

[104] Evidence from ACC also showed they have been active in this area as part of their core business.

[105] MBIE in 2011 introduced "The quad bike harm reduction project". The project was targeted to challenge unsafe quad bike use on farms in NZ.

[106] In my view it has been a successful project which has now become a building block for further development. New Zealanders know, the kiwi farmer is known to be stoic in their approach; self assured on their own opinions and stalwart on how their farms should be run. They often don't take change very well. These views and attitudes are often shaped by financial limitations or hardships; the affordability of resources; and uncontrolled variables like the weather and natural disasters. Despite the challenges MBIE have committed resources and policy to lift the bar on safe use of quad bikes on NZ farms.

[107] One of the successful outcomes of this project has been the increased use of helmets for quad bikes. There are a number of purpose-built quad bike helmets under NZ standards now available for users based on farmers' pragmatic needs. One of the problems why farmers do not wear helmets other than the fact it did not look good; was that they often could not perform some of their core functions like working the dog; being able to hear when moving stock; adaptable to weather demands; and realising whether there was any real benefit in using them.

[108] The project has shown there has been a marked increase in the use of helmets after a slow behavioural change. The use of helmets is one of the key messages.

[109] The original project was set for a two year period to end on 31 October 2013. The Court heard that given the perceived success and progress of the key indicators the programme has been extended. There are a number of factors contributing to the success. The dual approach of education followed by enforcement has been a clear indicator.

[110] The other has been the development of innovative ideas derived from the trans-Tasman relationships at government levels and with academic researchers involved in innovative research. These collective and ongoing developments have provided further positivity and support for the continuation of the programme.

[111] In the *Quad Bike Safety News*, June 2012 produced by MBIE, it was reported that the 2012 campaign saw more than 400 farmers across New Zealand visited by health and safety inspectors. That resulted in 67 repeat visits and at the time the Department of Labour (MBIE) had issued 189 written warnings and enforcement notices for issues like helmets; training; the carrying of passengers; towing; rider age and loading and fractions on the quad bikes.

[112] The same news reported that in the Taranaki region, there was an independent farming group that commenced regular meetings on health and safety issues including overwhelming support for the wearing of quad bike helmets.

[113] To summarise MBIE's position, they had four key messages which I endorse.

[114] There are four safety steps to consider; firstly, riders of quad bikes must be trained and experienced enough to do the job as required. To ensure the right vehicle is used for the right job. That makes reference to ensuring that the quad bike is not used beyond its capabilities. It may mean using other vehicles whether it is a side-by-side vehicle or a tractor. To always wear a helmet and to stop kids riding adult quad bikes.

[115] Whether quad bikes are used on farms or in a recreational setting it is important the quad bike safety message was transparent and clear.

[116] The second message MBIE promote is that farms are workplaces and therefore the Health and Safety in Employment Act 1992 furnishes legal responsibilities on farmers and their workers to comply with the Act and work safely. That includes the use of quad bikes and other machinery by employers and staff.

[117] I note the evidence of Jeanette Maxwell, National Board Member for Federated Farmers and spokesperson for health and safety highlighted there sometimes can be confusing messages on the interpretation of the Act. In her view it was understood by farmers that when they rode down to the letterbox to pick up their mail they did not need to use a helmet because they were not in a work phase. However, if they went from the letterbox to another part of the farm to check on stock that constituted work and therefore required to comply with the provisions of the Act. The point being clearer messages were needed.

[118] In my view pragmatism and common sense has been a feature of farming for many a long year there should be no issue on whether a helmet should be used or not.

[119] If engaging the quad bike in any activity there is always the possibility the bike could roll or flip given the well documented problems both in New Zealand and Australia whether it be at speed or low speed. On that basis the use of a helmet would be warranted in every situation.

[120] The third issue that MBIE seek endorsement is for the rural sector and communities associated with farming to stand up and take the leadership or ownership of the health and safety issues including quad bikes without the threat of enforcement of the regulators and prosecution.

[121] Human nature has shown that proactive leadership will always win the test of longevity in terms of success as opposed to coercion or compulsion. Self initiation has more long-term value in the end.

Roll Over Protection Devices

[122] The last issue and perhaps the most controversial of issues is the use of roll over protection devices (ROP's) or crush protection devices (CPD's). This inquest and the evidence provided by the experts confirmed that there is a diverse range of opinions. The debate is both robust and lengthy. There is a clash of scientific evidence followed by polarised views as to whether ROPs provide safety or undermine safety on a quad bike.

