

# Quad Bikes: A Look at the Safety Behaviour of Accident Victims



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## **Acknowledgement**

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## **EXECUTIVE SUMMARY**

### ***Background***

In November 2010, the Department of Labour ('the Department', now the Ministry of Business, Innovation and Employment) began a campaign to reduce harm resulting from the use of quad bikes. Quad bike use is widespread on New Zealand farms for work and non-work purposes. Unless ridden safely and properly, quad bike use can result in serious and fatal injuries. The social and economic costs of such injuries are high.

Fatalities from quad bikes range from two to seven per year. Quad bikes are involved in approximately 28 percent of all work-related farm deaths, and 850 people are injured every year on New Zealand farms while riding quad bikes. In 2010, it was reported that quad bike accidents cost \$10 million in ACC claims that year, and there were 3,000 active claims for quad bike injuries at the time.

This report presents the results from a survey of quad bike accident victims in an attempt to understand aspects of their behaviour around the use of quad bikes.

### ***Aim of the research***

The aim of the research was to identify the influence that having an accident has on the safety behaviour of accident victims who had a claim for the accident accepted by ACC, including training, helmet use and carriage of passengers. The research also provides a demographic profile of the accident victims, which can assist the Ministry of Business, Innovation and Employment ('MBIE') to better target its quad bike safety campaign.

### ***Method***

This research project used a phone survey of quad bike accident victims on farms in 2009 and 2010 who had had their claim accepted by ACC. A response rate of 74 percent gave 386 respondents. The results are restricted to quad bike accident victims who had their claim accepted by ACC and cannot be generalised to all quad bike accident victims nor to all quad bike riders. The respondents are potentially different from other quad bike users in their likelihood to make a claim to ACC. The sampling frame did not include fatal accidents, claimants under the age of 15 and claimants with serious head injuries. Hence, the results could be somewhat biased by these removals.

### ***Summary and discussion***

Only results that were significantly different from each other at the 95 percent confidence interval are included.

#### *Profile of accident victims and their quad bike use at the time of the accident*

The quad bike accident victims were largely middle-aged or older Pākehā men, who were farm owner/managers or self-employed. Most were untrained in quad bike use but experienced in farm work and riding quad bikes, although around

one in 10 had no experience of working on farms. Younger respondents (aged 15–44 years) had more experience riding quad bikes than farming.

The quad bike accident victims were usually the rider of the quad bike, at work on the farm, using the quad bike for work purposes. Respondents working at the time of the accident used quad bikes more often than respondents not working so had a higher exposure to the risks associated with quad bike use. It is possible to consider the respondents as two groups – those working and those not working at the time of the accident, where working relates to factors such as experience and type of use of the quad bike.

The survey collected descriptive information about the use of the quad bike and associated hazards at the time of the accident but did not attempt a root cause analysis of the accident. At the time of the accident, a large proportion of the quad bikes were towing an implement (a potential hazard), but in contrast, only a small proportion were carrying a load (also a potential hazard). In addition, a small proportion had a rollover protection device fitted (unclear whether or not this is a hazard).

One fifth of respondents' accident claims were considered 'serious', that is, the respondent was entitled to compensation in addition to having their medical fees covered. Respondents who were using the quad bike for work purposes were under-represented in serious accidents compared to respondents using them for other purposes. However, there was no difference in the seriousness of respondents' accidents by experience riding quad bikes.

#### *Awareness of Department of Labour's quad bike safety campaign*

Other research results combined with the current survey results suggest that there is awareness of some of the Department's key messages about the safe use of quad bikes.

In the current survey, half the respondents were aware of the Department's quad bike safety campaign. A similar proportion was aware of the message about wearing a helmet. A quarter of respondents were aware of the message about choosing the right vehicle for the job (including following manufacturers' instructions about carrying passengers and load limits). Awareness was higher among respondents working at the time of the accident than respondents not working at the time of the accident. Overall, there was limited awareness of other safety elements about quad bike use. These results could reflect the short amount of time between the launch of the information campaign (late 2010) and the survey (late 2011).

Respondents' ideas for preventing quad bike accidents and harm can be largely grouped around the Department's four main quad bike safety messages, as well as other safety elements such as the riders' attention to themselves and to their environment.

### *Behaviour changes following the accident*

Overall it appears that following the accident at least half the respondents had made changes to act more safely in their use of quad bikes. Changes included a decrease in the carrying of passengers and, consistent with other research, an increase in the use of helmets. One in six of the respondents who reported carrying passengers before the accident reported not carrying them following the accident. One in nine of the respondents who reported not wearing a helmet before the accident reported wearing a helmet following the accident.

Respondents also reported a reduction in the frequency of riding quad bikes. Of the respondents riding daily before the accident, one in four had stopped riding daily. Both those who were working at the time of the accident and those who were not reported a reduction in their use of quad bikes. Interestingly, one of the Department's quad bike safety campaign messages is 'Choose the right vehicle for the job'. As such, that some respondents reported using quad bikes less may reflect the desired change in behaviour, whereby they are now choosing vehicles better suited to the task than quad bikes.

Almost half the respondents reported other behavioural changes following the accident, such as increased awareness of their surroundings and speed and taking more care generally. A few had stopped riding quad bikes altogether (although it is not clear from the survey if their injury now prevented them from doing so). However, two-thirds were still not wearing helmets even after the accident; and only one percent of all respondents attended training following the accident.

### *Training*

About one-fifth of respondents had received some formal training in quad bike use, a similar proportion had received informal training and the remainder were self-taught. Of those who received formal training, nearly all had done so before the accident. Only one percent of all respondents attended training following the accident. The low proportion of serious accidents might be a reason for this.

Respondents' reasons for undertaking formal training were mainly to comply with their employers' instructions than for safety reasons. Younger respondents (aged 15–44 years) were more likely to have attended training than older respondents (aged 45 years and over). The respondents with most and least farming experience were less likely to have attended formal training. Perhaps the more experienced respondents were relying on their experience, while the newer ones had yet to be trained, if at all. About half the trained respondents had undertaken training more than 10 years before the accident. About two-thirds of trained respondents reported making changes after receiving training, with most reporting they were more cautious.

Among respondents who were working at the time of the accident, trained respondents seemed somewhat more open to behaviour change following the accident. They were slightly more likely to have reduced their frequency of riding quad bikes, slightly less likely to carry passengers and slightly more likely to wear helmets compared to untrained respondents. It is unclear if the behaviour changes are related to being trained or to other factors such as working, risk

tolerance, experience and age, so the results about training need to be treated cautiously.

Respondents' ideas about improving quad bike training included elements of the structure and content of training as well as information about training and its accessibility.

### ***Conclusion***

This research was about the influence of an accident on the safety behaviour of quad bike accident victims who had had their accident claim accepted by ACC. Respondents were largely middle-aged to older men who were experienced in farm work and in riding quad bikes. Very few had been formally trained in quad bike use. In contrast, trained respondents were more likely to be younger.

Accidents happened mostly in work circumstances but also in non-work circumstances, reflecting that quad bikes are used most often for work yet the risks surrounding their use are present in all situations.

Following the accident, at least half the respondents had made some changes to act more safely in their use of quad bikes. However, two-thirds were still not wearing helmets; and only one percent of all respondents had attended training.

Respondents who had received training before the accident were slightly more willing to make changes following the accident, although it is possible that other factors such as working, experience and age facilitated the behaviour changes.

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# 1 INTRODUCTION

## 1.1 Background

Quad bike use is widespread on New Zealand farms for work and non-work purposes. Unless ridden safely and correctly, quad bike use can result in serious and fatal injuries. The social and economic costs of such injuries are high. In late 2010, the Department of Labour ('the Department', now the Ministry of Business, Innovation and Employment) began a campaign to reduce harm resulting from the use of quad bikes.

## 1.2 Aim of the research

This report presents the results from a survey of quad bike accident victims to understand changes in their quad bike usage and behaviour following the accident.

The aim of the research was to identify the influence that having an accident has on the safety behaviour of accident victims who had a claim for the accident accepted by ACC, including training, helmet use and carriage of passengers. The research also provides a demographic profile of the accident victims and their awareness of the main messages of the Department's quad bike safety campaign.

This chapter describes quad bike use in New Zealand, the association with injury and what the Department is doing to reduce quad bike harm. Chapter 2 briefly describes the research method. Chapter 3 describes the demographic profile of the respondents and their quad bike use at the time of the accident as well as their awareness of the main messages of the safety campaign. Chapter 4 analyses the influence of the accident on respondents' behaviour and Chapter 5 analyses the influence of training. Chapter 6 brings together the results in the discussion, before the conclusion in Chapter 7. The letter sent to claimants about the survey is attached in Appendix 1, and the survey questionnaire in Appendix 2. Appendix 3 lists safety steps from the Department of Labour's quad bike safety guidelines.

## 1.3 Quad bike use on New Zealand farms

Quad bikes are one of the most widely used motor vehicles on New Zealand farms (ACC 2010). They tend to be used daily, and compared to 1993/94, their use is increasing, while the use of two-wheeled bikes is decreasing (Cryer *et al.* 2009). In 2011, 66 percent of surveyed farmers operated one or two quad bikes on their property, and only 13 percent did not operate any.<sup>1</sup>

Quad bikes are commonly known as ATVs (all-terrain vehicles). However, this term can be a misnomer. According to ACC's guide *Quad Bike Safety: Tips on how to stay safe* (ACC 2010), the term ATV 'suggests that you can go places that you probably can't or shouldn't'. The guide explains that 'quad bikes are

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<sup>1</sup> The Department commissioned these and other questions for a nationwide phone survey of farmers carried out in July/August 2010 and July/August 2011.

inherently unstable [because] they have a narrow wheel-base and a high centre of gravity. They have a type of tyre designed to grip on soft ground but on the road they can grip suddenly and tip over before you have time to react.'

## **1.4 Quad bikes can be a hazard**

Quad bikes and injury have been the subject of research since the 1990s, showing the risk posed by quad bikes in serious injury (cited by Cryer *et al.* 2009). Research has found that having no formal training contributes to the severity of the quad bike injuries (Shulruf and Balemi 2010). To ride them correctly and safely, quad bike riders need skill. In fact, many people are injured the very first time they ride a quad bike (ACC 2010).

