measures are practical, affordable and reasonable in the context of the growing popularity, accessibility and profile of rallying" consideration will need to be given to the variety of commentary and feedback from some competitors surveyed, that may resist regulated implementation of FHR's. Much of the commentary is uninformed, misguided, and/or anecdotal and not at all evidence based, underscoring the opportunity and requirement for a phased in approached in concert with competitor education.
- Several competitors have raised concerns about the FHR's impact on extrication from cars after a serious incident.
- General entry and egress from cars has been raised as an issue, seen as more problematic by some competitors due to the age/flexibility/fitness compared to professional drivers who do it with ease.
- Several competitors have raised concerns about the ability to either reverse, or turn the head at intersections on transport sections (between competition stages). Smaller cockpits has been raised as preventing removal and placement of helmet/FHR device.

The above points further highlight the need for education around use of FHR device, particularly at the non-professional levels of the sport.

RECOMMENDATION 10 - COMPETITOR LICENSING

The review panel recommends reviewing Competition licencing so as to apply more relevance to level of competition via a competency and experience-based system for new rally licenses

RATIONALE AND SUPPORTING DATA

- Rally licensing in Australia has a number of tiers, International, National and Clubman. To obtain a National or Clubman level license you must complete and pass the relevant CAMS on-line lecture and if under the age of 25 years (or over the age of 25 and not held a civil drivers licence for a minimum of 5 years), demonstrate your driving competency to a CAMS official via an Observed License Test. An Observed Licence Test is where your driving style, ability and attitude are evaluated in simulated competition conditions.
- A Clubman licence allows a competitor to compete in rally events with a status from Club up to State level Championship. There are no restrictions on vehicle type, course difficulty or stage speeds.
- Rally events are often run as multi status events where various competitions are run in conjunction with a higher level ARC or State Championship.
- Stakeholder comments were numerous and unanimous about competitor licencing and competency. All indicated concern that current licensing rules were too easy and there was no mechanism to prevent inexperienced or unskilled drivers from competing in high-powered cars. It was suggested that improved training and a higher level of demonstrated competency was required and that a staged license system could be implemented in which competitors need to finish a certain number of events before they can step up to the next licence level. The vehicles able to be driven would be linked to the license level to prevent inexperienced competitors driving over-powered vehicles.
- The Competitor survey, on the other hand, indicated that the least experienced drivers had the least incidents and experienced International and National event competitors the highest. However the Review Panel believes training is key to the future of rallying in this country and needs great attention in the short and long term.
- Based on the information received during this review, it is recommended that a competency and experience-based rally license system be adopted for all new Rally licenses.
- In addition, stakeholder input recommended that competitors be forced to compete in the regulatory section of Targa events prior to moving into the full targa style event.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Designing the licence system for the appropriate level of experience/competency
- Problems with defining or determining competency and identifying appropriate people to assess the drivers competency
- Should a navigator's/co-driver's Licence also be tiered?

RECOMMENDATION 11 - TARGETED EDUCATION

The review panel recommends in addition to any other competitor education envisaged, a targeted exposure to influence attitudes across three primary areas of competition…

1. **Higher degree of exposure to the confronting the reality of a competition incident (particularly tarmac rally).**
2. **Understanding the tangible benefits of enhanced side impact protection.**
3. **Better education around appropriate vehicles, vehicle types, and suspension settings for different road speeds and types**

RATIONALE AND SUPPORTING DATA

- Many areas of increased competitor education will assist in paving the way for increased safety and reduced injury or fatality. However, there are three areas the review panel has identified which are highly likely to influence outcomes, and of which competitors may not be overly exposed to or appreciate.
- The current landscape and some of the challenges within it can be summarised by comments from a well-respected key stakeholder...

> *In many ways there is an almost perverse dislike against those who try to make our sport safer. The moment that CAMS or Events try to bring in a safety measure there are many within our sport who object strongly that no one has the right to stop them competing at the speeds they wish to; the build quality of the car; the roads selected; the competence of the crew etc. I have been abused by competitors for introducing a speed limit; for not allowing low volume space framed cars; for not allowing open top cars; for having too many chicanes to reduce speeds... We have no structure in place to stop inexperienced or non-proven crews driving in any vehicle at any speed the vehicle is capable of running at".*

- It will be very difficult for CAMS to implement safety change against a backdrop of inappropriate attitudes, misinformation, or worse, no information. As such those that will benefit from progression in safety (who also ultimately pay for it) must be aware and educated as part of the very culture of competition. An education strategy will be key to getting the required 'buy in' allowing less resistance to positive change.
- Higher degree of exposure to the confronting reality of a competition incident (particularly tarmac rally) will assist with the message that events are there to be enjoyed, but with a very clear vision of being with his/her family on Monday.
- Understanding the tangible benefits of enhanced side impact protection This would include exposure to statistics of serious injury/fatality contributed to side force and intrusion (including not inappropriate vehicle damage imagery).
- Better education around appropriate vehicles, vehicle types, and suspension settings for different road speeds and types. This aspect of the education stems from comments that in too many instances a low slung stiff high performance vehicle has lost control as a result of inability to manage bumps/undulations that are hugely magnified at high speed, and potentially not within the scope of vehicle design or it's suspension settings.
- Information and data analysed during the review relating to the fatal accidents, found that (6/9) accidents were triggered by the crew losing control of the vehicle after encountering a crest or bump, a bend or combination of crest, bump or bend at high speeds.
- An enormous amount of damper and suspension work is undertaken to manage/optimise a tyre's contact patch (and hence grip) on smooth circuit racing. As a generalisation, the infrequent upper end of that scale in damper shaft travel is around 1m per second. It would be envisaged that a tarmac rally competitor on a

typically bumpy country road stage would go well beyond that figure, and more frequently, with a fraction of the development done (if any) to manage it.

- This recommendation does not envisage or propose competitors go down a spending path on damper/suspension development, but as the education basis here implies, they are more aware of it. This could then result in better understanding the car/suspension/tyre capability and adjusting speed (simplest and best option), or could result in enhance suspension development, or alternatively competing in a vehicle more suited to the purpose.
- It is the opinion of the rally review panel that high performance low slung sports cars that are envisaged to be driven at the limit would be better served doing so on a race circuit designed for purpose.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- If new License standards are to be introduced, such education programmes should be part of that process.
- Reluctance of competitors to attend education sessions, particularly those who believe their experience supersedes the need for such training.

RECOMMENDATION 12 - COMPETITION TRAINING OPPORTUNITY

The review panel recommends the creation of opportunities for inexperienced competitors (drivers and crew together), to train, learn, and to critique their skills in an authorised, safe environment outside of competition, in their own vehicle at up to competition speed.

RATIONALE AND SUPPORTING DATA

- In most forms of motorsport, and in fact sport more generally, there is adequate opportunity to learn and critique core skills before 'full competition' is undertaken. For example, in circuit racing there is no barrier to the amount of practice one can undertake, at full racing speed, in pursuit of refining one's skills in preparation for competition.
- Because of the unique nature of rallying and in particular it's requirement for navigating through long stretches of somewhat unfamiliar territory on closed public roads, the opportunity for the driver and co-driver to learn the basics and then refine or refresh their skills for competition, at competition like speeds, is a similar environment, has been almost non-existent and significantly undervalued to date in rallying as a key learning instrument and safety measure.
- Currently a person who has never rallied may purchase a very high powered car (even a World Rally Car), take out a CAMS club license and compete in a multi-club level rally event, with an untrained co-driver, and attempt to drive at speeds similar to those driven by the best drivers in the world over roads that are no different to those used in world championship events. The outcome could be catastrophic!
- Competency, or lack thereof, relative to competition opportunity, consistently came up as a topic in the review. However it is difficult to increase competency and experience when you are not able to practice outside of events.
- An observation made during the course of the review has been the disparity, sometimes significant, between how more professional drivers/co-drivers go about their craft as opposed to 'enthusiasts' or non-regular competitors. This in itself may not be seen as problematic, however in the case of rallying the 'competition environment', including speeds attained and exposure to risk do not differentiate between competitors. This disparity not only applies to the level of skill, but the general application and understanding required to compete safely and successfully in rallying.
- As a general observation, this circumstance appears more prevalent in tarmac rallying events where there is more often an (understandable) amateur and social aspect to competition, which, without an appropriate training and education opportunity is putting some competitors in a potentially dangerous environment.
- Creating and reading pace notes proficiently including the appropriate communication thereof between driver/co-driver is a critical part of education/training
- This observation is supported by both submissions and anecdotal commentary from key stakeholders, in addition to responses from the AIMSS competitor attitude survey.
- Central to many concerns is the need for both co-driver and driver to become more proficient in all aspects of pace noting, including, but not limited to, training in the appropriate creation or procurement of notes, and the utilisation of same in competition.
- Competitors who buy 'retail pace notes' are potentially at greater risk, as they have taken little or no 'ownership' of the descriptions within the notes, nor their own take on magnitude or thresholds.
- Experts agree that proficient rallying requires a more personal interaction between a crew and it's notes, and are intimately shared and understood by both parties. The absence of such means exactly what it is, the crew are driving to a set of notes on paper, with an absence of a more intimate relationship between the notes and the actual roadway being competed on.
- The review understands the potential need and growth of 'retail pace note' supply, which simply reinforces the requirement for appropriate rally competition training for less than experienced crew.

- The opportunity to misread, misinterpret or not fully utilise the benefit of quality notes, and the accompanying communication between driver and driver, should be minimised to any extent possible.
- There are instances in fatalities where potential causes of an incident have been contributed to by errors, lack of proficiency or appropriate communication between driver and co-driver. This raises potential concerns regarding the proper creation, utilisation and understanding of the critical importance of proper pace note use in rallying, where good practice will support both safety and competitiveness.
- As an example, with regard to the Mansell Targa fatality 2013, there is clear evidence in the immediate pre-staging, a lack of communication on key issues with regards the upcoming stage. No communication is evidenced regarding (the low) average speed required to achieve the base time, or specific issues to be aware of. This is considered good practice, and considered fundamental by professional rally participants. There appears to be a general lack of commitment to basic good procedure in several areas of this teams approach, which may/may not have contributed to the fatality, but does potentially demonstrate the requirement for improved knowledge through training and education as to best practice.
- Training in any sport or profession teaches and reminds us of good or best practice.
- It needs to be strongly acknowledged that the training and education on the proficient use of road books, pace notes and the art of 'rally cockpit' communication is every bit the equal (and arguably greater) responsibility of the driver. From the review feedback this critical aspect is too often construed as the primary domain of the co-driver. One stakeholder stated:

  "Targa Australia introduced the countries first tarmac rally training program this year with the Targa Experience. This event was endorsed by CAMS and was a huge success. The role of this training needs to be expanded in the year ahead with a view to it being mandatory for all new competitors to complete this course before being issued a National Rally licence to compete in any tarmac rally. Given the location being Mt. Buller, the program can easily be expanded to include gravel rallying also as there are a number of gravel roads close to the Village that could be utilised to conduct the physical component of the training".

- The review panel notes that rally training programs have been created by car clubs and State Rally Panels, the content and format of which vary. However many of these are desktop exercises which do not provide in-car experience for crews.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Lack of physical facility available to conduct training
- Potential for road damage to occur and associated costs

RECOMMENDATOIN 13 - ENFORCE EVENT AVERAGE SPEEDS

The review panel recommends the enforcement of average speeds as envisaged in competition, including readily achievable zero times across all Targa events

This recommendation also relates to use of tarmac rally standing regulation

RATIONALE AND SUPPORTING DATA

- The typical rally course goes through a living environment which changes in each stage of the same rally, and by default has little or no design element to capture or safely arrest wayward or out of control vehicles. Therefore the speed of competing vehicles needs to be carefully monitored to ensure competitors can enjoy a level of spirited driving on a challenging piece of roadway, whilst at the same time capping average speed over each stage to lessen the potential for catastrophe.
- This is not a new concept, and in fact the CAMS Tarmac Standing Regulations calls for course design to account for a 132kph maximum average speed.
- During a review of average speeds it was noted that many events contained stages where the base time required average speeds exceeding 132 kph. While the data demonstrate that some competitors achieved the base time it is not possible to determine the actual average speed because their notional time was the base time.
- The review of average speeds clearly demonstrated that the in each of four selected Targa events for the year 2011 to 2014 the average speed of the fastest competitor was well above 132 kph, up to 155 kph. The review panel notes that Targa events do not run under the Tarmac Standing Regulations and as such there is no speed restriction.
- The review does note, unlike Targa West for example, Targa Australia promoted competitions as listed in their 2015 (and previous) event Supplementary Regulations, expressly note they are run under the Authority of the CAMS NCR's, but do not list the CAMS National Rally Code or CAMS Tarmac Rally Standing Regulations, whereas Targa West does (which is where the 132kph limit is stipulated). The review has not determined if there is a default requirement to comply with the CAMS National Rally Code and/or CAMS Tarmac Rally Standing Regulations if operating an event under the authority of the NCR's.
- The link between vehicle speed and serious injury has been established during the review. Currently the standing regulations for Tarmac rallies impose a stage average speed ceiling of 132kph, Gravel and 'Targa' Rally disciplines do not. However, it should be noted that for all intents and purpose, a Targa rally is a "Tarmac rally", which raises an anomaly as to why no maximum average speed applies.
- The speed data analyzed during the review indicated that some average speeds for Targa competitions were significantly higher than those for the Australian Rally Championship and at some events were similar to, or faster than average V8 Supercar speeds on a homologated FIA circuit with all its inherent safety features, and the significantly greater level of safety requirements for the vehicles and occupants.
- At the coronial inquest into the death of a Targa Tasmania competitor, it was noted that in the opinion of Mr Ed Ordynski, former Australian Rally Champion and former Chairman of ARCom, that the concept of based times as a method of regulating speed probably causes speeds to escalate. Mr Ordynski told the inquest that by his calculations, two dozen stages on the 2013 event had base times which required competitors to exceed an average of 132 kph, with the highest speed of 196 kph on the Oldina stage.
- Targa New Zealand imposes an event maximum speed limit of 200kph and a stage maximum average speed of 135kph**.** Competitors stage times, plus penalties, are used to determine a competitor's position/place in the competition. Targa New Zealand does not use a base time system as used in Targa Australia and the event website boasts zero fatalities in its 20 years of operation.

- The issue has been raised during this review regarding the impact of having (sometimes unachievable) base times, and then publishing the results of competitors against them during the competition. The New Zealand Targa experience of not setting a base time may require further specific research and may (or may not) provide an indicator as to the impact that this may have on potentially pushing a competitors 'competitive spirit' potentially beyond his capability or that of his/her environment. It could be argued if base times were not used and outright times were the deciding factor, cars would have to be driver as fast if not faster.
- Limited data collected from the RallySafe system for ARC events clearly demonstrates that the maximum speed obtained on stage was 1.7 times higher than the average speed.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Targa Event organisers are concerned some of the sought after 'thrill' may be diminished from their event and the potential negative impact on the future participation by competitors who seek the higher speeds that have become part of the Targa experience
- Reducing average speed does not reduce terminal speed or speed on approach to a hazardous corner or section of roadway
- Modern Targa in Australia has been built on modern high performance cars and base times that regularly require the competitor to achieve average speeds well in excess of 132km/h
- There will be issues around how speeds are policed and what actions are taken when speeds are too high
- Organisers will need to undertake regular/ongoing changes and reviews of stages that exceed the average speed limit
- The introduction of chicanes or other course obstacles may increase the likelihood of road damage as cars brake and then accelerate heavily on the same patch of tarmac.
- Increased education and training of correct placement of course obstacles would be required to ensure they are placed in appropriate locations.
- Note: RallySafe does provide part of the response/solution to these barriers – see further recommendation

RECOMMENDATION 14 - ENFORCE A MAXIMUM SPEED OF 190KPH

The review panel recommends the introduction of a maximum terminal speed of 190kph during any Australian rally competition.

RATIONALE AND SUPPORTING DATA

- The review panel is not aware of any currently regulated maximum speeds in rally competition.
- While provided for under Section 5.5.3 of the CAMS Tarmac Rally Standing Regulations, one stakeholder suggested that individual events which had enforced a maximum speed limit had suffered by doing so as competitor number declined. This suggests that the decision to impose a maximum speed limit needs to be transferred away from event organisers who have a financial interest in maintaining an appealing event.
- The decreasing cost of older 4WD turbo rally cars has increased their appeal as entry level cars.
- The review panel understands that ARComhas become increasingly concerned by the very high terminal speeds (>200 kph) of some of the unrestricted 4WD turbo cars. A 36mm restrictor has been introduced from 2016 for all the currently unrestricted turbo 4WD cars running on pump fuel, however, as the maximum speed data from two ARC events show, some cars are still able to reach speeds of almost 200 kph.
- The review panel is not aware of any such plans for tarmac rallies.
- Nothing in the research or feedback received as a consequence of the review points to any significant group of competitors looking to attain high terminal speeds.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- The introduction of such a limit will no doubt attract resistance by those who believe it is their “right” to “manage” their own risk rests with the individual.
- Such a move may see some event organisers run, or endeavour to run, their events outside of the CAMS regulatory regime.
- Relies on systems being in place to physically cap terminal speeds and/or competitors using an electronic monitoring system that allows organisers to monitor terminal speed.

RECOMMENDATION 15 - WIDER APPLICATION/USE OF RALLYSAFE (OR SIMILAR) SYSTEM

The review panel recommends the wider implementation and broadened use of the 'RallySafe' (or similar) system, gaining further efficiency from the available technology as applied to safety

RATIONALE AND SUPPORTING DATA

- Accidents will always occur during rallies as crews push their limits and those of the vehicle.
- Current regulations for vehicle tracking through special stages are vague and would benefit from a clear set of guidelines and minimum requirements, standards (including radio communications network) and competency of the officials manning the system.
- It is recommended that the minimum standard of vehicle tracking for all rallies should consist of both a manual SOS vehicle tracking systems and an electronic Status Awareness System (such as RallySafe).
- The RallySafe system is currently used in the Australian Rally Championship, Targa Australia and a number of other state and national status events.
- The safety benefits of RallySafe have been identified in this review and by numerous stakeholders. Its ability to deliver information to competitors and official in real time, of the status of all vehicles on stage is a significant step forward in safety and risk management.
- All stakeholders had favourable comments about the RallySafe system with the majority suggesting mandated use of the system at national and state events, at a minimum. It was recognised that the system can fail so it cannot replace human tracking.
- Support for Rally Safe and its use in most rally levels, was the seventh most popular comment in the competitor survey.
- Several stakeholders also suggested that the features of RallySafe could be enhanced to provide advice/warning which are currently included in road books which would save potentially missing this information as co-drivers swap between safety notes and road book.
- Stakeholders suggested that adoption of RallySafe technology would also provide advantages in management and control. The system has proven itself effective and reliable and eliminates many of the human error factors associated with safety tracking. It is believed RallySafe dramatically reduces response time and provides clearer picture for recovery crews.
- The rally review panel notes that RallySafe is currently the only such system used in Australia. In making this recommendation, the rally review panel is not specifically advocating for RallySafe as a commercial entity, but rather the use of an electronic system for vehicle tracking.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

Rally Safe is an event supplied/managed feature that normally requires RallySafe personnel on and off site to monitor and facilitate the smooth running of the system. There are a number of key barriers to implementation including;

- affordability at grass roots level events
- hardware and event management fees
- sufficient personnel with the proficient level of expertise to run the system
- training of competitors and officials

It is also noted that currently RallySafe has a monopoly on this type technology in Australia which leaves CAMS and competitors vulnerable to price increases. CAMS is encouraged to undertake a cost/benefit analysis of the adoption of such a system.

RECOMMENDATION 16 - WIDER USE OF ARTIFICIAL CHICANES

The review panel recommends the wider use and increased strategic placement of artificial Chicanes, in particular to arrest speed approaching areas of potential high risk to the broad competency of competitors, provided these can be safely installed and maintained.

RATIONALE & SUPPORTING DATA

- Rally Special Stages are conducted on gravel or tarmac roads and selected by the event organisers to test the "*skill of the crew and capabilities of the vehicle*" (refer CAMS National Rally Code 1.25).
- The living environment that these roads are selected from presents a number of safety factors from which high vehicle speeds substantially increase the risks of death or serious injury should the driver lose control of the vehicle.
- Selecting roads and terrain that have a natural attribute to limit the speed of the vehicle is not always possible so artificial speed calming devices such as chicanes are considered by rally organizers to reduce the speed of the competing vehicles.
- These chicanes should be designed and strategically placed to reduce the vehicle speed in high speed, high risk sections of the special stage. They are normally of a physical nature using devices such as plastic water barriers (unfilled) commonly seen during road and site construction, or hay bales.
- Physical barriers introduce a number of problems, primarily
    - Vehicles often clip the barrier, which can open up or tighten the chicane for the next competitor
    - Require a judge of fact to determine if a competitor has gained an advantage through clipping the barrier
    - Potential safety concern when vehicles impact the barriers
    - Potential safety concern to event staff when repositioning the barriers during a live stage. Barrier chicanes can move and in Targa events, as the gap between cars gets tighter (because they start slowest car first then fastest) a very small time gap may be available to rectify a displace chicane.
    - In Tarmac rallies with narrow width bitumen roads the chicane placement causes the vehicles to use the verge of the road (loose gravel etc). A sudden change of grip may increase the risk of an accident.
    - Increased road damage in the area of the chicane caused by heavy braking and acceleration, particularly on gravel.
- In recent years modern technology has provided an electronic or virtual chicane solution. For instance, Rally Safe has a function that notifies the crew of a virtual chicane and monitors the vehicle for a set maximum speed through a predetermine section of the special stage. Virtual chicanes remove the problems associated with physical chicanes where barriers can be moved or damaged after a collision.
- A direct benefit from the adoption of Rally Safe (recommendation 15) can be a wider use or increase the use of virtual chicanes for sections of the stage where the potential for a high speed accident could occur.
- Information and data analysed during the review relating to the fatal accidents, found that (6/9) accidents were triggered by the crew losing control of the vehicle after encountering a crest or bump, a bend or combination of crest, bump or bend at high speeds. Data from the 'Competitor Attitude Survey' established that there is a significant association between the speed of the vehicle immediately prior to the accident and whether an injury occurred.
- The application of virtual chicanes is a solution to managing high risk sections of a rally special stage. Currently Rally Safe is the primary supplier for virtual chicane technology and systems. The increased favour by rally organisers to use the Rally Safe system for vehicle tracking etc. is encouraging and through regulation and specific protocols virtual chicanes can be an effective tool to mitigate serious injuries or death.
- The Lake Mountain Sprint, a tarmac rally conducted under AASA sanctioning, has mandated RallySafe in all competing vehicles and uses the GPS tracking to create 'electronically-policed,' restricted speed zones on

competitive stages. CAMS has used the same technology to monitor speeding on non-competitive stages of the Australian Rally Championship.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Costs to hire and install physical artificial barriers
- Costs to hire the Rally Safe units and event service fee
- Competency of officials and competitors with the Rally Safe system
- Training of officials and competitors
- Adequate inventory of Rally Safe system and technicians to cope with the number of rallies conducted each year.
- Procedures for dealing with technology failures where the RallySafe system stops working or similar.

RECOMMENDATION 17 - COMPULSORY RECONNAISSANCE ON PACE NOTED EVENTS

The review panel recommends consideration be given to regulating reconnaissance for events allowing pace notes.

RATIONALE AND SUPPORTING DATA

- Through the online survey of competitors it became apparent that there was a group of competitors, primarily tarmac competitors who purchase safety notes but never, or seldom, drive the competitive stages prior to competition.
- There is disagreement within the rally community about the primary purpose of safety/pace notes, and it is the philosophical viewpoint of the competitor which is important in defining how they use notes.
- ARCom has suggested that pace notes are designed to enable the driver to drive faster over the stage, while safety notes are designed to enable safe passage for a competitor who has not necessarily done reconnaissance. While this is a technical definition of the purpose of the notes it is not clear how this difference translates for a competitor during competition.
- The CAMS National Rally Code makes no reference to safety or pace notes, nor provides any definition.
- Safety notes and pace notes share the same definition in the CAMS Tarmac Rally Standing Regulations (Section 1.5) where they are defined as an aid to the driver which describe the nature of the road as perceived by the crew. They are separate to the organiser issued road book and have the purpose of increasing competitor safety.
- Irrespective of whether crews consider their notes to be safety or pace notes, both have the effect of increasing the speed crews can traverse the course by increasing driver confidence that there will be no 'surprises' which they do not know about.
- The review found that safety notes can heighten the competitiveness and commitment of the competing crews as the notes guide the driver beyond the physical inputs received when traversing the stage at speed.
- All rounds of 2015 ARC provide competitors the opportunity to complete 2 passes of each stage. However only International Rally of Queensland and Scouts Rally South Australia require competitors to complete a minimum of one pass.
- Targa Australia provides competitors the opportunity to reconnaissance each stage a maximum of 3 passes on any one day. Reconnaissance in competition vehicles is not permitted. The relevant state traffic laws and speed limits apply.
- Stakeholder comments highlighted the extreme skill required by both driver and co-driver not only for creating notes, but also using them in an efficient way.
- The purchase of notes can be seen as a way for inexperienced competitors to make sure that they don't miss important course features, however stakeholders noted that often these notes are more intense than required by new competitors. They also questioned the ability of inexperienced co-drivers to deliver the information within the notes correctly.
- Given the purpose of notes is to describe the nature of the road as perceived by the crew, it is difficult for the review panel to see how this is achieved when a crew does not actually drive the route prior to competition, irrespective of the quality of notes available to them.
- The review notes there is no training, licensing or certification for the suppliers of pace notes. While regulating the production of notes by commercial operators is one option, ultimately market forces probably partly do this with only good quality and reliable suppliers able to maintain a viable business.
- The majority (58.9%) of respondents in the online survey agreed with the statement "In events allowing safety notes, reconnaissance should be compulsory", with 25.3% agreeing and 33.62% indicating strong agreement. The lowest agreement occurred in respondents competing in tarmac only events (52.6%

agreement), while the highest occurred in respondents who compete in a combination of gravel and tarmac events (65.7% agreement).

- It is noted that reconnaissance is conducted in a road car, typically on open roads and as such are subject to normal road rules. Therefore reconnaissance is not practice, with the sole purpose of identifying potential hazards for the crew on the route prior to competition.
- The review panel believes that reconnaissance may also assist with helping crews get into the right headspace for competition by giving both the driver and co-driver practice at delivering and interpreting the notes, especially for competitors who may only use notes once or twice per year.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Most rally competitors are not professional race teams and take time off from their jobs or businesses to compete in rallies. The additional time and cost required by competitors to conduct reconnaissance may be prohibitive.
- Making reconnaissance compulsory could detrimental to the number entries (refer to the above point).
- It could be difficult for organisers to obtain approval from councils, police and other authorities, to conduct reconnaissance.
- Reconnaissance does have the potential for negative community impact and this must be taken into account.

RECOMMENDATION 18 - WIDER USE AND IMPROVED SELECTION OF COURSE WARNING BOARDS

The review panel recommends that organisers broaden and enhance the use of course warning boards to indicate hazards, including on pace noted events.

RATIONALE AND SUPPORTING DATA

- This particular topic received one of the strongest endorsements by competitors on the online survey with over 80% of respondents agreeing with the statement that 'organisers should use course warning boards to indicated hazards, even in pace-noted events'.
- Having hazards noted in road books, on safety notes or electronically via RallySafe does not replace the physical presence of a marker at the point in question, particularly for inexperienced competitors who sometimes get overwhelmed by the amount of information being delivered.
- Given the overlap of some competitors in both tarmac and gravel rallies, and the need for consistency safety messages, it seems prudent that tarmac and gravel events should share the same course warning standards.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Logically there should be few barriers to implementation, other that some organisers believing that their current system is the best and therefore not being willing to implement a standard system.

RECOMMENDATION 19 - BLACK SPOT HAY BALE IMPACT PROTECTION

The review panel recommends adoption of hay bale impact protection on known or likely black spots.

RATIONALE AND SUPPORTING DATA

- The FIA Institute has completed testing and developed guidelines for use of readily available round hay bales as a cost effective, successful impact absorbing medium. Successful employment of hay bales turns a 60 kph side impact with a pole or tree from fatal to survivable.

- It would be fanciful to imagine that every large tree that presented a danger on a rally stage could be cost effectively protected by a hay bale. However it is entirely logical that well considered placement of a few hay bales at known or probable black spots may prove a life-saving strategy.
- Guidelines for use of straw bales in motor sport (extracted from FIA Institute documentation)
    1. The use of straw bales may be considered as a means of creating a barrier to absorb impact energy and/or to distribute the impact over a larger area. They are typically used to reduce the potential for injury to participants during impacts with trees and other obstacles on rally and hill-climb courses but are not recommended for closed circuit racing.
    2. Bales are readily available in many countries, in a number of shapes either cylindrical or rectangular.
    3. Cylindrical bales are to be stood with the axis vertical and precautions should be taken to guard against the possibility of an impacting vehicle pushing the bales out of position so as to expose an obstacle.
    4. Rectangular bales should have at least one dimension exceeding 2,000mm.
    5. Bales typically weigh 300 – 600kg. In anticipated head-on impact situations the incorporation of a suitable air gap between the obstacle and the bale barrier should be considered in order to incorporate a degree of energy absorption by means of momentum transfer.
    6. It is of advantage if the straw is perpendicular to the expected direction of impact: this can absorb up to four times the energy compared to other orientations.
    7. Dry straw absorbs more energy than wet straw.
- The images below illustrate an appropriate candidate where hay bales may be deployed. The particular corner has resulted in one rally fatality after impact with tree on side of road.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Resistance to cost of implementation by promoters (cost of purchase and cost of installation and movement).
- Readily available (cost effective) supply of bales. This will often be determined by location and seasonal issues.
- However, out of season or low grade hay (such as sugar cane mulch) may provide good alternatives.
- Hay can sit in bales for extended periods of time (certainly between events). Promoters prepared to utilise this strategy would be advised to purchased hay when cheap and in plentiful supply, not approaching winter or drought. However this would require organisers to have capacity to store and subsequently move hay bales when needed.

RECOMMENDATION 20 - ADVANCED BUMP LOGGING FOR HAZARD WARNING

The review panel recommends using readily available current motorsport technology, to develop a system of more advanced 'bump and undulation' logging of tarmac stages for the purpose of identifying and logging hazards at a repeatable and understood threshold.

RATIONALE AND SUPPORTING DATA

- It has become apparent in the review of both fatalities and incidents that there are occasions where an accident, on tarmac, has been the result of a loss of tyre grip, which can be attributed to the bumps or undulation in the road. In fact the review would attribute no fewer than 3 fatalities to loss of traction from result of bump/undulation, and subsequent loss of control of the car.
- These bumps may not necessarily be marked with any caution in road books or pace notes.
- Many of these bumps would not typically register at non-competition speed during any reconnaissance and may not be picked up by course checking methods.
- The vehicle (and hence driver) response to these bumps or undulations will be very car dependent. For example a Mitsubishi Evo with high quality competition suspension improvements may react substantially differently to a low ride height Porsche or sports car, more developed for autobahns, which may mean an inability to absorb the bump or in fact bottom out as dampers can travel at speeds of up to 2m/sec approx. in these circumstances.
- Whilst it is not feasible to provide vehicle advice or suspension tuning specs, in the modern era of motorsport using sensors, there are more sophisticated methods of logging and determining the magnitude of undulation/bump in the road so as to begin to set a National scale and appropriate thresholds for cautioning requirement.
- This would remove anecdotal or 'gut feel' and replace it with predictable science allowing consistent identification of potentially dangerous bumps/undulations capable of catching a driver out at 160kph that may not have been in his awareness at 80kph during a recce, or picked up by course checking, or course cars including the '0' car (at speed but not competition speed).
- Initial discussions with Motec Australia have commenced on this topic, and two highly respected engineers (one who specialises in vehicle/circuit modelling, and the other in race engineering and suspension development including for Targa events), have been consulted and confirmed the concept has merit.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- A system capable of performing the required tasks has yet to be developed
- The added requirement will have additional cost to organisers, although the system could be shared by organisers
- All persons creating safety notes would require access to the information so hazards could be added to notes.
- The severity of bumps can change over relatively short time frames, even during events, so monitoring would need to occur each year, as close to the event as possible (which creates a problem for generation of notes).

RECOMMENDATION 21 - ENHANCED PRE STAGE WARNING SYSTEM

The review panel recommends investigating for Targa events, the enhanced use of a standardised pre-stage competitor warning system to better highlight and update anticipated hazards (including wet/damp conditions) on the upcoming stage.

RATIONALE AND SUPPORTING DATA

- Several of the fatalities reviewed by the panel have been as a consequence of loss of control in either wet or damp conditions.
- In circuit racing the difference from dry to wet is profound. Rain lights, heavily grooved softer compound/construction tyres, softer spring and/or damper settings, less camber, more downforce, rearward brake bias, different tyre pressures are all available as tools to be used to compensate for the changed conditions. Additionally, there is the ability to either sight a lap at the start of a race, follow others directly who 'pioneer' the wet racetrack setting a benchmark for the following driver, or just the opportunity to negotiate the same corner on multiple occasions to explore the available grip potential.
- None of the above apply to tarmac events, and cresting a small damp rise with even a soft radius bend at competitive speed is an 'exploratory' exercise with little room for error requiring high levels of risk management application that some competitors will not possess or exercise.
- This review panel recommends that further investigation needs to be conducted, with input from all levels of competitors, about the relevance and potential benefit of a pre-stage warning system and how to keep the information relevant when stages could be conducted over a 2 to 3 hour time period.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Further investigation is required about how to update the warning during the running of the stage, to properly reflect any change to conditions after the stage has started.

RECOMMENDATION 22 - RESTRICT PUBLICATION/CIRCULATION OF STAGE TIMES DURING COMPETITION

The review panel recommends investigating for Targa events (and for consideration for other tarmac events) whether the publishing and/or circulation of competitors stage times should be prohibited during competition, or during a time where doing so would unnecessarily heighten the sense of competition, and risk taken by competitors.

RATIONALE AND SUPPORTING DATA

- The original "spirit" of Targa competition was for the driver to drive within his or her ability and within the capabilities of the competing vehicle, and achieve a base time set by the organisers. Refer to the Review Panel's recommendation regarding a "revisit" to the original philosophy of Targa events (Recommendation 31).
- Some, but not all, competitors regard Targa events as an straight race against the clock, with achievement of the fastest stage time possible as the major objective.
- At least one stakeholder suggested that seeing stage times at the end or during stages heightens competition, encouraging crews to take more risk to improve their stage times.
- Statistical analysis of incident data supplied by competitors via the online survey indicated that respondents who said their result was irrelevant were almost 2.5 times less likely to have had 3 or more significant incidents compared to respondents who indicating winning was their main motivation.
- While the display of stage times at the end of stages will not change the motivation for competing, the prominence given to their publication during the competition is not seen as beneficial by the Panel.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Not publishing times could be seen as taking the 'competition' out of the competition.
- The Panel understood the original intention of Targa was for individuals to compete to achieve the base time for his or her car, rather than a competition with the other competitors.
- It will be difficult (impossible) to stop some 'key' competitors swapping times.
- The publication of times on social media will circumvent any endeavours to restrict the distribution of stage times.

RECOMMENDATION 23 - CREATION/IMPLEMENTATION OF A CAMS NATIONAL RALLY MANUAL

The review panel recommends the production of a CAMS National Rally Manual that brings together all elements specific to Rally competition and organisation.

RATIONALE AND SUPPORTING DATA

- During this review it became obvious that compiling documentation relevant to all aspects of rally was an onerous task with regulations distributed throughout various sections of the CAMS Manual, in different technical regulations, and in individual state sites.
- The review panel had difficulties in accessing, identifying and understanding all regulatory standards and requirements in any format that would be easily understood by competitors or organisers.
- In June 2016 the 'Rally Event Checkers Manual' was published by CAMS for use in all gravel/tarmac and targa style events. This manual brings together rules and regulations which must be applied to the role of the Checker. This is a significant step forward, but one which relates to only one of the many official roles in rallies.
- Providing one 'go to reference' for competitors which covers all aspects of competition provides the opportunity to introduce a preface or introductory chapter focused on highlighting the danger and exposure rally competitors face unique to this discipline, making some basic common sense statements from experts with a focus on making it back home safely.
- Organisers and competitors at all levels should have access via an intuitive document structure and format for all rally requirements and regulatory information.
- Numerous requests and searches for documentation of the standing, sporting and organisational regulations and requirements for Targa Australia were not forthcoming throughout the review period suggesting that documentation outside of the 'Targa Australia Supplementary Regulations' do not exist, and/or are too difficult to access for some reason.
- Some documents are not easily accessed or published for the general community. As an example, Part 3 of the Australian Rally Championship medical service guidelines and safety guide are not published on CAMS or ARC websites. This restricts the flow of information to lower level events or Championships who may wish to review their guidelines.
- There is also little information which the review panel could access regarding best practice, with a focus instead on regulation or minimum standards.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Significant resources would be required to manage and facilitate such a comprehensive manual.
- There may be differing levels of cooperation from the state panels and disciplines to achieve the desired outcome of less confusion, greater consistency and higher standards overall.
- It is likely that the initial preparation of a logically organised, comprehensive manual will require a commitment of a full time professional resource for a substantial period of time (eg 6 months).
- Rules and regulations change over time, so there is a constant need to review the information. An alternative may be a document which automatically updates from supplied links so that rule changes automatically get incorporated.

RECOMMENDATION 24 - ENSURE THE CAMS TARMAC RALLY STANDING REGULATIONS ARE APPLIED TO ANY TARMAC RALLY EVENT IN AUSTRALIA

The review panel recommends that CAMS, to the extent possible, does not allow any tarmac rally event to be conducted outside the governance of the CAMS Tarmac Rally Standing Regulations, specifically including average stage speeds and speed reduction measures.

RATIONALE AND SUPPORTING DATA

- During this review the panel regularly questioned why the Tarmac Rally Standing Regulations were not applied to all tarmac events, including Targa rallies. The regulations how obviously been prepared to address some of the safety issues facing tarmac events (eg average speeds), so there appeared to be no apparent reason why they would not be appropriate for all events.
- The Coroner's Report into the Mansell fatality recommended that Targa events run under the Tarmac Rally Standing Regulations.
- The review panel believe the consequences for the sport in not implementing this recommendation are very significant as it will become increasing difficult for CAMS to justify permitting an event which does not comply with its own regulations. It is also potentially unwise to ignore a Coronial Recommendation of this nature.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Existing contractual arrangements between CAMS and organisers
- Reluctance of some organisers to conform to the Tarmac Rally Standing Regulations
- Some competitors may believe that CAMS is trying to over-control "their" sport and limit their driving enjoyment

RECOMMENDATION 25 - APPOINT AND EMPOWER HIGHLY QUALIFIED COURSE CHECKERS

The review panel recommend the appointment of a highly qualified small pool of course checkers, trained under the new CAMS checker training module, to have authority and responsibility (to CAMS, not the organisers) for the signing off of events/stages in preparation for competition and for the general oversight of the event.

RATIONALE AND SUPPORTING DATA

- The need for appropriately trained highly qualified course checkers, who are not accountable to the event organiser, has been raised on several occasions during the review.
- In the opinion of the Review Panel it is "Mission Critical" for the sustainability of rallying and the prevention of what are in some cases avoidable fatalities and injuries, that CAMS not issue any rally permit unless the Course Checker has signed off their approval of the rally.
- After the permit is issued it is then essential that the Checker remain the final "line of protection" for the sport and advise the Organisers, or if necessary the Stewards of the Event, where there is the potential for a safety problem to occur during the running of the event.
- The review panel is aware CAMS has recently revised its Checkers Manual and Checkers Training Module. It supports this initiative, and sees it as essential that these be mandated and implemented across all levels of events, on a national basis.
- It is recommended that CAMS should also establish a pool of experienced and competent rally drivers to accompany the course checker on at least one passage of the entire route for all rallies, where the checker is not an experienced and competent rally driver himself/herself. The members of the pool would require approval by CAMS, based on their experience and ability to express sound opinions on safety aspects of the course.
- This person would advise the checker to change or modify the course or cause the organiser to install safety barriers and course marking appropriate to accommodate any section of a stage which has a sufficient level of safety concern.
- The process of charting the route and noting cautions is normally carried out in non-competition car within the required road speed limits with the road open to the general public. Identifying potential safety hazards inherent in rally special stages at non-competition speeds requires the expertise of experienced rally driver to understand how the characteristics of a car behave at speed over a bump or crest or corner etc.
- The review is aware of instances where road books have not been accurate as a consequence of varied 'interpretations' during the development or proofing stages of road book production. It is critical for consistently that the course checker signs off on the finished road book.
- The Checker must not be responsible to organiser but to CAMS and a high level of independence by the Checker with the organisers should be maintained.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Availability and willingness of officials to train and work in the role of course checker
- In some states events can span wide geographic regions meaning course checkers will be required to travel significant distances (more than once) which will have cost and time implications.
- Availability of experienced drivers
- Importance of encouraging experienced drivers to provide their services which would need to be on a volunteer basis expect perhaps at the very highest level of events

- Development of the driver pool
- Cooperation of the organisers for implementation of changes
- It is possible that some organisers will not accept the recommendations of the course checker and conflict may arise. In addition to task specific training, some though should be given to providing checkers with skills in negotiation and conflict management.

RECOMMENDATION 26 - VEHICLE TRAJECTORY MODELING TO IDENTIFY NO-GO ZONES

The review panel recommends utilising basic vehicle trajectory modelling in gravel rallying to better identify no-go spectator zones.

RATIONALE AND SUPPORTING DATA

- Initially the Review Panel was examining the recent Scottish and MSA (UK) rally spectator safety reviews against a backdrop of a good record in Australia. However the subsequent Western Australia spectator incident which occurred during the review period required additional review of this issue.
- Upon more detailed review of process/systems used to identify spectator no-go zones, including guidelines for safe distances, which are somewhat generic, it was the view of the panel that whilst the guidelines and system is of great value, little science is used and much left to interpretation as to which is the most likely path of an out of control vehicle, and hence the appropriate relative positioning of spectators
- The process of modelling vehicle trajectories is complicated by vastly varying road surfaces (loose "ball bearing" gravel in Western Australia, hard packed clay roads in NSW etc) and modelling every corner would be onerous, however, such modelling could be used to develop more robust guidelines and specific modelling could be applied to known problem areas and areas of spectator appeal providing a valuable aid to CAMS, organisers and checkers.
- The Review Panel has consulted with modelling engineers and believes the process is feasible, requiring further investigation as to the most effective and efficient process. This may include developing an indicative surface grip identifying mechanism and/or using sample corner base modelling which could be developed into a template for each rally, thus applying scientific methodology rather than guesswork.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- This could be a costly and time consuming exercise both in development and implementation. However there is the potential for it to have global application thus raising the possibility of it being a source of revenue or at least cost-sharing.

RECOMMENDATION 27 - MEDICAL & FIRST AID UPDATED AT LOWER STATUS EVENTS

The review panel recommends that base Medical and First Aid standards at lower status rally events be raised/updated.

RATIONALE AND SUPPORTING DATA

- Medical and first aid standards are usually contained in the event Safety Plan which details such items as medical staff and facilities, location and number of SOS points, medical intervention vehicles (MIV) and evacuation plan/routes etc to CAMS for approval, to obtain their event permit. The standard of these services varies from FIA Appendix H (world championship level) to the medical services/requirements detailed in the CAMS Manual of Motor Sport – General Regulations.
- A number of experienced doctors and CMO's responded in detail regarding medical and rescue standards and procedures. Whilst the FIA Appendix H is an achievable standard at national levels, the costs are prohibitive at the club and some state levels and very significant even for national events.
- Stakeholders suggested that the current CAMS requirements at club levels should be reviewed. The following comments were provided;
    - Whilst the highest level medical intervention available is desirable, in reality few lives are lost by lack of immediate high level intervention.
    - There are still no requirements for medical or ambulance at State level events. "*From the CAMS Manual: As an interim measure, State Council may approve medical requirements for road events where standards have not yet been set by ARCom. In this case, requirements for specific events will be available from State Offices.*" The interim measure has probably been in place for many years. This needs addressing.
    - It is understood that particularly in remote areas, or for events where budget is a major restriction, organisers have utilised volunteer medical ambulances and staff. In some cases these can be fully trained personnel with modern, completely fitted-out ambulances but in other cases, these can be rudimentary vehicles staffed by first aid personnel who are not certified in trauma intervention and do not have the skills or equipment to deal with a major rally trauma.
    - There has been evolution in clinical practice and discussions around safety equipment and regulations that would be worth considering as part of this enquiry
- It is recommended that Medical Services and Requirements at rallies should be reviewed and include a clear set of minimum standards and guidelines.
- The CAMS Medical Commission should be tasked with this role, but with high level event organiser input and consultation.
- CAMS nominates three levels below the FIA standard, level A, B and C. Level B is the nominated requirement for competition levels of state and below.
- The review could not find a copy of the Medical Requirements for the ARC published on the CAMS or ARC websites. These are described in the CAMS Manual of Motor Sport viz; *"are defined in Medical and Safety Requirements in Part 3 of the Australian Rally Championship Regulations as approved by the Australian Rally Commission (ARCom)".* A copy of these regulations was provided to the review by ARCom on request.

- Whilst the review has not evidenced systemic problems with medical and first aid services to rally events, current and former CMO's and medical service providers to rally events, suggest that competitions state level and below should have an improved level of medical and first aid service.

- The following a quote from a competitor regarding in a recent accident

"One of the MIV (Medical Intervention Vehicle) personnel that attended my recent accident was an elderly (60plus) overweight person who was over stressed by the incident and was close to having a heart attack himself. He could not even put in a drip successfully for my injured driver. He stumbled around. His pack did not contain more than two swabs. His only saving grace was he was better than nothing. MIV personnel attending accidents must be appropriately trained, carry the correct amount of equipment and MUST pass a CAMS physical. It is no use having an MIV if the personnel are not up to it".

- This review panel recommends that the information currently included in the CAMS Manual of Motor Sport – General Regulations - Medical Services and Requirements should be updated and include a clear set of minimum standards and guidelines for rally organisers for each competition status.
- If Recommendations 24 and 34 (Rally Manual and Safety Manual) are adopted, this would be an appropriate place for all medical requirements to be located, in a specific volume.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Availability and access of the services/resources to meet the standards
- Cost to meet the improved service levels at grass roots level
- Requires significant cultural change embedded in the sport at lower levels

RECOMMENDATION 28 - OVERHAUL ACCIDENT/INCIDENT REPORTING, COLLATION, ANALYSIS

The review panel recommends an overhaul of accident and incident reporting, collation and analysis, against a background of intended future safety reviews, including comprehensive information from all types and levels of competition.

RATIONALE AND SUPPORTING DATA

- One of the greatest impediments to the review in analysing factual incident data and providing more expedient evidence based recommendations was the general lack of a modern, quality incident data reporting system.
- Whilst (outside of fatalities) CAMS has done a good job of maintaining a basic incident database, it lacks the detail, including often basic detail, including driver information and incident information relating to speed, impact direction, component failure (or success), and medical repercussions to provide better capability for ongoing incident analysis. Additionally, it has been difficult to more accurately establish important links between the incident or accident and the lower club and multi-club level of the sport where very little information exists.
- Aside from capturing critical incident information, a quality database should equally capture incident circumstances where safety initiatives or developments have potentially prevented injury or fatality, at the same time as it captures incidents that do have consequences. There is no better proving ground for safety development than 'on the ground', but it must be captured and understood.
- The opportunity to understand more about causation of rally incidents can be broadened substantially if a much wider net is cast to capture significant incidents that encompass both positive and negative outcomes.
- The frequency of significant incidents self-reported as part of this review by competitors far exceeded the number of incidents reported to CAMS; 142 competitors indicated they had had a significant incident within the last two years compared to 26 CAMS-reported incidents in 2013 and 29 in 2012. Within the CAMS data there appeared to be a bias toward incident reporting in national and international events, with a large gap in incident reporting at the lower levels.
- It is strongly advised that CAMS strengthen its communication with organisers about the need for incident data, and note that such data is not just linked to injury or potential insurance claims, and will not be used to lay blame for incidents.
- The review acknowledges and applauds the recent implementation of enhanced CAMS Critical Response Procedures, particularly to club, multi-club and non-club events. CAMS defines a "Critical Incident" as an incident which results in:
    - Fatality to competitor, crew member, official or spectator as a result of a motor sport incident
    - Injury (of significance) to a member of the public; or
    - Serious injury to any person (including a member of the public) which is likely to result in death.
- For the purpose of future safety review and analysis, the above only captures a small portion of incidents that require detailing.
- The Review received considerable input that there is much to be learnt from "near misses" – incidents where miraculously a fatality has been avoided in a serious crash. Currently such incidents are not defined by CAMS as "Critical" and hence do not receive an appropriate, and what could be highly beneficial, level of examination.
- It is also recognised the FIA have now implemented a 'worldwide system' of capturing critical incident information from a range of ASNs. The FIA is quick to also recognise the importance of actual data to develop new procedures and safety recommendations stating "It is difficult to talk about a particular occurrence or a change in safety procedures and technology from a hypothetical point of view. It is an easier task to develop procedures and technology based on actual data."

- Whilst the Review Panel endorses the participation of CAMS in the 'FIA worldwide system', such system should not relied upon solely to provide analysis relevant to Australian rally competition as this review has sought to do.
- Whilst the FIA System seeks to achieve similar outcomes to that sought as part of this recommendation, it is targeted at primarily championship level (as the introduction of Accident Data Recorders into lower levels may be some time away, if at all), and may not account for, or capture the nuances of domestic competition across a wider range of competition.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Resources within CAMS
- Cooperation of organisers and competitors

RECOMMENDATION 29 - EVENT COMPETITOR/KMS/INCIDENT DATABASE

The review panel recommend that CAMS establish a database for events detailing numbers of competitors, number of competitive kilometres, and number of defined incidents.

RATIONALE AND SUPPORTING DATA

- To truly understand the risk of critical incidents and compare across rally types, it is essential that the number of such incidents is normalised by competitive kilometre travelled.
- During this review no reliable data could be obtained pertaining to the number of competitors in rally events. CAMS was able to supply information about the number of rally events sanctioned each year, but not the actual number of competitors in each event, or the competitive length of the event.
- A key aspect of reviewing incidents is to estimate the rate at which incidents or injuries occur, either per competitor or per competition km travelled. This has not been considered in this report since there is no available data on the number of competitors or competition distance for rallies over the study period. The only normalisation which was conducted was based on the number of CAMS sanctioned rallies per year. Because there are different numbers of competitors in different types of events, and also vast differences in competitive distance, it is not valid to compare the number of incidents between certain types of events without first correcting for these confounding factors. Since no data is available for this correction, no conclusions can be drawn regarding the rate of injury between events, between different vehicles, or between competition levels.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Resources within CAMS
- Cooperation of organisers

RECOMMENDATION 30 - PHILOSOPHICAL REPOSITIONING OF WHAT A TARGA EVENT IS, AND MEANS.

The review panel recommends that CAMS over time, in concert with organisers, undertake a philosophical repositioning of 'Targa' type competition, to move away from the high end competition it has become, back toward its foundation as a performance vehicle social motoring event.

RATIONALE AND SUPPORTING DATA

- This is arguably the most contentious recommendation, but also potentially the recommendation with the most scope to deliver tangible, life-saving outcomes.
- The modern tarmac Targa event has evolved from its roots as a gentlemanly sports touring event into, in most instances, a "full-blown" racing competition.
- Conventional, contemporary motor sport safety logic is at odds with modern Targa competition.
- It could be best described as a dichotomy that such significant effort and progress has been made in circuit racing, yet relatively low safety specification cars piloted by typically lower competency drivers, who compete infrequently, are competing in damp, bumpy, crested, blind, tree lined roadway at average stage speeds similar to average lap speed of a V8 Supercar at Sydney Motorsport Park. It is not surprising that targa events have tragically claimed a significant number of lives.
- It is a critical consideration that competitor attitudes and feedback did not seek or note the need for high speed or high risk as a necessary component of their ability to participate and enjoy motor sport. Conversely several experienced competitors, including very successful participants, did not want to put themselves at the current level of risk needed to succeed, hoping that regulation can be the mechanism that harnesses the risk, as their competitive spirit does not allow them to simply drive in a fashion that sufficiently minimizes such risk.
- This may appear an odd statement, but not at all an uncommon scenario in motor sport, which differs significantly from other sports in this regard, that is, being more competitive in sport generally means being fitter, stronger, and refining technique whereas an attempt to be more competitive in a Targa event will also encourage one to take sometimes life threatening risk.
- The review panel believes there is potential to use this as an opportunity to grow the sport if promoted correctly and pro-actively.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Competitor resistance
- Organiser resistance

RECOMMENDATION 31 - DISSEMINATION OF MEANINGFUL, INTERESTING SAFETY INFORMATION

The review panel recommends the development of a targeted rally safety education strategy to disseminate interesting, meaningful safety information and updates and reinforcement of key messages with a human and technical interest skew, (not regulatory) to ensure engagement.

RATIONALE AND SUPPORTING DATA

- As motor sport safety continues to evolve participants need to be aware of the latest developments, but in a way that does not sit within regulatory framework or part of a schedule.
- For example, at the top of that list should be immediate education around the development of a **'whole of safety system'** environment for the driver. This is something that is relatively simple and achievable for most. That is, advances in 'winged' seat design and mounting, coupled to use of a FHR device, roll cage nets, appropriate harness and good placement of safety cage padding, can provide significantly heightened protection from impact forces through 360 degrees.

- Fortunately motor sport safety is a topic that is of interest to large numbers of competitors, as evidenced by the strong response to this review's survey. Equally, as evidenced within the same survey, there is too often a distinct lack of education and/or understanding of safety aspects, driven by all manner of anecdotal or uninformed opinion. Frontal Head Restraints are a good example.
- As such it is recommended that CAMS produce, bi-annually at minimum, a colourful, informative, meaningful flyer, targeted at Rally participants, that specifically outlines or reinforces key car/occupant safety developments/trends. This task could be delegated to AIMSS and this might be perceived by competitors as being more "independent" and safety-focused as opposed to a perception of having increased regulation thrust upon them.
- It is important that any such literature is rally specific, use actual incident data (something competitors are interested in) and stories as part of the mix, and does not become cluttered with messages about OH&S, insurance, drug and alcohol policy and the like. This needs to be a production that will be engaged with, not a box ticked. Difficult to measure, but done well, could have more impact on the future of rally safety than any other recommendation.
- The primary impediment to successful implementation of several recommendations within these pages, should CAMS wish to adopt them, will be the resistance from competitors, particularly at the lower levels, on the basis of;
    1. Cost;
    2. Regulation being pushed on them;

3. Preparedness to accept the risk of competition.

- This is clear in many of the comments from competitors as part of the attitudinal survey, and equally clear that many are uninformed, which voices are often the loudest.
- It will not be that most competitors can/cannot afford a club level FHR, or to fit a club level winged variant of FIA racing seat, or replace their 4 point harness with a six point, it will be that they do not understand the actual evidence based safety benefit of doing so.
- With reluctance to support CAMS mandating of FHR use, one competitor's feedback (indicative of many), ***"We don't typically have frontal impacts in rallying"***, yet our own survey research shows us it is in fact the most common impact.
- Aside from specific product education, exposure to actual incident data and images, findings and trends identified in this report will potentially raise the awareness of actual risk and may influence the propensity to accept change.
- A strategy for the better education for all rally competitors is a critical component to the success of ongoing improvement of safety in rallying.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

A resource to provide this would be required. This could be done by CAMS or it could be out-sourced to AIMSS which would reduce the likelihood of it being perceived as "regulatory" in nature.

RECOMMENDATION 32 - ONGOING FACILITATION OF RALLY VEHICLE ROAD REGISTRATION

The review panel recommends CAMS continue to liaise with State Government vehicle registration authorities to ensure ongoing facilitation of road registration for competition vehicles with enhanced safety features.

