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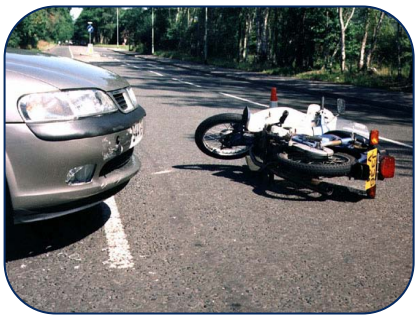


PUBLISHED PROJECT REPORT PPR621 Technical Annex

Technical Annex to PPR621: Analysis of Police collision files for motorcyclist fatalities in London, 2006-09

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Disclaimer

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Contents

Executive summary (reproduced from PPR621)		i
Appendix A	Haddon's Matrix for motorcyclist fatalities	1
Appendix B	Database coding guidelines	4
Appendix C	List of available countermeasures and descriptions	14
Appendix D	Detailed analysis of conflict types	31
Appendix E	Frequency of all variables collected	35
Appendix F	Motorcyclist clothing and PPE	70
Appendix G	Further collision details for fatalities with helmets displaced in collision	75

Executive summary (reproduced from PPR621)

Transport for London (TfL) is committed to improving road safety in London by reducing the number of road traffic casualties in London. Despite a fall in the number of casualties from road traffic collisions in recent years, there is still an unacceptable number of casualties each year. In 2011, 159 people were killed and a further 2,646 people were seriously injured on London's roads. Of these, 30 fatalities and 569 seriously injured casualties were motorcyclists, accounting for 21% of the killed and seriously injured (KSI) casualties in London.

This study analysed 93 police fatal files where a motorcyclist was killed in London in the period 2006-2009 with the overall aim of providing a better understanding of how fatal motorcycle collisions in London occur and how they could be prevented in the future.

The fatal files were coded using a Haddon's Matrix approach, which included items related to the environment, the motorcycle, the motorcyclist, other vehicle(s) and their driver(s)/rider(s) in the pre-event, event and post-event stages of the collision. The collisions were analysed in terms of who was involved, the contributory factors, injuries sustained and possible countermeasures.

The project identified the factors or primary interventions, which if they had been in place, may have prevented the collision occurring (primary prevention). Further, the study identified the secondary interventions, which if they had been in place, may have reduced the type and/or severity of the injuries; this was based on an assessment of their causes.

In total 94 fatalities from 93 motorcyclist collisions were coded. Several groups of fatalities were identified as accounting for a substantial proportion of fatalities. Each group shared a common characteristic or feature of the collision and therefore some fatalities are present in more than one group. The groups with the largest numbers of fatalities were:

- Motorcyclist exceeding speed limit (45, 48%)
- Motorcyclist loss of control (42, 45%);
- Only a motorcycle involved collisions (30, 32%);
- Another vehicle turning across motorcycle path (21, 22%);

Other groups of interest included motorcyclists who were:

- undertaking 'stunts' prior to the collision (5, 5%);
- unlicensed motorcyclists and motorcyclists whose motorcycles were defective (12, 13% in each group);
- impaired by alcohol or drugs at the time for the collision (15, 16%); and
- had previous convictions (17, 18%) and inexperienced motorcyclists (18, 19%).

The key characteristics from the analysis following the Haddon's Matrix are listed below by the three phases: pre-event, event (the actual collision) and post event;

For the pre-event:

- The majority of motorcyclist fatalities were male;
- All but three riders were wearing a motorcycle helmet;
- Where known, the majority of riders were familiar with their route;
- Where known, the majority of motorcycle journeys were leisure journeys;
- 77 (82%) of the riders killed were from London;
- 62 (66%) occurred on a major (M or A) road;
- 55 (59%) were at a junction;
- Half were aged 30 and under;
- 45 (48%) of the motorcycles had 'exceeding the speed limit' recorded as a contributory factor in the stats19 record;
- Where the speeds of motorcyclists were estimated by Police Officers at the collision scene 64% of motorcycles were travelling at speeds above the speed limit (45 above the limit, 25 below the limit and 24 where no speed was estimated);
- The most commonly involved other vehicles were cars (44, 47%) and HGVs (12, 13%);
- 30 (32%) collisions involved no other vehicle;
- The most common bike type was sports bikes over 500cc;
- 18 (19%) of the riders had less than one year of riding experience;
- 17 (34%) of the riders had previous convictions (of 50 where this was known);
- 15 (16%) of the riders were impaired by alcohol or drugs; and
- 11 (12%) motorcycles had at least one vehicle defect prior to the collision, most notably defective tyres;

For the event:

- The most common conflict types were those involving loss of control (42, 45%) or another vehicle turning across the motorcycle's path (21, 22%);
- The most common trajectory for the motorcycle was to roll or skid from the point of impact to a point of rest or second impact;

Contributory factors:

- In two-vehicle collisions (57, 61%), the motorcyclist alone was attributed contributory factors in 20 (21%) collisions, the other driver/rider alone in 9 (10%) collisions, and both parties in 28 (30%) collisions;
- In two-vehicle collisions, the most common contributory factor assigned to the motorcyclist was 'exceeding speed limit' (29, 31%); and
- In single vehicle collisions (30, 32%), the most common contributory factors were 'loss of control' (21, 22%) and 'exceeding speed limit' (18, 19%).

For the post event:

- The majority (80, 85%) of motorcyclists died on the same day as the collision;
- The most common body regions with life-threatening injuries were the thorax (78%) or the head (63%);
- Although there were cases with life-threatening injuries to limbs, in all cases other life-threatening injuries were also present;
- There were 17 (18%) fatalities whose helmets were displaced by the collision;
- 17 (18%) drivers of other vehicles in the collision were convicted for an offence following the collision, most commonly 'careless driving'; and
- 13 (14%) fatalities had injury levels that were classed as 'untreatable'.

Using this information the most common countermeasures recorded were primary countermeasures. The most commonly occurring countermeasures that could have prevented the fatal collision occurring were educational and enforcement (see table below). Examples of these countermeasures include:-

- Speed warning systems
- Speed enforcement to increase speed limit compliance
- Additional motorcyclist training to improve riding skill
- Improved braking systems for motorcycles
- Additional training to improve drivers' awareness of motorcycles.

Table 1: Number of fatalities in collisions with each proposed countermeasure type

Countermeasure type		Number	% of fatalities
Primary	Engineering - environment	9	10%
	Engineering - vehicle	46	49%
	Education - motorcyclist	63	67%
	Education - drivers	18	19%
	Enforcement	48	51%
Secondary	Engineering - environment	1	1%
	Engineering - vehicle	11	12%
	Education - motorcyclist	9	10%
	Enforcement	9	10%

Appendix A Haddon's Matrix for motorcyclist fatalities

The structure of the Haddon's matrix which guided the content analysis of the police fatal files is shown below. It was developed by the project team drawing on their previous experience of what is available in the files and what is poorly collected. The matrix was used as the basis for the coding structure of the database.

