

*Editorial*

## **Welcome to *Safety*—A New Open Access Journal Helping Shape a Safer World**

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Safety can be defined as the condition of being safe from undergoing or causing hurt, injury, or loss. It also includes assessing safety risks, including hazard prevention, control and management, a common requirement of occupational health and safety regulators and safety stakeholders around the world.

Safety risk confronts us every day in almost every aspect of our lives; when we are at home, travelling to work, or school, or at the day care center or doing a bit of shopping, or going on vacation. Whether we work with others in an office or develop plans to build various forms of infrastructure or processing and manufacturing plants; whether we are the planners, designers and construction supervisors or one of the workers, we are all required to consider and implement the governing occupational health and safety (OH&S) requirements. There is also an implicit ‘duty of care’ expected from professionals who may be responsible, be it through planning, design or management, for the safety of others, whether directly or indirectly. Depending on the law of the land, the OH&S regulations set the legal safety criteria and benchmark of what is expected.

In more recent times, researchers, policy makers and practitioners are adopting a safe system approach to safety, which is more holistic and human centric. For example, the World Health Organisation (WHO) has adopted the Safe System Approach to Road Safety to address the 1.24 million road deaths that are occurring globally each year [1–4].

However, failures and incidents occur all too often and we hear about them almost every day in the media or via the internet. Such events involve airliners going missing or crashing into mountains, earthquakes where buildings collapse, or chemical spills and pollution poisoning nearby residents. Such stories are beamed across our planet in minutes on TV networks. Failures are often examined through mainstream media, where a desire to create controversy and the need for quick ‘sound bites’ are often more important than rigorous analysis and technical details. Experts are interviewed; some are well qualified but some are simply activists. Increasingly some alleged safety and ‘health’ researchers, whether in, for example, road safety or other domains have shifted from providing high

quality scientific research into what could be regarded as advocacy, agenda pushing and activism—all forwarded under the guise of science justified policy.

Safety and injury prevention initiatives are sometimes met with considerable resistance from vocal minority groups within the community. Media and the blogosphere buzz with unsubstantiated opinions and distortions, with these comments sometimes elevated to the status of “accepted fact” by nonscientists and opinionated opponents in social media chat rooms and on websites. We live in a new age, where ideas or opinions can be instantly communicated to the masses at low cost and with no scrutiny. Some areas of safety, and indeed many aspects of injury prevention that attempt to address injurious risk taking, can be categorised as ‘wicked or intractable problems’, *i.e.* resistant to scientific and social resolution. Two examples that come to mind in the domain of road safety are speeding and the associated use of speed cameras, and bicycle helmets and mandatory helmet laws.

In regards to speeding, expert researchers have attempted to present the facts and provide evidence-based opinions about the crash and injury risks associated with speeding and the safety benefits of countermeasures such as speed (safety) cameras. In Australia, community surveys have indicated that the majority of the public do understand that speeding is a road safety risk, and they support speed limits and speed enforcement. But broad public and media acceptance of the facts are still being confounded by misleading publicity and opinionated non-expert mass and social media discussions putting forward views opposing speed enforcement and even views that disagree that speeding increases road trauma risk [5]. Media outcries of "revenue raising" when speed cameras are installed are deafening not only in Australia but worldwide. This is despite the clear scientific evidence that installation of speed cameras do change driver behaviour, resulting in reduced crashes and associated road trauma [5].

Another good example is the efficacy of bicycle helmets to protect against brain injury in a fall or crash and adoption of a mandatory bicycle helmet law. Messaging about helmets on Internet blogs and web pages are often portrayed as being part of "helmet wars". Helmets and helmet laws have been portrayed as a failure by the media and various advocacy groups even in highly respected peer-reviewed journals and literature. Many of these critics claim helmets are ineffective, helmet laws deter cycling, helmet wearing increases the risk of an accident, that there is no evidence helmet laws reduce head injuries at a population level, and even that helmet laws result in a net health reduction. However, when the majority of the evidence against helmets or mandatory helmet legislation (MHL) is carefully scrutinised using rigorous statistical analyses and real world evidence, it appears overstated, misleading or invalid. Moreover, much of the statistical analysis that is presented against helmet wearing has been conducted by people with known affiliations with anti-helmet or anti-MHL organisations [6,7].

