Causal Factors in Multiple Vehicle Accidents Involving Motorcycles: An Analysis of New Zealand 2008 Accident Data

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Abstract

There has been a great deal of public comment in New Zealand in recent years about the over-representation of motorcyclists in accident statistics. Not only has it been alleged that motorcyclists are at fault in 87 percent of all accidents in which they are involved, it is also commonly stated that many of these individuals are *born again* bikers whose mid-life crises have led to them being over-represented in crash statistics, through lack of their ability to ride modern day motorcycles. Such popular misconceptions have had a substantial influence on accident compensation policy and road safety initiatives.

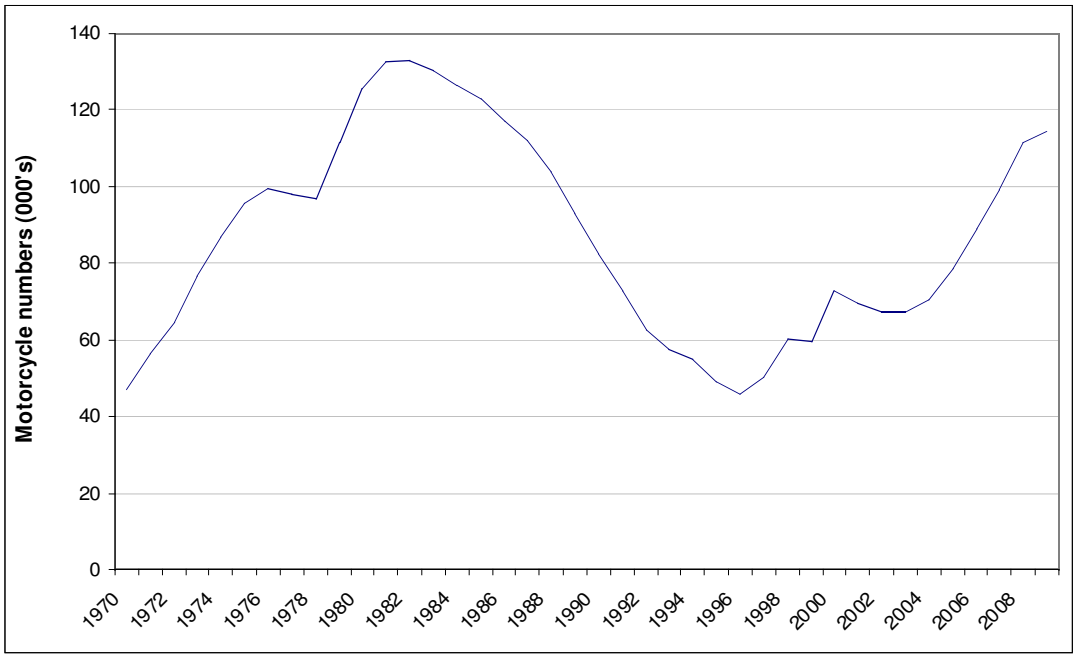
This paper reviews national and international research on motorcycle accidents. It then summarizes a detailed analysis of Transport New Zealand's (TNZ) Crash Analysis System (CAS) database. The New Zealand case is then compared with international studies. An examination of the various assumptions made by policy makers is presented, with particular reference to analysis of the crash data. Notably, the results of the analysis highlight visibility as a dominant cause of multiple vehicle accidents involving motorcycles in New Zealand.

Introduction

Over the past four decades, the number of motorcycles on New Zealand roads has fluctuated, and are currently at the highest levels since the mid 1980's. (Figure One below).

Figure One

New Zealand Motorcycle Numbers 1970 - 2009



The increase in motorcycle numbers has been accompanied by a commensurate increase in the absolute number of motorcycle related accidents. Government concern over the increase in accident numbers has led to policy initiatives affecting motorcyclists in a number of ways. For example, New Zealand has had a publically funded, no-fault injury compensation scheme in place since 1974. This is supported by a surcharge attached to the annual motorcycle registration fee, which partially underwrites the cost of the programme. This levy has not only increased disproportionately relative to other road users, but now makes motorcycle registration costs the highest of all non commercial road users. In terms of road safety, motorcycle initiatives have clearly been prompted by the increase in motorcycles numbers. The government-prepared policy document, Safer Journeys, New Zealand's Road Safety Strategy, 2010 – 2020, has indicated that

> *"the recent rise in popularity of motorcycle and moped use is likely to continue. Without a focus on the safety of motorcyclists, this could mean motorcycle injuries continue to increase"*
>
> MOT, 2009a

Many of the statements issued by Government officials in justifying such claims and the subsequent increase in levies on motorcyclists are both emotive and provocative. Government ministers and other public officials make numerous claims, with the media reporting accident information that if not, factually incorrect, is certainly open to alternative interpretation from a statistical standpoint. Such differences in interpretation of the accident statistics offer the potential for distorting and misrepresenting the accident

situation, which may then result in changes to public policy. The concern with differences between what is assumed by policy makers and as reported to the public, and conclusions that should be drawn from a dispassionate analysis of the data, forms the basis for this research.