Haddon's Matrix for motorcyclist fatalities					
	Motorcycle involved		Other vehicle/s involved		Environment
	Motorcycle	Rider/passenger	Vehicle	Driver	
Pre event	*Vehicle characteristics:* • make/model • engine size • registration year • vehicle condition • insurance/tax status, *Situation:* • pre event speed, • manoeuvres • appropriate signalling,	*Personal characteristics:* • age/date of birth, • gender, • ethnicity, • postcode, • UK resident, • impairment (alcohol, drugs, fatigue, illness) • level of motorcycle training, • riding experience • type of licence held, • conviction history • special personal circumstances *Situation:* • journey purpose, • journey start point, • knowledge of route/location, • distractions (mobile phone/headphone/external) • compliance with law/ highway code, • riding in a group *Equipment etc:* • helmet worn, protective clothing,	*Vehicle characteristics:* • vehicle type, • vehicle make/model, • registration year, • insurance/tax status, • for Buses/HGV details of mirrors fitted, protective guards • vehicle condition *Situation:* • travelling speed, • manoeuvre, • appropriate signalling,	*Personal characteristics:* • age, • gender, • ethnicity, • postcode, • UK resident, • impairment (alcohol, drugs, illness), • driving licence • conviction history, • special personal circumstances *Situation:* • journey purpose • journey start point • type of route • knowledge of route/location, • distractions (mobile phone, passengers, external), • number of passengers, • compliance law/highway code	*Situation:* • date/time, • day of week, • light conditions, • weather, • speed limit, • Borough, • road class, • road type (e.g. one way, single lane etc.) • traffic conditions - congested *Road layout:* • junction detail, • traffic controls, • bus lane

Haddon's Matrix for motorcyclist fatalities					
	Motorcycle involved		**Other vehicle/s involved**		**Environment**
	Motorcycle	**Rider/passenger**	**Vehicle**	**Driver**	
		• wearing dark clothing at night, • no headlights at night • vision restricted by visor, helmet etc • carrying load/passengers.			
Event	Situation: • impact speed, • manoeuvres - evasion, • first vehicle hit • interaction with other vehicle	Situation: • vision/sight lines were restricted by buildings, parked vehicles etc., • Impairment, • distractions (internal/external to vehicle), • impact with vehicle/road/object	Situation: • impact speed, • manoeuvres –evasion • first object hit	Situation: • vision/sight lines were restricted by buildings, parked vehicles etc., • Impairment, • distractions (internal/external to vehicle),	*Situation:* • road surface(dry, wet etc), • high friction surface • site maintenance (e.g. potholes, ironwork, including contamination),
	Detailed description of the event (the 'story')				
Post Event	*Outcome:* • was vehicle drivable	*Outcome:* • type and extent of injuries incurred, • cause of death • date of death	*Outcome:* • was vehicle drivable	*Outcome:* • convictions in relation to this collision, • legal advice, • Counselling.	*Outcome:* • Was the road closed following the accident

Appendix B Database coding guidelines

B.1 Introduction

This document is intended for use to assist with coding police fatal files for the Pedestrian and PTW user fatality project.

The majority of responses are in one of three formats:

1. **Drop down lists**

   Select the relevant answer; if regularly using the 'other' option discuss making changes to the drop down list. If 'other' is selected specify in the notes what the 'other' is. Do not leave these entries blank: select unknown or none from the drop down menus. If unknown is not an option on the drop down list, leave field blank and raise issue.

2. **Tick boxes**

   Tick = yes, blank = no, shaded = unknown / not applicable.

3. **Free text**

   Complete as appropriate, keep text as similar between records, and as concise, as possible. Where the information is unavailable enter "unknown" in a text field or "-9" in a numerical field.

The accident reference number is a unique reference that identifies each accident in the database and comprises the police force reference (01 for all of these files), the last two digits from the year and the 7 digit reference from the police (on the front of the file in pencil), for example, 0107TE00017. The database can be linked to the Stats19 report of the collision using this reference.

B.2 Guidance for each table / form / variable in database

B.2.1 Environment

The "Environment" form summarises the key circumstance of the accident. Several fields should be prefilled from the Stats19 records, although these will need to be checked, and additional information added.

Variable	Comments
ID	This is an automatically generated number field. This field does not need checking or changing.
Coded by	
STATS19 accident reference number	This is assigned to an accident by the police and consists of 11 digits. Where the STATS19 data has been prefilled this field will already be completed and accident records should be found by filtering on this field.
Accident date	Entered in the format dd/mm/yyyy. All dates in the pedestrian database are prefilled from Stats19 as 1st of the month change to the correct date.
Accident time	Enter in the format hh:mm using the 24 hour clock.
Light conditions	
Weather	This should have been prefilled with Stats19 data, however, the Stats19 list

	is different to the fatal files list so some records will need adjusting.
Speed limit	The speed limit of the road at the time of the accident, i.e. the maximum speed that any vehicle can travel. If a temporary speed limit is in operation then record this rather than the permanent speed limit on the road.
Borough	Filled in from Stats19
Road Class	Filled in from Stats19
Road Type	Filled in from Stats19
Traffic conditions	Light, Moderate, Heavy but free flowing, Heavy stop/start, Unknown
Bus lane	Was there a bus lane present at the scene of the accident that could have influenced the behaviour of the vehicles involved? If a bus lane is present but on the opposite side of the road to all vehicles involved in the accident this is unlikely to have contributed and hence tick box should be left blank.
Proximity to bus stop (pedestrian database only)	Rough distance to bus stop
Traffic control	Look at photographs and description if none seen or described mark as 'no', if seen or observed tick yes, else leave as unknown
Junction detail	filled in from Stats19
Road surface condition	filled in from Stats19
Site maintenance	Select none if none stated, only use unknown if accident circumstances are very unclear.
High friction surfacing	If described then yes. If not mentioned, then put unknown. Do not rely on photos.
Conflicts	Write code for conflict, see B.7
Story/Summary Text	This should concentrate on answering three main questions: what was the pedestrian/PTW doing before the crash? How did the pedestrian/PTW interact and what happened next. The story must be anonymous.
Road closed following acc?	If file says that road was closed then yes, if not mentioned then unknown
Pedestrian crossing type (pedestrian database only)	
Guard rails (Pedestrian database only)	look at photographs and description if none seen or described mark as 'no' else leave as unknown
Distance to crossing (Pedestrian database only)	
Pedestrian flow conditions (pedestrian database only)	Light: Pedestrians can move freely Moderate: Pedestrians occasionally interrupt each other's movement on the footway Heavy: Pedestrians often interrupt each other's movement on the footway
Roadworks or construction site present	
Shared space / pedestrianised	Shared space: A street shared by all modes of traffic that has no clearly defined boundaries of segregation Pedestrianised: A street which generally has no vehicular access

