

Preventing death and serious injury caused by quad rollovers on Australian farms - Policy Paper

Tony Lower, John Temperley
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Aim:

This policy paper aims to provide farmers, farm managers and workers with practical information to assess risks associated with quad rollovers and to put in place effective control measures to reduce the risk of death and serious injury. This paper should be read in conjunction with the update of the Australian Centre for Agricultural Health and Safety publication “Safety of quads and side-by-side vehicles on Australian farms - A practical management guide”.⁽¹⁾ The guide includes the full range of approaches to reduce both rollover and non-rollover incidents.

The nature of the risk:

Quads are commonly used on Australian farms and fall under the category of “plant” within the existing Work Health and Safety Regulations.^(2;3)

From 2001 to 2015 quads have resulted in over 220 deaths across Australia - an average of 15 per year.⁽⁴⁾

Quads are the leading agent of non-intentional injury death on Australian farms and have been for the past five years.⁽⁵⁾ Of the cases with completed coronial investigations (n=172), 60% involved the quad rolling over and the most common location for rollover deaths were farms (82%). Overall, rollovers were involved in 72% of on-farm and 35% of non-farm deaths.⁽⁴⁾

In addition to the physical, social and emotional impacts related to quad deaths and serious injuries, there are significant economic implications, with the average cost of a quad fatality being conservatively estimated as \$2.1 Million (in 2013 dollars) and the total cost from 2001-2012, being \$348.8 Million.⁽⁶⁾

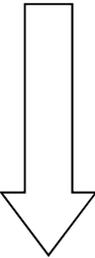
Rollovers resulting in crush injury and asphyxia (not being able to breathe), are a leading cause of on-farm fatalities. Just over half of all riders are pinned by the vehicle. Approximately 20 persons that died of asphyxia would have survived the crash if the vehicle did not pin them with sufficient force to cause asphyxia.⁽⁷⁾

These findings indicate that quads pose a significant risk of rollover in a farm environment and that steps must be taken to reduce the potential for death and serious injury.

Regulatory requirements:

All equipment designers, manufacturers and workplaces are required by law to undertake a risk assessment and to reduce the risk of injury from “plant”.⁽²⁾ This must include the risk from quad rollovers.

Specific efforts to reduce deaths and serious injury from quads should follow the range of actions based on the hierarchy of risk control and identified in the document “Safety of quads and side-by-side vehicles on Australian farms - A practical management guide.”⁽¹⁾

MOST EFFECTIVE	Hierarchy of Control Measures
	Elimination - you must always consider eliminating hazards and risks, this may not always be possible but start with this option.
	Substitution - use a more stable machine e.g. ute or side-by-side vehicle.
	Engineering Controls - fitting a rollover Crush Protection Device (CPD).
	Administrative Controls - operator training, safety induction and information, rider supervision, no passengers, no children (<16 years) using quads, no loads, no towing, regular vehicle maintenance.
LEAST EFFECTIVE	Personal Protective Equipment - helmet, gloves, goggles etc.

Control options:

The focus of manufacturers’ has been on promoting the lower order, or least effective controls:

- Rider training - is important but has not been demonstrated to be an effective risk control intervention.⁽⁸⁾
- Being a “safety conscious individual and rider” offers little protection against quad rollovers.⁽³⁾
- Using Personal Protective Equipment - while there is universal agreement that wearing a helmet will provide some head protection in the event of a rollover or crash,⁽⁹⁾ one-third of fatalities in Australia involve injury to the head.⁽⁴⁾

In contrast, ***the two higher level control options that farmers, farm managers and workers should put in place to reduce the risk of death and serious injury caused by quad rollover are:***

1. Selection of a safer vehicle or machine for planned tasks and farm work, and
2. If a quad is to be used, fitting a tested rollover Crush Protection Device (CPD).

a. Selection of the safest machine for the job

Where possible select a machine that has a low risk of rollover. Consider machines that can be fitted with suitable operator protective devices, including rollover protection structures and seat belts.

Many jobs on Australian farms can be undertaken using alternatives to quads (e.g. farm utes, tractors and side-by-side vehicles). Depending on the task, these alternatives may be more “fit for purpose” e.g. carrying / towing loads etc. In other instances, motorbikes may also be more “fit for purpose” than quads e.g. riding on narrow farm roads.

