In depth Study of 39 Motorcycle Collisions in Northern Ireland between 2004 and 2010 in which 41 motorcyclists were fatally injured

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ABSTRACT

This study analyses no.39 cases in which n.41 motorcyclists were fatally injured, or 36% of total motorcycle fatalities in Northern Ireland between 2004 and 2010 (n.114). There were n.17 cases (43.6%) where the actions of another vehicle driver caused the collision, in thirteen of these cases the motorcycles had their lights switched on. The remaining n.22 collisions (56.4%) were due to the actions of the motorcyclist. In the approach to the collision scene, there were n.13 cases (31.7%) in which the approach was a right hand bend and in n.8 (19.5%) cases, the approach was a left hand bend. In the remaining n.18 (43.9%) cases, the approach was a straight road. Of the n.17 (41.4%) motorcycles that slid after falling, n.10 (24.4%) fell onto their right side and the remaining n.7 (17.1%) fell onto their left side. The information from this study identifies primary and contributory causes of motorcycle collisions.

INTRODUCTION

This study is an examination of 39 collision scene reports from Senior Scientific Officers, Damian Coll, Emerson Callender and Lindsay McCormick of the Road Traffic Collision Investigation Unit, Forensic Science, Northern Ireland. The study and analysis of the reports was carried out by Elaine Hardy PhD, Research Director of Right To Ride Ltd.

During 2004 to 2010 the Road Traffic Collision investigators attended road traffic collision scenes in which motorcyclists were fatally injured. This document analyses No. 39 cases (41 motorcyclists) from their investigations which is equal to 36% of the total motorcycle fatalities in Northern Ireland between 2004 and 2010 (there were 114 fatalities during this period). The cases reported in this study represent the investigations carried out by Damian Coll (n.21 reports), Dr Emerson Callender (n.16 reports) and Lindsay McCormick (n.2 reports) between April 2004 and June 2010.

The collision scenes were attended by an investigator, a PSNI photographer and mapper. The files that the investigators prepare include photographs of the collision scene, witness statements, as well as maps, diagrams, laboratory examinations and their findings which are compiled in a report from each collision investigation. Typically, the investigator arrives at the collision scene within 2 to 4 hours following the collision. Each accident investigation takes approximately six months to complete. The case studies from which this report is based, contain information from the Investigators' reports including their findings and comments. There were 23 inquests held in relation to the collisions reported in this study, resulting in a Coroner's verdict. In the cases where there was no Coroner's verdict there may have been a prosecution; the person charged with an offence may have pleaded guilty or the family may have indicated that they did not want a public enquiry.

The Data Collected On-Scene included vehicle data, the collision scene including time, weather conditions and locality etc, the environment included road conditions and road layout and the actions taken by the motorcyclist. Human factors included helmet usage, alcohol and drugs, experience and riding in groups.

FINDINGS

Vehicle factors

Details of all vehicles involved in the n.39 cases reported were recorded which included the vehicle registration, make and model. There were n.41 motorcycles involved in these collisions.

With regards to style, there were n.21 (51.2%) super sports motorcycles (in two cases there were two super sports involved respectively), five (12.2%) tourers (including one super sports tourer and two sports tourers), three cruisers, three scooters, three naked/semi-naked, two sports, two mopeds, one adventure traillie and one trail bike. Of the n.41 motorcycles (including scooters and mopeds) n.31 (75.5%) had engine sizes between

600cc and 1300cc, there were two between 350cc and 400cc, six (14.6%) with an engine size of 125cc and two mopeds with an engine size of 50cc.

Mechanical factors and contribution of design or maintenance defects to collision or injury causation are recorded. n.36/n.41 (87.8%) motorcycles did not have any mechanical, design or maintenance defects which may have contributed to the collision or injury causation. In Northern Ireland all vehicles are subject to a regular annual technical inspection called MoT which covers lights, brakes, tyres, steering and general maintenance.

