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# AIMSS' SUBMISSION TO MOTOR SPORT RECREATIONAL ACTIVITY INQUIRY

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13 December 2019

Committee Secretary  
Transport and Public Works Committee  
Parliament House  
George Street  
Brisbane QLD 4000

Via email: ([tpwc@parliament.qld.gov.au](mailto:tpwc@parliament.qld.gov.au))

**RE: QLD Parliament Inquiry into Motor Recreational Activities**

Dear QLD Parliament Transport and Public Works Committee

The Australian Institute for Motor Sport Safety (AIMSS) is a not-for-profit organisation, established by the Confederation of Australian Motor Sport (CAMS) in 2007 and is the peak body for motor sport safety and related research in Australia.

AIMSS works in conjunction with CAMS in an advisory role and is a research partner of the FIA (Fédération Internationale de l'Automobile) Safety Department to develop safety through research, education and industry liaison. The FIA is the world governing body for four-wheel motor sport.

As a result of its partnership status with the FIA, AIMSS works to disseminate safety breakthroughs, news and information from around the world to the Australian motor sport community.

AIMSS helps keep Australia at the forefront of motor sport safety – benefiting CAMS members and licence holders at all levels. It should be noted that AIMSS is not a regulatory body. That responsibility is delegated by the FIA to CAMS in Australia.

The fundamental objectives of AIMSS is to promote and conduct research into all aspects of motor sport safety, support the training of officials and race personnel, and monitor safety trends in order to identify research and safety regulation priorities.

The AIMSS specific goals are to;

- Lead the development of motor sport safety through research, education and industry liaison.
- Oversee non regulatory activities affecting motor sport safety in Australia including the protection of participants, officials and the public.
- Act in conjunction with CAMS and the FIA.
- Advise Federal and State Governments on best practice in motor sport safety.
- Provide a centre of excellence for specific areas of expertise in motor sport safety procedures that have been developed in Australia.



- Provide AIMSS members with a range of motorsport safety benefits.
- As a conduit for the members of AIMSS, including suppliers to the motor sport industry, to have access to CAMS services relevant to safety in motor sport.
- Investigate motor sport incidents in order to identify causal factors and outcomes, report to AIMSS members, the Board of CAMS and public authorities as appropriate.
- Collect and analyse statistic relevant to motor sport safety.
- Monitor safety trends and develop a program to counter any perception in the community that risks in motor sport are high compared to other sports and respond to areas of public concern.
- Develop and implement innovated AIMSS research and educational programs on safety procedure, practices and technologies and raise funds for such programs.
- Support the training of motor sport officials, such as rally, off road, circuit and race personnel in safety procedures and the use of equipment.
- Monitor the progress of FIA Motor Sport Safety programs and manage the implementation of relevant results of these programs in Australian Motor Sport.
- Make representations to CAMS, where appropriate, that the results of safety research projects may be applied to the regulations of Australian motor sport.
- Promote public road safety in Australia.

AIMSS is providing a submission for consideration by the Transport and Public Works Committee regarding motor sport's contribution in two key areas addressing several points in the Terms of Reference. These are:

- 1) Safety of the Roads
- 2) Society in General

In addition, AIMSS through its association with the FIA, has been instrumental in the identification of specific initiatives within motor sport that has a direct and positive impact on sustainability and the environment. These are included in our submission for the interest of the Committee.

This submission has been included as **Appendix A**.

Should the Committee like to discuss any aspect of this submission further, I can be contacted via the details below. Our Chairman, Garry Connelly AM, is based in Brisbane and is available to appear before the Committee should the Committee so request.

Sincerely

**James Delzoppo**  
**Executive Officer**





## Appendix A

### Submission to Motor Sport Recreational Activity Inquiry

#### Australian Institute for Motor Sport Safety (“AIMSS”)

##### Introduction

Because the principle objective of AIMSS is motor sport safety, the focus of this submission will relate specifically to items d), e) and f) of the Terms of Reference.

However, consideration of matters under item d) will also have implications in relation to item c).

AIMSS will address in this submission the enormous contribution that motor sport research has made in areas of safety and sustainability. This could also be considered by the Committee under item h).

The bulk of this submission involves the identification of key developmental areas in the sport, which have resulted in saving lives and reducing the risk of injury in motor sport, which in turn have been or are in the process of being adopted into the road going automobile.