Physical testing has identified that quads have poorer stability than side-by-side vehicles and when a load is added, this further reduces quad stability.⁽⁷⁾ This has been reinforced by an Australian Coroner who indicated that quads are “prone to rollover”.⁽³⁾ Numerous farms and other organisations have moved away from using quads, predominantly to side-by-side vehicles, because they are more “fit for purpose” and the risk of quad rollover has been seen to be too high.

b. Fitting a tested rollover Crush Protection Device

In cases where quads continue to be used, many farms and others including agricultural training institutions, have looked at the issues and fitted suitably tested CPDs to reduce risks in the event of a rollover.

Manufacturer-supported research has consistently claimed that protective devices are unsuitable for quads, with issues raised including; that they reduce stability, inhibit active riding and impair rider-separation from the quad.^(10; 11) However, recent Australian physical static testing (using crash dummies) and dynamic testing (using real riders) conducted in 2014, indicates that for two types of CPDs assessed, their fitment was not detrimental to stability or handling. The study also concluded that active riding and rider separation were not considered reliable rollover risk reduction strategies for quads in the work / farm setting.⁽⁷⁾ Similarly, a Queensland Coroner has indicated that “...active riding should not be held out to be the answer to stability issues”.⁽¹²⁾

The most recent computer simulation modelling undertaken on behalf of the manufacturers’ reports that fitting a CPD on average increased injury severity and probability of fatality in the simulation sample of overturn events.⁽¹³⁾ However, the validity of the modelling assumptions, scenarios and the methodology used for comparing quads with and without a CPD in this research, has been repeatedly called into question by independent engineers,^(14; 15; 16; 17) with on-going counter arguments provided.⁽¹⁸⁾

In contrast to the hypothetical industry computer modelling, the body of evidence and real world field data supporting the potential for rollover protection on quads is continuing to grow, including information presented at two extensive coronial inquests in NSW and Queensland throughout 2014-15.^(7; 12; 19; 20; 21; 22; 23)

Australian findings from physical testing concluded that CPDs are likely to be beneficial in terms of reducing severe injury and cases where riders are pinned under the quad in some low speed rollovers typical of farm incidents. In some cases injury risk could be increased, although there is currently no real world recorded evidence of this.⁽⁷⁾ Indeed, during the coronial inquests in NSW and Queensland, no incidents involving a CPD were raised by the industry.^(12; 19)

Although study limitations exist, there is a highly consistent pattern present in the real world data where quads fitted with a CPD are under-represented in fatal and injury cases. Across Australia and New Zealand there is currently estimated to be around 10,000+ quads with some form of CPD fitted. In New Zealand approximately 20% of quads were fitted with a CPD in 2002,⁽²⁴⁾ with current estimates continuing to see rates around 10%.^(25; 26; 27)

Deaths information from New Zealand for 2000-2008 indicate there were 45 work-related fatalities, with 31 (68%) involving a rollover.⁽²⁸⁾ While not reported in the published study, data on whether a CPD was fitted were collected, with only one of the 31 rollover incidents involving a quad fitted with a CPD. Importantly, the CPD was not implicated as a factor in the incident or death.^(26; 29) Since this time (2008), there have been approximately 36 further work quad-related deaths in New Zealand (mean 5/year). Conservatively at least 50% (18) of these, are likely to involve rollover. None of these incidents is known to have involved a quad fitted with a CPD.⁽²⁹⁾ As such, in the 15 years since 2000 there have been approximately 50 rollover related fatalities in New Zealand and with a highly conservative CPD fitment rate around 10% throughout this period (noting it was double that in 2002), not a single fatality involving a CPD fitted to a quad and making contact with a rider has been identified.

This New Zealand study also identified 157 rollover related injuries, with only five cases noted to have been fitted with a CPD (though whether they were involved in the actual injury is not specified).^(26; 28; 29) This represents just 3% of rollover incidents (compared to CPD fitment of somewhere between 10-20% over this period).