RATIONALE AND SUPPORTING DATA

- Proper rally registration will ensure rally vehicles appropriately modified for safety purposes in rallying, can be used for specific journeys on public roads in each state of Australia.
- The review notes and commends the fact that CAMS has progressed this cause during the process of the review, however its further progression needs to be strongly encouraged. How wider implementation can be attained needs to be investigated as part of this recommendation
- It is noted that due to the efforts of CAMS significant progress has been made. The challenge now will be to ensure that competitors appropriately register their rally cars. Concern has been expressed that a heavily modified rally car (modified for example with appropriate safety items such as roll cages) unless properly registered in one of the new schemes, may not be compliant under some registration schemes. This could have serious consequences in an accident on a public road.
- The Review Panel believes this initiative would be extremely beneficial to the sport and therefore that it would be appropriate for CAMS to consider allocating additional resources to the task, which the Panel accepts, is not an easy one.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Given the onerous and expensive nature of complying with the new rego systems, competitors may be reluctant to engage, which may leave them and the sport still exposed.
- The restriction with regards the allowance of wider use of vehicles under the new schemes may encourage competitors to sidestep the system with fully or club registered vehicles that are not compliant for road use.
- State registration bodies may choose not to accept certain rally modifications, or suspend schemes with little or no warning, preventing competitors from registering new vehicles.

RECOMMENCATION 33 - RALLY SAFETY PLAN MANUAL

The review panel recommends the development of a 'one stop' Rally Safety Plan Manual to include the wide range of organisational and management guides, schedules, standards and procedures.

RATIONALE AND SUPPORTING DATA

- It is recommended that a comprehensive Australian Rally Safety Manual (ARSM) manual be developed that includes a set of minimum safety standards required for CAMS sanctioned rallies. The manual should be based on the FIA Rally Safety Guide, include relevant clauses and sections from ARC Rally Safety Plan, CAMS Spectator Safety Procedures, Checkers Manual etc.
- Ideally the ARSM should be an addendum to the Rally Manual proposed in Recommendation 24 as a separate volume.
- The review recommends that a group of experienced rally personnel including organisers, medical experts (representative of the NMAC), drivers and co drivers be charged with the developing the ARSM.
- It is suggested that the ARSM manual should;
    - Be the starting point and go to document for all CAMS affiliated clubs and organisation that intend to run a rally in Australia
    - Align with all current CAMS official training modules/courses
    - Provide a comprehensive base template for the user to follow so ensure that the minimum standards cannot be misinterpreted or overlooked.
    - Be easy to read and incorporate the use of diagrams and charts in addition to the "formal" written specifications and regulations.
    - Published on the CAMS website
    - Reviewed annually each version clearly marked on the document
    - All previous documents to be made officially redundant
- The panel also recommends that base modelling of rally vehicle trajectories for various, situations, speeds and stage attributes, be commissioned to establish a comprehensive list of accurate maps for spectator no go areas for specific use by rally organisers. A guide for protection barrier specification and use should also be developed.
- The panel also recommends that ARCom completes an in depth comparison of the recommendations recently adopted by MSA UK following the recent January 2015 review into spectator safety following two tragic accidents in Scotland that resulted in the deaths of 4 people and serious injuries to others.
- The Review Panel found that state and higher status Australian rallies are well organised and include detailed safety plans that include the safety of the general public. Whilst these safety plans provide significant detail from an event operational point of view, they sometimes lack specific guidelines or criteria for the selection and appropriate positioning of spectator areas or No Go areas.
- CAMS requires rally event organisers to develop and provide a safety plan as part of the permit process. These safety plans deal with all safety aspects including officials responsibilities and safety, stage security, Occupational Health and Safety risk assessments, safety of the public and competing crews, setup plans, communications, media management and emergency and support services.
- The public safety element of the event safety plan includes the management and control of the general public and rally spectators on the special stages where the vehicles compete on the closed road courses. The review found two guideline documents for event organisers relating to spectator safety, CAMS Rally Spectator Safety Procedures and the FIA rally Safety Guidelines.
- The review evidenced a number of rally safety plans and event planning documents that reference the CAMS Rally Spectator Safety Procedures or Guide. The review found that whilst there are published spectator

safety guideline manuals, they do not appear to be readily accessible, reviewed annually or attributed as the specific guide that forms the initial basis of event safety plan regarding requirements for spectator safety.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- There should be no barriers – this should be a priority.
- Identifying the right individuals to work on the manual will require thought and relationship considerations.

RECOMMENDATION 34 - GOVERNMENT REGULATION

The review panel recommend CAMS lobbies Government to propose endorsement of a single set of regulatory standards for safety in rallying in Australia, so as no entity can operate at safety standards at a levels lower than those set by CAMS as supported by the FIA.

RATIONALE AND SUPPORTING DATA

- The Review has identified that governments should legislate or regulate for there to be one set of minimum standards which apply to the conduct of all rallies in Australia, and nominate one body to enact, enforce and generally regulate for those standards. In the absence of such a mandate, event organisers and/or competitors will, if they disagree with the safety requirements imposed by the body recognised by the Australian Government and the FIA as the sole governing body for four-wheeled motor sport in this country, simply operate outside those safety requirements.
- This is, has been and will continue to be, a major impediment to the reduction of fatalities and injuries in rallying.
- CAMS, as it should, has a reputation of ensuring rigorous regulation around its sanctioned motor sport which may work against it on occasion as event organisers seek lesser regulated, potentially commercially favourable outcomes of which the consequence can be reduced safety to participants.
- As the governing body CAMS should lobby to have itself appointed as the sole source of rally safety regulation to be complied with by any event organiser or promoter.
- In events where other suppliers may not enforce appropriate safety regulations, CAMS should make it known it would not have sanctioned that particular event.
- Government departments, Councils, tourism and event organisations may not be comfortable if it not clear that a reputable, qualified and responsible body is sanctioning an event, and hence setting standards for safety. There may be a realisation that responsibility may fall back onto them and this may have reputational, legal and financial implications.

ISSUES AND/OR BARRIERS TO IMPLEMENTATION

- Vested interests by those organisers who do not wish to impose increased safety standard on themselves or competitors, often on a cost basis.
- Vested interests by those who purport to be “sanctioning” bodies for rallies (but in the main provide insurance and little if any risk management or safety supervision)
- Competitor resistance to being “forced” to improve the safety of their vehicles or upgrade their personal equipment either on the grounds of cost or philosophical objections (“It is my life and I will make my own decisions on my safety”)
- CAMS could be concerned that it will be portrayed as being too heavy handed with regulation, which by default may work in the favour of alternate suppliers. The Review Panel is of the view that on safety matters, compromise should not be made (which will only put CAMS on an equal footing with alternate suppliers).
- There are immense net positive consequences of CAMS and FIA designed safety systems being applied to the entire sport of rallying in Australia.

PRIORITISING RECOMMENDATIONS

As there are some 34 recommendations, it may be prudent to identify those that the review panel would consider having the greatest potential to improve rally safety, save lives and prevent serious injury, alongside a reasonable implementation schedule.

Not to remove the gravity of any recommendation, however for the sake of a more achievable implementation process, if the review were to prioritise recommendations on the basis of order of implementation it would identify the following as key.

1. Philosophical repositioning of Targa competition (recommendation 30) including
    a. adoption of tarmac rallying standing regulations (recommendation 24), and
    b. enforcement of maximum stage average speeds (recommendation 13)
2. Widest potential implementation of FIA 8862-2009 seats, or at minimum winged variants of FIA 8858-1999, that the competitor market can bear (recommendation 1)
3. Create higher awareness, regulation and recommendations around all areas of side intrusion (recommendation 2)
4. Wider use of RallySafe (recommendation 15) including
    a. Warnings (recommendation 21) and,
    b. artificial chicanes (recommendation 16)
5. Creating 'real world' training opportunities and improved education of competitors (recommendation 12)

Notwithstanding the above, the Review Panel considers that ARCom has a very good understanding of the issues within its discipline and therefore believes that ARCom should be consulted without delay, on what it believes are the recommendations from this review that should be prioritised.

And of course, ultimately it will be CAMS that will take the definitive decisions.

Another option is to do nothing...

In the opinion of the Review Panel that will result in a situation where it can be expected the fatalities and serious injury that have become prevalent, particularly in Targa events in the last decade, will not abate.

WHAT TO DO WITH THESE RECOMMENDATIONS?

The Review Panel respectfully submits the following proposal to the Board of CAMS, and recommends the steps to be followed after its receipt of this Review.

1. CAMS Board members individually receive the Review and have time to read and digest it.
2. Concurrent with the above, AIMSS issues a statement that the Review has been conducted and a 260 page interim report, containing 34 recommendations, has been submitted to the Board of CAMS.
3. CAMS Board decides if the report should be sent to ARCom. Note – the Review Panel is strongly of the view that the report must go, on a confidential basis, to ARCom members for ARCom's combined comment (not comment from individuals in ARCom). The confidentiality of the interim report must be stressed to the members of ARCom.
4. The Board decides if all, or if not, which parts, of the Review, should be released to the sport as a whole and the public at large, including where appropriate, governments, relevant coroners, participating stakeholders etc.
5. The Board either concurrently with the above, or before or after, advises ARCom of which recommendations it would like to pursue. This may include actual regulation change, recommendation change or further research/actions in order to implement or action recommendations.

6. ARCom is charged with drafting the appropriate wording for any regulatory amendments or other actions to implement whichever of the recommendations are to be adopted.
7. It is strongly suggested that within a reasonable period (perhaps one year) CAMS and AIMSS monitor the implementation progress of the adopted recommendations.

CORONERS RECOMMENDATIONS MANSELL INQUIRY – AIMSS RALLY REVIEW POSITION

AIMSS has been provided with a copy of the Findings handed down by Coroner Simon Cooper on January 20, 2016 regarding the death of John Mansell in Targa Tasmania 2013.

AIMSS considers that as part of this review it has a duty to make reference to the eight recommendations made by the Coroner, and to state the AIMSS position in relation to each. The recommendations, in the order published by the Coroner, and the Review Panel's position follow.

1. THAT THE CAMS TARMAC RALLY STANDING REGULATIONS (TRSR) APPLY TO THE RUNNING OF ANY FUTURE EVENTS

This matter is covered in Recommendation 24 in this report. AIMSS strongly recommends that the TRSR apply to all tarmac rallies. Our report identified that Targa Australia has not been bound by the requirements of the TRSR and hence has avoided the need to enforce the critical average speed and other requirements.

2. THAT THERE BE COMPULSORY ALCOHOL TESTING FOR ALL COMPETITORS BEFORE ALL STAGES, IN ALL FUTURE EVENTS

AIMSS, in its review, did not specifically examine this issue in detail. Notwithstanding, it is logical and prudent, especially considering the nature of multi-day Targa events and the "social" culture surrounding them, that such testing be conducted.

3. THAT THERE BE A FORMAL, TRANSPARENT SYSTEM OF REVIEW OF COURSE DESIGN AND SAFETY AFTER EACH EVENT, INCLUDING THE RECORDING OF THE OUTCOMES OF THE REVIEW

AIMSS broadly refers to this matter in the section on Rally Checkers. AIMSS is strongly supportive of the new CAMS Rally Checker regime however in view of the Coroner's recommendation CAMS should give consideration to making this a mandatory process, not only for tarmac events but for all rallies.

4. THAT CONSIDERATION BE GIVEN TO THE APPOINTMENT OF A SAFETY ASSESSOR TO ASSIST THE EVENT COURSE CHECKER.

The Rally Checkers role is indeed already one of "safety assessor". AIMSS has suggested supplementing this role with an expert driver to assist the Checker in assessing various road situations. However if the Checker does not currently consider himself or herself to be a safety assessor then this implies a serious misunderstanding of the role by the checker and/or the organiser. This matter can be addressed in the Training Programme for Checkers.

5. THAT THERE BE A SEPARATE BEGINNERS BRIEFING FOR ALL FIRST-TIME COMPETITORS IN THE EVENT

Whilst AIMSS has not specifically addressed this matter and our research did not reveal a correlation between incidents and first time competitors, albeit using a limited data set. However, we support the Coroner's recommendation and in particular, the need to make first timers acutely aware of the dangers of this type of event

(indeed the dangers of any rally event). It should be noted that some key stakeholders' unprompted comments included the need for beginners to be further briefed on issues pertaining to rally safety.

6. THAT THE USE OF HANS DEVICES BE MANDATED FOR ALL COMPETITORS

This matter is covered in detail in our Recommendation 9 and is strongly supported.

7. THAT CONSIDERATION BE GIVEN TO THE ACCREDITATION OF THOSE WHO PREPARE PACE NOTES FOR SALE, INCLUDING A SYSTEM OF UNIFORMITY OF SYMBOLS AND MEETINGS (SIC)

We suspect the Coroner intended to say "meanings" not "meetings. Although there is already a high level of standardisation, perhaps more could be done. Our review refers to training and education including pace notes. One particular concern is the potential to "skip" a note (e.g. miss a corner or caution). This was noted by experts as a not uncommon occurrence and a potential cause of at least one major fatal accident. Consideration could be given to the standardisation of notes and their layout, which could include a method of minimising this risk (by perhaps alternating font or colour etc.).

8. THAT THE CONTRACTUAL PROHIBITION ON THE USE OF CHICANES (REAL AND/OR VIRTUAL) BE DISPENSED WITH

AIMSS strongly supports this recommendation, and is mystified as to how it could have ever been included in any contractual agreement between a regulator and an organiser. This review deals with the need to use measures to arrest the speed of competing cars especially in tarmac rallies.

SECTION 4 – DETAILED DATA, SUPPORTING INFORMATION AND FEEDBACK

This section contains the full reports that have been utilised and/or summarised as part of the main report or recommendations. Four subsections are included:

1. Review of CAMS Incident, Injury and Fatality data
2. Results of the AIMSS Rally competitor attitude survey
3. Open ended comments from Competitors supplied during the Rally competitor attitude survey
4. Key stakeholder comments

REVIEW OF CAMS INCIDENT, INJURY & FATALITY DATA IN RALLYING

THE DATA

Data from injury/incident forms was supplied in two forms by CAMS; electronically for the period February 2006 to June 2008, and hardcopy from July 2008 to November 2013. No incident reports were supplied for 2009. Staff at AIMSS transcribed the information from the hardcopy forms to the electronic database.

The format of the data and type of information reported was different across the years. The data were most complete for 2006. Data specific for rally events (including sprints, safari, special stage and tarmac rallies) were extracted for preliminary analysis. Data were reported for the following variables:

- Name
- Date and time of incident
- Date of birth of subject
- Person's role at event
- Event location, name and type
- Track surface
- Details of 1st impact (location, type of impact, direction of impact, object impacted)
- Details of 2nd impact (location, type of impact, direction of impact, object impacted)
- Estimated impact speed and cause
- Narrative of incident
- Injury information including areas of injuries, comment on injury and treatment received
- Damage to vehicle, safety cage, helmet, clothing and harness

However not all of these variables could be populated for all incident reports due to missing information or vague descriptions of incidents in the original reports.

From the information provided, two new variables were created: age of participant and an indicator variable of whether the incident occurred during competition. This last variable allowed non-relevant incidents/injuries to be selected out (e.g. jammed finger in trolley jack while packing up, officials tripping over in service park etc.).

The data was considered separately for incidents and injuries. Where possible, duplicate reports relating to the same incident were removed from the incident database so that summary statistics for the number and characteristics of the incidents was not influenced by the number of people submitting injury reports for the one incident. Duplicate records were identified using the date of the incident, event name, role of participant and narrative of incident. Only records that were clearly duplicates were removed; if there was any uncertainty the record was retained. Hence the number of independent incidents may be slightly over-estimated.

No reliable data was obtained pertaining to the number of competitors in rally events during the reporting period. CAMS was able to supply information about the number of rally events sanctioned each year, and this data is used to normalise the number of incidents.

LIMITATIONS OF THE DATA

The data on which is report is based originates from self-reporting of incidents by competitors. The typical procedure is for competitors to complete an incident form which they submit to the event organisers. The organisers then forward all forms to CAMS with their post-event documentation. In preparing the data for this analysis AIMSS is solely reliant on the information provided by CAMS and must assume that all rally incident reports submitted by organisers have been supplied.

The collection of incident data using the optional self-report system is open to bias and there is no process for checking the quality or accuracy of the data supplied. Incident reporting is usually linked to receipt of medical attention at events or notification of an incident to facilitate potential personal accident insurance claims, if injuries develop.

For this reason the incident data is not likely to be representative of all incidents that occur at events; the number of reports will under-represent the number of incidents, and reports will be skewed towards the more serious incidents. Organisers can also influence how many and which incidents are reported through communications with competitors. Therefore care is required in interpreting the data, particularly comparisons between events.

A simple comparison between the number of CAMS incident records and the number of significant incidents self-reported by competitors demonstrates the degree of missing data. In a competitor survey conducted by AIMSS in June 2014, 71 competitors indicated that they had had at least one significant incident in the past 12 months, while 72 indicated their last significant incident was 1-2 years ago. This time frame overlaps with the current analysis of incident reports, with less than 60 incidents reported to CAMS during 2012 and 2013 combined.

A key aspect of reviewing incidents is to estimate the rate at which incidents or injuries occur, either per competitor or per competition km travelled. This has not been considered in this report since there is no available data on the number of competitors or competition distance for rallies over the study period. The only normalisation which was conducted was based on the number of CAMS sanctioned rallies per year. Because there are different numbers of competitors in different types of events, and also vast differences in competitive distance, it is not valid to compare the number of incidents between certain types of events without first correcting for these confounding factors. Since no data is available for this correction, no conclusions can be drawn regarding the rate of injury between events, between different vehicles, of between competition levels.

The conclusions in this report are also impacted by the amount of missing data in the incident reports. Very few reports have a full complement of data which restricts any meaningful interpretation of patterns or trends in the data. This problem will become evident through the report.

SUMMARY STATISTICS FOR EXPLORATORY DATA ANALYSIS

Overall there were 255 incidents reported for the period 2006 to 2013. However 22 of these incidents were related to non-competition accidents, while there was insufficient data to categorise 23 of the incidents as competition related or not. This analysis will focus on only those incidents and injuries arising from competition-related activities and those that could not be classified accordingly (a total of 233 incidents).

CHARACTERISTICS OF COMPETITION-RELATED INCIDENTS

Excluding 2009 where there was a problem accessing incident records, the number of incidents reported per year varied from 14 (2010) to 73 (2008) (Figure 42). There was a clear reduction in the number of incidents over the period 2010-2013, a period coinciding with the data being supplied in hardcopy.

The number of CAMS sanctioned rally events increased from 76 in 2006 to 143 in 2013. The number of competition related rally incidents per CAMS sanctioned event peaked in 2008 with 0.80 reported incidents per event (Figure 43).

The type of event was not defined for 78 of the 233 incidents (33.5%). For those incidents that were attributed to an event type, the majority (58.7%) were from tarmac rallies, with 41.3% from gravel events (Figure 42). However there has been a change in the tarmac/gravel event distribution over time, particularly in the later part of the data series. It is not apparent whether this change is due to data collection/reporting problems, or if it represents a true shift in event incidents.

Figure 42. Temporal pattern in the number of competition related rally incidents reported to CAMS

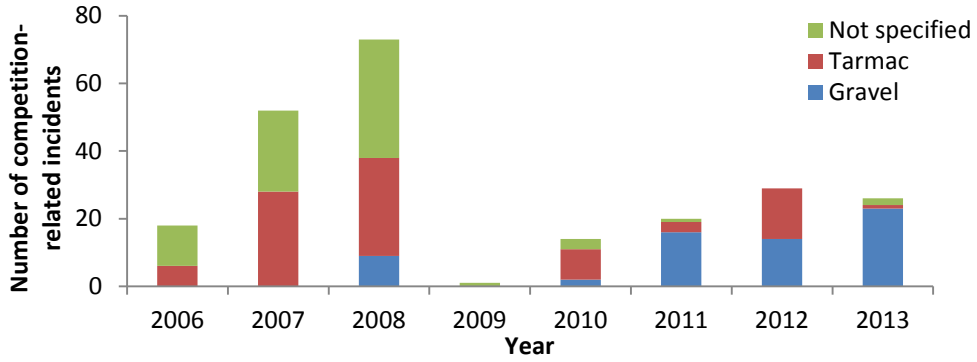
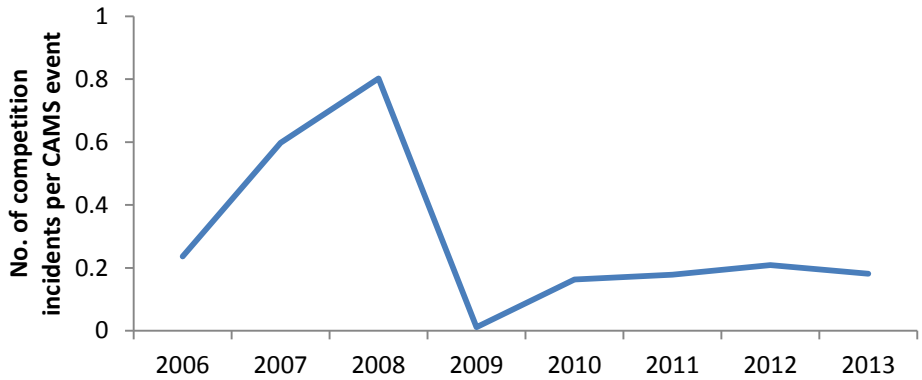


Figure 43. Number of competition related rally incidents reported to CAMS, normalised by the number of CAMS sanctioned rallies per year



Almost one half of the incidents reported occurred during international or national events (47.6%, 111/233) (Figure 44). The type of event (gravel or tarmac) and the level of event were closely related with tarmac events dominating the international and national events (Figure 45).

Figure 44. Profile of competition-related incidents according to level of competition

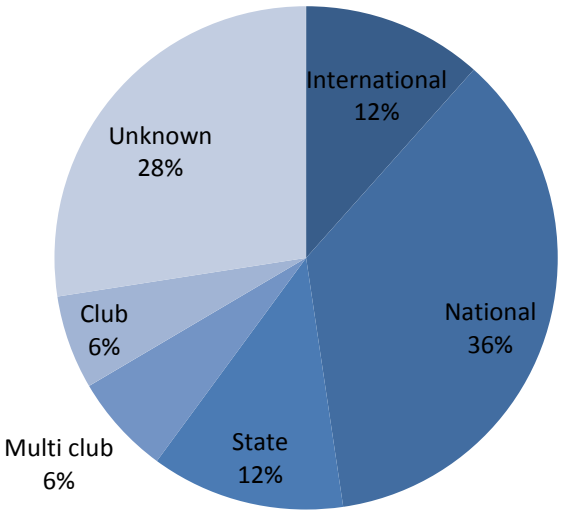
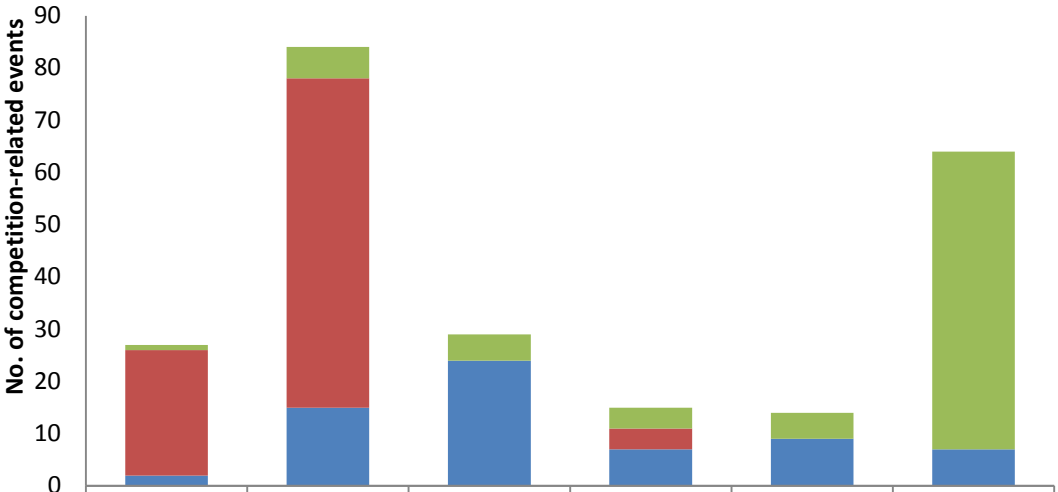


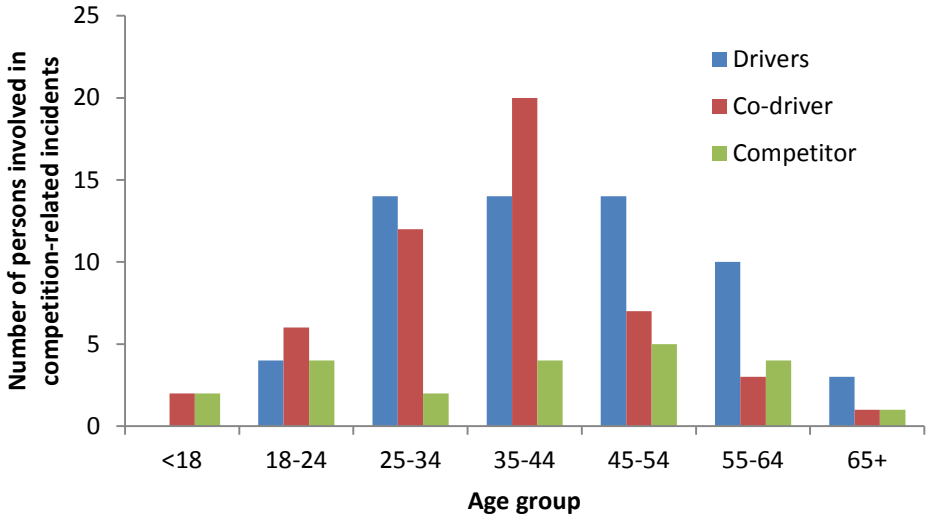
Figure 45. Distribution of competition-related incidents according to type of rally



	Internat.	National	State	Multi club	Club	Unknown
Unknown	1	6	5	4	5	57
Tarmac	24	63	0	4	0	0
Gravel	2	15	24	7	9	7

Age data were available for 127 competitors from 89 (38.2%) competition-related incidents. For the people with age data, 56 identified themselves as the driver, 51 as the co-driver and 20 as a competitor (could be either driver or co-driver). The mean age of persons involved was 40.1 years (range 15 to 73 years). The distribution of ages is displayed in Figure 46.

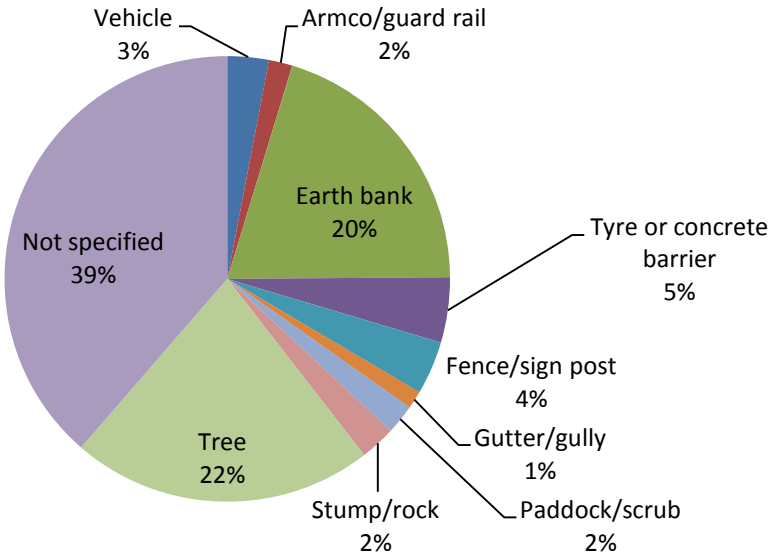
Figure 46. Age distribution of persons involved in competition-related rally incidents



The direction of first impact was available for 142 incidents, with vehicle rollovers being the most common incident (56/142, 39.4%), followed by frontal impact (47/142, 33.1%), side impact (29/142, 20.4%) and rear impact (10/142, 7.0%).

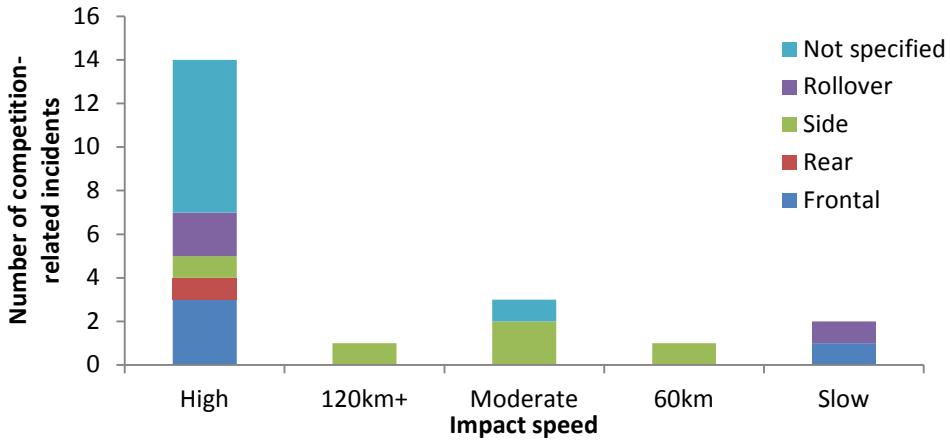
Vehicles first impacted with a variety of objects including other vehicles, trees, barriers, fences and earth banks (Figure 47). The most common impact occurred with trees and earth banks.

Figure 47. Objects first impacted during competition-related incidents



Impact speed was reported for only 21 (9.0%) incidents. Of these incidents, 15 (71.4%) were classified as high speed or 120km+ (Figure 48). There was insufficient data to examine impact speed and type of event, with only one gravel rally and seven tarmac incidents having reported impact speeds.

Figure 48. Profile of competition-related incidents according to impact speed and direction of first impact

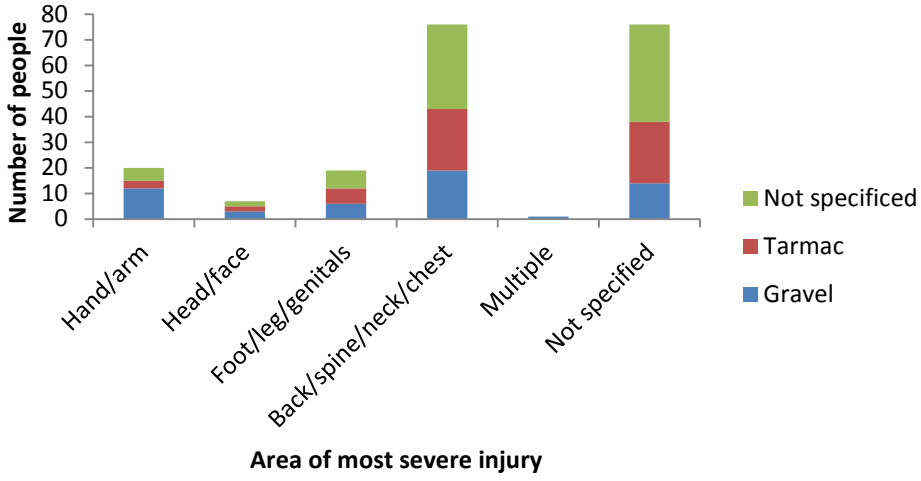


RALLY INJURIES

The 233 competition-related incidents produced 328 incident reports. However "no apparent injury" or no injury notation was recorded in 129 (39.3%) of these reports. Hence specific injury data was available for 199 individuals. The AIS score for the most serious injury was reported for 44.2% (88) of injuries; 54 (61.4%) had a score of 1, 21 (23.8%) a score of 2, 8 (9.1%) a score of 3 and 5 (5.7%) had a score of 5.

Approximately 37% (74/199) of injury reports had no specific body region identified as being the area of the worst injury. In reports where the injury region was identified, 60.8% (76) identified the affected area as the neck, spine, chest, torso or back. Within this group, neck was the most commonly listed area affected (40/76). Hand and arm injuries and foot/leg/genital injuries were also prevalent representing 16.0% and 15.2% of identified injuries, respectively (Figure 49).

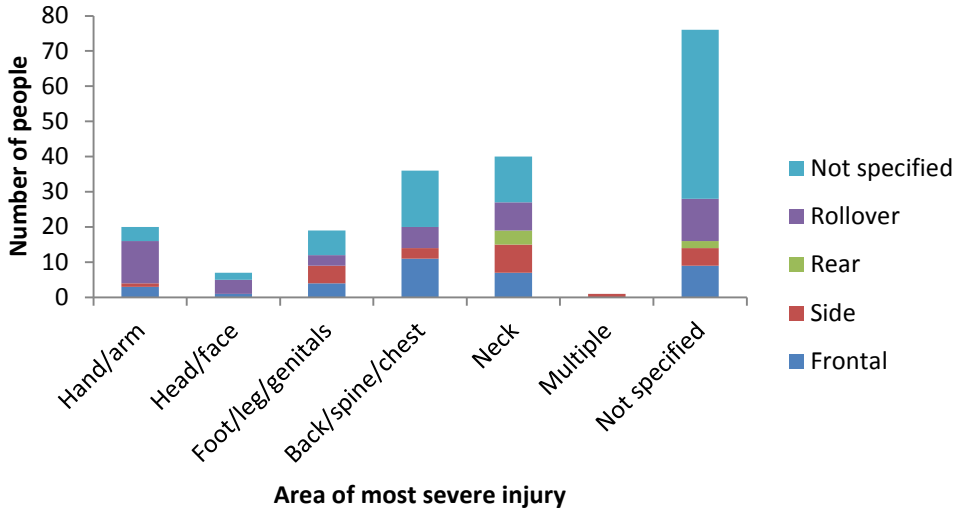
Figure 49. Area of worst injury according to event type



The relationship between the body region with the worst injury and impact type is displayed in Figure 50. The predominant injury area for frontal impact incidents is the back/spine/chest (31.4%), followed by unspecified body area (25.7%), then neck (20%). For side impact incidents the injury areas most reported were neck (34.8%), foot/leg/genitals (21.7%) and unspecified area (21.7%). Incidents where the first impact was a rollover generated injures in the hand/arm/shoulder (26.7%), unspecified area (26.7%), neck (17.7%) and back/spine/chest (13.3%).

There was insufficient data to look for associations between impact speed and AIS code of worst injury, or speed and injury area.

Figure 50. Relationship between injury area and impact type



FATALITIES IN RALLY EVENTS

Between 1990 and October 2013 there have been 21 competition related deaths during CAMS sanctioned rally events. These deaths arose from 18 independent accidents; 15 resulted in single fatalities and three caused the death of both the driver and co-driver. Of the 21 deaths, 11 have been of the driver of the vehicle and eight the co-driver. The role of two individuals was not stated.

The number of fatalities has remained fairly constant since 1990 (Figure 51). The only notable change has been in the type of event at which the fatalities occurred. Prior to 2004 the majority of deaths occurred during gravel rallies. Since 2004, all deaths except one have occurred at tarmac events. This pattern is possibly due to the increasing popularity of tarmac rallies over the past 10 years and should to be considered together with the number of events and entries in both gravel and tarmac rallies. The long-term expected number of fatalities per year is 0.99, and number of accidents resulting in fatalities per year is 0.95 (assuming a Poisson distribution).

The majority of fatalities (14/21, 66.7%) resulted from a side impact, most commonly with a tree. Four deaths resulted from frontal impacts, one from a fire and one from a rollover. The details surrounding one death were insufficient to determine the type of impact. The vehicles involved in fatalities are summarised in Table 4.

Figure 51. Number of fatalities in rally events 1990-2013. Top panel indicates number of deaths; bottom panel indicates number of independent accidents resulting in fatalities

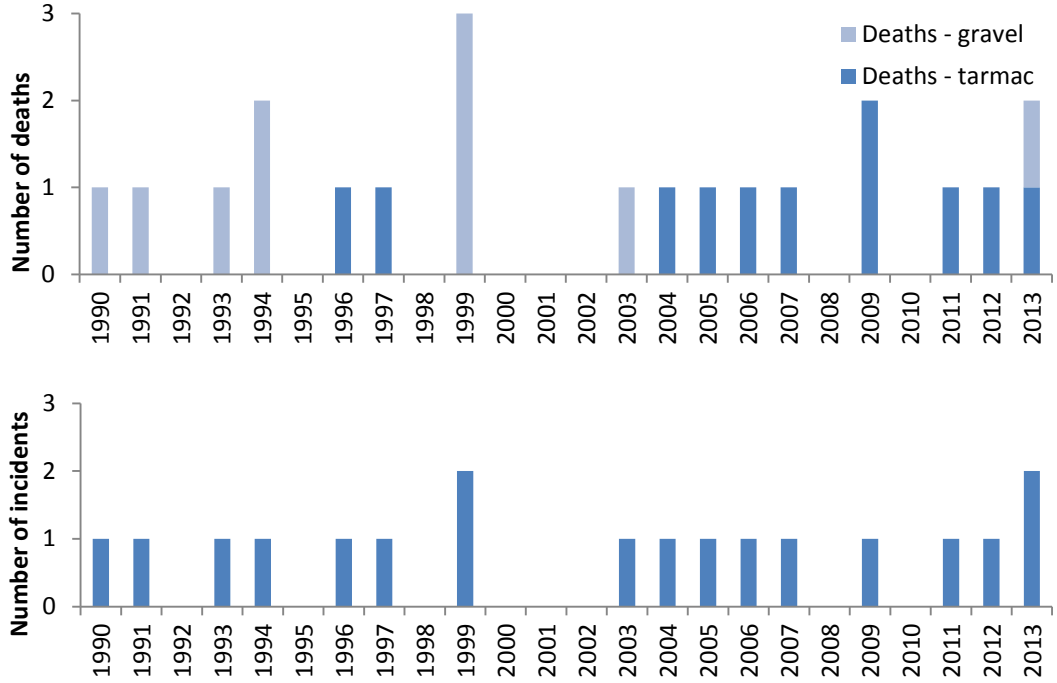


Table 4. Details of documented vehicles involved with rally fatalities

Year	Vehicle	Accident details
1990	Mazda RX2	Frontal impact with tree
1993	Subaru Liberty RS Turbo	Side impact with tree
1994	Ford Laser TX3 4wd turbo	Side impact with tree
1996	Mazda MX5	Side impact with pole
1997	Porsche 911	Hit tree and caught fire
1999	Subaru Liberty RS Turbo	Frontal impact with tree
2003	Toyota Corolla Sprinter	Frontal impact with another car
2004	Holden Torana XU1 LJ 202	Frontal impact with tree
2005	Porsche 911 GT2	Rolled into ravine
2006	Daytona Coupe - sports car based on classic Daytona body. Holden 5.7ltr V8 Engine & drive train	Side impact with tree
2007	Elfin MS8C - Clubman style car with Holden V8 engine & drive train	Side impact with trees
2009	Porsche 911 Carrera	Side impact with tree
2011	Porsche 911 1978	Side impact with tree
2012	Mitsubishi Lancer Evo	Side impact with tree
2013	Porsche Cayman S	Side impact with tree
2013	Subaru Impreza STi	Side impact with tree

CONCLUSIONS

The incident data which is currently available from CAMS contains a large amount of missing data and is primarily due to competitors not completing the incident form in full. In addition there are a relatively low number of incident forms overall considering the data should be reported for all incidents at all level events in Australia. Therefore the results of this analysis need to be considered on a background of possible bias in the number and types of incidents being reported. However in the view of the review panel, the available data, in certain areas, does provide evidence of trends such to influence recommendations.

AIMSS RALLY COMPETITOR ATTITUDE SURVEY

SUMMARY

This report summarises the results of an online survey of CAMS rally license holders conducted in May-June 2014.

A total of 648 respondents participated. The large majority of responses (79%, 514/648) were received within 2 days of the survey opening.

Respondents were predominantly male with representation from all states of Australia;

94% of respondents were either current or past competitors (with intention of competing again in the next 5 years).

Over 90% of respondents have competed in at least five events and 63% had competed within the past 6 months.

Respondents represented the spectrum of competitors with 28%, 45% and 27% competing in predominantly national/international, state and club/multi-club events, respectively.

Both tarmac and gravel competitors responded; 53% competed only in gravel events, 23% competed only in tarmac events and 24% competing in a combination gravel and tarmac events.

Forty-eight percent of past and current competitors indicated they use a Frontal Head Restrain (FHR) device. The lowest rate of FHR device use was in respondents who only competed in gravel events at club/multi-club level (21%). Of the 318 respondents who indicated they did not use a FHR device, 36% listed cost as a factor, 21% indicated that their seats and harnesses are not compatible with use of a FHR device and 53% indicated that they did not use a FHR device because it was not a required safety item for the events they compete in. Other reasons for not using a FHR device included uncertain benefits of FHR devices in rally accidents (particularly side-impact), difficulty of exiting vehicle in case of accident, problems with use on road sections and personal choice.

Approximately one quarter of drivers indicated they never used safety notes, while the remaining 75% use them with different approaches to note preparation and course reconnaissance. Drivers in gravel events were more likely to not use safety notes at all (35%), or prepare their own notes during reconnaissance (52%). In contrast, tarmac competitors almost exclusively used safety notes, but most (65%) used notes written by another person. In both types of events 3-4% of drivers indicated that they used safety notes written by another person and never drove the stages prior to competition. The proportion of respondents using safety notes differed between competition levels and also between recent and past competitors.

Most drivers (75%) indicated that they, or family and friends prepare the competition vehicle. Approximately 43% of vehicles had been built for competition within the past 5 years, while 31% were built for competition more than 10 years ago. The majority of drivers (67%) rated the overall safety of their vehicles as “the best” or “very good”. Almost 23% of co-drivers indicated their primary consideration when deciding whether to compete with a driver was the their inter-personal relationship and communication with the driver, closely followed by the driver’s incident history (22%) and type of vehicle, its preparation and safety features (18%).

Almost 32% of current and past competitors reported they had never had a significant incident, while 43% had 1 or 2 significant incidents in their competition history. Factors found to influence the odds of having had 3 or more significant incidents during the respondent’s competition history were rally experience, type of event, use of safety notes and motivation for competing. Event level was not an important factor.

The 406 respondents who indicated they had had at least one significant incident were asked specific questions about the last incident:

- Incidents occurred across all event levels with a fairly uniform distribution
- 65% of respondents indicated their last incident was more than 2 years ago

- 53% of respondents indicated they were travelling at medium speed (60-100kmh) immediately prior to the incident, while 30% and 5% reported travelling “fast (100-160kmh)” or “very fast (>160kmh)”, respectively
- Over 20% of reported incidents resulted in damage to the vehicle which was not repairable
- There was a statistical association between the speed immediately prior to the incident and the severity of damage to the vehicle
- The majority of incidents involved impact with an earth bank, gully or creek (36%), a tree, stump or power pole (29%) or a roll-over (30%), with frontal impacts (42%) and side impact (40%) dominating
- 19% of respondents indicated that the incident resulted in injury to at least one crew member, and there was a significant association between the speed immediately prior to the incident and whether an injury occurred
- There was no apparent difference in the proportion of incidents resulting in injury according to vehicle age
- Approximately 22% of injuries required either no medical attention or attention by the event first aid or medical team only
- 36% of injuries was severe enough to warrant admission to hospital; injuries sustained in international or national events were 4 times more likely to result in hospital admission compared to state, multi-club or club event. Speed prior to incident, impact object, impact direction and road surface were not important factors for predicting hospital admission
- Spinal and neck injuries were the most frequently reported types of injuries
- 47% of respondents ranked team error as the most important factor contributing to the incident

Respondents were asked about their level of agreement to 15 statements related to rally events and safety. Seven statements elicited a clear dominant or majority opinion. The majority of respondents agreed that:

- current events provide a good mix of conditions, speeds and road types (85% agreement),
- when it comes to safety, it is the competitors responsibility to keep up-to-date with new technology (81% agreement),
- organisers should use course warning boards to indicate hazards, even in pact-noted events (81% agreement),
- CAMS should be more pro-active informing competitors of advances in safety equipment (65% agreement),
- competitor safety standards in Australia are good and don’t require upgrading (56% agreement),
- in events allowing safety notes, reconnaissance should be compulsory (59% agreement), and
- every competitor should have first aid training and be competent at using the items in the first aid kit (54% agreement).

The remaining eight statements elicited mixed opinions from respondents, with differences noted between different groups:

- 43% disagreed with the statement “I prefer fast roads over slower, twisty roads”, while 16% agreed
    - The highest disagreement rates occurred within the tarmac competitors (52%) and competitors of international/national events (50%)
    - The highest rates of agreement occurred in respondents who competed in a combination of gravel and tarmac events (21%)
- 50% disagreed with the statement “Many of the roads used in current events are too fast”, while 21% agreed
    - The highest rate of agreement was from non-competitors (50%), then tarmac competitors (37%)
    - Gravel competitors and club / multi-club competitors had the lowest rates of agreement at 20% and 19%, respectively
- 58% disagreed with the statement “Limiting the maximum permitted average speed for rally stages will improve safety”, while 25% agreed
    - Non-competitors and club/multi-club competitors had the lowest rates of disagreement, 45% and 52% respectively
    - The lowest rate of agreement was in the least experienced competitors (10 events or less, 21% agreement), while the highest was from non-competitors (30%)
- 55% disagreed with the statement “Limiting the maximum terminal speed of vehicles will improve safety”, while 26% agreed

    - Competitors who had not competed within the last 5 years had the highest rate of disagreement (64%), while non-competitors had the lowest rate (38%).
    - Differences were noted in agreement rates between gravel and tarmac competitors; 21% of gravel competitors agreed with statement compared to 36% for tarmac competitors.
- 47% disagreed with the statement "Improving competitor safety should be the highest priority for regulators, irrespective of cost", while 26% agreed with this statement
    - Disagreement was highest amongst competitors who had not competed for the past 5 years (67%), and also in gravel club/multi-club competitors (55%)
    - The highest rate of agreement was in non-competitors (50%), then tarmac competitors (37%) and competitors who last competed 2-5 years ago (37%).
- 48% disagreed with the statement "In the past 2 years I have questioned the safety of some of the roads used for competition", while 30% agreed with this statement
    - The highest agreement rate was in non-competitors (40%) and co-drivers (38%)
    - Respondents who had competed in 10 events or less had the lowest rate of agreement at 22%
- 51% disagreed with the statement that "The required vehicle safety standards for rallies should be the same across all competition levels", while 33% agreed
    - Gravel only competitors had the highest rate of disagreement at 59%. There was a trend according to level of competition with club and multi-club competitors having a higher rate of disagreement than state competitors, than national or international competitors
    - Agreement with this statement was highest amongst tarmac competitors (53%)
- 47% disagreed with the statement that "The required personal safety equipment of rallies should be the same across all competition levels", while 40% agreed with this statement
    - There were large differences of opinion between tarmac only competitors and gravel only competitors; 66% of tarmac competitors agreed compared to 29% for gravel competitors.
    - The highest rate of disagreement (68%) occurred in competitors who last competed more than 5 years ago and in club / multi-club competitors (62%).

All survey respondents were provided the opportunity to add any additional comment or thoughts at the end of the survey. Comments from 292 respondents were assessed for their overall theme. The two most prevalent themes in the open-ended comments were 1) that safety equipment costs were too high for grass roots competitors and 2) concern that the sport of rally has been damaged by too much red tape.

THE SURVEY

The survey consisted of seven sections and logic flow was used to present participants with relevant questions, based on their responses to key questions. The full copy of the survey is contained in Appendix 6. The survey consisted of:

1. Information about the respondent
    a. Age group
    b. Gender
    c. State of residence
    d. Type of involvement with sport of rallying (compulsory question)
2. Competition section (only presented to respondents who indicated they were a current or past competitor in item 1d above)
    a. Rally experience (number of events and time since start of competition)
    b. Time since last event as a competitor
    c. For competitors that indicated they had competed within last 2 years in item 2b,
    d. Frequency of competition in last 2 years
    e. Level of competition (international, national, state, club/multi-club)

    f. Type of rallies respondent competes in (based on competition surface)
    g. Motivation for competing
    h. Awareness of latest personal safety equipment
    i. Use of a Frontal Head Restraint device and barriers to use
    j. Usual role during competition (driver, co-driver, combination of driver and co-driver)
3. Driver specific section (only presented to respondents who indicated they were a driver (or combination) in item 2h)
    a. Use of safety notes
    b. Car preparation, age of vehicle and safety features
4. Co-driver specific questions (only presented to respondents who indicated they were a co-driver in item 2h)
    a. Factors influencing decision of who to co-drive for
5. Significant Incidents (only present to respondents who indicated they were a current or past rally competitor in item 1d)
    a. Number of significant incidents over competition history
    b. Details of last significant incident (only presented to respondents who indicated they had had at least one significant incident in item 5a)
        i. Period since last incident
        ii. General injury and treatment information
        iii. Type of event where incident occurred
        iv. Vehicle details
        v. Incident details (approx. speed, impact object and direction of impact)
        vi. Factors contributing to incident
6. Opinions section
    a. Collection of 15 statements for respondents to rate their agreement with
7. Comments section
    a. Open text box for comments from respondents

THE DATA

The survey was designed specifically to obtain competitor opinions as part of the AIMSS Rally Safety Review and is not a validated tool. While logic flow was used to minimise the number of questions presented to individuals and improve internal consistency, there are some examples of inconsistent responses within individual surveys. Examples include:

1. One participant indicating that their last significant incident was 1-2 years ago, but indicating that they last competed 2-5 years ago
2. When asked in Q9 to partition their competition during the past 2 years into international, national, state and club/multi-club events (in 25% increments), many participants provided data that either added to less than 100% or more than 100%
3. In Q21 respondents were asked about barriers for improving vehicle safety, if they rated the safety of their vehicle as ‘good’ or below in the preceding question. However some respondents who rated their vehicle safety higher than good also responded to the question.
4. When asked details about their last significant incident, some respondents selected more than one event type or vehicle type

No attempt has been made to correct these inconsistencies and all data was included in the analysis.

A new variable representing the average level of competition was created based on how respondents partitioned their competition level. This derived variable was not created for respondents whose competition activities did not add to 100% in question 9 of the survey.

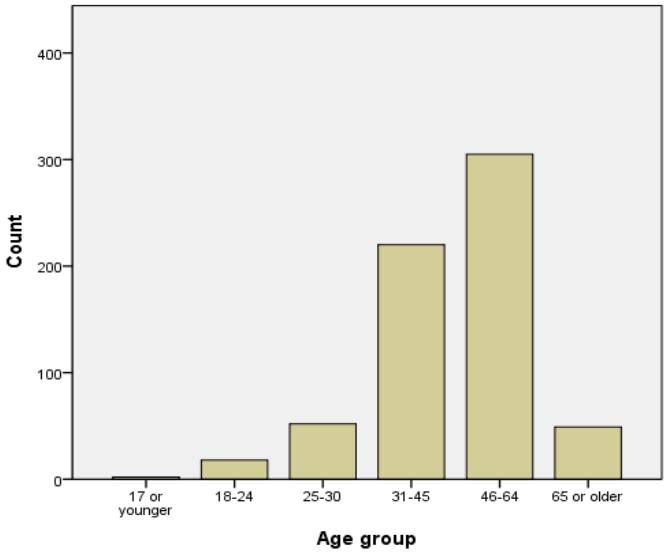
Only question 4 in the survey was compulsory so the number of actual responses to individual questions will vary depending on how many respondents answered the specific question.

RESPONDENT CHARACTERISTICS

Survey respondents were predominantly male (92.0%, 596/648) between the ages of 31 and 64 years (81.2%, 524/645) (Figure 52). All Australian states were represented, with Victoria (27.3%) and NSW (21.9%) having the largest representation of respondents (Figure 53).

The large majority of respondents (81.9%, 531/648) classified themselves as a "current competitor", while 11.9% (77/648) indicted they were a "past competitor with intention of competing again in the next 5 years". Thirteen respondents (2.0%) indicated they were a "past competitor with no intention of competing again" and another 13 (2.0%) indicated they "have not been a competitor but hoping to start competing in the next 5 years". Fourteen respondents (2.2%) classified themselves into the "Other" category (7 officials, 1 motor sport photographer, 1 respondent about to compete, 2 car preparers and 3 event organisers or administrators).

Figure 52. Age distribution of survey respondents

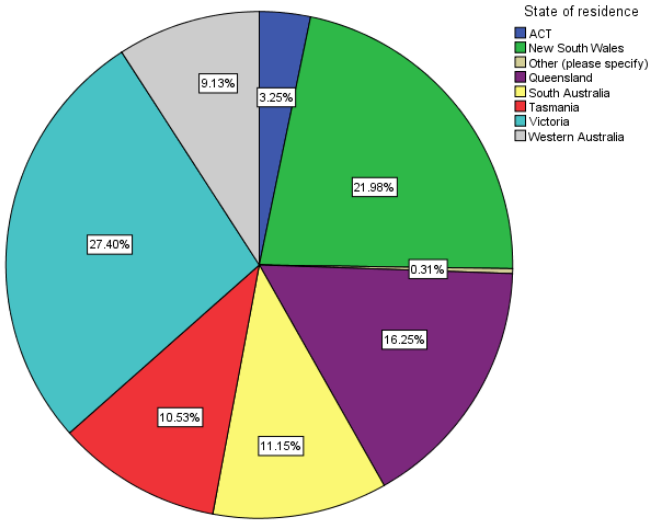


COMPETITOR CHARACTERISTICS

The respondents who indicated they were a current or past competitor were asked about their competition history. Sixty-one percent (374/612) indicated that they start competing more than 10 years ago, while only 13 respondents (2.1%) started competing this year. Over 90% of respondents have competed in at least five events (91.7%, 563/614) and most (62.9%, 386/614) had competed within the past 6 months. A small proportion (4.4%, 27/614) of respondents indicated they have not competed within the last 5 years. The majority of those who have not competed within the past 5 years had done more than 10 events (88.9%, 24/27).

The majority of current or past competitors classified themselves as a driver (60.3%, 367/609), while 22.8% (139/609) indicated they were a co-driver and 16.9% (103/609) said their role in the competition vehicle varied.

Figure 53. State of residence for survey respondents

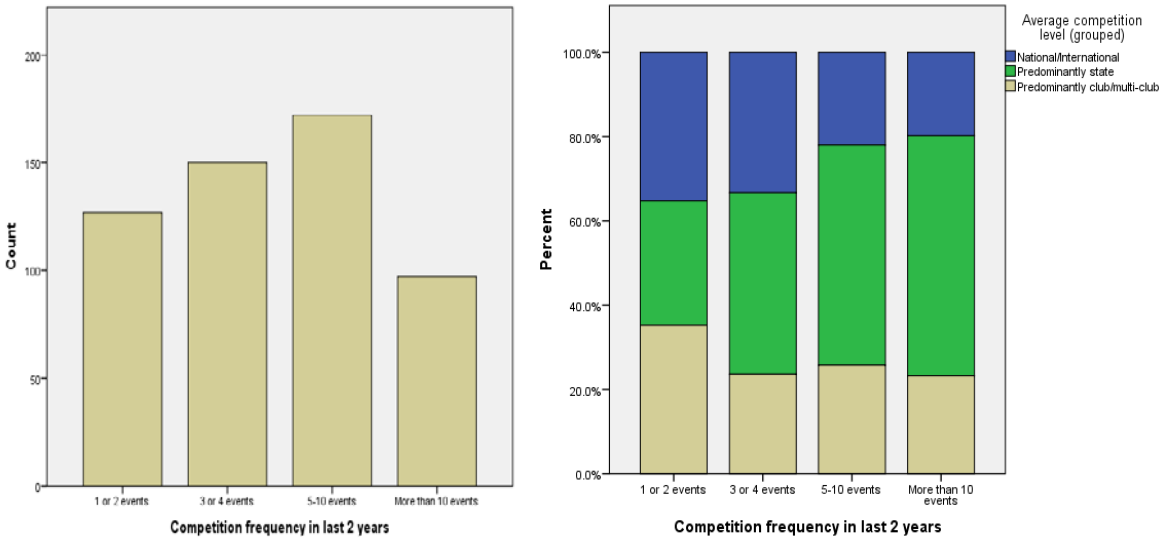


The 546 respondents who had competed within the past 2 years did so with varied frequency; 23.3% had competed in 1-2 events, 27.5% had competed in 3 or 4 events, 31.5% had competed in 5-10 events and 17.8% had competed in more than 10 events in the past 2 years (48). These respondents were asked to partition the events they competed in according to level of the rallies (25% increments). Responses were combined within individuals to give a weighted measure of "average" competition level:

- 2 respondents (0.4%) competed in international events only,
- 14 (2.7%) competed in a combination of international and national events,
- 107 (20.9%) competed only in national events (or equal quantities of international and state events),
- 84 (16.4%) competed in a combination of national and state events,
- 73 (14.2%) competed only in state events (or equal quantities of national and club events),
- 144 (28.1%) competed in state and club/multi-club events, and
- 89 (17.3%) competed only in club and multi-club events.