[123] There is a "Mexican standoff" between the competing factions and most recently the competing science.

[124] This debate has been raging for some years and over the last two or three years there has been a direct challenge to the science provided by manufacturers over the use of ROPs.

[125] The essential argument by manufacturers is that the fitment of ROPs or CPDs can undermine the stability of the quad bike which places the rider's safety at risk. The counter argument by the others (which include academics; independent engineers; farmers; and agricultural technology innovators) is that the unchanging design of the quad bike has led to a belief that a farmer or rider of a quad bike would be safer with an appropriate ROP. Countless injuries and fatalities support that view.

[126] The manufacturer's evidence which has been formulated from a testing regime based on computer driven simulation has now been directly challenged by Australian authorities such as John Lambert; Geoff McDonald and Professor Tony Lower in their respective areas of expertise.

[127] That information has been shared with NZ by way of the trans-Tasman relationships.

[128] MBIE form part of the trans-Tasman working group process in trying to provide clear resolutions around the issues of design improvements for quad bike safety with specific reference to ROPs. Unfortunately the trans-Tasman group struggle to reach consensus due to the polarised views of the members.

[129] Nevertheless, the process did succeed in gaining a general consensus about the methodological limitations of research commissioned by the quad bike manufacturers indicating that ROPs most likely would cause more injury than prevention. That has been the established position, unchanged, for many years by the quad bike manufacturers.

[130] MBIE confirmed in their submissions the watershed moment was achieved when the trans-Tasman specialist technical group called into question the validity of the manufacturer's findings. Specifically, the manufacturer's research had previously dominated the ROPs debate claiming to have the only empirical evidence on the effectiveness of ROPs.

[131] What MBIE say from their involvement in the trans-Tasman technical group is that the group now has an overall consensus that perhaps ROPs are not as bad as they have been made out to be.

[132] The current position by the NZ regulator taken from their submission is this;

“Various ROPs have been designed and fitted to quad bikes over the past two decades with the aim of protecting the rider from being crushed by the weight of the quad bike.

Quad bike manufacturers say that ROPs increase the chances of injury if a quad bike rolls and commissioned a computer simulation study to illustrate this effect. However, the validity of the study’s findings has been challenged by others citing contradictory evidence and the debate continues.

The Department (MBIE) cannot promote or require the fitting of ROPs to manage the hazard of quad bike roll over until the protective properties of such devices have been firmly established.

Fitting ROPs to a quad bike therefore remains a matter of personal choice for the farmer. A recent survey indicates that some form of ROP is fitted to quad bikes on approximately 15 percent of New Zealand farms.”

[133] At inquest the issue was put to Mr Barton representing MBIE. He confirmed MBIE had no real choice other than to take the neutral position as the status quo not withstanding future compelling evidence that would persuade the regulator differently. There is developing evidence in Australia now challenging the manufacturer’s science.

[134] NZ should be looking to the Australian landscape where ROPs have been fitted to quad bikes in the Federal government employment programmes and similarly in the NSW state government employment programmes. The quad bikes have been fitted with a proven commercial product deemed by the federal and state employers, endorsed by national health and safety entities, as an appropriate safety measure for their employees. I am aware a similar situation exists in Israel where ROP’s have been fitted to government quad bikes for over 10 years.

[135] It is important to distinguish the fitment of ROPs on Government quad bikes was done in their capacity as employers as opposed to an initiative by regulators.

[136] The Australia example has shown there has been genuine work towards addressing the issues surrounding the fitment of ROPs. Federal Minister, Mr. Bill

Shorten had led the charge on behalf of the Federal Government bringing together key stakeholders in terms of a review on the issue.

[137] It was my impression the Federal Government was potentially considering a legislative change in terms of the fitment of ROPs.

[138] In my view the Australian example which is being closely monitored by credible researchers like Professor Tony Lower and independent engineers including John Lambert and Geoff McDonald will provide the empirical evidence within the next 5 to 10 years showing that the fitment of appropriate ROPs will indeed reduce injury and fatalities.

[139] I believe this evidence in time will form the new bench mark science.

[140] In the NZ context there is a belief that at least 15 percent of quad bikes used on farms have a fitment of some sort. The perception is the farmer considers their choice of ROP as appropriate to their work demands.

[141] The inquests have shown there is a real variety of ROPs in NZ which may be best described "the good, the bad and the ugly".

[142] Dr David Moore who is considered in NZ and Australia as a credible academic and analyst of quad bike issues confirmed at inquest that not all ROPs were bad and in some situations an appropriate fitment would add safety.