The reduction of the road toll and serious injury rate (the latter having huge financial and social cost to the people of Queensland) is known to be of concern to the Government of Queensland, AIMSS respectfully submits that the identification of the benefit motor sport has provided, and continues to provide in this area, is of relevance to this Inquiry.

Likewise, AIMSS welcomes the amendment to Terms of Reference e) which now includes “health and wellbeing outcomes”. Our knowledge of the research and development that has emerged from motor sport allows us to submit to your Committee a list of areas where motor sport is making an enormous contribution to the health and wellbeing of all Queenslanders, and their fellow Australians in general.

However, as identified herein, there is greater opportunity for this to be more widely applied across the Queensland community, in numerous ways identified in this submission.

This submission will deal with the items we have identified where we believe AIMSS can assist the Inquiry, by addressing them in order of relevance to the contribution AIMSS can make.



## Item f - The impact of the industry on road safety outcomes

Motor sport has been the principle source of most safety innovations for the automobile. It is widely acknowledged that the “Race to Road” philosophy has led to an enormous number of safety features that have saved millions of lives globally, and the lives of thousands of Queenslanders.

Listed below are just some of these innovations, past and present:

### **1. Seat belts and safety harnesses**

Not only were these first used in motor sport, then finding their way into the production automobile as their ability to save lives and serious injuries became apparent, but the design of the belts, the materials used and the method of mounting, have all been researched within the sport then found their way into the road going car.

### **2. Seat design and head restraints**

Motor sport has been at the leading edge of seat design including head restraints. The original major breakthroughs occurred in rallying but then quickly spread to other forms of the sport. Seat design especially those approved by the FIA are now capable of enabling a driver in a side impact to survive far greater G forces than ever before.



*Picture: Aaron Wishart*



The new Nio EP9 road car demonstrates again how the research conducted by organisations like the FIA and AIMSS has resulted in a flow on effect to road cars, but no doubt more car manufacturers will follow suit in the years to come.

Seat mountings are also extremely important, and the research conducted in motor sport has flowed resulting in more robust seat mounts on road going cars.

### 3. Roll over protection

Roll over protection is highly visible in race and rally cars. It has proved invaluable in the survivability of very high G force crashes. Modern car manufacturers now incorporate the concept of rollover protection in their internal structure of their vehicle cockpits and passenger space.



*Picture: Aaron Wishart*

The combination of improved seat belt design, seats and seat mounts, and inbuilt rollover protection makes a major crash in a road going car more survivable and this is a direct result of motor sport research.

### 4. Lights

The improvement in vehicle lights has been exponential in the past three decades and this has principally been driven by research and development for lights on rally cars and endurance racing cars (such as those that race at night in events like the 24 Hours of Le Mans). The highly efficient low energy lights being fitted today to road going cars have their origins in motor sport. Highly efficient lighting is an essential crash prevention measure especially for a state like Queensland where much of the state's road infrastructure is unlit outside of the major population centres.

### 5. Brakes and Braking Systems

In 1953 Jaguar used disc brakes for the first time in the 24 Hours of Le Mans race. What followed was a rapid adoption of disc brakes on most competition cars and significant improvements in their design



and material which continues today with the development of ceramic discs which result in lower unsprung weight and therefore better and safer handling. These developments flow on directly to road going cars.

#### **6. Wheels and wheel design**

Reducing unsprung weight is a major contributor to the handling of an automobile and also with its energy efficiency. Motor sport led the way with the introduction of magnesium alloy wheels in the 1950s. Since then motor racing and rallying research has led to lighter, stronger and better airflow-designed wheels which are now quite frequently fitted to road going cars either on the production line or fitted post purchase. Less unsprung weight and better airflow are contributors to improved road safety.

#### **7. Tyres**

Without doubt, tyre technology which has its roots in motor sport, has resulted in safer cars and less crashes. Not only tread design but improved materials and compounds originating in motor sport research, provide the average motorist with tyres that are revolutionary compared to what existed three decades ago.

The tyre “arms race” between tyre manufacturers involved in motor sport, sees their R & D departments constantly striving for designs to give greater durability with improved traction in various surface environments. The knowledge gained from rally car tyre research has made tyres used on gravel roads more resistant to punctures and was also the origin of “run flat” tyre technology.