Researched aspects of Motorcycle Accidents

The literature covering all aspects of motorcycle accidents is extensive. However, the studies are often contradictory in their findings. These studies cover a range of variables, from characteristics of the rider such as age and gender to the environmental aspects of time of day, road condition, and lighting considerations. The following summary of research findings will concentrate on singularly large influences, specifically, multiple vehicle motorcycle accidents (MVMA).

Major Causes of Motorcycle Accidents

International evidence shows that the largest proportion of motorcycle accidents, involve another vehicle. In Europe, this was shown to be about 85 percent of all motorcycle accidents (ACEM 2008), whilst in the US, research indicates it is approximately 75 percent of all accidents involving motorcycles (Hurt et al 1981). Whilst there are obvious traffic density implications which will affect accident rates in different countries and cities, parts of New Zealand, such as the Auckland region, are similar to the major populated areas of Australia, Europe and North America. Almost all of the MVMA's, can be defined as *fail to yield* accidents, and as a consequence, it will be factors relating to this form of accident that will be discussed in the following sections.

Failure to Yield Accidents and Visibility Issues

In order to have some positive influence on the motorcycle accident rate, it is necessary to identify those individuals whose actions are primarily responsible for the accident. These people should then be the target of safety campaigns.

International studies provide strong evidence that in MVMA's, the responsibility for the accident usually rests with the driver of the other vehicle, not the motorcyclist. In Europe, the ACEM 2008 study found this to be the case in half of all accidents studied, whilst Hurt (1981), found that in 67 percent of MVMA's, the other driver was responsible. Presseur et al (1995), agreed with Hurt. When another vehicle was involved in the bulk of motorcycle accidents, it was usually the driver of the other vehicle, who was at fault. Clarke et al (2007) also noted that in the majority of right of way accidents studied in their research, the other driver was most often at fault.

The major contributing factor in *failure to yield* accidents, revolves around *visibility* related issues. ACEM (2008) noted that in 70 percent of MVMA's where the other driver was clearly at fault, they were unaware of the presence of the motorcycle. Watson et al (2007) describe what has become known as *look but fail to see* mistakes on the part of the other driver, and highlights that motorcyclists are particularly susceptible to this form of accident.

Clarke et al (2007) suggested that in multiple vehicle accidents, the other driver expects their peripheral vision to alert them to the presence of other vehicle. However, the narrow visual profile of motorcycles often makes them more difficult to detect. Interestingly, Clarke et al (2007) notes that that the average age of drivers of the other vehicle in *at fault failure to yield* accidents is higher than the average age of drivers in *not at fault right of way* violations. Pai et al (2009) also cite the influence of the narrow motorcycle visual profile as a factor, where also they emphasize the influence of sunset and darkness in motorcycle-related, intersection accidents.

Peek-Asa and Kraus (1996) highlighted motorcycle visibility problems, citing time of day and reduced lighting as contributing to the difficulty in seeing the motorcycle. Pai et al (2009) drew the same conclusions when studying motorcycle T intersection accidents. Again, this exemplifies the issue of the motorcycle profile, and also raises a number of questions regarding the ability of other vehicle drivers to accurately judge the speed of an approaching motorcycle. This is especially relevant in impaired lighting situations. Haque et al (2009) also concluded that at night, motorcyclists were less likely to be at fault in MVMA's. Crundall et al (2008) discuss a number visibility issues characteristics of *look but fail to see* type accidents, and highlight the possible importance of *conspicuity* as a key influence in helping prevent the occurrence of MVMAs.

Conspicuity

In light of the evidence relevant to the problem of visibility in *failure to yield* accidents, presented above, it would seem sensible to assume that motorcyclists should make themselves more conspicuous. It is clear that such a tactic would decrease the likelihood of the *failure to yield* type accident. Whilst ACEM (2008), Hurt et al (1981), Pai et al (2009), and Wulf et al (1989) all show that conspicuity of the motorcycle reduces accident and injury severity, the question really is how to ensure that a motorcycle is conspicuous.

The major focus taken in studies related to conspicuity, has been on the ensuring motorcyclists ride with their headlight on at all times[i], and the use of brightly coloured clothing, or vests. Hurt et al (1981) and Quddus et al (2002), show that using a headlight during the daylight hours does increase conspicuity and reduce injury severity in accidents. However, Clarke et al (2007) and Yuan (2002) challenge these findings, stating that using a headlight makes no difference. In their view, conspicuity is more about increasing the profile size of the motorcyclist, pointing out that larger motorcycles, such as those with windshields and fairings, are less represented in the accident statistics.

