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Quad Bike Safety Taskforce - Issue Paper Submission
Consumer, Building and Occupational Services
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Australia

Dear Mr Webster

RE: Response to the Quad Bike Safety in Tasmania issues paper

Thank you for the opportunity to provide a response to the 'Quad Bike Safety in Tasmania' issues paper developed by the Quad Bike Safety Taskforce. RACS commends Mr Guy Barnett and the Taskforce in its endeavour to look at innovative state-wide strategies to improve safety outcomes for quad bike users, and wholeheartedly supports the key safety actions listed in the paper.

RACS is extremely concerned about the increasing number of deaths and major injuries as a result of quad bike use. Trauma surgeons who manage these injuries on a far too regular basis are acutely aware of the inherent dangers of quad bikes and have been advocating for quad bike safety for decades.

The following key messages are imperative for quad bike safety:

- Quad bikes and kids do not mix
- An **independent quad bike safety assessment program** is needed to help inform the customer of their purchase choice as recommended by the Victorian, Queensland and New South Wales coroners. The well-known ANCAP (Australasian New Car Assessment Program) safety rating program is a fine example of a safety initiative that provides consumers with transparent information on occupant protection and collision avoidance capabilities.

The RACS submission to the Tasmanian Coronial Inquiry in April 2016 (attached) provides more detail into the background and the issues surrounding the dangers of quad bike use. Tragically many of the deaths and major injuries occur in children under the age of 16.

RACS is keen to assist with the promotion of any campaign surrounding quad bike safety and the advocacy of the key messages as listed above.

Yours sincerely,

Dr Girish Pande, FRACS
Chair Tasmanian Regional Committee

Dr John Crozier, FRACS
Binational Trauma Committee Chair

ROYAL AUSTRALASIAN COLLEGE OF SURGEONS



SUBMISSION TO
INQUEST INTO THE DEATH OF 7 RIDERS OF QUAD BIKES IN TASMANIA

7 April 2016

EXECUTIVE SUMMARY

The number of fatalities due to quad bikes is a cause for great concern in Tasmania and nationwide, and may be rising.¹ In 2015, 22 Australians died from injuries sustained from quad bike use, including three deaths in Tasmania. Of these 22 fatalities, 12 were the result of a roll over accident (including two in Tasmania), and three involved children under 16 years of age. In 2014, there were 15 quad bike deaths in Australia, 21 in 2013, 19 in 2012 and 20 in 2011.² Already in 2016, three Australians have been killed following quad bike accidents.³

The dangers of quad bike use in Tasmania have been previously highlighted following a cluster of quad bike deaths in 2003 and 2004. These deaths were investigated by the then Tasmanian Coroner, whose recommendations included wearing of an industry standard safety helmet and mandatory training courses for users of quad bikes.⁴⁻⁶ These recommendations were promoted heavily by WorkSafe Tasmania,⁷ highlighting the resonance with the *Workplace Health and Safety Act 1995* and the *Workplace Health and Safety Regulations 1998*. Despite this scrutiny and advocacy in this and other Coronial inquests, quad bike tragedies continue to occur.

Alongside deaths, quad bikes are a concerning cause of non-fatal injury. Detailed analyses conducted in Victoria,⁸ New South Wales (NSW)⁹ and Western Australia (WA)¹⁰ each document significant and increasing burden of injury, in addition to deaths, due to quad bikes. Nationwide, the characteristics of quad bike trauma are strikingly similar, including a strong male preponderance, and peak incidence of fatalities and injuries in younger riders, e.g. in those aged 10-29 years in WA,¹⁰ and 15-29 years in Victoria.⁸ These state-based datasets are reviewed in detail within the submission.