#### **8. Cockpit controls and instrumentation**

The internal layout of the driving cockpit and improvement in instrumentation design and accuracy, is an essential component of motor racing success. Continual development has resulted in technology and design including for example “paddle” gear changes on steering wheels and other steering wheel controls, now becoming standard in the road going car as a direct result of their utilization in motor sport.

#### **9. New “star-rated” Motorcycle Helmet Design**

Motor racing is renowned for having the highest standards in crash helmets, with the FIA specifying very rigid and lab-tested “homologation” requirements for helmets used in FIA-sanctioned motor sport events. As part of its Corporate Social Responsibility policy, the FIA is investing a significant sum of money in developing a new standard of helmet for motorcyclists on the public road. Being acutely aware that not everyone can afford the very highest standard, the FIA is coming up with several options including one for developing countries and less economically-empowered communities.

These standards use the world’s best researched and tested motor sport principles and apply them to helmet designs for member of the public, with the objective of reducing fatalities and major head traumas. This will have a significant economic and social benefit to the community and is part of the FIA’s “Race to Road” initiative.

#### **10. Crash barriers**

In the four or more decades since many racing circuits around the world were built, the speed and cornering ability of race cars have increased exponentially. This has had the unfortunate consequence of cars hitting barriers at much higher speeds, resulting in more fatalities and major injuries. Therefore,



since 1994, the FIA has been heavily involved with its partners such as AIMSS, in developing crash barriers which will not only achieve their principle purpose of protecting spectators, but will also enable energy to be absorbed thus minimising the risk of injury to the occupant of the race car.

Barriers such as the Tecpro barrier are a result of this research. Recorded motor sport crashes of in excess of 60G into Tecpro barriers have resulted in the driver walking away from the crash scene. The use of such barriers on Queensland roads, whilst expensive, would significantly reduce the road toll and serious injuries. Obviously cost is a factor, but the application of this technology to “black spots” would unquestionably be beneficial.

### **11. Debris fencing**

The FIA research division has recently finalized testing of trackside debris fencing and has issued international standards for their design and construction. This is a world-first and in some countries, government transport authorities have now adopted the FIA standard for temporary (and permanent) debris fencing on public roads.

### **12. Crash Data Recorders (or Accident Data Recorders)**

These provide essential data such as the magnitude and direction of G forces on a vehicle occupant during every phase of a crash. This data has proven invaluable in motor sport research to improve energy absorption systems in both racing and rally cars. Many of the design principles are now incorporated in the design of the modern road car, saving countless lives and serious injuries.

The FIA has just invested a significant sum in the design of a new low-cost Data Recorder that can be fitted to all motor sport cars, even at grass roots level, for which the targeted cost is less than A\$50.

### **13. High Speed Camera and Crash Investigation**

The FIA has developed a high-speed camera (400 frames per second) which is mounted facing the driver of top category vehicles such as Formula One and Formula E. Its purpose is to film the movement of the driver’s head and upper body during very high impact crashes.

When combined with the Crash Data Recorder and on-board GPS, this enables the FIA and AIMSS crash investigation specialists to obtain essential data which is then utilized to implement new safety initiatives. These initiatives then flow on to production road cars. However, there is even greater potential for these systems to be incorporated in all road cars thus providing researchers outside of motor sport, access to a vast array of crash data which could be used to improve vehicle and road safety.

### **14. Biometric Gloves**

The FIA conducted research resulting in a biometric driving glove which is used by all Formula One drivers. It measures a driver’s oxygen level and in the event of a crash, this data is transmitted to medical intervention units. This is essential information because it indicates to the intervention unit the state of the vehicle occupant and this facilitates critical decision-making as to the urgency of a particular extraction. There is enormous potential for this type of device in, for example, long distance transport.





## Item e) The impact on youth training and community engagement from motor recreational activities, including health and well-being outcomes.

AIMSS, in making this submission, has taken a very wide view of what it considers “health and well-being outcomes”. It considers that a critical factor in the health and well-being of Queenslanders is the environment and sustainability.

A reduction in the use of fossil fuels will result in less air pollution.