However in n.3/n.41 (7.3%) motorcycles, under-inflated tyres were identified as the cause or a contributory factor in the collision. In one case the front tyre was recorded as not for highway use. One motorcycle was recorded as having the steering damper missing which may have contributed to the loss of control. One motorcycle was burnt, so no information is available. Of the cases where another vehicle was involved, in one case where the car driver performed a U turn in front of the motorcycle, the investigator noted that the C and D pillars may have restricted the view of the driver. In a case there a truck pulled out in front of the motorcycle, there was a problem with the visibility of the driver from the cab of the truck to see the light of the motorcycle which may have had an effect on his perception of the distance of the oncoming motorcycle. No other cases reported mechanical factors or design issues which may have contributed to the collision.

Tyre Pressure

The measured tyre pressure of the motorcycles indicates that in n.28/n.41 motorcycles recorded, n.13/n.28 (46%) of these motorcycles had under-inflated tyres of between -8 psi up to -25 psi. In two further cases, investigation indicated that there was a probability that the deflated tyres were under-inflated and were a contributory cause of the collision. Overall, evidence that under-inflated tyres contributed to the collision, was found in one case, while in two cases, the under-inflated tyres were the primary cause of the collision. Although the tyre pressure was below the recommended level as indicated by tyre manufacturers in the n.13 cases mentioned above, according to the investigators there was no evidence (apart from the three cases highlighted) that under-inflated tyres had an influence to the outcome of the collision.

Collision scene and environment factors of n.39 collisions

The time of day of the collisions highlights that 46.2% (n.18) occurred between afternoon and early evening. 17.9% (n.7) occurred in the evening and 33.3% (n.13) occurred between morning and early afternoon. One collision (2.6%) occurred in the early morning. The highest proportion of fatalities: 23%, (n.9) occurred between 18.30 and 19.30. The proportion of collisions occurring in Spring were 46.2% (n.18), Summer 43.6% (n.17) and autumn 10.3% (n.4). None occurred in Winter In 72% (n.28) of cases, the weather was fine; in n.4 cases the weather was either overcast or damp. In six cases the weather was not mentioned.

Twenty eight collisions occurred in rural locations (71.8%) while n.6 (15.4%) occurred in urban locations, the remainder occurred in a semi-rural location (n.2), on a duel carriageway (n.2) and one occurred on a motorway.

Road Conditions

The investigators examine the road where the collisions occur looking for contaminants, surface irregularities, quality and markings. If the investigators suspect that there is an issue with the road surface, or to attempt to estimate the speed from the tyre marks, they would carry out a skid test, using a skid mark device to measure the coefficient of friction between the tyres and the road surface. Generally this would be applied more for cars, because the friction coefficient might be slightly higher for motorcycle tyres than what there would be in a test for a car. But if the investigators suspected that there was an issue with the traction of the road surface, or if they are to perform calculations based on the length of the tyre marks, then the investigators would conduct skid tests.

Typically there is a road test conducted at the scene while the road is still closed or at a later stage when the road is open, whereby the investigators will drive or ride through the collision scene or get another expert police motorcyclist to ride through the scene to comment on and/or determine whether it is possible to negotiate part of the road through the collision scene at a specific speed. The investigators need to be satisfied that the

motorcyclist was not travelling in excess of that speed to eliminate this as a factor in the collision and demonstrate that there was no issue with the road surface.

In all cases, the condition of the roads was reported as "good". In one case there were no road markings. In n.29/n.39 cases (74.3%), the surface of the road was "dry". In three cases the surface of the road was "damp" and in one case there were loose stones on part of the road.

Road Layout[1]

In the approach to the collision scene, there were n.13 cases (31.7%) in which the approach was a right hand bend and in eight (19.5%) cases, the approach was a left hand bend. In the remaining n.18 (43.9%) cases, the approach was a straight section of road.