B.2.2 PTW user data

Variable	Comments
Environment ID	Automatically completed from Environment form
PTW user ID	A number that is unique within each accident in order to identify a selected PTW user fatality. Usually there will only be one PTW user fatality per accident so the PTW user ID will be 1.
1st vehicle hit by	The vehicle ID of the first vehicle to make contact with the PTW user.
PTW RegPlateYear	http://www.motorcycle.co.uk/reference-material/uk-registration-letters.aspx
PTW make	
PTW model	
Engine size	in CC if unknown, write 'unknown'
Insurance	Tick if valid insurance mentioned, blank if definitely not, else unknown
Tax	Tick if valid tax mentioned, blank if definitely not, else unknown
Pre event vehicle condition	Was there any damage to the vehicle before the collision which may have contributed to the collision taking place?
Fatality age	Age in years
Gender	
Driver or passenger	
Ethnicity	
Postcode	Home postcode of the pedestrian.
Nationality	Was the PTW user from the local area, from a nearby area or a visitor from another county or country? Refer to map of boroughs B.6
Level of motorcycle training	select training if mentioned, only select none if this is stated, else unknown if none mentioned
Journey purpose	
Journey start point	postcode or address
Knowledge of route/location	
Distractions	
Carrying load	
Type of license held	Code car licence held as provisional PTW licence.
Experience	free text
Impairment	Assume none if not mentioned, or unknown if details are unclear. Select 'wearing dark clothing at night' only if directly contributory to the accident. possibly change to check boxes
Carrying passenger	
High visibility clothing	If not mentioned, then no, only use unknown if conflicting reports.
Headlight on	
Helmet worn	
Helmet displaced by acc	

Jacket	Select yes if specific motorcycle clothing, no if 'normal clothing, unknown if not mentioned or conflicting reports
Trousers	
Gloves	
Kneepads	
Elbow pads	
Boots	
Vision restriction	Assume none if not specifically stated that item restricted vision. If item mentioned but unclear whether it contributed to accident, select unknown.
Manoeuvre	
Filtering	Select if manoeuvre was driving between two lanes of traffic in the same direction
Appropriate signalling	Select yes if the PTW was signalling appropriately for the manoeuvre, no if it was incorrect, unknown if not stated.
Compliance with law	
If no state non compliance with law	
Compliance with highway code	
If no state non compliance with HC	
Line of vision affected by	
Evasion attempted	Did the motorcyclist attempt to avoid the accident?
Min travelling speed	from police reports, not witness statements
Max travelling speed	
Min impact speed	
Max impact speed	
Impact with objects	
1st point impact with other vehicle	12 = front, 3 = left, 6 = rear, 9 = back etc
PTW user trajectory	
Final distance between PTW user and bike	
Cause of death: Injury to	
Date of death	
Was PTW useable after acc?	
Conviction history	
Special personal circumstances	

B.2.3 Other vehicle

Variable	Comments
Environment ID	Automatically completed from Environment form
Vehicle ID	The ID given to the other vehicle in the accident (must be completed)

Reg plate year	http://www.motorcycle.co.uk/reference-material/uk-registration-letters.aspx
Veh make	
Veh model	
Insurance	Tick if valid insurance mentioned, blank if definitely not, else unknown
Tax	Tick if valid tax mentioned, blank if definitely not, else unknown
Pre event vehicle condition	Was there any damage to the vehicle before the collision which may have contributed to the collision taking place? write 'unknown' if not stated
Engine type	
Engine position	
Offside main mirror	HGV and buses only
Nearside main mirror	
Offside wide angle mirror	
Nearside wide angle mirror	
Close proximity mirror	
Front mirror	
Off-side protective guard	
Near-side protective guard	
Driver age	
Driver gender	
Driver ethnicity	
Driver postcode	
Driver nationality	
Driving licence appropriate?	
Journey purpose	
Journey start point	enter a postcode or address
Knowledge of route/location	
Driver distraction	Assume none if not mentioned, or unknown if details are unclear. Select only if directly contributory to the accident possibly change to check boxes
Driver impairment	Assume none if not mentioned, or unknown if details are unclear. Select only if directly contributory to the accident possibly change to check boxes
Vision restriction	
Number of occupants/passengers	not including the driver
Manoeuvre	
Appropriate signalling	
Compliance with law	
If no state non compliance with law	
Compliance with highway code	

If no state non compliance with HC	
Line of vision affected by	
Evasion attempted Long	
Min travelling speed	Take information from police officer's report and not from the witness statements.
Max travelling speed	
Min impact speed	
Min impact speed	
1st point of impact with PTW	12 = front, 3 = left, 6 = rear, 9 = back etc
1st object hit	
Was vehicle driveable after acc?	
Conviction history	
Drink driving	Convictions as a result of this collision. So for example if the driver was convicted of driving without due care and attention, this should be recorded as Careless driving.
Speeding	
Careless driving	
Dangerous driving	
Construction & use	
Other motoring offences	
Special personal circumstances	
Legal advice	
Counselling	

B.3 Countermeasures/interventions

Variable	Comments
Environment ID	Automatically completed from Environment form
Countermeasure	See lists http://hermes/hermes/llisapi.dll/open/16932478 (motorcycles) and http://hermes/hermes/llisapi.dll/open/16932338 pedestrians
Vehicle reference	what vehicle would measure affect
Probability	
Fatality reference	what fatality would measure affect
Comments	

B.4 Notes

Use to record important elements which are not recorded elsewhere.

Variable	Comments
Environment ID	Automatically completed from Environment form
Environment notes	
PTW user notes	
Other vehicle notes	
Any other details	

B.5 Contributory factors

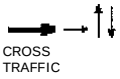
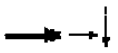
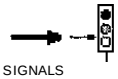
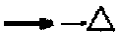
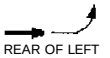
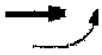
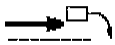
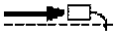
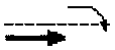
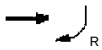
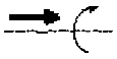
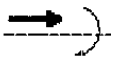
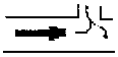
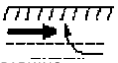
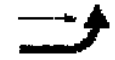
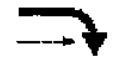
Select up to six factors from the grid below that contributed to the accident. Relate each factor to the relevant road user (e.g. Ped1, PTW1, V1). The same factor can be assigned to more than one road user.