[143] The clear message coming from the inquest is that there is a fine balance between an appropriate ROP and maintaining the stability of the quad bike given its limitations and error intolerance.

[144] Therefore the fitment of ROPs remains an independent and individual decision of a quad bike user. There are a range of ROPs available both on a commercial basis and individually developed designs by farmers who apply the "Number 8 wire" philosophy in a design that works for them.

[145] I take the view there is a strong argument that ROPs should be considered as a legitimate form of safety protection. Unless there is a fundamental shift in the design of quad bikes; that lowers the centre of gravity; that make the base of the

bike wider; and maybe a new manufacture enters the market with a new and a safer design; then the "Mexican standoff" remains in terms of the polarised views.

[146] It is not for this finding to endorse commercial products and name them individually; nevertheless, there are at least two on the market that have independent endorsement and merit and have proven to be an added safety feature without compromising the safety of the bike through independent testing and not by simulation testing. They are not perfect but they are more likely to save the life of a rider when it is tipped than not. Again, it comes back to the individual's view on the spectrum of whether ROPs should be standardised as a fitment or not.

Training and Education

[147] Most importantly as an immediate and long-term factor in quad bike safety is the issue of education and training.

[148] I was impressed with the industry leaders in terms of their dedication and commitment whether they were manufacturers or industry educators on ensuring that those who use quad bikes understood the limitations and capabilities of the bike; the issues around good maintenance and functionality of the bike; the use of helmets; the importance of active riding and the reasons why it is done; that inherently quad bikes are error intolerant; the importance of understanding the manufacturer's instructions and capacity weight tolerance when towing trailers or adding weight by way of spray machines and specifically understanding the importance of that safety aspect.

[149] There was a realistic acknowledgement, not directly, more from the understanding these types of bikes had unique design features and therefore they needed to be used as safely as possible. Training and education remains an integral part of the safety message.

[150] Over the years subsequent governments have funded or subsidised training and education programmes in quad bike use. The industry genuinely believed such programmes increased greater safety awareness adding real value to the agricultural industry and the Forestry industry.

[151] There were concerns by industry trainers the removal of Government subsidies would undermine the sector standards. The industry has tried to maintain a high standard of training and overall education established some years earlier. Their concern is the removal of the financial subsidy will undermine both the quality and effectiveness of the outcomes desired.

[152] I was impressed with the clarity of the message and whilst there may be a small element of self interest, overall, the message promoted to quad bike users was one of safety first above all else.

[153] With the complexities of design and associated arguments around it, the most pragmatic way of dealing with a quad bike on a day-to-day basis is through good education and training.

[154] Grant Hadfield, of FarmSafe NZ, reiterated the importance of skills-based training that included hazard identification and the management of that hazard. In applying the skill based principles to the use of quad bikes, it is making the rider of that bike personally responsible for their own safety. It is a lifelong responsibility when engaging quad bikes.

[155] With an estimate of between 80,000 and 100,000 quad bikes in use throughout NZ in various situations from commercial farming through to recreational use, one can imagine the variance in riding skill levels; the variance in maintenance standards; and general attitude to safe use. The variance would span from exceptional to total neglect and worse.

[156] It would be easy to suggest there should be a minimum standard of bike maintenance or riding skill and therefore a regulatory licensing and registration regime should be set up for quad bike and riders, as with motorbikes, as with other machinery. In terms of a business plan with enforcement provisions that would be very difficult to establish requiring political motivation.

[157] I like the concept of the "FarmSafe Quad Bike licence" where a farmer; farmer's employee; self contractor or a quad bike user is trained and taught to be competent when using a quad bike. The training includes understanding the hazards of using quads; and the importance of good quad bike maintenance.

[158] FarmSafe stated 68 percent of quad bikes fail mechanical checks. It is a skills-based training course that to date had seen 350 quad bike licenses issued in NZ since 2011.

[159] The concept has real merit and regardless if the quad bike user stayed with the same employer or moved to somewhere else it would be a qualification/licence that would be recognised within the industry. There is discussion of expanding the concept industry wide to a "Rural Licence"

[160] Overall, I would endorse the continuation of training and education in this area. In my view it is the most pragmatic safety measure that would have the most use over the longest period of time.