These data were grouped into three overall categories: national/international (28.1%), predominantly state (44.8%) and predominantly club/multi-club (27.1%). There was a statistically significant difference in the frequency of competition within the last 2 years between these three competition levels (Pearson Chi-square, P=0.001); state competitors were more likely to have competed in more than five events in the past 2 years compared to others, while national/international competitors were more likely to have competed in four or less events in the past 2 years and club/multi-club competitors were more likely to have only competed in 1 or 2 events (Figure 54).

Figure 54. Frequency and level of competition within the past 2 years



All current and past competitors were asked about the types of rallies they compete in, where rally type was defined by the road surface. Over half (52.7%, 321/609) of the respondents indicated they only competed in gravel events, while 22.8% (139/609) indicated they only competed in tarmac events.

The remaining 149 respondents competed in a combination of gravel and tarmac events; 115 (18.9%) competed mainly on gravel with some tarmac and 34 (5.6%) competed mainly on tarmac with some gravel.

A higher proportion of respondents who competed on gravel only, or a combination of gravel and tarmac had more than 10 events experience compared to tarmac only competitors (80.6% vs 62.3%; Figure 55).

Thirteen percent of tarmac only competitors had competed in less than 5 events, compared to 6.8% for respondents who competed on gravel or a combination of gravel and tarmac.

There was also a relationship between the type of competition surface and age of the respondent (Figure 56).

Figure 55. Respondent experience partitioned according to type of rally

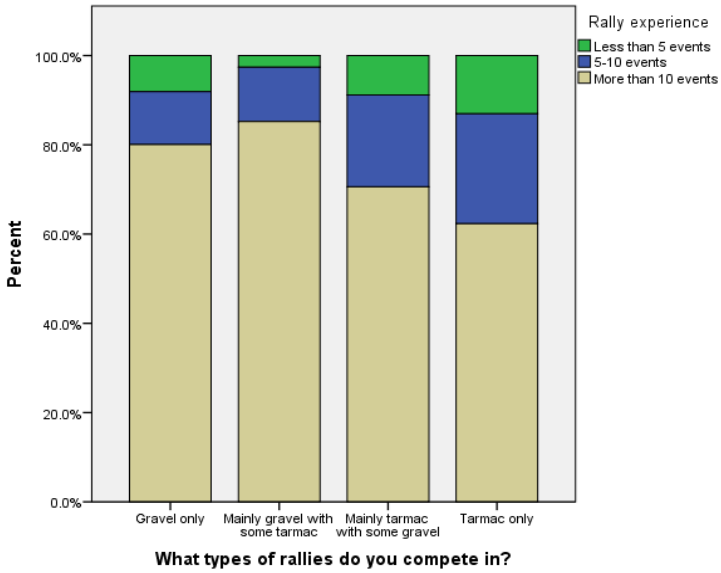
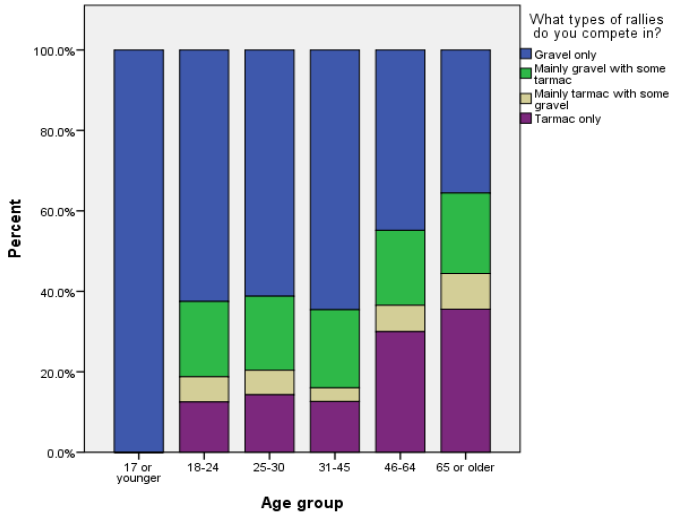


Figure 56. Respondent age and rally experience



MOTIVATION FOR COMPETING

Respondents were asked to select their main motivation for competing from a pre-determined list. Sixty-four percent (392/608) selected the answer “Of course I want to do well, but am generally happy if I achieve my personal goals and enjoy the event”, 18.8% (114/604) selected “My result is irrelevant so long as I enjoy myself”, while 16.9% (102/608) rated themselves as highly competitive selecting “I want to be the best on the day and have prepared my vehicle and team to achieve that goal”. Over a quarter (26.5%) of respondents aged 65 years or over rated their result as irrelevant, compared to 16.9% for the other age groups combined.

AWARENESS AND USE OF PERSONAL SAFETY EQUIPMENT

When asked how aware they were about the latest/best personal safety equipment, over half (62.0%, 378/610) of the current or past competitors indicated that they kept up with advances in safety, while 187 (30.7%), 37 (6.1%) and 8 (1.3%) responded “fairly”, “somewhat” and “not very”, respectively.

Past and current competitors were asked whether they use a Frontal Head Restrain (FHR) device, with 47.8% (291/609) indicating they did wear such a device and 52.2% (318/609) indicating they did not. The role of the respondent in the vehicle (driver vs co-driver) was not associated with FHR device usage (Pearson Chi-square, P=0.287). The lowest rate of FHR device use was 21.5% (23/107) in respondents who only competed in gravel events, or events that were predominantly gravel, at club/multi-club level (Figure 57). At the national/international level, 60.0% of gravel only competitors and 72.0% of tarmac only competitors indicated they used a FHR device.

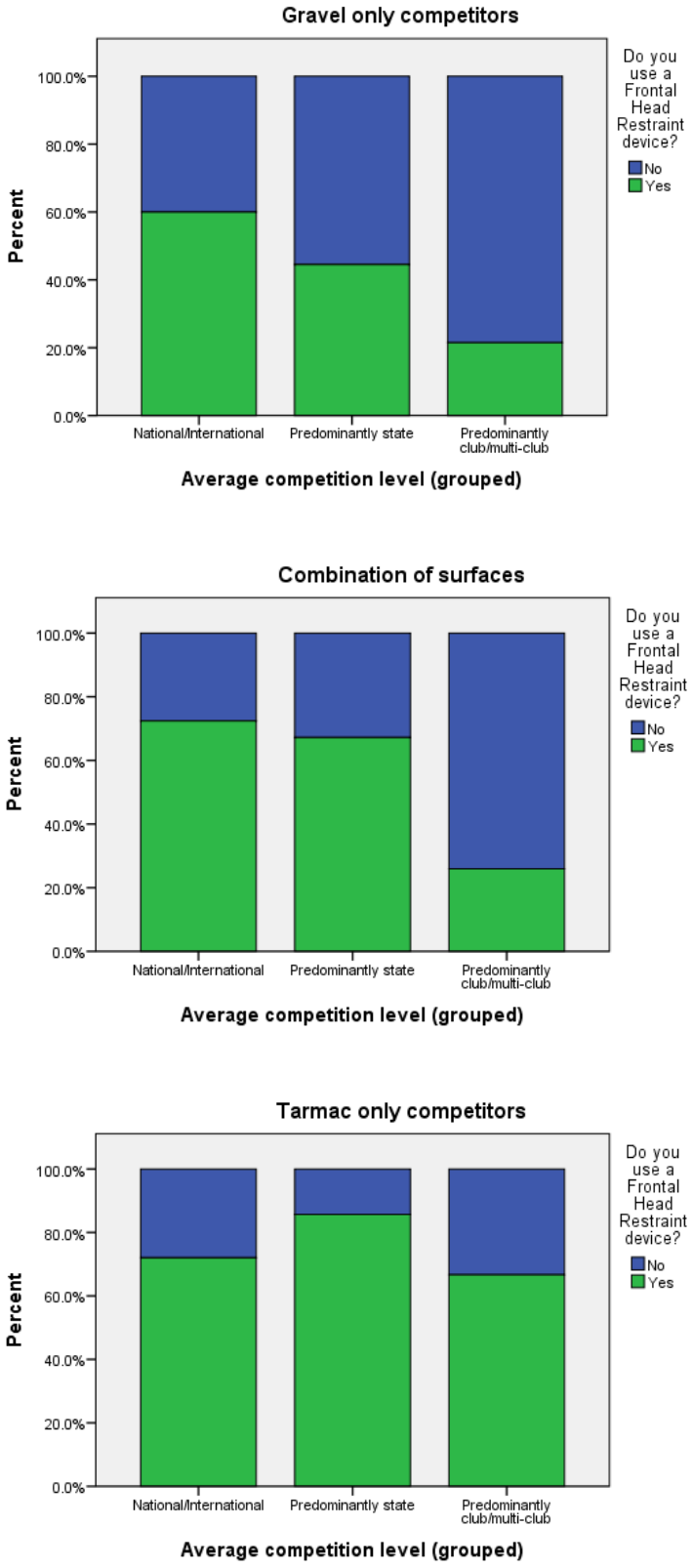
Respondents who indicated they did not use a FHR device were asked to indicate the factors that influence this decision. Three options were provided (cost, compatibility with seats/harnesses, regulations) and competitors could also provide other reasons in an open-ended response.

Of the 318 respondents who indicated they did not use a FHR device, 114 (35.8%) listed cost as a factor, 68 (21.4%) indicated that their seats and harnesses are not compatible with use of a FHR device and 168 (52.8%) indicated that they did not use a FHR device because it was not a required safety item for the events they compete in.

One-hundred and thirteen respondents listed ‘other’ factors that influenced their decision (see details later in this section). Within these open-ended responses, 28 respondents indicated they owned a FHR device but hadn’t used it as yet, or were planning on purchasing one in the near future.

There were also multiple competitors who questioned the benefits of FHR devices in rally accidents (particularly side-impact), commented on FHR devices making exit of vehicle harder in case of accident, problems with using them on road sections due to not being able to see around corners, problems associated with restricted space in some vehicles and personal choice.

Figure 57. Use of Frontal Head Restraint device by competitors who only compete on gravel (top), who compete on both gravel and tarmac (middle) and who compete only on tarmac (bottom), according to level of event



DRIVER SPECIFIC QUESTIONS

PREPARATION AND USE OF SAFETY NOTES

Respondents who classified their role in the competition vehicle as a driver or "varied" were asked about their use of safety notes and associated reconnaissance. Approximately one quarter of drivers (24.8%, 113/456) indicated they never used safety notes, while the remaining 75.2% (343/456) used them with different approaches to note preparation and course reconnaissance. Table 5 indicates the profile of safety note use among different groups of competitors.

There is a stark difference between safety note preparation and use between drivers competing in gravel events compared to tarmac events. Drivers in gravel events were more likely to not use safety notes at all (35.1%), or prepare their own notes during reconnaissance (52.4%). In contrast, tarmac competitors almost exclusively used safety notes, but most (65.4%) used notes written by another person rather than creating their own. In both types of events 3-4% of drivers indicated that they used safety notes written by another person and never drove the stages prior to competition (Table 5).

There appears to be a temporal trend in the use of safety notes. Drivers who have not competed within the last 5 years are more likely to report they never use notes (63.6%) compared to drivers who have competed within the last 2 years (22.9%).

Considering the level of competition, almost 60% of drivers who predominantly compete in club/multi-club events never use safety notes and this is likely due to the regulations of many events prohibiting safety notes (ie blind rallies). Most drivers who predominantly compete in state events either make their own notes during reconnaissance (59.6%) or use notes written by another person but always drive the route to check them (17.3%). Less than 15% (24/168) of state competitors do not use safety notes at all. The large majority of drivers at national and international level use safety notes (96.2%) and the majority either write the notes themselves (40.9%) or use notes written by another person but always drive the route to check them (33.3%). Almost twenty-two percent of drivers at national and international events indicated they use notes written by another person and never (3.8%) or not always (18.1%) drive the route prior to competition.

VEHICLE PREPARATION AND SAFETY

Drivers were asked who is responsible for the preparation of the vehicle they most commonly drive. Most respondents indicated that they prepare the vehicle themselves (54.3%, 250/460), or with the help of family and friends (20.4%, 94/460). Twenty-one percent (97/460) pay someone else to prepare the vehicle and 19 (4.1%) respondents provided alternative car preparation scenarios which generally represented shared preparation between themselves and a paid mechanic.

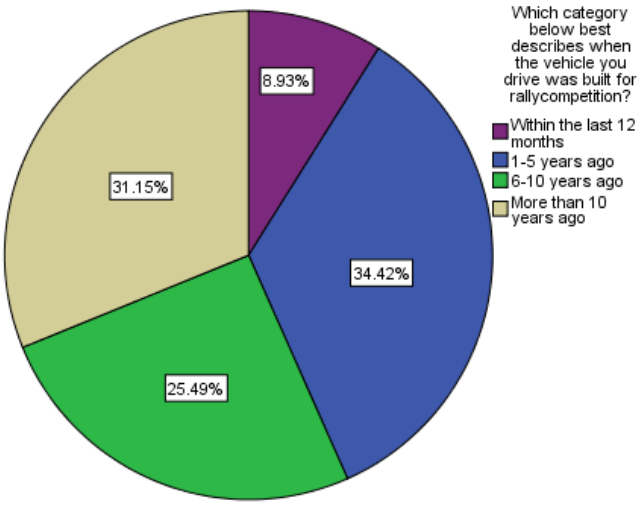
Approximately 43% of vehicles had been built for competition within the past 5 years and 31.2% were built for competition more than 10 years ago (Figure 58).

When asked about how often they considered the safety features of the vehicle (eg seats, harness, seat mounts, safety cage, etc), 34.6% (159/459) of respondents indicated they regularly review the safety features every 6 or 12 months. Most (53.6%, 246/459) indicated that they tried to keep up to date with advances in safety and selectively incorporate those which they think are appropriate. Fifty-four respondents (11.8%) indicated that the safety features hadn't been reviewed since the vehicle was built or the required standards were changed. These proportions were not significantly associated with the age of the competition vehicle ($P>0.05$).

Table 5. Use of safety notes according to type of rally and time since the respondent last competed

	Overall % (n)	Type of rally		Time since last competed		
		Predominantly gravel	Predominantly tarmac	<2 yrs	2-5 yrs	>5 yrs
I always drive the route & make my own notes	32.7 (149)	38.6 (123)	19.1 (26)	33.0 (131)	47.2 (17)	4.5 (1)
I usually drive the route & make my own notes, but on occasion I used someone else's notes but always drive the route	13.2 (60)	13.2 (42)	13.2 (18)	13.4 (53)	8.3 (3)	18.2 (4)
I usually drive the route & make my own notes, but on occasion I use someone else's notes without having driven the route	0.9 (4)	0.6 (2)	1.5 (2)	0.8 (3)	0 (0)	4.5 (1)
I usually use notes written by another person but always drive the route prior to competition	17.5 (80)	6.0 (19)	44.1 (60)	18.9 (75)	11.1 (4)	4.5 (1)
I usually use notes written by another person & do not always drive the route prior to competition	7.2 (33)	3.1 (10)	16.9 (23)	7.1 (28)	8.3 (3)	4.5 (1)
I usually use notes written by another person & never drive the route prior to competition	3.7 (17)	3.4 (11)	4.4 (6)	4.0 (16)	2.8 (1)	0 (0)
I never use notes	24.8 (113)	35.1 (112)	0.7 (1)	22.9 (91)	47.2 (17)	63.6 (14)
Total	100 (456)	100 (319)	100 (136)	100 (397)	100 (36)	100 (22)

Figure 58. Age of competition vehicles driven by respondents



More than half of the drivers rated the overall safety of their competition vehicle as "the best" or "very good" (Table 6). None of the 459 respondents rated the safety of their vehicle as "very poor".

Table 6. Driver rating of vehicle safety

	Percentage (n) nominating corresponding rating					Total
	The best	Very good	Good	Fine for purpose	Poor	
Overall safety	14.4 (66)	52.7 (242)	24.6 (113)	8.3 (38)	0 (0)	459
Permanent safety features of vehicle (structural integrity, safety cage)	25.3 (114)	47.7 (215)	19.3 (87)	6.9 (31)	0.9 (4)	451
Removable safety features (seats, harnesses, padding)	20.1 (91)	50.1 (227)	21.6 (98)	7.9 (36)	0.2 (1)	453

Drivers were asked to identify barriers to improving the safety standards of their vehicle if they "rated the safety of the vehicle lower than good". Thirty-eight respondents fitted this category, but others with higher safety ratings also answered the question:

- 20 respondents identified cost as a barrier (cost was also identified by 39 respondents with 'good' vehicle safety, 24 with 'very good' vehicle safety and 1 with 'the best' vehicle safety)
- 18 respondents indicated that their vehicle met the required safety standards for their level of competition and they had no intention of improvement unless the regulations changed (also identified by 12, 16 and 4 respondents who rated safety as 'good', 'very good' and 'the best', respectively)
- 10 respondents identified the limited lifespan of safety items as a barrier (also identified by 13, 12 and 4 respondents who rated safety as 'good', 'very good' and 'the best', respectively)
- 8 respondents identified issues with fitment (also identified by 11, 5 and 2 respondents who rated safety as 'good', 'very good' and 'the best' respectively)
- One respondent identified awareness of advances in safety equipment as a barrier (also identified by 4, 5 and 1 respondents who rated the vehicle safety as 'good', 'very good' and 'the best', respectively).

Respondents were also invited to identify other barriers to improving safety and these responses are provided in Table 7.

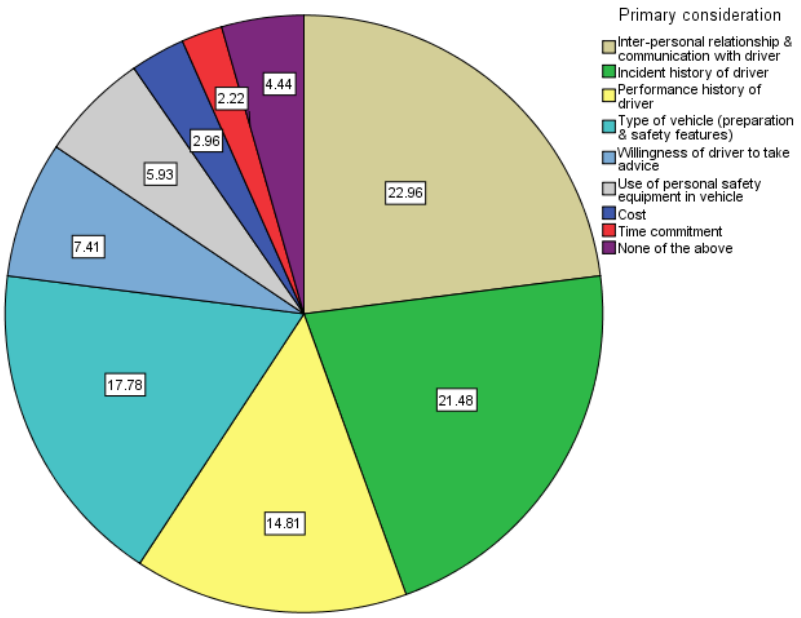
Table 7. Individuals responses for respondents who answered "Other" to the question "If you rated the overall safety of the vehicle lower than 'good' in the question above, what are the biggest barriers to you improving the safety features"

Grading of vehicle safety	Explanation of barrier
Fine for purpose	All safety equipment was fitted to last specs less than 12 months ago don't want to have to spend the extra money since 90% of my equipment is less than 12 months old
	Cost vs benefit. If I was competing more often, and more seriously, I would upgrade some aspects.
	Dont think any upgrades are necessary
	Draconian Laws in queensland making addition of extra side intrusion bars impossible due to no longer being able to get a vehicle blue plate for safety cages under queensland law
	Impossible to update certified non complying rops unless fully replaced under current rules
	It is a significant historic rally car, i do not wish to alter it
	It is not needed as the car is not fast - as I increase the cars performance, I will increase the level of safety equipment.
	My vehicle is fine for the level I compete at and intend in immediate future. If I go up a level, I will increase safety.
	No longer competing
Good	age of vehicle precludes the design features in modern ones
	I build classic rally cars
	I just bought an $800 helmet then you changed the rules and I can't use it with HANS!!!
	No barriers. But believe side protection should be better researched to include things such as crush boxes
	Used mainly for Novice Club activities - speed is not the main criteria for the use of the car
Very good	Although I rate my vehicle safety better than "good", I would still like to make a comment: in many cases the "regulated" life span of components like belts is a ridiculous expense for vehicles that gets used only once a year and is stored in a closed garage out of UV exposure, as many competition vehicles are. Such components should be judged by examination and not by time. Belts less than 5 years old but installed in a vehicle parked in the sun will be far more degraded than those "regulated" to be replaced which are still perfect at 10 years old when installed in a garaged vehicle.
	I have no interest in competing in a HANS device, and will leave the sport if forced to wear one
	I maintain the car with the best roll cage and saftey cell intrusion measures. but there are some "Nice to have items" that are just too expensive for a couple of races a year as they need to be replaced so often thay really only get used 8 or 10 times.
	inappropriate for vehicle (vintage)
The best	solid car built by Jamie Drummond, say no more
	The car meets all current FIA specifications so it is the best available. The sport is over regulated already.

CO-DRIVER SPECIFIC QUESTION

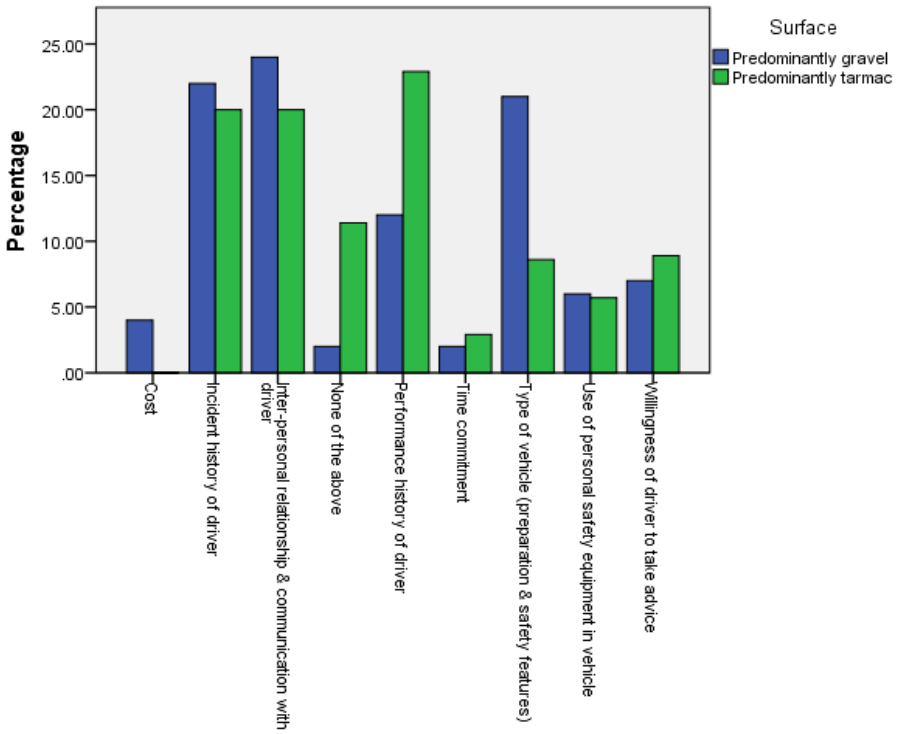
The 135 respondents who indicated their role within the competition vehicle was the co-driver were asked to rank eight factors according to how important they consider the factor in their decision to co-drive for someone. Almost 23% of respondents indicated their primary consideration was the their inter-personal relationship and communication with the driver, closely followed by the incident history of the driver (21.5%) and type of vehicle, its preparation and safety features (17.8%). Few co-drivers indicated that cost or time were their primary consideration when asked to co-drive (Figure 59).

Figure 59. Most important factor influencing co-drivers decision to compete



The majority of co-drivers (74.0%) indicated they primarily competed in gravel events (100 in gravel vs 35 in tarmac). Overall the responses were similar for both groups of co-drivers with two exceptions; performance history of the driver was the highest ranked factor for 22.9% of tarmac co-drivers compared to 12.0% for gravel co-drivers, while type of vehicle and it preparation and safety features were the first ranked factor for 21.0% of gravel co-drivers compared to only 8.6% of tarmac co-drivers (Figure 60).

Figure 60. Primary factor influencing decision to co-drive according to event type

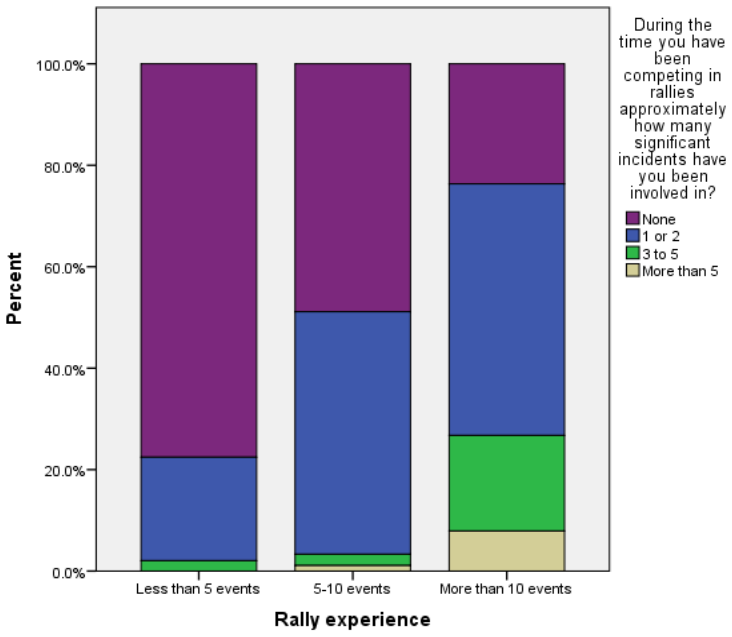


SIGNIFICANT INCIDENTS

All current and past competitors were asked how many significant incidents they had been involved in during the time they had been competing. No definition of "significant incident" was provided so competitors were free to report anything they personally considered to be significant. Almost 32% (190/596) of respondents reported they had never had a significant incident, while 43.2% (280/596) had 1 or 2 significant incidents, 13.7% (89/596) had 3 to 5 significant incidents and 5.7% (37/596) had had more than 5 significant incidents in their competition history.

The number of significant incidents increased with the experience of the competitor. Forty-nine competitors had done less than 5 events; 77.6% (38/49) of these had had no significant incidents, 20.4% (10/49) had 1 or 2 significant incidents and one respondent (2.0%) had 3 to 5 significant incidents. For the 90 respondents who had done 5-10 events, 48.8% (44/90), 47.8% (43/90), 2.2% (2/90) and 1.1% (1/90) had had none, 1 or 2, 3 to 5 and more than 5 significant incidents, respectively. The majority of respondents had competed in more than 10 events and 23.7% (108/455) and 49.5% (225/455) indicated they had had no, or 1 or 2 significant incidents, respectively (Figure 61).

Figure 61. Number of significant incidents during rally career according to experience



FACTORS AFFECTING THE ODDS OF HAVING 3 OR MORE SIGNIFICANT INCIDENTS

It is difficult to investigate relationships between the number of significant incidents and specific variables such as type of events, motivation and use of safety notes because all of these variables are correlated. For example tarmac competitors are more likely to use safety notes written by others, while gravel competitors tend to write their own notes or not use notes. Hence it is not easy to disentangle the effect of surface from safety notes. To overcome this problem, a statistical technique called generalized linear modelling was used. This technique allows the effect of specific factors to be assessed, after adjusting for differences in the other factors.

For this analysis the number of significant incidents were collapsed to two groups: 2 or less significant incidents and 3 or more significant incidents. The independent factors considered in the model were:

- Experience level (groups: 10 events or less, more than 10 events)
- Type of event (groups: predominantly gravel, predominantly tarmac)
- Level of event (groups: national/international, state, club/multiclub)

- Use of safety notes (groups: make own safety notes, never use notes, use notes written by others but always drive route, use notes written by others but do not always (or never) drive route)
- Motivation for competing (groups: want to be the best, achieve personal goals, results irrelevant as long as have fun)

Interactions were also considered. Binary logistic regression was used to fit the model and determine which factors significantly influenced whether a respondent had had 3 or more significant incidents. Non-significant factors and interactions were removed in order to create a final model containing only significant variables, and to maximise the amount of data included in the model. The final model analysed data for 451 respondents and was highly significant (P<0.001), explaining 19.0% of the variation in the odds of having 3 or more significant incidents (Nagelkerke R Square = 0.190).

EXPERIENCE LEVEL

Rally experience of the respondent was the most important factor influencing whether the respondent had had 3 or more significant incidents, with less experienced competitors having a significantly lower chance of having had 3 or more significant incidents:

- Respondents who have competed in 10 or less rallies were 8.13 (95% CI: 2.46-27.03) times less likely to have had 3 or more significant incidents, compared to respondents who have competed in more than 10 events

TYPE OF EVENT

The type of event significantly influenced the odds of having 3 or more significant incidents, after adjusting for experience level, use of safety notes and motivation (P=0.001). Tarmac competitors were 3.64 times (95% CI: 1.68-7.87) less likely to have had 3 or more significant incidents when compared to gravel competitors.

LEVEL OF EVENT

The competition level of the event was not a statistically significant factor in determining whether the respondent had had 3 or more significant incidents (P>0.05).

SAFETY NOTES

The users of safety notes were categorised into four groups, with the reference group being those respondents who wrote their own notes. Compared to this group (after adjusting for other significant factors):

- Respondents who never use safety notes were 2.42 (95% CI: 1.25-4.67) times less likely to have had 3 significant incidents, compared to respondents who wrote their own safety notes (P=0.009)
- There was no significant difference between the odds of having had more than 3 significant incidents for respondents who used notes written by someone else (irrespective of whether they drove the route or not) and those who wrote their own notes (P>0.5)

MOTIVATION FOR COMPETING

There were significant differences in the odds of having had at least 3 significant incidents between the three motivation groups, after adjusting for experience, type of event and use of safety notes (P=0.049).

- Respondents who said their result was irrelevant were 2.47 (95% CI: 1.08-5.65) times less likely to have had 3 or more significant incidents, compared to respondents who indicated winning was their main motivation (P=0.032)
- Respondents who said their main motivation was to achieve personal goals were 1.95 (95% CI: 1.06-3.56) times less likely to have had 3 or more significant incidents, compared to respondents who indicated winning was their main motivation (P=0.031)

- There was no significant difference between respondents who said their result was irrelevant and those who wanted to achieve personal goals (P=0.516)

COMPETITORS AT HIGHEST RISK OF HAVING HAD 3 OR MORE SIGNIFICANT INCIDENTS

Combining the above results, the model predicts that gravel rally competitors who have done more than 10 events, who write their own notes and are competing to win have the highest odds (0.86) of having had 3 or more significant events in their competition history.

DETAILS OF LAST SIGNIFICANT INCIDENT

406 respondents indicated they had had at least one significant incident in their competition history. The majority of respondents (64.8%) indicated their last incident was more than 2 years ago, while 71 (17.5%) and 72 (17.7%) had had their last incident within the past 12 months and 1-2 years, respectively. Approximately 50% of the incidents (50.4%, 205/409) were reported to involve vehicles manufactured between 1960 and 1984, 27.8% (113/409) involved vehicles manufactured between 1985 and 1999, with the remaining incidents involving vehicles manufactured between 2000-04 (7.6%, 31/409), 2005-09 (10.3%, 42/409) and 2010 or later (3.9%, 16/409). Only two vehicles manufactured before 1960 were reported.

Respondents were asked specific questions about their last significant incident including the level of the event. 141 respondents indicated their last significant incident occurred at a club or multi-club event, 143 at a state level event and 146 at a national or international event. These frequencies exceed the number of respondents who experienced at least one significant incident because 24 respondents (5.6%) selected multiple event levels.

The majority of respondents (53.2%, 214/402) indicated they were travelling at medium speed (60-100kmh) immediately prior to the incident, while 5.0% (20/402) and 30.1% (121/402) reported travelling “very fast (>160kmh)” or “fast (100-160kmh)”, respectively. Almost 12% of incidents (11.7%, 47/402) were reported to have occurred at under 60kmh.

The survey contained no information about what constituted a “significant incident”. This was left to the respondent’s personal view. To help better understand what severity of incidents were being reported, respondents were asked whether the vehicle was damaged, and to what degree, during the incident. Only 1.5% (6/402) of incidents resulted in no vehicle damage, while 35.8% (144/402) and 39.8% (160/402) resulted in minor and major damage, respectively. Over 20% of incidents (22.9%, 92/402) resulted in damage to the vehicle which was not repairable.

There was a statistical association between the speed immediately prior to the incident and the severity of damage to the vehicle (Pearson’s Chi-square, P=0.001); the majority (51.1%, 24/47) of slow speed incidents resulted in minor damage, while over 40% (8/19) of incidents at very high speed resulted in damage which was not repairable (Figure 62).

Respondents were asked to categorise the first action of the incident according to direction of impact and object impacted with (Table 8). The majority of incidents involved impact with an earth bank, gully or creek (36.0%), a tree, stump or power pole (28.6%) or a roll-over (29.9%). In terms of direction, frontal impacts (42.1%) and side impact (39.6%) accounted for the majority of incidents. Forty-two respondents selected “other” and were asked to provide details of the first action of the incident. The specific responses are provided separately later in this section.

Figure 62. Vehicle damage in the last significant incident categorised by incident speed

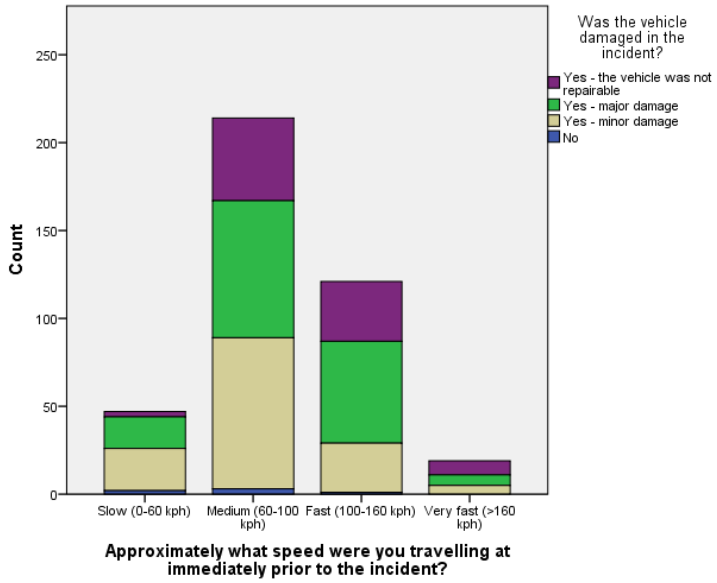


Table 8. Incident details for object first impacted and direction of impact.

	Direction/type of impact				**Total**	% resulting in injury
	Frontal	Rear	Side	Other		
Impacted with tree or stump or power pole	78	9	45	4	**136**	23.5
Impacted with earth bank, gully or creek	78	16	63	14	**171**	18.8
Impacted with Armco	2	0	4	0	**6**	16.7
Impacted with gate or fence or signpost	5	1	7	0	**13**	15.3
Roll-over	34	9	66	33	**142**	14.9
Fire	3	0	3	1	**7**	14.3
Total	200	35	188	52	475	
% resulting in injury	21.1	5.7	17.6	23.1		

Seventy-seven respondents (19.0%) indicated that the incident resulted in injury to at least one person, with 55 co-drivers injured and 49 drivers injured. There was a significant association between the speed immediately prior to the incident and whether an injury occurred (Pearson Chi-square, P=0.001). One half (10/20) of the incidents reported to have occurred at very high speed (>160 kmh) resulted in injury, whereas 20.0% (24/120), 17.8% (38/213) and 8.5% (4/47) of incidents where the speed was fast (100-160 kmh), medium (60-100 kmh) and slow (<60 kmh) resulted in injury.

There was little difference in the proportion of incidents resulting in injury according to vehicle age. The proportion of incidents resulting in injury for incidents involving vehicles manufactured later than 1985 varied between 20.0% and 25.0% (mean = 23.0%, 46/200). The proportion of incidents resulting in injury for vehicles manufactured prior to 1985 was lower at 14.0% (29/207).

Approximately 22% of injuries required either no medical attention (8.7%, 8/92), or attention by the event first aid or medical team only (14.1%, 13/92). Thirteen respondents (14.1%) indicated that medical advice was obtained after the event from a private practitioner, while 24 (26.1%) respondents indicated that medical advice/treatment was obtained from a hospital, but without admission. Thirty-three respondents (35.9%) indicated that the injury was severe enough to warrant admission to hospital.

Binary logistic regression was used to investigate which factors influence the odds of hospital admission when an injury was noted. Factors tested included speed immediately prior to incident, type of event, level of event, use of safety notes, impact object and direction, body area injured and vehicle age. The only factor that significantly influenced the odds of hospital admission was the event level (P=0.004, Nagelkerke R^2 = 15.0%); injuries sustained at international or national events were 4.25 (95% CI: 1.59-11.37) times more likely to result in hospital admission compared to state, multi-club or club events.

Injuries were reported to occur to different regions of the body as outlined in the following table with spinal injuries being the most frequent.

Table 9. Body area injured as a result of last significant incident

Body area of injury	Frequency
Head	8 (7.0%)
Neck	26 (22.6%)
Face (including eyes)	3 (2.6%)
Hand, wrist, arm, shoulder	13 (11.3%)
Torso (including chest, internal organs)	14 (12.2%)
Spine	33 (28.7%)
Foot, knee, leg, hip	18 (15.7%)
Total	115

Respondents were asked to rank in order of importance the factors they thought contributed to their last significant incident. Almost half of the respondents (46.8%, 182/389) ranked team error as the most important contributing factor (Figure 63). This was followed by the section of road being out of character with the rest of the stage (14.7%, 57/389) and the weather conditions (10.8%, 42/389). The frequencies of rankings for each factor are displayed in Figure 64.

Of the 20 incidents that were reported to have occurred at >160 kmh, only three respondents (15%) selected “section of road was too fast” as the highest ranked factor contributing to the incident, while nine of the 20 respondents (45%) indicated this factor was not applicable to the incident.

Figure 63. Factors ranked as being the most important contributors to the significant incident

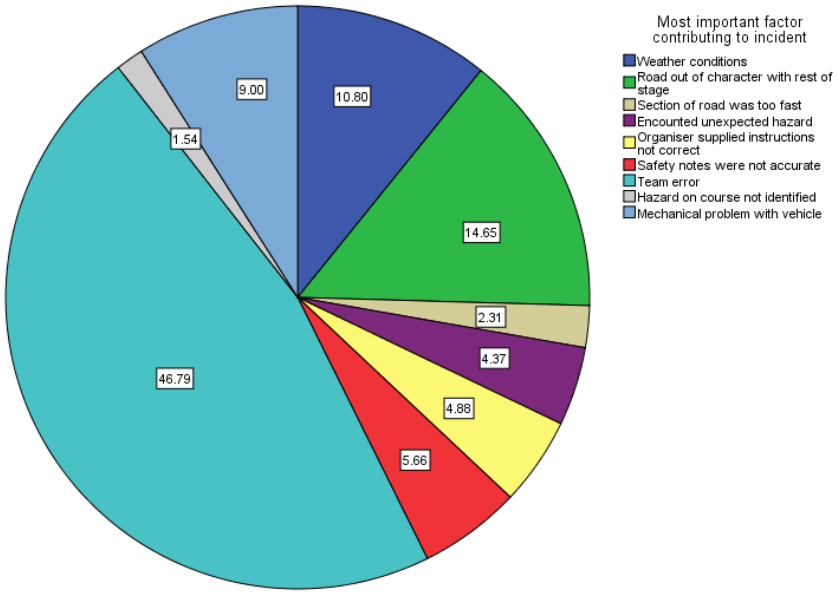
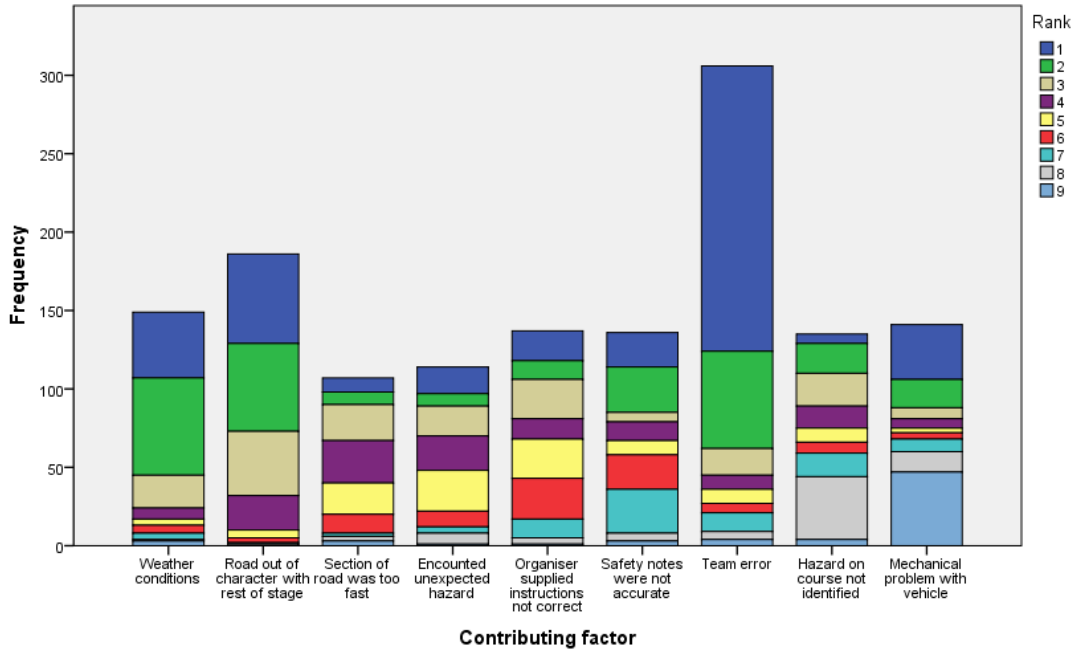


Figure 64. Factors contributing to the incident and their relative importance (rank 1, most important)



COMPETITOR OPINIONS

The survey contained 15 statements which respondents were asked to indicate their agreement with using a Likert Scale. Respondents were also able to select "N/A" if they felt the statement did not relate to them.

The overall agreement and disagreement with each statement is reported in the sections below, along with responses according to the following sub-groups:

- Competition role (non-competitor, driver, co-driver, roles varies between driver and co-driver
- Experience level (10 events or less, >10 events)
- Time since last competed (within last 2 years, 2-5 years, >5 years)
- Main competition level within past 2 years[3] (national/international, state, club/multi-club)
- Types of rallies contested (gravel only, tarmac only, combination)
- Number of significant incidents in competition history (none, 1-2, >2)

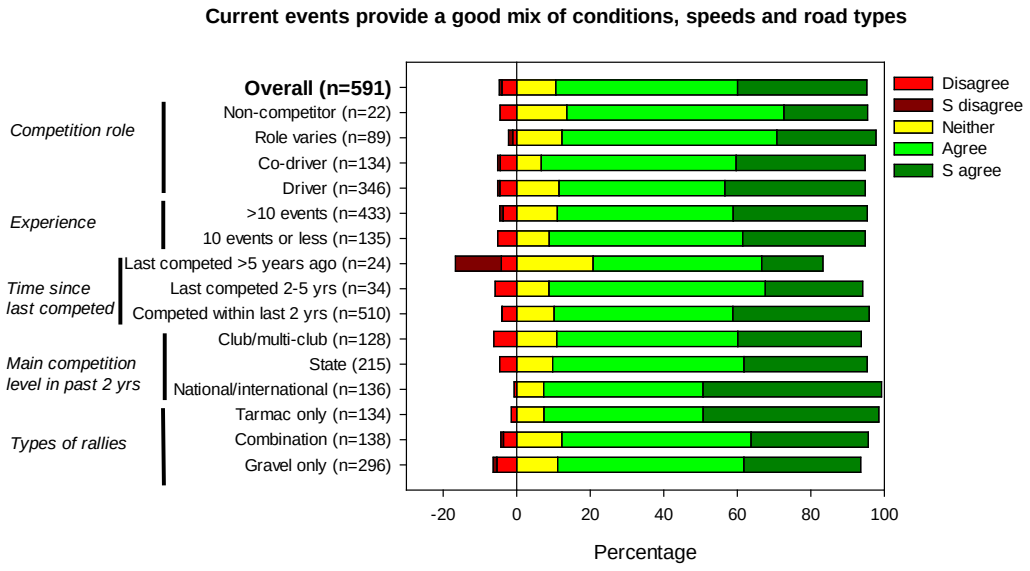
It is important to note that some of these sub-groupings contain relatively small numbers of respondents (20-30) so the results for these groupings should be interpreted with caution. This is the case for non-competitors and past competitors who had not competed within the past 5 years.

Of the 15 statements, four elicited agreement from the large majority of respondents, three showed majority agreement, while the remaining 8 statements had mixed responses that were often vastly different between certain sub-groups of respondents.

Table 10 provides an overview of the relative agreement / disagreement with each statement, with detailed analysis of each statement in the following sections.

CURRENT EVENTS PROVIDE A GOOD MIX OF CONDITIONS, SPEEDS AND ROAD TYPES

Overall 84.6% of respondents agreed or strongly agreed with this statement. The lowest rate of agreement (62.5%) was in the group of competitors who had not competed for at least 5 years, while tarmac competitors and those competing predominantly in national and international events had the highest rates of agreement at 91.0% and 91.9%, respectively.



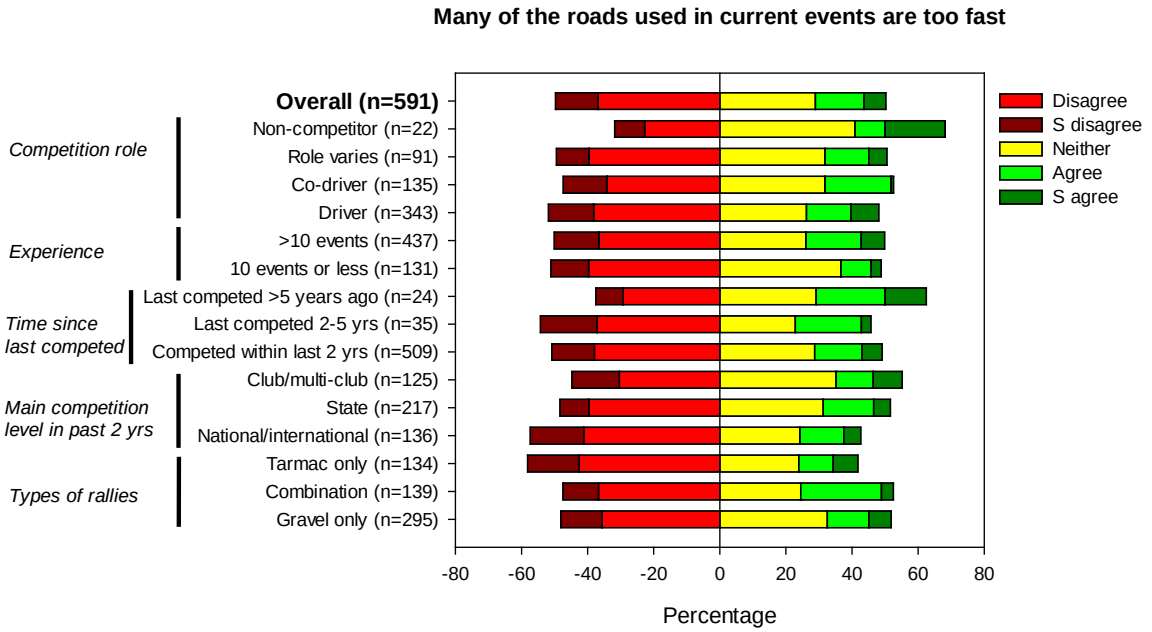
[3] Only for competitors who have competed within the past 2 years

Table 10. Overview of opinions to 15 statements relating to safety

% **agree**/disagree (Normalised)	Survey Statement
Statements with clear dominant opinion	
85 : 5 (17.0 : 1)	*Current events provide a good mix of conditions, speeds and road types*
80 : 6 (13.3 : 1)	*When it comes to safety, it is the competitors responsibility to keep up-to-date with new technology*
80 : 7 (11.4 : 1)	*Organisers should use course warning boards to indicate hazards, even in pace-noted events*
65 : 7 (9.3 : 1)	*CAMS should be more pro-active informing competitors of advances in safety equipment*
Statements with majority dominant opinion	
56 : 12 (4.6 : 1)	*Competitor safety standards in Australia are good and don't require upgrading*
59 : 17 (3.5 : 1)	*In events allowing safety notes, reconnaissance should be compulsory*
54 : 18 (3 : 1)	*Every competitor should have first aid training and be competent at using the items in the first aid kit*
Statements with mixed opinion	
16: 43 (1 : 2.7)	*I prefer fast roads over slower, twisty roads*
21 : 50 (1: 2.4)	*Many of the roads used in current events are too fast*
25 : 58 (1 : 2.3)	*Limiting the maximum permitted average speed for rally stages will improve safety*
26 : 55 (1 : 2.1)	*Limiting the maximum terminal speed of vehicles will improve safety*
26 : 47 (1 : 1.8)	*Improving competitor safety should be the highest priority for regulators, irrespective of cost*
30 : 48 (1 : 1.6)	*In the past 2 years I have questioned the safety of some of the roads used for competition*
33 : 51 (1 : 1.5)	*The required vehicle safety standards for rallies should be the same across all competition levels*
40 : 47 (1 : 1.2)	*The required personal safety equipment for rallies should be the same across all competition levels*

MANY OF THE ROADS USED IN CURRENT EVENTS ARE TOO FAST

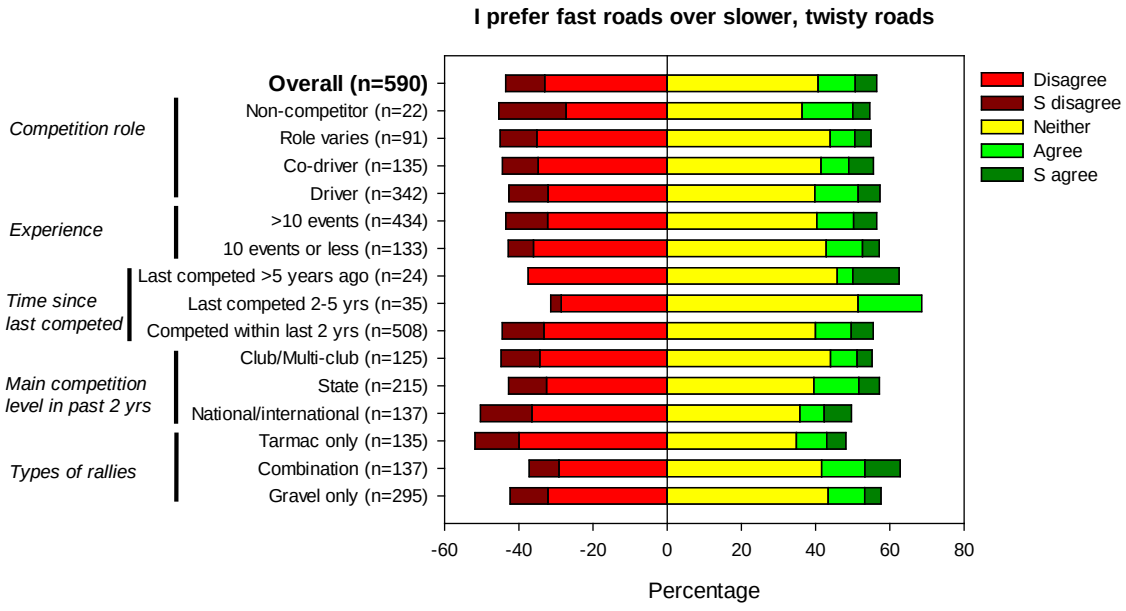
Approximately 50% of respondents either disagreed or strongly disagreed with this statement, while 21.3% agreed or strongly agreed. Tarmac competitors had the highest rate of disagreement (58.2%). The highest rates of agreement with the statement were from respondents who had not competed within the past 5 years (33.3%), those who contest a combination of gravel and tarmac events (28.1%) and respondents who identified themselves as non-competitors (27.3%).



I PREFER FAST ROADS OVER SLOWER, TWISTY ROADS

Overall 43.6% of respondents either disagreed or strongly disagreed with this statement. The highest disagreement rates occurred within the tarmac competitors (51.9%) and competitors of international/national events (50.4%). Respondents who last competed 2 to 5 years ago had the lowest rate of disagreement at 31.4%.

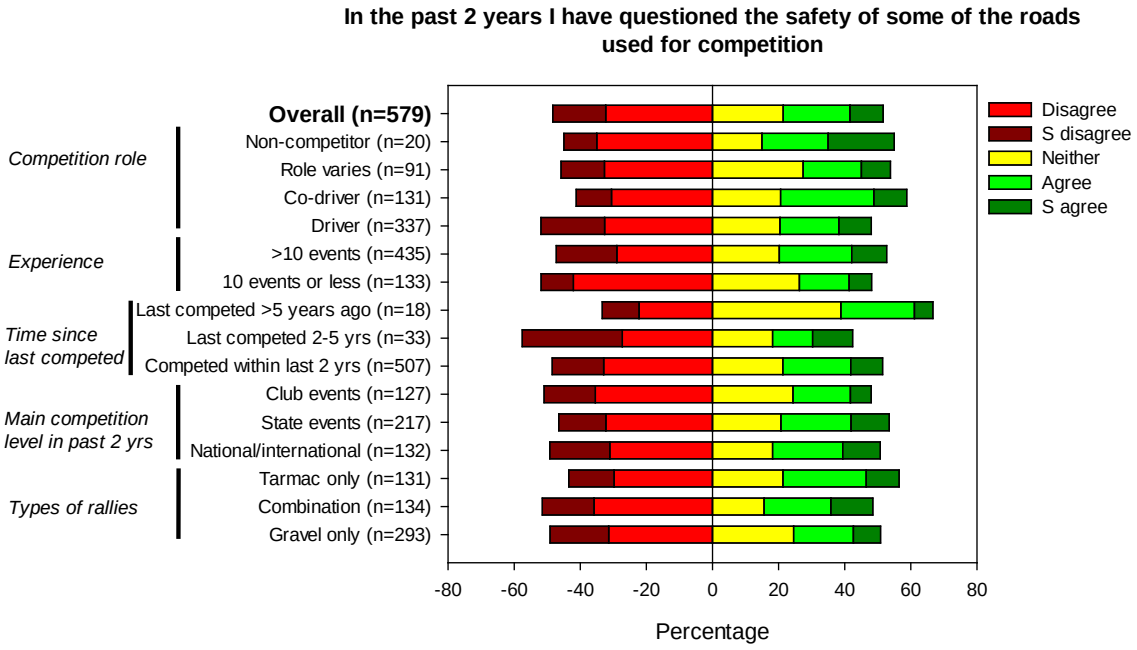
Approximately 16% of respondents agreed or strongly agreed with this statement. The highest rates of agreement occurred in respondents who competed in a combination of gravel and tarmac events (21.2%), while respondents whose role within the vehicle varies or who compete predominantly in club and multi-club events had the lowest rates of agreement at 11.0% and 11.2%, respectively.