Fatalities from quad bikes range from two to seven per year (Department of Labour 2011a). Quad bikes are involved in approximately 28 percent of all work-related farm deaths, and 850 people are injured every year on New Zealand farms while riding quad bikes.<sup>2</sup> The evidence on serious harm and fatalities suggests that these two indicators are tracking in a manner consistent with previous patterns of the incidence of harm, without any significant reduction in the 2010/11 year (Department of Labour 2011a).

In 2010, it was reported that quad bike accidents cost \$10 million in ACC claims that year, and there were 3,000 active claims for quad bike injuries at the time (Department of Labour 2010). In fact, the prevalence and cost of the accidents is likely to be higher than the claims put to ACC, as not all farm accident victims put in claims (Cryer *et al.* 2009). Further, the costs will be much higher when considering additional costs such as lost output, social costs and so on.

## **1.5 New Zealand response to quad bike harm**

In late 2010, the Department of Labour launched a quad bike 'harm reduction' campaign that ultimately aims to reduce by 30 percent the number of serious injuries involving quad bikes on farms by November 2013.<sup>3</sup> The campaign, in which ACC is also involved, is aimed at farms with employees, that is, farms that are workplaces. Due to the complex nature of quad bike harm, the multiple contributing factors and the strong influence of culture on the problem, the Department considered it appropriate to implement a multi-faceted intervention that collectively aimed to effect change. Each facet is necessary to influence widespread cultural change in the farming sector – none are sufficient on their own (Department of Labour 2010).

The campaign involves the following interventions:

- Engaging with and informing stakeholders and the wider farming community on four main quad bike safety messages.
- Disseminating information and a media campaign (since late 2010).

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<sup>2</sup> See <http://www.dol.govt.nz/quad-bikes/index.asp>

<sup>3</sup> Harm reduction projects are aimed at reducing harm from a particular hazard in a particular sector. The projects are based on the method outlined by Sparrow (2000). This method involves collecting evidence, defining the problem that needs a solution, developing indicators to measure progress, developing and implementing interventions and assessing progress against those indicators.

- A series of targeted enforcement phases.
- Rewriting the quad bike safety guidelines.

Alongside the above interventions, the Department and ACC both encourage riders to be trained. ACC also provides information on the safe use of quad bikes on its website<sup>4</sup> and, in its revised guidelines (ACC 2010), suggests that even experienced riders can learn to hone their skills on a course. ACC's other work in the area of quad bike safety includes injury prevention activities and part-funding research into quad bike safety initiatives.

The Department is monitoring the quad bike harm reduction project, with the monitoring framework covering indicators of harm, indicators of changes in on-farm behaviour and use of quad bikes, and indicators relating to the harm reduction project. The first monitoring report was released in 2011 (Department of Labour 2011a).

In addition to the harm reduction focus on quad bikes, the Department launched an Agriculture Sector Action Plan, which has prioritised improving health and safety around the use of agricultural vehicles and machinery, including quad bikes.<sup>5</sup> To meet this priority, the Department has undertaken to conduct research on the safety behaviour of quad bike accident victims.

## **1.6 Australian Government response to quad bike harm**

Quad bike harm has been a shared focus for both the Australian and New Zealand Governments for some time. In late 2009, the Heads of Workplace Safety Authorities (HWSA), of which New Zealand is a member, directed that a working party be formed to develop an industry strategy to address the unacceptable level of harm arising from the use of quad bikes on farms. The working party was made up of representatives from workplace safety regulators across Australia and New Zealand, manufacturers, automotive associations, farmer associations, unions, training providers and other government bodies. The main aspects of the resulting strategy bear a strong resemblance to the Department's quad bike campaign, reflecting the parallel development of both processes.

These aspects include:

- compliance with manufacturers' guidelines in relation to passenger-carrying, load requirements and rider age, that is, children do not operate adult-sized bikes
- the mandatory wearing of approved helmets
- improvements to point-of-sale material to guide farmers in purchasing the vehicle best suited to their needs and profile
- providing farmers with the option to fit safety improvements such as devices to protect the rider in case of a rollover, under certain conditions
- the introduction of nationally recognised rider training
- guidance materials to assist in providing a better match between quad bike accessories and the host vehicle.

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<sup>4</sup> See [http://www.acc.co.nz/preventing-injuries/on-the-farm/PI00060#P10\\_686](http://www.acc.co.nz/preventing-injuries/on-the-farm/PI00060#P10_686)

<sup>5</sup> See [http://www.dol.govt.nz/whss/sector-plans/agriculture/agriculture-sector-plan\\_02.asp](http://www.dol.govt.nz/whss/sector-plans/agriculture/agriculture-sector-plan_02.asp)

To follow up on this work, the Australian Government launched the QuadWatch initiative in July 2012. QuadWatch aims to raise awareness of safe quad bike practices by establishing a network to promote information exchange. By bringing interested parties together, farmers and quad bike users will have a central point of safety information, guidance material and contact details of relevant work health and safety regulators in their state or territory. QuadWatch will provide farmers, quad bike users and the community with practical information and assistance to help minimise risk of a quad bike fatality or injury.<sup>6</sup>

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<sup>6</sup> See

<http://www.safeworkaustralia.gov.au/sites/swa/industryinformation/agricultureforestryandfishing/quad-watch/pages/quad-watch.aspx>

## 2 METHOD

This research project used a phone survey of quad bike accident victims on farms in 2009 and 2010 who had had their claim accepted by ACC, regardless of their working status at the time of the accident (see Appendix 1 for the questionnaire). The claims were for medical fees and in some cases also for other entitlements, such as weekly earnings compensation, rehabilitation or special treatment costs.

A response rate of 74 percent gave 386 respondents.<sup>7</sup> Compared to the sample of accident victims who were contacted for the survey, these 386 respondents were somewhat older Pākehā. In addition, the respondents slightly over-represented 'serious' accidents (see section 3.3 for this result). Therefore, the results are biased towards older Pākehā who had a serious injury.

### ***Ethics statement***

The research was approved by the ACC Research Ethics Committee. The ethics process involved informing claimants through a letter and information sheet (see Appendix 1) sent by ACC about both the research and the consent process. Claimants then had two opportunities to opt out of the research – when they received the letter and then again when they were telephoned for the actual survey.

To protect vulnerable claimants, the sampling frame did not include fatal claims resulting from quad bike use, claimants under the age of 15 and claimants with serious head injuries who, at the time of the survey, were being managed by the ACC serious injury service.

The survey was live in November–December 2011. Following data collection by UMR (the selected provider), UMR also cleaned the data, removed identifiers and supplied it to the Department for analysis.

### ***Data analysis***

The Department analysed the survey data using Excel. Descriptive statistics are reported here. A t-test with a finite population correction factor was used to compare the difference between two proportions, with at least 40 respondents in that response category.<sup>8</sup> Only results that were significantly different from each other at the 95 percent confidence interval are reported.

Comparisons have been made with data and other results where available. Some data comes from phone surveys commissioned by the Department of 800 farm

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<sup>7</sup> The response rate was calculated using the formula  $RR = A / (A + D + C \times f)$ , where:

A= Completed interviews (eligible responding) = 386

B= Not eligible = 847

C= Unknown eligibility = 99

D= Eligible non-response = 97

f =  $(A+D)/(A+B+D)$

<sup>8</sup> A t-test is a statistical test of two proportions to assess whether their means are different from each other at a given level of confidence.

owners and managers conducted in July–August 2010 and repeated in July–August 2011. This data is not referenced separately in the report.

### ***Limitations***

The results are restricted to the population of quad bike accident victims who had their claim accepted by ACC and cannot be generalised to all quad bike users nor to all quad bike accident victims. Research has found that only one in three farm injury victims made a claim to ACC even though, in general, the injuries were 'reasonably serious', with poor work capacity following the injury (Lovelock and Cryer 2009). Therefore, the sample may not represent the reasonably seriously injured victims.

As noted above, the sampling frame did not include fatal accidents, claimants under the age of 15 and claimants with serious head injuries. Hence, the results could be somewhat biased by these removals.

### 3 WHO HAD QUAD BIKE ACCIDENTS?

#### 3.1 Demographic profile

Respondents were mostly middle-aged to older Pākehā men, with 60 percent aged 45 years and over (see Table 1). It is possible that these results are skewed by the exclusion of claimants below the age of 15. Of the respondents, 81 percent were men, 88 percent were Pākehā and 5 percent were Māori. The role of age as a factor in the accident is not clear from the survey, although other research has found that the older age groups are associated with an increased risk of injury (cited in Cryer *et al.* 2009). Age can relate to other factors such as health status (older), cumulative work experience (older), risk-taking behaviour (younger) and the usual number of hours worked. Unlike other occupations, many farmers never completely retire (Browning *et al.* 1998).

**Table 1: Age profile of respondents (n=386)**

Age	Percent
15–24 years	7
25–34 years	14
35–44 years	19
45–54 years	23
55–64 years	21
65 years or over	16
<b>Total</b>	<b>100</b>

At the time of the accident, half the respondents were the owner/manager employing staff (28 percent) or self-employed doing farm-related work (25 percent). Almost one in five (18 percent) were employees on the farm, and a further 9 percent were doing unpaid work on the farm (see Table 2).

**Table 2: Employment situation of respondents at the time of the accident (n=386)**

Employment situation at the time of the accident	Percent
I was a farm/business owner or manager employing staff	28
I was self-employed doing farm-related work	25
I was an employee on the farm	18
I was doing unpaid work on the farm	9
I was a contractor or the employee of a contractor doing farm-related work	3
I was a labour-hire worker or temporary employee doing farm-related work	2
Unspecified	15
<b>Total</b>	<b>100</b>

### 3.2 Experience on farms and quad bikes

Most respondents (84 percent) had been on the farm for work purposes at the time of the accident. They were largely experienced in farm work, with over two in five respondents (43 percent) having 26 or more years of experience, while only 13 percent had no experience of working on farms (see Figure 1). Of the latter, only 16 percent had been on the farm for work purposes at the time of the accident.