We acknowledge that whilst electric vehicles will play a significant part of the move to reduce air pollution, especially in major cities, their universal adoption or even widespread use in a state such as Queensland, with all the challenges of “tyranny of distance” is decades off.

That is why, in this submission, we will place strong emphasis in the highly significant role that motor sport has played, and is continuing to play, in dramatic improvements in the efficiency of the traditional internal combustion engine (ICE).

In addition, motor sport is leading the way with the introduction of Formula E – an “open wheel, single seater” category of racing car, powered by batteries.

### **1. The Formula One Power Unit**

The modern Formula One power unit comprises a small but highly efficient ICE of 1.6 litres capacity. The ICE is approaching an energy efficiency level of in excess of 50%, nearly double that of an internal combustion engine of 20 years ago. In addition, it has an extremely sophisticated “hybrid” system comprising two energy recovery systems – one kinetic and one heat (from the turbo charger).

Together these two systems recover approximately 160 horsepower – roughly the equivalent power of a medium size sedan car. The energy recovered is stored in a very small but highly efficient battery system. This technology, developed for Formula One by Mercedes, Ferrari, Renault and Honda, is finding its way into road going cars.

This has resulted in the modern production car being extremely efficient and emitting less pollutants thus making a significant difference to the environmental footprint created by the mobility of the world’s population.

### **2. Formula E**

Formula E is similar to Formula One in that the vehicles are single seat open wheeled race cars. However, Formula E is powered by a 100% electric motor. This has meant that competitors have been forced, by the regulations, to develop batteries which have greater capacity, but which are lighter and smaller. This technology has now been utilised in not only the production car market but also in commercial applications in industry.



Improved battery storage capacity will drive an increased use of solar energy, enabling it to be stored in greater quantities, and will lead to less reliance on fossil fueled power, thus contributing to a better environmental outcome that will benefit everyone, including all Queenslanders.

### **3. Lubricants**

Motor sport has led to the development of more efficient lubricants such as engine and gearbox oils. Major oil companies such as Shell, Total, Castrol and Mobil are all active suppliers of lubricants to all forms of motor sport and spend significant sums of money to develop lubricants that result in engines and gearboxes shedding less energy through friction, thus making the cars more efficient overall, and therefore burning less fuel and hence emitting less pollutants.

### **4. Fuels**

Motor sport is leading the way in the development of more sustainable environmentally friendly fuels. Supercars in Australia use a fuel developed with Shell, comprising 85% ethanol.

The FIA has just commissioned a major research project to develop a 100% carbon neutral biofuel and has allocated 500,000 euros to the research project. It will only be a matter of time for the ultimate results of this research to flow on to a fuel that will be available for production cars with internal combustion engines.

### **5. Use of Carbon Fibre Reinforced Polymer**

For more than two decades, carbon fibre has figured prominently in vehicles designed for motor sport, because of its weight and strength. Twenty years ago, McLaren developed a totally carbon fibre chassis for its Formula One car and now all major racing categories have adopted this same principle. Finally, this has led to its use in a production car – the BMW i3 which has a carbon fibre body. The use of carbon fibre significantly reduces weight, meaning less energy is required from the power unit.

### **6. Direct Shift Gearbox**

The Direct Shift Gearbox (DSG) or Seamless Shift was developed in motor sport to enable more efficient changing of gears. This results in less energy loss and more efficient performance. The DSG technology is now available in many production gears including mass produced models such as Mazda. DSG in production cars means less fuel is consumed because the power train is more efficient.



## Other areas where motor sport contributes to the community and well-being of its people

### 1. Formula 1 in Schools

Run by Re-Engineering Australia Foundation (REA), the competition commenced in Australia in 2003 and is offered to all high schools across Australia. It focusses on developing the creativity and innovation of high school students through a structured engineering design project based on the development of a of a model Formula 1 racing car.

Initially aimed at students in years 7-10, the program is now offered to students from years 5-12. Each year the program engages more the 40,000 high school students in Australia and delivers industry-standard technology into schools with is made available to a further 300,000 students outside the program.

Queensland schools involved in the program include Canterbury College, Concordia Lutheran College, Runcorn State High School and Roma State College.

### 2. FIA Action for Road Safety

The FIA has a long and distinguished history in promoting road safety. For many years the Federation has lobbied for improved legislation, infrastructure and vehicle safety technologies on an international scale.