IN THE PAST 2 YEARS I HAVE QUESTIONED THE SAFETY OF SOME OF THE ROADS USED FOR COMPETITION

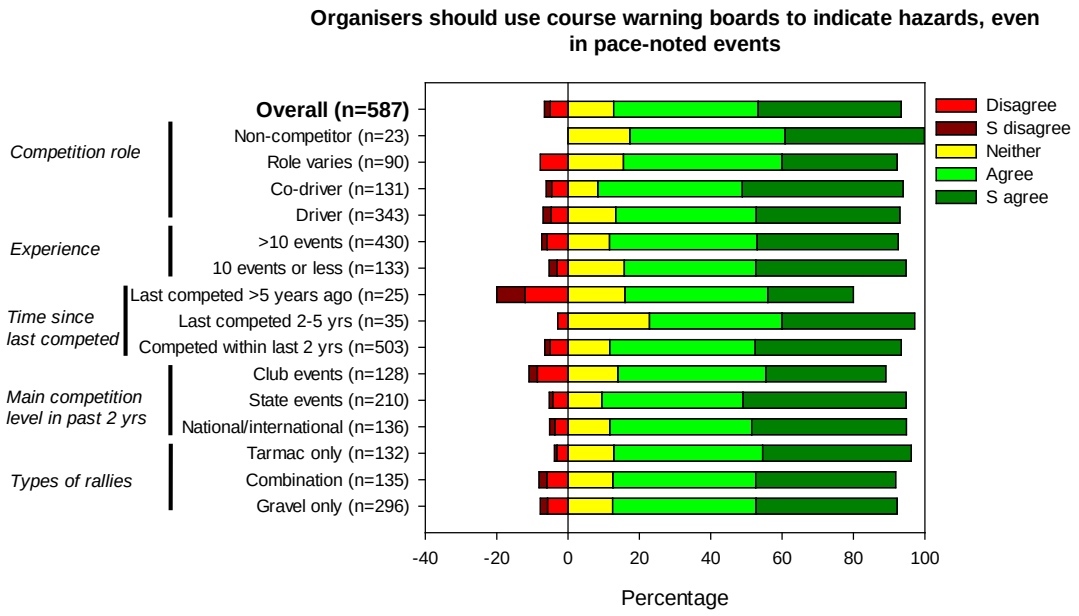
Almost half of the respondents disagreed (32.3%) or strongly disagreed (16.1%) with this statement. Respondents who last competed 2 to 5 years ago had the highest proportion of disagreement (57.6%), while those who last competed more than 5 years ago had the lowest disagreement rate (33.3%).

A smaller proportion (30.2%) of respondents agreed (20.2%) or strongly agreed (10.0%) with the statement. The highest agreement rate occurred in non-competitors (40.0%) and co-drivers (38.2%). Respondents who had competed in 10 events or less had the lowest rate of agreement at 21.8%.



ORGANISERS SHOULD USE COURSE WARNING BOARDS TO INDICATE HAZARDS, EVEN IN PACE-NOTED EVENTS

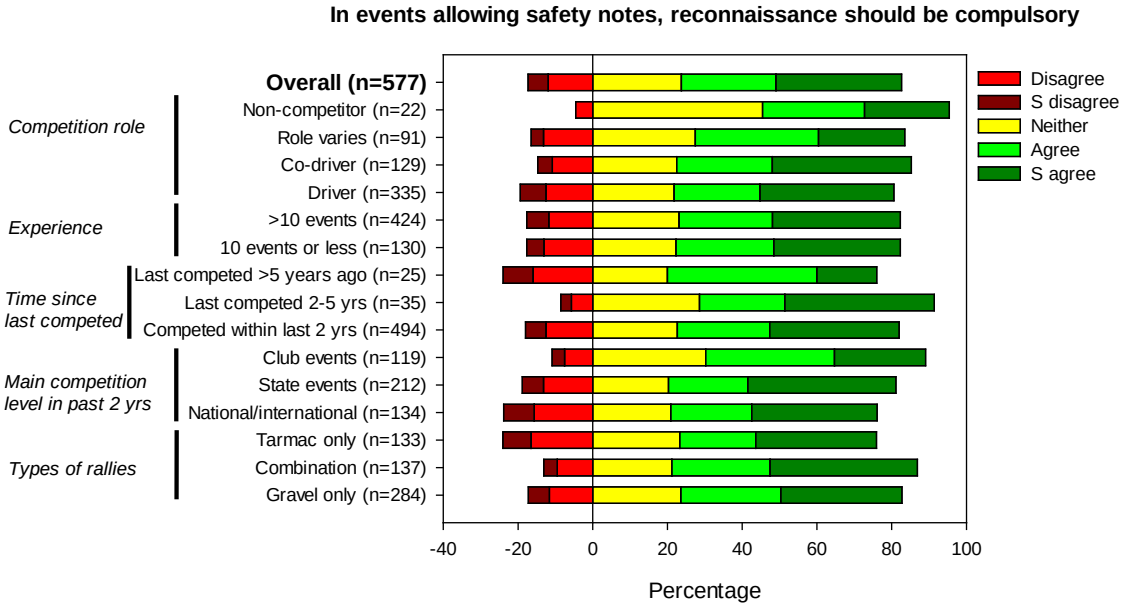
This statement was supported by 80.6% of respondents, with only 6.6% indicating they disagreed or strongly disagreed. Competitors who had not competed within the last 5 years were the most disparate group, with 64.0% agreeing with the statement and 20.0% indicating disagreement.



IN EVENTS ALLOWING SAFETY NOTES, RECONNAISSANCE SHOULD BE COMPULSORY

The majority (58.9%) of respondents agreed with this statement, with 25.3% agreeing and 33.62% indicating strong agreement. Excluding non-competitors who were relatively neutral (45.5% neither agree nor disagree), the proportion of respondents agreeing with the statement was relatively consistent across respondent groups. The lowest agreement occurred in respondents competing in tarmac only events (52.6% agreement), while the highest occurred in respondents who compete in a combination of gravel and tarmac events (65.7% agreement).

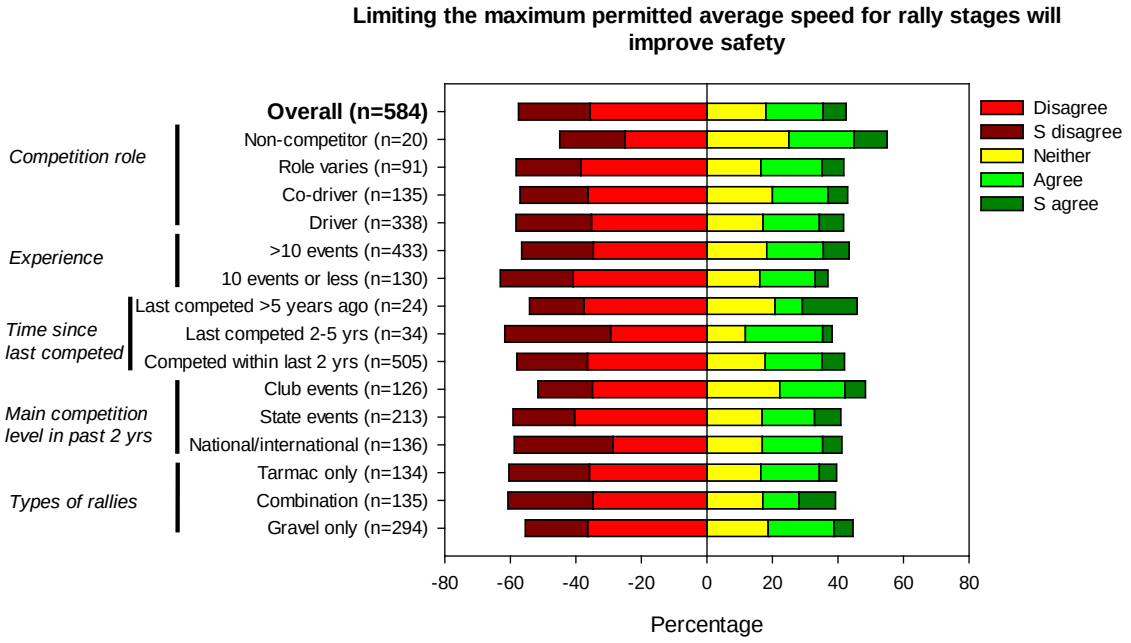
Overall 17.3% of respondents disagreed with this statement; tarmac only competitors and respondents who had not competed within the last 5 years had the highest disagreement rates of 24.1% and 24.0%, respectively. Low rates of disagreement occurred in amongst competitors who last competed 2 to 5 years ago (8.6%) and in respondents who predominantly compete in club and multi-club events (10.9%).



LIMITING THE MAXIMUM PERMITTED AVERAGE SPEED FOR RALLY STAGES WILL IMPROVE SAFETY

The majority of respondents (57.5%) disagreed with this statement (35.6% disagreed and 21.9% strongly disagreed). The highest rate of disagreement was for respondents who had competed in 10 events or less (63.1%). Non-competitors and club/multi-club competitors had the lowest rates of disagreement with the statement with 45.0% and 51.6% disagreeing, respectively.

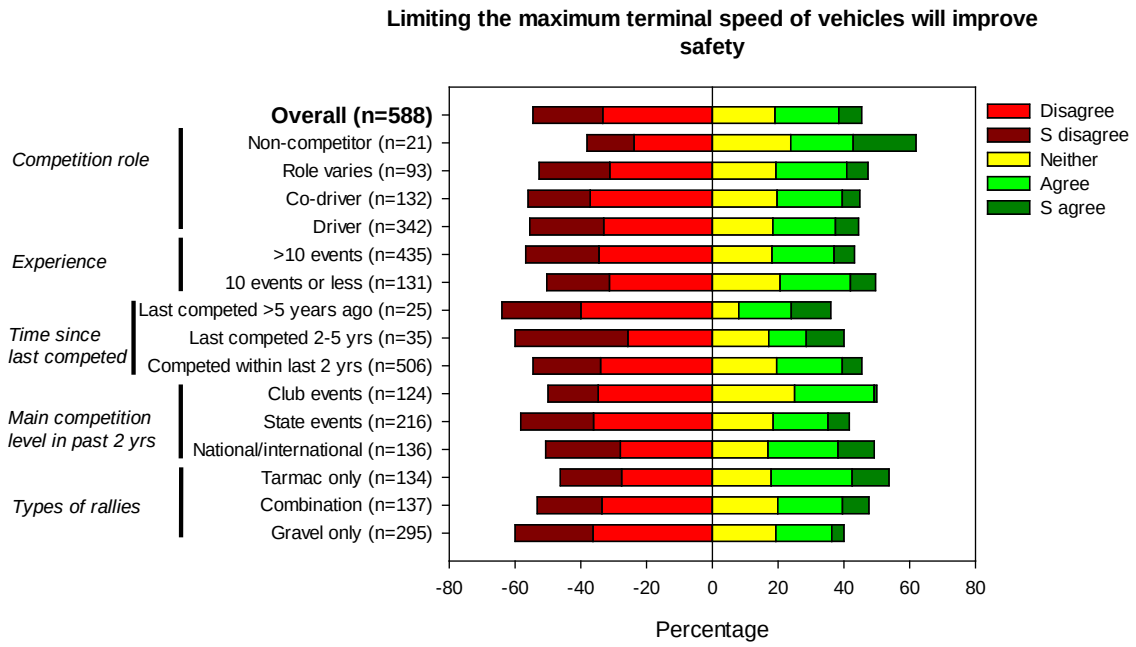
Approximately one quarter of respondents agreed with the statement. The lowest rate of agreement was in the least experience competitors (10 events or less, 20.8% agreement), while the highest was in non-competitors (30%).



LIMITING THE MAXIMUM TERMINAL SPEED OF VEHICLES WILL IMPROVE SAFETY

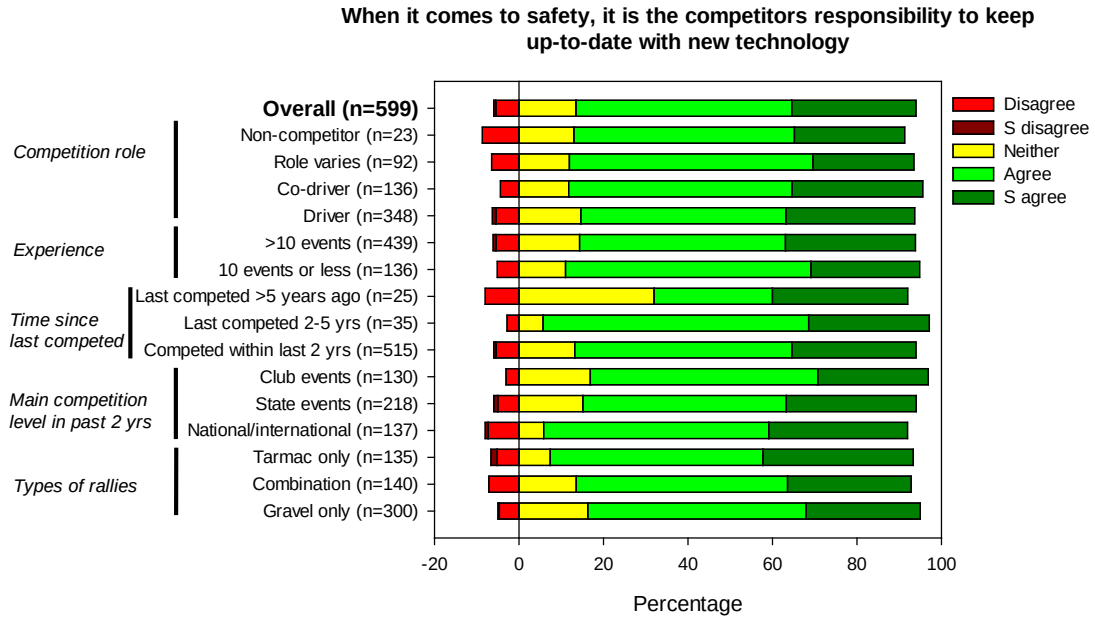
The majority of respondents (54.6%) disagreed with this statement. Competitors who had not competed within the last 5 years had the highest rate of disagreement (64.0%), while non-competitors had the lowest rate (38.1%).

Twenty-six percent of respondents agreed with the statement. The highest rate of agreement was from non-competitors (38.1%) and there was a clear divide between gravel and tarmac competitors with 20.7% of gravel competitors agreeing with the statement compared to 35.8% for tarmac competitors.



WHEN IT COMES TO SAFETY, IT IS THE COMPETITORS RESPONSIBILITY TO KEEP UP-TO-DATE WITH NEW TECHNOLOGY

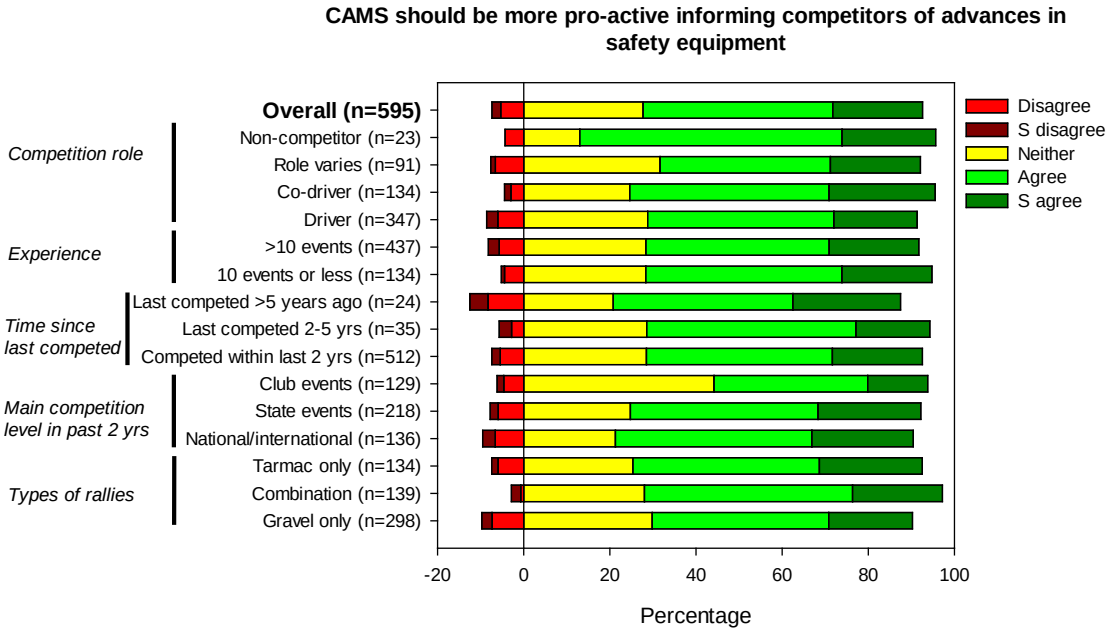
This statement was supported by 80.5% of respondents with 51.1% and 29.4% indicating agreement and strong agreement, respectively. The highest rate of agreement (91.4%) occurred in competitors who had last competed 2 to 5 years ago, followed by national/international competitors (86.1%) and tarmac only competitors (85.9%). Competitors who had not competed within the last 5 years had the lowest rate of agreement at 60.0%, but this was due to a high proportion of respondents selecting the 'neither' option. Only 6% of respondents disagreed with the statement.



CAMS SHOULD BE MORE PRO-ACTIVE INFORMING COMPETITORS OF ADVANCES IN SAFETY EQUIPMENT

This statement was supported by 64.9% of respondents with 44.0% and 20.8% indicating agreement and strong agreement. The highest rate of agreement (82.6%) occurred in respondents who were not competitors (past or present), while competitors in club and multi-club events had the lowest rate of agreement at 49.6%.

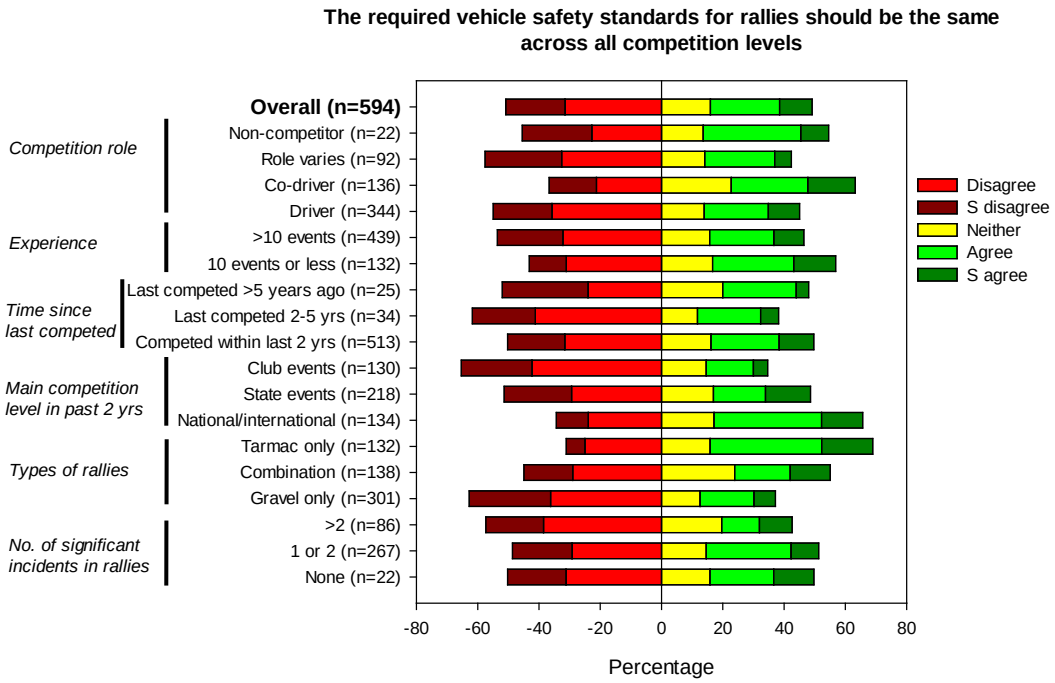
Approximately 7% of respondents disagreed with the statement. Past competitors (not competed within the last 5 years) had the highest rate of disagreement (12.5%). The lowest rates of disagreement occurred in non-competitor respondents (4.4%) and co-drivers (4.5%).



THE REQUIRED VEHICLE SAFETY STANDARDS FOR RALLIES SHOULD BE THE SAME ACROSS ALL COMPETITION LEVELS

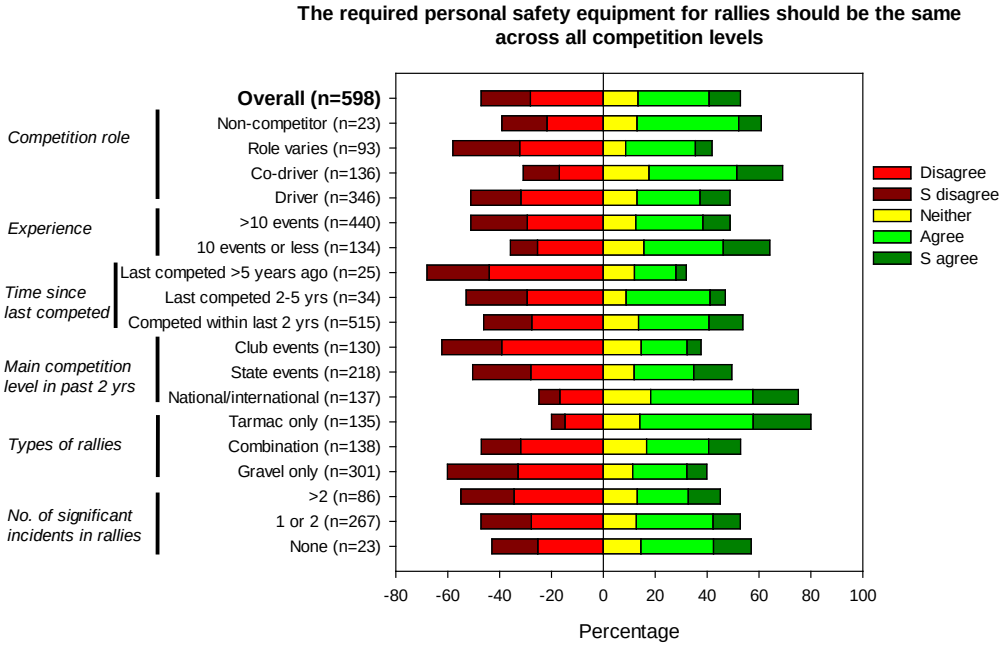
One half (50.8%) of respondents disagreed with this statement. Gravel only competitors had the highest rate of disagreement at 58.8%. There was a trend according to level of competition with club and multi-club competitors having a higher rate of disagreement than state competitors (65.4% compared to 51.4%), who had a higher rate than national or international competitors (34.3%). Club and multi-club gravel competitors were 1.5 (95% CI: 1.0-2.3, p=0.036) times more likely to disagree than gravel international and national competitors. Tarmac only competitors had the lowest rate of disagreement (31.1%) and this value was not influenced by level of competition (p>0.9).

While half of the respondents disagreed with the statement, one third (33.2%) agreed that vehicle safety standards should be same across all competition levels. The agreement was highest amongst tarmac competitors (53.0%) and lowest in club and multi-club competitors (20.0%). Interestingly, the second lowest rate of agreement (23.0%) was among competitors who had had more than 2 significant incidents while competing. This was lower than competitors who had not experienced any significant incidents, or those who had had only 1 or 2 significant incidents.



THE REQUIRED PERSONAL SAFETY EQUIPMENT FOR RALLIES SHOULD BE THE SAME ACROSS ALL COMPETITION LEVELS

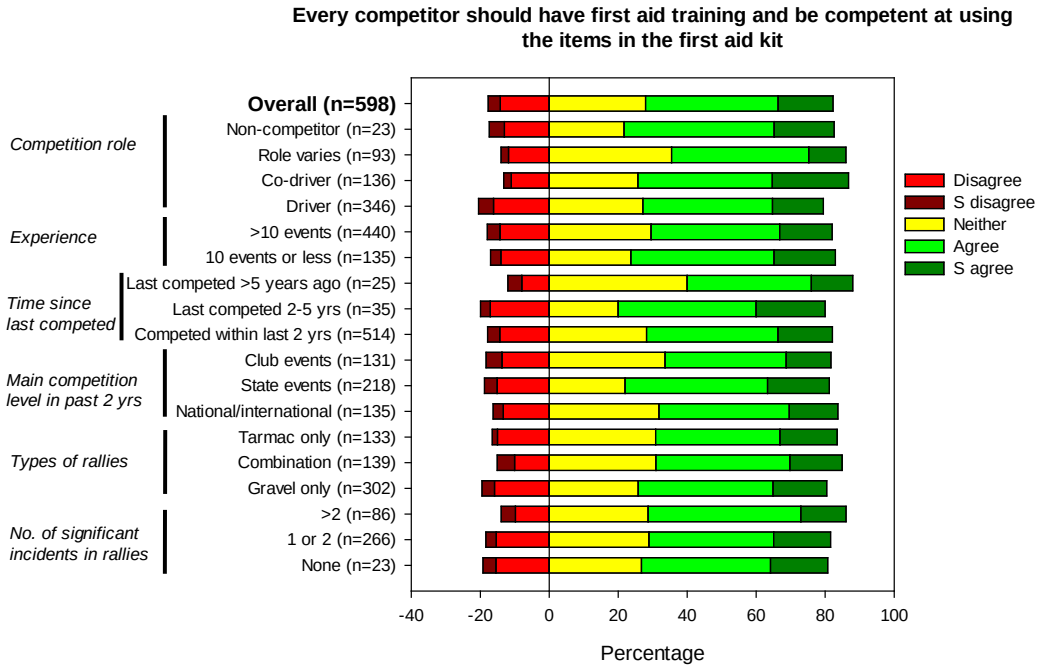
Overall 47.2% of respondents disagreed with this statement, while 39.5% agreed. There were large differences of opinion between tarmac only competitors and gravel only competitors, with 65.9% of tarmac competitors agreeing compared to 28.9% for gravel competitors. These values were reversed for disagreement; 60.1% of gravel competitors compared to 20.0% of tarmac competitors. The highest rate of disagreement (68.0%) occurred in competitors who last competed more than 5 years ago and in club / multi-club competitors (62.3%).



EVERY COMPETITOR SHOULD HAVE FIRST AID TRAINING AND BE COMPETENT AT USING THE ITEMS IN THE FIRST AID KIT

Overall 54.4% of respondents agreed with this statement. Co-drivers had the highest rate of agreement (61.0%), followed by competitors who last competed within the past 2-5 years (60.0%). Club and multi-club competitors had the lowest rate of agreement at 48.1%.

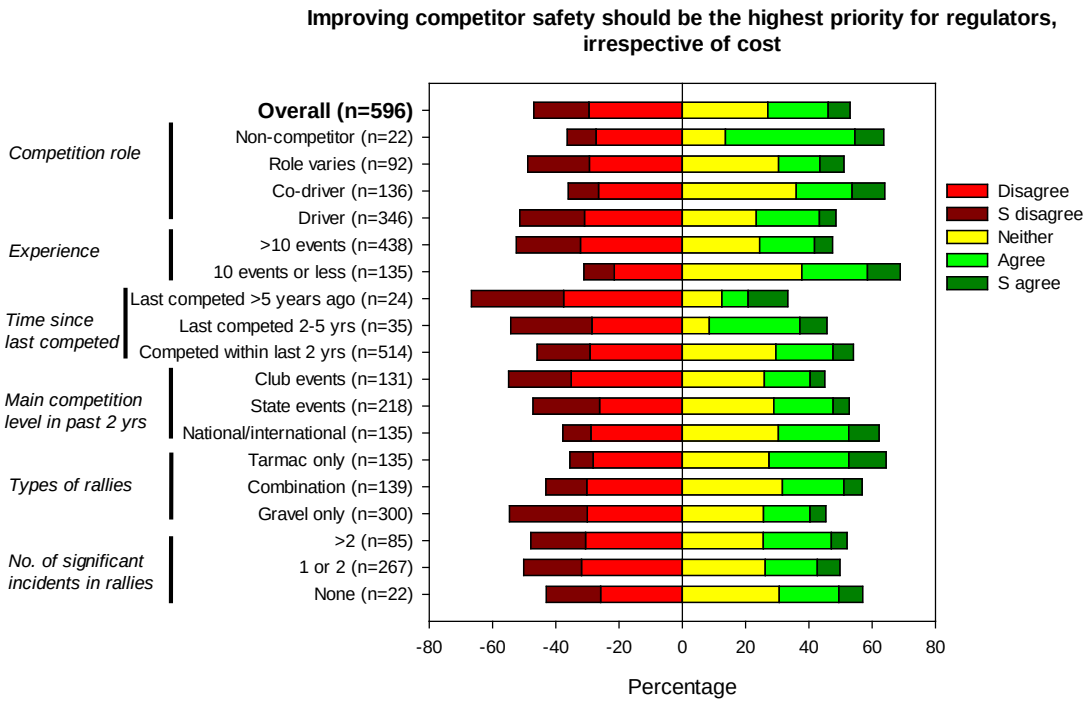
Almost 18% of respondents disagreed with the statement. Rates of disagreement were lowest amongst competitors who had not competed for the past 5 years (12.0%), co-drivers (13.2%) and competitors who role within the vehicle changes (14.0%), and competitors who had had more than two significant incidents in their rally history (13.9%).



IMPROVING COMPETITOR SAFETY SHOULD BE THE HIGHEST PRIORITY FOR REGULATORS, IRRESPECTIVE OF COST

Approximately 47% of respondents disagreed with this statement; 29.5% disagreed while 17.5% strongly disagreed. Disagreement was highest amongst competitors who had not competed for the past 5 years (66.7%), and also in gravel competitors (54.7%), club / multi-club competitors (55.0%) and competitors who last competed 2-5 years ago (54.3%). Competitors who had done 10 or less events had the lowest rate of disagreement (31.1%).

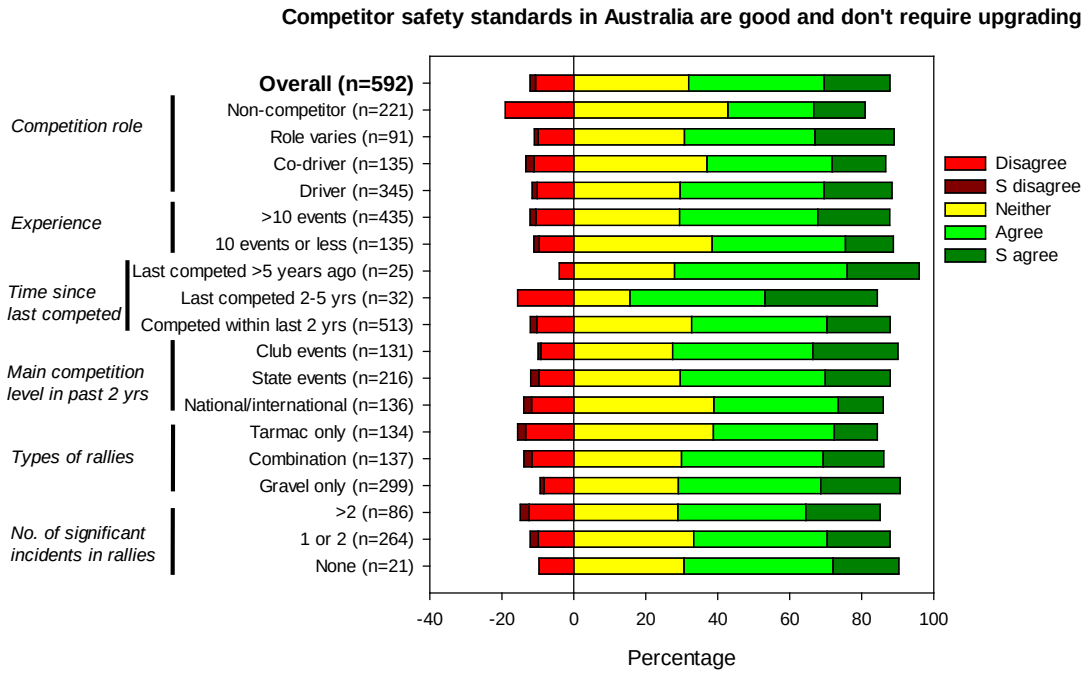
Just over one quarter of respondents (26.0%) agreed with the statement. The highest rate of agreement was in non-competitors (50.0%), then tarmac competitors (37.0%) and competitors who last competed 2-5 years ago (37.1%). Gravel competitors and club / multi-club competitors had the lowest rates of agreement at 19.7% and 19.1%, respectively.



COMPETITOR SAFETY STANDARDS IN AUSTRALIA ARE GOOD AND DON'T REQUIRE UPGRADING

Overall 55.9% of respondents agreed with this statement (37.7% agreed and 18.2% strongly agreed). The highest rates of agreement were 68% amongst competitors who had not competed within the past 2 years. Gravel competitors had a higher rate of agreement compared to tarmac competitors (61.6% compared to 45.5%). There was also a trend with the level of event with the highest rates of agreement in club/multi-club competitors (62.6%) followed by state competitors (58.3%) followed by national/international competitors (47.1%).

Approximately 12% of respondents disagreed with the statement, although very few respondents (1.5%) strongly disagreed. Non-competitors had the highest rate of disagreement (19.0%), while competitors who had not competed within the past 5 years had the lowest rate (4.0%).



SUMMARY OF OPEN-ENDED COMMENTS FROM SURVEY RESPONDENTS

The last question of the survey provided all participants an opportunity to leave additional comments, either expanding on the questions they had answered in the survey or offering other thoughts they had regarding safety in the sport of rallying.

The question was: “Please provide any additional comments expanding on the questions of this survey and your thoughts regarding the safety aspects of rallying in Australia”.

The objective of this question was to ensure the survey had not overlooked potential critical issues that the review should address and to gauge the general feeling of what competitors see as important issues regarding rally.

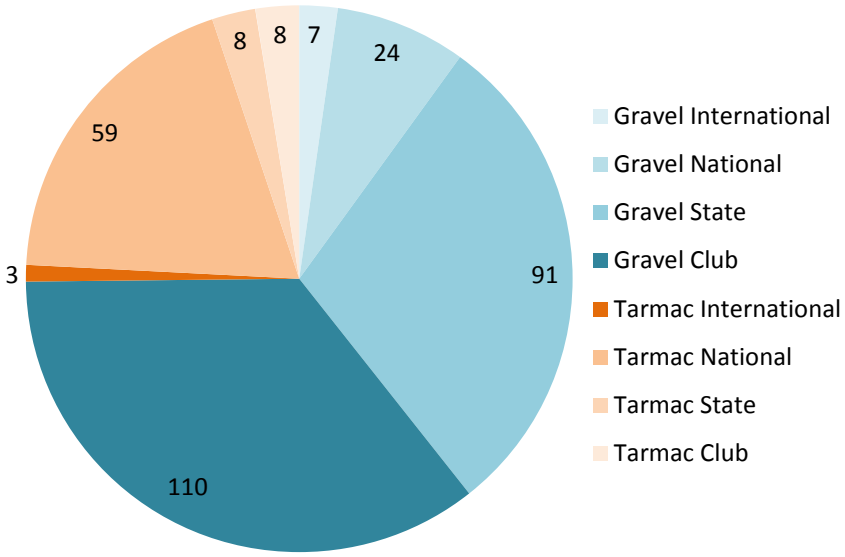
Of the 648 respondents to the survey, 292 (45.1%) responded to the question and provided additional comments.

The key points/comments of these open-ended responses were extracted and interpreted to provide a guide of the participants’ views. These comments were then categorised to form a list of the most frequently raised comments.

Filters were applied to determine what segment of rally, these comments came from. These included the levels of rally competition, (International, National, State and Club) and their recent experience/frequency of competition (1 to 2, 3 to 4, 5 to 10 and 10 or more events competed in) over the last 2 years.

Overall the gravel rally discipline provided the highest number of comments (232) compared to 78 from tarmac competitors. The two largest groups of respondents were 110 comments from competitors that represented club level gravel competitors, followed by 91 comments from state level gravel competitors. National tarmac competitors provided 59 comments, while national gravel competitors supplied 24 comments (Figure 65).

Figure 65. Number of open-ended comments supplied by respondents according to type of rally they mostly compete in



The following two charts show the 30 most common comment themes according to level of competition (Figure 66) and frequency of competition of the past 2 years (Figure 67).

Figure 66. Top 30 comments according to competition level

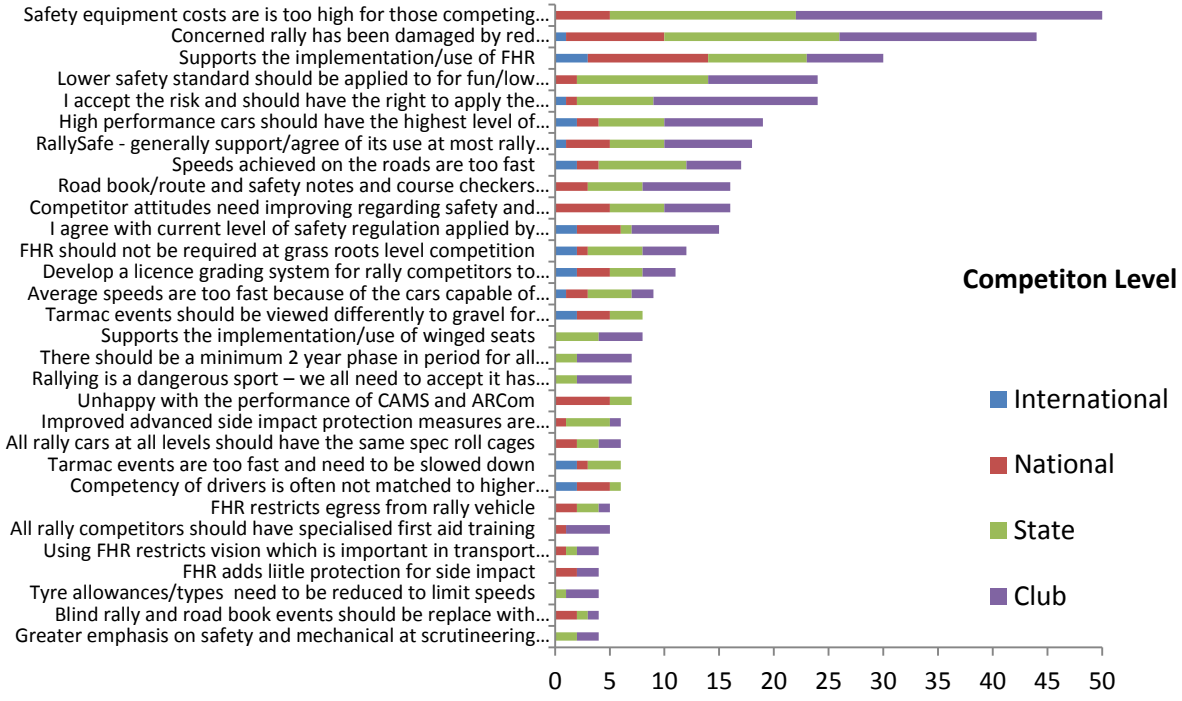
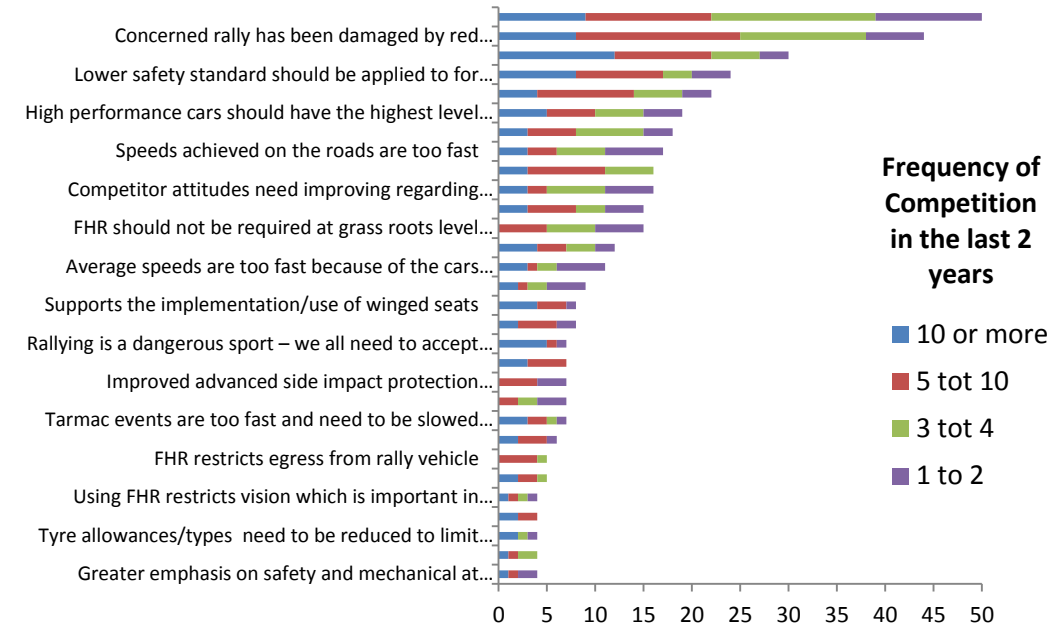


Figure 67. Top 30 comments according to competition frequency in past 2 years



RESPONSES RELATED FHR DEVICE USE

A range of responses from individuals who selected “other” in the question asking the reason for not using a FHR device;

- In a rally car you require a device that works both ways, side to side and front to back
- Not been required yet, however am examining what modifications will be required to comply with rule change from 01/07/14
- Unnecessary for the majority of events I do
- I realise there is an element of danger, but as I don’t really go much faster than I drive my road car, I see little value in the expense of FHR. I drive well with in my limits and have a far greater chance of an incident on the open road with no helmet and no FHR than in a controlled rally environment
- Purchase cost is prohibitive, as would also have to upgrade my helmet and I don't believe its necessary for gravel rallying
- Have device, have yet to use it
- Building a new car. will get one when it's finished
- I am happy to accept the risk of competing without one and I don't believe they should be made compulsory.
- My new car is nearly complete and I will use it in the next event
- I have one on order so will be using in the future
- Access to vehicle
- Will be getting a fhr during the year
- After 32 years competing, I honestly cannot see the benefit in them
- Entry and egress as co driver, ridiculous (IMHO) protocols in regard to booking in at controls
- Not required + I understand the risks I am taking without it + cost + I drive a slower-end-of-the-market vehicle + lots of other reasons!
- I judge the risk to my neck to be minimal
- Helmet also not compatible so i now have to buy a new Helmet.
- Lack of visibility in trials where have to reverse etc.
- Given what I believe the risks to be of competing in rallying, and my willingness to accept that risk, I do not believe that it would significantly improve my safety.
- Has not been priority up until now
- I have brought a HANS device since my last event. I will try it, but may choose to not use it for smaller events if it is not comfortable when in use.
- Don't believe they are the best thing for rally with multiple direction impacts
- Did some research, couldn't justify it. Tried one a few weeks ago in an event. Opinion has not changed.
- Expense, unsafe in road events, cannot see around corners
- Unemployed for past 14mths
- Other protocols would have a greater safety impact
- Due to space limitations within vehicle the helmet must be worn on transport sections; HANS device limits head movement impeding visibility at junctions, etc. Also the extra cost is not limited to the device itself; helmet, seats and belts must be renewed which will probably preclude my participation in future events. As competitors we all understand and accept the risks of motorsport, but mandatory cost increases of this magnitude results in competitors being forced away from the sport we love.
- Not convinced by the evidence
- Will purchase before next state event
- Consequential Risk. To use a hans would make exit of the vehicle in an emergency much harder
- Looking to purchase now
- I have brought a HANS device, but not competed since purchasing it
- Will purchase within 3 months
- I have purchased one but have not had the chance to use it yet
- Not required when the sport was simple, and fun

- Research I have been shown is that FHR devices may be less safe in typical rally accidents (side impact). I have inherited a Leate Brace, but it is not FIA so can't use anyway.
- Required from this point onwards
- No longer compete, but would not do so without a FHR
- Cost of seat belt and the device has been hold me back from up grading.
- We are currently looking into it
- I have used a neck donut for years
- About to purchase for next event.
- Not now competing in rallies
- My Safety is MY choice
- My own personal risk assessment says that a FHR offers minimal increase in safety compared to the cost.
- Need to draw a line in the sand somewhere. Everything to do with safety is good but ultimately motorsport has risks and I accept that.
- Not Competing
- Will purchase for the next event
- Only were coming in when I left, I wont rally without one now
- Over regulated and not necessary
- Have not got around to it as yet, but will get it soon
- I believe FHR are appropriate for track events, but not suitable for rally events and in fact increase the risk and danger to competitors
- I have never used one, however i just purchased one and intend to use from now on.
- No longer competing. If I was, I would use one...
- Plan to purchase fhr this year
- Helmet is FHR, will purchase hans on o/s trip July
- Have not yet bought one but in the process of buying one. Costs are a large factor with many Australian supplies being expensive. Also added cost of updating the car.
- Uncomfortable cumbersome
- I have one just haven't used it yet
- Will use one next event
- Have HANs post helmet not bought Device Yet
- I need to buy for the Navigator as well and I want to buy the Simpson product
- Some of the events I do require mobility, navigational events.
- Have been rallying for 30 years , have not needed one yet.
- Makes it difficult to get in and out of car
- Haven't looked at them yet, but I will buy one
- Will mean change of helmet, intercom and also for driver as well
- They restrict head movement making them unsafe for public road driving and tricky Navigation events
- Not competing right now but if i was it be the cost!
- Space in the competition vehicle
- Not suitable, usable, required.
- Of doubtful benefit in rallies. Restricts movement
- Needs to be the individuals decision. Should not be mandatory
- My consequential risk management assessment suggests, like most CAMS "good Ideas" there is a consequential risk in that it has significant risk for me when trying to exit a vehicle.
- In the type of events I compete in I believe winged seats are more important than FHR I have looked into FHR and am going to purchase one but that is my choice do not think they should be mandatory in gravel rallying.
- In over 50 years of motor sport at all levels up to and including international I have seen no justification for the compulsory usage edict

- Current helmet not suitable; current intercom likely not compatible with new helmet
- Besides the cost of the FHR, I would also require a new compatible Helmet which adds more $$$$. After testing a HANS FHR, it appears it would be ok in one of my cars but is uncomfortable and creates neck stiffness to wear in my other car
- Not sure how restrictive the FHR. The cost isn't a big issue
- They have not been mandatory until now, other factors are cost and as a navigator the ease of entry and exit to the vehicle at controls.
- I have made a personal risk assessment that FHR is not justified at the speed I compete at (i.e. slow !)
- Working towards it
- Would have brought one but someone band my helmet for no reason except the FIA don't want them anymore
- No longer competing
- Will purchase a FHR in late 2014
- The likelihood of basal skull fracture in rallying is extremely low to to average speeds being much less than other forms of motorsport. There is no need to control a risk by wearing FHR that is mostly irrelevant to my specific sport and has never been identified as posing a significant risk.
- Seating, cage but will be getting one before next event
- Have purchased one
- The HANS impedes the exit of our vehicle in an emergency situation and there is no Place to store it in the car between competitive stages. We rally a. Triumph TR7V8.
- Don't believe its necessary.
- Optional when I bought helmet
- Not important
- I run in classic competition and although I know that even the classic cars are getting faster, I tend to resist the push towards modern technology, even to my own detriment.
- Yet to fully evaluate. May purchase on return to competition.
- Infrequency of event entered
- Have purchased two different types in the last year and both did not fit comfortably have one on order from USA but it is not FIA so presumably won't be legal
- Risk assessment deems not warranted in my circumstances
- Personal choice
- Not a required safety item for the events I COMPETED in.
- Excess regulation introduced with no risk analysis relevant to rallying
- I AM HAPPY NOT TO USE ONE
- I am not convinced the benefits outweigh the risks in rallying for someone of my age/fitness
- Planning to purchase
- Will be purchasing, as is required.
- Not effective in rally accidents
- Cost is an influence but will probably buy one when my car goes back on the road
- Looking to do so soon
- I'm speaking as a person who has had spinal problems for many years. Whilst I don't question the value of the protection provided by FHR devices in a head on impact, or a predominantly head on impact, I am concerned that in the type of accident that appears most fatal for rally competitors, a side impact with a stationary and immovable object, the device has the potential to do more harm than good. It feels like a guillotine to me! I understand that the speedway competitors have some issues with the devices and that the seriousness of spinal injuries in their sport may have increased since the introduction. Having said that, I have purchased a FHR device and fully intended to use it in the recent Targa Tasmania, but unfortunately it was not compatible with my existing helmets and I did not have time to replace them.
- Mixed feeling
- Long distance events require agility and this limits(along with suits, underwear, shoes, helmet, intercom etc)

- Currently not competing, but cost of FHR is a significant barrier to re entering the sport. No evidence of cost benefit analysis being done either.
- Cost & limited room in my car
- These devices are only suitable for high impact head on

RESPONSES AS TO THE FIRST VEHICLE ACTION OF INCIDENT

A range of responses from individuals who selected “other” as the response to the first action of an incident:

- all over
- All panels except bonnet and boot, including cage damaged significantly.
- Car was rotating/yawing when it hit trees.
- Chicane over a crest not viewable
- damage to lh side, front & suspension
- front and roof
- front corner impact
- Front, Rear and side impacts
- front/side
- Hard landing over crest in Rally Australia 2000 bending chassis rails and driver had some back pain but completed event
- Hit trees and then rolled 5 times
- I have noted two accidents had in 25 yrs of rally, one state one ARC. Two cars
- Impact with trees and travelling down into gully
- Impacted another vehicle on a transport
- impacted ground after very large airborne over single caution crest, then trees
- Impacted with middle of a straight piece of road
- Incident 1. (2010 Targa Tas) Hit a road sign - navigator's door Incident 2. Front wheel clipped a tree (1979 Alpine Rally)
- Kerb
- L/H rear onto top of spoon drain cut/mound
- landed heavily/awkwardly after a big jump/crest
- Left the road, airborne, roll-over multiple
- Mechanical failure, front suspension
- Minor bump into bank then following competitor failed to respond to warning triangles and ran into the back of us
- Off edge of road - road dropped away on angle like small cliff
- Off sideways then all corners & end for end
- RH front corner
- rock, ditch roll
- rocks /trees
- rolled along bank & road after hitting tree
- rolled gently into dam full of water
- Rolled over 5m down side of track
- Rolled over by chicane barriers
- Rolled, damaging all sections of the car
- Shot off bank on outside of corner, falling 2m down hitting trees roof first. Part rollover, part impact trees. Side damage.
- side impact into large rocks
- Slid into gutter (side impact), then stopped suddenly by end of gutter (frontal impact)
- Slid off the road rolled 2 x times in blacbery & tree's 20 meters down a revaine
- understeer off a corner and down embankment at speed
- Vehicle rolled 4 times
- Vehicle spun and dragged its nose and right side along the bank.
- Whole car, multiple inversion roll over into trees

- You need to define the first action here. In my case the rear-end let go irrecoverably on a downhill section, but that caused no damage. The front bumper then gently touched a sand bank, but this (in itself) caused no significant damage). However it did cause the car to roll (generally sideways but vaguely corner-to-corner) several times, and made it a complete write-off. Pick a "first action".

OPEN-ENDED COMMENTS FROM RESPONDENTS DOING ONLINE SURVEY

A range of unedited, open ended comments from individual survey respondents where they were given an opportunity to contribute on safety related matters. This can be utilised by CAMS as a great insight into competitor attitudes toward safety.

Get survey thanks

The regulations currently in place support levels necessary to compete safely. The sport regulators also support entry level competitors to join the sport in a cost effective manner. Competitors accept the increased level of expense as they improve through the levels. To those who have the difficult discussions in making rules. Thanks! Thanks for keeping our sport safe. Longevity of our sport needs to focus on grass roots development, lifting the profile and finding that right balance of cost to enter the sport and keeping the risk low. I think the cost to enter the sport is right. Thanks for taking the time to ask competitors how we view issues we always consider important.

Clearly motorsport is dangerous. I would be happy for max speeds to be capped. Doing 240 + through a tree lined section with no run off can be a bit scary but you need to do it as this is where you lose heaps of time to the really quick guys. That being said, driving within your limits is critical - especially in tarmac rallying. Driving 9/10th's generally gets you home - anymore and the risks multiply. The Targa events combine the very best of a variety of roads as they try and cater for a variety of likes / dislikes matched with vehicle strengths / weaknesses.

I've competed at every level from introductory to wrc so I've seen the different levels required. I actively encourage use of Hans for competitors, especially in fast cars, I am also well aware of the difficulties at competing at a grass roots level. The main distinction between rallying and other forms of Motorsport are the remoteness of competition and not having the marshals around at all times, but also that it involves two people per crew. I understand the first increases risk, but the second compounds cost and opportunity. After co driving for many years I recently built an entry level Hyundai excel to drive and am finding it difficult to find a co driver. I have all the safety equipment from competing at fia level, but if I want a friend to jump in for an event if the equipment levels are too high then it is impossible. No one will spend $1000+ just to see if they like it, particularly as a co driver where motion sickness is an issue. I'm all for safety gear, especially if you have a fast car (eg p3, p4, p5), but leeway needs to be in introduced for the rookie and budget competitor. My suggestion is maybe 1-3 events to see if you like it then introduce higher ppe. Or 1 "lower ppe" state round per year for club competitors, similar to the old level 2 license. My opinion is if you can afford a big dollar car (be it wrx, escort etc) then you should get the safety equipment. But a uni student eating 2 minute noodles to drive a $4000 car because he loves it should also be given some leeway, as well as those new to the sport. Personally I would never compete without my Hans, and my brothers who are top level drivers have said the same. But a little grass roots leniency is needed to be taken into consideration to not make the entry level too high

I believe safety requirements of rallying in general have been increased over the recent years mainly as a direct result of the increased speeds/risks and increased number of fatalities as a result of tarmac rallying. Tarmac rallying and gravel rallying should be treated and viewed separately (especially the low cost club level rallying) These increased safety requirements,, roll cages, frontal head restraints etc. etc. are a substantial added cost to events which are designed to be entry level and are resulting in competitors being turned away as the costs are far too high.

There is a trend for Clubmans rallies in WA to use a roadbook only with no opportunity to do a recce of any kind. A good example is the recent Forest rally, This is a national event and in my view a fast technical rally and one which should not be conducted with a roadbook. A number of instructions in the roadbook had questionable tulips and on one particular instruction all Clubman competitors had some kind of "moment",.At least one car ended up on its roof and clearly if our safety is reliant on the setter "getting it right" perhaps all competitors should be given the opportunity to do some form of recce.

Competing in Motorsport has an inherent risk associated with it. There have been minimal deaths and injuries in rallies for a number of years. Competitors assume the risks based on their personal assessment of the risks they perceive. Mandatory increases in personal safety requirements (particular "level" of driving apparel, helmet specifications, roll cage padding - none of which I believe has ever been a problem or cause of injuries in a rally incident) take away the competitors ability to assess the risks for themselves, increases their costs and reduces the ability to both compete in and enjoy their chosen sport. I personally will need to spend more to re-enter the sport than I previously when I first commenced in the sport at the age of 19. Whilst I now have greater capacity to afford

this, it will not only delay my re-entry slightly, but more importantly, may prevent younger people from entering the sport at the grassroots and hence reducing the traction of growing the competitor base from a young age.

RallySafe Virtual Chicanes should be used to limit high speeds. Using them on fast sections of roads limits speed with distracting the crew (by monitoring speed) and allows the use of roads that otherwise might be too fast. Speeds before unsighted corners cab be contained. No extra officials are required on stages to use virtual chicanes.

I believe the official who approves the road for racing immediately before the 1st car starts has a lot of responsibility and in my view has been making a lot of mistakes by approving unsafe roads for racing, Wet conditions with new or repaired surfaces , slippery surfaces by nature of location to sunlight etc , If there is no grip then there will be accidents , it is as simple as that , sticky cold tyres rarely provide safety at speed .