The Royal Australasian College of Surgeons (RACS) is very concerned about the risk of death or injury for young persons riding quad bikes. Of the quad bike deaths recorded in Australia between 2001 and 2015, 18% occurred in children under 16 years of age, including 11 children under 6 years of age. In this 15 year period, at least one Australian child under 16 years has died from quad bike injuries every year, except in 2008 and 2010, with an average of 2.6 child fatalities per annum.³ These already concerning statistics are brought into even clearer focus, when one considers that children under 16 years of age accounted for three of the nine Queensland deaths and four of the 13 NSW deaths investigated in recent coronial inquests.^{11,12}

In other countries and contexts, quad bikes are also referred to as 'all-terrain vehicles' (ATVs). Contrary to what this name implies, quad bikes are *not suitable* for use in all terrains. Despite having four wheels, current quad bike design imparts a high centre of gravity and a narrow wheelbase to the vehicle, making them unstable and prone to rolling; e.g. if used on steep or uneven terrain.¹³ Most serious quad bike injuries and deaths involve the vehicle rolling onto the rider, even at low speeds.¹⁴

One contributor to the reported increase in quad bike trauma may be increased use of these vehicles. Quad bike sales have risen steadily over the past decade, with the Federal Chamber of Automotive Industries reporting a 34% increase in sales to a total of 4,509 units in the first quarter of 2011

compared to the previous year. Other years show more modest increases in sales.¹⁵ Quad bikes now represent approximately one fifth of total motorcycle sales in Australia. This acknowledgement does not shift the responsibility from industry to consumer, rather highlights the positive and proactive opportunities manufacturers and sellers of quad bikes can have towards making an increasingly popular product safer in its design and use.

Unfortunately, quad bike manufacturers have a history of resisting design modifications or other measures proposed by safety experts.^{16,17} Research shows use of alternate vehicle designs such as side-by-side vehicles, that are inherently more stable, and factory-fitted roll over protective systems with a combination of roll bars/cage and seatbelts could save lives. Quad bikes themselves can be made safer by design changes, including improved static and dynamic stability, safer cornering on hard surfaces and fitting of an operator protection device.¹³ All possible efforts to improve the engineering and design safety features of quad bikes are critical in reducing fatalities and injury rates.

This and other research detailed in the potential dangers of quad bike formed part of the evidence considered at three previous coronial inquests, namely Victoria¹⁸, Queensland (2015)¹² and NSW (2015).¹¹ The recommendations of each these inquests are consistent in their message for action, including consideration to be given to the introduction of mandatory quad bike user training, mandatory helmet use, prohibiting children under 16 years of age from using adult-sized quad bikes, creation of Australian standards for quad bike manufacture and quad bike helmets, and introduction of an Australian safety rating scheme for quad bikes and similar vehicles, e.g. side-by-side vehicles. These recommendations will be well known to the Tasmanian Coroner, and only summarised here with the full details outlined in the respective inquest reports referenced above.

In this submission, we will set out the history of RACS involvement in the prevention and care of quad bike and other transport-related trauma, summarise key research addressing quad bike trauma, and outline the RACS position on quad bike trauma as informed by this history and research.

SUMMARY OF KEY RECOMMENDATIONS

The Royal Australasian College of Surgeons requests that the Tasmanian Coroner consider the following recommendations.

1. **Helmets:** compulsory helmet wearing all quad bike riders (whether an operator or passenger) at all times, on all roads, together with adoption/development of a suitable standard for quad bike helmets designed for the requirements for off-road riding.
2. **Children:** all available strategies to prevent children under 16 years from riding quad bikes, including prohibiting use of adult- and child-sized quad bikes alike, restricting sale of child-sized quad bikes, and mandating child-resistant starting mechanisms.
3. **Training and licencing:** compulsory quad bike handling training mandatory for all new owners, and all employees whose work involves quad bikes.
4. **Safety rating system:** there is a need for improved stability, dynamic handling and rollover crashworthiness safety for both workplace and recreational quad bikes. The College recommends implementing an Australasian New Quad Bike Assessment Program, along similar lines to the ANCAP safety rating system, noting the differences in proposed rating methodologies.
5. **Standards and design:** industry-partnered development and implementation of an Australian standard for quad bikes, which incorporates the design advances and safety features identified in the TARS report and allied engineering and road safety research. Separate and more demanding safety requirements may be appropriate for quad bikes intended for use in the workplace, or for which conditional registration may be sought for limited on-road use.