Variable	Comments
Environment ID	Automatically completed from Environment form
Factor Number	
Factor Code	Select up to 6 factors. Only for pedestrians use the pedestrian only factors (or 999). See below and Stats20 for definitions Use the investigating officer's report and other parts of the file but not the Stats19 data. (http://www.dft.gov.uk/pgr/statistics/datatablespublications/accidents/casualtiesgbar/s20instructionsforthecom5094.pdf)
Vehicle reference	reference of the vehicle or casualty for the factor
Likelihood	A (very likely) or B (possible)
Comments	

B.6 Boroughs and Inner/Outer London

B.7 Conflict options

	TYPE	1	2	3	4	5	6	7	8
A	OVERTAKING AND LANE CHANGE	PULLING OUT OR CHANGING LANE TO RIGHT	HEAD ON	CUTTING IN OR CHANGING LANE TO LEFT	LOST CONTROL (OVERTAKING VEHICLE)	SIDE ROAD	LOST CONTROL (OVERTAKEN VEHICLE)	WEAVING IN HEAVY TRAFFIC	OTHER
B	HEAD ON	ON STRAIGHT	CUTTING CORNER	SWINGING WIDE	BOTH OR UNKNOWN	LOST CONTROL ON STRAIGHT	LOST CONTROL OF CURVE		OTHER
C	LOST CONTROL OR OFF ROAD (STRAIGHT ROADS)	OUT OF CONTROL ON ROADWAY	OFF ROADWAY TO LEFT	OFF ROADWAY TO RIGHT					OTHER
D	CORNERING	OST CONTROL TURNING RIGHT	LOST CONTROL TURNING LEFT	MISSED INTERSECTION OR END OF ROAD					OTHER
E	COLLISION WITH OBSTRUCTION	PARKED VEHICLE	ACCIDENT OR BROKEN DOWN	NON-VEHICULAR OBSTRUCTIONS (INCLUDING ANIMALS)	WORKMANS VEHICLE	OPENING DOOR			OTHER

F	REAR END	 SLOW VEHICLE	 CROSS TRAFFIC	 PEDESTRIAN	QUEUE	 SIGNALS	 OTHER		OTHER
G	TURNING VERSUS SAME DIRECTION	 REAR OF LEFT TURNING VEHICLE	 LEFT SIDE SIDE SWIPE	 STOPPED OR TURNING FROM LEFT SIDE	 NEAR CENTRE LANE	 OVERTAKING VEHICLE	 TWO TURNING		OTHER
H	CROSSING (NO TURNS)	 RIGHT ANGLE (70 TO 110 DEGREES)							OTHER
J	CROSSING (VEHICLE TURNING)	 IGHT TURN RIGHT SIDE R	 LEFT TURN LEFT SIDE	 TWO TURNING					OTHER
K	MERGING	 LEFT TURN IN	 RIGHT TURN IN	 TWO TURNING					OTHER
L	RIGHT TURN AGAINST	 STOPPED WAITING TO TURN	 MAKING TURN						OTHER
M	MANOEUVRING	PARKING OR LEAVING	 "U" TURN	 "U" TURN	 DRIVEWAY MANOEUVRE	 PARKING OPPOSITE	 ANGLE PARKING	 REVERSING DOWN ROAD	OTHER
N	PEDESTRIANS CROSSING ROAD	 LEFT SIDE	 RIGHT SIDE	 LEFT TURN LEFT SIDE	 RIGHT TURN RIGHT SIDE	 LEFT TURN RIGHT SIDE	 RIGHT TURN LEFT SIDE	 MANOEUVRING VEHICLE	OTHER
P	PEDESTRIANS OTHER	 WALKING WITH TRAFFIC	 WALKING FACING TRAFFIC	 WALKING ON FOOTPATH	 CHILD PLAYING (TRICYCLE)	 ATTENDING TO VEHICLE	ENTERING OR LEAVING VEHICLE		OTHER
Q	MISCELLANEOUS	FELL WHILE BOARDING/ALIGHTING	FELL FROM MOVING VEHICLE	TRAIN	PARKED VEHICLE RAN AWAY	EQUESTRIAN	FELL INSIDE VEHICLE	TRAILER OR LOAD	OTHER

B.8 Contributory factor codes

Further definitions are given in Stats20, DfT, 2004

MG NSRF/D

CONTRIBUTORY FACTORS

Sept. 2004

1. Select up to six factors from the grid, relevant to the accident.
2. Factors may be shown in any order, but an indication must be given of whether each factor is **very likely (A)** or **possible (B)**.
3. Only include factors that you consider contributed to the accident. (i.e. do NOT include "Poor road surface" unless relevant).
4. More than one factor may, if appropriate, be related to the same road user.
5. The same factor may be related to more than one road user.
6. The participant should be identified by the relevant vehicle or casualty ref no. (e.g. 001, 002 etc.), preceded by "V" if the factor applies to a vehicle, driver/rider or the road environment (e.g. V002), or "C" if the factor relates to a pedestrian or passenger casualty (e.g. C001).
7. Enter U000 if the factor relates to an uninjured pedestrian.

Road Environment Contributed	101 Poor or defective road surface	102 Deposit on road (e.g. oil, mud, chippings)	103 Slippery road (due to weather)	104 Inadequate or masked signs or road markings	105 Defective traffic signals	106 Traffic calming (e.g. speed cushions, road humps, chicanes)	107 Temporary road layout (e.g. contraflow)	108 Road layout (e.g. bend, hill, narrow carriageway)	109 Animal or object in carriageway	
Vehicle Defects	201 Tyres illegal, defective or under-inflated	202 Defective lights or indicators	203 Defective brakes	204 Defective steering or suspension	205 Defective or missing mirrors	206 Overloaded or poorly loaded vehicle or trailer				
Driver/Rider Only (Includes Pedal Cycles and Horse Riders) – Injudicious Action	301 Disobeyed automatic traffic signal	302 Disobeyed 'Give Way' or 'Stop' sign or markings	303 Disobeyed double white lines	304 Disobeyed pedestrian crossing facility	305 Illegal turn or direction of travel	306 Exceeding speed limit	307 Travelling too fast for conditions	308 Following too close	309 Vehicle travelling along pavement	310 Cyclist entering road from pavement
Driver/Rider Only – Driver/Rider Error or Reaction	401 Junction overshoot	402 Junction restart (moving off at junction)	403 Poor turn or manoeuvre	404 Failed to signal or misleading signal	405 Failed to look properly	406 Failed to judge other person's path or speed	407 Passing too close to cyclist, horse rider or pedestrian	408 Sudden braking	409 Swerved	410 Loss of control
Driver/Rider Only – Impairment or Distraction	501 Impaired by alcohol	502 Impaired by drugs (illicit or medicinal)	503 Fatigue	504 Uncorrected, defective eyesight	505 Illness or disability, mental or physical	506 Not displaying lights at night or in poor visibility	507 Cyclist wearing dark clothing at night	508 Driver using mobile phone	509 Distraction in vehicle	510 Distraction outside vehicle
Driver/Rider Only – Behaviour or Inexperience	601 Aggressive driving	602 Careless, reckless or in a hurry	603 Nervous, uncertain or panic	604 Driving too slow for conditions or slow vehicle (e.g. tractor)	605 Learner or inexperienced driver/rider	606 Inexperience of driving on the left	607 Unfamiliar with model of vehicle			
Driver/Rider Only – Vision Affected by	701 Stationary or parked vehicle(s)	702 Vegetation	703 Road layout (e.g. bend, winding road, hill crest)	704 Buildings, road signs, street furniture	705 Dazzling headlights	706 Dazzling sun	707 Rain, sleet, snow or fog	708 Spray from other vehicles	709 Visor or windscreen dirty or scratched	710 Vehicle blind spot
Pedestrian Only (Casualty or Uninjured)	801 Crossing road masked by stationary or parked vehicle	802 Failed to look properly	803 Failed to judge vehicle's path or speed	804 Wrong use of pedestrian crossing facility	805 Dangerous action in carriageway (e.g. playing)	806 Impaired by alcohol	807 Impaired by drugs (illicit or medicinal)	808 Careless, reckless or in a hurry	809 Pedestrian wearing dark clothing at night	810 Disability or illness, mental or physical
Special Codes	901 Stolen vehicle	902 Vehicle in course of crime	903 Emergency vehicle on a call	904 Vehicle door opened or closed negligently						*999 Other – Please specify below

	1st	2nd	3rd	4th	5th	6th
Factor in the accident						
Which participant? (e.g. V001, C001, U000)						
Very likely (A) or Possible (B)						

* If 999 Other, give brief details .....