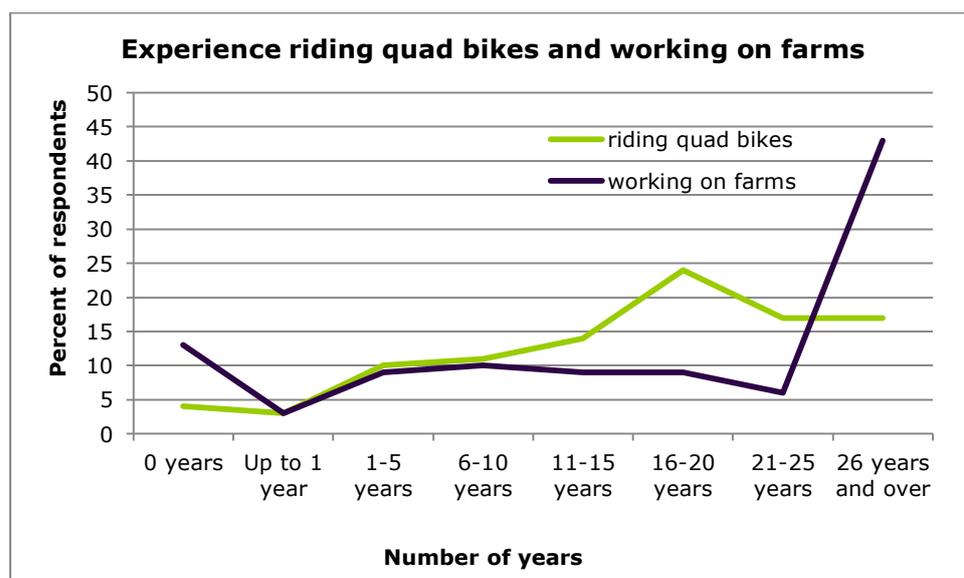
As can be expected, there was a relationship between employment status and years of experience farming. Respondents with 36 years or more of experience in farming were more likely to be farm owner/managers or self-employed (see Table 3). Respondents with less farming experience were more likely to be employees, unpaid workers or contractors.

**Table 3: Employment situation by experience of farming (n=385)**

Employment situation	Experience working on farms (percent)		
	0 years	Up to 35 years	36 years and over
Owner/manager or self-employed	0	50	85
Employee/unpaid worker/ contractor/labour hire	22	44	12
None of the above	78	7	3

Quad bikes started being used on New Zealand farms in the mid-1980s (Department of Labour 2011a), so as expected, overall, respondents had less experience in terms of total number of years riding quad bikes than they had of farming. However, in general, they were fairly experienced at riding them, and younger respondents were more experienced at riding than older respondents. Thirteen percent of respondents had no experience in farm work, whereas 67 percent had 10 or more years of experience (see Figure 1). Only 4 percent had no experience in riding quad bikes, whereas 72 percent had 10 or more years of experience.

**Figure 1: Respondents' experience on farms and riding quad bikes**



There was a lot of variation in experience of farming and quad bike use among the respondents. This ranged from 69 years of farming with no prior experience riding quad bikes to no experience farming but 40 years of experience riding quad bikes.<sup>9</sup> Overall, 97 percent of respondents had prior experience with both farming and quad bikes. Half the respondents had more years of experience farming than riding quad bikes (an average difference of five years), 29 percent of respondents had more experience riding quad bikes than farming and the remaining 20 percent of respondents had equal experience of both. However, this pattern varied by age, with younger respondents (aged 15–44 years) likely to have more experience riding quad bikes than farming by three years on average (see Table 4).

**Table 4: Comparing farming and quad bike experience by age group**

Age	Average years of farming experience	Average years of quad bike experience	Difference (farming - quad bikes)
15–44 years	9	13	-3 <sup>10</sup>
45 years and over	32	21	11
<b>All respondents</b>	<b>23</b>	<b>18</b>	<b>5</b>

The demographic and experience profiles of the respondents are very similar to that of Cryer *et al.*'s (2009) survey of ACC accident victims who had been seriously injured whilst working (and hence different from the current sample) and somewhat similar to their survey of decision makers in agricultural

<sup>9</sup> Since quad bikes have only been widely available in New Zealand since the 1980s, it is unlikely any respondents had 40 years of experience riding them. It is possible that respondents were thinking of earlier three-wheeled vehicles or that, after so many years, they were unclear about the timeframes.

<sup>10</sup> The difference between 9 and 13 years rounds down to -3 years rather than -4 years.

production (Cryer *et al.* 2009). This similarity is likely to be a reflection of the characteristics of farmers – older, experienced Pākehā men.<sup>11</sup>

However, self-employed are under-represented among the current respondents – 25 percent compared to 40 percent in the agriculture sector (Department of Labour 2012). This under-representation could be a result of the 'claim effect' whereby the self-employed are more likely to self-manage their injuries and less likely to put in a claim to ACC for compensation of weekly earnings.<sup>12</sup>

### **3.3 The accident**

Quad bikes are very commonly used for towing and carrying passengers, but few are fitted with a rollover protection structure. Previous research has found that farmers frequently use some or all of their quad bikes for towing (88 percent<sup>13</sup>; 93 percent Cryer *et al.* 2009) and carrying passengers (82 percent<sup>14</sup>; 63 percent Cryer *et al.* 2009), but a relatively low proportion report that some or all of their quad bikes were fitted with permanent roll bars or a rollover protection device – 15 percent.<sup>15</sup>

The Department's and ACC's quad bike safety guidelines identify carrying passengers, towing and carrying loads as hazards (Department of Labour 2011b, ACC 2010). It suggests that these hazards can be managed by following the manufacturer's guidelines about keeping within the load limits stated by the manufacturer and by not carrying passengers on quad bikes designed for one person. Until conclusive evidence of the protective properties of rollover protection devices has been established, the guidelines state that their use 'remains a matter of personal choice for the farmer'.

#### ***Quad bike use at the time of the accident***

In this survey, at the time of the accident, 87 percent of respondents had been the rider and 9 percent the passenger. Another 4 percent had been near the quad bike, doing things such as manoeuvring it or attaching things to it or had tripped over it. Only 12 percent of the quad bikes had been carrying passengers.

At the time of the accident, 83 percent of the quad bikes were being used for work purposes including mustering, transporting, checking on farm animals and equipment and patrolling areas of the farm, and general farm work. The

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<sup>11</sup> The agriculture, forestry and fishing workforce is predominantly male, and a significant portion of the workforce is in the 65+ age group (Department of Labour 2009b).

<sup>12</sup> A study of South Otago farmers where nearly two-thirds were self-employed found that quad bike LCEs (loss of control events) were grossly unreported – one in nine LCEs resulted in injury, one in 15 LCEs required the attention of a health professional, only one in 18 submitted a claim to ACC for injury and one in 20 had to take time off work (Milosavljevic *et al.* 2010).

<sup>13</sup> This result comes from the Department's questions commissioned in a nationwide phone survey of farmers carried out in July–August 2011.

<sup>14</sup> This result comes from the Department's questions commissioned in a nationwide phone survey of farmers carried out in July–August 2011.

<sup>15</sup> This result comes from the Department's questions commissioned in a nationwide phone survey of farmers carried out in July–August 2011.

remaining 17 percent of bikes not being used for work were being used mainly for recreational purposes, hunting, transporting and sightseeing. These results may be skewed by the exclusion of claimants below the age of 15, who would probably not have been working. The Department's quad bike safety guidelines identify multi-tasking as a hazard because the rider's attention is divided, which can be managed by stopping the quad bike before performing another task. However, from the survey, it is not clear if the rider had stopped the quad bike, so it is not possible to be sure that the rider was multi-tasking and that this had contributed to the accident.

Respondents who were working at the time of the accident were less likely to be carrying passengers (9 percent) than respondents who were not working (27 percent) at the time of the accident.

At the time of the accident, 86 percent of bikes were towing an implement such as a trailer or spray tank. Only 17 percent of bikes themselves were carrying a load such as farm equipment, animals or liquids. Only 9 percent of quad bikes had a rollover protection (ROP) device fitted.

The above descriptive information about the use of the quad bike and associated hazards at the time of the accident was collected in the survey, but root cause analysis of the accident was not an aim nor possible in the survey, nor was establishing the relationship between the descriptors and the manufacturer's instructions. For example, based on the survey results, we cannot say that carrying passengers had been a factor in causing the accident or that respondents were carrying more than recommended by the manufacturer.

### ***Seriousness of the accident***

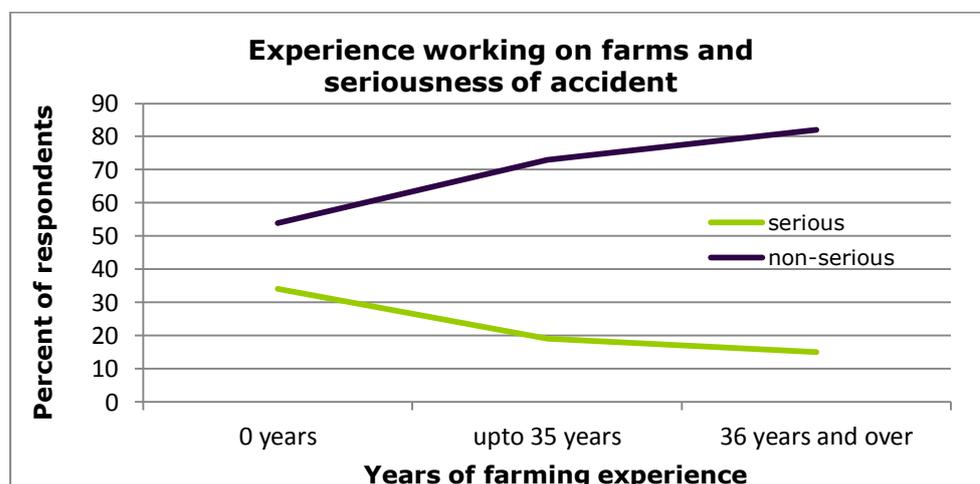
Twenty percent of respondents had an 'entitlement over life of claim' (as identified by ACC), which represented a serious accident for the purpose of this survey. These respondents had more than their medical fee paid – they were entitled to some support from ACC over the life of their claim, such as weekly compensation of earnings and/or rehabilitation and special treatment costs. The data was analysed to see if there were significant differences by seriousness of accident.

Respondents who were on a quad bike being used for work purposes at the time of the accident were less likely to have had a serious accident than respondents who were on a quad bike being used for other purposes – 18 percent compared to 29 percent. Similarly, respondents who were on the farm for work purposes at the time of the accident were less likely to have had a serious accident (18 percent) than respondents who were not on the farm for work purposes (30 percent). However, serious quad bike accidents occurred whether the respondent had been working or not because many of the risk factors would still have been present.