THE COLLEGE'S HISTORICAL INVOLVEMENT IN THE ISSUE OF QUAD BIKE SAFETY

The Royal Australasian College Of Surgeons (RACS) has a strong history, and ongoing engagement, with trauma prevention.¹⁹⁻²¹ The Trauma Committee of RACS was established in 1970 in response to an escalating road toll and recognition of the serious public health risk posed by road crashes. As a profession, surgeons have a unique opportunity, and so responsibility, to understand and work to prevent transport related trauma. "It is the [surgical] profession which sees the aftermath of a road accident, the aftermath of the split second in which it happened, the horrible and irreversible mutilation, the griefs, the brave attempts to repair, the heartbreaking rehabilitation. And it is the profession which must help find a solution to this problem, a cure for a disease of the community that has reached a significant magnitude." (ESR Hughes, first Chairman of the RACS Standing Committee on Road Trauma).²²

RACS has been influential with policy makers and legislators and was a public advocate for reducing trauma.²⁰ For example, Gordon W. Trinca, a celebrated Australian Trauma Surgeon, leading advocate and Chair of the RACS Road Trauma Committee from 1975 to 1993, was a key player as in the campaign for mandatory seat-belt wearing and drink driving countermeasures during the 1960s and 70s. Whilst controversial at the time, these measures proved the turning point in reducing the hundreds fatalities each year. The history of the role of RACS and its Fellows in this campaign and in the advocacy space is clearly documented in RACS publications, including that from Alan Gregory, *Blood, Belts Booze and Bikes*.^{19,20}

RACS also works as a strong advocate for the Australian Trauma Registry, which collates data from 27 designated trauma centres across Australia, and published its inaugural report in 2014, containing data from 2010 to 2012. This report includes information on trauma cases arising from transport related accidents, falls, fire, suffocation and drowning.²³

In recognition of the important contribution offered by the Royal Australasian College of Surgeons, representatives of RACS were invited to join the Trans-Tasman Quad Bike Working Group established by the Heads of Workplace Safety Authorities (HWSA) in early 2010 to address quad bike safety. Other members of the group included representative of work health and safety regulators from Australia and New Zealand, manufacturers, unions, automotive and farming associations. This Working Group led to the research project commissioned by SafeWork NSW, on behalf of HWSA, and was undertaken by TARS UNSW. This research was informed by the Quad Bike Performance Project Reference Group, established in 2012. The reference group outlined a broad strategy to address quad bike safety, including safety improvements for quad bikes and farm industries aimed at reducing fatalities and injuries. RACS were also asked to join the Quad Bike Performance Project Reference Group (QBPPRG), which was another group that included safety researchers, work health and safety regulators from Australia and New Zealand, the FCAI, and other safety stakeholders. The QBPPRG was set up Transport and Road Safety Research Centre at the University of New South Wales on behalf of WorkCover NSW a \$1.3 million research project commenced to help reduce the number of quad bike deaths across NSW.

Sadly, 40 years on from ESR Hughes' seminal observations regarding the role of RACS in trauma advocacy,²² surgeons again find themselves 'on the front line', confronted with unpleasant opportunity to learn from, and respond to, firsthand experiences of the devastating results of quad bike injuries. "The unique contribution of surgeons in identifying injurious biomechanical outcomes from real world incidents and, in particular, leadership and involvement in the collection of accurate trauma data used by epidemiologists and engineers, has been critical to establishing the evidence base necessary for effective quad bike safety countermeasures."²⁴

Given the informed nature of surgeons' engagement in quad bike trauma, it is not surprising RACS were called as an expert witness in an inquest into quad bike deaths conducted by the NSW Coroner in 2015. The College's contribution to this inquest is clearly evident in the published findings.¹¹