(Note: Only use if another factor contributed to the accident **and include it in the text description of how the accident occurred**)

These factors reflect the reporting officer's opinion at the time of reporting and may not be the result of extensive investigation

UNCLASSIFIED

Appendix C List of available countermeasures and descriptions

This appendix provides a comprehensive list of interventions to improve motorcyclist safety in London, including those considered by the researchers to be appropriate for the cases investigated. The list has been compiled based on published work, readily available grey literature and inputs from TRL and Transport for London motorcycling experts.

The interventions are grouped into the following types based on the Haddon's matrix:

- Primary safety interventions - those that may prevent the crash from occurring in the pre-crash phase;
- Secondary safety interventions - those that may reduce the severity of the injuries in the crash phase.

Within these groups the interventions have been further divided into three groups (the 3 E's):

- Engineering (environment and vehicles),
- Education (including training and publicity),
- Enforcement.

Some interventions include activity in more than one of the three E's. The three E's are commonly understood areas of activity within road safety. The funding, resources, skills and people charged with delivering each of these types of activity are often distinct. Sometimes, the interventions themselves are not so distinctly categorised. In such cases, the intervention has been assigned to one category (Engineering, Education or Enforcement), but the relevance to other categories has been noted. Working across these boundaries is strongly encouraged and can be expected to lead to improved delivery. For example, publicity advising of changes to enforcement practices is expected to lead to greater compliance, and therefore improved safety, than would be achieved with enforcement alone.

	Primary (crash prevention)	Secondary (Injury prevention)
Engineering - environment	1.1.1 Proposed changes to junction layout 1.1.2 Improve the condition of the road surface. 1.1.3 Avoid the use of bitumen for road repairs. 1.1.4 Introduce warning signs of poor/changes in road surface. 1.1.5 Ensure road markings are skid-resistant and of a maximum height.	2.1.1 Removal or re-engineering of crash barriers 2.1.2 Motorcycle friendly furniture
Engineering - vehicle	1.2.1 Improve visibility of motorbike (e.g. high-vis/fluorescent colours, bright headlamps, striplights). 1.2.2 Speed Alert – Advice or warning systems 1.2.3 Improved braking systems (e.g. ABS, enhanced braking) 1.2.4 Improve other vehicle driver's view of the road (including obscuration due to width of A-pillar 1.2.5 External mirror placement to ensure driver's vision is not obscured 1.2.6 ITS (such as radar)	2.2.1 Alternative design of motorcycle (e.g. roll-over bars, roofs) 2.2.2 Dynamic suspension to reduce 'front end dive' of the motorcycle under heavy braking conditions 2.2.3 Introduce airbags and leg protectors for motorcycles
Education – motorcyclist	1.3.1 Advanced motorcyclist training 1.3.2 Improved motorcyclist conspicuity (high-vis/fluorescent clothing). 1.3.3 Eliminate riding whilst impaired by fatigue 1.3.4 Eliminate riding whilst impaired 1.3.5 Improve Roadworthiness of motorcycle 1.3.6 Anti-tampering 1.3.7 Work related road safety training 1.3.8 Greater motorcyclist awareness of other vehicles 1.3.9 Changing driving/riding behaviour that affect motorcyclists safety	2.3.1 Use of helmets 2.3.3 Use of protective clothing (jackets, trousers, gloves etc.) 2.3.4 Use of PPE – back protector 2.3.5 Ensuring good roadworthiness of motorcycle 2.3.6 Reducing impact speed
Education – drivers	1.4.1 Improved driver awareness of motorcyclists. 1.4.2 Driving whist impaired 1.4.3 Roadworthiness of vehicle 1.4.4 Work related road safety training 1.4.5 Elderly driver training	2.4.1 Reducing speed 2.4.2 Ensuring good roadworthiness of vehicle
Enforcement	1.5.1 Graduated driver/rider licensing 1.5.2 Speed enforcement 1.5.3 Drinking and driving/riding 1.5.4 Driving/riding without a licence/uninsured 1.5.5 Ensure compliance with all traffic law 1.5.6 Targeted enforcement	2.5.1 Helmet use 2.5.2 Speed enforcement

1 Primary interventions

These interventions are measures that may have prevented the crash from occurring.

1.1 Engineering - environment

1.1.1 Proposed changes to junction layout

This should be coded when for example

- One road user fails to see another that was hidden in a blind spot behind street furniture or vegetation and this was contributory to the cause of the collision such that moving the furniture could have prevented the accident.
- The sight distance from bend to junction was too short, contributing to the cause of the collision, which could potentially have been prevented by moving the junction or signing bend. (i.e. the contributory factor was vision affected by road layout)

This intervention could apply in situations where a motorcyclist has failed to see an approaching vehicle and turned across its path or vice versa when the driver of another vehicle has failed to see a motorcyclist and turned across its path.

This measure should only be coded when it is the design of the junction and associated street furniture that led to one road user failing to see another. In some cases, the driver may have failed to look in the correct place, perhaps due to fatigue, impairment, haste or inexperience. In other cases, vehicle structure may have caused a blind spot or in fact the other road user may have been seen and the driver/rider simply misjudged the time available for the manoeuvre. Coders must consider the evidence and the conclusions of the police and reach a judgement as to whether changing the road layout would have prevented the collision.

When making the above judgement, it should be noted that there may be some improvements possible that would not necessarily be considered in a legal context to be a contributory factor in the cause of the accident. For example, rider stress may be reduced by modifying road-environment stressors, for example by designing road systems which reduce perceived demands, particularly by riders giving attention to other vehicles rather than the road surface. This sort of factor should also be considered in the judgement.

The probability rating assigned (definitely, probably, maybe) should reflect the coder's confidence in the judgement that the failure to see was contributed to by a road/junction design feature and that removal of this contributory factor or the reduction in workload from an improved design, would have been sufficient to prevent the collision.