Much of the evidence around clothing colour highlights the fact that darker clothing decreases conspicuity, (ACEM, 2008). However, rather than brighter clothing increasing conspicuity, it is now thought that colour contrast is of greater importance. To date, there is little published research on the influence of bright, contrasting colours and the effect on motorcycle conspicuity, with the exception of that done by Wulf et al (1989), who assessed the effect of contrasting motorcycle clothing colours, suggesting that this improves conspicuity.

Age, Experience and Gender

Younger riders are disproportionately represented in motorcycle accidents, both in New Zealand (Watson et al 2007), and internationally, (Hurt et al 1981, ACEM, 2008). It has also been shown that as age increases the likelihood of being in an *at fault* accident decreases, (Haque et al 2009). Specifically, Haque (2009) showed that middle-aged riders were under-represented in *at fault* accidents, whilst younger and older riders were over-represented. It has also been noted that the disproportionate representation of younger people involved in motorcycle accidents, regardless of experience level, is often attributed to the sensation seeking behaviour of those under the age of 20 (Watson et al 2007). Overall however, riders over 30 years of age have a lower accident rate than younger riders (Haworth et al 2002, and Watson et al 2007).

Clarke et al (2007) makes a critical point, where he distinguishes clearly between age and experience. He highlights that less experienced riders often have difficulty negotiating bends, regardless of age. This would be a plausible explanation for the much publicized New Zealand case, where middle aged, born-again bikers appear to be overly represented in the accident statistics.[ii] However, when examining the evidence more critically, it is evident that relatively inexperienced riders, regardless of age, are shown to be disproportionately represented in *at fault* accidents, (Haque et al 2009). This clearly indicates the need for more extensive training of motorcyclists.

Although the number of female riders is not large, Hurt et al in 1981 indicated that they do tend to be disproportionately represented in accident statistics. However, given the change in rider demographics in the nearly thirty years since the publication of that study, it is logical to assume that there could have been distinct changes, given the increasing number of females riding either motorcycles or motor scooters. In light of the experience data, the increasing numbers of novices riding motorcycles or scooters would suggest that rider and driver training initiatives would be important additions to changes in public policy.

Riding Training and Driver Licensing

The evidence, however, is mixed in terms of the success of rider training courses, with Hurt et al (1981) showing them to be successful in mitigating motorcycle accidents. In contrast, Savolainen and Mannering (2007) provided an explanation for the curious statistic that riders who undertook a specific motorcycle safety riding course were twice as likely to be fatally injured. They suggested a likely cause may be the "safety compensation effect". This is essentially described as a false sense of one's ability, presumably induced by completing the course.

Given the rather high proportion of other vehicles found at fault, it would also seem prudent to focus a substantial portion of training efforts on drivers of other types of vehicles. It has been shown that car drivers who also hold motorcycle licenses are less likely to be involved in a motorcycle accident when driving a car (Magazzù et al, 2006). Clearly, knowledge about and experience with motorcycles is a potentially critical component in reducing this type of accident.

Speed

Not surprisingly, it has been shown that motorcycles travelling at excessive speed are more likely to be involved in accidents, (Savolainen & Mannering, 2007), and these accidents are likely to have a higher fatality rate. However, the research reported by Peek-Asa and Kraus (1996) highlights the fact that more often than not, these speeding motorcyclists are likely to have their right of way violated. This emphasises the difficulty the *other driver* may have in judging the speed of an approaching motorcycle. This effect is likely to be exaggerated when the motorcycle is travelling at excessive speed. This also again emphasizes the visibility related issues faced by drivers of other vehicles in a MVMA situation.

Road Conditions

Quddus et al. (2002), and Savolainen and Mannering (2007) have shown that wet road conditions do not increase motorcycle accidents. They suggested that increased caution while riding in inclement conditions might be responsible for the lack of change in accident numbers. However, Majdzadeh et al, 2008 showed that once again, compromised visibility caused by rain and fog are in fact likely to increase MVMA's. De Rome (2002), as reported in Watson et al. (2007), noted that in their study, poor road conditions were a factor in almost half the MVMA's studied.

Engine Capacity

Larger capacity motorcycles appear to be disproportionately represented in multiple vehicle accidents. Haque et al. (2009), Quddus et al. (2002), and Pai et al. (2009), have all noted that larger capacity motorcycles were more likely to be involved in *right of way* accidents. Crundall et al. (2008), suggested that a quick look each way at intersections by the *other driver*, is even less likely to detect a large motorcycle travelling faster than the accompanying traffic.

