ROYAL AUSTRALASIAN COLLEGE OF SURGEONS

JOINT INQUESTS INTO DEATHS INVOLVING THE USE OF QUAD BIKES AND RELATED VEHICLES

NSW CROWN SOLICITOR'S OFFICE

15 MAY 2015

EXECUTIVE SUMMARY

Since 1 January 2015, there have been six quad bike fatalities, one each in in Tasmania, New South Wales, Victoria, Western Australia and two in Queensland.[1,2] Last year, 15 people were killed, nine of which were the result of a roll over. In 2013, there were 21 fatalities, 19 in 2012 and 20 in 2011.

Data from the Australian Trauma Registry demonstrates that major trauma injuries from quad bikes have been steadily increasing, from 26 in 2010 to 51 in 2012. Of the 111 major injuries which occurred from 2010-2012, more than a quarter of the riders were less than 25 years of age. In June last year six people were flown to hospital in southern Queensland in the space of a fortnight, following quad bike crashes.

Contrary to their common name, all-terrain vehicles (ATVs) are not suitable for use in all terrains. Despite having four wheels, quad bikes have a high centre of gravity and a narrow wheelbase, making them unstable. Most injuries and deaths involve the bike rolling onto the rider and can occur at low speeds.[3]

Quad bike manufacturers have a history of resisting design modifications or other measures proposed by safety experts.[4,5] Research shows that use of alternate vehicle designs, such as side-by-side vehicles, that are inherently more stable, with factory-fitted roll over protective systems which have a combination of roll bars/cage and seatbelts, could save lives. Quad bikes themselves can be made safer by design changes, including improved stability, safer cornering on hard surfaces and fitting of an operator protection device. All possible efforts to improve the engineering and design features of quad bikes are critical in reducing fatalities and injury rates.

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.[6] Quad bikes now represent around one fifth of total motorcycle sales in Australia.

Possibly because they are primarily used as off-road vehicles, they are not subject to the same safety requirements as other vehicles, yet they are just as dangerous. Nonetheless sixteen cases (11%) of the total 141 fatal cases that were identified between 2000 and 2012 occurred on a public road.[7] Quad bikes are not subject to a formal safety assessment program, riders are not legally required to undertake training, wear a helmet, or protective gear, and children under the age of 16 often operate them, despite the manufacturer stating that no child under the age of 16 should operate or ride on adult-sized quad bikes.

A Victorian study found that the peak age group for fatalities and hospital admissions for quad bike accidents between 2002 and 2011 was 15–29 years (26.3% and 27.9%, respectively), with children 0–14 years being the most common group presenting to emergency departments.[8] Fatalities were frequent, and the number of hospital admissions, often serious, increased over the study period. Last year, Queensland Deputy Coroner John Lock handed down his findings from an inquest, saying that children under 16 years of age should not be allowed to ride quad bikes.[9]

It is disturbing that four out of the 13 deaths being investigated as part of the NSW Coronial Inquest were children. More needs to be done to ensure children are not exposed to death or serious injury by being given access to adult-sized quad bikes.

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

The Royal Australasian College Of Surgeons has a strong history with regard to trauma prevention.[10] The Trauma Committee of the College was established in 1970 in response to an escalating road toll and recognition of the serious public health risk posed by road crashes.

The College has been influential with policy makers and legislators and was a public advocate for mandatory seat-belt wearing, drink driving countermeasures, and the compulsory use of helmets by cyclists in the 1960s and 70s.

In 2012 the NSW Government announced $1 million in funding for research into vehicle safety and improving quad bike protective devices and accessories. Funded by the NSW WorkCover Authority, hundreds of tests on 11 quads and five side by side vehicles were undertaken to provide a star safety rating for stability, handling and rollover crashworthiness for quad bikes and side by side vehicles. The research was conducted by the UNSW Transport and Road Safety (TARS) research faculty.