NATIONWIDE PICTURE OF QUAD BIKE DEATHS AND INJURIES

National quad bike fatality data

From January 2001 to March 2016, 223 Australians died from quad bike related trauma: 185 (83%) persons aged 16 years or more, 27 (12%) aged 6-15 years and 11 (5%) aged less than 6 years.³ Between 2001 and 2015, deaths occurred in every year, with an average of 14.7 deaths per annum. Fatalities have occurred in each of the eight Australian states and territories, with majority of cases occurring within Queensland (27%), NSW (26%) and Victoria (19%). Twenty Tasmanians have died, which represents 9% of the total cohort. Cause of death is recorded in 181 cases, with the most common causes being: head injury (28%), asphyxiation (16%), other thoracic injury (15%), and multiple injuries (13%). In accordance with this injury pattern, roll over accidents account for 62% of the 211 fatal cases in which the mechanism of accident has been determined.³

Victoria

Clapperton et al (2013) investigated quad bike injuries and deaths in Victoria between 2002/03 and 2010/11, identifying 19 fatalities, 766 hospital admissions and an additional 816 emergency department presentations associated with quad bikes. The incidence of admissions increased by 40% over the nine year study period. Strikingly, younger patients accounted for the peak incidence of fatalities (15-29 years, 26%), admissions (15-29 years, 28%) and emergency department presentations (0-14 years, 32.2%). Considering the 19 fatalities, head injuries were most common (26%), followed by traumatic asphyxiation (16%) and fractures (16%). Considering the 766 admissions, 28% fulfilled criteria for "serious" injury. Consistent with other Australian states, "males were strongly overrepresented (84.2% of fatalities, 73.8% of admissions and 71.2% of ED presentations)".⁸

New South Wales

Data provided by the NSW Institute of Trauma Injury Management record 102 patients admitted to a NSW Trauma Facility with quad bike injuries between 2010 and 2014. Whilst the majority of these patients survived their injuries, six died, most commonly due to head injury. Overall, the chest was the

most commonly injured body region, with chest injuries in two thirds of cases. Eighty-five percent of cases sustained injuries to multiple body regions, with Injury Severity Scores (ISS) showing moderate (ISS 13-15) or serious (ISS 16-24) injury in the majority. As might be expected, males accounted for almost 90% of all cases. Giving cause for particular concern, younger persons (<25 years of age) were as likely to be injured as those aged 25-44, each group accounting for one quarter of all cases.⁹

Western Australia

A state government report based on data from the WA Hospital Morbidity Data System (HMDS) reported “less than five deaths and 2,149 separations” in WA hospitals due to quad bike injuries between 2001 and 2011.¹⁰ There was an upward trend in quad bike trauma hospital separations, increasing from 92 in 2001 to 291 in 2011. The majority of separations were male (78%), and aged 10-29 years (53%). Considering all injuries, the extremities and pelvic girdle were most commonly injured (54%), followed by head/neck (21%), abdomen/pelvis (13%) and chest (11%).¹⁰

KEY RESEARCH ADDRESSING QUAD BIKE SAFETY

Quad Bike Performance Project

In 2012, the NSW Government announced \$1 million in funding for research into vehicle safety and improving quad bike protective devices and accessories. The research was conducted by the University of New South Wales (UNSW) Transport and Road Safety (TARS) research faculty, supported by funding from the NSW WorkCover Authority and Australian Consumer and Competition Commission (ACCC). The research comprised hundreds of tests on 11 types of quad bikes and five types of side-by-side vehicles. The research was led by Professor Grzebieta, a highly credible safety expert, with over 30 years of research and practical experience in crashworthiness and road safety.

One key outcome of this exhaustive research was a proposed star safety rating for quad bikes and side-by-side vehicles. This rating system reflected the stability, handling and rollover crashworthiness of each vehicle type. The full details of this research are summarised in the document ‘Final Summary Project Report: Test Results, Conclusions, and Recommendations’.¹³

The recommendations of the *Quad Bike Performance Project* outlined in this project report included:

- A requirement for all quad bike riders to undertake vehicle specific accredited training before riding unsupervised.
- Mandating the use of an appropriate helmet for all riders and side-by-side vehicle occupants.
- Children under 16 years of age should not operate an adult quad bike.
- Implementation of an information campaign for farmers about quad bike stability and safety, including the risks of carrying of passengers and loads (especially spray tanks).
- Recognition that active riding is required on current design quad bikes and that warnings are required for riders about the safety risks.
- The use of alternate (side-by-side) vehicles by older riders who cannot or will not use an active riding style, as older riders are over represented in work place quad bike fatality data.