This is a very difficult area, however a few suggestions below. Suggest new rallyers should compete in compulsary short rallies/rooky events (1 or 2 days) on carefully chosen stages to develop their skills and test their machinery. Potentially there's a need to limit speeds with chicanes etc - appreciate ideally these need to be manned and volunteer numbers are also an issue. Terminal velocity could be limited but hard to do i would think. More scrutiny around engine capacity and turbo modifications etc - basically everyone I know who rallies is pushing the rules hard with strokers and modified turbos in stock housings - these cars are putting out 25%+ more than they should - this certainly increases risk, especially in winter rallies on wet roads. Consider avoiding rallies in the middle of winter, wet roads and leaves certainly increase risk.

On tarmac rallies more attention needs to be given to cars leaking oil. Several cars were clearly leaking oil while stopped for lunch break in Targa Tas, but no CAMS officials appeared to be checking. I also observed oil dropped by a. Car lined up at a stage start. Several cars crashed because of non- reported oil on stages. I spun twice because of oil, luckily no damage. Cars should also be checked at the time control point before stage starts. This refers to obvious oil on the road as the car moves up, not a detailed inspection.

Motorsport and particularly rallies are entered by competitors who know the risks. There should be general safety standards that will ensure competitors are as safe as practical. This also needs to be balanced with ensuring the sport is growing and that the cost of safety equipment is not prohibitive. Much more thought needs to be given to building the grassroots of the sport up from motorkhana, khanacross, etc.. up to rallysprints/rallies. Refer Finland as a good example of how the sport is developed and grown.

1. Warnings issued by organisers need to be correctly located to be relevant. 2. Each person should be responsible for their own actions, however assessment of a driver's ability in "super cars" such as Porches and Evos would be nice (We know the problem - man offers money to enter...organisers happy to have the entry) 3. Too many entrants do not appreciate the skill required to be quick, reliable and safe in a rally car. 4. Too many drivers fail to realising that they have a friend on board and a family back home. 5. Most of us "grass roots" competitors do so on the bones of our arse. We spend far too much money and we fail to full-fill family needs...but we love the sport. Reduction in costs such as licences, permits, entries, vehicle compliance (e.g. Fuel sample point which was never used) may release money for safety. 6. One cannot argue against high safety standards, but often it feels it is a bit like spending small fortune of gain 1/10th of a second a lap. e.g. two piece suit banned, seat belt width and age going every which way, ROPS and padding changes, HANS, the new "saviour" is now suddenly down graded to a frontal impact restraint, chicanes...(how many prangs did these cause?), FIA compliant items (Consider USA standards)

Cost is the biggest Isuue in improving safety. For grass roots competitors another $500 for a HANS and another $500+ for a new helmet is just too expensive. People cannot afford to compete anymore with the cost of all the safety requirements, restrictions on equipment etc, especially in todays environment when cost of running in events is so high. Costs such as entry fees, club insurances, tyres, licensing and fuel are such a big factor that most people are scratching just to be out there doing what it is they enjoy. If competitors could get a HANS and Helmet with Intercom headphones combined for under $500 maybe it would be acceptable, but currently cost of this is triple that and people cannot afford it. You may ask what the cost of safety is? but many will argue that although the increased safety from the new devices is an improvement that the gain is negligible when compared to the up front cost. Its a case of risk and reward. How about all of us out there who compete on second hand tyres, or marginalise maintenance due to costs. You cant increase the costs of participation and then expect increased entries. Maybe CAMS could supply HANS devices for a nominal hire fee of $10-15 per event, this might at least

encourage people to buy a new compatible helmet.

The key to serious injury is usually side impact. I would favour introduction of stronger side impact protection, ideally built into door structures, to lock in to the safety cage when the door is closed. This would need R & D as there is no such device currently that I know of. I would be happy to discuss this further.

Rallying is too expensive as it is. All these extra safety requirements are knee jerk reactions to things and all it is doing is removing competitors from the sport due to costs. While I use a HANS device because I got used to it in circuit racing, I do not believe that they are of huge benefit for rally. I have never had an accident in rally where I could say that the HANS device had to 'work'. Nearly every rally accident I have had has involved a rollover or tagging a tree/post/bank with the rear of the vehicle. More due diligence by course checkers, set-up crews and better drivers briefings will go a long way to preventing accidents. A briefing with 10 road book updates is much more beneficial than a clerk of course saying thank you to 50 different people who helped to clean toilets before the event.

Far too expensive generally for the average person. Too many over-regulations....it is car racing for heavens sake! If one wants to go car racing, it is expected that there will be forms of danger. Please cease attempting to save ourselves from ourselves and forcing us to spend unnecessary hard earned money. CAMS is well known now for driving us out of the sport.

I think common sense should prevail here and not just everything being driven by insurance . I have more friends being seriously injured cycling than from rally accidents. In fact one of Australia's best rally drivers was killed last year riding a mountain bike down. Mt Cootha in Brisbane. We had a fairly serious crash in Targa Tasmania in 2012. I had just bought a head restraint and I am sure it helped me. My wife was co driver and didn't have any bruising or damage. Our car was very well prepared and met its test. Lets not kill a great sport by red tape.

The first aid question: because first aid has to be updated constantly, this could prove to be a stumbling block for many. With the advances in technology, e.g. the incar rally safe, help is usually only a few minutes away. Some basic life saving points could be part of the road books.

With the last question, (32) I am against "All Comers" competing without roll cages, this is a recipe for disaster. Im 52 years of age and at the end of my career after 25 years of rallying. I drive to the conditions I am not a world beater and don't want to be. A close mate of mine, life was saved by Hans Device in South Australia last year. I think making this compulsory will make costs excessive and you will loose people from the sport. I believe all 4WD Turbo's should have them with the speeds they do. I publically said when they made the Turbos go unrestricted, someone would die, it took 3 years for this to happen. There also have been some lucky escapes but these people will have a permanent disability. The top speeds of these cars are too high, I know I have driven one, margin of error is slim. I believe the ARCOM have lost the plot & this is not my opinion this by many. I have ceased competing in ARC, as have many others, as it is a joke. Having a podium finisher that breaks or bends his car, then returns to score points, in an ARC is a joke. I understand nothing can be done, but when the series folds or you only get 3 & 4 finishes like is happening, you watch these administrators try to blame something else, rather than have a good look at themselves. That's egos taking control and killing a sport. 1/ Get the average speed down, 2/ Dont select flat out roads, 3/ Make it compulsory for safety equipment on cars that do go 200kph not cars like mine, one does 160k flat out and my classic car 135kph! 4/ All comers, no roll cage? = inexperience drivers, more possibility of roll over, I am amazed know one has died yet. But I suspect it will happen. I hope I am wrong.

My recent experience with safety related issues was Targa Tasmania 2014 where I believe there needs to be more pre event education (Eg .on the event web site Drop down box's with the safety videos shown at the driver briefing available so they can be studied and understood with more time pre event by Rookies and competitors that have only do the occasional event) with regard to the use of Rally Safe and the uses for it, Ok, SOS & Triangles at accidents , parking of the race line when stopping at a accident , Medical team on course with lights flashing Etc Also there need to be a standard length away from the start line that the incident board is displayed as at the moment it is displayed at the officials tent, and if there are 4 x cars off and different Km's oil & Gravel at different Km's there is not enough time to accurately record these warnings on the pace notes before you are being asked to show wrist bands , belts tight etc by a start line official There also needs to be a protocol developed that is clearly understood by stage officials and competitors that if there are multiple accidents and cars off , the stage is very wet cars blocking the road etc (EG Riana Short 2014) that the stage is shut down to Touring stage 60kph and all times are zero.

Generally speaking I love road book events, to me they are a challenge and I suspect people are slower. Pace notes

with recce and people will be faster, and I can accept that there are some that love it. Safety for events needs to be respective to the level and speed. A club/state road book event probably does not need to be heavily regulated. Pace notes events for all intents and purposes state/national could be considered speed events in my mind. There are not many competitors especially in NSW and those that are are 'commonly' fast in very decent cars, there would be a need to see safety improvements for them. However for a much slow clubbie in an older/under developed car requirements need to reflect this. FHR - not impressed by the mandated nature especially since they are sooooo expensive. Yes they save us but it seems cost prohibitive to clubbies and clubbies that compete side by side in a state event. In saying that though if you could get FHR's for less that $300 guess what, you would not need to mandate them and everyone will just start using them at any event.

Tarmac rallies can be slowed down by reducing the number of tyres available. The current 8 tyre rule has made these events into sprints from start to finish

The greater the costs incurred by competitors, the less people will compete, the less relevance there is for CAMS to exist as an entity in any form.

We are involved in a dangerous sport and accept that, we don't need restrictions on how fast we can go or being told we need extra safety equipment. I believe that limiting max speed will increase the incident rate as those drivers that rely on high speed to get better times will lose that advantage and will push harder in the corners and possibly beyond their abilities. This is coming from a competitor that is most often in vehicles that do not rely on top speed for times so it is no advantage to me

Mistakes will be made at all levels , if we all had to be at ARC level standards you wouldn't have many new comers (ie like the no of crews in ARC today). Cost is a major factor but its the game we like to play. Maybe safety gear could be bought through clubs, CAMS at a discount rate or TAX free .

The Rallysafe system works brilliantly to increase safety.

In recent times (over the past 12 months in Victoria) there have been several major accidents involving old cars (Datsun 1600, ford escort etc.) that have resulted in serious injuries. The trouble is that old cars don't have the same factory built safety structures as modern say post 1990 cars, but the governing bodies have rules in place that give old cars more freedom and effectively encourage people to build older cars. Regulations should be in place to discourage older more dangerous cars many of which have old inferior safety cages as well. Perhaps banning cars over 30 years old from being eligible for awards and ensuring that all cars have the same minimum requirements in regards to ROPS, minimum weight, engine modification and substitution.

Don't over-price the sport. As a father, I would love to compete in rallies with my kids as navigators, but the more the costs rise, the less likely this is to happen - particularly if HANS devices and the like are made compulsory at club level. Rallying has always been affordable at an entry level, and hopefully this will continue.

After hearing the FIA results on testing of vehicle and equipment at CAMS meeting and Seminar , these findings do not get distributed to clubs for analysis and awareness. ie : Seat tests, kids helmets, seat belt tests etc. Tarmac Rallies (ie Targa's) should not be deemed as rallies, they are an outlet for people with extremely large quantities of money to attempt to be a racing car or high speed competitor without proven experience before. Poor level of acceptance criteria for the vehicles used in Tarmac Rallies. A Ferrari owner is not necessarily a Ferrari driver !

At certain ages some competitors should not be allowed to get new very fast cars. Also young people should not get in older cars. The cars they grew up with are what they can handle and the number of very fast cars that run off are due to competitors who cannot handle them. Example is Porsche cars also there is a problem of some cars in a class which are altered and are too fast and this is driving many out of the sport

Why are the apparel standards different (ie - lower) for state level gravel rally versus everything else? They should be a uniform standard across the board for all motorsports

FHR should be compulsory for state level and above rallies. Motorkhanas etc should not have FHR required. $600 is money well spent on FHR $200 for the new roll cage padding is a waste of money. CAMS need to prioritise and implement safety features that have significant safety features. FHR for state level and above should be mandatory.

Cams regulations are often out of touch with club level competition. How many Cams staff and decision makers

are current (or even past) club level competitors? I build rally cars for a variety of competitors both here and in the UK and have seen many rally cars with basic safety flaws that have been accepted as safe up to and including international level. The new safety cage padding padding is entirely unsuitable for navigational events where a helmet is not compulsory and in any case Bulletin B13/070 11.1 (a) refers only to "where the helmet" not "where the head". To me this indicates that the FIA or SFI padding is not required where helmets are not compulsory. By the way, cars I have built and/or maintain have won, over the years, championships in ARC and VRC , Middle East, UK Group N, European and UK Historic so I have some degree of experience. As well, I have been competing since 1969 and am still an active competitor and official at multiclub level.

Any mandated changes should also include a document outlining the facts that led to the change being implemented so that competitors can appreciate why the change is being mandated and the incidents or research that led to the decision. I don't have any real data on the following statement but from what I've seen in ARC events it is the state entrants, who are trying to test their mettle against the ARC drivers, that appear to have the biggest accidents and the lower level of safety equipment. A possible solution might be to grade drivers and their vehicles by their previous state performances and once a certain level or grading is achieved then the requirements for safety items becomes mandatory. This could include multiple levels of requirements so that the financial cost is dispersed as a driver and their vehicle gets faster. This won't capture new drivers pushing too hard but will ensure that the people who have gained confidence are protected as their speed and risk grows. So don't mandate safety just by event type but by vehicle and driver type too. I also think safety items should be mandated by a star style system, i.e. every safety item has a star rating, a current spec cage might be 2 stars, a HANS device 1.5 stars, a head restraint seat 1 star, a three layer suit .5 star etc etc Lower level cages would be graded with a lower star rating therefore a driver could increase their rating by compensating with other items until they reached the required level for the competition they are entering and their driver rating. For lower level events or lower level drivers may only need 4 safety stars, that might mean they choose a Cage, head restraint seat and a HANS device rather than a driving suit and gloves. This style of system would allow regulations to be written so that an event with a higher average speed could be run but the safety star requirements would be higher. It should also means that people entering the sport won't be put off by all the mandated requirements until they reach a certain level.

How is it that a first time rally competitor can jump straight into a high performance car, without first having to learn the craft of gravel driving in a low powered naturally aspirated 2WD vehicle limited to say 1600cc maximum? Mandated safety levels should also be proportional to vehicle capability. Combined, these two suggestions would make rallying more affordable at entry level, and safer as the driver progresses to a vehicle with higher performance. I'm a late bloomer as far as my involvement in the sport is concerned, having only got involved in around 2001. However in that short time I've seen the sport on the decline on the Mid North Coast of NSW, one of the premier rallying locations in Australia. Doing something about entry level rallying safety might be worthwhile in turning that around.

Having competed in Ireland & UK Australian standards in cars allowed to rally with regards safety and roll cages is below standards in Europe.

Since when are pace notes called 'safety notes'? They're done to help us go faster. Nice survey, but more needs to be done to keep costs down for competitors, it's already an expensive sport, making people shell out 1500 bucks for a pair of HANS devices is a big cost. Plus they're bloody annoying to wear, I don't like mine at all.

Please don't make it harder for competitors to start rallying. A new guy in an excel doesn't need a 48 point roll cage and HANS device when they would be lucky to go over 100kmh. Cams has stuffed the arc, state series and trying to put this rubbish on clubman competitors will be the final nail.

I own 4 cars, 3 classic cars & 1 modern Diesel car, I do both Tarmac & Circuit racing all cars are used in all forms of motor sport from Motorkhana, Hill climbing, Rally & track. I feel that some competitors will feel as if the are being bashed? by CAMS on HANSS devise, These are good for Track, & Tarmac events but forest cars & Motor Karana , Auto cross events this is not an option . The speeds are not there! To put competitors in to costs that they can not afford, you will loose some competitors with Driving suits, HANNS devis etc You need to find the balance of Club motor sport v/s State level to National - International > motor sport

I think safety standards by organisers in Australia are at an acceptable level and competitors should be considering safety upgrades with their vehicle as they increase their vehicle speed or personal commitment levels.

Recently competed in targa tas. Love the even been doing it for 13 years, dad 17 years. We both have no issues

with safety what's so ever. There are 2 aspects I would raise. Scrutineering. Event scrutineers is out of your hand however cams technical scrutineer isn't. There was a big lack of communications in regards to HANS devices and the rules of becoming compulsory from the 1 July 2014 in my instance. Cams scrutineer told me I had to have one for the event even though cams sent out an email saying we didn't. Event scrutineer also said I had to have one for the event. Which was not correct. (I had a HANS device however the issue was around the crutch strap in the car) Secondly the across the board I feel that the scrutineers need to be more of an "teaching" role (other than if it is a significant safety breach) about an issue. An example is rather than saying no you can compete because of your crutch strap in your harness to be more like "this is what the regulations state, the requirements are that if wearing a HANS device you need to have a crutch strap. Yes you have a crutch strap however the dates need to match with the rest of the seat belts. What you will need to do is look at replacing the seatbelts. My suggestion is you do it now. However if that cant happen make sure that you do it for the next even and I will write it in your log book so that you remember for next event.

I have been competing (navigating and driving) in rallies since I was 15 (I am now 30). I estimate I have competed in over 50 rallies and officiated at over 20 rallies. In that time I have had 3 serious accidents which I will give some background on - 1) High speed roll over (120kmh) then a significant impact with a tree. The car was written off (every panel damaged, no wheels pointing straight, etc.). Safety equipment was a bolt in cage, fixed seats, 4 point harnesses and helmets. There were no significant injuries aside from some minor bruising from the seat belts. 2) Impacted a tree stump at approximately 70km/h then rolled onto the roof. The car required extensive work on the front. Safety equipment was a welded in cage, fixed seats, 4 point harness and helmets. Again there were no injuries. 3) Impacted a tree with the rear of the car at around 100km/h then rolled onto the roof. Same safety equipment as above and again no injuries. In all my time rallying I have seen very few accidents where someone was seriously injured (although I am aware that there have been). I believe the current clothing requirements do little to improve safety and that a good welded in cage, good seats and harnesses and a helmet provide adequate protection. I have never heard of someone in NSW being burnt in a rally accident. I feel that the introduction of HANS or similar would be a huge detriment to the sport representing a significant increase in cost. The bottom level of the sport is suffering due to far to extensive safety requirements to compete.

It appears that on a number of events in the past 24 months have reduced information supplied in event road books. Long periods of up to and in some cases 10k without an instruction. Tulips not being marked on pace noted events, this makes it harder to get back onto notes should the co-driver fall of the notes, thus becoming a blind rally until an identifiable point be located. The current requirement for the co-driver to exit the vehicle and walk into the control raises the possibility of a number of problems: 1. Incorrectly adjusted helmet straps or straps not done up 2. Seat belts not done up or incorrectly adjusted 3. Head Restraint equipment not correctly fitted or adjusted Event timing. 1. Whilst schedules are the back bone of rallying, the timing of liaison / transport being critical with either late or early arrivals at time controls leads to competitor penalties. 2. We are using public roads in most cases to transport, having a problem ie, flat tyre on a transport may lead to a 'late' time into control and thus a penalty. Unless the driver pushes to make up time, which in most cases pretty close the transport time is tight. Closed Roads are for timed competition, not public roads. 3. Whilst not advocating for an open ended schedule, I personally believe systems utilised by AMSAG minimise this risk by allowing competitors more flexibility re transporting safely, and allowing for unforeseen hold ups not causing a competitor to exceed Designated public road speed limits. 4. Modification as per above would minimise poorly fitted or adjusted safety equipment, in particular for the co-drivers.

Cost is a Major Part of Motor sport and in Grass roots Club and Multi club levels many may not be able to afford it if latest and greatest safety gear is required at these levels most vehicles aren't doing the terminal speed that is in state and National level.

Safety should be first priority. HANS initiative this year excellent - head restraint seats should also be compulsory.

Maybe some of the changes to regs could be explained a little bit better eg the requirement for every car to use FIA or equivalent padding didn't have much if any reason behind it that i could find but was just put out there. Agree with frontal head restraint as i have been using one for a while anyway and see the benefits in any frontal impact.

As a competitor that only competes in 1 or 2 rallies a year, the cost of a hans Device and new helmet to go along with it will be my entire budget for a year, As I don't have the disposable budget I used to it just means I wont do any state or national events. For me I feel much safer on a new set of tyres than I would if I used a HANS device. I also believe that other safety measures like the rallysafe tracking system give a greater safety benefit.

I have been competing regularly for just over 20 years. Because of Hans devices I am now preparing my car for sale. These devices are unsuitable for my type of event.

Lifeing components on rarely used vehicles is a big barrier to safety. If the component's such as harnesses were evaluated on condition, rather than age, then competitors would likely purchase better quality components. Fire extinguisher replacement based on age alone is an unnecessary expense. The old system of annual tagging was better, cheaper and gave the same end result. If a extinguisher is charged and powder is free flowing, then it will work, regardless of age.

Here is my message to organisers. MOTORSPORT IS DANGEROUS AND NO MATTER WHAT YOU DO PEOPLE WILL HAVE ACCIDENTS AND MAY GET HURT. If you keep changing and upgrading the regulations you will lose competitors (if not from the sport completely then to rival organisations) and you will prohibit people from joining the sport sheerly on a cost basis. At the ARC level I can see that there could be an argument for Sainz-bars, HANS devices and a pile of other safety equipment. People competing at this level probably weigh their cars and micro-manage weight placement and a pile of other things irrespective of cost. This may be true of some state level competitors as well, but probably not all. Whether these features should be mandatory and whether they save lives and or actually increase the safety of competitors is your call, but frankly I would leave much of it up to competitors. They have to realise that there is a significant difference between rallying a Datsun 1,000 and an EVO Lancer, in terms of the speeds reached and the level of danger, but if you drive either off a 100 foot cliff you are in trouble no matter what. Also, with the drop in popularity of high level rallying you are getting a combined ARC, State level and Club event being run on the same day over the same course. The ARC people are wearing high quality flame suits with plumbed fire bombs and HANS devices (etc), and are being followed by people in jeans and long T-shirts with 10 year-old helmets on the same roads and on the same day. but they still have FIA-rated padding on the cage (because so many people have been hurt by other padding, or have they?). Doesn't this sound a bit silly to you? Yes the above sounds like a disorganised rant (because it is) but come down to the following recommendations: * Outside of the ARC make most of the safety equipment that is currently specified "recommended" rather than mandatory as the cost and need for it vary immensely and is blocking access for competitors. * STOP CHANGING THE RULES, and when you do show instances where the lack of the "new" mandatory rule caused problems. If there is no problem, why change the rules? * Highlight that people can get hurt in motorsport, and put the emphasis on the competitor to ensure that they have appropriate safety for the type of vehicle and the speeds that they will be travelling at. Making people have safety gear appropriate for a 200 klm/h+ tarmac rally when they are competing in a (max) 110 klm/h dirt rally feels (and is) ludicrous. Thanks for letting me babble.

After a recent roll over I will be reviewing my personal safety items re: head restraints etc.

One of the MIV personnel that attended my recent accident was an elderly (60plus) overweight person who was over stressed by the incident and was close to having a heart attack himself. He could not even put in a drip sucessfully for my injured driver. He stumbled around. His pack did not contain more than two swabs. His only saving grace was he was better than nothing. MIV personnel attending accidents must be appropriately trained , carry the correct amount of equipment and MUST pass a CAMS physical. It is no use having an MIV if the personnel are not up to it.

As a competitor in all manner of events since 1966 (yes 1966) I feel that the time has come to establish improved regulation of the position of Road Director and Course Checker at any event. My recent experience - which has resulted in nil significant injury to myself or co-driver - has resulted in the loss of a lovely classic rally car with some $80k replacement value. So that is the end of my competing career as drive rand co-driver. However, for this incident it was clear that changes to the conditions long the road - clearing of a major firebreak in the approach to the RGL was not noted by the Road Director nor the Checker. Hence, the change of road direction that would have been indicated by standing roadside forest was absent. And a wide path - straight on from the approach - had been cleared as the firebreak. So the call in the Route Instructions should have been "! X-roads, CREST, RGL" with appropriate tulip. But this was absent. Additionally, my guess would be that the course work was completed from a 4-WD or SUV and not a low driving position sports car with extended bonnet such as would be used in competition. Another factor I guess was not taken into account at the time the Route Instructions were written and checked. Hence, competitor approach visibility was not taken into account. I reckon. Final analysis of course is that the driver must control the vehicle in an appropriate manner although my co-driver, seeing the finger signpost at the xroads and knowing this feature was not called said "signpost ignore, straight on". So I did!! Another competitor crashed at the same site and was lucky to avoid death against the tree he impacted. Safety responses

were slow, radio communications relied on the so-called "PieNet" radio system and as is often the case, coverage was patchy. And we were in a black patch! I am happy to provide more information.

Pace notes from trusted suppliers are so good that Recce is not essential, and is often not practical or affordable. Regardless of notes or recce drivers must drive to the actual conditions and leave a margin.

It is in the end the competitors choice as to how fast they want to drive and the risks they take, we all sign disclaimers and have the CAMS WHS rules spelt out to us every event, giving us a chance to withdraw. We are doing it for the enjoyment, we all know it is dangerous which is what makes it exciting. Forcing costs up continually for no real benefits to the average competitor makes no sense. Some of us are forced to enter "State" level events because there are not enough lower status events to compete in, but forcing these people to comply with "State" requirements (eg FHR) will only stop them entering for the one or two events they may want to run. I think rallying is a very safe sport in general and I feel safer out on a stage in a well prepared car than I do on the roads some days. But to see the sport continue it needs to be kept as cheap as possible to encourage young drivers back.

Confederation AGAINST Motor Sport puts beaurocracy ahead of the sport.

I think there should be a lot more emphasis at scrutineering on the actual safety of the vehicle as well as personal safety apparel. Maybe 2 scrutineering bays, 1 for mechanical side of the vehicle and the 2nd for the Safety Side. Also maybe "on the spot" checks thru the event as well. The old scenario of damaged vehicle and can't be "fixed" 100% but the crews go on and this is where preventable accidents can occur.

After last year with 4 deaths I can understand why the events need to be slowed down ,and the Hans device being used , but grass roots events not compulsory to save costs.

Safety requirements in rallying should be under constant review. But the regs should not automatically go straight to the extreme. There should be balanced consideration and a level of personal responsibility retained. Recommendations over regulations. Safety requirements dictated by CAMS such as the introduction of HANS should be supported by CAMS. Where HANS devices are required, CAMS should provide events the option to hire HANS devices for newcomers, who may want to do one or two events and can't justify the purchase of a $X00 item. Personally, I wouldn't get in a rally car without a good cage and winged seats. And not without my suit, helmet & HANS. That's my choice. I select the level of safety equipment necessary for the level of competition. I compete to push the car to its limits. That's where the risk is. That's why I need the safety gear. Others aren't interested in driving flat out. They drive with more of a margin and they may decide to be more relaxed in the safety equipment around them. Whenever you get in a car, be-it competing in a rally or driving on the road, there are risks. It's up to the individual the manage the risks.

In regards speeds of events. Coming from Canberra and our technical roads to South Australia. Some, particularly here in SA are way too fast. Speeds over 200kph in places. For irregular drivers (most of those in motorsport in this country) is just too fast. At times, drivers exceed the FIA average speed set for rallying. But, the organisers then average the speed over all drivers and the average speed sits under the FIA's requirement and they get away with it. I think anytime "any" car goes over the average speed limit, then something should be done about a stage to reduce speeds in areas where those high speeds are achieved. This should not be done by sticking a chicane in towards the end of a stage where the speed may be slow anyway. It comes down to road selection, and the mentality of the organisers. It seems there is a, "But we have always done it like this" mentality which does not wash, and I think it is time for a change. I saw with my time officiating for Targa events in NSW that speed restrictions were implemented. It still did not stop a couple of serious accidents and deaths and it was purely down to road selection. Events in Forests on the East Coast are slower by comparison to those here in SA due to road selection. Road selection seems to be a high priority in the East, not so here in the south. Rallying is a technical driver's sport where roads should be chosen to challenge a driver and the cars setup. Not a drag race or flat out speed fest where anyone can drive flat-out in a straight line. I suppose also assisting my wife who was chief safety officer at Rally of Canberra with Mike Bell, and the East Coast Targa's has put a different view for me on safety. I think her decision to remove herself from the organising committee because she felt the event became unsafe speak volumes over those who think events should be run at any cost.

Events in South Australia are being pushed out of the areas which currently provide lower average speeds (eg Mount Lofty Ranges). If CAMS was more involved in liaising with Councils etc, then events would not be forced into area which has straighter roads and higher average speeds as a result. To ignore this fact will only increase the risk of serious accidents (made worse by higher average speeds) and/or the death of rallying in this state because we will not be able to conduct events at all. Of course no rallying will affect the bottom line for CAMS too, this will

spread to the National championship and other State championships will follow. State Governements are stepping away from the sport, CAMS need to step in.

Having rallied over some 35 years at this point I am disillusioned with the sport and dont know if I really want to compete again. It is no lomger an adventure. It is far to controlled and the paper work to compete is onerous. A great sport has been ruined.

I'd like to buy a HANS device and new helmet however right now I don't have the money. I also need new harnesses and the cost of all those will prevent me from competing for at least 6 to 12 months. Cost is the limiting factor for me in terms of keeping up with the highest safety standards. I also believe that pace noted tarmac events are more dangerous than gravel rallies (rapid loss of grip combined with limited ability to reduce speed in the wet results in bigger accidents) and should have more stringent safety standards.

I think improvements can be made to safety levels at state events as the level of speed is not signicantly lower than national events, but for some crews the level of saftey is significanly lower. Some compeditors say that cost is a factor in preventing them upgrading saftey equipment, but then spend thousands on performance modifications. I think that club level events need to remain afforadble with limited sensible saftey items. It is a very tricky area to make decisions in as someone will always be negativly effected.

I think if that the lack of available roads and competitors reluctance for "rough" roads are making organisers choose roads that are too fast in some examples. 2-The course checkers need current competition experience to get a good understanding just how fast a modern rally car can travel. 3-I firmly believe that competitors need to serve an apprenticship in lower powered rally cars before being permitted to get into fast cars (4wd turbo's, G2 spec cars etc). 4-The OLT needs to be returned for rallying. 5-Rallies should be graded by an experienced course checker on safety (similar in the way 4wd clubs grade thier trips) the upper level events say border ranges and IROQ for example shouldn't be available for new competitors to enter.

Safety is the responsibilty of each competitor. I was surprised at the number of serious crashes in Targa Tasmania this year. (It was our first ever tarmac event).

I am against imposing maximum speeds on rally stages. I believe this is dangerous, as it would be a distraction on the driver and navigator trying to watch the speed and maintain a speed whilst driving quickly. It would be better to choose rally stages that are slower by nature, or alternatively restrict speed either by chicanes or restricted speed zones. I believe there needs to be more education and scrutineering of harnesses. Generally just the expiry dates are looked at. I often see harnesses with incorrect wraps, long insertions, incorrect angles and geometry etc which are not optimised for safety. More education in this regard would be of value. CAMS deserves kudos for the extension of life of harnesses! I believe rallysafe should be implemented wherever possible. It certainly was of value in my recent accident, alterting for assistance etc etc I am supportive of the new HNR policy. There is a lot of criticism in the rally community. Some of this is cost related, which is understandable. Unfortunately though there are a group of competitors who are simply anti - HANS, as they think it will be uncomfortable etc. The cost problem is significant, and a rental pool of devices (with suitable deposit etc) would be an excellent idea I have reservations regarding compulsory use of winged type seats. These undoubtedly are more safe in rally accidents. However, I believe they are more UNSAFE on the public roads on transport stages, due to potential restriction of visibility at intersections, overtaking etc etc. The last thing we want is to cause accidents with members of the public on public roads.

the organisers generally do a good job however stages should not be run in torrentail rain as i have experienced this compounds the risk significantly

I have been competing in gravel rallies for over 20 years and in that time I have had a couple of big accidents. A hans device would not have helped me in any of these incidents. I am very comfortable competing without wearing an hans device and will not be buying one. So after this year I will no longer compete in state events. I will just do club events or will run AMSAG events only!

Consistency is important. Current Scrutineering is not effective. Less often and more structure will yield better results. The critical defects regarding safety should be logged in a central simple database sitting on a cloud server (So they can log in to Scruit venues) Keep it simple!! Check cars every three events but actually follow up on the changes logged. Real improvements might actually occur if competitors and Scrutineers spend less time ticking compliance boxes and doing massive numbers of cars each event. Cut the logistics time by 2/3 will allow more time to actually focus on safety and ensure improvements plus increase competitor numbers by removing time

spent away from family just travelling to poorly structured compliance checks. - I am passionate about this topic!

Tarmac rally in particular bad. Targa Tasmania has half its stages above the FIA 132kph (120 + 10% for tar) threshold for average speed on rally stages. Results in many high speed sections with inexperienced drivers a lot of the time, with no chicanes to slow them down. Lamborghini and GTRs have reached 270kph in some fast sections.

The use of Rallysafe is important Rally I have been involved in have been very well run with safety in mind

High costs of safety equipment is impeding entry to the sport of novice competitors. Safety standards should be progressively applied as the level of competition increases. I have estimated, that next year, it will cost around $15000 to fit the required safety equipment into a new rallycar. Then you can add the cost of preparing the vehicle. This is an inhibition to anyone entering the sport. Remember, when I entered the sport, we all wore terry towelling safety hats. My first rallycar cost me 15 weeks pay.

Personally I don't like pre loaded questions, but it is a survey

Competitors should be made aware of the benefits of updated safety equipment and then make their own choice on whether to utilise that equipment. CAMS should encourage and strongly recommend the use of the latest safety equipment, but should not mandate it.

There is always a trade-off between safety features and costs. If CAMS requires the ultimate in safety features then this would price some competitors out of rallies. I think there is a good balance right now and forewarning is usually given on impending upgrades such as frontal head devices. Rally Safe is a very good tool.

Tarmac events need to be slowed down. Tyre allowances should be reduced (events like Targa Tasmania are now a series of sprints with the 8 tyre rule- not an endurance event). Max speed limit should be applied. All competitors should have to undergo specialised/tailored first aid training- geared to first response at a car accident. Road book events on gravel should be replaced with pace notes.

There need to be suitable safety standards in place to reflect the activity, rally needs specifics around single vehicle activity at high speed with potential obstacles where entry level autocross or motorkhana have methods of restricting speed and more controlled environments and shouldnt be over - burdened with high costs. I have answered as an autocross driver and as a state level rally navigator. One improvement I see as easy to do and giving great benefit is to allow Clubman level competitors to 'safety' note the stages by reconnaissance. Clubman cars are not neccessarly slow, they are not 4WD and the roadbooks can only give a limited amount of info. Thanks for the survey.

I am a big boy now and feel I am informed and do research on safety all the time. I should be allowed to decide if I should spend $X on the perceived benefit of a piece of safety equipment or $X on new tyres, brakes or maintenance of my car.

I only compete in Amsag Rallies

I believe it should be the competitors decision on whether to use or not to use personal safety equipment such as FIA compliant helmets and FHR's. Especially at grass roots/club events, the compulsory introduction of FIA compliant personal safety equipment is prohibitive in bringing new blood into our sport. Personally, I believe personal safety equipment such as FHR's should be encouraged by organisers at all levels of the sport, however the ultimate decision on whether to wear them or not should be up to the individual competitor. For every event we compete in we sign and agree to a waiver of indemnity against the organisers for any damages or injuries we sustain, therefore as a part of that waiver should be that the competitor accepts the risks that rallying contains and protects themselves to the level they are comfortable with.

You have not differentiated between pace noted special stage events, route charted special stage events, non special stage events and touring road events / touring assemblies. Some of the medical requirements for Clubman Rally Licenses and below are far too onerous. Regardless of the requirement of FHR's, in any sudden stop your brain can move or rotate inside your head causing the type of brain injury a FHR is supposed to prevent.

I am a big fan of Rallysafe and believe it should be compulsory in all rallies

At the end of the day, part of the attraction of motorsport is the speed and the additional risk that speed entails. I believe that I am the best judge of the amount of risk that I am prepared to tolerate. We are at risk of killing this

sport, if we continue to impose greater safety requirements. I think we need to be very selective with the safety technologies that we choose to adopt e.g. I see significant benefits with wider use of the rally safe system - both for competitors and organizers. I see much less benefit from imposing hans devices at club and state level, firebombs, wiz bang cages and new harnesses etc. The facts don't lie - driving to an event is much more dangerous than competing in one. I commend AIMSS on seeking feedback in this way, it is something that the rest of CAMS can learn from.

With the compulsory introduction of HANS, I doubt I'll ever compete in a CAMS event again. It is completely unnecessary and the addition cost to upgrade is much to prohibitive. I certainly have no intention of renewing my CAMS licence which expires at the end of June. If I don't sell my car I will compete in AMSAG events instead. CAMS can go and get (edited) !!!!!

I dont like the terms that are through out the survey like irrespective of cost, mandatory ect, they seem to overly taint the responses to the survey. For example - Should safety be considered a teh highest priority - irrespective of cost. If this comment is taken literally CAMS would not be able to send staff to any motorsport event as the saftey precautions would be unaffordable. Whilst I agree there must always be a minimum standard, this should be the default. It is concerning to me that there is trend to the maximum possible standard being the default instead. It is my view that in every instance that the minimum standard should be applied and mitigations to speed / danger be put in place (Much like the current systems) to make events safe. From there it should really be a competitors decision to balance their risk profile (Driving style, Level of competition, vehicle preparation ect) Other wise you will be making a decision that is the equivalent of mandating the standards of all competitive equipment as being state of the art. E.G. only WRC cars of less that 5 years are allowed to compete, and all cars must carry a certification from the manufacturer that the vehicle is in "as new" condition and ready for and capable of with standing any circumstance (Foreseeable or otherwise). All crew members must wear ..... Please - Ralling is in the most part a sport / hobby and competitors take a common sense approach to their risk management this has seen very few major incidents occur over the past 3 decades (When compared to other forms of motor sport or normal road usage). Thankyou for seeking my input, I look forward to you findings.

I compete in Targa and Mountain Motorsports events. I consider the stages used to be fine in terms of average and terminal speeds. Targa has great safety systems and protocols. The accident I had was caused by stage having been graveled on tarmac, a common method used in Tasmania. We had recced the stage the week before and there was no gravel. Targa have repeatedly ask councils not to do this just before the event, I believe they now listen!

It amazes me sometimes how a seemingly intelligent person can disregard the real life evidence for the effectiveness of a hans device and outright say that they will not wear them if and if they have to they will stop competing.

Overall, I think it is up to the individual to ensure their own personal safety is a priority. As a co-driver, I will not get into a car without doing a background check on both the driver and the preparation of the car. I will also ensure the car has winged seats for the co-driver. Unfortunately, often you will see a car where the driver has a winged seat and the co-driver does not. Of course, it also depends on the level of competition. If it's a fun, low speed club event I feel the rules should be a little more relaxed however the more serious the competition, the more serious the safety standards should be. I also think the speeds/roads on some tarmac rallies are too fast. At times, the average speed of a stages exceeds that of a WRC event! Thanks for asking our opinion, it's certainly a hot topic at the moment!

I believe that the increased use of the Rallysafe stage monitoring system in events will have a positive influence on safety. I have no commercial affiliation with the Company, but have had good cause to be grateful for the presence on an event.

Question 17 doesn't seem to understand rallying in Australia, many events are blind rallies, so pace notes are not allowed. I compete on a tight budget, and drive to the conditions and my ability. I bought my seats, belts, tyres all secondhand. All maintenance is done in the shed at home, using mainly secondhand parts. I can't see my budget stretching to extra safety gear. People at club level gravel rallying are just as likely to have a big crash as at ARC level, so why are HANS only going to be compulsory over a certain level? I do my own personal risk assessment every time I walk out of my house.

All state level event should be pace noted. State level cars and now too fast for route charted events.

Using a pre 1961 car in Tarmac rally's I am concerned about the current focus on safety versus the practicality and functionality of this focus given the risks and capability of the vehicle. It will not take much more for the cost involved relative to the risk to make it impractical to continue to participate in Tarmac rally's

Very high speeds on rallies concern me, and as an event organiser, I take care to write a route which minimises very high speeds. I also take great care to ensure that the Tulip instructions given to the competitors accurately reflect the road shape and that potentially dangerous or "out of character" situations are included. I have competed in several other events where such care seems not to have been taken - book written for pace note competitors, not Road Book users. The value of experienced and careful Course Checkers cannot be underestimated.

to me as a driver I feel that no one should compromise safety, I don't get it when people spend 20k on a engine and not $500 on a Hans device,we should make Rally Safe used for all events and not just VRC.Hans device should be compulsory and keep the cost down,in club events the field can be spread out and if a incident should happen you can be waiting a long time for the next car to arrive, hence Rally Safe will alert the officials, its a no brainer, Cams make it happen before we do have a big problem, of course you drive as fast as you want to that's your choice, but the speeds are getting higher each year due to vehicle performance, better roads etc,

I am unlikely to enter another competitive Rally due to personal safety concerns

I have competed in route chart and pace note events over the past 20 years and it is my belief that the higher speeds achieved on pace note events is the number one cause of serious accidents. Due to the lack of experience writing and using notes by state and clubman competitors when they are required to do note events as part of the ARC events it puts them at a greater risk of major accidents (as has happened in the past few years. Its ok if the driver and co-driver are doing pace note events on a regular basis 6 or more but when amateurs only do 2 events a year the risk of a mistake is much greater. I dont blame roads or the cars for being too fast but I know that we travel much faster (20km/h or more) on same roads because of the notes meaning that any mistake will result in a much bigger accident which we experienced in the 2010 Rally of Qld.

Involved in high speed multiple roll over-stage used 2 years ago-since then road side slashed & straight ahead no trees so no visual clue approaching crest at night that road goes left - nothing in instructions ie instructions not updated from 2 years ago when plenty of roadside vegetation existed. Event Instructions generally referenced the out of ordinary but not this one !! Suggest Event checker should change each year if using common roads - -ie "new eyes" Also Checker often in SUV in daylight - rather different to competition cars - does checker see what competitor sees? What training/competence does checker hold?

This survey (along with better consultation in general) should have been circulated to competitors BEFORE changing the rules for frontal head restraints and helmet standards. Another PR disaster by CAMS which could have been implemented in a much better way with far less backlash. I am a member of the NSW Rally Advisory Panel and we were never consulted by CAMS in Melbourne before these changes were made. Competitors are gradually improving their safety equipment over time anyway, there is no need to make FHR mandatory at anything below International level. CAMS' well intentioned changes are only serving to alienate grassroots competitors and drive them towards AASA rallying. We have been working so hard to grow CAMS rallying in NSW but when rule changes come in that we know nothing about and had no say in the implementation process, how can we convince CAMS affiliated car clubs and rally competitors that we are the best service provider to go rallying with? It is embarrassing and really hurts to think that as volunteers, the CAMS hierarchy have no interest in our intimate 'coalface' knowledge of rallying in our own states. Thankyou for this survey, but once again I fear the damage has already been done.

gravel rallying is very different from other forms of motor sport, competitors should be able to choose their own level of safety equipment

It appears to me most accidents in club events occur from pace-noted events where pace notes are prepared by Rally Organisers and Competitors don't have an opportunity to check pace-notes and adjust to their own format. Or inexperienced drivers lack of ability and unaware of their vehicles limitations on gravel roads varying conditions. Winning is great but you need to finish first. More emphasis on safe driving in club events could be of benefit

There needs to be a progressive cost implication for new starters to rally. Simple steps, not need race suits till certain level, frontal head restraint till certain level, full roll cages to certain level etc. Issue is sometimes events are multi level and the higher level sets requirements for all entrants. eg first time navigator for a state level event is

up for suits, shoes, helmets, frontal head restraints, belaclavas, NRN licence, etc. Significant cost... Safety is important however, excessive initial costs could be a negative effect on potential competitors. CAMS should try and include all areas within a state for events (State championship) and motivate competitors to attend all areas. Without entrants, events don't run and without events, entrants don't run. Queensland rally registration needs to be sorted out and fast. Otherwise no new Australian cars will be able to be made and therefore no new competitors and therefore reduced entry to events and less events - the cycle goes on. To meet safety requirements for CAMS, competes with Queensland rego requirements to the point of making it impossible to get a vehicle registered to compete. Incidences in events - what is considered a significant event? In this case, an accident into a tree was selected but a fast glancing blow to a guide post could also be considered an incident. definition required. CAMS web site calendar for Queensland events seems very limited and difficult to find event. Yearly calendars should be available end of December previous year or early January so competitors can organise the schedule for the year. Up to date content also needs to be maintained.

This survey is poorly designed, and will inevitably lead to erroneous conclusions. I would suggest you engage a professional to design your next survey. For instance roads used in gravel events are not on the whole too fast but in the majority of tarmac events - there are many stages which are clearly not suitable for competition and the FIA 132 km/hr maximum average is often exceeded. The significant issues in tarmac rallying safety should be addressed by restricting the cars which are eligible and their modifications. Lambos and GTRs with greater than GT3 circuit racing car performance are NOT appropriate for rallying generally , and certainly not on the roads used in this country. Gravel rallying is suffering because of the allowance for these high HP GT cars in tarmac- usually with only basic bolt in safety cages,the significant number of inexperienced crews who don't have a progressive introduction through lower powered cars, and high confidence because of 'safety notes' has lead to application of safety requirements which are significantly out of line with the risks posed at a club or state rally where speeds are much lower, the events are route charted- drive to what you see and cars are restricted in power by way of regulation and car eligibility. I am currently slowly building a new car for gravel events, and have built the cage to current CAMS requirements, however should these requirements change before my build is complete to logbook stage I will likely just abandon rallying altogether under CAMS. In any case I will seek an AMSAG logbook, and a AASA one for circuit events. Cheaper, easier. The survey is very clearly aimed at how competitors view safety items, particularly in light of the recent introduction of mandatory FHR across many aspects of motorsport. The introduction was incredibly poorly communicated, with little warning, and a too short transition, and will significantly impact participation at club level rallies and rallysprints (gravel , where competitor numbers are low and falling. Introduction of FHR will contribute to the further deterioration of the grass roots of the sport, as the cost of the FHR and new helmets for a crew of two persons will often be 100% of the entire seasons budget. Where is the published cost benefit analysis? - how many death/serious injuries are expected to be prevented as a result, compared to the impost of competitors- 'if it saves one life, it must be done' is not an acceptable answer in any regulatory context. CAMS is completely and woefully out of touch with rallying and needs to refrain from applying high end circuit racing safety requirements to all forms of motorsport. The day when FHR is required in a motorkhana can only be 4 or 5 years away.... I note that CAMS is making profit from members following the introduction of FHR by becoming a supplier of said items and has used the communication of the introduction to leverage their commercial position. It is appalling, and a clear conflict of interest. That the CEO clearly does not understand this shows his lack of competence I can currently reconsidering my support and participation in CAMS events until such tiime as the CEO admits this is inappropriate. I will always stand in awe of your ongoing ability to destroy the sport from the both the bottom up AND the top down. It is a significant achievement, you should be proud.

Please don't make it harder to compete. Our sport is close to dying as it is. CAMS should be making it easier for people to get involved in the sport I love. In the 35 years I have been involved, all they have done is make it so much harder for competitors, organizers and officials. Most of the officials are volunteers. They are being turned away in droves due to the requirements that CAMS have stipulated.

I reported in writing a dangerous incident involving another competitor at a CAMS rally, asking for action, but never even got any acknowledgment of the report from the officials. I think all written incident reports should be at least formally acknowledged even if no action is to be taken. This lack of response has been a factor in me reducing my level of involvement in rallying significantly since then.

The primary safety features of the car (seat mounts, belts, cages etc.) should be a priority for scrutineers. Use of technology such as rallysafe should be considered mandatory for State level and above. I recently competed in Targa Tasmania and was impressed that every start control included safety crews who checked that harnesses , chin straps etc. we're correctly used. Irregardless of wether pace notes are used or not drivers should still be

responsible for driving to the conditions and organisers should only be responsible for cautioning known hazards evident prior to competition.

CAMS must respect the various levels of competition to ensure that the level of vehicle and personal safety regulations do not restrict the attractiveness of the sport at grass roots / entry levels. Over regulation is beginning to have a negative impact on the sport and risked based safety systems and regulations should be adopted. Fundamentally, competitors at this level can then comply to a minimum acceptable standard (what ever that may be deemed as appropriate subject to the risk) or take responsibility for their personal safety equipment. Higher level categories should be standardized to allow for cross over between various disciplines. Finally, changes to regulations requiring significant investment need to be introduced over longer time frames. For example the recent removal of BS Standards on helmets.

I feel that speed limited cars would definitely be a major improvement ,whilst i am a 4wd fan ! I do not agree with the unrestricted cars top speed !!!

I am happy with my personal safety levels and risk assessments. ie have worn a hans device at all levels for the last 3 years

Rallying is not and should not be a speed event. There is a tendency to make rules align with international and higher level competition. I do long distance rallies that do not have the massively high speeds as animals and hazards arent called and you need to drive with common sense. I feel todays rally competitors are all about smooth roads, high speeds and knowing what every part of the stage looks like. A return to blind rallies with rougher roads that require ability to pick lines etc will result in improved safety and less incidents. I have just completed the Australian leg of the Sydney to London and all competitors made it to Perth without major incident - there were no DNfs

Whilst safety is important and I understand the requirement for a governing body to investigate and implement safety measures, please do not consider "tick box" safety measures like chicanes or average speed zones in the middle of otherwise perfectly safe stretches of straight road. I can understand an easily visible chicane being employed (still don't like them) to slow competitors down before a crest with a blind tight turn that is totally out of character with the roads recently encountered....but I have never seen them used in this context. They have only been used to "tick the box" and bring the average speed for the stage down. There is also nothing wrong with stages with high average speeds, I recall one a few years back where we ran an average of 180kph in perfect safety, it was appropriate for the stage and the road furniture.....don't unnecessarily destroy the fun stages! I am happy to be contacted if further information or opinion is wanted.

Driver abillity is a big factor in crashes /expensive & very fast toys Check book racer with little or no experence .

I have been involved in rallying since I was born in 1971 and most of my involvement has been in the UK. Cost and overregulation has been the most significant contribution to lower competitor numbers in rallying globally and is the main barrier to new competitors entering. As a father to a young rallying son, I know. Motorsport is risky but just like Motorcycle racing any keen competitor would accept the risks in order to compete even if you can't afford safety items as I did when I was young. I believe the unique nature of the roads we compete on make safety requirements and control of your environment more difficult than racing but for the majority of the time your crash is either bad driving or mechanical failure therefore you should be in charge of your own risk assessment. Injury and death are far more prevalent in other sport like bike racing. horse riding, etc but they are not regulated as much. Unfortunately Motorsport is now only really assessable to rich people or sponsored people and will only get worse until their is no sport left. This is primarily because of safety preparation requirements in my opinion. Its just too hard to get out on the stages for anyone new to the sport.

It would be nice to be able to use our FIA homologated rally car across the board in rallying (surely if it complies with WRC safety standards there should not be any reason the car cannot compete in state or national championships).

Overall, it is up to the competitor to make their own decisions about their personal safety. The biggest challenge facing rallying, particularly rallying under CAMS permits, is the over-regulation which is just making the cost to compete far too prohibitive. Set guidelines, and make recommendations, but STOP over-regulating to the point of excluding the competitors - your customers. There are plenty of volunteers in rallying in NSW who are working damn hard to grow the sport, and every new "safety" ruling CAMS issues totally undermines their work, and sets things farther back. People need to take responsibility for themselves, and in the sport, you will find they

generally do - they are fully aware of the risks associated, and will take precautions for their personal safety as they feel is necessary, based on their personal circumstances.

I think it should be up to the competitor to decide wether they want to use a HANS devise or not. In a roll over the device can be dangerous, people have been stuck because of the device. Also helmets have to upgraded to HANS compatible. A very expensive exercise to get a HANS and helmet.. I'm unsure if I need to purchase one for state rally? I know I will need one for targa wrest point if it still going to be held in 2015??

My view on this survey is one of distinction and suggest a broad brush approach does not work on several levels. The average club event should continue to be self regulated. It is an entry level to the sport and the cars used reflect that level of skill and preparation. The last thing anyone wants is over regulation of a favoured sport. That is not to say that encouraging safety is something to be shunned! There is a balance An over enthusiasm of regulation will be counter productive to the enjoyment of a large number of club competitors who use their cars sparingly for specific rally related events. If CAMS and its affiliated parties was serious about safety, it would underwrite the cost of a large number of safety developments. For example, for a number of infrequent competitors, the cost of the entry level HANS device is about $550. If CAMS were keen to introduce this safety component (and it is a valuable safety component), offer it with a subsidy at $250 for a 1 year term - 1 item per licence holder..... not at a $50 discount. The truth is that there is a risk in everything we do including crossing the road and people accept that risk. We read the Conditions of Entry stating that Motor Racing is Dangerous for Spectators as well as participants. And accept those dangers.Our cars are in general safer than a large number of cars on the road, and very few cars are used at ARC or FIA levels. Support of Motor Sport can be a key contributor to Road Safety, and the message should be that these safety components in Motor Sport are not widespread in a large variety of road cars. The last thing we want to see is over vigilant executives seeking exclusion to our sport, rather than inclusion. We tend to live in an increasing level of "Nanny State" interference. Tasmania's 90 kph limit on gravel roads is a prime example. Decrease the executive interference and their numbers,(and salaries) allowing the individual competitors to make their own decisions.

YOU DONT need HANS For a Club event. You should focus on Upgrading Vehicle inherent safety and giving us a rego system that allows us to use our vehicles first. When you get that sorted THEN worry if we have a HANS device. PS, as I now use a HANS because I run in the ARC/WRC, I am getting neck strain as I cant use my neck "donut" and Im getting lower back issues as im broad shouldered and a HANS is not designed for the average Australian bodytype!

To blindly apply the same (safety or other) standards from ARC to club events is the surest way to kill off the lower levels of the sport. People simply do not have the budget to comply. What tends to happen at the lower level of the sport is that competitors spend their finite funds disproportionately on performance, rather than safety. The challenge for CAMS is to determine if they want these people to stay in the sport or not.

Targa Adel prolouge in showgrounds was very dangerous, I can't believe it was allowed! I can't see how a circuit or hillclimb needs barriers, sand traps etc..., yet a Tarmac rally with higher speeds and extra danger needs nothing?

In relation to Tarmac rallying I think sustained high speed should be avoided. I liked the water filled chicanes as they involved crew skill - understand they may be expensive option for organizers. The three or four warm up stages are a good idea but in my experience the roads chosen are too fast. Experienced competitors should then take it easy but Im concerned that less experienced competitors may note understand and adjust accordingly. I am also concerned about MS category cars. I love the engineering work that goes into these cars but I am concerned about the resultant speed potential. To date these cars have been generally well constructed but there is little reason why a cobbled together (say V8 Torana) death tarp couldn't get a start with disastrous consequences for crew and sport. LMS allows great brakes and limits ultimate output by retaining the same block and head. That should be enough. Another factor is the increased emphasis on Classic Outright rather that Handicap. Improve the handicap system (linear, based on vehicle age, capacity and mods, adjustments limited to small increments so car builders can know where the goal posts are), and make Classic handicap only. Outright times and placing will still be if interest but this formula will encourage the building of lower capacity cars with less ultimate speed potential - therefore safer.

There are inconsistencies below national level competition with the level of personal safety equipment that is required for an event. How can wrist to ankle coverage by non FIA standard clothing be acceptable when, in the same rally event (state/club), a higher level of protection is required..is the fire less severe? The level of equipment should be ultimately the responsibility of the crew, and any regulation should take into account the level of the

sport, and at least provide a minimum of care based on current understanding.

Please help keep grassroots rally accessible to the masses!!!!!

Preferred the old roll cage padding. The new padding is too hard, expensive and difficult to work with.

I built my car when I was single and had a good income. Now with three young children I have a lot of other things to consider spending money on before a passion which is mine, not my families. If, for example, I had to renew my helmet and buy a "HANS" device that would basically be my budget for a years competition gone. Every competitor is responsible for their own safety in the end but things can go wrong and of course risks should be "minimised". If changes such as mandatory introduction of "HANS" type devices are made I believe competitors should be given a 2 year period before they become mandatory, to allow people to plan and budget for these changes. Thank you for asking for my opinion as a competitor.

It's a fine line between encouraging competitors to take responsibility for the safety of themselves and their vehicle, and overly restrictive regulations. There will always be 'cowboys' who compete, no matter how tight the regulations are. As with ocean racing and other high risk events, the risk assessment and decisions about what speeds to drive on the various roads encountered in Tarmac rallies should reside with the driver and co-driver. Providing information to enable an informed decision (including hazard warnings etc) is a vital role for the race organisers and officials. I'm all for encouraging and supporting competitors to enter a rally with their vehicle in the best (safest) condition, and with all appropriate personal safety gear. Regular safety updates from CAMS, accompanied by evidence and illustrative stories would work for me. On another note, I love rallies which have a good combination of long and straight, and tight and twisty! Both test the skills of the driver and co- driver, and allow for fun and a sense of achievement.