RESULTS

Action taken by Motorcyclist

Table 1: Left hand bend approach prior to collision and subsequent action taken

Style of MC	Approach to collision scene by MC	Position of MC prior to collision	Action taken by Motorcyclist	Side that MC slides after falling
Sports 750cc	Downhill left hand bend	On main road	Leans MC and applies front brake severely (locking wheel)	Left side
Super Sport 1100cc	Gentle left hand bend	Centre of lane	Applies brakes severely locking rear wheel	Motorcycle "high sides"/falls on right side
Moped 50cc	Gentle left hand bend	Approaches junction	Applies brakes severely	Right side
Trail 125cc	Left hand bend	Veers towards kerbstone	Puts left foot down on raised verge	Left side
Super Sport 750cc	Sharp left hand bend	Attempts to overtake van and leans MC into the corner	Applies brakes to front wheel (locking wheel) changes gears and leans MC left at same time	Left side
Super Sport 900cc	Uphill left hand bend	Centre of lane	Applies brake	N/a (Impacts car)
Tourer 1300cc	Uphill left hand bend	Travelling on duel carriageway	Moves left to avoid van	N/a (Impacts van)

63.4% (n.26/n.41) motorcyclists applied their brakes prior to the collision and n.18 (43.9%) applied their brakes severely. Of the n.17 (41.4%) motorcycles that slid after falling, ten (24.4%) fell onto their right side and the remaining seven (17.1%) fell onto their left side. Table 1 highlights the actions of seven motorcyclists who approached the collision scene on a left hand bend. In five cases, the motorcyclist applied the brakes. Three motorcycles fell on the left hand side and two fell on the right side. (N/a = Not applicable - Did not slide)

[1] In Northern Ireland, as with the rest of the United Kingdom, vehicles drive/ride on the left hand side of the road.

Table 2: Right hand approach prior to collision and subsequent action taken

Style of MC	Approach to collision scene by MC	Position of MC prior to collision	Action taken by Motorcyclist	Side that MC slides after falling
Naked 600cc	Downhill right hand bend	Not recorded	Applies braking severely and almost locks front wheel	Right side
Tourer 1100cc	Downhill right hand bend	On main road	Veers to left and hits kerbstones	Right side
Scooter 125cc	Downhill Right hand bend	Veers to left to avoid metal covers on road	Applies brakes	N/a (impacts wall)
Sports 400cc	Gentle right hand bend	Close to left hand side	Applies brakes	Left side
Super sport (2) 1000cc and 1200cc	Gradual right hand bend	Centre of lane Two MCs speeding at >130 mph	1200cc applies brake severely to both wheels; 1000cc applies brake	N/a (Impacts truck)
Cruiser 650 cc	Long sweeping right hand bend	Travelling on main road	No Action	N/a (impacts car)
Super Sport 600cc	Right hand bend	Motorcyclist leans to left and loses grip	No action	Left side (into oncoming car)
Super Sport 1000cc	Right hand bend	Overtakes bus, perceives hazard (oncoming vehicle)	Manoeuvres to left and applies brakes, locking front wheel	Right side
Super Sport 1000cc	Right hand bend	Travelling on main road	Applies brakes severely	Right side
Super Sport 1000cc	Right hand bend	Travelling on main road	Applies brakes, locking front wheel	Right side
Super Sport 600cc	Right hand bend	Goes wide and moves left onto hard shoulder then top of Armco Barrier	No action	Flies 112 metres over Armco barrier to construction site
Sports Tourer 750cc	Right hand bend	Overtakes cars and follows wide path	Leans MC severely to the right and falls	Left side
Classic 350cc	Right hand bend	Travelling on main road into bend, loses control	Applies rear brake severely (locking wheel)	N/a (Impacts raised bank)
Super Sport 750cc	Uphill right hand bend	Overtakes three cars, centre line	Loses control, applies rear brake and rotates left	N/a (Impacts telegraph pole)