The FIA's 'Action for Road Safety' campaign, launched in support of the UN Decade of Action for Road Safety, is based around 4 key priorities:

- Advocacy at the highest levels – The FIA has developed key working relationships with international institutions such as the UN, the World Health Organisation, the European Union and the World Bank and governments around the world.
- Action by clubs on the ground – The FIA is supporting its club network through the FIA Grant Programme. Established in 2012, the Grant Programme works with clubs to improve road safety at a local level.
- Motor sport and Road Safety – The FIA has mobilised the motor sport community to promote the FIA's Action for Road Safety.
- Campaigns & Partnerships - The FIA has launched its own initiatives, such as the 10 Golden Rules and an online pledge in its mission to make roads safer. To mobilise for the cause, the FIA has also established numerous institutional and corporate partnerships with leading actors.

Central to the campaign are the 10 Golden Rules for Safer Motoring - a set of simple tips intended to help motorists improve their driving behaviour. These rules hope to assist motorists in reaching a golden standard of motoring and to remind them of their responsibilities to themselves, their passengers and all other road users.



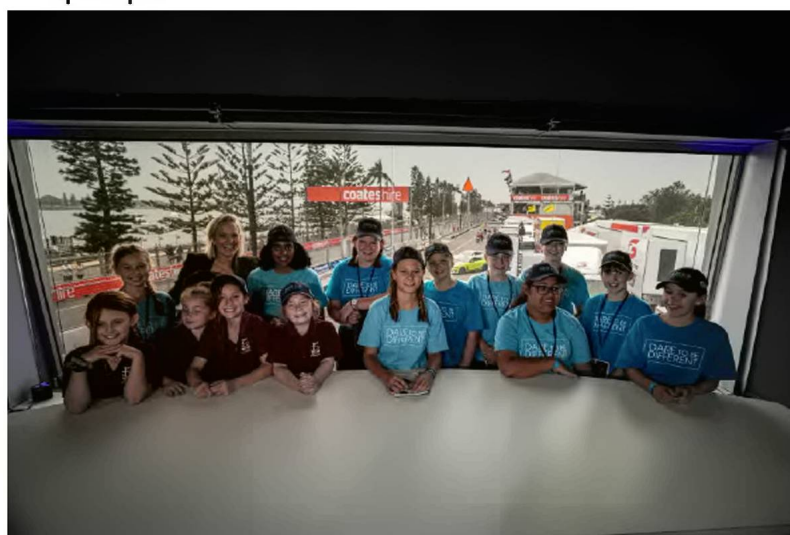
More recently the FIA has partnered with Global PR company JC Decaux, to promote via the use of billboards, its road safety campaign in over 1000 cities around the world, including Brisbane, Sydney and Melbourne

### 3. Dare to be Different

Dare to be Different is a global, not-for-profit initiative spear-headed by former Formula 1 development driver Susie Wolff. In Australia the program is backed by the Confederation of Australian Motor Sport (CAMS). School girls aged 8-14 are offered a unique opportunity to participate in free Dare to be Different events.

The goal of the program is to grow interest in STEM subjects and industries amongst schoolgirls with the aim of increasing female participation in these sectors, using motor sport as a tool to expose them to the incredible opportunities and career paths.

In 2019, Dare to be Different events have been held at Triple Eight Race Engineering and the Supercars Ipswich SuperSprint.



*Picture: Mick Reynolds*

### 4. Crashtag

Crashtag, a current project developed and coordinated by AIMSS is focused on the development and world-wide deployment of a smartphone application for crash reporting and consequently, provision of essential data for National Sporting Authorities (ASN) and the FIA World Accident Database.

Based upon field-based research, it is apparent that there is a significantly greater number of crashes during motor sport events (particularly for rally and off road) which are unreported (or only partially reported), and consequently data regarding such incidents is not captured. Without this data, the ability to comprehensively analyse matters, particularly those related to safety, is significantly diminished. The consequence is potential delays to improvements in safety, with such delays having the potential to result in further injuries or fatalities.



Based on the Review of Australian Rallying undertaken by AIMSS, it was determined that the under-reported crashes were the result of the time-consuming paper-based process for recording such incidents. With the development of an app, such as Crashtag, AIMSS believes that such incidents will be significantly easier to record and be less time consuming to capture. It will also lead to greater standardisation of data, and promote faster and more comprehensive analysis, which shall further enhance motor sport safety research.