Whilst the safety standards in Australian motorsport are very good, it is still motorsport and has a high degree of risk and it is the competitors responsibilty to utilize the available safety apparatus. Organizing bodies should promote and show data as to why safety apparatus should be used.

Cams should supply hans to all entrants

non of these is for cross country rallying which it should include---non pace noted cross country

All levels of Rally should be kept to the minimum cost of compulsory safety requirements. Otherwise the cost of mandatory new equipment will force a lot of competitors out of the sport through lack of funds. Not every car is lucky enough to have sponsorship.

I am very concerned about what I see as a knee-jerk decision to implement the compulsory use of FHRs in rallying. Whilst undoubtedly FHRs have their place in motorsport, I am not convinced they are the correct solution for rallying. I can see their benefit in reducing injuries in heavy frontal impacts, but this tends to be a fairly low risk in gravel rallying as most impacts tend to be side on or roll-overs. Where these types of impacts occur I am concerned as to what other risks are then introduced in terms of vehicle egress and secondary injuries to areas such as the collarbone (note a collarbone breakage makes it virtually impossible to exit a rally car unassisted). I would like to see what studies have been done using the typical state level rally competitor, whose age and fitness levels are not the same as a formula 1 driver's. What additional risks are being introduced here that we are not aware of? How is an FHR going to interact with my existing equipment? Will I need to purchase new seats or harnesses? I am also concerned about it applying across the board at the state level. Not all state rally entrants are equal! Many club level competitors compete in state level rallies because they are generally good events, but this does not mean they are running at state level speeds. With fewer and fewer rallies being run these days, giving club level competitors the opportunity to run in a state level event is important for the well-being of the sport. For example, I usually compete as a navigator in a fast, state level turbo 4wd. However I sometimes drive in my own car, an older, much slower 2wd. When competing in the 4wd we are competing for outright positions, but when I'm driving my 2wd I am down the back of the field. Although I can could be competing in the same event, the speeds (and risk level) just do not compare. Unless you have competed at both levels, it is just not possible to understand this. Making FHRs compulsory for all who want to enter state level rallies is a serious cost impost at very short notice and will likely add further pressure to the viability of some events due to a reduction in the number of available competitors. I am a great believer in accepting personal responsibility and like to make my own risk analysis in everything I undertake. I take my safety seriously and like to keep up-to-date with all aspects of motorsport technology. However, I want to be able to make informed decisions as to what constitutes an acceptable risk and what equipment is best suited to mitigate those risks. CAMS have simply not presented a

valid argument for this decision. If this change is to happen, I would like to see CAMS implement it properly. Allow a decent transition period so that competitors can make an informed decision on which product best suits them. Present the arguments for in a professional manner (ie show us real, relevant evidence instead of motherhood statements) and also present the added risks so that we can mitigate them as best we can. (And despite what CAMS may argue, there is always a risk.)

ultimate descission on personal safety equiptment should rest with the competitor

It is important to be safe in rallies but it is also important to be reasonable in requests for upgrading equipment, clothing etc. Costs can be prohibitive if competitors are asked to upgrade to newest and latest gear constantly. For example it is great that common sense prevails in allowing us to wear "B" level Flame-retardant overalls in Targa Australia tarmac rallies.

The event in which I was injured, had very good emergency plans and the medical assistance was on the seen of the incident within a very short period of time after the accident occurred. As we were running a Classic class car, it still had alloy roll protection. I believe that had the car had a steel or similar form of protection. The resultant injury may not have occurred. I would like CAMS to seriously look at all older car that still complete with alloy rollover protection. David McNab 0408630180

I don't subscribe to saving people from themselves. We decided to have the best seats, harnesses and FHS and at that stage we were only in a datsun 1200, but the cage was alloy. These decisions were mine and my co-drivers decisions. Bluntly, if all of what we ultimately chose to do, regarding safety, was legislated, then we would never have started. So my point is, encourage the use of safety equipment, educate about safety, but make it up to the individual. I acknowledge that it does help that I past the age of any peer pressure influences. I do think that the average speed of some stages is a little high. But choice of roads is also limited. Ultimately, I just back off. We also have our car geared to a max speed of 176kph. Well done on creating the survey.

Safety requirement have increased for good reasons over last 10 years and hans devices should be compulsory for National but NOT State level competition. State level speeds are not as high as national and it is not all about maximum speed at any cost. hans should be a personal choice, as it will makes it very expensive to step up to State level next year even for one event as i would need to buy a new helmet and hans = $1000. If as crew we wanted to try state level events it will be added cost as the current race seats do not work well with hans so cost for us a crew in our car is hans & helmet x2 = $2000, plus 2 seats = $2000, so the all up cost of new safety gear is a total $4000.!!!!! As a crew we will NOT be doing State rally's and State series rally's will find it even harder to get competitors, its already boarder line for my club to run a state round as 2 out of the last 3 years we have lost money due to poor competitor numbers !! Please modify the hans rule to make it a personal choice at state level and not required at club level.

My answers would be different depending if the particular rally is on Gravel or on Tarmac. Tarmac events typically have a higher "average" speed, and a shorter "correction" time span to regaining a vehicle when it gets out of control (so I would view tarmac events require a higher standard of safety levels), where as gravel, average speeds tend to be lower, with the "correction" time increased due to constant vehicle movement. From a gravel background, top level ARC should carry full levels of standards as they often use the highest powered cars, and faster/better condition road choices. At club at state level, road choice often are of lower quality standards, forcing average competitor speeds down, with slower cars etc. However a 80kph into a tree is the same force be it a top 4wd on gravel/tarmac, or a low level hyundai excel. The difference is the "amount" of time each particular car spends in the higher levels of speed, where serious accidents are more prone to occur. Many events run various forms of vehicle tracking (Rallysafe/manual vehicle tracking etc), and provide essential accident intervention, which I feel is an expected requirement at all levels Rallying in general in my view requires high standards of safety, however that needs to be very closely controlled, as by increasing the demands of safety expenditure on club & state competitors, has the potential to reduce the pool of competitors, bring further financial strain to a category of sport that is "struggling" at all levels from previous long term trends. Thanks, and good luck!

Rallying in Australia is quite safe. There needs to be more consideration to costs otherwise there will not be any rallying, Rallying will be priced out of exsistance.

This survey avoids the issue of the higher speeds achieved in pace noted events and the effect on safety. I would like to see a analysis of all incidents in gravel rallying that result in any significant injury and the correlation with pace note / no pace notes. E.g. my most recent incident was on a non-pace noted event, but it's the severity of any

injury in an incident that matters, not the number or type of incident. Pacenoted events are the major damaging influence on the sport, increasing resources required to run an event, reducing the road variability (e.g. 4 stages run twice) in order to compact an event into a weekend, and in my view causing faster and more damaging impacts. Pacenotes should be banned at any level below ARC. The major reason for me leaving the sport in 2008 was event format and disillusionment with the direction the sport was heading. The sport needs to get back to basics at every level including the ARC. I competed regularly from 1980 to 2008.

The introduction of compulsory HANS or similar devices at state level events is going to decimate our sport (gravel rallying). So many injuries critical and otherwise seem to be occurring in tarmac events but gravel events that seem to be much safer get slugged with the extra safety requirements. I have competed for 7 years but have no interest in forking out $2000 for new helmets and HANS devices instead of putting that money into the cars active safety instead. I'm out for good if the rules stay in place. Provide a list of injuries from Tarmac and Gravel events and let us know why tarmac and gravel events have to have the same mandatory safety requirements.

One of the items not mentioned in your survey was the Road worthiness of competing vehicles as a former Licensed Vehicle tester in Vic I am confident that the majority of cars are UNROADWORTHY in competition. Modifications made to the cars render them unroadworthy -including the fitment of "safety cages" and harnesses. So using mandated "safety" items including HANS devices render the vehicle unroadworthy therefore CAMS has competitors driving over public roads-irrespective of whether their closed or open-- in cars that have been rendered illegal by the very safety equipment that you have to have to compete. I would be more than happy to expand on this theme but it is quite ridiculous to have vehicles "SAFE" for an event but totally illegal to actually drive on the roads.

I think safety at State and above levels is very good, HANS devices will only improve this. Club level is harder because the costs need to remain low to get new people into the sport.

If everyone were driving world rally cars and fields were full, then perhaps looking at HANS might be an option. But they're NOT ! I know of several regular competitors who've advertised their cars for sale as a result of the HANS decision. Their optional, and should remain so. I'm strongly against it, as a competitor of 25 years experience and many rally outright wins.

I was involved in a high speed roll over in Targa Tasmania. I believe the safety gear in my car saved my and navs life. These at the time were not compulsory items. Adam 0414 207341

Having officiated and assisted with organization of events, I am concerned at the lack of safety standards involved in the very grassroots development levels. Especially in consideration of the speeds some competitors get to. there is also this view from some who believe that all the safety precautions will save them regarless of the speed they are doing. I have watched many reach a win at all costs attitude, andnot consider that if something goes wrong there is no promises that they safety gear will save your life. I am also horrified the number of competitor's who do not use hans, my mother broke her neck when the car we were stationary in was hit from behind - luckily the cord was not damaged. That was at low speed, and left her with permanent nerve damage down one side. I won't start competing until I have all the safety gear, regardless if its required, but I am a rare one.

I hate pace note events, I MUCH prefer 'blind' rallies. In my experience pace notes encourage people to drive closer to the limit on the (false) assumption they are better informed about the road. The biggest danger in gravel rallying is "the nut behind the wheel", if you drive sensibly the risk is low. If you drive beyond your capability your risk is high. I would suggest the best safety measure CAMS could take is to run real world driving workshops which CAMS underwrites where people turn up and 'learn how to drive' their rally car in gravel on a real road (not a classroom thing, although may be part of it) with a competent instructor so they better understand car control, where the limits are and how to minimise risk. Hard to do that at the moment without spending a fortune. It is too easy to get a licence and be let loose, maybe the risk doesn't hit you until a few events later. Personally I never cease to be surprised by the number of crashes etc - people try too hard, but how do you stop that??? I am VERY annoyed that you didnt flag earlier - even as a potential - the change to FHR requirements for 2015 as I just bought an $800 helmet that isnt compliant. Have you ever tried to sell a brand new (used once) helmet? Take it from me, you lose a lot of money.

Speed is a major contributing factor to incidents. Speed on stages can be mitigated by appropriate selection of roads or by the use of chicanes before hazards. Fast roads can be avoided.

cars purchased/built overseas should be CAMS log booked to current safety cage specs in australia as if the

car/cage was just built new.

I am sorry I can not answer these any better as I have not yet been involved in a rally some of these are hard to answer. However I will say that I think that it is important not to exclude new participants in lower level Rallying/grass root events (Khanacross, Autocross, Rally Sprints) by inforcing too higher safety equiptment standards for said events. I say this as When I was doing my entry level events last year to make sure this was what I really wanted to be doing if I had to have full safety gear I never would have contimplated buying a car. Now that I know that I enjoy the car and this style of driving I was comfortable outlaying the money for all the appropriate safety gear. IE suit, boots, gloves, helmet and hans to compete in a state level rally. Selling a car if you decide its not for you is relatively easy however seccond hand safety gear is hard to recover costs on. I hope this makes sense Daniel Ludlow

Over 12 years of tarmac rallying, the safety standards have continued to improve. This isn't always related to the equipment used, and is sometimes the way the events are organized and set out. Passive safety measures such as chicanes, or enforced slow points are sometimes of more value than the equipment in the car. There have been many incidents where the cause is the driver exceeding his/her ability. The most important component of safety is the attitude of the driver.

I agree with the new rules, wearing head and neck support. I think co-drivers should be made to wear gloves given recent experience of someone getting burnt. It would be good to have some information sent to competitors of examples of why safety is so important. Cheaper safety equipment is a must. RallySafe type systems in all rallies. Same code in safety at all rallies and the same systems in place. Blood types on race suits. Balaclavas mandatory? Recce in complete daylight and 60km/h or above as anything under 60 is unsafe due to the speed you will be doing in competiton. Fire extinguisher nozzles in the rear of the car and Kevlar protection of fuel tanks. Please feel free to call me, Brendan Reeves on 0427 794 479

CAMS stewards should be more proactive in reviewing incidents and implications thereof. Gravel rallies lack safety factors that tarmac rallies does.

Seems like this survey has completely lost the plot. No where does spectator safety get a mention whereas there seems to be a God like attempt to prevent a driver from farting for fear the gasses could explode and singe an eyebrow. Motor racing is dangerous and if it wasn't we would find something else to do. Let the drivers kill themselves, they will do it no matter what the rules, but please prevent drivers injuring spectators or officials. You can't legislate against stupidity and that causes most accidents from F1 down so prevent the stupid injuring those paying to be a spectator or volunteering to officiate. Why is classic and vintage racing the fastest growing part of the sport?

The increase of safety related devices at entry level club events is a mojor hurdle to new competitors and returning competitors, After competing regularly 5-6 years ago and now wanting to return for just an event or 2 a year the amount of new safety equipment required for the vehicle and personal equipment seems excessive for club level competition.

In my case i am soon having the roll cage upgraded to more current specs by an authorised installer. My car is classic but additional bracing will help and improve performance and safety. Making this a commonly known fact may help safety aspects of particularly older vehicles.

CAMS needs to talk to the competitors before making sweeping changes with short lead times. FHR is not the only risk factor in a rally car. The ability to exit a damaged car is possibly more important and is hindered by the HANS system. We have ordered Simpson Hybrid Pros but the short implementation time is making purchasing them difficult. The HANS device gives very poor protection in other than full frontal impacts. The use of winged seats is not practical in some vehicles. This is supported by the fact that most works rally drivers are now using the Simpson system.

I believe there are certain safety "advances" that should be left up to the competitor. Eg. FHR's. CAMS is forcing grass-roots competitors out of the sport by mandating such items. I believe this decision should be left up to the individual and not forced upon people. CAMS is successfully killing off grass-roots motorsport with a huge number of members moving to across to AMSAG in NSW (where I do most of my rallying). If CAMS can't see that, then they're a bunch of idiots. State rally panels also put in a ridiculous amount of work to keep the sport alive, and CAMS are rude enough not to even run proposed rule changes past them. Disgusting. CAMS should be ashamed at the way they treat their volunteers.

Safety regs are good, cant impose every rule on lower level competition or there wont be any then there wont be any higher level competition or only for persons with large budgets

I think things are heading the right way and at a speed that is good :)

Frontal Head restraints are great but they don't save you from injury in a rear impact incident - don't know what would. I don't think you can restrain the head/helmet any more than now - navigators need to move their head up and down more than a driver does.

Keep it simple for club events .A lot of guys doing club events cant afford new belts every 2 years , head restrants Our club runs mostly trials set at 80 km and its done for fun not sheep stations.Just keep that in mind when you make some bullshit rules other wise we will loss them to some other sport and then we all lose.

I've been Rallying for over 30 years and I find it very difficult to register a Rally Car in NSW. If I have difficulty, how on earth do we get new people involved. I also think that less powerful cars should be encouraged to be used by new commpetitors, eg: 2WD non turbo up to say1600cc and allow the minimum level of safety equipment, ie: 6 point bolt in Roll cages with side intrusion bars instead of having to spend 2 or 3 grand on a fully welded in structure. Of course more powerful machinery should require more serious rollover protection. The whole sport needs to be made easier and simpler for potential new competitors to get started.

Competing in tarmac rallies and in the Classic class something should have been done long ago in regards to controlling some of the latest cars in the field, some of them are basically V8 supercars wrapped in a classic bodyshell, Torana, Perana etc. There's no way known that these cars would have been running the equipment they have now back in the day - do not remember ever seeing someone plugging a laptop in to a '71 Perana for instance back in 1971 .....

FHR restraints must be a personal choice and cannot be mandated. In rallying, the accidents vary significantly depending on the scenario. A FHR may hinder a competitor in some situations. Any rally stage that averages over 110kph (plus 10%) - so 121kph should be neutralised and the director asked to explain. 110 should be the maximum goal. This can be achieved via intelligent road selection. The key to safety in rallies is response time to the scene of accident. This is where the focus should be. Competitors are integral to any safety management policy and as such the procedures and systems must be communicated effectively and an induction of sorts should occur for at least one competitor in every car. Snr 1st Aid certification would be a plus, in addition to UHF in every car. Anyway... this is all a waste of time- you guys will do whatever you wish. If you want to work at putting plans in place to help manage real and actual risks evident in forest rallying then give me a call on 0432919800 and I'd be only too happy to make it happen. If you just blindly mandate the use of FHR and raise the introductory cost of the sport then you will kill it. Do the research, examine the science. Lower the speed and increase communication and response times.

I note that road conditions vary across Australia eg Targa High Country is one example, Rallying in the Adelaide Hills is another. Organisers can only go with the roads which can be made available. Fortunately Rallysafe units are now used and they are fantastic. HANS devices should be compulsory for all.

I think the Safety Aspect of Rallying in Australia (western Australia) in particular is good, the only thing will be as new organisers take over from older more experienced people, the 'knowledge' needs to be passed on so in an emergency the correct action is taken promptly. I see an over reaction from inexperienced officials which stops the event or causes bigger delays than necessary. Sometimes a course of common sense should be run. Over all I am happy to compete at a high state level as I feel safe.

There is too much disparity betyween tarmac & gravel. Why should tarmac rally competitors be able to compete at any level (including targa events & rally sprints) without a compliant ROPS, and harnesses? Same goes for tarmac speed events where vehicles can easily reach speeds (220km/h+) well beyond the fastest gravel rally speeds. Whilst reducing the max speed and average speed of rallies by way of changes to stages is a very good idea, the reality is that in most states, there are not enough alternate roads available to do this and adding chicanes is not generally feasible (or financially viable).

Rally Safe is a great idea but does add a lot of cost. Need to find ways to support competitors with costs associated with safety features

the costs of FHR with helmet, belts etc just so I can compete in my only local rally (state level) in 2015 has resulted in the decision to retire from rallying at the end of 2014. I cant justify the cost just to compete in the only state level rally that is my "home" event.

As someone who does approx 20 rallies at all levels each year I would be happy to help with discussions on safety at rallies. I compete in Tarmac rallies, ARC, State and club level as both a driver and codriver. If you would like me to be involved I'm happy to help out. Ray Baker CAMS licence 9933934 0497825558

All my rallies are either the Targa series prev run by Octagon or the Mountain Motorsports Australian Tarmac Rally series, both of which are always well run and highly safety orientated, even though the MMS event are AASA, there is still a focus and good delivery of safety. The rest is up to competitors, Motorsport is dangerous and competitors who don't accept this simple fact should find a new sport like gymkanas or hill climbs. Don't spoil it for those competitors that invest the time and money to compete at a high level and still make safety and important aspect for their approach to the sport, any prudent competitor understands the risks involved. Being safe and being fast are not mutually exclusive.

this survey is biased towards pacenoting and shows a lack of knowledge on blind rallies and how rallies are run.

Rollcage: As the original designer and manufacturer (whom consulted the certifying engineer prior to and post construction and therefore is aware of what was and was not taken into account in calculations), regulations prevent me from adding more diagonals or 'A' pillar reinforcements to an otherwise sound previously certified non-complying rops, unless I complete a full re-certification to comply with current testing/ strength requirements which the original structure is unlikely to meet. This means we continue to compete with a rops that is less safe than it could easily and cost effectively be. Helmets: I am no longer able to use a carbon composite reinforced helmet with noise attenuation that cost close to $2000 when purchased new late in year 2000, just because it is 13 years old. It has only seen the light of day/ been used 3 times and has always been carefully stored safely in a cupboard away from UV exposure and mechanical stress when not in use. If it came factory fitted with hans posts it's apparently still OK to use it, but because we fitted the posts it is not. Yet I can replace it with a $35 'Aust Standard Approved' 'made in china' plastic motorcycle helmet and retro-fit posts myself and that is OK? Which is likely to be safer? Harnesses: Same goes for 'top of the line' brand new in original packaging, Willans 6 point 3 inch harnesses purchased in late 2000 that have NEVER been out of their original packaging/ dark cupboard. They may be out of date but a quick visual inspection clearly indicates their condition as brand new. They have since been replaced with 'in date' harnesses, that are junk in terms of comparable build quality and have lightweight 'plastic' rotary buckles that are so small only a child could operate them effectively which means they are almost impossible to fasten yourself, as necessary in a rally car, once wearing a hans device and helmet. The build quality of most harnesses I have looked at does not compare with that of which we were able to purchase more than a decade ago - obviously part and parcel of the throw away mentality that came with dating/ mandatory discarding an item irrespective of its usage, care and condition. Mandatory usage of Hans: Rally event organisers need to understand the implications of the increasing complexity and array of safety and other equipment that we are adopting and allow enough time for its usage and proper fitment both at stage start and removal at stage end and build extra time into the liaison. The addition of a hans device (along with more diagonals on rollcages) now dictates that helmets/ hans attached will have to be stored somewhere in the rear of a rally car where the crew must get out of the vehicle for access. The envelope for entry/ departure from a rally car has reduced significantly over the last decade or so with implementation of additional side intrusion and A pillar reinforcements, thicker rollcage padding and seats that have had side head restraints added. Drivers also have a steering wheel to get around or to remove and ensure has been re-fitted correctly, along with balaclavas, helmets, hans, harnesses with diminishing sized buckles that are difficult to fasten with a hans and helmet on, gloves, triple layer suits that make a driver sweat causing hydration and/or associated toilet issues, an intercom and as well now, point of view cameras (which are an important form of media for our sport), all of which need to be dealt with – and organisers seem oblivious to the time it takes to manage all of that. In rallying we MUST not be driving out of busy town centres through traffic (or liaising anywhere on open pubic roads for that matter) with all this equipment hindering our vision. Yet I find at recent VRC events, this is what is required of competitors because organisers have cut liaison time so short they have no option but to leave the service park with all the gear inc, helmet and hans on and arrive back there dehydrated and/or busting for a pee because there was no opportunity to get the gear off and cool down between stages or service. Rally drivers in this country are not full time professional athletes that are physically fit enough to endure these demand without risking fatigue. These issues need urgent attention. Blind Rally VRC route charts: The standard of route information supplied to recent Victorian Rally Championship events I have competed has been severely lacking, with obvious triple cautions omitted (Grant Walker Accident, East

Gippsland stages 2014). Conversely, several cautions included were entirely visible, readable, not required and only served as a driver distraction over the prior kilometre as a co-driver commences communication of superfluous instructions (e.g. 'caution bridge' for something that may well have been marked up on an old map as a bridge, but that has since been removed and replaced with a small concrete pipe under the road, where there is no railing or bridge siding to hit, no narrowing in the road width, no drop over the edge any more significant than any other drain passed bye already on the stage, and absolutely no change to the road surface). The cautions omitted have caused problems of varying degrees for every competitor, ranging from a 'near miss', to 'went off but got away with it', and 'a nasty accident involving injuries and hospitalization'. What's more, on events that used the same stage twice, the checker still did not pick up on the problem despite wheel marks left by competitors on the first run through. The standard of event checking at this level of competition needs urgent review as does the amount and the way information is presented on a route chart. Tulip diagrams, by the time they make it from a unscaled hand sketch made in a moving vehicle to a computer generated printout and back to a driver as a verbal description aren't much better than a Chinese whisper. A simple instruction such as 'road goes right' is not sufficient to describe a long bend that increases in severity or has multiple apexes. Once a competitor identifies the corner and severity they get back on throttle only to find the corner tightens late which is what the organizer had really intended to communicate, but they still weren't adequately forewarned and arrive there too quickly. Caution boards and tulip/ instruction number boards: I am dismayed to find that organisers are no longer compelled to place a caution board on a single caution. What happens when a competitor has a malfunctioning trip-meter or muddled up co-driver? We let them find the caution at speed! Same goes for non-mandatory use of instruction/ tulip number boards and/or arrows/ flags to clearly identify the corner or road feature that has been added to the route chart. I experienced several instructions in recent events where the information given on the route chart near enough matched the conditions experienced on the road one or two corners prior to that which is the feature the road director was concerned about. Consequently, thinking you have safely passed the hazard, moments later you arrive at THE HAZARD back near full speed because the road director and checker didn't notice or look for the similarity and was not compelled/ too lazy/ was trying to cut set up time/ cut costs and didn't erect a tulip/instruction number board/ caution board/ arrow. This is simple low cost stuff that can significantly improve competitor safety. Blind rally vs pace note: I firmly believe the speed of modern vehicles as well as new technology applied retrospectively to older vehicles, whilst vastly improving the enjoyment, spectacle and lifting levels of competitiveness in the sport, has also outstripped the safety afforded by route chart/ blind rallying, at least at State level in Victoria. This also applies to some special stand alone events such as 'The Alpine Rally'. The solution is not to slow the cars or further restrict the rapidly diminishing number of roads/ forests available for competition to those that offer lower average speeds. The answer is competitors need to be handed back responsibility for their own safety, prepare their own route information and drive according to their own level of experience. I strongly believe state level rallying SHOULD NOT be run as a blind competition. Frankly, a better way of doing things has evolved as evidenced at/ commenced in the WRC decades ago, and that is pace noting. There are issues that go with this method of competition, the greatest being when competitors 'do not know, what they do not know'. That is, they think they're running safely on notes when really they do not have enough experience at the discipline to know. This is a educational issue. People need to be made to understand they will not reach a reasonable level of proficiency at this method of rallying until they have successfully competed a minimum of 10 to 15 rallies with a high level of dedication required away from actual competition in learning/ reviewing and refining their skills, and they need to drive accordingly whilst undergoing this steep initial learning phase. After competing 10 to 15 rallies they will have just reached the start line with this discipline. Training needs to be made more readily available for those inexperienced in the discipline, there is much information available these days, it is no longer/ does not need to be a black art. Competitors should not run on pace notes they did not make themselves without first completing a through recce. Competitors that do not wish to compete on pace notes should be allowed to run blind on a route chart if they choose to. The issue here is choice. Experienced pacenoters aren't being given the choice in 50% of the VRC rounds. As an experienced pace noted rally driver at national and international level, my recent experience has also reaffirmed my strong belief, that once a competitor has reached a reasonable standard of proficiency in pace noting, they should NEVER return to competing blind again. It is far too easy for a driver that has become accustomed to a greater level of commitment on notes to find themselves sometimes, even if only momentarily, slipping back into a level of overcommitment relative to the lesser quality of information afforded by a route chart. As a competitor that took the enormous step up from State/ VRC to National/ ARC and International (and coming from a state which has somehow stumped up more than is fair quota of ARC outright champion drivers over the previous decade), I can confidently say we have all struggled to make that step up, coming from a state where there was and still is very little on offer in the way of a pace noted state championship or other stand alone pace noted events. Many eventually had to leave behind their regular co-drivers and take on another that had previously enjoyed a better opportunity to gain more experience in pace noting. I firmly believe there need be a clearly defined pathway through the sport for aspiring competitors on the way up from

introductory events through National level and beyond, as well as a path for those coming back down/ or taking a step back for a while to consolidate. If we are to have pace noted events in the ARC, then the State Championships need also be pace noted to both provide a more cost effective training ground for aspiring drivers to learn that discipline on the way up, and a championship to return to that employs the discipline they have become accustomed to (pace noting) on the way back down. Otherwise, as we have too often seen, when the competitor has burnt out or is for what ever reason unable to maintain the high level of commitment (time/ money/ sponsorship/ effort) that is required to keep up an ARC or higher level campaign, we lose them sometimes altogether from the sport, or at least as high quality potential state level competitors. Blind Rally vs Pace notes from a competitor safety perspective: My own experience by way of 'moment count' informs me that pace noting is a safer way to go rallying and I WILL NOT EVER compete in another blind rally. Throughout my last full season in the ARC and competing overseas, we had 3 moments for a whole season of rallying (8 events), none of which related to pace note or co-driver error. In the space of two rounds of VRC competing blind on organisers route chart, we have had several more (and more severe) moments in each event than we did in an entire season of pace noting and this was all down to poor quality or omitted information from blind route charts. I do not enjoy a near miss, sooner or later a near miss becomes a hit. The VRC has lost me as a series/ championship competitor as a result of their decision to persevere with running blind events. I reiterate, as a competitor that's attained an adequate level of experience in both methods of rallying to make an informed judgement, I WILL NOT EVER COMPETE IN ANOTHER BLIND RALLY.

I have no problems with the FHR restraint rule changes except that you have disallowed my $1000+ Stilo helmet, but I can buy a cheaper brain bucket for $300 that does comply. Go figure.

Too much emphasis on speed ie heat systems, power stages, pace notes etc instead of traditional rally values of reliability and consistency. Serious accidents in Australia were rare before these innovations even with the much lower safety requirements. Using tighter roads would also help keep speeds down.

I competed as a navigator/co-driver (at up to National level, including winning a state championship) for 25 years, before taking up driving 5 years ago. I now compete primarily in club events (mostly traditional navigation trials) in a Historic Rally Car of very standard specification. I also usually 2 or 3 club events & 1 state level event per year. I am not a very fast driver, but enjoy it. I have been competing long enough to understand the risks in rallying, and drive according to the level of risk I am willing to accept given the level of preparation of my car, my safety equipment, and my level of skill. I used to make similar "judgement calls' when it came to deciding who (and in what car) I would compete as a navigator/co-driver. I do NOT need CAMS to treat me as an idiot who needs protecting from myself through excessive regulation ... I am quite capable of making my own risk assessments & and acting accordingly. The increases in mandatory safety equipment in recent years have very nearly made the sport unaffordable for the occasional competitor like myself who is only in it for fun. (eg. the new FHR requirement means I will not be able to do a State event after this year). You need to start treating us like responsible adults !!

The cost of going rallying is becoming a major factor as to whether the sport keeps its current participation levels. I agree that everyone's safety is important, however, there will always be competitors that take risks that exceed their skill and vehicles capabilities. Making the minimum safety level affordable to new comers and multiclub competitors is a priority. Some of the safety items required are expensive to replace when you take into consideration the short "use by date" and the amount of usage they get. Some less expensive items may seem trivial or affordable to others, but to throw out a perfectly servicable item is wasteful. An example of this is the relative inexpensive fire extinguisher. It only passes scrutineering and complies with regulations for 3 years from date of manufacture, however, the manufacturers puts a 5 year guarantee on it! These items have a charge indication gauge which at a glance shows its condition. Why replace it because it becomes 3 years old and unused. The current safety items required to compete today, seem to be set for the higher & professional end of our sport. At the entry level and the not so frequent competitor these items are all valid, its just the replacement costs when the frequency of use is considered. I can't help but think that the manufacturers "use by date" is arrived at with an ongoing commercial aspect in mind, rather than the expected failure of the materials used in the construction.

Cams seems to have got the cart before the horse with this survey. Changes the rules on safety equipment them release a survey about safety equipment. I believe that competitor's should be responsible for there own safety decisions accept when it comes to car preparation where appropriate skilled officials should carry out scrutineering.

I believe we need to have more SOS points and have the officials radio through missing cars to rally head quarters

I have watched competitors do their harnesses up and have told officials that their harnesses are not done up tight enough in the case of an accident S1rally sprints should have a minimum requirement to have at least a half roll cage

Am unsure why chest Holger type neck restraints used in speedway and other events cannot b e used in Australia after 2015.these types of restraints are equally safe as a cams kick back Hans devise .in fact these type of restraints reduce the amount of vertibrae crush compared to Hans .I have a protruding broken collarcbone and can't wear a Hans devise .due to compression on my shoulder

I think the Rally safe tracking system used in ARC and VRC rallys should be used in club and multiclub level events. I think forward information such as the use of Hanns device in Stateround events providing information from cams that this is planned for 2014 season maybe 2 years ago (if possable) then planning for new helmet may be taken into account now have a $1000 peltor with no Hanns will have to be another helmet and hanns device if I wish to compete in VRC event. Thanks for the opportunity for the feedback

Biggest hurdle will be convincing the older guard that safety isn't a dirty word and anything to improve safety is a good thing. And although they started in the days of half cages and short sleeves, those days are long gone.

As a former competitor in motorcycle enduros I would have to say that the risk of injury in rallying is minimal in comparison. I liken CAMS (and their insurers) current obsession with mandating the use of every new safety device that comes along, akin to our Road Traffic Authorities who have enforced air bags, ABS and ESC on the pretext that it will save lives. Sadly the road toll stays exactly the same, due in my opinion to a lack of appropriate driver training, and the misplaced belief of so many drivers that the if they buy a 'safe' car there is no longer a need to stay alert and drive responsibly. Please don't take rallying down this path. The most important safety feature in a rally car is the attitude of the competitor. Let the competitor determine the risks that they are prepared to take, and what safety equipment they want to use. CAMS role should be to educate its members not enforce ever more expensive safety requirements. Unfortunately this type of behaviour also occurs in rallying. There will always be those who want to win at all costs, and often these are the ones who don't drive to the conditions. Try as you mayYou cannot stop people (competitors) that want to take big risks from doing so. so (we do after all sign an indemnity as part of our entry and at every drivers briefing competitors are given the opportunity to withdraw from the event if they do not believe it is safe) with are are the rallying that I have been involved in (Club level through to State Championship including ARC rounds)

If CAMS is serious about safety then they need to be realistic. Competitor numbers are rapidly dwindling for CAMS events yet event numbers by other organisers are growing rapidly. Many people can't afford to do CAMS events anymore. For all intents and purposes the NSW Championship ceased to exist years ago, so few numbers meant enter and you are pretty much assured of winning 'something'. Further if CAMS is serious, encourage competitors to take some responsibility for their own outcome should there be a serious accident. I and many fellow competitors were completely unaware that there is additional personal insurance that can be bought through CAMS/OAMPS until being closely involved in a very serious accident. To little too late. Why aren't competitors being told about it!! Finally I think it is reprehensible that CAMS is now 'selling' safety gear. Is it our governing body, there to regulate the sport and support competitors? Or is it a money making shop front? The later is the opinion of many competitors and yet another reason they are moving to compete in other series' I hope CAMS has the liability cover in place for their 'shop' because when something goes wrong, don't ask us competitors to pay for that too. I am yet to decide if I will renew my CAMS license this year.

Have you people ever heard of blind rallies? I guess you haven't .....

Talk about loaded questions. How about asking the competitors a question and allow them to answer that question and not choose one of your specific answers! - I do agree that the use of an FHR is a good thing, but the way it was forced upon the motorsport community is a total cock up on CAMS behalf. What ever happened to the 2 years notice on mandatory changes and not the 6mths? - Not only do I need to buy an FHR (and why FIA Spec only?) but due to this I need a new helmet as well, which is more $$$. What do I do with a perfectly good helmet besides throw it away? - Why do we need an FIA rated FHR but I can use a SFI rated Helmet? Why cant I use a SFI rated FHR? - Thanks for the option to get a $25 rebate off my next CAMS license if I pay the CAMS store a minimum of $550 for a HANS device. How about giving a 10-15% discount on the HANS instead? - Thank you for involving the competitors/members and asking their opinions after the changes have been implemented. CAMS at its finest!

With the costs of new head restraints, helmets , harnesses and seats to suit to compete in State rallysprints, I am going to stop competing in these events. I am very disappointed in this. I was going to start competing in these

events again after having a couple of years away from the sport. I can see State fields dwindling with the implementation of the new regs.

I would like to see a scaled discount fee event entry fee for competitors that fit and use the latest safety equipment and attend first aid training

A lot more thought should be put into targeted risk assessments from the point of view of a practical rather than compulsory solution. In the case of FHR devices the more sensible result would have been to strongly recommend their useage as competitors already accept by their signature on an entry form that as a result of their participation in events they could be seriously injured or die. I believe by making anything compulsory CAMS could compromise the organisation should it be proven that something they made compulsory was the primary reason a competitor lost their life whereas highly recommending that item would recognise a risk and give a possible solution.

Generally, most people rallying in Australia - even at ARC level - own their own cars and pay for all damages. This presents a barrier to outright speed in itself compared to the level of competition seen overseas, as many of these people cannot afford to destroy their cars. Of course, this is not the only factor. I agree that at ARC level, competitors are generally driving much faster than in lower levels and therefore should have safety equipment such as HANS devices and the like. However, that does not mean that everyone entered in a national (or state, for that matter) level event are going to have cars as fast as or be pushing as hard as the people competing for the ARC/State championships. Therefore, I think requiring all the extra gear for ALL competitors in even national level events is foolish. As many of these events (the main one I have in mind is Rally Australia in Coffs Harbour) often have entrants who are simply locals wanting to have a go at local roads, the higher level of safety equipment may not be necessary for everyone. For example, as a Coffs Harbour local I would be very interested in running my Datsun 910 Bluebird in the Classics at Rally Australia, however I am not able to due to regulations. I would need to purchase a HANS device, the relevant helmet (I currently use a AS1698 motorcycle helmet), a suit that I don't have, 5/6 point harnesses and seats to suit, extra bars in the rollcage and a firebomb - all in a Datsun with no modifications to the standard engine bar a 2nd hand rally camshaft and twin SU-style Hitachi carburettors off a 180B SSS. Put quite simply, it's crazy considering all I want to do, like many of the other locals, is to go out into the forest, do some skids and have some fun at my own pace. I'll also extend on this point by saying that there are no other rallies in the Coffs Harbour area - only one rallysprint per year. I am fortunate in that I can stay with my parents for rallies in Port Macquarie but many do not have the luxury of the money for accommodation or family/friends in other areas they can stay with. For individuals in areas like Coffs where there is only one major rally and that's it, it can be a serious barrier for entry into the sport. As such, I believe that only championship-registered competitors should have to comply with regulation requiring HANS, Sainz bars, roof bars, harnesses, FIA underwear & suits, etc. Otherwise, these events should have a entry section for lower spec cars & competitors that don't/can't meet the higher safety regulations for whatever reason.

More blind + night events to allow crews to learn + read roads correct. Try to lesson the use of same roads for the same events from year to year. Try not to double loop stages. Greater importance to crews in set up vehicles to add amendments to instruction for saftey on stages. Correctly train FIV teams.

Gravel rallying has had safety standards enforced from the major deaths in Tarmac rallying when the disciplines have totally different aspects and average speeds. Gravel rallying has changed over the 30 years I have been competing it used to be a a sport that you had to make a car last the distance with minimal service time but now it has become forest sprint racing. We all love the the thrill of driving fast hence why it is Motorsport driving the quickest from point a to point b but because of the world we live in and litigation if someone breaks a finger nail we as CAMs seem to always take a knee jerk reaction to it. We keep getting risk ramed down our throats if the risk is that great we shouldn't get in a race car every time we pull a helmet on there is every chance I could die simple. But I feel safer being strapped in a race car than I do driving down the road at 110 kph with other cars coming the opposite way not more than 3 metres away from me doing the same speed and I have no idea if they can drive or not. At least in rallying we are all going the same way the road is closed to the best of the organisers ability I think my safety is 1000% better while competing than driving to and from the event. Plus we have to face the fact no one can regulate for stupid but we still need to be able to attract new competitors to the sport at minimal cost or else it will die. Safety is good whilst I agree with the FHR ruling I belive it has been handled very badly by management. I also think that not allowing SFI FHR into the ruling is very poor form on CAMS behalf as the Simpson hybrid for example possibly the most effective device on the market the only difference from SFI to FIA is a sticker plus $200 more cost. I think also that making FHR compulsory we haven't made wing seats compulsory which I think the both should go together because when wearing a FHR (especially a hans type device they give no

sideways support) and you have a side impact which is the most common in gravel rallying injury is to shoulders collar bones etc is more likely to happen than not wearing a FHR at all.

It is clear you don't understand Gravel Rallying, Pace notes are not safety notes and safety notes are not pace notes. It is also clear this is a self serving survey. Questions were asked about FHRs, but not RallySafe. RallySafe offers the most sensible advance in rallying in decades, FHRs offer some protection when you go head long into an obstruction, something that has never happened to me in 40 years of rallying.

I am still not convinced that FIA roll cage padding is a good thing. i believe it to be too hard.

Road books are generally good but some of the most tricky and therefore dangerous corners are regulary not included in book.Huge improvements are required in preparing road books.

Targa events are very well organised and very safe - the abandonment of chicanes and CAMS safety measures are a major factor in increased safety. But for Classic events, allowing 8 tyres is causing a major reduction in safety - it leads to much faster times and risk taking in wet and dry conditions. As more and more people realise that without 8 tyres you cannot be competitive and there are no adjustments to handicaps for using super soft tyres in the wet, costs (for the tyres and wheels as well as the service crew) will rise further creating an even higher barrier to entry. CAMS should assist with allowing logbooked classic competition cars with ROPS and harness to be registered and used normally otherwise they will have no value and classic category will disappear.

Rallying is like life there is risk in anything you do

Australian Rallying has evolved from Car Club "Trials" of the 1960's. These 1960/70's club "Car Trials" were often much longer, 300 miles plus, thus requiring high levels of endurance of both car and crew to perform longer. In that "Trials" era, the emphasis was on the combination of car reliability, tested over long periods on rough forest tracks,creek crossings, steep rocky inclines and (occasional) gravel. Winches, shovel and snow chains were part of the emergency kit. Crew driving skills in all road/weather conditions and navigational skills in poorly mapped areas, and technical mapping skills were all tested. Cars were mildly modified from standard and driving too fast often broke them, boiled them, left them brakeless, or "lost". Keeping the car running in the event on the correct route was part of the challenge. These factors combined to allow a combination of car preparedness, driving and navigational skills, all factored fairly equally in a good result. Fastest time was not the only factor in a successful result. Each section was given a set time with penalties for lateness/early arrival, wrong directions and missed route vias. The majority of today's rallying is essentially timed racing against competitors on very clearly defined courses of (closed) public roads. The higher average (and top) speeds of vehicles in today's "fastest time sets the benchmark" forest events demand a high level of vehicle crash design, vehicle occupant crash protection, safety aids, and significant driver skill on forest roads. For this style of rallying, route charting is essential, and my preference is for co driver pace notes prior to the competition. Pace notes highlight to the crew in advance, the location of risks or hidden dangers along the route. However, events replicating the old style "Car Trials", demanding endurance and skills including navigation, where speed at the wrong place is often a way to loose position in the event, should not require the same degree of safety preparation at the organisational or competitor level. The element of surprise or navigational decision is part of the competition challenge and should be retained in this style of event.

The recent mandatory changes to safety equipment requirements for gravel rallies do not appear to be justifiable based on incident data from the last five years. They have limited relevance to the most common types of gravel rally impacts and severely restrict the crew movement and amenity that is essential in rallies. The tolerable level of risk should be a matter of personal choice for competitors. The risks to crews should be identified, including the likelihood and consequence of the risks, and then it should be left to the individual crew members to decide whether that level of risk is tolerable or whether they wish to mitigate the risk by acquiring and using additional safety devices and equipment. The requirement for increased safety equipment is considered unreasonable and will drive competors away from CAMS rallies.

There comes a point where competitor safety and safety equipment used should be the decision of the individual competitor, based on their personal preference and perceived risk.

There should be many levels and roads selection is getting to fast for some level of rally's as I always thought rally wasn't about out right speed as you can do circuit racing, there's a unique skill in rally & it is just not speed

Your survey did not identify when my significant incident occurred other than more than 2 years ago. In fact it

happened 40 years ago and a lot has changed since then. The survey did not seek to identify if the vehicle I was driving then is the same car I compete in now. I am now competing in a different car.

competitors need to understand the importance of allowing faster cars to pass in stage and yield safely

Some gravel rallies use roads that are too fast. In Qld a course checker should look at IROQ and Border Ranges Rally. forest gravel rallies are not bitumen or tarmac rallies, dont force competitors in gravel rallies to have formula 1, circuit safety equipment, encourage it but dont force safety equipment on them. Rally cars should always be based on a production vehicle body for strength and safety, are the current WRC cars? and are ARC cars getting too light? Can we move away from Turbo 4wd rockets, future cars should not be progressively faster and lighter, enforce a min weight. Dont let car makers dictate the formula. Concentrate on seats and belts, seats are a safety capsule, make cars with roll cages have fibreglass or carbon fibre seats not steel frame. Are side intrusion bars a safety issue, do they break more legs and arms and hips then they save? do you really want a steel bar between you and a tree? at hip height. I really appreciate this survey to get feedback, as a competitor, event director, spectator and rusted on rally nut for the last 30 years its good to give some feedback to AIMSS and CAMS.

Make rallying more affordable and a clear direction from club to state rounds to top level. The cost to run the ARC is not achievable and is getting worse

This shouldn't be a nanny state. If people are smart enough to build a rally car and enter an event after signing a waiver that Motorsport is dangerous then they should be smart enough to accept the consequences of their actions if they crash. Please don't feel obligated to design out the responsibility for people to make their own risk assessments by over-regulating or entering into the blame game for those who turn around after a crash looking to find someone else to take responsibility for their actions

I have a drawer full of perfectly good safety gear that I cannot use because the items have the wrong number. In many circumstances competitors should have the option of wearing out their gear. The constant minor changes to rules regarding safety equipment are infuriating, eg fire extinguishers.

Everything is so expressive and it is hard for competitors with no sponsors to do so!

cams needs to remember that the cars competing in the lower club level events are the new and possibly up and coming competitors of the future, if you make the costs of competeing to high you will end up not having any competitors at all,club level rallying needs to be kept to a sensible cost to allow our sport to grow into the future

As with many things in life, people do rallies knowing that there is a risk of crash, injury, death and loss or damage to personal property.... this is in part the reason that they take the risk! Whilst the risks should be advised of, any legislation should be gauged upon by common sense... Cost prohibitiveness in many aspects of the sport are killing participation and numbers in the sport.

There needs to be better communication and education of competitors so they realise that safety cannot simply be signed away by competitors (as some wish). We can continue to enjoy rallying and other motor sport because of the ability of CAMS et al to get events and competition appropriately insured, and without that we would be leaving our cars locked up in garages. There simply is not enough appreciation that the shared venture of motor sport relies upon having appropriate insurance in place, and with that taking reasonable steps to minimise obvious risks. While we are discussing safety, PLEASE can CAMS do something about competitors in Touring Road Events that utilise gravel roads who compete in cars with roll cages, yet without helmets. This to me is a recipe for disaster in terms of risk of head injury. It should be that IF a car is caged, then one must wear a helmet during competition (save for Motorkhanas) due to the relative proximity of cages to competitors heads etc.

Club level rallying is in decline. Imposing further high cost equipment levels (e.g. HANS devices) will see many more leave the sport at this level. Competitors who leave will also likely be unavailable to officiate at events causing further issues for organisers. Our club (HRA) level events have changed over the 20 years I have been involved from slower navigational events in basically prepared vehicles to faster forest route charted events with highly modified vehicles. Wheras many are happy to compete and enjoy there are now more drivers spending big bucks to win at all cost. Obviously as speeds rise so does the risk of injury if the car leaves the road. Road racing safety gear is not always applicable to rallying. As an example a fireproof suit rated in seconds is no help when the nearest help is at least two minutes away. Club level rallies use public roads and HANS devices restrict peripheral vision and make reversing impossible without removing the device.

Question 22 was poorly written it took several re-reads to find the answer that I clearly knew the answer too due to the weird negative.

In Tarmac rallies restrict allowed mods to SS and LMS. Full MS can result in poorly engineered rocket ships. For Classics, focus on Handicap comp' rather than Outright (again the latter creates potential for catastrophe)

I participate in historic style rallying with the HRA in Victoria. Speeds are slow and sections are mostly navigational. I've competed at all levels since 1976 but my last state level event was in 1997. Therefore due to the number of events I have participated in I have have had various incidents. I have wound back my competition due to age and desire to minimize risk to myself. If I wanted to compete in a state or higher level event I would certainly purchase a FHR and top class helmet. However as the events I do are for personal enjoyment and enjoyment of the camaderie, I dont think it's necessary to upgrade safety equipment yet.

The loss of " good " rally roads , to National Parks , development etc. have forced organisers to use any roads they can get , many of these roads are not suitable for safe enjoyable rallys.(too fast , too rough , too far from each other , long transports on public roads) CAMS should be more active in lobbying government's to keep our traditional rally roads available for rallys. CAMS should be more active in a workable rally registration system for rally cars. This would be a good place to start on basic safety features.

Whilst the upper end of the sport needs the highest level of safety available, it is simply not possible to legislate this at the bottom end and still have a sport. Those like myself with groan and carry on about new imposts but will continue anyway as we are addicted to the sport. Newcomers will take one look and simply walk away, There is no way grass roots events such as autocross will survive if safety requirements are taken to excess. Getting back to rallying the higher level events see up to 25% of competitors crash out every every event. Lower level trials events including long distance outback events usually see no incidents at all. Bringing this up, presently I am entered in the COT, not a National event in my book although it is somehow classified as one and one in which I just want to have a trouble free run and enjoy the outback. National event to me is ARC or Targa, the COT as its name suggests is a trial held in the backblocks on property management tracks. I, along with others am having great difficulty in justifying the costs and inconvenience and am seriously considering withdrawing, a big thing as this is the only event that I consider a "must do". Not so much the HANS device which is a good idea for people of my age with necks not as good a they were but in particular the heavy, hot, driving suit, far more chance of being dehydrated than being burnt in the extremely unlikely chance of a fire. Another safety item which needs addressing is that of the new roll cage padding, OK it is safer in the case of a very high speed accident as long as you are wearing a helmet, but very unsafe when driving on public roads without helmet, just driving through a service station driveway can result in painful knock to the head . I feel that it should also be compulsory to fit the original soft padding back over the new stuff, I have done this in my car. I would like to discuss club motorsport and safety with CAMS, after all I have been running events for 45 years now. Contact details Graham Wallis ewal7731@bigpond.net.au

the different required safety level for cars and crews in club or state is flawed because the no matter which level you want to enter the crews who take the risks and require the highest level of safety gear are the top ten to fifteen teams in each level, Example, if a crew has been entering club rallys for years and finish regularly finish around 25th OR and want to do their local state round why are they suddenly required to buy driving suits and now Hans devices for what is the same style of event they normally use and in the same car, A state round doesn't suddenly make the crew behave different. While I will be buying a FHR in the future, I see no need to mandate there use because all that will do is stop people from entering, the safety level of my car has increased as money and wanting to go faster has increased, I started with a bolt in cage and second hand seats because that's what I could afford at the time, now after many years I have new seats and a weld in cage and a FHR will be in the future, But mandating all these things will stop people from starting in the sport

Club level rallying should be as safe as possible but not at an expense that is prohibitive to involvement. Example. We rally in North Qld. Mostly between June and October each year. Triple layer fire suit is not required at club level rally. Most of us have them but do not use. I have one but do not use it as it is far to hot. The chance of fire is far less than the chance of heat exhaustion & dehydration.

Most of my recent rallying has been off road style, I believe introducing the rally safe style system to off road racing would be a big step forward. Overtaking is a major problem, especially in dust it can be very dangerous and a cause of many accidents. Also having a GPS fix is a major safety boost, I often wonder how they would find us if we are off course and crashed... Type of rally im talking about is aust safari, condo 750 etc Thanks Richard den

Brinker 0414656911

I have been competing for 30+ years. The top speeds have not increased significantly ,only the acceleration. The level of car preparation has risen dramatically along with safety equipment. Rally cars are renewed more often than circuit cars (at club level) and constantly improved. When I started most newcomers to the sport drove modestly powered cars for some years & slowly developed their skills before advancing to faster cars. These days many enter the sport with very fast cars & little experience. This can & has, lead to big accidents. Is there a way require newcomers to compete for some period in low powered cars to learn their craft?

I have been involved in rallying for near 50 years, never have i seen the sport in such a poor condition CAMS should start facing the real problems if the sport is to continue Frank Neale 0429081248

Raising the cost of being able to race will only cut the number of people about to compete. Sponsorship is almost impossible to get for dirt rallies,but the cost every year just keeps going up.

If you over regulate the lower forms of the sport you will put the final nail in the coffin of rallying in Australia, if that nail has not already been half driven.

I believe there have been significant improvements in the safety aspects of rallying in the last 10 years .I compete in the historic or classic classes but with new rollcages and seats as well as full protective clothing .I think that in gravel rallies the chance of hitting something we all accept, usually sliding into a tree or ditch .However, with tarmac rallies one area which can be hazardous is when the car is airborne and lands at an odd angle and as the tyres are usually of high grip , the car can head into the side of the road . I think for tarmac an "air" hazard board would be a help .Although safety is of prime concern , every time we have a major accident a lot of negative publicity is generated . Perhaps setting a 190 km/hr limit would reduce incidents and prevent headlines such as "car travelling at 200 km plus hits tree ! " or similar .

Would like to see more research on side impacts and the use of additional crush structures in the doors. Perhaps this means emptying doors of window mechanisms, converting windows to perspex with slide windows, thus allowing cage side bars to extend through the void and to the outer door panel.

Tyre quality is another way to slow fast cars - current targa rules allow 2 sets of soft tyres to easily be used which allow dangerous speeds (and cost much more).

I believe safety is important but there are limits that are sometimes overboard. Many competitors are out doing slower races and enjoying themselves at that speed and if requiring to have Hans devices is not needed. I think more training should be involved for new competitors and first aid course but not compulsory. Rally is a great sport but is somewhat sheltered and closed nit. trying to obtain help is sometimes hard for new competitors. More information sessions should be in place to make competitors less nervous in racing conditions. Extra safety devices rather be allocated for types of races eg VRC should be on the style of car like all 4WD turbo not matter what even should have Hans devices, also if a hra spec car does a VRC they are not required. Although people may not admit but cost is probably the largest factor.

unrestricted 4WD rallycars are too fast for occassional or gentlemen competitors. most forms of motorsport appear to be restricting speeds and horsepower but state and national level rallying allows unrestricted 4wd vehicles. i think rallying needs to consider a driver grading system where drivers are not allowed to drive unrestricted cars until they have a proven record. IE: they must COMPLETE a certain number of events in a restricted car within a certain time of the winners before being allowed to progress. the safest cars in the world do not stop idiots who think they can drive.

I believe far more should be done to improve vehicle side impact protection. FIA studies/findings into side impact protection should be adopted ASAP. Current 3C regs inhibit the introduction of side impact protection systems to our vehicles as the removal of window regulators and fixed windows is banned. Many vehicles are racing without factory side intrusion beams i.e. EVO RS's. Also i believe the introduction of seats with side head protection should be progressively introduced Happy to discuss Franco Liucci 0413835247

More thought should be given to publicising the base times and average speed required to complete stages under base times on Targa events. Clearly some competitors are unaware of this and complete the stage as fast as possible when they could go much slower (and safer) and still complete the stage under the base time. There is no time to be gained by completing the stage under the base time yet some competitors take unnecessary risks to do

just that.

CAMS do need to keep on top of safety and safety regulations for rallying but do need to give time for people to acquire extra safety devices such as HANS neck supports as the cost is significant.

I think rallying is over regulated..

Rule makers need to be cognisant of the differing levels of road motorsport and avoid the one-size-fits-all mentality. Confusing say Historic Rallying with ARC or WRC is the same as confusing a social cricket game with a test match.

I will never race again without a FHR, however I believe it comes down to personal choice as to the type and price range. I believe the recent plan to ban those not FIA homologated is wrong especially when a lot of the ones that have been purchased in the last 12 months will do the job even if they are only SFI rated. When doing Risk assessment and management, there is a small portion of an assessment that looks at Likelihood, I know one person being seriously injured is not good but how many people have been versus the amount of competition going on? I feel the blanket ban of non FIA units is wrong. Likewise competitors are turning away from the sport because it is becoming too expensive, if they choose to go the cheap option on safety gear because they are new and have just built a car, I believe they should be allowed to make that choice. For the first year or two at least, then when they are entrenched in the sport full Safety gear should then be mandatory. I am talking all driver apparel here not just FHR. Its like the requirement for fire bombs...I know they are compulsory in new cars but honestly when was the last time one was activated?- too much expense for no reason, two 1kg extinguishers can do the same job and last time I crashed I didn't care about the car I was just spending my time trying to get out. I can go kart racing and get just as dead without all of the other stuff your making us use in rallying,

One safety aspect overlooked is event radio communications between organisers and road closures and stage controllers etc. sometimes radio comms have been lacking in events due to lack of coverage and confusion can reign when there is an incident.