Motorcycle Accidents In New Zealand

Ministry of Transport annual crash statistics highlight the relative level of risk of various categories of road users (MOT 2009b). What is noticeable in this comparative reporting is a lack of consistency across different categories of road users. Data for cyclists, pedestrians, and motorcyclists are not subjected to comparable forms of analysis. This analytic fault frequently portrays motorcyclists in a negative light in terms of both safety and risk.

For example, in determining the risk of riding a motorcycle, as compared to car drivers, the unit of analysis is "distance travelled". However, when comparing cyclists and pedestrians to motorcyclists, the unit of analysis is "million hours travelled". If cyclists and pedestrians were compared on the basis of distance travelled, it would indicate that motorcycling is not as dangerous, and a pedestrian or cyclist is at substantially greater risk of accident and injury.

The assignment of fault is another aspect of motorcycle accidents often discussed. In New Zealand law, fault is only considered in light of whether or not the law was broken in the accident, and the allocation of financial responsibility is in terms of material damage. With regard to personal liability for causing injury, the New Zealand accident compensation

scheme (ACC) prevents private litigation for injurious personal damage. This is due to one of the major principles of ACC operations, which emphasises community responsibility and where no individual is therefore held responsible for an accident. However, assigning cause and thereby implying blame is part of the reporting process. The assumption of cause is frequently used to justify policy decisions by both government and non-government organisations when considering traffic accidents.

A commonly accepted form of representing accident statistics is to express accidents, injuries and fatalities per 10,000 motorcycles. This accounts for increasing traffic density and provides for a good temporal comparison. Table One is a summary of accident and fatality statistics for New Zealand in recent years. All four measures show interesting trends. In terms of fatalities, deaths for the most recent years reported are remarkably consistent. More impressive still is the decreasing rates of both crashes and injuries, while there has been a simultaneous increase in the number of motorcycle registrations.

Table One
Annual Motorcycle Numbers and Accident and Fatality Statistics

Year	Motorcycles	*Per 10,000 On Road Motorcycles*		
		Crashes	Injuries	Fatalities
1973	76674	511	551	17.0
1988	103648	264	276	14.1
1989	92945	253	264	15.2
1990	82437	257	267	13.8
2003	67368	150	108	4.5
2007	99213	170	129	4.0
2008	111568	164	121	4.7
2009	114443	122	86	4.4

Source: Ministry of Transport, New Zealand Vehicle Fleet Statistics, and CAS.

Figure Two below provides a comparison of motorcycles numbers and motorcycle accident injuries per 10,000 motorcycles on the road over the period 1980 to 2009. It is clear from the plots covering the years 1998 to the present that the relationship between the number of registered motorcycles and injuries has reversed the trend observed in the previous ten years. The increasing ratio of registrations to injuries is notable.