- Promotion and support for a safety rating system that assesses stability, dynamic handling and crashworthiness of quad bikes and side by side vehicles, to allow informed consumer choices and to encourage safer vehicle development.
- Implementation of a quad bike standard or other functional design requirement and continuous improvement of this based on findings from the research program.
- Further research into safe use of age-appropriate children's quad bikes, Operator Protection Devices and an exposure-based survey of quad bike safety.¹³

Importantly, the findings of the *Quad Bike Performance Project* suggest that while current prevention strategies focus on lower order risk controls such as rider training and administrative controls, developing a safety rating system quad bikes and side-by-side vehicles system similar to the New Car Assessment Program (NCAP) would lead to significant improvements in safety through safer vehicles being developed and marketed, safer vehicle choice, and increased safety awareness among users.²⁵

Despite initial resistance from the industry (as is occurring now with quad bikes) the benefits of NCAPs in Australia and overseas are undeniable. They have led to dramatic improvements in vehicle safety and road tolls through the installation and improvement of airbags, crashworthy structures and handling assistance such as antilock braking system (ABS) and electronic stability control (ESC).

Additional research from Australia

The effects of quad bike injuries and fatalities devastate the lives of the victims, families and surrounding communities, and there is also an economic cost to pay. A University of Sydney study found the average cost to the Australian economy per quad bike-related fatality is \$AUD2.3 million.²⁶ This includes the cost of lost earnings, emergency services, accident investigations and other factors.

Over 60% of all deaths in this study involved a rollover, meaning design approaches to improve the safety of quad bikes in terms of stability and protection in the event of a rollover should be prioritised. The study also recommended that no children under 16 years of age should ride adult-sized quad bikes, riders should not carry passengers, and proper training and the use of helmets is essential.²⁶

Additional research from the United States

Since the introduction of quad bikes (termed here all-terrain vehicles, ATVs) to the United States in 1971, injuries and mortalities related to their use have increased significantly.²⁷ The first ATVs were three wheel bikes, that were eventually proven to be so dangerous that the US Consumer Product Safety Commission (CPSC) issued a Consent Decree that banned their sale for 10 years from April 1988. After the 10 year decree expired, manufacturers voluntarily continued to abstain from selling three wheel bikes in the US. Meanwhile, quad bikes were growing in popularity and effectively replaced three wheel bikes as a recreational and work machine.

Research from the University of Mississippi found that patients on a quad bike with an engine size of 350 cc or greater had higher injury severity scores and an increased incidence of traumatic brain injury than those on smaller quad bikes. The researchers concluded that legislative efforts to implement rider protection laws for quad bikes were warranted.²⁷

A 2015 study of mortality and morbidity related to quad bike use in the US between 1982 and 2013 by the CPSC identified 13,043 reported fatalities.²⁸ Estimated fatalities for 2012 were 650, and 691 for 2011. There were an estimated 99,600 quad bike-related hospital presentations in 2013, a quarter of which were children under 16 years of age.

Impact of 'Sean's Law' on quad bike trauma in Massachusetts, United States

In 2010, Massachusetts, US, introduced state legislation to establish an absolute age restriction for use of 'off-road vehicles' (ORVs), which includes quad bikes – the first of its kind in the United States. The law is coined 'Sean's Law' in memory of 8 year old Sean Kearney, whose tragic death following quad bike trauma was formative in prompting the legislation. Most notably, this law prohibits all children less than 14 years of age from using all quad bikes on both public and private land. Children aged 14 to 16 also had restrictions enforced on quad bike use, including mandating quad bike training and direct supervision by an adult. This law complimented the existing legal requirements in Massachusetts for mandatory helmet use and ORV registration.