I enjoy Tarmac Rallying but don't like the pressure of Full competition so I have elected to in future events do the Regularity events only as I love the friendship of fellow competitors and the comradery. The pace of the regularity is fast enough and I would like a category where the maximum speed is say 160 kph and this can be monitored and enforced by the Rally Safe unit which should be compulsory in all events. Please contact me if you wish to discuss further as I am passionate regarding all CAMS approved events. Super sprints are fast becoming my favourite Motorsport as I am hesitant to compete in the Tarmac rallies due to the increasing expectations of speed and the danger of being in a fatal accident.. Best Regards and thank you for the opportunity to express my thoughts.

I personally choose to run safety devices that are above the current standard for my competition level, 1) because I can afford the extra cost and 2) I choose to.

This survey could have been better worded and better spelt. It's not that hard to do it right. Also I feel very strongly about the fact that if your car is legal for Targa Tasmania, for example, it is impossible to use it normally as a registered vehicle because it has a full roll cage and a safety harness. That is ludicrous, and it is the direct result of both CAMS and the State Government trying to legislate for safety and doing it in two different directions. It will stop people from running classic cars in tarmac rallies. They already look like space capsules inside, and now they are illegal as well unless you are using them in a very restricted way. I wear a HANS device in my small classic car, but I would not like to see them made compulsory because they will be very difficult to manage in some cars and they will turn more people away than is already happening. We all wear tags that say motor sport is dangerous. All of us know it is dangerous. Safety is fine, but let's try to be sensible. The cars are safe enough now. In fact according to the law in Tasmania, they are too safe.

I feel the use of HANS should be compulsory for all rally events. Also feel that other "non-speed events" such as drifting are a joke with safety standards. Anything where your traveling over 100kph in an event should be compulsary HANS. Limiting or chicaning rally stages so terminal speeds are no more then 150-160kph should considered.

Thre needs to be a sensible balance of saftey and the relevance of risk ie club rallies will not be in the same risk category as ARC. Rules around Seat , Belts ,Helmets are quite rediculous given the limited time frames for these items. The recent decision of a CONTROL MAUNFACTURER for tyres in Classic competition is completley inappropritae for this category. The rules are designed around including cars of an era to be enjoyed by

competitors and ensthuusiats with competition as asecondary consideration.

Safety needs to be kepted in mind but it needs to be balanced with cost of safety items. We all do not have a endless supply of money and rallying is become a very expensive sport in total.

It is unfortunate that the recent FHR decisions were not taken with any consultation (that I am aware of) of the rally community. The FHR system is designed for front or front quarter impact, which is not common in rallying as it is on a circuit. I have been in a rollover incident many years ago, and restrictions like FHR would have hampered my exit from the vehicle, and them me getting my navigator out of the upturned vehicle. Hopefully the AIMSS rally safety review in progress actually addresses these scenarios. Cost of the devices is a concern, as is the conflict of interest for CAMS as the regulator AND a sales outlet for these devices. However, cost for safety is one thing that I support, but I do not believe these devices actually improve crew safety.

From what ive seen the safety standards seem to be fine. amatuer competitors cannot be expected to have the same equipment as professional teams as it will drive people from the sport.

Safety aspects have been good in my opinion. I would not like to see additional cost burdens related to safety placed on those introductory events designed to get people into the motor sport. I believe a course can be modified to slow down competitors without placing significant additional safety cost burdens on introductory level motor sport.

I am involved in Historic Rallying & feel there is too much regulation already so don`t want anymore. Let the individual be responsible for his/her own actions as was the case in the 70`s when all the great rallies took place. There were no major incidents back then, little in the way of pace notes. Let the driver drive the road as is/was the case in all the long distance events of the past.

I believe fhr should be compulsory at all levels of rallying in particular Tarmac. I would like to see more education on seat fitment and harness adjustment in particular for woman in the sport. Most off the shelf seats do not have harness holes cut at the correct height for woman. Traditionally women are much shorter in the torso than men. This was the cause of significant compression fractures T9 - T11 for me

Gravel rallies should have a lower average speed by way of using secondary roads not shire roads.

Cars need greater side impact protection. Every time there is an upgrade it upgrades the roof or some ineffective change to side impact. Front and rear you have metres of car between you and the obstacle but less than 50mm from side impact. Also crutch straps are dangerous when fitted straight down as it prevents movement from side impact.

Fhr should be mandatory in all speed level events race and rally in any vehicles that have race seats and harnesses . Anything less than full multiple point cages is not acceptable for Tarmac rallying in particular due to the higher average speeds. Head restraint seats should also be mandatory for such events.

As a relatively inexperienced driver, I am aware of the risks of rallying and try to drive accordingly. This is driven by the concern for my safety, my family, co-driver safety and his family, and the cost and time to fix the car. For me this means backing off where I feel unsafe or too fast, driving to what I can see, not fully committing to the notes, etc. I would rather go a bit slower, stay safe and not have to fix my car every rally yet still have fun and do it all again next time. I don't have the time or money to fix the car all the time. We have still got top 10 finishes at state level with this approach. Anywhere above this requires increased driver skill, more experience behind the wheel or a touch of craziness.

Roads available for rally directors to choose from have become increasingly limited by the adoption of bigger logging trucks in managed forests. This means that available roads are wider and have better sight lines with fewer bends. Combined with cheap fast 4WD turbo vehicles in lower levels of competition means the median speed of an 'average' accident is increasing IMHO.

CAMS needs to consult competitors more. Bringing in compulsory FHS is expensive and there will be a number of competitors who will drop out of the sport. If CAMS pursues competitor safety regardless of cost we won't have any competitors or sport. The same view applies to other disciplines.

Some events go over the top when it comes to apparel for the lower/older graded vehicles ie those not competing

at warp speed for sheep stations. It is cost prohibitive and deters in some instances competitors. To grow the sport use some common sense in conjunction with WHS requirements to facilitate competition for those who are not backed by a factory team or those with plenty of money. Have a look at how AMSAG run an event and learn what can be achieved without over bureaucratic obstacles and associated costs- make the sport affordable at a level other than State or International for all to enjoy and have some personal satisfaction- bearing in mind safety at all times without shortcuts but by same token NOT over the top. Don't price the young ones out of a situation where they can learn at reasonable cost and at the same time keep some of the older ones to support the events financially as a competitor. My team has good financial resources however many others don't have that luxury when it comes to dollars for whatever is needed. Regards Mike Tuckey 0408659862

not enough freedom for spectators

To much is aimed at the top level of the sport. More should be done for Multi Club events (grass roots)

Safety is primarily the responsibility of the competitor. Organisers should identify and mark more dangerous situations (in road books, drivers briefing and on road), which they do.

limiting or controlling average speed by chicanes is dangerous, there are more crashes at chicanes. Competitors/cars in Club level events should not be required to have the same level of equipment(added cost) as international events/competitors. You simply will price grass root rallying out of reach of most people.

I believe gravel rallying is being over governed, this is leading to events becoming too expensive and is driving competitors away

FHR's should not be compulsory below State level.. FHR's are just too difficult to use in long distance Trials such as the Classic Outback Trial. This event is not significantly different to the BPand although it is rated as a National event, this is only by some technicality and it is not a National event according to theusual use of the word National..

Rules for FHR should say Strongly Recommended. Not Compulsary.

The mandatory use of HANS devices should have been given the "Strongly recommended"and not Compulsory. If mandatory, the use should be:- There shall be two years' notice on the implementation of any increased apparel requirements, save for any identified and pressing safety-related requirements which may arise or become evident, for non-international events. This improvement in safety has been known for a long time, and has been recommended. "The sudden introduction as MANDATORY" to National and State level events" is just unfair.

As a competitor I feel I have the ability to make informed decisions about my own safety!!

Often rallies are held in wet conditions and the majority of accidents occur in very wet conditions and visibility is poor. Hard to arrange but should consider dryer months and perhaps limiting speed in the wet?

entry to this sport is too expensive for many - many are husband and wife teams - cost of full safety gear amounts to about $5k for a start up team, this is before car prep and entry fee - it is becoming elitist....only the rich can afford. In an accident situation The practice of cutting driving suits etc is crazy if the competitor is capable of removing it but they are often not given the option, if the competitor is capable they should be given the option

Roll cage safety is something that should be at the higher end. Side intrusion bars and checking of this should be more of a focus at scrutineering.

At the end of the day, you are responsible for your own safety out there, and may make decisions about what equipment is appropriate based on how you intend to drive - i.e. winning at all costs, or just out for a bit of fun. Yes, accidents do and will happen - however someone being absolutely committed regardless of potential vehicle damage is at much greater risk of making an error that someone just out to finish. I have made the choice to upgrade my PPE as I have grown older, been more able to afford it, and realised I take much longer to recover than I used to! However, since that PPE (Stilo and HANS) have been lost/stolen at an event last year, as someone now only competing in 1 or 2 events a year -- it's mandatory introduction for state events next year now present a financial barrier to continuing in the sport - round 1 next year is now going to cost in the order of $3,500 to attend. As someone out for a bit of fun, that's just not viable. As an organiser as well as a competitor, there is just an acceptance that as items become available (i.e. RallySafe), these items all need to be assessed and potentially introduced. The last thing anyone wants to do is stand before the state coroner to explain why a death that was

potentially preventable was allowed to occur. I believe gravel rally in Australia will be extinct in the coming years, possibly the next ten - regardless of what safety measures are or are not introduced. I see more and more event cancellation notices coming to the attention of the Rally Panel due to a lack of volunteer organisers. As an organiser who won't do it again, I point to more people becoming forest-based residents who are too hard to manage and are anti-anyone using 'their' forest, and local councils and shires who have no interest in events - and are mandating conditions that are impossible to meet in the hope we will simply go away. Andrew Ormesher - ao@ormie.org

I think the use of MIV & 999 cars has been a great advance in the safety for all competitors in events where they are used. The question of safety in rallying is as wide as the type of events that come under this banner and the needs of a competitor in a pace noted Targa or full tarmac events are a world away from an all gravel navigation event. I do not believe that pace noted events are inherently safer than "blind" events but some competitors are not able to make the adjustment from one to the other. It seems to be more of a problem for those who compete mainly in pace noted events. I have been competing for over thirty years & have been with a similar number of drivers without being in a major incident and have only ever had some concern over my safety with two drivers who were both the slowest drivers I have been with.

There needs to be more events for Tarmac rally events and hope to see club level rally cross events make a come back.

Most cars and drivers I've seen are well prepared for safety - scrutineering makes sure that the car is structurally sound and seats and belts and helmets are at least adequate. The only current question is HANS where there are competing systems and their benefits probably aren't well known for rallying. As I understand it they were developed primarily for closed circuit racing where multiple car accidents are a feature - this doesn't happen in rallying yet CAMS blindly insists on rallyers using them. While it's hard to argue against anything to do with safety, rallying is increasingly an older persons sport. The cost to entry because of items like HANS is deterring younger entrants to the sport. Not good. I think speed on events is a major contributor to accidents, especially for the less experienced competitor: set courses where the speed is lower and serious accidents will decrease. Also, getting a National Rally licence without experience is too easy.

I have been actively involved as a competitor in Special Stage rallying for 16 years now. I have watched the "one size fits all" attitude drive MANY lower level competitors out of the sport. I've previously run near the front of the state 2WD field, in a car with very good safety equipment. Nowdays, I take my rallying far less seriously and while I still try to be as competitive as I can be, I am in a much slower car and take far fewer risks. It seems utterly absurd that I now need MORE expensive safety equipment than I did in a much faster car. I also race dirt bikes (enduro and motocross). I have no doubt that I'm FAR more likely to be injured on a dirt bike than in a rally car, and yet Motorcycling Australia's safety requirements are far lower. And their entry fees are much cheaper. As the father of two young children, I take my safety very seriously. CAMS' biggest failing is their assumption that every competitor is driving to win the world championship and has no regard for their own safety - that they are children who are incapable of making their own assessments of risk. Personally, in hundreds of rallies, there's only been two occasions where I've done more than very superficial panel damage (and neither of those wrote the car off). I don't like fixing cars and I don't like DNF'ing, so I drive accordingly - even if it means I'm slower than I could be. I am aware that even the world's best safety gear isn't an iron-clad guarantee that I cannot ever be hurt. I am aware of my responsibility to my navigator and his/her family. I am also aware that this attitude doesn't mean that I won't ever have 'a big one'. This knowledge improves my own safety far more than any legislation possibly could. The overwhelming majority of competitors - particularly those in the second half of the field - have very similar attitudes. I am now very much at the cross-roads for my continued participation in CAMS motorsport. It has been a huge part of my life, including meeting my wife at a rally, but the additional cost of a FHR is likely to drive me away from the sport I love. If I was still doing 12 events each year then the cost is easily absorbed - but at the current average of one event/year, the extra cost really galls. The additional cost per event is enormous.

There is a Huge difference in risk between an International event and a Novice entry level Event. Applying the same safety standards from a top level International Event to State level Events will kill the Sport. Personal Safety is each individual's responsibility. CAMS has No place enforcing these standards onto other levels of motorsport, as long as each competitor does not pose a risk to others.

this answer maybe outside your question,but it about time that CAMS and the RMS came to agreement on rally rgistration.THE amount saved then on registration could be put into updating safety gear.Also due to the the falloff of local club rallies and rallysprints ,I believe that CAMS should become more engaged in negotiations with Forestry

managers to obtain more rallies in forest areas.This has become a problem in the WaggaWagga area over the past 10 years where rallies and rallysprints have become extinct.Once in the 80s and 90s State rallies run in the Carabost forest by the Wagga Wagga Car Club but now ,not one has been run for many years,which is unfortunate.FORESTERS claim that roads are cut up by the rally cars and request that a large deposit is lodged with their department before request to run the rally is granted,THEN they (not inderpendant) hve the right to inspect the roads used and make the assessment of same whether damage is caused to the total of deposit made which is not refunded.

The safety of WA events is of a high standard with a number of officials/competitors having had past experience with Rally Australia when it was part of the WRC. I agree with the implimentation of FHR and most other requirements. There are also some grey areas and some proposed safety changes that I am unsure. The requirement for an onboard fire system for rally would be ok provided there is a 100% gaurantee that the device can not malfunction. I have one in my circuit car (1988 E30 BMW) but not in the tarmac rally car (1999 EVO 6.5 TME). There is not run off areas in tarmac. Thanks for including me in this survey. Regards, Brett

Any support that can be given by CAMS to State Rally Panels to ensure they have experienced people available to course check all rallies and to give consistancy and fairness with the course and instructions and assist organisers to run as safe event as practicable.

The cost of competing is becoming prohibitive for an owner driver. I would like to see more Historic sections with reduced costs. I am an older competitor last competed in 1992 WRC Perth in the Charade class, this enabled me to compete without the huge cost of the 4WD's and made competing fun.The cost to enter a ARC events make it unlikely that I could afford to compete, I am rebuilding a Vic registered 1979 Mazda RX7, and would like nothing more than competing against other historic vehicles in low cost events. These do not need to be high speed, skill based would be better, maybe average speed sections within the State championship rounds. Clive Broughton SA

I feel that that the persons in the competitive vehicle and team should use common sense I do not start an event or stage if the is some thing wrong with the car that could jeopardize the safety of the crew or the public as for frontal head restrains it is a good idea but haw do they help if you peg something side ways as for road or average speeds being to fast or car with a high top speed you should always drive to the conditions and to your ability keeping in mind every time you do a stage for the 2nd time you should be quicker with in reason.

Course design and crew training levels should be considered. Driver temperament as well as ability could be assessed. (There are current drivers that i wouldnt set foot inside the car with because their approach to the sport is too "gung-ho"). Cams has the resources to keep up to date with safety. I dont. I think Cams should focus on competitor safety but "regardless of cost" is too strong! That said, anything that can be done to improve side impact should be considered. Personally, the first thing i look at in a car is the sides of the roll cage closely followed by the harness arrangements and i wont go anywhere unless i have a seat with head wings. thanks

In some cases to have the best of the best in safety standards and the cost of the up grade to that standard would have the potential to force some competitors out of completion. A good example is roll cage padding. I just finish building a new car and 6 months later I have to change the roll cage padding which I have been told it has the wrong number on it and may need changing again at $60 a length the change of set belts after three years with some people those belt may have on been use three time in car that is stored in a shed out of direct sun light and the only reason they need changing is UV damage. If we store them of direct sun light and have them scrutineered ever year be a beater solution.

CAMS approach to safety seems to be illogical. In the 92Targa Tas helmet had to comply with the Aus std. In 95 it was necessary to have a Snell or other helmet at double the cost. Helmets now have gone back to Aus std. I understand that Defender HANS devices will not be acceptable next year yet it is a superior device to the one I have which is acceptable. CAMS needs to recognise that most of the people in motorsport are not in F1 or in V8 super cars and that the the rules you put in place are making it impossible for many people to compete in the lower levels of the sport.

Safety can always be improved. I would like the rally safe system warnings to come through the competitors intercoms as on a pace noted event I do not have the time to keep checking the screen.

A maximum average stage speed will result in 30kph stretches in the middle of a fast stage, as the Targa does. Tight roads usually means rough roads, which is why rallying is an endurance event, that is just the way it is. I blame the WRC for changing it into a fast smooth spectacle for TV, and I expect it to be held in an arena in the future, like the

evolution of Motorcross. It needs to be as simple as possible, (run anything you want) as cheap as possible, (build what you can afford) and as unregulated as possible. People will die in motorsport, that should be accepted just as it is with mountain climbers, and the more complicated, the more expensive and the more regulated you make it will increasingly make the competitor base smaller. Compare building a rally car and entering it with just buying a 500cc sports bike and racing mates out in the mountains on a breakfast run.. The chance of dying is greater on the bike, the thrill is similar and the price of bike-riding incomparably cheaper. Are there more bike riders than rallyists?

Your questions seem to be more biased towards having a co-driver. Many rallies in Australia have navigators and not co-drivers. Some questions are not relevant to those who do not co-drive, even thought quite a lot do both and some more pertinent questions could have been asked. The questions asked regarding an accident/crash are strange. A co-driver/navigator often doesn't know about a crash until it is actually happening, so to answer your questions accurately is a bit difficult. Rally competitors who compete in the grass roots levels of rallying sport seem to be quite often ignored in favour of the competitors who compete at National and State level in both gravel and tarmac events. I think you should have got some more advice and asked for a few more opinions before you settled on the final version of your questionnaire.

Care needs to be exercised in basing future actions on sweeping statements, such as "do you agree that rallying should be safer, irrespective of the cost" (not quoted from this survey) as any improvement in any area, including safety, must always be considered in relation to the "cost" of introducing such a change. The comments of the Victorian Coroner, the late Graham Johnston, when holding an inquiry into the death of Graham Beveridge at the Australian Grand Prix in 2001, made mention of this issue by saying words similar to (not a quotation, but I could probably find the reference in the daily transcripts) "I understand that to move all spectators to areas where there are no risks may result in the financial destruction of the event, as there will be a significant fall off of spectators and without spectators the event will surely fail. It is however important that the risks which are present are assessed and controls placed on those risks are realistic in the holistic sense and are introduced so that the level of risk is reduced to a level which is considered to be reasonably practicable given all the circumstances. To eliminate all risk may be impracticable. If you need further comment you may care to speak to Bruce Keys at CAMS.

With the changes in safety requirements, it is making rallying more and more expensive. I can understand that we have to be as safe as possible in this sport, but perhaps there has to be a happy medium reached between CAMS and rally competitors. It will soon be compulsory for competitors to wear HANS devices - consequently some people have dropped out of the sport because of this. This doesn't apply to myself, as I voluntarily wear a HANS device. There has to be a point though, where people can take responsibility for their own safety and not be "babysat" by CAMS. If competitors choose not to wear a HANS device, and are injured as a consequence of that, then they have to take the responsibility for their decision and not CAMS. I am more than happy with the level of safety in rallying. I would hate to see the regulations become so strict that the sport becomes obsolete. In the end, it's mostly up to the driver to drive to the conditions - maybe CAMS could run talks aimed at drivers driving safely, eg. how to deal with pressure to win, or peer pressure to perform well? Of the four accidents that I have been in, three were due to driver error - the fourth was a rollover due to wheel nuts not being tightened after a wheel change during service.

We need to maintain the top level competition and safety standards that meet that level, while having sensible and cost effective regulations that allow lower level competition in smaller and historic vehicles to continue to grow

Differentiating safety requirements by 'Series' level is dumb. Speed is key factor. Something like Drag use, achieve a certain speed, and you have to move to a higher level of equipment. Personally I'd be happy with a max top speed AND max average speed, a "speed class". The thread of an occasional random judge of fact with radar run, and publish the competitors the average stage speeds published with their "speed class". Anyone going over speed is penalised. Publishing them means it will get protested out, and people can get encouraged to improve equipment. ("I hit 210kmh" ... "but your results say your max is 160" When on a stage, you would 'know' say 150 is your limit, and personally I'd be happy to have a reason to back off. The nav can easily monitor the average speed if possible might be too quick. As a bonus, it would mean and "Event" could become a single field once again, seeded properly, instead of the multiple fields with a small gap... that either puts numpties who drop back in the premier field in the middle of the fast guys in next field... OR you get huge field gaps that is just asking for problems (cars, animals, people) to get onto the stage.

The issue of letting competitors buy a licence without having any experience is something I would like to see tightened. A competitor can buy a licence to rally with only limited experience. I believe some sort of schooling

similar to a junior driving school could be implemented or more Autocross/Rallysprint events need to be entered to ensure they have enough experience.

1. The speed and violence of rallying is insane, and CAMS is irresponsible to allow it. 2. The emphasis on utter speed is a fatal deterrent for many potential competitors 3. "Same PPE for all events" imposes unrealistic burdens on low intensity events. 4. Rally consumes a disproprtionate slice of CAMS' resources including labour and insurances.

Safety is very important and having the best gear is great, but it needs to be balanced against the type of event otherwise many competitors just cannot afford to be involved. The requirements say for Targa Tas & say a NSW multiclub rally should be different. Seat belt usage should be based on usage (no of Log Book entries) provided there has been no accidents and the are in good condition. Event checkers should be experienced & competent with the same checker looking after all events in a series. They should be reimbursed for expences.

III. KEY STAKEHOLDER COMMENTS

Whilst the key stakeholder group contributed significantly to the review, for the purpose of the review we have corralled comments that could be defined by topic into the following review pillars.

PILLAR 1 – COMPETITION CARS

ROLL CAGE RELATED COMMENTS

The retrofitting of engineered solutions to improve safety (e.g. by mandating ROPS upgrades) is not considered a viable option. The existing standards are considered effective and the data that is available from CAMS regarding fatal accidents seems to supports this conclusion. It was noted that for side impacts, even a current World Rally Car does not provide survivable impact protection where the impact speed exceeds 65 kmh. Expert advice from AIMSS on the latest engineering knowledge should be sought.

Could safety cage requirements be stepped up to meet FIA WRC standard as a minimum

As Clerk of Course for the past 8 Adelaide Hills Tarmac Rallies, and having lived through the eventual death of one of our competitors in Milan Filo who died about 18 months after his crash from complications caused by his accident, I am all for improved safety of the vehicles we rally. Milan Filo would still be with us if he did not have a cheap bolt in roll cage, as it is the roll cage that broke and hit him in the head that eventually killed him. I strongly believe that we should not allow bolt in cages in rallies, as the bolt together joints allow for the cage to move and twist in an accident. The many severe accidents I have seen with cars with welded in cages show that the welded in cages hold their structure far better for improved out comes for the occupant.

I also believe that double intrusion bars should be mandatory for rally, and a cross bar at the base of the roll cage from one leg to the other just above the floor to strengthen the bottom of the side of the car at seal panel height where a lot of stumps and trees incur into the car in side on impacts.

It would be great to mandate tower to tower cages, but this is often very hard to do and much more expensive, but would also add a huge amount of strength to the foot well area of the car where many occupants get their legs crushed by the wheel coming back into the vehicle.

Is it wise to permit cars to compete that were log booked 20 years ago with what is now significantly below the accepted standard for safety cage structures?

Simplifying the process for competitors to augment pre-existing cages in older cars they have purchased (I did this when I bought my Lancer and it took a while to arrange) to bring it up to a more modern specification.

Tarmac rallies are demonstrably more dangerous than gravel rallies, yet the safety cage and vehicle regulations are less stringent.

Expensive sports car used for Targa often have the cage design compromised to avoid cutting into dashes and interior which devalues the cars for potential resale. This compromises the driver's extrication aperture when coupled with winged seats and FHR's

Some classes of some events still allow vehicles with 'half cages' or similar. Whilst I believe it is my right to chose what level of risk and benefit I take, this does expose organisers to increased risk also

The biggest single accident type that leads to injury and death is the side impact, specifically between the A and B pillars.

The V8Sc vehicles have moved the driver back behind the B pillar, also moving the pedals back from the fire-wall. They have also moved the driver more toward the middle of the car. For rallying moving the driver and co driver back behind the B pillar might be feasible but given there are two people in it, moving them closer to the middle is not.

Vehicle engineering for protection in frontal and rollover crashes is pretty good now, although side impacts with trees without offset will remain highly lethal, and rollcages are of limited benefit

Subaru “C” specification rally cars have been built to a high safety standard. There are approx 5 to 10 ‘C’ spec cars rallying in Australia with full FIA certified cage.

Some cages appalling in club spec rally/targa cars – some Mitsubishi, not Subaru
National and Targa need to up spec on cage. State and clubman level not bad –

Low overlap frontal collisions with trees not infrequently miss stiff structures and allow major penetration into cabins: better firewall and toepan reinforcement would be beneficial

When I first saw the car Peter Brock was going to compete in Targa West I was gobbed smacked that we allowed such a car to compete in rallying, 24 hours later he was dead.

FHR, WING SEAT AND WINDOW NET RELATED COMMENTS

With side intrusion being the biggest cause of severe injury in the sport we should be looking at the effect that good wing seats have in the prevention of injury. ‘

Intertial hanging’ is a very real risk, particularly as vehicles get stiffer, and HANS should be protective, but not in lateral impacts. HANS however still has a way to go in user friendliness, it does limit mobility and hence does have a price. High wing seats are similarly beneficial (for side impacts) but also limit visibility and so may cause crashes

I would also move towards mandating winged seats to help the neck in side impacts where a hans device does not always work. For rally where competitors are in and out of the car regularly it would be more helpful if a better “neck cushion” was developed to put under the helmet. There a few on the market, but I have not heard of any testing done to support their effectiveness against a hans device. My own son uses one as he feels it is far more comfortable and easier to use, and believes it would help more in a side impact (it would be nice to know if this was true or not).

Either regulate or encourage seats with head restraints. Regulation should be made for the higher powered cars.

Neck Support – Should be compulsory for all rallying, but brought in over a period of time for each level rallying.

Winged seats reduce the likelihood of head strikes and lateral head and neck movement in the vehicle but make access for medical treatment more difficult

Window nets may be useful to protect the competitors from debris and also to prevent the head/body moving out of the confines of the vehicle during an accident (especially a roll over)

The problem with nets is the reduction in vision for the driver plus making medical access more difficult.

HIGH PERFORMANCE CAR RELATED COMMENTS

Turbo 4WD cars are now readily available at prices that make them fun and affordable at lower ends of the competition spectrum. They have excellent acceleration and may now be used by people with relatively little experience in fast high performance rally cars who then get themselves into trouble (any evidence?).

Why is it that the FIA restrict the world’s best cars and the world’s best drivers to around 200kph, yet in Australia we believe it is OK to have no restriction on the cars or drivers.
Gravel – It has been believed that gravel rallying is safer than tarmac due to the cars being slower and the car gripping for longer rather than snapping grip like tarmac tyres. As the cars acceleration gets quicker and the tyres and suspension improve, maybe this is no longer the case. By default, if the car is accelerating or travelling quicker than before, the time of “catching” the car has to reduce. This may not be a problem for the very experienced, the default car for rallying is the Subaru WRX, and even a standard WRX is a very powerful car on gravel for an inexperienced driver. An average Subaru driver in 2014 is running a more powerful car than was an Australian Championship winning car 10 years ago, but the driver does not have the skill of Possum Bourne or Cody Crocker

Ban supercar competing in Targa, cars capable of 280kph plus speed. Encourage more production based classes, eg price range $200k - $100k etc Needs to be instigated before Targa series of 2015
Personal and in-car safety items are of high standard.

Group N is quite fast, nearing WRC

CLASSIC CARS RELATED COMMENTS

These cars are getting so much faster and don't have the general strength integrity of the modern vehicles who have the advanced steels and manufacturing techniques. The perception by a lot of competitors that an old HQ is stronger that a current Commodore, just defies belief. Try cutting a B Pillar of a modern car to an old car and it clearly demonstrates the changes. This is a major attitudinal issue.

Rallying is the province of older cars as they are cheaper to self maintain
Modern technology is gradually being permitted more and more in historic or classic categories
Although these older cars are being made safer with modern helmets, intercoms, seatbelts, HANS, seats etc, even safety only items such as better brakes, suspension and transmission makes them f By default cars are getting faster each year.

A car capable of winning a State Championship 25 years ago, would now struggle to be better than last. Even current cars that are 25 years old have double the power they did back then, plus the latest technology in transmissions, suspension, tyres and brakes – they just keep getting faster and more prone to incident in fast events

OTHER COMMENTS

Drag Racing has system that as you reach a milestone in times, the improvement in safety is increased. They do not have exceptions, break the speed set once and you are not allowed back without the next step of safety fitted. We must be able to do something similar in rallying. If you are happy to drive a slow car then it is OK to have the minimum requirements for ROP, seats and head restraints etc, however if you wish to drive a quicker car then the level of safety has to increase. Most rally cars now days would require "A Level" of Safety, but there are still a few who just love the sport and happy to do it very low key and very low budget and adding additional costs to them would drive them out of rallying.

Fire and entrapment remain potential areas of high problem. Given the inevitable delay in response, even with the use of good transponders, this remains a danger area. Generally, given the alloys in rally cars (you know more about that Michael!), they go up like a torch. The in car "fire bombs" really only suppress things long enough to allow the crew to exit – entrapment = problem.

The contribution to higher rates of incidents arising from increased cornering speeds achieved by modern rally cars using improved rally tyre designs should be considered. Expert engineering advice and some analysis would be required from the FIA Institute or AIMSS on improvements in this area

Removal of helmets and FHR is difficult whilst the competitor(s) is still in the car. Porsche displayed a car at this year's AGP with a small roof hatch, used to facilitate helmet removal but not large enough to allow extrication through it (and therefore presumably not too big so as to effect the structural integrity of the vehicle).There is a possible place for this type of hatch in rallying.

COMPETITOR LICENSING- COMPETENCY RELATED COMMENTS

The existing rally car fleet in Australia is faster and cheaper than it has been in the past with higher powered vehicles now more readily accessible to less experienced competitors. Improved training and a higher level of demonstrated competency by drivers in general and also of more powerful cars could be considered. A review of how people obtain a rally license should be reviewed, it is simply too easy.

Another issue in the same space is that fast 4wd turbo cars with loads of grip are affordable in the 'second tier' of competitors and that the experience and skill level of these competitors in these faster cars may not be as sharp as the outright guys – when combined with the faster roads mentioned above the accidents that do occur are faster than they used to be.

I also believe a driver should earn the right to drive a high powered vehicle. A few of the fatalities in the past few years have been when a driver steps up to a fast vehicle when they have had very little experience. Adam Plate had done a few events in the regularity sections of the Adelaide Hills Tarmac Rally and Targa Adelaide, but was in his first event in a turbo 4wd when he died. I strongly believe there needs to be a licencing process like they do for karting where you have to earn your way up to super karts. At the moment I'm not sure anyone could stand in front of the coroner and say they were completely satisfied that a new rally competitor was competent in a ??? say Lamborghini when they had only done circuit racing or only raced let's say a Hyundai Excel before that. There needs to be a certain number of events finished by a competitor before they are allowed to step up to the next licence level and so on until they can compete in the superfast cars running at the front of the fields.

Restricting competitors to certain types of cars until they can demonstrate some ability (which I think is anathema to the culture of the sport)

A strong selling point of rallying is that anyone can compete at any level without prior experience. We can all buy a car and compete in a WRC against the world's best. Or buy an exotic high powered car that can do 250kph and do a tarmac rally. Or buy an Evo 10 and do 210 kph on gravel. Have we come to a time when we need to start grading drivers on their experience and ability before we allow them to drive certain cars or drive the cars at their full capability?

licence competency test – rally is the most dangerous but the easiest to get licence.

Minimal competition license requirements for the most dangerous sport – Targa

Gravel competitors are passionate, keen, applied, good car prep. Tarmac/Targa competitors are fly by night racers. Fundamental attitude and competency issue between gravel and targa

Average age of competitors is increasing

There seems to be a higher incidence of lesser experienced drivers in more powerful cars on the tarmac events than in gravel. This is presumably because tarmac events are often higher profile and more "social" than gravel and this seems to appeal to drivers with the financial wherewithal to own a more powerful/exclusive vehicle. A factor may also be that tarmac events do less damage in terms of paint finish etc so perhaps this influences the use of more expensive and potentially powerful vehicles.

The milestone based regs in drag racing can't be superimposed onto rallying. I could drive around in a stock Excel series car far more dangerously but significantly more slowly than I do in the Lancer and not be 'caught' by a regulation like this. How do you regulate in this way a unique car like my XR8 that had good results – no-one but Bob would know if I was a sublime talent in a rubbish car or merely competent in what is a deceptively good car (I'm much more the latter than the former, unfortunately) and how close to the limit I really was. In a car like the Lancer (that is a preposterously good car) the difference between fast and safe and slow and unsafe is entirely down to driver ability, not stage times, and this is extremely difficult to assess objectively.

We have no structure in place to stop in-experienced or non-proven crews driving in any vehicle at any speed the vehicle is capable of running at.

FHR RELATED COMMENTS

The FIA Institute has concluded that there are no circumstances where the use of Frontal Head Restraint (FHR) systems (e.g. HANS and other devices) has been shown not to be beneficial in reducing or preventing injury. The costs for basic systems are now around $450-500. Another avenue the FIA is also testing is net-type restraint systems that are believed to almost as effective as some of the FHR systems and that can be retrofitted at a low cost to most kinds of vehicles used in rallies. The extension of a requirement for FHR systems to all special stage rallies should be investigated noting the potential cost impacts at the lower levels of the sport.

We are strongly of the belief that the HANS device is playing a significant role in decreasing severe upper spinal injuries and can refer to a number of cases we believe this applies to. I strongly endorse the actions of the Targa Championship in making them mandatory for all modern vehicles in 2014, however on the evidence available they should be used at all levels of the sport.

HANS should be compulsory and driving suits/boots/gloves should not. HANS helps in minor accidents as well as big ones. I would be far safer competing in a HANS, Levis and footy jumper than a Driving suit per regs with no HANS. I have had probably three accidents where HANS would have helped before they existed and another three where it did help after I bought one. I have never had an accident where a driving suit helped me anymore that a t-shirt and shorts would have, and this is pretty typical. My experience that there are far more accidents where a HANS saves a competitor from injury or more serious injury than a driving suit. Making them compulsory will be an unpopular decision in some quarters; changing the regulation making them compulsory at the same time as removing the requirement to wear driving suits/gloves/boots at all but ARC level will go a long way to making the change palatable among the majority of competitors.

Compulsory adoption of HANS or similar Frontal Head Protection. All evidence points to these being effective particularly in frontal impacts. Conceptually HANS etc. should be at all levels from Club up. Issue is that the cost to adopt at lower levels may be an impediment to entry to the sport. Some will contend there is not any evidence of a demonstrated need at the grassroots level of the sport where serious accidents do not seem to be occurring (is there evidence to support this?). HANS does not as effectively ameliorate the risk of injury from side-on impacts with solid objects like trees.

That the HANS device, or equivalent, be declared mandated equipment for all National & State Championship stage events That they be phased in this year as soon as possible with the advice that they will become mandatory in 2014

It is a proven fact from all reports available to me that the use of the HANS device in Car 26 last Sunday was instrumental in saving a life. The incident that sparked our massive MIV response showed that rapid intervention and the use of RallySafe were definite contributory factors in saving that life. But there is no doubt in my mind that the outcome would have been different without the device. The price is small compared to the potential. As the sport is at a low ebb at the moment, now is the time to act Existing competitors can gear up, and new ones will know they need this equipment from the get go I am guessing competitors will cite costs as a reason not to do this, particularly at state level. That attitude should be rejected, as I have seen time and again no compunction in buying tyres, or go faster bits. In my opinion, the HANS type device should be ahead of any of that. To mandate it also speaks to our collective duty of care

The biggest safety improvement has been in the use of Frontal Head Restraints (FHR). CAMS are to be commended for undertaking to make these compulsory for all motor sport competition. I understand there are some limitations for rally competitors of the HANS device in that it restricts head rotation, more necessary in rallying than circuit racing. Perhaps new designs will alleviate that problem

FHR – yes absolutely at all levels

PACE NOTES AND RECONNAISSANCE RELATED COMMENTS

Check out many in car footage of crews reading Pacenotes and there are varied abilities of the crew, sometimes scarily dangerous as they have no idea what they are doing. Should we enforce new crews to learn rallying from a Road Book and Reading the Road and then upgrade to Pacenotes. It is a lot easier to find your location on the stage with a Road Book and Tripmeter than it is on Pacenotes.

Driver attitude and approach is the biggest issue. Pace notes purchased from pro's are often intense and committed. Jim Richards uses very simple Flat/Medium/Slow notes and drives to his vision/capability, all attitude based. Reconnaissance is appropriate in terms of opportunity but some confuse it with practice.

Pace notes – often not used, use drivers intuition and visual cues.

Pace notes are commercially available for purchased by competitors. There are different levels of pace notes pro (committed) to lower levels. Smoothline pace notes- Steve Glenny – tarmac/gravel
Bernie Webb Jamie Vandenberg (Brothers)

Reconnaissance is good. WA events are pace noted and provide 2 passes of each stage

Road books get you by (but better to make pace notes)

Yes, happy to be able to complete reccy. Concerns with speeds and danger of competitors completing reccy in road cars.

The organiser has little to do with how a crew creates and uses their Pace Notes. Pace note skills do not come easily and even at the highest levels of the WRC, professional crews can take a year or two of constant work to achieve a high standard. Accident rates are higher until the crew experience matches the desired pace. Clever crews build up their pace as their skill with notes improves – others crash until they learn the skills! Perhaps the sport can do more to educate crews not to explore maximum speed until they have developed high standards of pace noting.

Pace noted rallies are faster and cars are driven less sideways and accidents have greater potential for injury.

Road books, pace notes (there's strong arguments both ways with regard to safety)

COMPETITOR ATTITUDE

In many ways there is an almost perverse dislike against those who try to make our sport safer. The moment that CAMS or Events try to bring in a safety measure there are many within our sport who object strongly that no one has the right to stop them competing at the speeds they wish to; the build quality of the car; the roads selected; the competence of the crew etc.

I have been abused by competitors in both Targa West and Rally Tasmania for introducing the 200kph speed limit; for not allowing low volume space framed cars; for not allowing open top cars; for having too many chicanes to reduce speeds; and recently for having to crack down on burnouts and donuts mid-stage!!

Whilst many competitors will whinge and whine about the cost of these safety initiatives, at the end of the day they can have a dramatic influence on incident outcomes.

The same people who whinge about the cost of a HANS device would not think twice about spending that same amount of money in the bar at the local pub!

Rarely is a mechanical failure the cause of a rally accident – although drivers often say something like a steering or brake fault was a factor. If ever this is the case, the fault was likely a result of the same or a prior incident.

Brock Accident - missed prologue flew in late, slicks-damp-drizzle, Brock 2nd quickest to Herridge, Brock FIV 3 minutes

Unfortunately our Chaplains have become the most popular people in rallying, more so than the medical and rescue teams. I wonder why people thank the Chaplain but no one ever bothers to thank the medical, rescue, command or stage teams. We as a sport have come to accept that major accidents are part of our sport when they shouldn't be.

BLIND RALLIES (EG: NON PACE NOTE EVENTS)

The organiser has a much greater role to play in events where the road book is the only source of "what is coming up". Too often there is not enough accurate detail within a Tulip diagram or instruction – this leads to unnecessary surprises for the crew no matter how good the co-driver is reading the road book to the driver. There is a definite shift back to "blind rallies" (away from Pace Notes) at some levels in Australia – this is due to the costs and time commitments required for crews to undertake Pace Note reconnaissance.

Very recently in Western Australia a highly experienced competitor and organiser (Andy van Kann) was asked to write some guidelines for organisers in relation to preparing an accurate road book. I have worked alongside Andy in the car as we write the road books for some major events and I support the comments covered in the guidelines. I believe these or something similar could/should be used nationally (the information in the current CAMS literature is more generic in nature). Refer attached draft copy which I understand will be presented to the WA Rally Panel shortly.

Blind rallies are slower and involve more sliding to unsettle the car before potentially unseen tightening corners and accidents are less serious.

DRIVER HEAT EXHAUSTION

There are a few simple things that I believe should be implemented like a heat policy where events are forced to shut down when the temperature reaches 40 degrees. Rally cars do not have cool suits and neither do the officials out in the field.

ACCIDENT PROCEDURE FOR COMPETITORS

Making sure competitors know the procedure. Using a system to make sure everything is done appropriately by the assisting crew (the attached form or a variation of it)

PILLAR 3 - RALLY COURSE OR STAGE

COURSE DESIGN AND ROAD SELECTION RELATED COMMENTS

Consideration should be given to course design to address any potential risks that may arise from rally cars sustaining high speeds for long periods of time particularly when there are hazards close to the roadside. While the effectiveness of mechanisms that lower average speeds on stages, such as breaking up high speed sections of road using chicanes, has not been demonstrated to be the most effective solution, these and other 'calming' devices may have a place in some circumstances and should be considered as one of the tools available to improve our safety record.

I believe one of the highest priorities in avoiding rally crashes is in the selection "and marking" of roads to be used – taking into consideration the likely weather of the region. All rally roads have the potential for accidents but the almost common denominator in a crash site is the driver being surprised by one of the following:

- a sharper bend then expected
- a hidden rock or ditch on the racing line
- an unexpected deviation over a crest or rise
- an unexpected change in available grip (tyre to road)

Average speeds (alone) are not an accurate indicator of how safe or otherwise a stage is. However the higher the speed, when coupled with one of the above "surprises", has a significant bearing on the outcome of the crash.

Course selection needs to include;

- Minimising excessively fast roads
- Avoiding roads where trees and cliffs are very close to the road
- Avoiding roads that deteriorate badly or become very slippery in wet weather

Form a personal point of view, stages I enjoy the most are the longer more technical stages, rewarding good notes, good teamwork, an ability to keep concentration and a reliable car. At Rally Qld this is Million LA and the old Tower Rd, New Traverse type roads. Super fast roads like High Eden, Mitchell Creek Rd and Derrier Flat/Arucariua Road don't blow my kilt up.

Rallying should be a test of a driver and co-driver skills. If you ask the majority of drivers what event or stage they like the best, it will inevitably come back to the fastest stages rather than the most technical or challenging. There has been a growing trend to make the stages faster. This has been partially due to the lesser roads either not being maintained by forestry or the quality of the tyres destroying the roads and hence the organisers choose better roads that by default are quite often faster.

In the ideal world we would only choose roads with a slow average speed, no hidden obstacles and no other surprises. This is simply not possible and only the most naive of administrator would suggest otherwise. We would also avoid stages in forests with close tree lines. This pretty much describes motor racing – not rallying, certainly not rallying in Australia.

I have seen stages or sections of road with extremely high average speeds (130kmh +) that pose very little accident risk. Yet slower roads with tricky to see or predict "surprises" claim victims.

It could be said that tarmac stages in Australia (with our high ratio of trees near roads) are more likely to have a serious accident than gravel rallies. In my opinion there are two reasons – first and foremost it is the massive change in available grip when a vehicle gets out of shape or off-line on tarmac as compared to gravel. Hence a greater need for highly experienced road marking crews and the use of Black Spot or similar markers.

No matter whether tarmac or gravel – the choice of which road to use for a stage should be heavily influenced by an experienced person looking for things that will surprise a driver. Wherever possible – avoid using that section of road. Where it is necessary to use a road with obvious or possible surprises, then mitigation strategies including road book notations and course signage are imperative. Supplemented in some instances by barriers/shields.

Another consideration arising from a double fatality in WA some years ago is the use of rally roads that form loops where they come close to others parts of the same or adjacent stage. Extreme care in marking and positive road closures/blocking are essential to prevent a car taking a wrong route and ending up on another stage in opposing direction.

STAGE SPEED, LENGTH AND HISTORY

Tarmac rallying is out of control. Power and speed has been deemed more important than driving ability. This has to be addressed.

Targa – key drivers of accidents

- Competency – new, inexperienced drivers/crews
- Competition – a raised level of competition
- Weather conditions – damp, wet, variations

The FIA has set an average speed for both Gravel and Tarmac and yet we constantly see that those averages exceeded at many events. Some Tarmac events have average speeds in excess of 160 Km/hr. Over the years we have seen so many measures taken to meet the average speed requirements and I am not sure of the value.

I am certainly of the belief that certain levels of the sport that the average speed criteria should be mandatory – i.e. Club and State Level events.

FIA & CAMS used to have Maximum Average Speeds for stages. Event organisers hated them as it prevented some roads from being used. As the cars got faster and the average speed harder to maintain, the average speed is

something that conveniently no longer gets mentioned. Maybe we need to re-assess what is a safe road that can be used for rallying.

Average speed (in gravel) is not really a big issue (over last 10 years) narrower than Targa

The concept of a rally is that sustained maximum high speed is not a core attribute of the sport that adds to the enjoyment, spectacle, marketability or sporting context of the event. We should be seen to be acting to eliminate this aspect of unnecessary risk in the sport. Defining the appropriate envelope that is an acceptable level of risk is difficult and consensus is unlikely.

Most think an average stage speed above 120kmh exceeds what they regard as demonstrating a responsible approach to event design (many think this is too high - though there will be exceptions eg: race circuit stages).

One example that seems to have an element of truth about it is that logging contractors use larger B-double trucks to extract logs these days - which has in turn required the widening and straightening of roads in logged forests where rallies are run. Organisers have few choices but to include these roads in their courses to make the event logistically practical and flowing (and the side roads in forests are let go by forest authorities and not maintained). The net result is that faster roads are being used.

Over the last 20 years the maximum speed of rally cars has increased up to 100kph faster. Yes the cars are safer but the drivers reaction time and ability has not changed. The time a driver has to catch a car going out of control has been reduced as the cars are going faster. There is a need for Maximum Speed Limits to be imposed on rallying in this country. When are we going to say the cars are going fast enough and go back to deciding the winners on crew ability rather than vehicle speed? The Maximum Speed does not have to be a set speed, but can be by default of road selection or artificial barriers like chicanes

When we brought in the maximum speed for Rally Tasmania and Targa West about 6 years ago, the drivers were talking about 230kph maximum speeds, the talk is now over 250kph (even heard 270kph).

Whilst Organizers like to have long stages is it in the best interest of the competitors especially in some events where the level of some competitor experience may not be that high. At a recent meeting an Organizer stated that he had reduced the length of stage by breaking it into two stages and had seen the crash rate reduce significantly. The stage was technically difficult and the crashes were previously generally near the end of the stages. In Targa Tasmania the Rianna stage was well known as a crash stage in the early days. The stage was technically difficult with a number of changes in character and it caught many people out.

It would be interesting from the data to review what was the length of the special stage and is there any difference in stages with greater length.

There are some stages in Australian rallying that traditionally have experienced significant crashes and yet each year they are still included. If a stage is regularly sustaining a high crash rate there should be a mechanism for it to be reviewed.

SPEED RESTRICTION AND CHICANES

There has been over the years a call from some people to place a top end speed restriction on the vehicles such as the one applied in New Zealand.

I remember when the restriction was applied at Rally Tasmania it was the start of the decline of that event and eventually I believe one of the factors that lead to its demise. I believe that some of speeds however we are seeing on some stages depending on competitor ability are too high. The other issue that ties into this is public perception. “Rally Driver killed as car impacts tree in excess of 165 Km/hr is something the sport does not need”.

Maybe the structure of the classes needs some review and also takes into consideration driver history, I realize this is complex.

No fatalities in NZ, Max speed in NZ - 200kph

Australia does not want to know about speed limits
Public perception is of speeds - 270kph we should not promote really high speeds
Steve Glenny and Jason White did not sign a 200kph max speed that Tony Quinn had circulated

Avoid posting times until the end of the day – seeing each section times drives/increases competitiveness Publication of times during the stages, heightens competition, increasing crews to take more risk to improve/better their stage times

Few if any rally crashes occur on high speed straights, most rally crashes occur as a result of loss of control on corners, with subsequent under or oversteer off into the trees: regulatory measures to reduce stage speeds probably increase crash rates by selecting slower stages with more bends.

Rule changes – neutralise stages where any competitor sets an average speed that is higher than a predetermined ARC maximum allowed? Withhold payments from events where a stage average exceeds a championship maximum.

Chicane's have been used to slow cars down and in most cases not for any safety reasons like a complex corner at the end of a fast straight but a method to reduce speed to meet average speed requirements. There were more crashes at Chicanes in some events than anywhere else on the course.

Chicanes are not a good solution and often cause accidents. Rally safe could police max speeds and course deviation electronically

Targa chicanes often cause accidents.

Chicanes are of limited benefit if placed on straights (where crashes don't occur) but could be beneficial if placed immediately before major hazards

CAR TRACKING AND COMMUNICATIONS

Rally safe – support the use of this system. Has the potential to provide solutions to some safety issues.

Adoption of the RallySafe system at levels below the ARC should be considered. The data gathering capability, improved emergency response times and accurate geographical positioning information provided by the tracking system justifies the cost. The Commission noted that there are different levels of service that RallySafe can provide and that some of these less embellished modes of operation may prove cost effective. Consideration should be given to a national implementation plan, possibly funded centrally through the permitting system.
ACTION: Further discussions with RallySafe will be conducted between the administration and ARCom as the system continues to evolve and as further implementation is considered.
Secretary's Note: Post meeting the RallySafe team met with CAMS administration members to discuss the system, varied discussions on the software's abilities now and moving forward, different levels of RallySafe systems available for use and potential avenues for further implementation with the Rally discipline.

Whilst this system should not be relied upon to provide a 100% fail safe system it certainly has gone a long way to improving responses to incidents and warning competitors of crashes ahead on a course. MSR is looking at investing in these units to be fitted to the MIV's to assist with locating crashed vehicles and improving response times.

Could Rallysafe be adapted for recce to provide advice/warnings that are currently included in the road books (which are used by most codrivers for navigating from junction to junction without looking at any of the advisory notes in the road book)? This could be particularly relevant in SA with trees on exits e.g. rally safe for recce displays "Danger - next 500 metres trees close to road" or " next three corners slippery if wet" or "high accident zone next 500 metres"

Compulsory adoption of Rallysafe technology. The system has proven itself effective and reliable and eliminates many of the human error factors associated with safety tracking. At the moment in the ARC it is compulsory for ARC section only. There is a view that it should be mandatory for all events with human tracking systems as back up. It is believed Rallysafe dramatically reduces response time and provides clearer picture for recovery crews. This is something that we seem to excel at. Our response protocols at the ARC level seem to be entirely effective and the Rallysafe system has now enhanced the response time and the effectiveness of locating the incident site.

While a lot of people a saying RallySAFE should be mandatory to help with accidents, I have been in the position where it has failed for a whole day of our event. I do believe it is a fantastic concept and very helpful for rally control (big help to me at Targa High Country last year). However it is only helping after an incident has happened and I believe the biggest push should be to make the cars safer if the first place.

Rallysafe is an amazing development and should be progressed to the point where it is something that is standard equipment in all rally cars. Rallysafe won't be used by most competitors in stage unless they have a problem. There's no time to watch it - we don't even use a tripmeter when on notes. It can't be used as a warning device reliably unless there is a way of attracting the co-driver's attention when required.

RallySafe – Recognised as the best new thing into rallying but for now is probably an expense that state events and below will struggle to afford. Rallying should work closely with RallySafe to find a minimum standard that they can provide that is affordable and then compulsory for all rallies with the higher level of event having the full tracking. If organisers knew a car had stopped on a stage and required medical attention it would dramatically reduce the time taken to send in medical help.

I do believe that as a sport we have greatly improved the safety of rallying since I began participation in the sport in 1979.

In recent years there have been a few significant advances, 1. HANS device and 2. RALLYSAFE 3. Winged seats

SOS Vehicle Tracking – There are very few requirements for vehicle tracking and no one to check that any standard is met. A standard should be set for all rallies to meet.

That the RALLYSAFE system, or equivalent, be declared mandated equipment for all National & State Championship stage events. That it be phased in this year as soon as possible with the advice that it will become mandatory in 2014. It is a proven fact from all reports available to me that the use of the RALLYSAFE SYSTEM last Sunday was instrumental in saving a life. The incident that sparked our massive MIV response showed that rapid intervention, and the use of RallySafe were definite contributory factors in saving that life, along with the HANS device. But there is no doubt in my mind that the outcome would have been different without RALLYSAFE, and the radio "heads up" from the crew of car 514. The price is small compared to the potential, just as it is with HANS. As the sport is at a low ebb at the moment, now is the time to act. Existing competitors can gear up, and new ones will know they need this equipment from the get go

Lifesaving, game altering equipment that raises the ability to see what is going on, and respond to that by quantum leaps.Rally controls everywhere are much much much better off when RALLYSAFE is in use, sure there have been glitches, but these are being eradicated. The same arguments as for the HANS type device pertain, and CAMS duty of care is foremost to me. Having run many rally controls over the years, I have never felt more able to respond appropriately than I do now. Let's make it so for all events as described

The single biggest problem in a rallying incident has always been to find out if an accident has occurred. Previously we relied upon SOS points and following competitors, which resulted in considerable response delays. The MIV (previously FIV) would often be sent in an investigative capacity to check the scene.

The new Rally-Safe monitoring system has been a great development. It is satellite based, gives information which can be tracked at the Rally Base, has a G force detector, proximity alarm (for following competitors and responders) and also a "dead man's hand" – if the car is stopped a button must be pushed within a certain time or an alarm is activated.

This favorably contrasts with the FIA system, which while giving similar information, requires a repeater aircraft to send the signal onto Rally Base.

It should be mandated that there is a minimum level of acceptable communications at all events. I have been to events where the start and finish have not been able to communicate with HQ's or through the stage the radio has dark holes.

ROAD MARKING – COURSE CHECKING

Caution boards where required on stages A plan to have 00 or 0 cars place/note additional cautions/boards as they deem appropriate on stages. Once when driving the zero car I tried to add cautions and these were denied. Two cars were severely damaged as a result.

Road Marking (done by organisers in the days before the event OR by the course cars immediately in front of the field). For Blind rallies it is imperative that a higher standard of marking of Cautions is used (signs on the road at consistent distances and visibility before hazards). It takes a skilled course car crew or event "setter" to decide where and when to erect signs. I believe the sport can do more to train and inform these crews through the CAMS training programs and appropriate literature.

An initiative I first saw at Targa Tasmania is the marking of "Black Spots" on the stages. As a competitor I found that these had a sobering effect on both myself and my co-driver as we prepared our pace notes. To be most effective they should be marked on the road with an appropriate sign and also in the road books.

In Rally Australia in 2013, I introduced a similar system with a large triangle sign with a 50m sign under – and placed these 50m prior to some trees that were hidden around slight bends or crests. This received favourable comment from crews and will be expanded for the 2014 event (in instances where we cannot avoid the use of that section of road). We will also in 2014 introduce more soft protective measures on some trees (large hay bales or similar).

Could use some improvement in danger warnings

All tarmac stages used to be checked by Greg Carr before they were deemed to be safe to use. Greg either became a great advisor on the roads or a nemesis if you didn't like his advice and it affected the distance v entry fee relationship. NSW has recently asked Neal Bates to do similar role on two State gravel rallies. For this to be really effective, they should be inspected before the road book is finalised, rather than days before the event when there is too much pressure to keep the stages as promoted and to make slight changes. Maybe we need Road Inspection and Event Observers to decide if the roads selected are appropriate for rallying. Maybe the experienced drivers should be asked if a stage or part of a stage is suitable for rallying and if not prevent the organisers from running the stage in future years.