Figure Two

Motorcycle Numbers and Motorcycle Accident Injuries 1980 - 2009

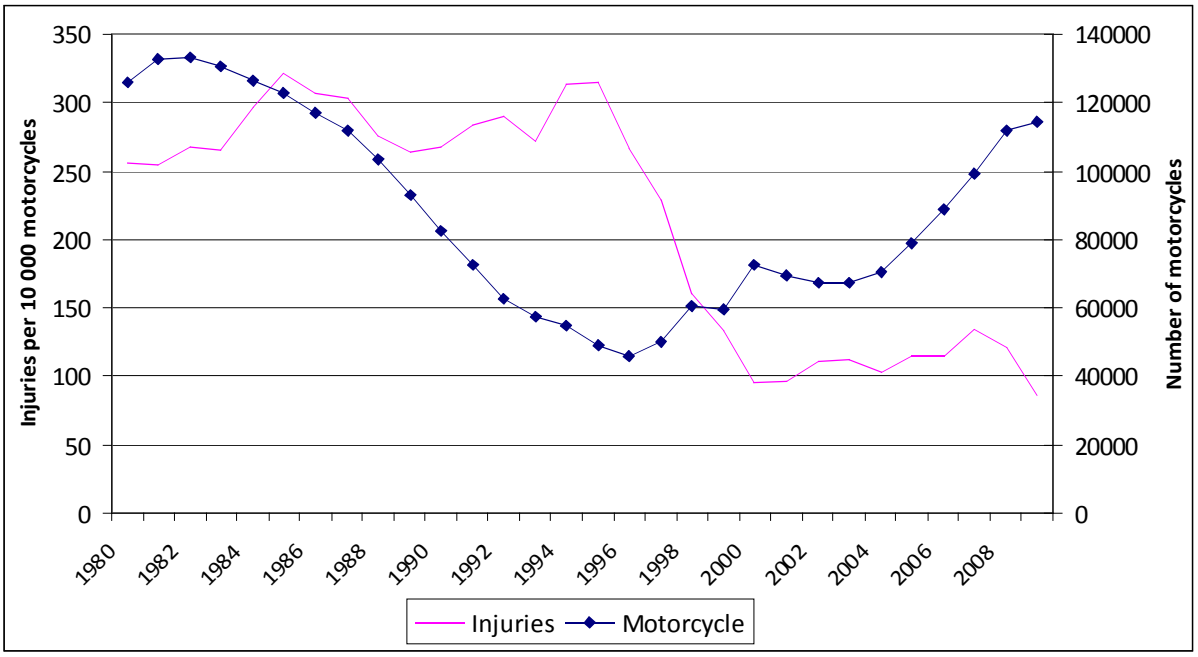
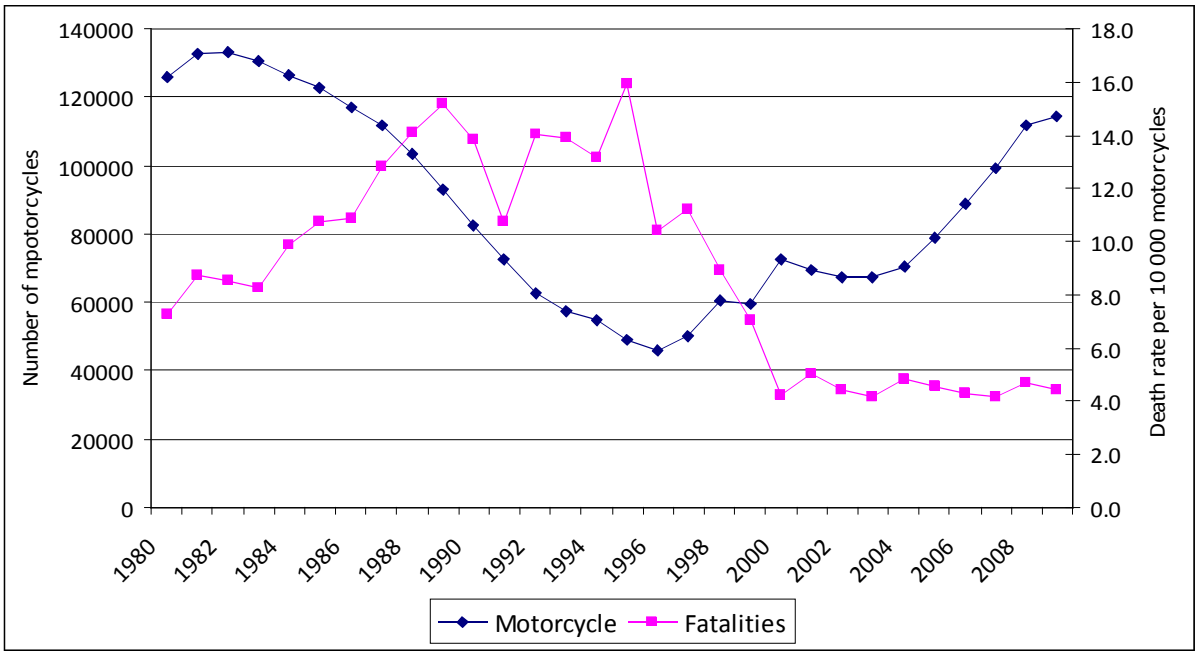


Figure Three below provides a comparison of motorcycles numbers and motorcycle accident fatalities per 10,000 motorcycles on the road over the period 1980 to 2009. A similar trend to that noted above, of increasing ratio of registrations-to-fatalities, for the years 1998 to the present, is revealed in the accident fatalities data. The data for the ten years previous to this period are, however, more mixed. What is most apparent from these figures is the relatively constant trends for both injuries and fatalities since 2000.

Figure Three

Motorcycle Numbers and Motorcycle Accident Fatalities 1980 - 2009



The following analysis looks at MOT data in order to describe factors involved in MVMA's in New Zealand in 2008. This specifically focuses on fault, and where possible, addresses those considerations identified in the international research cited earlier.

Multiple Vehicle Motorcycle Accidents in New Zealand in 2008

The analysis reported in the following sections is drawn from data obtained from the Ministry of Transport's Crash Analysis System (CAS). The CAS is an integrated computer database programme that provides tools to query, collect, map, and provide the substance for reporting on the road crash and related data. The majority of the reports in the database are police accident reports, and due to the time delay in compiling, organising, and presenting the details gleaned from the accident reports, 2008 was the year providing the data most appropriate for the detailed investigation into MVMA's.

In 2008, there were a total of 1480 motorcycle-related accidents. These resulted in 51 fatalities and 1073 injury reports. MVMA's represented 66.4 percent of all reported accidents in the CAS database in 2008, thus totalling 982 accidents.