The more experience that respondents had working on farms, the less likely they were to have had a serious accident (see Figure 2) – 34 percent of respondents who had no farming experience had a serious accident compared to 19 percent of respondents who had had up to 35 years of farming experience and 15 percent of

respondents who had had 36 years or more of farming experience.<sup>16</sup> Once again, the 'claim effect' cannot be discounted here – it is possible that self-employed respondents (that is, those with more farming experience) had a lower rate of putting in claims. In addition, these findings may be skewed by exclusion of younger claimants who would not have been working.

**Figure 2: Experience working on farms and seriousness of accident**



The results in this figure do not total to 100 percent because blank responses are excluded.

There was no difference in the seriousness of respondents' accidents by quad bike riding experience – illustrating that serious accidents are just as likely to happen to experienced riders.

There was also no difference in the seriousness of respondents' accidents by formal quad bike rider training, but without further details of the accident or information on the training of quad bike users overall, it is not possible to say from the survey data that training had made a difference to respondents' chances of having a serious accident.

### **3.4 Awareness of the Department of Labour's quad bike safety campaign**

A major part of the quad bike safety campaign involved the Department promoting the following four main messages to farms with employees for the safe use for quad bikes, from a list of safety steps:

- Riders must be trained/experienced enough to do the job.
- Choose the right vehicle for the job.
- Always wear a helmet.
- Don't let kids ride adult quad bikes.<sup>17</sup>

Research suggests that there is awareness of at least some of these key messages. In 2011, of the 24 percent of farmers who had made changes or rules in regard to quad bike safety on their farms, 50 percent had made helmet use compulsory. Farmers reporting quad bike riders using a helmet increased from 20

<sup>16</sup> The difference between 19 percent and 15 percent was not significant.

<sup>17</sup> See Appendix 2 for all the safety steps listed in the guidelines.

percent in 2010 to 29 percent in 2011. However, farmers allowing riders under 16 years to operate quad bikes remained steady at 15–16 percent during the same time period (Department of Labour 2011a).

Respondents in the current survey were questioned about their awareness of the main messages of this campaign. The survey was run about a year after the launch of the information campaign. Almost half (48 percent) were unaware of the campaign (see Table 5, where the four main messages are marked with an asterisk and grouped together). Respondents who were on the farm for work purposes at the time of the accident were more likely to be aware of the campaign – 44 percent of these respondents were unaware compared to 67 percent who were not on the farm for work purposes.

There was highest awareness of the message to 'wear a helmet' (45 percent). Again, respondents who were on the farm for work purposes at the time of the accident were more aware of this message – 48 percent compared to 29 percent awareness among respondents who were on the farm but not for work purposes at the time of the accident. Farm owners/managers and the self-employed were more likely than the rest (employees, people doing unpaid farm work, contractor or employee of contractor, labour-hire worker or temporary worker) to be aware of this message – 51 percent of owners/managers and self-employed compared to 39 percent of the rest.

The message about 'choosing the right vehicle for the job' encompasses messages about following manufacturers' instructions about carrying passengers and load limits.<sup>18</sup> Nearly a quarter of all respondents were aware of these messages.

There was much lower awareness about the other two campaign messages about rider training (6 percent) and riders under 16 (4 percent). Even though respondents were not necessarily aware of the main messages, they had some awareness of other safety elements of riding quad bikes, such as attention to speed and terrain and to personal fatigue.

Some of their responses reflect the safety steps issued in the guidelines.

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<sup>18</sup> The website states: 'When choosing the right vehicle for the job pay close attention to what your quad bike owner's manual says about carrying passengers. Most manufacturers' manuals say passengers should not be carried. Also consider the maximum towed and carried load limits for your quad bike.' (<http://www.dol.govt.nz/quad-bikes/factsheet.asp>)

**Table 5: Respondents' awareness of main safety messages of Department of Labour's quad bike safety campaign (n=386, multiple responses possible)**

<b>Main safety recommendations of Department of Labour's quad bike safety campaign (safety campaign main messages have an asterisk)</b>	<b>Percent</b>
Unaware of campaign	48
*Wear a helmet	45
*Choose the right vehicle for the job:	24
*Choose the right vehicle for the job (2%)	
*Pay attention to manufacturers' instructions on whether passengers can be carried (18%)	
*Pay attention to limits on towing and carrying (4%)	
*Ensure riders are trained/experienced enough to do the job	6
*Don't let kids (under 16) ride adult quad bikes (over 90cc)	4
Get rollover protection structures (ROPS)	7
Watch your speed	3
Other	10

### **3.5 Preventing quad bike accidents and harm to quad bike users**

All respondents were asked about the most important factor in preventing quad bike accidents and harm to quad bike users. Their responses were wide ranging (see Table 6), and some of them can be grouped into themes or clusters around the Department's four main messages, as well as additional themes that are similar to the Department's safety messages.

Fifteen percent considered training as the most important factor, and a similar proportion considered 'using common sense' as the most important factor.

**Table 6: Responses about the most important factor in preventing quad bike accidents and harm to quad bike users (n=386)**

<b>The most important factor in preventing quad bike accidents and harm to quad bike users</b>	<b>Percent</b>
Doing training courses (especially beginners)	15
Using common sense, being careful	14
Watching your speed	14
Concentrating when driving and being aware of the surroundings	10
Only using them on suitable terrain (not too steep)	6
The experience of the driver is a factor	6
Wearing safety gear such as helmets and jackets	4
Knowing the limits of the bike	4
Other	21
Don't know/irrelevant/refused	5
<b>Total</b>	<b>100</b>

Additional themes included the rider's own attention – the rider's concentration, their speed and their fatigue levels – as well as attention to the terrain and conditions and maintenance of the bike. Respondents also considered that

information was important – awareness of the risks surrounding quad bike use and knowing how quad bikes worked.

## **4 BEHAVIOUR CHANGES FOLLOWING THE ACCIDENT**

### **4.1 Wearing helmets and carrying passengers**

Respondents were questioned about behaviour changes in relation to wearing a helmet and carrying passengers before and after the accident. As noted, research has found that at least three (Cryer *et al.* 2009) or four in five farmers report that some or all of their quad bikes sometimes carry passengers.

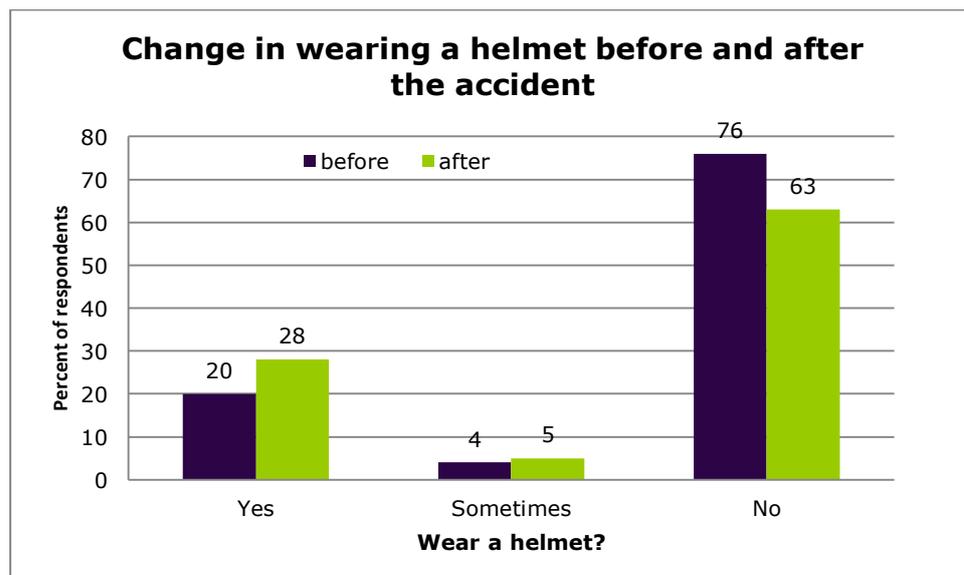
Previous research has found a range of helmet use reported among quad bike users, with it being as low as three or four percent (Cryer *et al.* 2009), although surveys commissioned by the Department have found reported helmet use by some or all riders on a farm to be increasing – from 20 percent in 2010 to 29 percent in 2011. Even though quad bike helmets have been available since some time after 2003 (Department of Labour 2009a), their use has increased sharply since 2010 when the Department stepped up its targeted quad bike enforcement phase.

The difference in these research results about helmet use is likely because of the somewhat different samples covered as well as the timing of the research. Cryer *et al.*'s sample was accident victims who were seriously injured while working on a farm (not necessarily on a quad bike), whereas the current sample was quad bike accident victims. Cryer *et al.*'s research preceded the Department's quad bike safety campaign, whereas the surveys commissioned by the Department were done in July–August 2010 and July–August 2011, just before and after the launch of the quad bike safety information campaign.

The results from this survey show that, following the accident, respondents had changed their behaviour in relation to wearing helmets and carrying passengers. Of the respondents who reported not wearing helmets before the accident, 11 percent reported wearing them following the accident. This result is similar to the Department's previous survey results, despite the different samples. Of the respondents who reported carrying passengers before the accident, 16 percent reported not carrying them following the accident.

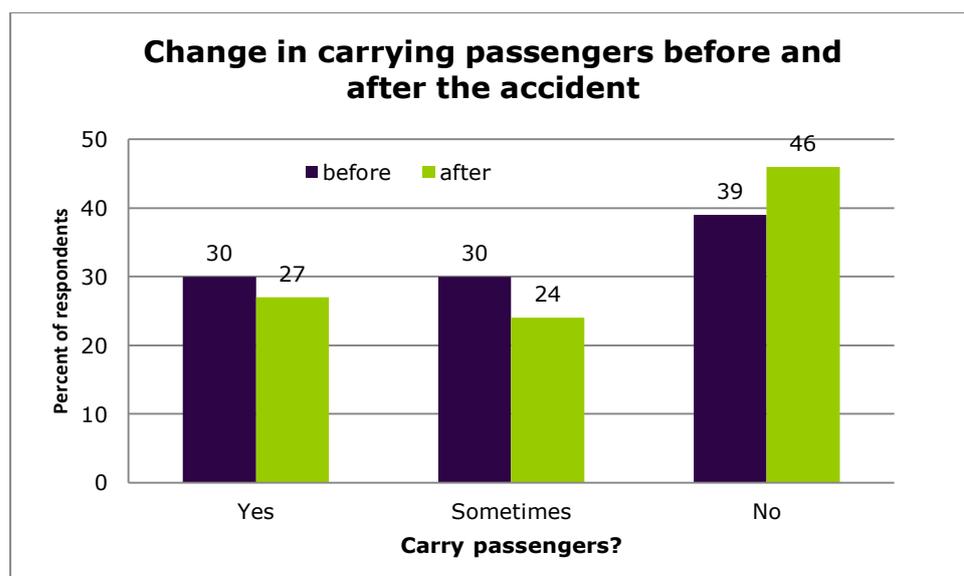
Overall, reported helmet use had increased from 20 to 28 percent while not carrying passengers had increased from 39 to 46 percent (see Figure 3 and Figure 4). There were no significant differences by whether or not respondents had had a serious accident. However, 63 percent of respondents continued to not wear helmets – a very high proportion. It is possible that these results are skewed by the exclusion of claimants with serious head injuries.