Retention of Expertise

[161] At inquest, Dr. Moore, highlighted the need to accumulate and retain genuine and credible knowledge around quad bike use; safety and other appropriate evidence associated with it. He felt there was not enough expertise or overall knowledge being built up. There needed to be more collection and analysis of the contributing factors to both injury and death. There needed to be a building up of sector and technical knowledge.

[162] He felt the sector wasn't retaining the people with the sector and technical knowledge. There were too few people involved in key positions in the analytical and regulatory bodies and often they changed roles too frequently resulting in failure to retain the knowledge and the people who could make a difference.

[163] Dr Moore reiterated that New Zealand was not a separate case in that we were in a similar position to that of Australia, Sweden and other countries having the same debates and challenges. Other countries were struggling with improving health and safety standards in the issues around quad bike safety and the agriculture sector in general.

[164] In summary, he acknowledges that New Zealand was not a wealthy country overall and therefore would never be able to afford a health and safety system for agriculture modelled on the aviation or petrochemical sectors for an example which

had large expert teams of regulators developing and updating rules; policies and procedures.

[165] He felt that we should adopt a different model in New Zealand to harness the energy and specialist knowledge of individuals in this industry but particularly around quad bike use. I support that sentiment.

ACC

[166] I acknowledge the work ACC have been doing in education and training. They have been at the forefront of funding research on helmet use and other factors. They have funded Standards New Zealand to develop specific helmets for quad bikes and have been working with companies both here in NZ and overseas (including Australia) to further the safety message around quad bike use. They remain active in the area of quad bike injury reduction and remain committed in providing media developed resources around keeping children safe around quad bike use.

[167] I endorse their continued involvement in the New Zealand community working with various groups including "Kidsafe" and others in providing the overall education and clear message about sensible use of quad bikes.

[168] Moving forward into the future ACC will play an important role in monitoring the scientific development of new evidence in its role of reducing injury; risk; and fatalities from quad bikes. ACC is also challenging the science around ROP's and continues to work and fund other researchers with similar views.

Testing of Aftermarket products

[169] There is a need for more information around the testing of after-market products that can be fitted or attached to a quad bike. Specifically, I talk about the use of spray units and the impact they have on the stability of a quad bike when in use. The same would apply to the attachments of trailers or purpose-built trailers.

[170] In all five inquests the common denominator was an after-market attachment either a spray unit or a trailer that contributed to the overall demise of each crash and eventual death.

[171] Dr Moore talked about having baffles in the spray unit tanks to stabilise as much as possible the shifting liquid. He talked about better research on the coupling flexibility of purpose built trailers towed by quads etc. There is a genuine lack of available research on these aftermarket products and the impact they have on the stability of the quad bike. This in itself would form part of the knowledge build up.

[172] There is very little scientific feedback on the impact these after-market products have. Whether they are provided by the manufacture or an industry leader which has the ability to widely publish such information, in my view is required.

ATV

[173] Two final points for consideration; firstly, the term "ATV" in my view should be removed from any official description of a quad bike. Manufacturers explain the term ATV has been around for many years and was a distinguishing tag attached to a quad bike and easy to be identified in the market place.

[174] In today's context, the all-terrain vehicle (ATV) is simply not that and should not be referred to as it is misleading.

[175] In many of the quad bike fatalities in which Coroners have dealt with there has been a common result where the deceased has often been trapped under their quad bike for some period of time. They have survived for a period before succumbing to the weight of the bike or the sustained injuries. The carrying of a personal alarm of some sort may lead to saving a life. I would invite the innovators to consider the concept.

[176] Farmers work hard; often in isolation; over long hours; often battling fatigue and tiredness; having an alarm system or communication system that can be activated relatively easily could save a life especially if rescuers are searching and time is of the essence.

[177] Lastly, other Coroners have raised in their findings the use of a mechanical beeper of some sort when the bike is being reversed. It gives a busy farmer who is often on and off their bike all day a warning when in reverse. There have been cases when a rider has reversed backwards over a cliff when they genuinely

thought they were in gear to move forward. Is this something the innovators may consider as well?

[178] The same principle could apply by way of engineering intelligence when the quad bike is at risk of rolling over because of unstable terrain; or when it is been ridden across an unsafe hilly slope. It tells the rider to immediately alter their course or to stop. That is a discussion and a suggestion requiring further involvement from industry leaders and innovators.

Eliminate Quad Bikes from Farming

[179] The other consideration is to stop using quad bikes in farming altogether. There have been projects examining this concept in both in Australia and NZ on large commercial operations. Many NZ farmers are transferring from quad bikes to UTI's or side-by-side all terrain vehicles. The two wheel motorcycle is considered safer to use accepting it is very limited in playing multiple roles. There is the rise of small vehicles with a genuine utility role.