Table 2 identifies n.14 motorcyclists that approached the collision scene on a right hand bend, in five cases, the motorcycle fell to the right, three fell to the left, two motorcyclists impacted the other vehicle. (N/a = Not applicable - Did not slide)

Table 3: Straight approach prior to collision and subsequent action taken

Style of MC	Approach to collision scene by MC	Position of MC prior to collision	Action taken by Motorcyclist	Side that MC slides after falling
Sports Tourer 800cc	Straight (junction)	Manoeuvres to right of lane	Applies brakes	N/a (Impacts car)
Super sport 1000cc	Straight	Manoeuvres over centre line to opposite lane	Applies brakes	N/a (impacts car)
Advent. Traillie 1150cc	Straight	Attempts to overtake car and car applies brakes	Applies brakes (ABS) but too close to car in front	N/a (Impacts oncoming car)
Semi-naked 650cc	Straight	Emerges from junction without stopping	Applies brakes severely	N/a (Impacts car)
Super Sport 1000cc	Straight	Approaches junction	Applies brakes severely front and rear wheel	N/a (Impacts truck)
Super Sport 600cc	Straight	Centre of lane	Applies brakes severely locking brake, causing rear wheel to lift	N/a (impacts car)
Super Sport 600cc	Straight	Travelling on main road	Applies brakes severely locking brake, transfers weight, causing MC to pivot	N/a (Impacts car)
Super Sport 600cc	Straight downhill	Crosses centre line	Applies brakes severely locking front wheel	N/a (Impacts oncoming MC)
Super Sports 1100cc	Straight	Travelling in group of Motorcycles	Applies front brake severely (locking wheel)	Right side
Super Sport Tourer 1100cc	Straight	Travelling on duel carriageway	Applies rear brake severely	Right side
Super sport 125cc	Straight at junction	Attempts to overtake truck while truck steers to the right	Impacts truck and slides towards oncoming car	Right side
Cruiser 125cc	Straight, crest then decline	Emerging from junction without stopping	No action	N/a (Impacts car)
Cruiser c.900cc	Straight	Overtakes bus and runs into car at junction	No action	N/a (impacts car)
Sports 1000cc	Straight	Manoeuvres to right of lane	No action	N/a (Impacts car)
Scooter 125cc	Straight	Travels across junction running red light	No action	N/a (impacts car)
Scooter 125cc	Straight	Moves gradually to left towards kerbstone	No action	Left side
Moped 50cc	Straight	Travelling on main road impacts friend's moped, loses control	No action	N/a (Impacts wall)
Super Sport 600cc	Straight (dip in the road)	Travelling along main road	No action	N/a (impacts van)

Table 3 indicates that there were n.18 motorcycles that approached the collision scene on a straight stretch of road. Of these, n.12 impacted another vehicle. In seven cases the investigators provided evidence that no action was taken (i.e. the motorcyclist did not apply the brakes). Three motorcycles fell on their right side and one on the left side. (N/a = Not Applicable - Did not slide)

Road Infrastructure

Of the n.39 cases, there were n.12 cases (30.8%) in which the motorcyclist impacted against road infrastructure. In five of these cases the motorcyclist either impacted a fence or wall. In one of these cases, the wall had "dragon teeth" which caused the injuries to the motorcyclist. In four cases the motorcyclist impacted a pole – in one case, the pole had a traffic monitoring box attached which caused the injuries of the motorcyclist. In two cases the motorcyclist impacted the bank or kerbstones on the side of the road and one motorcyclist impacted rocks in a construction area after "flying" over an Armco barrier. Of the n.12 cases, in five (12.8%), the collision involved another vehicle while in seven cases (17.9%) there was no other vehicle involved.

Other Vehicle Involvement

There were seventeen cases (43.6%) in which another vehicle was considered the primary cause of the collision. Four of the other vehicle drivers performed a U turn in front of the motorcycle. One driver was a hit and run (i.e. after the collision the car driver left the scene of the collision). The remaining vehicles exited from a side road or private entrance in front of the motorcycle or turned across the road in front of motorcycle from the opposite lane. Of the seventeen cases, eight (47%) were cars, five (29.4%) were vans, two were trucks and one was a tractor.