**Figure 3: Change in wearing helmets following quad bike accident (n=386)**



The results in this figure do not total to 100 percent because they exclude respondents who were unsure and respondents who had not ridden quad bikes before or after the accident.

**Figure 4: Change in carrying passengers following quad bike accident (n=386)**



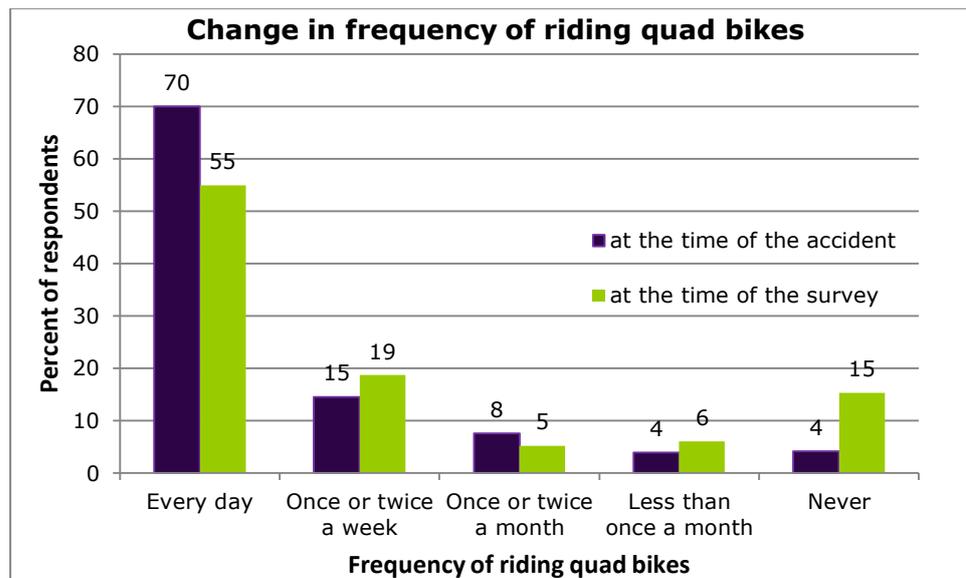
The results in this figure do not total to 100 percent because they exclude respondents who were unsure and respondents who had not ridden quad bikes before or after the accident.

## 4.2 Changes in frequency of riding quad bikes following the accident

Following the accident, the frequency of riding quad bikes had fallen among respondents, with more riding them less often (see Figure 5). Of the respondents riding daily before the accident, 77 percent continued riding daily at the time of the survey. Interestingly, one of the Department's quad bike safety campaign messages is 'Choose the right vehicle for the job'. As such, that some respondents reported using quad bikes less may reflect the desired change in behaviour, whereby they are now choosing vehicles better suited to the task than quad bikes.

Overall, around the time of the accident, 70 percent of respondents had been riding quad bikes daily, 15 percent had been riding once or twice a week, 8 percent once or twice a month and 4 percent had been riding less than once a month. Another 4 percent had never ridden them before the accident. In contrast, at the time of the survey, the percent riding daily had fallen to 55 percent, while 19 percent were riding them once or twice a week and 15 percent never. There were no significant differences by whether or not respondents had had a serious accident.

**Figure 5: Change in frequency of riding quad bikes following the accident**



At both points in time – before the accident and the survey – respondents who were working at the time of the accident were more likely to be riding daily and less likely to have never ridden before the accident than respondents who were not working at the time of the accident (see Table 7). While all respondents riding quad bikes were exposed to the hazards of riding, working respondents had a greater exposure because of their more frequent use of quad bikes. Both those who were working at the time of the accident and those who were not working decreased their use of quad bikes after the accident on average.

**Table 7: Frequency of riding quad bikes analysed by respondents working (n=323) or not (n=63) at the time of the accident**

How often rode quad bike	How often rode quad bike around the time of the accident (percent)		How often rode quad bike at the time of the survey (percent)	
	Working at the time of accident	Not working at the time of the accident	Working at the time of accident	Not working at the time of the accident
Every day	81	11	64	6
Occasionally	18	68	25	54
Never	1	21	11	40
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

To allow statistical comparisons, the category 'occasionally' was a combination of 'once or twice a week', 'once or twice a month' and 'less than once a month'.

### 4.3 Other changes following the accident

Forty-six percent of respondents reported other changes they had made to the way they rode quad bikes since their accident (see Table 8). The most common ones included changes to their riding behaviour such as riding more carefully, limiting their load, changes to their speed and being more selective about when they rode quad bikes. Other changes included respondents buying a better bike or checking their bike to ensure it was safe to ride. A few respondents were more watchful of the terrain and the weather. Ten percent of respondents who reported making other changes had stopped riding quad bikes. It is not clear from the survey if they were prevented from doing so by their accident.

There were no differences between trained and untrained respondents who reported making other changes to the way they rode quad bikes since the accident.

**Table 8: Other changes to the way respondents ride quad bikes since their accident (n=176, multiple responses possible)**

Other changes to the way respondents ride quad bikes since their accident	Percent
More attention to how I ride, get off, sit	69
More attention to speed	16
Don't ride/be a passenger in some situations	14
Don't ride quad bikes anymore	10
Other	13
Unsure	2

## **5 TRAINING**

While training for quad bike users is recommended and the Health and Safety in Employment Act requires that employees are adequately trained to safely operate equipment and machinery in the workplace, formal, externally provided training is not compulsory. Previous research has found that at least four in five quad bike riders had received some informal instruction, but just under one in five had formal instruction (Department of Labour 2011a). Other research has also found that formal training for quad bike use was low compared with training for other farm safety concerns such as chemical handling (Cryer *et al.* 2009). However, for training to be effective in leading to behaviour change, research suggests that it needs to be part of a range of interventions because of the multiple nature of hazards (mechanical, physical, biological, chemical, musculoskeletal and psychosocial) on farms (Lovelock and Cryer 2009).

### **5.1 Respondents with informal training**

The sub-sample of respondents who had at least a year's experience using quad bikes (93 percent of all respondents) were asked about their training in using them. Of those who had been trained, respondents had more often received informal on-the-job training.

Sixty percent of the respondents were self-taught, with no training (formal or informal). Seventeen percent had formal training (11 percent on a course up to a day long and six percent on a course longer than a day) and 21 percent had had informal training on the job from someone else such as the farm manager or boss, a family member, co-worker, spouse/partner, salesperson or bike shop. In this on-the-job training, respondents had learnt things such as using the controls, areas of the farm where they could use the bike and safety carrying loads or towing implements.

The different results for informal training in this survey compared to previous research may be a result of different definitions of informal training being used as well as different samples.

### **5.2 Respondents with formal training**

Of all the respondents, 19 percent had attended formal training. This low proportion is similar to previous results. Only one percent of all respondents (or 7 percent of all formally trained respondents) had attended the training following their accident. However, it is not clear if respondents who had attended training prior to their accident considered that they did not need to do it again following their accident. As noted in Table , only 15 percent of respondents considered training as the most important factor in preventing quad bike accidents and harm to quad bike users. This may be one reason for the low uptake of training. Further, since 80 percent of respondents needed only their medical fees paid without further entitlements following the accident, they may not have felt the need to undertake training. While a large proportion of respondents had made some form of change following their accident, it is possible that respondents

considered training to be costly and not appropriate to mitigate the cause of the accident.

Of the formally trained respondents, most (93 percent) had attended the training before their accident, which may be a reflection of the recency of the accident. Nearly half the respondents had attended training more than a decade before the accident – 47 percent between 2000 and 2009 and another five percent in 2010–2011.<sup>19</sup> Just over a quarter (27 percent) were unsure about when they had attended the course, and five percent had attended training more than once.

The training had been mainly run by training organisations such as the AgITO, FarmSafe, polytechs and other similar institutions and farm sector large employers such as Landcorp. Nearly three-quarters (72 percent) of the formally trained respondents considered their course had been NZQA approved, while nearly a quarter (23 percent) did not know.

Younger respondents were more likely to have attended formal training, with a quarter of those aged 15–44 years having attended compared to only 15 percent of those aged 45 or over.

The respondents with most and least farming experience were less likely to have attended formal training. Only six percent of respondents with no of experience working on farms had attended training compared to a quarter of respondents with up to 35 years of experience and 12 percent with 36 years or more of experience.<sup>20</sup> These results suggest that the more experienced respondents were likely relying on their experience, while those with little experience working on farms had yet to be trained.

Because very few respondents received training after the accident, it is not possible to examine the links between training and changes in behaviour following an accident.

### ***Reasons for undertaking training***

Respondents seem to have undertaken the training more to comply with their employers' instructions than for safety reasons. Just over a third of the respondents who had attended training had done so because their employer had wanted them to do it (36 percent) (see Table 9). This result is encouraging given that employers are responsible for ensuring that inexperienced riders have the knowledge and skills to ride a quad bike safely (even though everyone on the farm has a role to play in making work safe).

For 18 percent, the training was part of a bigger course they were doing, and 11 percent were doing it to comply with legal obligations. Only a few respondents seem to have been motivated directly for safety reasons (after seeing or hearing about accidents or as a safety precaution), although this is difficult to pick conclusively from the responses.

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<sup>19</sup> The survey was conducted during November and December 2011.

<sup>20</sup> The difference between 6 percent and 12 percent was not significant.