Since introduction of 'Sean's Law' in 2010, the burden of injury and death due to quad bikes has reduced significantly. In Massachusetts, emergency department presentations were reduced 'post-law' (2011-2013) by 33% in children 0-9 years, 50% in children 10-13 years, and 39% in 14-17 year olds. Admissions to hospital for quad bike trauma in patients aged 0-17 years were decreased by 41% in the same 'post-law'. Head injuries due to quad bike trauma have reduced by half, with both immediate and projected savings to health and societal costs of traumatic brain injury. (*Unpublished and proprietary data*, kindly provided by Trauma Surgeon Associate Professor Peter Masiakos, Harvard Medical School and Director, Pediatric Trauma Service, Massachusetts General Hospital).

THE COLLEGE'S POSITION ON POTENTIAL CHANGES OR DEVELOPMENTS IN THE:**A. USE OF HELMETS BY QUAD BIKE RIDERS**

Helmet status is recorded in 128 of the 223 quad bikes deaths in Australia between January 2001 and March 2016. Of these, 70% of fatalities occurred in riders *not* wearing helmets, and head injuries were the most common cause of death.³ These observations are strongly supported in the literature, with non-helmeted quad bike riders to sustain “significantly more head, neck, soft tissue injuries, concussions, intracranial hemorrhages, facial fractures, skull fractures, and thoracic spine fractures than helmeted [quad bike] riders”.²⁹ Adding to these concerns, helmet usage by quad bike riders is low. For example, a study conducted by the University of Vanderbilt, Tennessee, showed only one third of 163 children under the age of 16 years sustaining quad bike injuries were wearing a helmet at the time of their injury.³⁰

RACS supports passage of legislation that makes helmet wearing compulsory for all quad bike riders (whether an operator or passenger) at all times, whether on- or off-road.

Further, RACS advocates for the development of a suitable standard for quad bike helmets, which recognises the unique design requirements for off-road riding. An example of this is provided by the New Zealand standard (NZS 8600:2002).

In New Zealand, use of standard-compliant quad bike helmets in the work place is required by law (*Health and Safety in Employment Act, 1992*), whether on- or off-road.³¹ Similar recommendations are echoed by Safe Work Australia, albeit without the same requirement in law for off-road use.³² These are important considerations given quad bikes now account for more deaths on Australian farms than any other equipment, including tractors. It is also noteworthy that, of 13 work place quad bike deaths in Australia from 2011 to 2015 for which helmet status was known, all but one were *not* wearing a helmet.³²

In light of such statistics, RACS calls for the urgent adoption of a legal framework, which protects employees and makes compulsory the wearing of a standard-compliant helmet whenever riding quad bikes in the work place, including off-road.

The position here notwithstanding, it is notable that a significant proportion of quad bike deaths would not be prevented by wearing of a helmet, e.g. 31% of Australian quad bike deaths since 2001 were due to asphyxiation and/or thoracic trauma. Also, 13 Australian children under 16 years are known to have died from quad bike injuries despite wearing a helmet at the time of the accident.³ These qualifications are not included to undermine the importance of mandatory helmet use by all quad bike riders. Rather, they underline the importance of complimentary safety measures *in addition* to helmet use.

B. USE OF QUAD BIKES BY RIDERS UNDER THE AGE OF 16 YEARS

Use of adult-sized quad bikes by children under the age of 16 years is a breach of manufacturer directions for use. Therefore, industry and health groups are agreed that all children under 16 years should be prohibited from riding adult-sized quad bikes in accordance with these directions. Unfortunately, warning labels may not be effective as a deterrent, placing the burden of care on the supervising adults to enforce safe use of adult-sized quad bikes.

Evidence that child-sized (also term 'youth-sized') quad bikes afford greater safety is lacking, and many commentators are agreed on the dangers of even child-sized quad bikes.^{33,34} Indeed, six Australians are known to have died as a result of injuries sustained when using a child-sized quad bike, including five children who sustained fatal crush injuries.³ Further, children are inherently at increased risk of quad bike trauma due to their relative lack of judgement, lack of knowledge, lack of skill, or even lack of body mass and physical strength, when compared with adult riders.³⁵⁻³⁷

Taking into account the manufacturer directions, and wealth of cautionary evidence regarding quad bike use by children, the RACS position is that no child under 16 years should be permitted to ride (or be a passenger on) quad bikes, irrespective of the vehicle's size or specification.