Human factors

Helmets

Of the twenty eight cases where information about helmets is recorded, twenty six were full face and one was a flip face. In six cases, the helmet was recorded as not being secured. The type of closure was recorded for eight of the helmets: six had a "Double D" closure and two had a "locking tongue" closure. In two cases the visor was tinted, sixteen of the visors were clear and there was no information about visors for the remaining nine helmets.

Alcohol/drugs

There are four recorded cases in which the motorcyclists had levels of alcohol over the legal limit and or drugs in their blood. In Northern Ireland the maximum legal alcohol limit for driving is 80 mg per 100 mls. In three cases the alcohol content was more than two times over the legal limit. In one case the motorcyclist had also taken nerve suppressant drugs and possibly cannabis. In another case the motorcyclist also had ecstasy in his blood. Three of these collisions were single vehicle (no other vehicle involved) and the fourth ran a red light through an intersection with no headlights on and impacted a car crossing the intersection. The information on alcohol and drugs is only available from the Coroner's Verdicts.

Experience

The information available from the Coroner's Verdicts regarding the experience of the motorcyclists is limited (only six cases are reported). In one case, the rider was experienced, but was more than twice over the legal drink limit and had traces of ecstasy and cannabis in his blood. In another case the rider was "very experienced" but veered suddenly and lost control; in a third case the rider had insufficient experience (he had returned to riding three years previously and had owned his motorcycle for one year). In the fourth case the rider had only one year's experience. In the fifth case the rider had only passed his test eleven months previous to the collision and owned his motorcycle for two months, he was almost twice over the legal drink limit. In the sixth case the rider was experienced, but was more than twice over the legal drink limit.

Riding in Groups

There were n.9/n.39 (23%) cases in which the motorcyclists involved in collisions were either riding in a group or with another motorcyclist. In two cases the collision occurred between two or more motorcycles. In two other cases the motorcyclists were accompanied by another motorcyclist and were speeding above the national limit. In both cases, the catalyst for the collision was another vehicle pulling out in front of the motorcycles. In another case the motorcyclist was accompanied by a second motorcycle, but the catalyst of the collision was a

van performing a U turn in front of the lead motorcyclist. In one case two mopeds were involved, although the evidence is unable to determine with absolute certainty, one of the mopeds may have collided with the other and caused the moped and rider to deflect and hit a nearby wall. In two cases two motorcyclists were killed respectively. Finally there were three cases in which the second rider (who was following a lead rider) was involved in a collision with another vehicle and/or road infrastructure. In all these cases the total number of motorcyclists killed was n.11/n.41 (26.8%).

Other Influencing Factors

Speed

Of the 39 cases, there were four in which evidence of speed above the national legal limit was recorded. In one case the speed of two motorcycles involved was above the national legal speed limit (>130 mph) and the motorcyclists were unable to stop in time when a truck exited from a quarry. According to the investigator, had the motorcycles been travelling at the national speed limit and had they begun braking at the location of the start of the long tyre mark, the collision would have been avoided. Furthermore travelling at a constant speed of 60 mph, it would have taken approx. 5.2 seconds for the motorcycles to travel from the start of the tyre mark to the impact area (139 metres). This would have given sufficient time for the truck to move away from the quarry entrance and clear the west bound lane. In this scenario, the collision could have been avoided without any brake application by the motorcyclists.

In the three remaining cases, the speed was higher than the national legal limit and in each case a vehicle pulled out from a minor road in front of the motorcycles. However, the actions of the other vehicle driver pulling out in front of the motorcycles were the primary cause of the collision, not the speed of the motorcycle. With regards to the actions of the motorcyclist, due to the speed of the motorcycle, the rider was restricted in his ability to brake sufficiently in time prior to impact.