**Table 9: Reasons for respondents undertaking formal quad bike training (n=74, multiple responses possible)**

Reasons	Percent
My employer wanted me to do it	36
It was part of a bigger course I was enrolled in	18
Compliance with legal obligations	11
A friend, family member or colleague recommended it	9
I enjoy riding motorbikes/I just wanted to learn more about bikes	8
Other	16
Unsure	4

### ***Behaviour changes following formal training***

Respondents were asked whether they had changed the way they rode quad bikes after the training. About two-thirds of respondents reported making changes, with most reporting they were more cautious and safer generally (see Table 10). A few respondents reported other changes, such as their balance being better, awareness of the terrain and its risks, changes to their riding behaviour and greater general awareness.

However, following training, nearly a third of respondents had not made any changes to the way they rode quad bikes (31 percent). While it is possible some of these respondents felt their way of riding a quad bike was consistent with what they had learnt and so felt no need to make changes, the reasons for not making changes were not explored in the survey.<sup>21</sup> Consistent with other research (Lovelock and Cryer 2009), this finding raises questions about the efficacy of training by itself to encourage behaviour change. It is also possible that some respondents had made changes soon after the training (nearly half the respondents had attended training more than a decade before the accident) but had not sustained the changes and were reporting their behaviour at the time of the survey.

**Table 10: Changes to quad bike riding since doing the training (n=74, multiple responses possible)**

Changes to the way respondents ride quad bikes since their training	Percent
More cautious, safer generally	35
Nothing has changed	31
Other	46
Unsure/can't remember	1

### ***Behaviour changes of trained respondents compared to untrained respondents***

Behaviour changes among respondents working at the time of the accident were further analysed, including the frequency of riding quad bikes, wearing helmets and carrying passengers. Overall, among respondents who were working at the time of the accident, trained respondents seemed somewhat more likely to change their behaviour following the accident. They were slightly more likely to

<sup>21</sup> The small number not making changes precludes further analysis of this issue, such as their reasons for undertaking training.

have reduced their frequency of riding quad bikes, slightly less likely to carry passengers and slightly more likely to wear helmets compared to untrained respondents. It is possible that the small behaviour change of trained respondents was facilitated by other factors (such as working at the time of the accident, experience, age) so should not be generalised.

### ***Frequency of riding quad bikes***

As noted in the previous chapter, following the accident, the frequency of riding quad bikes had fallen among respondents, with more respondents riding quad bikes less often. This behaviour change was examined for respondents working at the time of the accident by whether or not they were trained.<sup>22</sup> Trained respondents were more likely to have reduced their frequency of riding quad bikes by the time of the survey, although the association is weak.

Among respondents working at the time of the accident, the difference in using quad bikes every day around the time of the accident and at the time of the survey was somewhat greater for trained than untrained respondents (see Table 11). For trained respondents, the percentage of those riding every day fell from 97 percent around the time of the accident to 73 percent at the time of the survey) compared to 15 percent for untrained respondents. These results indicate a weak association between training and reduced frequency of riding quad bikes.

**Table 11: Frequency of riding quad bikes by respondents working at the time of the accident who were trained (n=72) and not trained (n=250)**

How often rode quad bike	Around the time of the accident (percent)		At the time of the survey (percent)	
	Trained	Untrained	Trained	Untrained
Every day	97	77	73	62
Occasionally	3	22	21	26
Never	0	1	6	12
<b>Total</b>	100	100	100	100

To allow statistical comparisons, the category 'occasionally' was a combination of 'once or twice a week', 'once or twice a month' and 'less than once a month'.

### ***Wearing helmets and carrying passengers***

Also as noted in the previous chapter, following the accident, more respondents were wearing helmets and fewer were carrying passengers. This behaviour change was also examined for respondents working at the time of the accident by whether or not they were trained. As noted, most trained respondents had attended training prior to the accident.

As with frequency of riding quad bikes, among respondents working at the time of the accident, the difference in behaviour before and since the accident was greater for trained than untrained respondents, especially in the case of wearing helmets. Again, these results indicate a weak association between training and behaviour change.

<sup>22</sup> Of the respondents not working, only 3 percent were trained, so this sub-sample was excluded.

The increase in wearing helmets for trained respondents was 18 percent compared to seven percent for untrained respondents (see Table 12). For carrying passengers, the difference for trained respondents was small (five percent) and not statistically significant.

**Table 12: Wearing a helmet before and after the accident by respondents working at the time of the accident who were trained (n=72) and untrained (n=250)**

Wear a helmet	Before the accident (percent)		After the accident (percent)	
	Trained	Untrained	Trained	Untrained
Yes	25	13	43	20
Sometimes	4	5	3	7
No	71	82	51	71
Other	-	-	3	2
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

### ***Improving quad bike training***

Forty-nine respondents had ideas for improving quad bike training. These ranged from the (non-compulsory) status and format of the training itself, such as making it mandatory for new users, and longer cheaper training, to the messages given out including that the bike is not a toy and that passengers should not be taken. A few suggestions also related to information about training courses, their accessibility and how enjoyable they were.

## 6 SUMMARY AND DISCUSSION

With a background of daily quad bike use a common feature in New Zealand farms, whether for work or other purposes, and the high levels of quad bike injury, this research aimed to find out the influence that accidents have on the safety behaviour of quad bike accident victims who have had their claim for the accident accepted by ACC. The results also provide a demographic description of accident victims who had their accident claim accepted but are not generalisable beyond them nor to all quad bike riders. The respondents are potentially different from other quad bike users in their propensity to make a claim to ACC. The sampling frame did not include fatal accidents, claimants under the age of 15 and claimants with serious head injuries. Hence, the results could be somewhat biased by these removals.<sup>23</sup>

### 6.1 Profile of accident victims and their quad bike use at the time of the accident

The quad bike accident victims were largely middle-aged or older Pākehā men, who were farm owner/managers or self-employed. Most were untrained in quad bike use but experienced in farm work and riding quad bikes, although around one in 10 had no experience of working on farms. Younger respondents (aged 15–44 years) had more experience riding quad bikes than farming.

The quad bike accident victims were usually the rider of the quad bike, at work on the farm, using the quad bike for work purposes. Respondents working at the time of the accident used quad bikes more often than respondents not working, so had a higher exposure to the risks associated with quad bike use. It is possible to consider the respondents as two groups – those working and those not working at the time of the accident, where working relates to other factors such as experience and type of use of the quad bike.

The survey collected descriptive information about the use of the quad bike and associated hazards at the time of the accident but did not attempt a root cause analysis of the accident. At the time of the accident, a large proportion of the quad bikes were towing an implement (a potential hazard), but in contrast, only a small proportion were carrying a load (also a potential hazard). In addition, a small proportion had a rollover protection device fitted (unclear whether or not this is a hazard).

The accident claim of a fifth of the respondents was considered 'serious', that is, they were entitled to compensation in addition to having their medical fees covered. Respondents who were using the quad bike for work purposes were under-represented in serious accidents compared to respondents using them for other purposes. However, there was no difference in the seriousness of respondents' accidents by experience riding quad bikes.

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<sup>23</sup> Only results that were significantly different at the 95 percent confidence interval are reported in the text.

## **6.2 Awareness of the Department of Labour's quad bike safety campaign**

Other research results combined with the current survey results suggest that there is awareness of at least some of the Department's key messages about the safe use of quad bikes.

In the current survey, half the respondents were aware of the Department's quad bike safety campaign. A similar proportion was aware of the message about wearing a helmet. A quarter of respondents were aware of the message about choosing the right vehicle for the job (including following manufacturers' instructions about carrying passengers and load limits). Awareness was higher among respondents working at the time of the accident than respondents not working at the time of the accident. Overall, there was limited awareness of other safety elements about quad bike use. These results could reflect the short amount of time between the launch of the information campaign (late 2010) and the survey (late 2011).

Respondents' ideas for preventing quad bike accidents and harm can be largely grouped around the Department's four main quad bike safety messages, as well as other safety elements such as the riders' attention to themselves as well as to their environment.

## **6.3 Behaviour changes following the accident**

Overall it appears that following the accident, at least half the respondents had made changes to act more safely in their use of quad bikes. Changes included a decrease in the carrying of passengers and, consistent with other research, an increase in the use of helmets. One in six of the respondents who reported carrying passengers before the accident reported not carrying them following the accident. One in nine of the respondents who reported not wearing a helmet before the accident reported wearing a helmet following the accident.

Respondents also reported a reduction in the frequency of riding quad bikes. Of the respondents riding daily before the accident, one in four had stopped riding daily. Both those who were working at the time of the accident and those who were not reported a reduction in their use of quad bikes. Interestingly, one of the Department's quad bike safety campaign messages is 'Choose the right vehicle for the job'. As such, that some respondents reported using quad bikes less may reflect the desired change in behaviour, whereby they are now choosing vehicles better suited to the task than quad bikes.

Almost half the respondents reported other behavioural changes following the accident, such as increased awareness of their surroundings and speed and taking more care generally. A few had stopped riding quad bikes altogether (although it is not clear from the survey if their injury now prevented them from doing so). However, two-thirds were still not wearing helmets even after the accident; and only one percent of all respondents attended training following the accident.

## 6.4 Training

About one-fifth of respondents had received some formal training in quad bike use, a similar proportion had received informal training and the remainder were self-taught. Of those who received formal training, nearly all had done so before the accident. Only one percent of all respondents attended training following the accident. The low proportion of serious accidents might be a reason for this.

Respondents' reasons for undertaking formal training were mainly to comply with their employers' instructions than for safety reasons. Younger respondents (aged 15–44 years) were more likely to have attended training than older respondents (aged 45 years and over). The respondents with most and least farming experience were less likely to have attended formal training. Perhaps the more experienced respondents were relying on their experience, while those with little experience working on farms had yet to be trained. About half the trained respondents had undertaken training more than 10 years before the accident. About two-thirds of trained respondents reported making changes after receiving training, with most reporting they were more cautious.

Among respondents who were working at the time of the accident, trained respondents seemed somewhat more likely to change their behaviour following the accident. They were slightly more likely to have reduced their frequency of riding quad bikes, slightly less likely to carry passengers and slightly more likely to wear helmets compared to untrained respondents. It is unclear if the behaviour changes relate to being trained or to other factors such as working, risk tolerance, experience and age, so the results about training need to be treated cautiously.

Respondents' ideas about improving quad bike training included elements of the structure and content of training as well as information about training and its accessibility.

## 7 CONCLUSION

This research was about the influence of an accident on the safety behaviour of quad bike accident victims who had had their accident claim accepted by ACC. The results may be biased by excluding from the research claimants with serious head injuries, claimants under the age of 15 and fatal accidents.