An interesting aspect of the helmet wars demonstrating how some research that is bordering on pseudoscience, yet which managed to be published in a highly reputable journal, are the papers by Curnow a decade ago [8,9] where he argued that helmets are injurious. Curnow suggested helmets exacerbate rotational injuries, the more serious being diffuse axonal injury (DAI). Although Curnow only hypothesised the DAI/helmet link, some anti-helmet advocates have taken this as fact. There is, however, no existing evidence to support the DAI hypothesis. McIntosh *et al.* found a decade later, when testing oblique impacts on dummies to simulate head rotation, helmet wearing did not increase angular acceleration, a result unsupportive of Curnow’s hypothesis. Olivier *et al.* [7] outlined other

strong epidemiological evidence that further disproves the DAI hypothesis. Yet the myth still continues to be supported by the anti-helmet lobby.

Often when safety is discussed in various domains, we hear the expression of becoming the “nanny state”. There have been numerous outcries about how Australia is a “nanny state” in its speed enforcement and mandatory bicycle helmet laws. Note that “nanny state” is defined as: “A government perceived as having excessive interest in or control over the welfare of its citizens, especially in the enforcement of extensive public health and safety regulations [10]” A question often asked is, “While we are all keen to see good safety policy implemented, what are the limits? When is it going too far and infringing individual freedoms and rights?”

Interestingly the Swedish perspective of road safety appears to be far more mature and respectful of the rights of its citizens, than can be seen in some aspects of Australian road safety policy, implementation and enforcement practices. Belin *et al.* [11] compare speed camera programs in Sweden and Victoria in 2010. They state that the “*approach adopted in Victoria is based on the concept that speeding is a deliberate offence in which a rational individual wants to drive as fast as possible and is prepared to calculate the costs and benefits of their behaviour. Therefore, the underlying aim of the intervention is to increase the perceived cost of committing an offence whilst at the same time decrease the perceived benefits, so that the former outweigh the latter. The Swedish approach, on the other hand, appears to be based on a belief that road safety is an important priority for the road users and one of the reasons to why road users drive too fast is lack of information and social support.*” The Swedish approach is to assist the driver with making a safe speed choice and thus bring about a general cultural behavioural change. On the other hand, in Victoria the system is punitive and treats the offending driver as intentionally carrying out a criminal act. Hence, in the pursuit of safety it is important we consider how to bring about cultural change and not just impose rules.

That such change does not violate our freedoms, but instead is respectful of the notion that humans do make errors; that the system is designed with a holistic perspective; that the solution is based on sound peer-reviewed evidence and rigorous analysis and reported by researchers who have no hidden or other agendas; and most importantly, that the system is designed to minimise human error and be more human error tolerant. The paper by Horberry and Burgess-Limerick, *Applying a Human-Centred Process to Re-Design Equipment and Work Environments*, has been featured as one of the *Safety* journal’s first papers. The Authors challenge us to rethink how we are currently designing and building various engineering systems—put the human first at the centre.

If you think that such human centred design is already part of current design technology, and is nothing new, think again. I would encourage you to read Richard Champion de Crespigny’s book QF32 [12]. It talks about one of the most sophisticated aircraft in the world, the pinnacle of modern human innovation and high tech transport, and yet it is obvious essential human factors criteria were missing from its cockpit design at a safety critical moment. When the Rolls-Royce Trent 900 failed catastrophically, the crew of five in the cockpit were bombarded with error messages and warnings from the airplane’s computers. Instead of transmitting to the crew what systems were still working and available, the aircraft was telling the crew what was not working—counter to the way humans naturally think. It is clear designers of complex engineering systems still have a long way to go and Horberry and Burgess-Limerick’s article is timely.

The focus of this journal is to advance safety science and technology through the reporting and exchange of scientific evidence and rigorous analyses that will lead to the improvement of public and industrial safety and societal health related to safety. Scientists and engineers have, over many decades, produced strong peer-reviewed studies on a range of areas concerning safety. However, there are some institutions with strong ties to particular industries that focus their efforts on creating doubt in the science of safety outcomes; “merchants of doubt” as coined by Oreskes and Conway [13]. They obfuscate the facts in order to provide support to industry defendants in civil and coronial inquests and to delay any proposed policy, standards and regulations.