As part of this research a trans-Tasman Quad Bike Performance Project Reference Group was established by the Heads of Workplace Safety Authorities, comprising work health and safety regulators from Australia and New Zealand, manufacturers, unions, automotive and farming associations, and surgeons from the College. The group identified safety improvements for quad bikes and farm industries to reduce fatalities and injuries, and a broad strategy to address a range of issues impacting quad bike safety.

RESULTS OF RESEARCH CONDUCTED INTO QUAD SAFETY

According to data provided by the NSW Institute of Trauma Injury Management in April 2015, there were 102 patients injured between 2010 and 2014 from quad bikes who were admitted to a NSW Trauma Facility.

Most people survived injury from a quad bike, however:

- There were six deaths and these were all males of varying ages. Of those who died, heads were the most commonly injured body region.
- Overall, chests were the most commonly injured body region, at 67%.
- Multiple body region injuries occurred in 85% of cases.
- Males were injured more often than females (89% and 11% respectively).
- The majority of males injured were aged between 45 and 64 years of age (30%).
- Young people under the age of 25 were just as likely as those aged 25-44 to be injured (both 27%).
- Moderately injured (ISS 13-15) to seriously injured (ISS 16-24) were the most common ranges of injury at 33% and 34% respectively.

The Australian Work Health and Safety Strategy 2012-2022 states that the most effective and durable means of creating a healthy and safe working environment is to eliminate hazards and risks during the design of new systems.

The results from the TARS research indicate that while current prevention strategies focus on lower order risk controls such as rider training and administrative controls, developing a system similar to the New Car Assessment Program (NCAP) that tests and rates quad bikes would lead to significant improvements in safety through safer vehicle choice, safer vehicles being developed and marketed, and increased safety awareness among users.[11]

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).

Since the introduction of all-terrain vehicles (ATV) to the United States in 1971, injuries and mortalities related to their use have increased significantly.[12] 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 ten 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 an ATV 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 ATVs. The researchers concluded that legislative efforts to implement rider protection laws for ATVs were warranted.

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.[13] Estimated fatalities for 2012 were 650, and 691 for 2011. There were an estimated 99,600 ATV-related hospital presentations in 2013, a quarter of which were children under the age of 16.

The effects of quad bike injuries and fatalities devastate the lives of the victims, families and surrounding farming communities, and there is also an economic cost to pay. A University of Sydney study found that the average cost to the Australian economy of each quad bike-related fatality is $AUD2.3 million.[14] This includes the cost of lost earnings, emergency services, accident investigations and other factors.

Over 60% of all deaths in the 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 be riding adult-sized quads, riders should not carry passengers, and that proper training and the use of helmets is essential.

POSITION ON POTENTIAL CHANGES OR DEVELOPMENTS IN THE:

A. USE OF HELMETS BY QUAD RIDERS

The College supports the development of a suitable standard for quad bike helmets that recognises the unique design requirements of such a device. The College also believes the immediate adoption of the NZ Quad Bike Helmet Standard for workplace use would significantly improve the current situation.

B. USE OF QUADS BY RIDERS UNDER THE AGE OF 16

Allowing children to ride adult quad bikes is a breach of manufacturer directions for use. The penalty for lack of judgement, lack of knowledge, lack of skill, or even lack of body mass and physical strength, all of which are more probable in children riding quad bikes, should not be death or serious injury.

All children under 16 years of age should be prohibited from riding adult sized quads, and consideration should be given to whether children under the age of 6 should be able to ride quad bikes at all. The intent of this prohibition is not to criminalise use of adult quad bikes by children under the age of 16, but rather to allow clinicians to refer appropriate cases of children injured or killed in quad bike accidents to child protection groups within hospitals. Similar arrangements already exist for children who drown in bath tubs or swimming pools.

C. TRAINING AND/OR LICENCING OF QUAD RIDERS

Quad bikes are inherently unstable and leave very little room for rider error. The existence of warning labels on quad bikes is testament to their danger. The fundamental vehicle design requires the use of an active riding technique for safe operation. Without active riding, riders have an increased risk of crashing. Quad bike rider training should be mandatory for all new owners.