PILLAR 4 – ORGANISATIONAL/OPERATIONAL

OFFICIALS ROLES, TRAINING AND BRIEFINGS

The amount of panic we constantly here form some Command Centres is unprofessional and dangerous.

I have always had this desire to develop a standard incident response system and also develop a national training system for Command Centre staff. Our English counterparts have expressed a desire in developing this course together and with some seed funding this could occur and eventually be presented on a world basis.

The adoption of improved training, reviewing roles and responsibilities and resource materials such as manuals, for event checkers and others with responsibilities around event safety should be considered. A 'safety delegate' model should be considered for adoption at the ARC level who would be tasked as the responsible party to oversee all safety aspects of ARC events and be proficient in CAMS critical indecent procedures as part of their role.
ACTION: ARCom will work with the CAMS administration in reviewing current documentation for event checkers and also explore the possibility of a Safety Delegate role.

Establish a separate and consistent CAMS/ARC safety "team" to supplement Event teams and with a role for event safety oversight. One suggestion for a model is:

Chief Safety Manager – Field:
This person would be consistent for the championship and would be the eyes and ears out in the field for the Chief Safety Manager – HQ. This person would be a responsible and well-respected high-level competitor who has competed in recent machinery e.g. a Neal Bates, Ed Ordynski, Rob Herridge, Cody Crocker etc. Responsibilities would

be:

- Driving the zero car at each event (ideally a modern front wheel drive with Kumho's) and providing consistent information on stages…. not just cautions but a report of each stage driving conditions back to the start line – relative to the last time competitors would have driven it – for first runs that is recce for second runs that is the previous run). This would be similar to a "T-car" scenario but more basic info and for the entire field……would be a report like "overnight rain of 2.4mm in area has made stage damp in sections especially under trees and at road edge"
- Joining the Chief Safety Manager – HQ 6-9 months before each event to assess road selection and assist in the development of the road book and overall running of the event including target times. Some events struggle to calculate realistic time on transport sections to refuel as well as get out check tyre pressures, have a drink, don all the safety gear etc. Separately, a stage where 50% of the distance is spent in 6th at 166km/h…and averaged on the stage 123km/h …..an unrestricted evo has the ability to do 220km/h+. It would be the responsibility of the CSM - Field to look at this stage and either have it deleted or provide other options like chicanes.
- Prepare a report on each stage which should be communicated with rally guide one for competitors. This should include a general description of the stage.
- Drive the stages in the week before the event (before recce) with caution signs on particularly dangerous corners….maybe a grading system of signs so that crews (especially inexperienced ones) know which corners or parts needs to noted with care
- Be at recce to talk to competitors and get a feel for concerning corners or stages….and also to monitor recce speeds in a policing role.

Chief Safety Manager – HQ :

- This person is the overall safety boss and sits above the clerk of course/event director and the chief steward in terms of overall power. This person would have an in depth knowledge of the route, event organisation and things like Rallysafe.
- CSM is the only person that can stop a stage, apply dust gaps etc…….some competitors have serious concerns over allowing event command to make the final decision on stopping stages. They may have conflicts of interest between the smooth running of their event and timing etc. versus balancing risk on safety grounds. A separate person should be responsible for this with ultimate power to stop a stage or a rally. CSM would be dealing with the Field Safety Manager before, during and after the event. Would be the person responsible (with ARC Sporting Director) on signing off on routes. Would take on some responsibility from events in terms of safety and medical team supply. In the event of an incident would take this over from the event so that the event can continue to function. Compiles an extensive report with ARC Sporting Director and CSM : FIELD on each event and the improvements needed. Most important role would be continued monitoring of event itineraries and processes before the event. This person + Sporting Director + a Commercial ARC rep should also be part of these meetings.

Following a serious accident at Rally Qld some years ago - the second accident where competitors required hospital treatment that I have been first on the scene, and the third if you include one where I was an official and assisted, I developed a form for use at an accident scene in a stage. Despite having some relevant military training in this area, my experience is that it is extremely difficult to immediately shift concentration from driving at speed in the forest to very suddenly managing an accident scene on your own, and there are a lot of details that are very easy to overlook. The form is for inclusion in roadbooks and serves as a memory jogger and notepaper for all the information an FIV crew may require in commencing the actions to provide assistance. This form can be filled in quickly by the assisting crew and given to the next car to arrive on the scene to take to the end of stage or a radio point. A copy is attached and it is included in roadbooks for some events up here. I have also conducted a number of times a role playing exercise at QRC event drivers briefings where an accident scenario is acted out by competitors and we walk through the procedure that should take place and discuss some considerations appropriate for various different accident scenarios. It's one of the few times when you get complete silence at a drivers briefing; not because I am captivating, but because competitors seem to take it more seriously than nearly everything else mentioned at a drivers briefing. Errol's probably seen it – he may care to elucidate further more objectively.

Course checkers to be thoroughly trained, appointed independently and not over-ruled by event organisers.

Proper instruction in use of safety items is compulsory – e.g. many seem to not know basics like the correct order and technique for fastening a multi-point harness with crotch straps.

Competency of official, Understand they are volunteers, however improvement is needed in education, course signage etc

That a safety video be produced that is mandatory to be shown at all future briefings for all National & State Championship stage events. There is currently no cogent, comprehensive and instructive resource available to help teach all competitors what needs to happen upon arrival at accident scenes.

Briefings vary widely, and it would be fair to say some of them are of a very low standard. We propose that a professional video shoot be funded by the CAMS to produce such a resource, modern day, up to the minute, cutting edge practice. This would involve the appropriate scripting advice from senior doctors and competitors and organisers, and would not be shot until that agreed script is in place

If this idea is supported, then we can turn to proposing a budget, but, as a guide, we think 2 days shooting, 2 days editing, and 2 days' worth of professional medical advice would be involved – so around $10K.

A better educated competitor could help to save lives, and certainly impact positively on rally safety in general

Targa style driver's briefings that make it clear to all competitors the risks associated with competition (emphasizing that it is a sporting contest and most of them won't ever win – so approach the driving from the perspective that on Monday you still want to be with your family and not in a hospital on a ventilator).

That the driver briefing in its present form be discontinued. That they be phased out this year as soon as possible with the advice that they will become discretionary in 2014 I have the following from several competitors;

Having competed throughout the world for the last 8 years I still do not understand why we have drivers briefings in Australia. Nowhere else conducts them. It is a requirement of the OLT to obtain a CAMS rally licence that we know the safety requirements. May I suggest first timers attend a briefing to explain to them what their requirement is at an incident but everyone else does and should know.

I COULD NOT AGREE MORE. THE ARC DEMANDS IT. I THINK IT IS A WASTE OF TIME IN PRESENT FORMAT. This needs resolution, as it is one more thing to do in a really crowded event calendar, and is unnecessary for all but first time competitors, who could be briefed on safety procedures only by the CSO

INCIDENT AND INJURY DATA

There is a lack of detailed data on rally related incidents involving injury making informed decision making based of hard evidence challenging. Some statistics were provided by CAMS but the access to a centralised database is considered a critical priority. There may be some potential for AIMSS to assist in interpreting any data available.

Recommendations arising from investigations into previous fatalities are implemented expediently and as requirements rather than 'take-it or leave-it' advice.

A system of record keeping of all serious incidents is implemented and maintained.

Investigations are conducted into non-fatal, serious incidents – we can learn a great deal from incidents where it was miraculous a fatality did not occur.

I am very disappointed to report that in well over 25 years of organising rallies, I have never once been advised of the findings of a CAMS enquiry into an accident (except where I have been on the investigation panel). I understand that some matters are confidential – but we desperately need a better system to ensure all organisers benefit immediately from lessons learned in accident investigations. I have requested of CAMS that a procedure be implemented but to date have not seen/heard any outcome.

Revised incident report form should not be too comprehensive. There should be triggers that may call for more detail.

The information required should have an obvious value and benefit for the sport otherwise they will not be filled in.

The main thing that strikes me in reading it is an issue that I have been voicing for a little while now, including at the

CAMS NMAC meetings; the need for a well maintained Australian and New Zealand motorsport injury registry. Given the process that goes into identifying gaps in current care, making recommendations based on current best available practice and ensuring that those recommendations result in the expected outcomes, it would suggest the need for a Quality Improvement approach. For his to be effective we need data and therefore a good database, the characteristics of which should include:

- Easy for data entrants to access and use
- Easy for data users (research & recommendations) to access and use
- Secure
- Confidentiality protected
- Legal issues protected

I believe there is interest from a number of directions in setting up an injury registry and I think this enquiry could be the catalyst for getting it up and running. This would keep CAMS in line with best practice as practiced by other major professional bodies.

Severity of injury – Tarmac versus Gravel. I strongly believe we are seeing that Tarmac Rally has a far more serious rate of injury versus gravel, I however am not convinced that the crash rate per competitor number and kilometres travelled is any higher.

MEDICAL AND RESCUE

Our company equips our vehicles to meet FIA Appendix H, whilst we might not always agree with some of the requirements of the FIA it has proven to be a good standard. We see a number of variants to its application to non FIA events i.e. not having a doctor in every car, something that would bring the sport to a halt if applied at lower levels of the sport.

MIV's – There are still no requirements for medical or ambulance requirements at State level events. From the CAMS Manual: As an interim measure, State Council may approve medical requirements for road events where standards have not yet been set by ARCom. In this case, requirements for specific events will be available from State Offices. The interim measure has probably been in place since 1953. This needs addressing.

There has been evolution in clinical practice and discussions around safety equipment and regulations that would be worth considering as part of this enquiry, which I would be happy to contribute. Items that come to mind immediately would include: - Streamlining medical trauma and resuscitation packs, in line with the goals of rapid, practical stabilisation and early transport to definitive care - airway equipment, vascular access (IV and IO), resuscitation fluid, core pharmacology - Reviewing the roles of event medical centres and their composition - Reviewing certain clinical practices; e.g. Competitor self extrication with cervical spine precaution, volume resuscitation in the setting of blunt trauma, the role of tranexamic acid in motorsport trauma - Reviewing patient transport processes - Co-operation between technical and regulatory sporting developments and the provision of medical care to injured competitors; eg rollcage design, driver positioning within the vehicle, competitor safety equipment and its integration with rescue and clinical care.

Currently CAMS defines what is required in terms of medical intervention vehicles at the different level of rallying.

Generally the equipment and personnel, regardless of competition level, should be able to deal with a seriously injured competitor and package them properly for evacuation and transport. This means appropriately qualified doctors who are familiar with trauma (not necessarily "just a doc" e.g. in the past haematologists and dermatologists!) and intensive care level paramedics.

The old days of using the local country ambulance with a couple of volunteer ambulance officers should have gone. It is unfair to the competitors, the volunteer ambulance officers and also may open up the organisers to the possibility of litigation.

At the more grass roots level event, the use of intensive care paramedics alone is fine. However whilst paramedics are more than able in fulfilling the organisational part of the CMOs role, they are neither qualified or authorised to declare a competitor fit for competition (important for a multiday event) NB CAMS has a Return to Competition form to use in this case which must be taken to a doctor and filled in by him or her. They do not have to be an accredited CAMS Examiner

The emergence of a number of commercial companies who provide medical services for motor sport events has occurred over the last decade or so. Generally this has been a positive occurrence. MSR who does a lot of rally work has good personnel and good equipment (currently the equipment complies with and sometimes exceeds the requirements of FIA Appendix H). However there must be a cautionary note that firms contracted by event organisers, deliver what they say they will in terms of equipment and personnel. Organisers have no real mechanism or medical ability to assess them. The NMAC has looked at this and put it in the too hard basket as CAMS has no way of being a de facto licensing authority for medical services suppliers.

There are inevitable delays and time passage in the evacuation of injured rally competitors to definitive medical care. This is inherent in the nature of rallying usually somewhat remote from medical care, out in the country. Evacuation plans need to be well thought out with alternatives available especially if aircraft, fixed wing or rotary wing, are planned to be used.

Good medical packaging of the patient to enable them to tolerate a sometimes, long evacuation process is essential. Generally treatment during transport is sub-optimal.

Whilst the highest level medical intervention available is desirable, in reality few lives are lost by lack of immediate high level intervention. We must balance gold standard for the race track vs practical limits on stage rallies.

The best Medical Team is only as good as the dispatching system and in rally it varies significantly. At some events we supply a Commander and yet other events we are subjected to officials whom undertake the task once a year with little or no training. As the requirement for the sport to relate to the Government Health Commanders as is required in Victoria the requirement to have the correct people in these positions is going to become mandatory.

A number of the accidents happening now are faster and harder and even though the safety gear has improved tenfold, there is still a limit to how much punishment the human body is capable of taking.

The effectiveness of the response times to critical incidents should be reviewed to ensure the sport understands the degree to which this aspect is a significant factor in the outcome of fatal accidents. The meeting noted the information presented by Bruce Keys from CAMS that suggests that the majority of impacts resulting in fatalities were not survivable in any case. The cost benefit of focussing too much effort on emergency response should be considered. Trying to resource even better incident response times over and above the effective response that is already available may not achieve the desired improvement in outcomes.

My interest is more about the avoidance of accidents than the response to same. (I feel the response technologies and skills in rallies are already at a reasonable standard or are being investigated by more experienced people than myself). Likewise I believe lots of energy and skill in terms of specifying apparel and neck braces etc is being undertaken by the sport. Certainly these are vital elements of safety but I think in too many discussions they over-shadow the avoidance issues.

CAMS AND ARCOM

CAMS Critical Incident Management. This system has been reviewed numerous times in recent years and is a pretty good guideline to managing a critical incident. However, it is only as good as those who know about it and implement it. At the recent accident at Rally Queensland the official Press Release was not on the ARC website until 24 hours after the accident and to make it worse the ARC Facebook page promoted what a great and enjoyable weekend of rallying they had. At Rally of SA the accident didn't even get mentioned, almost as if we don't tell anyone maybe they won't know about it. In both cases the accidents were in the national media and the ARC should have been the first to provide information.

The critical incident communications protocol within CAMS does not seem to be effective in ensuring that the senior leadership group in rallying is informed in a timely way about serious incidents. A review of the implementation of the protocol should be undertaken. ACTION: Mr Roder to raise with CAMS senior management regarding if a additional protocols are required to ensure the senior leadership group in rally is informed in a timely manner as part of the Critical Incident Procedure document.

Ability for Event to Continue to Run. My personal view is an event should only continue when the Clerk of Course, Rally Command, the Medical and Rescue Teams and all the Stage Teams are capable of handling another Critical Incident. If the teams are not capable of handling two critical incidents at the same time, then the rally should be stopped and reassessed until that point of time.

CAMS Accident Report CAMS does not issue reports of why a fatality occurred on a rally. In all my time I have only ever been given a report on why fatalities occurred on tarmac rallies. How are we ever meant to ensure the same accident doesn't happen twice if we are never told of the cause of any fatality?

Greater overall ARC leadership……by an ARC manager or ARCom in insisting that certain aspects of events change. Event directors have few incentives to change practices/courses. Given that there are not a large number of events lining up to be included in the ARC the current paradigm means that there is little leverage on events to require changes where there may not be consensus about what needs to be done.

Do we need to consider going back to an ARC board scenario where we have "roles"…..e.g. competitors, safety etc. etc.

Rally organisation and administration is fragmented by states, other than for the ARC. Some State Rally advisory panels are more active and strategic than others.

As an ARCom member I feel our main role is to protect competitors from spending more of their money as they think that they are not slower than the next person, they just have slower car that needs money spent on it to make them equal.

GENERAL RALLY OPERATIONS

Rally car registration systems are implemented in each state and that cars must be on the registration system to be allowed to start an event - failing to address this may cost the sport dearly one day, especially if a rally car injures members of the public and is found not to have been processed through the appropriate system nor to comply with the requirements i.e. there is a safety responsibility required in this area especially as rally cars traverse public roads.

We should be checking that all competitors are ready to start the stages, there are many examples of helmets not done up correctly and also the number of belts not correctly tightened, this is especially true in tarmac events.

The trend toward very limited service is dangerous. The risk of mechanical failures that causes accidents is greatly increased. Rough stages such as Million this year in Rally Q should be followed by service – not a fast stage such as Mitchell Creek. It makes event planning more complex and potentially requires more liaison, but competitors may well be safer.

Increase the minimum time in controls to 4 or 5 minutes with increased safety checks and a briefing of any key issues in the stage. There isn't enough time to assimilate much information into your pace notes when a clipboard is thrust in your face with a couple of minutes to go. This is particularly the case when the co-driver has to get out the car to follow control procedures, which shouldn't be necessary.

That the practice of CUTTING be declared an act prejudicial to the sport for all National & State Championship stage events. That definitive regulations be phased in this year as soon as possible with the advice that they are mandatory in 2014

It is a proven fact from photographic, video and other reports available to me from the recent SCOUTS RALLY SA that the use of CUTTING THE PUBLISHED COURSE is now prevalent in the sport, even lauded and encouraged. The latest documentary that went to air recently implied that cutting was an act to be admired. It is far from that. In fact I consider it an act that is prejudicial to the sport, not in the correct spirit of competition, and one that gains its perpetrators an unfair advantage. In fact it alters the outcome of a stage, and thus the rally

It is also becoming an issue for the governance of the sport in that Local Government Authorities are questioning why we allow it all. In particular, Forestry SA, and the various councils, are now asking that we control it somehow. It will not be long before ask turns to demand. In Forestry, that is close to the case as we speak. Conservation groups are

also getting heard, and many roadsides now show the council blue squares signage, indicating verges that contain plants that are to be preserved. I have evidence of a cut in this year's event, where one of those signs was on the left of the car as it cut down a fence line well off the road. In other places, cars have cut across "virgin" bush, creating a neat new way for erosion to begin, and in one case cutting a massive 400 metres off the set course All in all it is a scenario that cannot be tolerated

I have heard people say that if we do not want cutting, we need to put barriers in place. This is not really do-able given the scale of the problem, nor should it be a strategy that is down to already hard pressed organisers. The situation requires clear regulations that provide certainty to competitors that cutting will result in heavy penalties. Organisers need time to gather the evidence, so such a regulation may require a clause that allows for, say, two weeks where a competitor can still be bought to account following an event. As organisers, we will be doing our best to address everyone's concerns, and will have a new clause in our regulations, and will add DO NOT CUT

Stage Security is an issue and I constantly worry when a piece of tape is tied around a gate or placed across the road is considered safe enough. This is an area of the sport that needs a definite tightening up. The whole issue of stage security and managing people on the stages is worthy of a major discussion in itself.

Spectator and public safety has been pretty well nailed over the last decade or so. Spectators are held in "safe" places with spectator marshals to ensure they remain that way. No more "shoals of fish parting before a shark" as was seen many years ago in Portugal.

Media also are fairly safe but still can get themselves into danger with their somewhat cavalier attitudes and the assumption they have carte blanche to go wherever they want. No go areas for any one plus the rigorous enforcement of passes and tabards for media has helped control them.

Officials are also generally OK – the Flying Finish well before the Stop Time Control ensures that no one arrives at speed (unlike Japanese dentists in the Australian cannonball run) to where there is a collection of officials.

Road closure officials are usually well placed in safe positions

Rally is intrinsically risky, and more time should be spent defending the rights of the participants to take part in full knowledge of the risks, rather than pretending to the media that all risks are managed, or that 'reviews' will be undertaken every time a serious incident occurs. I note the Dakar rally has a total of over 40 fatalities so far, including 3 this year and 8 in a previous year.

REFERENCES

Ernst and Young, 2014. Economy Contribution of Australian Motor Sport Industry.

Nassiopoulos, L. and Njuguna J. (2010). An assessment of the side impact protection systems (SIPS) for racing drivers in motorsport rallying championships, *School App. Sci. Cranfield Univ., Cranfield, UK.*

IV. APPENDICES

APPENDIX 1. TERMS OF REFERENCE

REVIEW OF RALLYING IN AUSTRALIA

TERMS OF REFERENCE

BACKGROUND

Rallying in Australia is a popular and growing sport which is conducted on public and private roads which are closed for the event. Road surfaces comprise of gravel and tarmac. In general, the natural roadside environment provides the only protection for crews and vehicles, with few exceptions, usually when sections of a rally are held in an arena or a specifically designed venue, or for areas where spectator facilities and/or protection is deemed appropriate.

In view of the growing profile of rallying and the manner in which it is conducted, the Confederation of Australian Motor Sport Ltd ("CAMS") believes that it is an appropriate time to conduct a review of Rallying in Australia, with a particular emphasis on maintaining the high standards of competition, continuing to grow the number of events and increase the competitor base, whilst at all times ensuring the safety of all participants, including competitors, crews, officials and spectators.

To facilitate such a review CAMS has requested the Australian Institute of Motor Sport Safety ("AIMSS") to inquire into, consider, report and make recommendations no later than xx 2013 on (a) the current engineering, management and safety response requirements applicable to all forms of Rallying in Australia and (b) any existing or new developments or technologies which may be applicable to Rallying and the feasibility of introducing new or additional requirements to Rallying at each of its levels, from introductory/novice level to Australian Rally Championship and Tarmac Rally level ("the Enquiry").

1. PURPOSE OF THE ENQUIRY

1.1 To review the current safety based requirements and any standards applicable to meet those requirements, for all status levels and forms of Rallying in Australia and overseas.

1.2 To review and consider any investigations or reports from the FIA Institute into Rally safety.

1.3 To provide recommendations on how to maintain best practice for safety standards for all status' and in all forms of gravel and tarmac surfaced Rallying on the basis that the suggested measures are practical, affordable and reasonable in the context of the growing popularity, accessibility and profile of rallying, AIMSS is requested to consider:

(a) trends over time in crash types, road surface types, speed, experience levels of drivers/co-drivers (where known) and the types of vehicle being driven;

(b) the attitudes of drivers/co-drivers to safety and risk minimisation including travelling at speeds in excess of those permitted on open roads, use of personal protective equipment including clothing, and fatigue;

(c) countermeasures used in Australia and other comparable overseas jurisdictions to reduce the number and severity of rally accidents with reference to road environment, behavioural change programs and the design and technology of rally cars and protective equipment;

(d) organisational factors that may influence the selection of rally competition stages;

(e) new initiatives to reduce the likelihood and consequence of rally accidents and injuries;

(f) the current level of emergency medical assistance provided for rallies and its adequacy and effect on survivability rates for persons injured in serious collisions

(g) new initiatives to increase survivability rates for persons injured in serious collisions

2. CONDUCT AND MEMBERSHIP OF ENQUIRY PANEL

2.1 AIMSS is charged with the responsibility of determining the appropriate way in which to conduct the Enquiry including the composition of a Panel, however

(a) the Chairman of AIMSS will also act as the Chairman of the Enquiry;

(b) it is expected that suitably qualified experts in the conduct and safety of rallies will be engaged;

(c) internal or external persons may be invited to attend meetings at the request of the Chairman to provide advice and assistance considered necessary.

(d) The Panel will consult with a wide range of stakeholders and in particular will seek input from the Australian Rally Commission to support its deliberations and finalise its advice.

2.2 AIMSS is requested to conduct the Enquiry is an expeditious manner and is expected to present the Report into the findings of the Enquiry by no later than xx, 2013.

2.3 AIMSS is to ensure that the ongoing Enquiry and the final Report are protected by confidentiality at all times.

2.4 AIMSS is to provide the Report to the CAMS Board and to no other party.

Incident Report Form

RESEARCH FOR THE REVIEW OF RALLY SAFETY IN AUSTRALIA

Dear Organiser/Official/Competitor,

The Australian Institute for Motor Sport Safety (AIMSS) was recently appointed by CAMS to conduct a review of Rallying in Australia. AIMSS purpose will be to make recommendations to CAMS around safety related matters, taking into account the broad variety of rallying and participants that compete.

As part the review, AIMSS is collecting and analysing relevant rally incident data from the CAMS archives, and has created its own incident form to capture expanded information moving forward.

In the interest of motor sport safety research, we are seeking your cooperation;

A) at the organisational/official level to ensure this form is filled out appropriately and returned to AIMSS, via scanning/email or posting to the details below, and;

B) at the competitor level to actually fill in the form, or assist the completion thereof, where possible/ practical.

The attached AIMSS Incident Report Form;

- Has no regulatory purpose
- Does not replace or restrict any other associated incident, document or report form required by CAMS or your organiser
- Will be held by AIMSS expressly for the purpose of research into rally safety.
- Will remain anonymous (you have no requirement to identify yourself on the form)

A 'Reportable Incident' would be defined as;

- Any incident that has prevented the vehicle or participant from continuing in competition.
- Any incident that the organiser, crew, officials or competitor/participant may feel would contribute to the review. Eg: this may include an incident whereby the participant did actually continue, but may have been involved in an impact/incident where harm or injury *could* have occurred.

The sport benefits from your contribution.

AIMSS thanks you for your co-operation.

Mark Larkham - Director
Australian Institute for Motor Sport Safety
PO Box 3205 Helensvale TC Qld 4212
Ph: 0755 801411
contact@aimss.com.au **www.aimss.com.au**

Incident Details

The information collected via this form will be used by the Australian Institute of Motor Sport Safety (AIMSS) to gain a better understanding of the types of incidents occurring in rallies, the circumstances around the incident and the performance of the safety equipment. All information provided will be treated as confidential and used only for research purposes.

Event name (optional): _____ **Stage No.:** _____

1. Light conditions:		
		Day
		Dusk
		Night

2. Road conditions at incident location:	
	Dry gravel
	Dry tarmac
	Wet gravel
	Wet tarmac
	Slippery
	Rough

3. Visibility:	
	Good
	Dusty
	Rain
	Foggy
	Blinding sun
	Other

4. Vehicle type: _____ **5. Vehicle class:** _____

6. Approx. power output of vehicle: _____

7. Crew experience (please select most appropriate description)

	Driver		Co-driver	
Overall rally experience		First event		First event
		2-5 events		2-5 events
		5-10 events		5-10 events
		> 10 events		> 10 events
First started competing in rallies		This year		This year
		1-2 years ago		1-2 years ago
		3-5 years ago		3-5 years ago
		6-10 years ago		6-10 years ago
		>10 years ago		>10 years ago
Experience in this style of event (same road surface & instructions ie pace-noted/blind etc)		First event		First event
		2-5 events		2-5 events
		5-10 events		5-10 events
		> 10 events		> 10 events
Period since you last competed in this style of event		< 6 months		< 6 months
		6 – 24 months		6 – 24 months
		2 – 5 years		2 – 5 years
		> 5 years		> 5 years
Age group		<18 years		<18 years
		18 – 24 years		18-24 years
		25 – 30 years		25 – 30 years
		31 – 45 years		31 – 45 years
		46 – 64 years		46 – 64 years
		65 years or older		65 years or older

8. Type of incident

	Vehicle roll-over
	Frontal or side impact
	Fire
	Other:

9. Amount of damage to vehicle

	Significant (eg write-off)
	Major (not drivable)
	Minor (drivable)
	Insignificant (not noticeable)

10. Describe damage to vehicle: _____

_____

11. Was anyone injured? No / Yes Details: _____

_____

12. Describe the road characteristics immediately prior to incident/leaving road:

	Very fast (>160 kph)
	Fast (100-160 kph)
	Medium (60-100 kph)
	Slow (0-60kph)

	Long straights
	Flowing corners
	Twisty

	Characteristic of rest of stage
	Out of character with rest of stage
	Had noticeable change in grip level

13. Did the vehicle impact with a stationary object? Yes / No (go to question 14)

What was the object? _____ Approx. how far was it from the road? _____

Indicate your estimated speed of impact?

<40 kph 60 80 100 120 >140 kph

Please indicate the location & direction of impact on the diagrams on the last page

14. Did the incident occur at an instruction in the road book? Yes / No / Don't know

15. Was there any physical signposting (eg caution board) of a hazard immediately prior to the incident? Yes / No / Don't know

If not, in your opinion, should there have been a physical warning of the hazard? Yes / No

16. Were you using pace notes? Yes / No (go to question 17)

Did you drive the stage prior to competition? Yes / No

17. During the incident was there contact between the occupants and safety cage? Yes / No (go to question 18)

Which part of the body impacted with safety cage? Head / torso / arm / leg / other

Which part of safety cage was impacted? _____

Does the safety cage have padding at point of contact? Yes / No

18. During the incident was there a fire? Yes / No (go to question 19)

Where was location of fire? _____

Was an extinguisher used? Yes / No

Did the extinguisher successfully control the fire? Yes / No

What type of extinguisher was used? Fully plumbed system / Handheld / Both

19. During the incident was there front or side impact, or a rollover? Yes / No (go to question 20)

Indicate if any of the following safety equipment failed to perform as intended during the incident:

	Safety cage (broken or torn welds, structural deformity)
	Seats
	Seat mounts
	Harnesses

If any of these items failed to perform as intended, please provide specific details: _____

_____

20. Characteristics of safety equipment in vehicle

Was safety cage manufactured within the last 5 years? Yes / No

Safety cage specification

	Chromoly
	Steel
	Aluminium
	No safety cage

	Has side intrusion bars
	Has main hoop cross bars
	Has advanced gusseting

Does the vehicle have door foam? Yes / No

Do seats in vehicle comply with FIA standard (ie, does seat have FIA tag)? Yes / No

Type of harness worn by driver? 4 point / 5 point / 6 point

Type of harness worn by co-driver? 4 point / 5 point / 6 point

Was a frontal head restraint (eg HANS device) used by the crew? Driver / Co-driver / Both / Neither

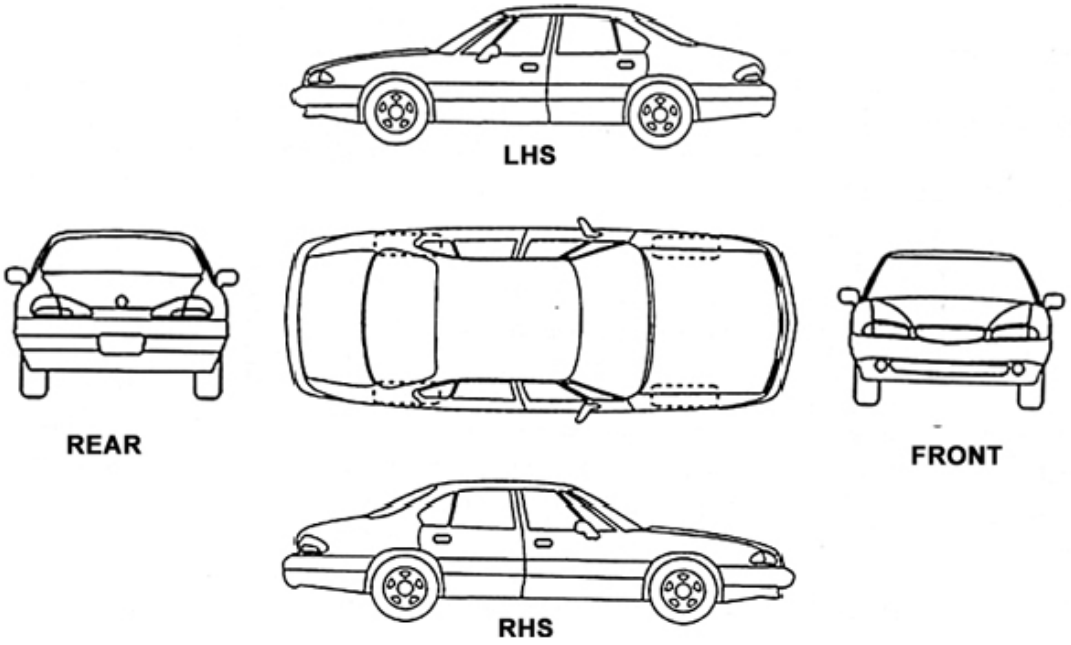
21. Do you have access to photos of the incident environment or vehicle damage that you would be happy to provide to AIMSS? Yes / No

If yes, please supply an email address so we can contact you: _____

If you have any comments you would like to add about your incident that you think may be beneficial please feel free to note them below.

INCIDENT DIAGRAM PAGE

IMPACT FORCE DIRECTION: Please indicate by use of arrow(s), the direction of the force into car on impact. (Thicker arrows for most significant force in multiple impact incident). Please feel free to add further information to diagram such as approx. crumple.



INCIDENT OVERVIEW DIAGRAM (Below)

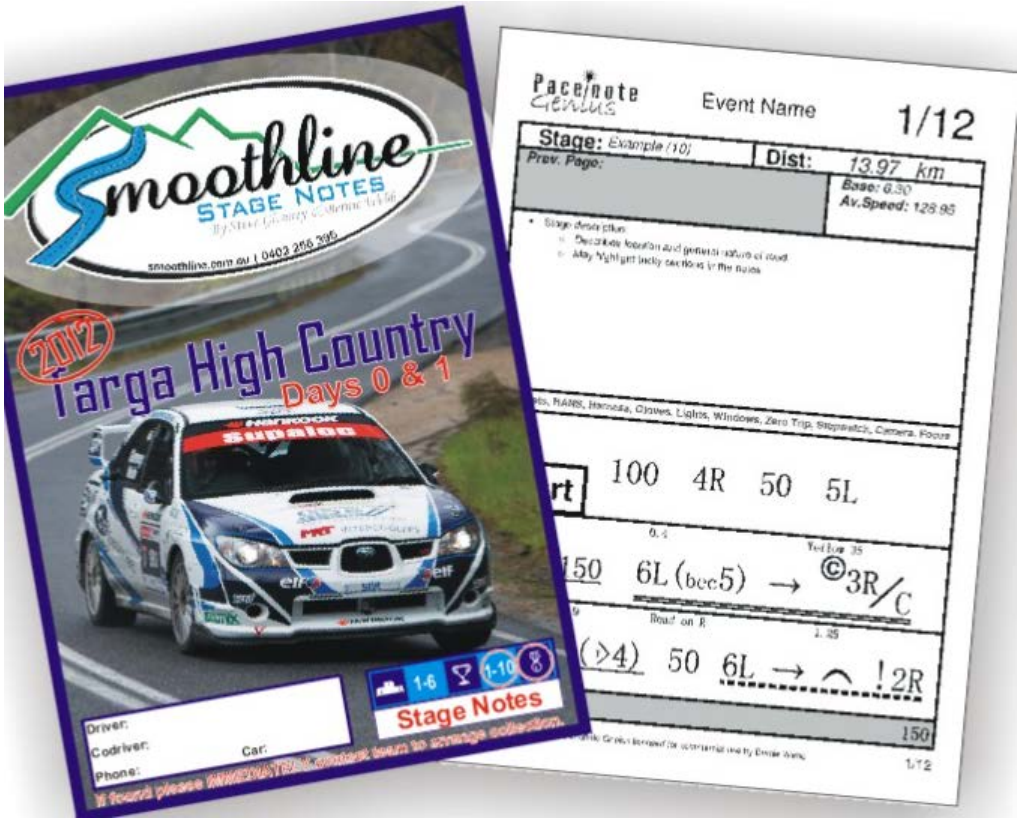
Using a plan view (looking from above), please draw a simple line diagram of the incident including any relevant information such as known cause, roadway, speed, dangers, obstacles, loss of control point, impact points etc.

APPENDIX 3. PACE NOTE ENTRY SAMPLES

Typical ‘Pace Notes’, which can be on a digital screen, handwritten or purchased,

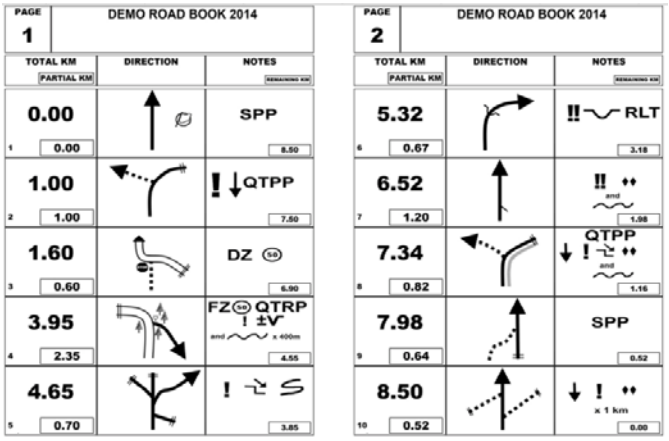
RallyNAV Test Rally 1 1/2

Stage: SS1	Distance: 1.55 KM
Start 225m R5 — L4	
/ Cr ! Slp 300m	
L8 < — L4 Don't Cut	
][R7 L9 L4 L7	
R2 R6 2 L7 L4	
Next Page Call: - L9 Jmp FFIN 20m	



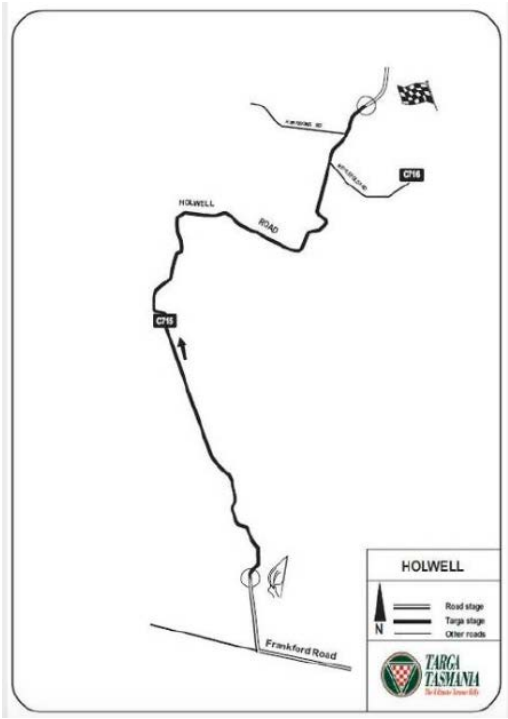
APPENDIX 4. ROAD BOOK ENTRY SAMPLES

Typical ‘Road Book’ entries as provided by event organisers



PAGE 1	DEMO ROAD BOOK 2014	
TOTAL KM / PARTIAL KM	DIRECTION	NOTES
0.00 / 0.00		SPP
1.00 / 1.00		QTPP
1.60 / 0.60		DZ
3.95 / 2.35		FZ QTRP
4.65 / 0.70		

PAGE 2	DEMO ROAD BOOK 2014	
TOTAL KM / PARTIAL KM	DIRECTION	NOTES
5.32 / 0.67		RLT
6.52 / 1.20		
7.34 / 0.82		QTPP
7.98 / 0.64		SPP
8.50 / 0.52		



APPENDIX 5. OTHER RESEARCH AND REVIEWS ASSOCIATED TO RALLYING SAFETY

FIA INSAFETY journal of 2009 - Jari-Matti Latvala and Miikka Anttila walked away virtually unharmed from their huge accident at Rally Portugal is testament to the work of the FIA, the FIA Institute and the BP Ford Abu Dhabi World Rally Team in improving rally safety.
http://www.fiainstitute.com/SiteCollectionDocuments/In%20Safety%20-%20April%20-%20Web%20version.pdf

STAGES OF SAFETY - Every year, the FIA World Rally Championship welcomes hundreds of thousands of spectators to its events across the world. But with rally stages spanning huge areas, how do organisers ensure the safety and welfare of spectators?
http://www.fiainstitute.com/publications/Documents/AutoMedical3.pdf

INSIDE THE WRC MEDICAL AND SAFETY CARS - Rally GB Chief Safety Officer Charley Webber talks through the various pieces of equipment inside the medical and safety cars at every World Rally event.
http://www.fiainstitute.com/publications/Documents/AutoMedical3.pdf

THE ROAD BACK - Two-time World Rally Champion Marcus Gronholm has experienced a number of accidents in a career spanning over 20 years. But it was whilst competing in the Global Rallycross Championship during the 2012 season that he suffered one of his worst injuries. Gronholm was knocked unconscious when his Ford Focus struck an exposed concrete light pole base on a practice run at the X Games event in Los Angeles. The accident would leave him in hospital with serious injuries and a new perspective on his career. The Finn details to his recovery and the impact the accident has had on him and his family.
http://www.fiainstitute.com/publications/Documents/AutoMedical3.pdf

SPINAL INJURIES AND MOTOR SPORT - FIA Institute Medical Advisor Dr Paul Trafford along with FIA Institute Fellows Dr Michael Henderson and Dr Terry Trammell examine the science behind spinal injury in motor sport and the latest research being undertaken by the FIA Institute to help prevent such injuries
http://www.fiainstitute.com/publications/Documents/Auto+Medical.pdf

WORLD ACCIDENT DATAABASE BEGINS TEST PHASE - The FIA has launched the beta version of a World Accident Database that could help to hugely improve safety in motor sport. A cross-section of National Sporting Authorities, including all accredited FIA Institute Regional Training Providers, have been invited to participate in the pilot project to test and develop the database.
http://www.fiainstitute.com/Documents/Auto+Medical2.pdf

TRAUMATIC BRAIN INJURY IN MOTOR SPORT - Since the first automobile race took place from Paris to Rouen, France, in 1894, Traumatic Brain Injury (TBI) has been and remains the leading cause of death in all forms of motor sport. http://www.fiainstitute.com/Documents/Auto+Medical2.pdf

RALLY SAFETY – Present at the FIA meeting in Istanbul last year, this website has been established to help improve basic knowledge in particular safety areas directly related to the rallies and to reduce the potential danger.....http://www.rally-safety.com

ASSESSMENT OF THE SIDE IMPACT PROTECTION SYSTEMS (SIPS) FOR RACING DRIVERS IN MOTORSPORT RALLYING CHAMPIONSHIPS Elias Nassiopoulos and James Njuguna, Cranfield University Bedfordshire 2010.
http://www.researchgate.net/publication/257748054_An_assessment_of_the_side_impact_protection_systems_(SIPS)_for_racing_drivers_in_motorsport_rallying_championships

V8 SUPERCAR/FIA INSTITUTE SIDE IMPACT TESTS - Australian V8 Supercar racing, the FIA Institute has worked in close collaboration with the championship and the Australian Institute of Motor Sport Safety (AIMSS) to help prevent driver injury. Ultimately, outcomes from this style of research influence FIA Technical Regulations with regard to ROPS and side intrusion…….http://aimss.com.au/fia-institute-v8-supercar-crash-test/

ROLL-OVER PROTECTION SYSTEMS - FIA Institute research testing potential improvements to the roll-over protection system fitted to competition rally cars. http://aimss.com.au/latest-roll-over-protection-rops-research/

AIMSS 'SAFETY–FIRST' SEMINAR PROGRAM - Australian Institute for Motor Sports safety conducted a safety seminar on multiple topics.....Safety Issues in Rallying

http://aimss.com.au/wp-content/uploads/2012/12/AIMSS_Safety_First_Seminar_Report-.pdf

Australian Motor Sport Crash Data Collection and Analysis - Tom Gibson, Michael Henderson and Christine Bethwaite. December 2008 AIMSS Pilot Study.

TRAUMA REDUCTION IN MOTOR SPORT, SIENCE AND SAFETY - A public health and historical perspective - Michael Henderson Chairman, Australian Institute For Motor Sport Safety, Fellow, FIA Institute For Motor Sport Safety. 2009 Annual Conference International Council For Motorsport Sciences
http://aimss.com.au/project/trauma-reduction-in-motor-sport-henderson/ -

SPECTATOR SAFETY AT MULTI –VENUE STAGE RALLIES IN SCOTLAND - The Review Group was established in response to the tragic deaths of 3 people and injuries to others at the Jim Clark rally during 2014.
http://www.gov.scot/Resource/0046/00467124.pdf

MSA – MULTI VENUE RALLY SAFETY REQUIREMENTS
On the back of the Scottish review into rally safety, the MSA (Motor Sports Association UK) also conducted a similar review, including taking on recommendations from the Scottish review
https://www.msauk.org/assets/2015rallyreqs.pdf

OPTIMISATION OF WRC RACECAR BODY/ROLLCAGE DESIGN – Hyundai Motor Company. As a consequence of their participation in the WRC, Hyundai investigate and present a paper to APAC 18 on body/cage design aspects and crash performance achievement under severe conditions for their i20.
http://apac18.com.au/wpcontent/uploads/2015/03/1%201320%20Sung%20Hoon%20Cho.pdf

AIMSS Competitor survey

Some information about you

1. Which category below includes your age?

- ◯ 17 or younger
- ◯ 18-24
- ◯ 25-30
- ◯ 31-45
- ◯ 46-64
- ◯ 65 or older

2. What is your gender?

- ◯ Female
- ◯ Male

3. In which state or territory of Australia do you currently reside?

- ◯ Western Australia
- ◯ South Australia
- ◯ Victoria
- ◯ Tasmania
- ◯ New South Wales
- ◯ Queensland
- ◯ Northern Territory
- ◯ ACT
- ◯ Other (please specify)

***4. Which of the descriptions below best describes your involvement with the sport of rallying?**

- ◯ Current competitor
- ◯ Past competitor with intention of competing again in the next 5 years
- ◯ Past competitor with no intention of competing again
- ◯ Have not been a competitor but hoping to start competing in the next 5 years
- ◯ Other

If 'other', please specify

Page 1

AIMSS Competitor survey

Competition history

5. Which category below best describes your overall rally experience?

- ◯ Less than 5 events
- ◯ 5-10 events
- ◯ More than 10 events

6. About how long ago did you first start competing in rallies?

- ◯ This year
- ◯ 1-2 years ago
- ◯ 3-5 years ago
- ◯ 6-10 years ago
- ◯ >10 years ago

7. Approximately how long has it been since you last competed in a rally?

- ◯ Less than 6 months
- ◯ 6 months to 2 years
- ◯ 2 to 5 years
- ◯ More than 5 years

AIMSS Competitor survey

8. In the last 2 years how often have you competed?

- ◯ More than 10 events
- ◯ 5-10 events
- ◯ 3 or 4 events
- ◯ 1 or 2 events

9. In the past 2 years, what level events have you competed in?

	Aprpox. % of events
International events	
National events	
State events	
Mult-club and Club events	

AIMSS Competitor survey

10. What type of rallies do you compete in?

- ◯ Gravel only
- ◯ Mainly gravel with some tarmac
- ◯ Mainly tarmac with some gravel
- ◯ Tarmac only

11. What is your main motivation for competing in rallies?

- ◯ I want to be the best on the day and have prepared my vehicle and team to achieve that goal
- ◯ Of course I want to do well, but am generally happy if I achieve my personal goals and enjoy the event
- ◯ My result is irrelevant so long as I enjoy myself

12. How aware are you of the latest/best personal safety equipment (eg helmets, suits, frontal head restraints)?

Not very	Somewhat	Fairly	I keep up with advances in safety
◯	◯	◯	◯

13. Do you use a Frontal Head Restraint device?

- ◯ Yes
- ◯ No

14. You have indicated that you do not use a Frontal Head Restraint (FHR) device. What factors influenced your decision?

- [ ] Purchase cost of device
- [ ] Seats and harnesses in competition vehicle are not compatible with use of FHR device
- [ ] Not a required safety item for the events I compete in
- [ ] Other (please specify)

AIMSS Competitor survey

15. What is your usual role when competing?

- ◯ Driver
- ◯ Co-driver
- ◯ Varies

AIMSS Competitor survey

Driver specific questions

16. Which category below best describes your use of safety (pace) notes?

- ◯ I always drive the route and make my own notes
- ◯ I usually drive the route and make my own notes, but on occasion I use someone else's notes but always drive the route to check them
- ◯ I usually drive the route and make my own notes, but on occasion I use someone else's notes without having driven the route
- ◯ I usually use notes written by another person but always drive the route to check them
- ◯ I usually use notes written by another person and do not always drive the route prior to competition
- ◯ I usually use notes written by another person and never drive the route prior to competition
- ◯ I never use notes

17. Which category below best describes who is responsible for the preparation of the vehicle you most commonly drive?

- ◯ I prepare the vehicle
- ◯ Family and friends help me prepare the vehicle
- ◯ I pay someone to prepare the vehicle
- ◯ I am not sure as I lease or borrow the vehicle
- ◯ Other (please specify)

18. Which category below best describes when the vehicle you drive was built for rally competition?

- ◯ Within the last 12 months
- ◯ 1-5 years ago
- ◯ 6-10 years ago
- ◯ More than 10 years ago

19. How often do you consider the safety features of the vehicle (eg seats, harness, seat mounts, safety cage etc)?

- ◯ The safety features of the vehicle haven't been reviewed since it was built or the required standards were changed
- ◯ All of the safety features are reviewed regularly (every 6 or 12 months)
- ◯ I try to keep up-to-date with advances in safety features and selectively incorporate those which I think are appropriate

AIMSS Competitor survey

20. How would you rate the overall safety specification of the vehicle you drive, compared to your understanding of the best available?

	Very poor	Poor	Fine for purpose	Good	Very good	The best
Overall safety	◯	◯	◯	◯	◯	◯
'Permenant' vehicle features (eg structural integrity and safety cage)	◯	◯	◯	◯	◯	◯
'Removable' vehicle features (eg seats, harnesses, padding)	◯	◯	◯	◯	◯	◯

21. If you rated the overall safety of the vehicle lower than 'good' in the question above, what are the biggest barriers to you improving the safety features?

- ☐ Awareness of advances in safety equipment
- ☐ Cost
- ☐ Replacement of items due to limited (regulated) life span
- ☐ Difficulty of fitment in the vehicle
- ☐ The vehicle meets current safety specifications so I have no intention of updating safety measures unless regulated to do so
- ☐ Other (please specify)

Page 8

AIMSS Competitor survey

Co-driver specific questions

22. Rank the factors (1 being most important) that you consider when asked to co-drive for someone?

☐	The performance history of the driver	☐ N/A
☐	The incident history of the driver	☐ N/A
☐	The type of vehicle and its level of preparation and safety features	☐ N/A
☐	Whether your personal safety equipment can be used in the vehicle (eg Frontal Head Restraint)	☐ N/A
☐	Cost and/or reimbursement of costs	☐ N/A
☐	Time commitment	☐ N/A
☐	Inter-personal relationship and communication with driver	☐ N/A
☐	The willingness of the driver to take advice about speed, driving style and mechanical matters, particularly if I am concerned about safety	☐ N/A
☐	None of the above	☐ N/A

AIMSS Competitor survey

Significant incidents

23. During the time you have been competing in rallies approximately how many significant incidents have you been involved in?

- ◯ None
- ◯ 1 or 2
- ◯ 3 to 5
- ◯ More than 5

AIMSS Competitor survey

Thinking about your last significant incident ...

24. Approximately how long ago was your last significant incident?

- ◯ Within the last 12 months
- ◯ 1 - 2 years ago
- ◯ More than 2 years ago

25. Was anyone injured as a result of the incident?

- ☐ No
- ☐ Driver
- ☐ Co-driver
- ☐ Spectator / marshal / other person outside the vehicle

AIMSS Competitor survey

Thinking about your last significant incident ...

26. What type of medical intervention was required for the injuries?

- ☐ Injuries required no medical advice
- ☐ Received medical advice / treatment from the event first aid or medical team
- ☐ Medical advice was obtained after the event from a private practitioner
- ☐ Received medical advice / treatment from hospital but was not admitted
- ☐ The injuries were severe enough to result in hospital admission
- ☐ Other (please specify)

27. Indicate which areas of the body (or bodies) were injured in the incident

- ☐ Head
- ☐ Neck
- ☐ Face
- ☐ Hand, wrist, arm, shoulder
- ☐ Torso including chest, internal organs
- ☐ Spine
- ☐ Foot, knee, leg, hip
- ☐ Other (please specify)

AIMSS Competitor survey

Thinking about your last significant incident ...

28. What type of event were you competing when the incident occurred?

	Gravel event using safety (pace) notes	Gravel event not using safety (pace) notes	Tarmac event using safety (pace) notes	Tarmac event not using safety (pace) notes
Club or multi-club level	◯	◯	◯	◯
State level	◯	◯	◯	◯
National or international level	◯	◯	◯	◯

29. Approximately what speed were you travelling at immediately prior to the incident?

- ◯ Very fast (>160 kph)
- ◯ Fast (100-160 kph)
- ◯ Medium (60-100 kph)
- ◯ Slow (0-60 kph)

30. What type of vehicle were you competing in when the incident occurred?

	4 wheel drive	front wheel drive	rear wheel drive
Vehicle manufactured 2010 or later	◯	◯	◯
Vehicle manufactured between 2005-2009	◯	◯	◯
Vehicle manufactured between 2000-2004	◯	◯	◯
Vehicle manufactured between 1985-1999	◯	◯	◯
Vehicle manufactured between 1960-1984	◯	◯	◯
Vehicle manufactured prior to 1960	◯	◯	◯

31. Was the vehicle damaged in the incident?

- ◯ No
- ◯ Yes - minor damage
- ◯ Yes - major damage
- ◯ Yes - the vehicle was not repairable

AIMSS Competitor survey

Thinking about your last significant incident ...

32. Select the option below which best describes the first action of the incident

	Frontal impact	Side impact	Rear impact	Other
Impacted with tree or stump or power pole	◯	◯	◯	◯
Impacted with earth bank, gully or creek	◯	◯	◯	◯
Impacted with Armco	◯	◯	◯	◯
Impacted with gate or fence or signpost	◯	◯	◯	◯
Roll-over	◯	◯	◯	◯
Fire	◯	◯	◯	◯

Other (please specify)

AIMSS Competitor survey

Thinking about your last significant incident ...

33. Identify which of the following the factors you believe contributed to the incident, and rank them in order of importance (1 being most important).

☐	Weather conditions (eg. reduced visibility due to rain, fog, blinding sunlight etc)	☐ N/A
☐	Section of road was out of character with rest of stage	☐ N/A
☐	Section of road was too fast	☐ N/A
☐	Encountered an unexpected hazard (eg livestock, wildlife, another competitor)	☐ N/A
☐	Instructions supplied by organisers were not correct or failed to identify a significant hazard	☐ N/A
☐	Safety (pace) notes used by the crew were not accurate	☐ N/A
☐	Team error (eg missed call by co-driver, driver too fast for conditions)	☐ N/A
☐	Hazard on course was not identified using a caution or hazard board	☐ N/A
☐	Mechanical problem with the vehicle	☐ N/A

AIMSS Competitor survey

Your opinions

34. Indicate your agreement with the statements below.

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree	Don't know or N/A
Current events provide a good mix of conditions, speeds and road types	◯	◯	◯	◯	◯	◯
Many of the roads used in current events are too fast	◯	◯	◯	◯	◯	◯
I prefer fast roads over slower, twisty roads	◯	◯	◯	◯	◯	◯
In the past 2 years I have questioned the safety of some of the roads used for competition	◯	◯	◯	◯	◯	◯
Organisers should use course warning boards to indicate hazards, even in pace-noted events	◯	◯	◯	◯	◯	◯
In events allowing safety notes, reconnaissance should be compulsory	◯	◯	◯	◯	◯	◯
Limiting the maximum permitted average speed for rally stages will improve safety	◯	◯	◯	◯	◯	◯
Limiting the maximum terminal speed of vehicles will improve safety	◯	◯	◯	◯	◯	◯

35. Indicate your agreement with the statements below.

	Strongly disagree	Disagree	Niether agree or disagree	Agree	Strongly agree	Don't know
When it comes to safety, it is the competitors responsibility to keep up-to-date with new technology	◯	◯	◯	◯	◯	◯
CAMS should be more pro-active informing competitors of advances in safety equipment	◯	◯	◯	◯	◯	◯
The required vehicle safety standards for rallies should be the same across all competition levels	◯	◯	◯	◯	◯	◯
The required personal safety equipment for rallies should be the same across all competition levels	◯	◯	◯	◯	◯	◯
Every competitor should have first aid training and be competent at using the items in the first aid kit	◯	◯	◯	◯	◯	◯
Improving competitor safety should be the highest priority for regulators, irrespective of cost	◯	◯	◯	◯	◯	◯
Competitor safety standards in Australia are good and don't require upgrading	◯	◯	◯	◯	◯	◯

AIMSS Competitor survey

Thank you for completing this survey

36. Please provide any additional comments expanding on the questions of this survey and your thoughts regarding the safety aspects of rallying in Australia.

Page 17

AUSTRALIAN INSTITUTE OF MOTOR SPORT SAFETY LTD
851 DANDENONG RD, MALVERN EAST, VIC 3145