Accident victims were largely middle-aged to older men who were experienced in farm work and in riding quad bikes. Very few had been formally trained in quad bike use. In contrast, trained respondents were more likely to be younger.

Accidents happened mostly in work circumstances but also in non-work circumstances, likely reflecting that quad bikes are used most often for work yet the risks surrounding their use are present in all situations.

Overall, following the accident, at least half the respondents had made changes to act more safely in their use of quad bikes. One in six of the respondents who reported carrying passengers before the accident reported not carrying them following the accident. One in nine of the respondents who reported not wearing a helmet before the accident reported wearing a helmet following the accident. Of the respondents riding daily before the accident, one in four had stopped riding daily, although the reasons for this are unclear.

Almost half the respondents reported other behavioural changes following the accident, such as increased awareness of their surroundings and speed and taking more care generally. However, two-thirds were still not wearing helmets after the accident.

Very few respondents received training following the accident. Respondents who had received training before the accident were slightly more amenable to making changes following the accident, although it is possible that other factors such as working, experience and age facilitated these behaviour changes.

Overall, while there is awareness of some of the Department's key messages about quad bike safety, only half the respondents were aware of the Department's quad bike safety campaign.

The research found a low uptake of training following an accident. Because training is one of the messages of the quad bike safety campaign, future research may focus on the following questions:

- What would motivate quad bike riders, including accident victims, to undertake training and then to make appropriate changes to their riding behaviour?
- What is the role of age and experience in undertaking training? Do older, more experienced people consider they are sufficiently experienced to not need training?
- How does the motivation for undertaking training relate to changing behaviour following training?
- What would improve the effectiveness of training?

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## 8 APPENDIX 1: LETTER AND INFORMATION SHEET SENT TO CLAIMANTS

12 October 2011

[Name]  
[Address Block]

Dear [Name]

### Department of Labour – Quad Bike Injury Study

ACC has been approached by the Department of Labour to support a research project exploring quad bike injuries in New Zealand, using data from the ACC claims database.

The research study aims to:

- Identify the influence whether formal training relating to the handling of quad bikes and the having an quad bike related accident has influenced safety behaviour.
- Understand factors including training, helmet use and carriage of passengers in relation to quad bike use.

From our records, we have identified you as someone who has experienced such an injury. We are contacting you to consider allowing your information that is held by ACC to be included in this study. The request from the Department of Labour is for claim information that will allow the researchers to contact you and seek your agreement to be interviewed. You will find the information the researchers have requested about your claim detailed on the attached information sheet.

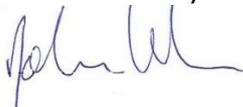
If you do not want your information to be included in this study **please ring 0800 956 125 within the next 7 days** from the date of this letter. Leave the **full name and reference number** on the answer-phone and the researchers will not contact you. The reference number is: QB[Ref No].

If you have any other questions, please contact John Wren, Acting Research Manager. Phone – 04 816 6753. Email – john.wren@acc.co.nz

This study has received ethical approval from the ACC Research Ethics Committee.

Thank you for taking the time to read this letter.

Yours sincerely



John Wren

Acting ACC Research Manager

## **Participant information sheet**

### **An invitation**

Your ACC claim information has been requested to be included in a research study because your ACC records indicate that you have had a quad bike injury either during 2009 or 2010. This study is being carried out on behalf of the Department of Labour by UMR Research.

It is entirely up to you if you want to be involved in this research (your choice). If you choose not to agree to participate in this research your claim with ACC will not be affected in any way.

### **What are the aims of this study?**

The main aims of the study are to:

- Identify whether the influence of formal training relating to the handling of quad bikes and the having a quad bike related accident has influenced safety behaviour.
- Understand factors including training, helmet use and carriage of passengers in relation to quad bike use.

We hope this study will be of long-term benefit to New Zealanders in furthering the current state of knowledge of quad bike safety and applying that knowledge to harm prevention activities.

### **What types of people can be in the study?**

All people who have had an ACC claim accepted involving a quad bike injury for 2009 and 2010.

### **How many people will be in the study?**

We estimate about 400 will be involved in this study.

### **What happens if I do decide to take part?**

Your ACC contact and other information will be supplied to UMR Research (who are acting on behalf of the Department of Labour). UMR may then contact you seeking an interview. The information requested by the Department of Labour is:

- Your name
- Your age
- Your address and phone number
- Your gender and ethnicity
- The date of your accident
- Your injury type and injury diagnosis
- The type of your claim (medical fee or entitlement)
- The cost of the your claim to date
- The accident description
- Your claim number

### **What is the time-span for the study?**

The study is expected to start on 25 October 2011 and will continue until 2 December 2011.

### **How will the study affect me?**

This study will be of benefit to the wider population. There is no guarantee that you will benefit directly from this study. The results obtained from your participation may help others with this type of accident in the future.

### **Confidentiality**

The ACC information that we will supply to UMR will remain strictly confidential. No material that could personally identify you will be used in any reports on this study. The researchers will either destroy the ACC data or return it to the ACC within 3 months of completion of the final report based on the research. The researchers will only retain copies of anonymised summary data after this date. The researchers will inform the ACC in writing that the ACC data has been destroyed. No information that could identify you will be supplied to the Department of Labour or your employer.

All computer records will be password protected. All future use of the information collected will be strictly controlled in accordance with the Privacy Act.

### **Your rights**

If you have any queries or concerns about your rights in this study, you may wish to contact a Health and Disability Advocate at the Health Advocates Trust,

Telephone 0800 555 050, or email: [advocacy@hdc.org.nz](mailto:advocacy@hdc.org.nz)

If you do NOT want your information to be included in this study please call 0800 956 125 within the next 7 days from the date of this letter. Please leave your full name and reference number on the answer-phone and ACC will not pass your ACC claim information onto the researchers. The reference number is on your letter.

### **Finally**

This study has received Ethical Approval from the ACC Research Ethics Committee 5th October, 2011.

If you would like some more information about the study please feel free to contact John Wren, Acting Research Manager, ACC Research  
Phone 04 816 6753  
Email [john.wren@acc.co.nz](mailto:john.wren@acc.co.nz)

### **Study Investigators**

Name of Principal Investigator: Alice Kan  
Address of Principal Investigator including email:  
UMR, PO Box 12604 Wellington, New Zealand  
Tel: 04 473 1061  
E mail: [alice@umr.co.nz](mailto:alice@umr.co.nz)

Please keep this brochure for your information.  
Thank you for reading about this study

## APPENDIX 2: SURVEY QUESTIONNAIRE

### INTRO

Hello, I am [%INAME%] and I work for UMR research. I would like to speak with [claimant's name]. [Ensure that you are speaking with the right person].

We are conducting a survey on behalf of the Department of Labour and ACC to better understand quad bike use and safety. Can I just check, have you had an injury as a result of a quad bike accident between 2009 and 2010? [If NO, code to NOT SUITABLE].

ACC Research sent you a letter in December about this research, saying that we would contact you.

We would like to ask you some questions about the circumstances of the accident that resulted in your ACC Claim, and about some of your quad bike safety practices. Taking part in this survey will not impact your claim with ACC.

Before I ask whether you would like to participate in this survey, I need to let you know that answers you give to these questions will be given to the Department of Labour and ACC, but no information that identifies you will be passed on.

The data gathered in this survey will enable ACC and the Department of Labour to better understand quad bike safety on New Zealand farms.

The survey will take no more than 15 minutes of your time.

[Interviewer Note: If ACC claimant indicates that they would have difficulty answering this survey e.g. communication issues/ memory loss/ head injury then please note and say THANK YOU and terminate]

SP

Proceed.[ ] GO TO Q1

Don't proceed.[ ]

---

Q1 Are you willing to answer some questions about quad bike use and training?

Yes.....1

No.....2

---

Q2 First, I would like to check that we have the correct information for you.

Are you still living in [ %ADD1% - %ADD4% ]?

Yes.....1 GO TO Q4

No.....2 GO TO Q3

---

IF Q2='No' ASK Q3

---

Q3 What region are you currently living in?  
(10-29)

---

ASK ALL

---

Q4 Which of the following age groups are you in?  
[READ LIST]  
15 to 24 years.....1  
25 to 34 years.....2  
35 to 44 years.....3  
45 to 54 years.....4  
55 to 64 years.....5  
65 years or over.....6  
[DO NOT READ] Refused.....7

---

Q5 Your ethnicity is recorded as [ %ETHNICP% ]. Is this correct?  
Yes.....1 GO TO Q7  
No.....2 GO TO Q6

---

IF Q5='No' ASK Q6

---

Q6 Which of the following ethnic groups do you belong to?  
[READ LIST]  
  
European/Pakeha.....1  
Maori.....2  
Pacific Peoples.....3  
Asian.....4  
Other.....5

---

ASK ALL

---

Q7 Were you on the farm for work purposes at the time of the accident?  
[INTERVIEWER: "work purposes" include people in that location as part of their normal work, contractors, service providers, part time and temporary workers, people there for work experience, volunteers, labour hire workers, borrowed employees, unpaid workers and people on the farm for a work purpose other than farming]  
Yes.....1  
No.....2

---

Q8 Which of the following best describes your employment situation at the time of the accident?  
[READ LIST]

---



ASK ALL

---

Q11 Thinking back to around the time of the accident, which of the following best describes how often you rode quad bikes?

[READ LIST]

- Every day.....1
- Once or twice a week.....2
- Once or twice a month.....3
- Less than once a month.....4
- Never.....5
- [DO NOT READ] Unsure.....6
- [DO NOT READ] Refused.....7

---

Q11A And now, which of the following best describes how often you ride quad bikes?

[READ LIST]

- Every day.....1
- Once or twice a week.....2
- Once or twice a month.....3
- Less than once a month.....4
- Never.....5
- [DO NOT READ] Unsure.....6
- [DO NOT READ] Refused.....7

---

Q14 When you had the quad bike accident on [ %ACDATE% ], were you riding the quad bike yourself OR were you a passenger on the quad bike?

- Rider.....1 GO TO QPASS
- Passenger.....2 GO TO Q16
- Neither/bystander.....3 GO TO QPASS

---

IF Q14='Rider' OR Q14='Neither/bystander' ASK QPASS

---

QPASS Was the quad bike carrying any passengers at the time of the accident?

- Yes.....1
- No.....2
- [DO NOT READ]Unsure.....3

---

IF Q14='Neither/bystander' ASK Q15

---

Q15 How were you involved in this quad bike accident?  
(47-66)

---

ASK ALL

---

Q16 When the accident happened was the quad bike being used for work purposes or for some other purpose?