Australian road safety authorities must also carefully monitor and evaluate quad bike usage on public roads, and ensure that current restrictions on the on-road usage of quad bikes and similar vehicles are not watered down.

Australian workplace safety authorities should consider mandating formal rider training as a requirement for all quad bike riders in the workplace.

D. CARRYING OF LOADS ON QUADS 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.

The College of Surgeons strongly recommends that riders do not carry passengers or excessive loads on single passenger quad bikes.[15]

E. ENGINEERING REMEDIES TO IMPROVE THE STABILITY AND/OR HANDLING OF QUADS

Industry and safety experts need to work together to improve the stability and handling of quad bikes.

F. FITTING OF ROLLOVER PROTECTION, OR CRUSH PROTECTION DEVICES TO QUADS

According to TARS research, it is possible to design a practical rollover protection system for quad bikes that will assist in protecting a rider against serious injury in a rollover, and other collision modes. The ultimate 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 designs would need to be modified to either increase track width or lower the centre of gravity height to avoid making the vehicle more unstable.[16]

G. FITTING OF CHILD RESISTANT STARTING MECHANISMS

The College of Surgeons supports any mechanism that will prevent children from riding adult-sized quad bikes.

H. THE FITTING OF SEATBELT INTERLOCKS TO SIDE BY SIDE STYLE QUADS

Side by Side Vehicle (SSV) incidents also contribute to rural casualties albeit to a much lesser extent than quad bikes.[17] The College of Surgeons supports the conclusion of the UNSW TARS report, that SSVs have seatbelt interlocks fitted to prevent travel at 10km/hr or above when seatbelts are not engaged.

I. OTHER ENGINEERED INTERVENTIONS TO ÍMPROVE QUAD SAFETY

The College of Surgeons supports any engineered interventions that will improve quad bike safety. An NCAP type star rating system is the best way to encourage the market to develop these types of interventions.

J. DEVELOPING AN AUSTRALIAN STANDARD FOR QUADS

Relevant parties to the Queensland coronial inquest are now considering whether the industry should initiate a process of developing an Australian standard or other functional design requirement for quad bikes based on the USA standard, in consultation with stakeholders. 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.

K. DEVELOPING AN ANCAP STYLE SAFETY RATING SYSTEM FOR QUADS

The benefits delivered by the Australasian NCAP star rating system for motor vehicles have fostered major improvements to vehicle safety, and 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. A star-based safety rating system for quad bikes would also help provide incentives to manufacturers and consumers to drive competition for improved vehicle safety.

POSITION ON THE CONCLUSIONS AND RECOMMENDATIONS IN THE REPORT OF THE UNSW TARS PROJECT

The lead author of the UNSW TARS report, Professor Raphael Grzebieta, is a highly credible safety expert, with over 30 years of research and practical experience in crashworthiness and road safety. The College of Surgeons supports the conclusions and recommendations in his report.

The findings and recommendations included the following:

- A requirement for all quad bike operators to undertake vehicle specific accredited training before operating unsupervised.
- Mandating the use of an appropriate helmet for all riders and all 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.

OTHER CONSIDERATIONS

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.

Industry will attempt to obfuscate the root causes of quad bike safety problems by claiming there is no data that supports the recommendations below. These recommendations are based on observations of real world fatalities and injuries and through the application of the laws of physics and standard vehicle design principles. Any delay in action will lead to further deaths and injuries that are otherwise avoidable.

RECOMMENDATIONS

The College of Surgeons requests that the NSW Coroner consider the following recommendations.

1. There is a common 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, identical in essence to the ANCAP safety rating.

2. Consider all available strategies to prohibit children under the age of 16 from riding adult quad bikes.

3. Make quad bike handling training mandatory for all new owners.

The College has a position paper on Trauma Prevention and Road Trauma Prevention available on our website at www.surgeons.org/policies-publications/publications/position-papers/.