1.1.2 Improve the condition of the road surface.

This should be coded when:

- A road surface defect such as reduced skid resistance or excessive unevenness or potholes contributed to the collision (including the use of bitumen road surface 1.1.3 and non-skid resistant road markings 1.1.4)

Motorcycles are particularly vulnerable to the design and condition of roads, with hazards such as pot holes, drain covers, uneven surfaces and poor resurfacing after road-works posing a potential danger to motorcyclists. Motorcycles are 'single track' vehicles and therefore at risk of becoming unstable and 'capsizing' if a wheel loses adhesion to the road surface, particularly if the vehicle is taking a bend. If a front wheel loses adhesion then the bike and rider will typically fall flat onto their side and travel in a straight line (known as low-siding). If the rear wheel loses adhesion then the bike will typically rotate to become side on to the direction of travel and then "flip" over, catapulting the rider into the air (known as high-siding).

1.1.3 Avoid the use of bitumen for road repairs.

This should be used when:

- The use of bitumen road surface contributed to the collision (in particular when the road surface is wet and the presence of the bitumen is believed to have contributed to a loss of control or poor braking efficiency.
- When this countermeasure is used, 1.1.2 should also be used

Bitumen is frequently used to repair cracks in road surfaces. Surfaces repaired in this way will typically have narrow lines of black bitumen in them. Bitumen has a smooth finish, which has a much lower friction value when wet compared to asphalt (μ=0.25 and 0.8 respectively). The effect of this is illustrated by the fact that an emergency stop (from 30mile/h) on bitumen would require more than three times the distance, assuming 100% adhesion utilisation, compared to the same stop on good quality asphalt. However, it should be noted that the nature of bitumen repairs is such that it will only be present for small areas so it would not have this magnitude of effect on stopping distance if the bike only passed over a small section of it.

1.1.4 Introduce warning signs of poor/changes in road surface.

This should be used when:

- A poor road surface contributed to the accident AND there was no sign indicating the presence of this poor road surface

Note that no scientific evidence has been identified to establish the likelihood that a driver or rider would see and take notice of such a sign.

Signs warning of poor road surface or changes in road surface may better enable motorcyclists to prepare for potential instability. However, the coder will have to make a judgement as to whether the specific road user they are investigating would have been likely to respond to the sign adequately to avoid the collision, taking into account the experience of the road user and their other behaviour, for example whether they were proceeding carefully, recklessly, distracted or impaired. The probability assigned should reflect the coder's confidence in this judgement.

1.1.5 Ensure road markings are skid-resistant and of a maximum height.

This should be coded when

- The motorcycle skidding on a road marking contributed to the collision
- When this countermeasure is used, 1.1.2 should also be used

Road markings will also have lower friction coefficients than asphalt, particularly when wet and if they also retain surface water. This can also increase stopping distances or cause instability. By imposing a maximum height for profiled markings and ensuring that they are skid-resistant, the risk posed by road markings can be minimised

1.2 Engineering - vehicle *Improve visibility of motorbike (e.g. high-vis/fluorescent colours, bright headlamps, striplights).*

This should be coded when:

- An alert driver (i.e. one not fatigued, distracted or under influence or drink/drugs) who was looking in the right areas failed to see the motorcyclist and this contributed to the collision. Evidence of poor lighting or poor contrast with background makes this countermeasure more likely to be effective.

Poor conspicuity can occur at day or night because the key factor in the human ability to see an object and recognise what it is the contrast between the object and its background. So, poor conspicuity is more likely to be a contributory factor when contrast is poor, for example dark clothing on an unlit street at night, or a bright red bike in front of a bright red bus during the day.

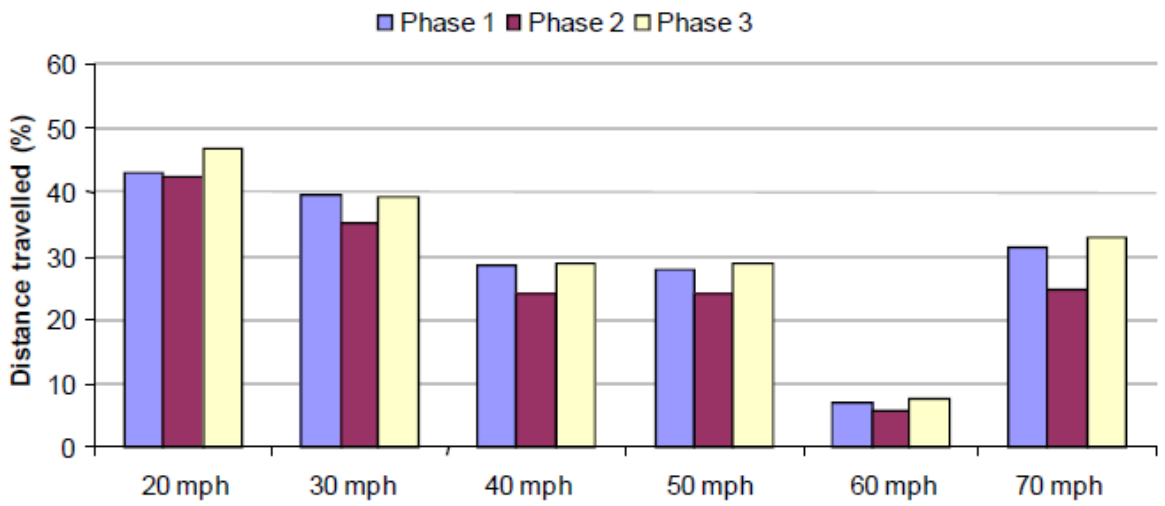
Thus, methods of improving conspicuity typically aim to improve that contrast and include the use of bright/fluorescent motorcycle colours, the use of headlamps during the day etc. Research also suggests that recognition is improved when these high contrast markings help to identify the shape of the object. For this reason, striplights and high visibility leg shields can also help.

1.2.2 *Speed Alert – Advice or warning systems*

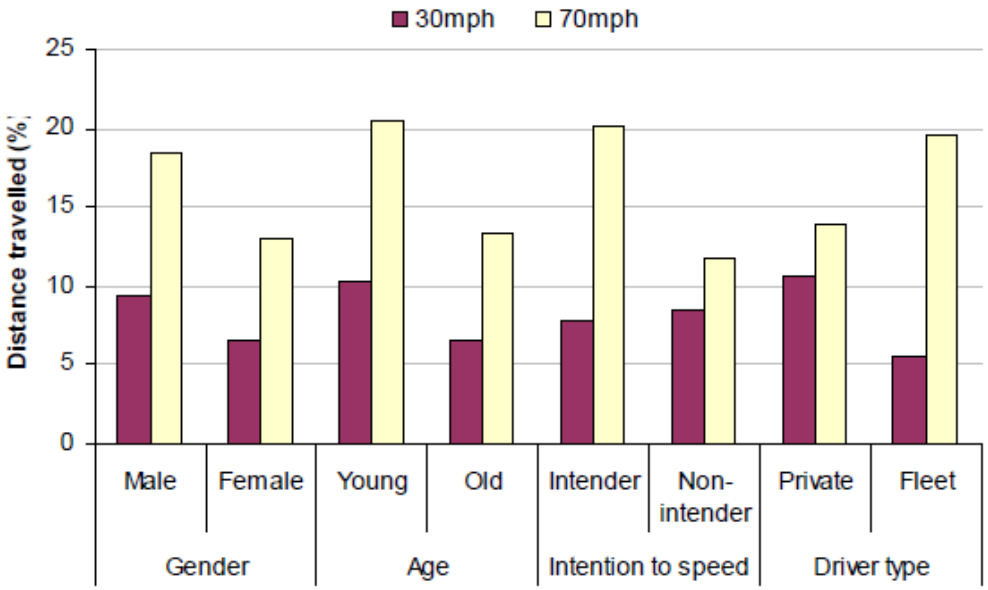
This should be used when:

- A vehicle was exceeding the posted speed limit where complying with the speed limit would have prevented or reduced the severity of the collision

Note that we cannot say definitively whether a driver or rider would have heeded a voluntary warning. However, research (Carsten, et al., 2008) studied the effects of a voluntary ISA system (similar to speed alert but if switched on it would take action such as limiting throttle when limits exceeded) on a series of private and fleet motorists where each participant drove the vehicle for 6 months, the first and last months (phases 1 and 3) with the system switched off and the 4 middle months (phase 2) with the system switched on.



The chart above shows the proportion of distance travelled where the speed was in excess of the limit in each phase on roads with different speed limits. It can be seen that the system does not eliminate speeding but it does reduce it. The effect is most noticeable on motorways where 31% of the distance was travelled in excess of the speed limit before the intervention and only around 25% with the system active. However, the effects varied by driver characteristic as shown by the graph below of the proportion of distance travelled where the system was overridden. This suggests it is more likely to be effective for older females that were not intending to speed (i.e. not deliberately reckless). It was more likely to be effective for fleet drivers than private drivers on low speed roads but less likely on high speed roads.



The above results were from car drivers. A short trial with motorcyclists was undertaken but the speeds were considered to be influenced by the novelty factor, in many cases speeding increased as the motorcyclists tried the system out.

The limitation of all of these devices are that they cannot prevent inappropriate speed, below the legal limit, but nonetheless dangerous for the environment or road conditions. For example, a motorcycle travelling at 60 mile/h on a motorway (70 limit), between queues of stationary traffic would still be excessively fast but would not be influenced by

speed alert. Currently there are no commercially available speed alert or control systems available.

1.2.3 Improved braking systems (e.g. ABS, enhanced braking)

This code should be used when:

- A vehicle braked and skidded/lost control which contributed to the collision

As noted previously, two wheel vehicles are very difficult to control if one or both wheels lock and lose directional control. On a motorcycle this is exacerbated by the fact that the rider individually controls front and rear brakes and has to judge not only the right amount of brake force to maximise deceleration but also the distribution of that braking between front and rear. This is very difficult, particularly in wet or slippery road conditions. Smith, Gibson, & McCarthy, 2009 cited research showing that most riders, particularly inexperienced ones, did not therefore achieve a deceleration level in simulated emergencies as high as was possible in the conditions. It was also found that fitting combined brake systems (that mean the bike apportions the braking between front and rear) and ABS (which prevents wheel lock) gave the riders more confidence to apply the brakes hard and thus the deceleration levels improved. Thus CBS/ABS may possibly offer benefits in collisions where the rider braked but failed to stop in time. This is more likely when there is evidence of braking (for example witnesses report brake light) but there is no evidence of wheel lock or of only one wheel locking. This should only be coded where CBS/ABS are not already fitted (most older vehicles except BMWs).

CBS will reduce the likelihood of wheel lock and ABS will prevent wheel lock. Thus these technologies will also be effective where there is evidence that the rider has braked, locked a wheel and subsequently lost control (e.g. low side, high side or leaving the carriageway). The coder will need to consider the space and time available for the motorcycle to slow before a collision and/or to steer round an obstacle while braking, if the motorcycle had of remained in control and on its wheels.

1.2.4 Improve other vehicle driver's view of the road (including obscuration due to width of A-pillar)

This should be used when:

- the drivers view of the road was obstructed by their own vehicle and this contributed to the collision

There is some evidence that in recent years, car windscreen A-pillar supports have increased in size and this can have the effect of reducing the drivers' view of the road. Other technologies or features, such as mobile phones or satellite navigation devices can be attached to windscreens and can cause blind spots. Extensive mirror clusters, particularly those fitted to trucks and buses intended to improve indirect field of view can reduce the direct field of view but are considered under a separate countermeasure below. A careful review of each case based on the kinematics and geometry of the pre-crash dynamic movement of the respective vehicles will assess whether these factors could have contributed to the accident. If it is considered that a blind spot could have contributed to the cause of the collision then eliminating the blind spot could be considered as a countermeasure. This should be considered a "technology neutral" countermeasure, that is, all that matters is whether eliminating the blind spot would have prevented the accident, not how that blind spot was eliminated (i.e. removal of

mirror, narrower A-pillar, camera system etc). Care will be required to judge and balance the interaction between the existence of an obstruction with the responsibility of the driver to look appropriately and to remain vigilant (for example, it is often possible to see vehicles obscured in an A-pillar blind spot by moving the head by only small amounts).

1.2.5 External mirror placement to ensure driver's vision is not obscured

This should be used when:

- the drivers view of the road was obstructed by their external mirrors and this contributed to the collision

In other respects this countermeasure should be considered in the same way as 1.2.4 above.

1.2.6 ITS (such as radar)

ITS, such as radar could be used to improve safety. Such systems may include automated emergency braking systems and lane departure warnings. This countermeasure should be used when:

- the motorcycle was travelling too close to a vehicle

1.3 Education and training - motorcyclist

1.3.1 Advanced motorcyclist training and skill refinement

This should be used when:

- The motorcyclist's performed an unsafe manoeuvre or was driving too fast for conditions or sudden braking, swerving, loss of control, close following or misleading signal which contributed to the collision

Advanced rider education and training may help to reduce the motorcycle collision rate. For example, research has found that motorcyclists are more likely to have a collision whilst performing an overtaking manoeuvre or close following compared to car drivers and the most frequent contributory factor in a motorcycle collision attributed by the police is loss of control and travelling too fast for conditions. However any interventions which aim to enhance the skills of motorcyclists have the potential side effect of motorcyclists becoming over-confident in their riding ability. Assessed rides (e.g. the five-year initiative launched in Scotland in 2000), involving an assessment by a trained police motorcyclist of on-the-road skills alongside advice and guidance, may also improve biker skills and reduce collisions. Advanced training could be focussed on the typical crash scenarios in order to raise rider expectations of likely driver actions and the rider's options for both prevention and evasion. Riders could also be trained to cope with the perceived demands of on-road situations.