Lights

Of the 39 cases reported seventeen (43.6%) were collisions between a motorcycle and another vehicle that had either pulled out from a private entrance, another road (typically at a junction) or performed a U turn in front of the motorcycle. In these cases, the other vehicle was considered the primary cause of the collision. The investigators were unable to determine whether the motorcycle had its dipped beam or headlights on in three cases, while in a fourth case the dipped beam lights were not switched on, however in that specific collision, the car driver performed a U turn in front of the motorcycle which was coloured bright yellow and was being followed by a white car, which the car driver also failed to see. In the remaining thirteen cases, the motorcycles had their lights switched on and in one case the motorcyclist was wearing a high visibility jacket.

Conspicuity

79.5% (n.31) of all the collisions occurred during daylight hours. In one of these cases where the collision involved another vehicle (truck), there was a problem with the visibility of the driver from the cab of the truck to see the light of the motorcycle which may have had an effect on his perception of the distance of the oncoming motorcycle. According to the investigator, the motorcycle was being ridden on dipped beam illumination at the time of the collision, however the illuminated dipped beam headlight on a similar motorcycle tested at the scene, did not significantly alter the visibility of the motorcycle in daylight when viewed from the inside of the truck at the end of the minor road. The illuminated headlight is much more apparent when viewed from a lower angle and when more closely aligned with the direction of travel of the motorcycle.

Braking, Deceleration and Perception/Reaction time

The deceleration rate of the motorcycle is dependent on a number of factors, one of which is the braking technique employed by the motorcyclist i.e. the severity of braking applied and the ratio of front/rear brake distribution. Unlike a car, the front and rear brakes of the motorcycle in question are separate systems and the rider can vary the ratio of braking applied to each wheel. Under severe braking, the minimum deceleration is

achieved with rear wheel only braking and a value of approximately 0.4g (3.92 m/s^2)[2] can be considered. A deceleration of 1g (9.81 m/s^2) can be considered representative of strong braking by a skilled motorcyclist on, for example, a 1000cc engine Super Sports motorcycle using both front and rear brakes[3]. Following examination of the motorcycle, considering the nature of the tyre mark and considering the friction surface dressing on the road surface, the investigators are thus able to determine a range of possible deceleration rates.

Before the motorcyclist applies braking and begins to leave a tyre mark, there is a time period during which the rider perceives there to be a hazard ahead and then, typically reacts to that perceived hazard. The length of this perception/reaction time depends on a number of factors and cannot be known. However, a probable range of perception/reaction times of 0.75 to 1.5 seconds can be assumed.[4] These calculations for braking, deceleration and perception/reactions time are considered by the investigators when preparing the reports of the scientific examination of the material relating to the collision scenes.

DISCUSSION

The n.39 case studies analysed in this report are a representative sample of motorcycle fatalities in Northern Ireland between 2004 and 2010. Of the six investigators in Forensic Science Northern Ireland who attend all road fatalities, the cases in this report represent the sum of motorcycle collisions attended by two investigators as well as two sample cases from a third investigator.

Overall 12.2% (n.5) of the vehicles presented defects and of these, 7.3% (n.3) motorcycles had under-inflated tyres, one of the motorcycles had the steering damper missing, while the C and D pillars of one of the other vehicles involved may have restricted the view of the driver.

Information from the case studies indicates that the conditions for riding were generally optimal and during daylight. Eighteen (46.2%) of the collisions occurred mainly between the afternoon and early evening; 90% of the collisions occurred in Summer and Spring and the weather was fine in 72% of cases. 71.8% of the collisions occurred in rural areas with 15.4% in urban settings. The road conditions were good in all cases and in 74.3% of cases the surface was dry.

Before the motorcyclist applies braking and begins to leave a tyre mark, there is a time period during which the rider perceives there to be a hazard ahead and then, typically reacts to that perceived hazard. The length of this perception/reaction time depends on a number of factors and cannot be known. However, a probable range of perception/reaction times of 0.75 to 1.5 seconds can be assumed.