A reading of the original accident reports was necessary to obtain a clearer understanding of the factors involved in these accidents. However, due to the large number of reports and the limited time available for the project, it was necessary to concentrate on a sample of accidents from the database. All reports from two regions of the country were chosen for a full reading; the province of Auckland, containing the country's largest city, Auckland, and the Canterbury region of the south island, which includes the country's second largest city, Christchurch. These two subsamples provided a total of 573 individual accident reports, of which 443 were MVMA's. Once the reports were read, they were separately coded and the details entered into an SPSS statistical software data file. Table Two below refers to these two regions, with figures for the country as a whole included. This presentation emphasises the relevance of traffic density in MVMA, indicating a somewhat higher percentage of MVMA's in the two populated regions, which are similar to those utilised by the international studies referenced previously.

Table Two

Number of Motorcycle Accidents 2008

	Total number of registered vehicles	% of registered vehicles	Motorcycle Accidents Total (MAT)	MAT %	MVMA	MVMA % of MAT
All New Zealand	3456610	100.0	1480	100.0	982	66.4
Auckland	1047652	30.3	416	28.1	328	78.8
Canterbury	499904	14.5	157	10.6	115	73.2

Age and Gender of Motorcyclists involved in MVMA

The average age of motorcyclists in New Zealand has risen from 22 in 1980 to 33 in 2005 (AA, 2007). A study in 2007 estimated the mean age in Christchurch to be about 45 years (Lamb, 2008). As might be expected, there has been a commensurate increase in the average age of motorcyclists involved in MVMA's. As Table Three below indicates, the average age of those involved in an accident with another vehicle was 37, with a mode of 21.

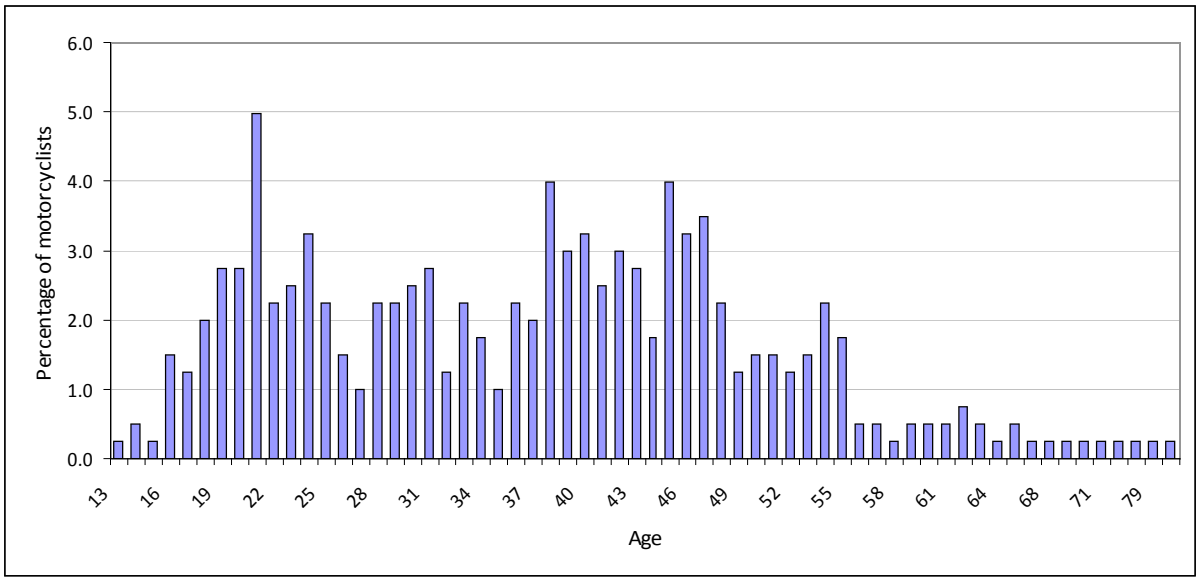
Perhaps a bit surprising was the age range of those involved in MVMAs; 76 years. The youngest person involved an accident was 13 years old, whilst the oldest was 89.

Table Three
Age Statistics of Motorcyclists in MVMA's 2008

Statistic	Age
Mean	37
Median	38
Mode	21
Maximum	89
Minimum	13

As can be seen from Figure Four below, the distribution of age is bimodal, indicating a disproportionate representation of younger riders, relative to the average age of rider.

Figure Four
Age Distribution of Motorcyclists in MVMA's 2008



Ninety one percent of the motorcyclists were male. Interestingly, the average age of the driver of the other vehicle involved in the sampled MVMA's, was 39, with 38 percent of these drivers being female.