There are two good examples where such doubt creation has been unfortunately highly effective. The first is the ‘roof crush wars’ that have raged in US Civil courts over the past four decades involving the less responsible US vehicle manufacturers. Batzer [14] provides some details of the arguments that have ensued over the past four decades; that is, until the US National Highway Traffic Safety Administration (NHTSA) amended their Federal Motor Vehicle Safety Standard (FMVSS) 216 so as to require double the roof crush strength to weight ratio (SWR) compared to that of the earlier years (SWR = 3 as opposed to 1.5). Many tens of thousands of people died or have received serious spinal injuries rendering them wheel chair bound as a result of the impasse.

The second example involves off road All-Terrain Vehicles (ATVs), Recreational Off Highway Vehicles (ROVs) and Utility Terrain Vehicles (UTVs). In Australia these vehicles are better known as Quad bikes (ATVs) and Side by Side Vehicles (ROVs and UTVs). Details of the problems and the impasse between safety stakeholders and industry are provided by Rechnitzer *et al.* [15]. The main argument presented by manufacturer’s defense teams is that at the time of the incident that lead to a death or injury, the rider was performing a warned against behaviour, i.e. excessive speed, riding while intoxicated, attempting to ride over steep slopes, carrying a passenger on a single rider machine, *etc.* The solution touted by manufacturer’s industry lobbyists is that administrative controls should be increased significantly, e.g., more training, licensing, enforcement, *etc.*, with personal protective equipment the only tier of protection that can be improved. They further point out that the use of any rollover or crush protection devices on ATVs could cause high levels of harm in comparison to their benefits [16].

On the other hand, safety stakeholders point out that ATVs have a dangerously low resistance to rollover and should be redesigned, or at least crush protection devices should be fitted. They also advocate riders switching to ROVs and UTVs that are inherently more stable and have rollover protection (ROPS) systems that include three point seat belts. Moreover, Australian regulators emphasise that Quad bikes and Side by Side Vehicles (SSVs) are classified as mobile plant in their Work Health and Safety legislation. The hierarchy of controls for managing risks within that legislation specifies that engineering controls which design out the hazard are considered more effective control measures than administrative controls such as training courses which seek to change human behaviour and personal protection measures (e.g., helmets). Within the hierarchy of safety controls, administrative controls are generally accepted as the least effective form of control. This is particularly so in a Vision Zero or Safe System Approach (where a workplace death or a serious injury that results in a permanent disability are not acceptable) [4]. Hence, there is a high level of interest on the two Australian Coroners, one in the state of New South Wales and the second in Queensland, who are currently conducting inquests into a number of deaths that have resulted from Quad bike and SSV

incidents and will likely make recommendations that will require engineering controls to improve safety of these vehicles.

To build on some of the topic areas discussed above, there are three special editions of *Safety* planned. The first special edition will focus on ‘Quad bike (ATV) and Side by Side Vehicle (ROV and UTV) Safety’. The second will focus on ‘Advances in Road Safety Evaluation’ and the third on ‘The Return of Cycling’.

General paper submissions are also being sought that include topics regarding plant, machine and product safety design, human–machine interaction and human factors related to all aspects of safety, the safety of product processing and manufacturing, safety packaging, safe storage and transportation safety, environmental health and safety, *etc.* Articles investigating process or system failures and consequent evolution of evidence based policy making and safety philosophy, will also be considered. The safe mobility of air, sea and land vehicles is paramount in today’s modern, highly mobile and technologically advanced society. Hence, research studies involving topic areas such as crashworthiness, biomechanics, crash prevention, and intelligent transport systems that can prevent crashes and injuries are also sought. Safety related ‘myth-busting’ style articles that challenge without fear or favour the armchair pseudoscientists and doubt merchants who promulgate them, will also be considered.

Safety affects all age groups, but the community is particularly keen to see that children are well looked after, and at the same time have freedom to learn and develop without unduly wrapping them in ‘cotton wool’. Research reporting on child and youth safety will similarly be accepted for peer review.

Paper submissions in 2015 and 2016 will be published free of any charge to the authors. The publisher, journal editors and the editorial board encourage researchers to capitalise on this great opportunity. However, it needs to be emphasised that each paper will be subjected to the highest peer review standards and, as Editor-in-Chief, I will ensure that guidelines issued by the Committee on Publication Ethics (COPE) are followed.

I hope you can support us with the launch of this new exciting open access journal *Safety* that will help us to shape a safer world.

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