- Work.....1 GO TO Q18
  - Other.....2 GO TO Q17
  - Don't know/Unsure.....3
- 

IF Q16='Other' ASK Q17

---

Q17 For what purpose was the quad bike being used?  
(8-27)

---

IF Q16='Work' ASK Q18

---

Q18 For what purpose or task was the quad bike being used at the time of the accident?

[DO NOT READ]

- For mustering.....1
  - To check on farm animals.....2
  - To check on farm equipment.....3
  - For transporting feed or other supplies.....4
  - For spraying.....5
  - For transit or transport to another area of the farm.....6
  - Other (specify) 7
- (29-48)
- Specified Other
- 

ASK ALL

---

Q19 Was the quad bike towing an implement of some kind at the time of the accident?

[DO NOT READ]

- Yes.....1 GO TO Q20
  - No.....2 GO TO Q21
  - Don't know/Unsure.... .....3 GO TO Q21
- 

IF Q19='Yes' ASK Q20

---

Q20 Can you please describe the implement being towed?

[INTERVIEWER: IF RESPONDENT MENTIONS - TRAILER PROMPT FOR LARGE / SMALL AND ONLY SELECT ONE, IF NOT LARGE / SMALL SELECT TRAILER (OTHER)]

---

	MP
Trailer (large).....	1
Trailer (small).....	2
Trailer (other).....	3
Spray tank.....	4
Animal feeder/ calfeteria.....	5
Mower/ Slasher.....	6
Fertiliser spreader.....	7
Irrigation equipment.....	8
[DO NOT READ]Unsure.....	9
	MP
Other (specify)	0
	(52-71)
Specified Other	

ASK ALL

- Q21 Was the quad bike itself carrying a load the time of the accident?
- Yes.....1
- No.....2
- [DO NOT READ]Don't know.....3

IF Q21='Yes' ASK Q22

- Q22 What was the quad bike itself carrying at the time of the accident?
- [DO NOT READ]

	MP
Animal Feed.....	1
Farm equipment.....	2
Liquids.....	3
Animals.....	4
Don't Know.....	5
Other (specify)	6
	(8-27)
Specified Other	

ASK ALL

- Q23 Did the quad bike have a rollover protection device or ROPs fitted at the time of the accident?
- Yes.....1
- No.....2
- [DO NOT READ]Don't know.....3

ROUTE(Q10A=0 AND Q10B=0)GO QX

---

Q24 Which of the following responses best describes the training you have had on using quad bikes:

[READ LIST]

Informal training on-the-job from someone else..1

A formal training course for 1 day or less.....2 GO TO QX<sup>24</sup>

A formal training course for more than 1 day....3 GO TO QX

No formal or informal training/self-taught.....4 GO TO QX

[DO NOT READ] None of the above.....5 GO TO QX

---

IF Q24='Informal training on-the-job from someone else' ASK Q25

---

Q25 Who provided this on-the-job training on using quad bikes:

MP

A co-worker.....1

A farm manager or boss.....2

Other (specify) 3

(31-50)

Specified Other

---

IF Q24='Informal training on-the-job from someone else' ASK Q26

---

Q26 In this on-the-job training what did you learn about using quad bikes?

[PRECODES - MULTI - DO NOT READ]

MP

How to use the controls.....1

Safety with carrying loads or towing implements..2

I should wear a helmet.....3

I should not carry passengers.....4

Areas on the farm where I could use the bike.....5

Unsure.....6

Other (specify) 7

(52-71)

Specified Other

---

ASK ALL

---

QX Can I just check, have you attended any formal training courses about riding quad bikes?

---

<sup>24</sup> The people who did informal training on the job from someone else were routed to qs 25 and 26. Then everyone was routed to QX.

Yes.....1 GO TO Q27  
No.....2 GO TO Q33  
[DO NOT READ]Unsure.....3 GO TO Q33

---

The rest of the questions in this section are only for those who have attended a formal training course.  
[If the respondent says they have attended more than one formal training course, they should be instructed to answer the following questions about the most recent course attended.]

---

Q27 Who ran the course you attended? (text)  
Don't know / Can't recall  
(8-27)

---

Q28 Was this a NZQA approved course?  
Yes.....1  
No.....2  
[DO NOT READ]Don't know.....3

---

Q29 Did you attend this training course before or after your accident on [%ACDATE% ]?  
Before.....1  
After.....2  
[DO NOT READ]Don't know.....3

---

Q30 In what month and year did you attend this training course?  
[RECORD MONTH AND YEAR IN FULL TEXT E.G. JANUARY 2007]  
[Allow approximations if the respondent can't remember exactly]

[DO NOT READ]Unsure.....1  
Other (specify) 2  
(31-50)  
Specified Other

---

Q31 Can you tell me what prompted you to do the quad bike training course?  
[PRECODES - MULTI - DO NOT READ]

MP

My employer wanted me to do it.....1  
Compliance with legal obligations.....2  
A friend, family member or colleague recommended it .....3  
I was motivated to after reading about quad bike accidents or quad bike safety.....4  
I wanted to after seeing a friend or work mate have an accident.....5  
I wanted to after I had an incident/accident.....6

Unsure.....7  
Other (specify) 8  
(52-71)  
Specified Other

---

Q32 Since doing the quad bike training course what, if anything, has changed about the way you ride quad bikes?  
(8-27)

---

Q33<sup>25</sup> Do you have any comments about how quad bike rider training could be improved?  
Yes.....1  
No.....2  
[DO NOT READ]Unsure.....3

---

IF Q33='Yes' ASK Q34

---

Q34 How do you think quad bike training could be improved?  
(29-48)

---

ASK ALL

---

Q35 Before the accident on [ %ACDATE% ] did you usually wear a helmet when riding a quad bike?  
Yes.....1  
No.....2  
Sometimes.....3  
[DO NOT READ]Unsure.....4  
Other (specify) 5  
(50-69)  
Specified Other

---

Q36 Since the accident on [ %ACDATE% ] do you usually wear a helmet when riding a quad bike?  
Yes.....1  
No.....2  
Sometimes.....3  
[DO NOT READ]Unsure.....4  
Other (specify) 5  
(8-27)  
Specified Other

---

<sup>25</sup> This question seems to have been asked of many people, not just the 74 formally trained ones, and is a router to next question.

Q37 Before the accident on [ %ACDATE% ] did you carry passengers when riding a quad bike?

- Yes.....1
  - No.....2
  - Sometimes.....3
  - [DO NOT READ]Unsure.....4
  - Other (specify) 5
- (29-48)
- Specified Other
- 

Q38 Since the accident on [ %ACDATE% ] do you carry passengers when riding a quad bike? Remember your name is not linked to this data

- Yes.....1
  - No.....2
  - Sometimes.....3
  - [DO NOT READ]Unsure.....4
  - Other (specify) 5
- (50-69)
- Specified Other
- 

Q39 Since your accident, has anything else changed about the way you ride quad bikes?

- Yes.....1
  - No.....2 GO TO Q41
  - [DO NOT READ]Unsure.....3
- 

IF Q39='Yes' ASK Q40

---

Q40 What has changed about the way you ride quad bikes since your accident?

[PRECODES - MULTI - DO NOT READ]

- MP
- I now wear a helmet.....1
- I ride more carefully.....2
- I ride slower.....3
- I don't ride quad bikes in some situations.....4
- I use other vehicles for certain jobs.....5
- I check to bike to ensure it is safe to ride each day.....6
- I received training.....7
- I don't carry passengers.....8
- I limit the load carried on the quad bike.....9

- MP
  - Unsure.....0
  - Other (specify) 1
- (8-27)
- Specified Other
-

---

ASK ALL

---

Q41 The Department of Labour has been running a quad bike safety campaign to help reduce the number of accidents on farms. Can you tell me any of the main safety recommendations of that campaign?

[MULTI - ALLOW APPROXIMATIONS - DO NOT READ]

MP

Ensure riders are trained/experienced enough to do the job.....1  
Wear a helmet.....2  
Don't let kids (under 16) ride adult quad bikes (over 90cc).....3  
Choose the right vehicle for the job.....4  
Pay attention to limits on towing and carrying...5  
Pay attention to manufactures instructions on whether passengers can be carried.....6  
Most manufactures say passengers shouldn't be carried.....7  
Unsure of campaign.....8  
Other (specify) 9  
(29-48)

Specified Other

---

Q42 What do you think is the most important factor in preventing quad bike accidents and harm to quad bike users?

(49-68)

Don't know.....Y

---

D1 If we would like to ask you some follow-up questions about this survey in the next few months would you be happy for us to re-contact you?

Yes.....1  
No.....2  
[DO NOT READ]Unsure.....3

---

IF D1='Yes' ASK PHCHK

---

PHCHK ....and can I confirm that your phone number is %KEY%

Yes.....1  
No.....2

---

IF PHCHK='No' ASK STD

---

STD Could you please tell me the std code for your area

[YOU CAN ONLY ENTER THE STD CODE 04 OR 4]

---

1 TO 9 \_\_\_\_\_ (71)

---

PHONE ...and if you could tell me your phone number  
[ENTER ONLY THE RESPONDENTS 7 DIGIT PHONE NUMBER]

1000000 TO 9999999 \_\_\_\_\_ (72-78)

---

ASK ALL

---

That's the end of this survey.  
I would like to thank you for taking part.  
My name is %INAME% and if you have any queries about this survey you can  
ring my supervisor Pania Brown on (09)-373-8711.

### **APPENDIX 3: STEPS TO QUAD BIKE SAFETY FROM GUIDELINES FOR THE SAFE USE OF QUAD BIKES, 2011**

- Before you ride, ask yourself whether the quad is the right vehicle for the job.
- Ensure riders are trained/experienced enough to do the job.
- Always wear a helmet.
- Recognise dangerous areas by establishing 'no-go zones'.
- Don't carry passengers.
- Don't let kids under 16 ride adult quad bikes.
- Check the operating condition of the quad bike before you ride.
- Keep quad bikes maintained in a safe condition.
- Keep within the manufacturer's towing or carrying limits.
- Only use attachments designed for and compatible with the quad bike.
- Don't do tasks that interfere with safe riding.
- Tell someone where you are going.
- Avoid use while fatigued or under stress.
- Restrict unauthorised access to the quad bike.