[180] The fact remains the quad bike is entrenched as a vital farm tool in NZ.

Recommendations

- (a) I indorse the programmes and projects MBIE have instituted in relation to supporting guidelines for the safe use of quad bikes;
 - That riders must be trained and have the requisite experience to ride a quad bike in performing their duties and functions.
 - To ensure that proper judgement is exercised in choosing the right vehicle for the right job.
 - To always wear a helmet.
 - To prevent children riding adult quad bikes.
- (b) That a quad bike should not be referred to as all-terrain vehicle (ATV). It is accepted the acronym ATV was associated with the

marketing of quad bikes over many years and has been an accepted term within the quad bike/motorcycle industry. In my view it is misleading and to remove it from Government terminology in relation to quad bikes is appropriate. Quad bikes should be identified by their true definition and not a misleading definition like ATV.

- (c) I endorse the recommendation by all heads of the industry in that a helmet should be worn at all times when a quad bike is in use.

- (d) I strongly recommend the continuation of training and education with the tertiary sector in relation to NZQA to review appropriate levels of funding in ensuring that appropriate training which would include skills-based training; hazard identification and management; the understanding of appropriate maintenance including tyre pressure on the quad bike. Training and education would include a thorough understanding of the limitations and frailties of the quad bike particularly when after-market attachments like spray units and trailers are attached to it.

Unfortunately, training and education cannot teach common sense or good judgement; nevertheless, they can teach the realities of poor decisions when quad bikes are placed in vulnerable situations as a result of riding them on hilly; sloped or steep terrain. Death and injury can also occur when in slow motion or when turning.

Active riding is one of the most important skills required to safely control a quad bike and must be taught by qualified people.

Making training of quad bikes as accessible as possible not only for corporate units within the agricultural industry; to those in the recreational industry; to those in forestry and other related industries would benefit from a similar type of training.

Whether there is an opportunity to discuss a certification or licensing option would be worthwhile pursuing.

- (e) I suggest consideration be given to supporting a multi-disciplinary taskforce to specifically research and advise on ROPs. As it stands, there is a trans-Tasman group who consider design issues and ROP's etc. The evidence at inquest has shown there is a diverse range of opinions that are entrenched and therefore the issue of safe fitment of ROPs cannot be advanced. This group has adjourned from time to time due to the entrenched positions. Therefore a dedicatory group of professionals within the New Zealand Government regulator set up is worth considering. It may even fit within the new standalone entity.
- (f) ROPs: in continuing this area I endorse the view of closer relationships with Australia and to look to their developments both at the Federal and State Government levels with the fitment of ROPs and to closely monitor the success that comes from their development and further evidence provided by independent engineers and health and safety experts.

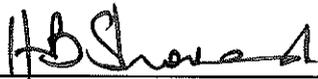
To provide further support to ACC in their endeavours to fund more research in joint projects and to continue to develop advanced scientific approach's to reducing risk; harm and fatalities relating to quad bikes.

Further consideration should be given to a specialist unit for quad bikes, tractors and farm machinery. As pointed out by Dr. Moore there is a problem in retaining the technical and sector knowledge and the personnel who have built up expertise over time. To have a dedicated unit not just around quad bikes but other farm machinery would greatly assist the agricultural sector and other similar industries. It may be worth pursuing consideration of a joint venture between industry leaders and the New Zealand Government.

- (g) To have regular testing of after-market attachments and products associated to quad bikes specifically trailers and spray units. To provide better information around risk and compromise in relation to the stability issues of a quad bike. To provide better understanding of

limitations and to provide a better and safer message within the industry.

- (h) To give thought to a better message about quad bike maintenance, in particular having the correct tyre pressures and general maintenance of the quad bike reducing risk and potential fatalities – training and education.
- (i) Lastly, recognising quad bike issues are complex in many aspects. Maintenance remains a genuine problem and a contributing negative factor to injuries and fatalities. In the ideal world having quad bikes either registered or licensed or warranted may be of real benefit. Is there any merit in considering this issue?
- (j) To consider fitting a warning signal by way of a beeper or alarm when a quad bike is in reverse or when it is on a slope and potentially at a point of tipping. Whether the issue of artificial intelligence can be attached to a quad bike for safer use is both an academic and technical discussion. It is accepted these are but discussion points that with the right political will and physical environment may become a reality.



Coroner H B Shortland