RACS is not alone in taking this position, which is shared by many other professional bodies, including the Australian Centre for Agricultural Health & Safety, Farmsafe Australia, American College of Surgeons, American Pediatric Surgical Association, American Academy of Pediatrics, Canadian Association of Pediatric Surgeons and the Canadian Pediatric Society.^{26,38-42}

The primary intention of the RACS position and advocacy is to *protect* children from preventable injury and death, rather than any wish to *penalise* children younger than 16 who use quad bikes. Indeed with the current status quo, the penalty for riding a quad bike for these children is an unacceptably high risk of death or serious injury.

Whilst RACS acknowledges the legal and enforcement complexities posed by introduction of a law prohibiting all children under 16 years of age from using any quad bike, it considers the burden of preventable death and injury caused by these vehicles so unacceptable to call for such a ban. Moreover 'Sean's Law' (Massachusetts, United States), described previously, provides a working precedent for law-makers and health professionals alike of quad bike specific legislation achieving measurable improvements in health and safety for children.

C. TRAINING AND/OR LICENCING OF QUAD BIKE RIDERS

Quad bikes are significantly less stable than their riders assume them to be, and their dynamic handling characteristics leave very little room for rider error. The existence of warning labels on quad bikes is testament to this danger. The fundamental vehicle design requires the use of an

'active' riding technique to reduce crash risks when riding. Certainly, without active riding, riders have a significantly increased risk of crashing.¹³

RACS supports mandatory quad bike rider training for all new owners, to gain competency in 'active' riding as well as other aspects of safe quad bike use. Australian workplace safety authorities should also consider mandating formal quad bike rider training as a requirement for all employees whose work involves quad bikes use.

RACS requests Australian road safety authorities carefully monitor and evaluate quad bike usage on public roads, to ensure that current restrictions on the on-road usage of quad bikes (and similar vehicles) are not watered down to the detriment of safety.

D. CARRYING OF LOADS ON QUAD BIKES INCLUDING PASSENGERS

Carrying a person on the back of a quad limits the rider's ability to shift weight appropriately to safely control the quad bike. This is because the passenger cannot lean far enough to counter their additional weight set high above the vehicle (often on the cargo rack) and their weight stops the rear axle from lifting the inside wheel at turns, which impels the rider to make sharper turns to drive the vehicle into corners. Once the quad bike does start to turn, the body roll lifts the inside wheel, causing the vehicle to turn very sharply. With the extra body weight on the cargo rack, both riders are in danger of the quad bike rolling on top of them.^{13,14}

RACS recommends that there be a total ban placed on carriage of passengers or excessive loads (loads exceeding the manufacturers load limit for the cargo rack or the total load for the vehicle) on quad bikes not designed for them. If this first recommendation is not supported, then as a minimum, children under the age of 16 years should never be carried as passengers on quad bikes of any size.

The risks associated with carriage of passengers or heavy loads when using quad bikes are well understood and supported by evidence. If however, circumstances might require such carriage, a side-by-side vehicle is considered a far more appropriate and safer alternative.

E. DEVELOPING AN NCAP STYLE SAFETY RATING SYSTEM FOR QUAD BIKES

The benefits delivered by the Australasian NCAP star rating system for motor vehicles have fostered major improvements to vehicle safety. A rating system adapted for quad bikes would deliver similar improvements. Given the rising incidence of quad bike sales, injuries and fatalities, it is entirely reasonable to provide end users with as much information as possible to allow them to make good purchase and safety decisions.

RACS recommends implementing an Australasian New Quad Bike Assessment Program, identical in essence to the ANCAP safety rating system. Such a system is anticipated to inform consumer

choices, as well as provide incentives to manufacturers and consumers to drive competition for improved vehicle safety.