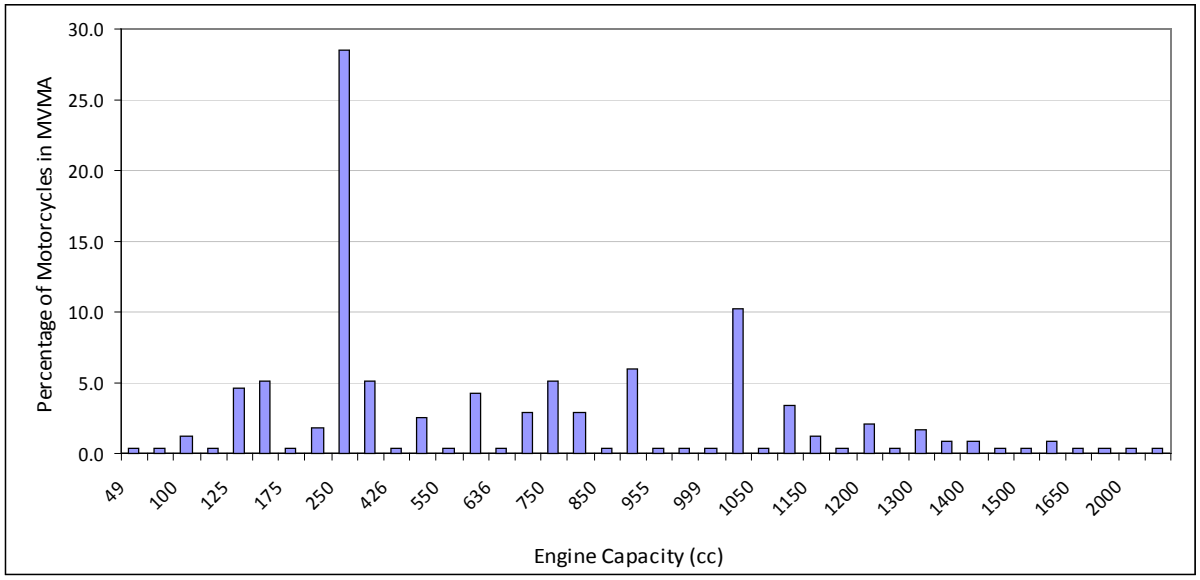
Engine Capacity

Although there has been a great deal of commentary (MOT, 2009b) about the preponderance of high capacity motorcycles involvement in accidents, the data does not confirm this view. The most common capacity motorcycle involved in accidents is 250cc. Table Four and Figure Five present the statistical summary of the engine capacity data.

Table Four
Engine Capacity Statistics of Motorcycles in MVMA's 2008

Statistic	CC rating
Mean	607
Median	500
Mode	250
Maximum	2300
Minimum	49

Figure Five
Engine Capacity Distribution of Motorcycles in MVMA's 2008



Speed

Excessive speed for the conditions, was a factor in ten percent of the MVMA's analysed. This was further assigned as a factor in 6.6 percent of the cases where the rider of the motorcycle was at fault, and 3.4 percent of the cases in which the driver of the other vehicle was assigned cause for the accident.

Table Five provides a distribution of the MVMA's by speed zone in which the accident occurred. As both Canterbury and Auckland have large populations within their respective boundaries, it is perhaps not surprising that the majority of accidents happened in the restricted speed zones typical of the urban and semi-rural settings, i.e., 50 – 80 kmh. The largest bulk of these occurred in 50 kilometre per hour zones.

Table Five
Distribution of 2008 MVMA's by Speed Zone 2008

Speed Zone	% of MVMA
50	69.9
60	4.3
70	3.1
80	4.3
100	18.2

Light, Weather Factors and Road Condition

The greater majority of MVMA accidents occurred during daylight, in fine weather conditions on dry roads. Table Six presents the rates of MVMAs under the various weather and road conditions. These figures seem consistent with the manner of most motorcycle riding -- dry, reasonably well-lit, fair conditions will be preferred by motorcyclists, presumably in recognition of the greater risk from riding in more precarious conditions.

Table Six
MVMA - Light, Weather and Road Conditions 2008

FACTOR	**%**
Light	**of MVMA**
Bright sun	48.7
Overcast	28.8
Dark	17.0
Twilight	5.5
Weather	
Fine	88.5
Light rain	10.3
Heavy rain	0.7
Mist or Fog	0.5
Road Condition	
Dry	85.8
Wet	14.2

Alcohol

Alcohol was identified as an accident factor affecting the motorcyclists in 4 percent of the accidents, and affecting the driver of the other vehicle in 3.7 percent. Accident data published by ALAC (2008) provides figures for the percent of crashes where alcohol was involved. For the period 2005 to 2007, 15 percent of all Auckland area motor vehicle crashes involved alcohol. The corresponding figure for the Canterbury region was 12 percent. On the face of it, these figures seem to support the notion that alcohol plays a somewhat lesser role in crashes involving motorcycles.