[1] Safe Work Australia. Quad bike fatalities. From: http://www.safeworkaustralia.gov.au/sites/swa/whs-information/agriculture/quad-watch/pages/quad-watch. Accessed 15 April 2015.

[2] The West Australian. Boy dies in quad bike crash. 2015. From: https://au.news.yahoo.com/thewest/a/27213343/boy-dies-in-quad-bike-crash/. Accessed 20 April 2015.

[3] Better Health Channel. Farm safety – quad bikes. From: http://www.betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/Farm_safety_Quad_bikes. Accessed 17 April 2015.

[4] Stock & Land. Quad bike collision course. From: http://www.stockandland.com.au/news/agriculture/general/healthcare/quad-bike-collision-course/2722963.aspx?storypage=0. Accessed 17 April 2015.

[5] Background Briefing. The trouble with quad bikes. 2015. From: http://www.abc.net.au/radionational/programs/backgroundbriefing/2015-04-05/6359984. Accessed 17 April 2015.

[6] Federal Chamber of Automotive Industries. ATVs and scooters lead motorcycle sales figures. 2011. From: http://www.fcai.com.au/news/news/2011/all/267/atvs-and-scooters-lead-motorcycle-sales-figures-. Accessed 17 April 2015.

[7] Grzebieta RH, Rechnitzer GR, McIntosh AS, Mitchell R, Patton D. Road Related Quad Bike and Side by Side Vehicle Casualties. Proceedings of the 2014 Australasian Road Safety Research, Policing & Education Conference November 2014.

[8] Clapperton, A, Herde, E, Lower, T. Quad bike-related injury in Victoria, Australia. MJA 2013; 199: 418–422 doi: 10.5694/mja12.11456.

[9] Office of the State Coroner (Qld). Inquest into the death of H, a child. Brisbane. From: http://www.courts.qld.gov.au/__data/assets/pdf_file/0009/290763/cif-h-20140926.pdf.

[10] Gregory, A. Blood Belts Booze and Bikes. Royal Australasian College of Surgeons, 2008.

[11] Rechnitzer, G, Grzebieta, R, McIntosh, A, Simmons, K. Reducing all terrain vehicle injuries (ATVs) and deaths – a way ahead. Transport and Road Safety (TARS) Research, University of NSW. Paper Number 13-0213.

[12] Butts, J, Rostas, J, Lee, YL, Gonzalez, R, Brevard, S, Frotan, M, Ahmed, N, Simmons, J. Larger ATV engine size correlates with an increased rate of traumatic brain injury. Injury 2014; http://dx.doi.org/10.1016/j.injury.2014.11.007

[13] US Consumer Product Safety Commission, 2013 Annual Report of ATV Related Deaths and Injuries; http://www.cpsc.gov//Global/Research-and-Statistics/Injury-Statistics/Sports-and-Recreation/ATVs/2013-ATV-Annual-Rpt-of-ATV-Related-Deaths--Injuries.pdf Accessed 29 April 2015.

[14] Lower, T, Pollock, K, Herde, E. Australian quad bike fatalities: what is the economic cost? ANZJPH 2013; http://onlinelibrary.wiley.com/doi/10.1111/1753-6405.12036/abstract

[15] Better Health Channel. Farm safety – quad bikes. From: http://www.betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/Farm_safety_Quad_bikes. Accessed 17 April 2015.

[16] Rechnitzer, G, Grzebieta, R, McIntosh, A, Simmons, K. Reducing all terrain vehicle injuries (ATVs) and deaths – a way ahead. Transport and Road Safety (TARS) Research, University of NSW. Paper Number 13-0213.

[17] Grzebieta RH, Rechnitzer GR, McIntosh AS, Mitchell R, Patton D. Road Related Quad Bike and Side by Side Vehicle Casualties. Proceedings of the 2014 Australasian Road Safety Research, Policing & Education Conference November 2014.