It is worthy of comment that this and the following College positions are consistent with RACS' long standing commitment to supporting and encouraging adoption of vehicle safety technologies, including being a vocal advocate for the introduction of ABS brakes, Electronic Stability Control and airbags into Australian vehicles.²⁰

F. ENGINEERING REMEDIES TO IMPROVE THE STABILITY AND/OR HANDLING OF QUAD BIKES

RACS affirms the needs to industry and safety experts need to work together to improve the stability and handling of quad bikes as outlined in detail in the TARS reports.¹³

G. FITTING OF ROLLOVER OR CRUSH PROTECTION DEVICES TO QUAD BIKES

According to TARS research, it may be possible to design a practical rollover protection system for quad bikes, and other small off road vehicles, that will assist in protecting a rider against serious injury in a rollover, and other collision modes. The aim of such a solution is to provide a lightweight but high-strength structure that creates an occupant survival space, together with a high-backed seat with side bolsters, and seatbelt system to effectively restrain the occupant within the protected zone. Existing quad bike designs would need to be modified to either increase track width or lower the centre of gravity height to avoid making the vehicle even more unstable when fitted with such rollover protection devices.^{13,25}

H. FITTING OF CHILD RESISTANT STARTING MECHANISMS

RACS supports any mechanism that will prevent children from being able to start (and so ride) adult-sized quad bikes.

I. DEVELOPING AN AUSTRALIAN STANDARD FOR QUAD BIKES

Relevant parties to the Queensland coronial inquest, in consultation with stakeholders, are now considering whether the industry should initiate a process of developing an Australian standard (or other functional design requirements) for quad bikes, similar to that for quad bikes in the United States. Counsel also recommended that Safe Work Australia consider if a different design standard is needed in work environments, and that they initiate work to develop this design standard.¹²

RACS supports development and implementation of an Australian standard for quad bikes sold within Australia, including design improvements, which afford greater safety such as those outlined above and supported by the Australasian New Quad Bike Assessment Program (or similar).

J. THE FITTING OF SEATBELT INTERLOCKS TO SIDE BY SIDE STYLE VEHICLES

Whilst this submission pertains primarily to quad bikes, RACS acknowledges that side-by-side vehicle incidents also contribute to casualties, albeit to a much lesser extent than quad bikes.⁴³

RACS supports the UNSW TARS report conclusion, that side-by-side vehicles should have seatbelt interlocks fitted to prevent travel at 10km/hr or above when seatbelts are not engaged.

IMPORTANCE OF REGISTRY SUPPORT FOR INJURY SURVEILANCE

Maintaining funding for the Australian Trauma Registry is vital if policy makers are to monitor the significance of the threat and develop a strategy to prevent unnecessary fatalities and injuries from quad bike accidents. It would be useful if the Registry included a specific coding for quad bike injuries.

FINAL COMMENTS

The Royal Australasian College of Surgeons has genuine concern that industry parties may attempt to obfuscate the root causes of quad bike safety problems by claiming there is no data to support the recommendations proposed by RACS here or attempt to blame the victim, by highlighting incidence of warned against behaviours. This situation is not dissimilar to what was happening in regards to car crashworthiness issues per NCAP. Clearly history is repeating itself. Contrary to this assertion, these recommendations are each based on sound evidence regarding the epidemiology of quad bike trauma, as well as on physics and standard vehicle design principles as they apply to quad bike safety. Furthermore, these recommendations are uniquely re-informed by surgeons' experiences of real world fatalities and injuries and the data they collect that informs the designers, regulators and safety policymakers.

The burden of injury and death due to quad bike use cannot be allowed to continue unchecked, and ongoing delay in action may permit to further avoidable tragedies. RACS welcomes the opportunity to contribute to this important inquest process, and so aid finding and adopting solutions to the complex issues raised by quad bike trauma. To adapt the earlier cited quote, "It is the [surgical] profession which sees the aftermath of a [quad bike] accident, the aftermath of the split second in which it happened, the horrible and irreversible mutilation, the griefs, the brave attempts to repair, the heartbreaking rehabilitation. **And it is the profession which must help find a solution to this problem, a cure for a disease of the community that has reached a significant magnitude.**"²²

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