Visibility

A very large proportion of accidents identified in the 2008 CAS database were directly keyed to visibility; 30.8 percent of all MVMA's occurred with some form of compromised ability to see the oncoming motorcycle or, in the case of the motorcyclist, the other vehicle. These involved situations were environmental factors such as sun strike, *look but fail to see* mistakes (Watson et al, 2007), misjudged speed of oncoming vehicles, slow reaction time, poor conspicuity, and obstructed line-of-sight were major contributors to the accident.

Accident Cause and Responsibility

Visibility-related issues were the largest single determinant of MVMA from the 2008 Canterbury and Auckland data base. Table Seven below summarises the factors, as well as looking at the distribution of these across the individuals who were identified as responsible for causing the accident. This highlights the role of the other driver as responsible for the accident, and the significance of visibility issues as a major determinant factor in MVMA's.

Table Seven

Factors and Responsibility for MVMA's in 2008

Contributing Factor	% of All Factors	Accident Responsibility			
		Both	Motorcyclist	Other Driver	Not Identified
Visibility issues	38.6	3.8	1.0	33.8	
Aggressive driving	22.3	6.3	13.2	2.8	
Inattention	18.7	2.6	3.3	12.8	
Poor Judgement	12.0	3.1	2.6	6.3	
Inexperience	10.1	1.4	5.6	3.1	
Other (road surface etc)	6.8	0.5	3.3	2.8	0.2
Hit and run	5.1		0.2	4.9	
Indeterminant	12.3		2.4	5.9	4.0

Note: Percentage of all factors sum exceeds 100.0% due to multiple factors involved in an accident.

Conclusions

The New Zealand road safety strategy has been, and currently is, largely based on the Australian, Victorian State Government, road safety initiatives (Macpherson et al 1998, MOT 2009c). This has largely focused on the factors of alcohol and speed as being major contributors to motor vehicle accidents.

In the case of the motorcyclists, the current New Zealand road safety strategy, (MOT 2009a), stated their focus will be on four areas:

1. Targeted treatments of popular motorcycle routes, ie road surfaces, crash barriers etc.
2. Safer motorcycles for novice riders through limiting the power to weight ratio of motorcycles to 150kw/tonne (0.15kw/kg).
3. Improve rider training and licensing.
4. Improve training and licensing of those returning to ride motorcycles.

Whilst these initiatives are admirable, and may go some way toward reducing the motorcycle accident rate, they still, fundamentally do not address the single largest determinant of accidents. As documented here, visibility, particularly the apparent difficulty that other road users have in seeing motorcyclists, is a substantial contributor to motorcycle accidents. Given this unambiguous conclusion, communication with the public about visibility, and enforcement measures geared toward greatly improving the visibility of motorcycles by other motorists should be a priority in all motor vehicle policy decisions and initiatives. A dispassionate analysis of the Ministry of Transport's CAS 2008 accident database demonstrates that speeding, alcohol, and inexperience are considerably less likely to result in accidents involving motorcycles and other vehicles. Though these potential causes of accidents should not be ignored, the effects of them - even when added together - are not as significant as the problem of motorcycle visibility.

Motorcyclists can only do so much to improve their visibility to other road users. Wearing high visibility clothing is only one possible reaction to the visibility problem. It is, however, dependent upon the action of individual motorcyclists. Further, international studies on the value of high visibility clothing are mixed. Relying on this type of clothing may be of questionable value in reducing motorcycle accidents. A road safety campaign targeting all other road users that clearly highlights the small visual profile of motorcycles will certainly benefit motorcyclists. There will likely be positive spill-over effects, as the same campaign would also benefit those riding motor scooters and bicycles. Given that the accident statistics for cyclists in 2008 were similar to motorcyclists with 1179 accidents, 36 deaths and 93% of the reported accidents involving another vehicle, any such generalisation effect would be a welcome outcome of any such campaign. Clearly, enhancing visibility should be a primary focus for motorists, governments, and organisations concerned with road safety.

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NOTES

[i] New Zealand legislation made it compulsory from 1st November 2009 to ride a motorcycle with its headlight on (dip) low beam during daylight hours, for all motorcycles manufactured after 1st January 1980.

[ii] The Christchurch Press Editorial, pg A6, 2nd January 2009, stated motorcycle accidents were mainly occurring to older riders, who were considered to either be novices, or those who *"…could have ridden as teenagers but they might not appreciate the greater power and lightness of modern machines or be used to riding on today's more congested roads".* In AA Directions magazine, Autumn 2007, it was claimed that *"...most injuries and deaths of motorcyclists are in the 40 years-and-over age group."* Ironically, in the same article, it is noted that average age of motorcycle ownership has risen to 33 in 2005. In a study done in Christchurch in 2007 (Lamb, 2008), it was noted the average age of motorcycle ownership is 45 years of age. Consequently, given the increase in age of motorcycle ownership, it would be expected that older riders would be represented in accident statistics, however, the critical question is whether or not older riders are disproportionately represented.