Working with Queensland-based developers, AIMSS received funding from the FIA in December 2019 for continued development of the project. AIMSS believe Crashtag may be applicable in a mobility environment in the future, particularly for emergency and military services.



## 5. Anti-Doping and Alcohol Programmes

In motor sport as in other sports, anti-doping is essential. And in a sense, it is perhaps even more crucial in our sport, in that it is not only a matter of equity, ethics and health, but also a question of safety. By using any substance that can alter judgement and reactions, a driver may indeed put his/her life and the lives of others in danger.

Various programs exist to relating to anti-doping, alcohol and illicit drugs, the purpose of which is to protect any motor sport participant's fundamental right to participate in a doping-free sport and thus promote health, fairness, equality and safety in motor sport.

FIA Race True is an eLearning course, developed by the FIA, which covers the key anti-doping points that a competitor must be aware of. Ignorance is no excuse when it comes to anti-doping violations so it is highly recommended that competitors take the time to complete this course. It is available in English, French, Spanish, German, Russian, Portuguese and Arabic and takes about 30 minutes to complete.

CAMS contracts the Australian Sports Anti-Doping Authority (ASADA) to conduct testing at certain events throughout the year. Testing is done primarily by collecting urine samples however ASADA do have the authority and ability to take blood samples if they so wish.

The CAMS Illicit Drugs in Sport (IDiS) program was established as part of the Australian Government's 'Illicit Drugs in Sport – National Education and Action Plan' initiative. In addition to educating motor sport participants about the dangers associated with illicit drug use, CAMS Safety Testing is carried out on participants to detect illicit drugs and enforce penalties such as exclusion from events, drug counselling and fines.



Breath alcohol testing has also been carried out at CAMS-permitted events since the early 2000s. This service is carried out, at no cost to event organisers, by CAMS Authorised Testing Officials (CATO) throughout all states and territories and at all levels of competition from grassroots right through to the international level.

#### **6. Motor Sport Events in Queensland**

Each weekend Queensland plays host to a range of motor sport events, from grass-roots gymkhanas, hill climbs, sprints, rallies and off road races, to major international events such as the Gold Coast Supercars event in October each year. Every event brings an economic impact to the local community. Often overlooked, even small club events such as rallies and off road events in rural Queensland, bring positive benefit and dollars to local businesses.

Likewise, the huge network of CAMS Car Clubs throughout Queensland, provides a means for people with a common interest to gather together and to work together. Leadership and other skills are developed and promoted particularly in the organisation of motor sport events.

#### **7. Motor Racing Teams based in Queensland**

AIMSS is aware that a number of leading Supercars teams are based in South East Queensland. These provide jobs but equally as important, are in themselves, venues for innovation and high technology. Queensland is also home to other motor sport teams and product suppliers including PWR Advanced Cooling Technology, a publicly listed company supplying Queensland designed and built products to motor sport teams around the world, including most Formula One teams.



## Item d) Options to improve the safety of all industry participants

AIMSS, as the primary motor sport safety research organisation in Australia, firmly believes that all motor sport in Australia should be conducted in the safest manner possible. It believes that this is only possible where events are conducted according to the best available safety regulations, such regulations being founded on relevant and up to date research.

In Australia, that would mean applying the standards set internationally by the FIA for four-wheeled motor sport, and the FIM for two and three-wheeled motor sport. These standards apply to 5 main aspects of motor sport:

1. Vehicle safety
2. Driver equipment
3. Circuit design and safety
4. Event organisation
5. Driver licensing

The sole regulatory body delegated authority by the FIA for the conduct of four wheeled motor sport in Australia is the Confederation of Australian Motor Sport (CAMS) – soon to be known as Motorsport Australia.

The sole regulatory body delegated authority by the FIA for motorcycle sport is Motorcycling Australia (MA).

AIMSS is aware that in Queensland some motor sport events are conducted outside of the above regulatory regime. AIMSS considers this to be a dangerous practice and respectfully urges government to ensure that motor sport events in Queensland are conducted under the authority of, and with the sanction of, the respective internationally-recognised bodies.