In relation to injury, again noting study limitations, data from the New Zealand Accident Compensation Corporation (ACC) for the period July 2000 to July 2001 recorded only five cases where a CPD was mentioned as the agent of injury from a total of 433 rollover incidents, representing 1% of rollover incidents compared to approximately 20% being fitted with a CPD in 2002.^(24; 30) In summary, all the existing New Zealand data illustrates that quads fitted with CPDs are under-represented in the fatality and injury data.

For Australia, while the current fleet fitted with CPDs is smaller (around 3-4,000 units), there are no fatal cases involving rollover (2001-2015) and only one involving a non-rollover where a rider was ejected from the quad and the CPD played no part in the incident.^(4; 7) There are also no known reports of these CPDs causing an injury and a growing number of testimonials from independent sources where they have been reported to prevent or reduce injury in rollover incidents in both Australia and New Zealand.^(31; 32; 33) There are also additional testimonials on product related sites.^(34; 35)

Internationally, there is also long-term support for the use of CPDs on quads from Israel, where compulsory fitting of “safety arcs” on all quads has been in place since the early 1990’s. This compulsory regulation was most recently updated in April 2014.⁽³⁶⁾ It is inconceivable that such regulations would be maintained if they were causing fatalities, increasing injury severity or rates over such an extended period.

CPDs that have been tested to examine their effectiveness in reducing deaths and serious injury in the event of a rollover are available for sale to Australian farmers (Attachment 1). Overall, the benefits of fitting a suitably tested protective device, have been estimated to potentially reduce quad rollover deaths by up to 30%.⁽³⁷⁾

Although further ongoing research is required, based on the most recent evidence and specifically the consistency of the physical testing and real world data indicating reduced fatality and injury risk, there is a very strong case drawing on precautionary principles to recommend the adoption of suitably tested CPDs to minimize the risk of death and serious injury from quad rollovers.

Since 2011, the Australian Heads of Workplace Safety Authorities which includes all Australian state and territory work health and safety authorities, has supported but not required the fitting of CPDs meeting their stated requirements.⁽³⁸⁾ The NSW and Queensland Coronial inquests (2014-15) identified a range of approaches including advertising and law reform to produce a cultural safety shift.^(12; 19) Currently, several states in Australia are examining their options in relation to these issues, with Victoria announcing that it will now require fitting of a CPD as part of a comprehensive safety package based on the hierarchy of controls (February 2016).

Farmers and other owners of quads should be encouraged to:

(a) select a safer vehicle for farm work

(b) fit suitably tested Crush Protection Devices to quads to reduce death and serious injury from rollovers.

The Australian Centre for Agricultural Health and Safety:

Through its own activities and in partnership with its network of stakeholders, the Centre will:

- Continue to promote the adoption of the two higher order controls -
 - (1) selection of the safest machine for the job, and
 - (2) fitting a suitably tested CPD.

These will be supplemented by the lower order controls such as rider training and use of relevant personal protective equipment including helmets. This approach and further information to also reduce non-rollover incidents, is outlined in more detail in the “Safety of quads and side-by-side vehicles on Australian farms - A practical management guide”.⁽¹⁾

- Actively work with farmer networks to advocate for moving to safer alternate vehicles and where quads continue to be used, fitting suitably tested CPDs.
- Advocate for the fitting of suitably tested CPDs as a standard component of all new quad sales in Australia.
- Work with states’ Work Health Authorities to promote the fitting of suitably tested CPDs and to endorse the introduction of financial incentives for retro-fitment by farmers.
- Maintain a focus on further developing the evidence on fatalities and serious injuries through the National Farm Injury Data Centre and monitoring changes in fatality and injury patterns.
- Encourage further definitive assessments of CPDs for quads to limit deaths and serious injury in the event of a rollover.
- Engage in activities with farmer networks to improve quad safety using all elements of the hierarchy of control to reduce incidents.

Attachment 1

Crush Protection Devices (CPDs) tested and illustrating potential for rollover protection:

1. Quad Bar

Contact Details: Ph: (07) 4612 3100
 Email: info@quadbar.com.au
 Website: <http://www.quadbar.com.au/>

2. ATV Lifeguard

Contact Details: Ph: 0427 378040
 Email: sales@atvlifeguards.com
 Website: <http://www.atvlifeguards.com>

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