In 63.4% of cased, the motorcyclists applied their brakes prior to the collision and n.18 (43.9%) applied their brakes severely. Of the n.17 (41.4%) motorcycles that slid after falling, n.10 (24.4%) fell onto their right side and the remaining n.7 (17.1%) fell onto their left side. However, there only appears to be two instances whereby anti-lock brakes may have benefitted the rider by keeping the motorcycle upright, in this case the collision occurred on a straight section of road.

For the purpose of conspicuity, 79.5% (n.31) of all the collisions occurred during daylight hours.
In one of these cases where the collision involved another vehicle (truck), there was a problem with the visibility of the driver from the cab of the truck to see the illuminated dipped beam light of the motorcycle which may have an effect on the perception of the distance of the oncoming motorcycle for truck drivers in general.

Out of the n.39 cases, there were seventeen (43.6%) in which another vehicle was considered the primary cause of the collision, in three cases, the investigators were unable to determine whether the lights of the motorcycles were on, in one case the lights were switched off. In the thirteen remaining cases the motorcycles all had their lights on, but in nine cases the other vehicle driver either pulled out in front of the motorcycles and in four cases, performed a U turn across the path of the motorcycle.
In twenty eight cases, (72%), information is recorded about helmets, in n.6 cases, the helmet was not secured.

[2] Interpretation of Motorcycle Rear-wheel Skidmarks, W. Bartlett Proceedings, Fourth International Conference on Accident Investigation, Reconstruction, Interpretation and the Law; Vancouver BC, Canada, August 2001. (g = gravity; m/s = miles per second).
[3] Motorcycle Handling and Chassis Design, Tony Foale, April 2002, Tony Foale Designs, ISBN 84-933286-1-8
[4] Forensic Aspects of Driver Perception and Response, Paul L. Olsen, Lawyers and Judges Publishing Company Inc. 1996. ISBN 0-913875-22-8

There were four known cases (10.3%) of speeding, but in all cases, the actions of the other vehicle driver precipitated the collision. Equally there were four cases (10.3%) in which the rider had levels of alcohol over the legal limit and or drugs in their blood. (In Northern Ireland the maximum legal alcohol limit for driving is 80 mg per 100 mls). Three of these collisions were single vehicle (no other vehicle involved) and the fourth ran a red light through an intersection with no headlights on and impacted a car crossing the intersection.

There were n.9 cases (23%) in which the motorcyclists involved in a collision were either riding in a group or with another motorcyclist. There were three cases in which the second rider (who was following a lead rider) was involved in a collision with another vehicle and/or road infrastructure. In all these cases the total number of motorcyclists killed was n.11/n.41 (26.8%).

CONCLUSIONS

Panic braking by motorcyclists was an important factor in the cause of the fatalities. Anti-lock braking systems (ABS) may help in some circumstances, but not all. At this point in time, the application of ABS is limited to straight sections of the road. It is not (yet) designed to work when the motorcycle is in a lean. The development of braking systems that can function as efficiently when the motorcycle is leaning either left or right, may improve casualty rates. However, care should be taken about too much focus on technology rather than good training and attitude. The only reliable way to prevent motorcyclist injuries and deaths seems to be the prevention of the collision in the first place, which means the rider needs to get his/her eyes up and scanning ahead, and then taking evasive action when a potential collision is still several seconds from happening.

ACRONYMS

AT: Advanced Training
CBS: Combined braking system
CBT: Compulsory Basic Training
DOE: Department of the Environment Northern Ireland
DRD: Department of Regional Development (Roads Service)
DVA: Driver and Vehicle Agency Northern Ireland
FSNI: Forensic Science Northern Ireland
MC: Motorcycle
OV: Other Vehicle
PSNI: Police Service Northern Ireland
SCRIM: Sideways Force Coefficient Routine Investigation Machine
VRU: Vulnerable Road Users

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