1.3.2 Improved motorcyclist conspicuity (high-vis/fluorescent clothing).

This should be coded when:

- An alert driver (ie one not fatigued, distracted or under influence or drink/drugs) who was looking in the right areas failed to see the motorcyclist and this contributed to the collision. Evidence of poor lighting or poor contrast with background makes this countermeasure more effective.

Improved conspicuity measures to improve the visibility of motorcyclists both at day and night can reduce collisions. Methods of improving conspicuity include modified rider clothing.

1.3.3 Eliminate riding whilst impaired by fatigue

This should be coded when:

- The motorcyclist was fatigued and this contributed to the collision.

Fatigue may be exacerbated by wearing heavy helmets and by long journeys. In more extreme weather conditions, such as heat or cold, heavy rain or high winds, the rider's ability to maintain concentration or effective use of the motorcycle's controls may be adversely affected. The probability assigned to this countermeasure should reflect the coder's judgement as to how big a contributory factor fatigue was and their confidence in the assessment. For example, if there was clear evidence that falling asleep was the sole cause of a collision a definite countermeasure would be appropriate. If there was evidence to suggest the driver may have been a bit tired but the circumstances of the accident were such that even a fully alert driver might have struggled to avoid the collision then a "maybe" assessment might be more appropriate.

1.3.4 Eliminate riding whilst impaired by alcohol and/or drugs

This should be coded when:

- The motorcyclist was found to be over the legal limit of alcohol and this contributed to the collision.
- The motorcyclist was found to be impaired by drugs and this contributed to the collision.

Given what is known about the effects of alcohol, the demands of motorcycle riding, and the vulnerability of motorcyclists to injury, Elliot et al (2003) concluded that Motorcycle riders are more vulnerable to the effects of alcohol. However, this should not be coded simply because the legal limit has been exceeded, the circumstances of the accident also need to suggest that the driver/riders response was inadequate as a result.

1.3.5 Improve Roadworthiness of motorcycle

This should be coded when:

- The motorcycle was found to be not road worthy and this contributed to the collision. For example, illegal tyres, defective lights, defective brakes, defective steering, defective mirrors, overloaded or poorly loaded vehicle.

The probability assigned should reflect the likelihood that the defect identified might have contributed to the collision. For example a total brake failure on a downhill section where the motorcyclist ran off the road on a bend might have the brake defect as a sole

cause and thus a definite countermeasure. Where the lights were defective during the day and a vehicle with a distracted driver turned across the motorcyclist's path the role of the defect would be much less certain – the collision may still have occurred.

Coders should not explicitly consider the means by which the roadworthiness could be improved. The measures could include incentives for compliance, education interventions, increased frequency of roadside or periodic technical inspections, improved quality of inspections and/or increased penalties for non-compliance. This countermeasure aims to quantify the casualty reduction effects if any or all of those measures were sufficiently effective to achieve perfect compliance.

1.3.6 Anti-tampering measures

This should be coded when:

- The motorcycle was found to have been illegally modified and this contributed to the collision.

Motorcycles are sometimes modified to improve their performance, normally to increase their maximum speed or acceleration characteristics. This is more commonly carried out on small engine capacity (e.g. 50cc) mopeds and scooters which by their nature are restricted to a top speed of 48 kph. This has the potential for adverse effects on the fuel consumption and the emission of CO_2 and other pollutants. It can also mean that the acceleration potential and top speed is equivalent to that of a larger bike that the rider has not been trained, and is not qualified, to ride. The countermeasure to limit the prevalence of such modifications can involve mechanical solutions such as tamper-evident seals and special tools but are increasingly likely to involve electronic solutions such as encrypted engine management systems which would make harmful tampering more difficult. Wherever possible it would be useful to enter a description of any tampering evidence in a comment field.

1.3.7 Work related road safety training

This should be used when:

- The motorcyclist was driving as part of their job and performed an unsafe manoeuvre or was driving too fast for conditions or sudden braking, swerving, loss of control, close following or misleading signal which contributed to the collision
- The motorcyclist was driving as part of their job and was unfamiliar with the model of the motorcycle and this contributed to the collision

1.3.8 Greater motorcyclist awareness of other vehicles

This should be used when:

- The motorcyclist 'failed to look properly' or 'failed to judge another vehicle's path or speed' and this contributed to the collision

1.3.9 Changing driving/riding behaviour that affect motorcyclists safety

This should be used when:

- The motorcyclist riding style or behaviour contributed to the collision

Motorcyclists may display aggressive or risk-taking behaviour, for example, motorcyclists tended to choose faster speeds, overtook more and pulled into smaller gaps in traffic compared to car drivers Horswill & Helman, 2001. Young male riders are particularly likely to display risky behaviour.

1.4 Education - driver

1.4.1 Improved driver awareness of motorcyclists.

This should be used when:

- The driver 'failed to look properly' or 'failed to judge the motorcyclist's path or speed' and this contributed to the collision
- The driver did not see the motorcyclist who was filtering through slow or stationary traffic and this contributed to the collision
- The driver had in-vehicle obstructions (such as door pillars) and blind spots and this contributed to the collision.

Motorcycles are physically smaller than other motor vehicles. Their face-on silhouette area is 30-40% that of a car, and they are more likely to be obscured by traffic. Horswill and Helman (2001) found that people about to pull out from a junction tend to judge that an oncoming motorbike will reach them later than a car travelling at the same speed. There are fewer motorcycles on the road and so drivers do not expect to encounter them. Riders often 'filter' through slow or stationary traffic, and this may 'subvert' the expectations of other drivers regarding how traffic behaves. Drivers may have visual limitations such as in-vehicle obstructions (e.g. door pillars, passengers) and blind spots. Educating drivers can help encourage head movement to gain views into blind spots. Labbett & Langahm, 2006 found that, when checking whether it is clear to emerge from a junction, experienced drivers may tend to fixate on areas where 'experience' has taught them to expect hazards, whilst novice drivers actually detected motorcyclists more rapidly. It may be argued that if drivers understood more about why riders behave in certain ways they would better anticipate their actions/ be more cautious in certain situations.

1.4.2 Driving whist impaired

This should be coded when:

- The driver was found to be over the legal limit of alcohol and this contributed to the collision.
- The driver was found to be impaired by drugs and this contributed to the collision.

Information is otherwise as for impaired motorcyclists.

1.4.3 Roadworthiness of vehicle

This should be coded when:

- The vehicle was found to be not road worthy and this contributed to the collision. For example, illegal tyres, defective lights, defective brakes, defective steering, defective mirrors, overloaded or poorly loaded vehicle.

Description is as for the same measure applied to motorcyclists.

1.4.4 Work related road safety training

This should be used when:

- The driver was driving as part of their job and performed an unsafe manoeuvre or was driving too fast for conditions or close following or misleading signal which contributed to the collision
- The driver was driving as part of their work and was unfamiliar with the model of the vehicle and this contributed to the collision
- The vehicle blind spot contributed to the collision for an HGV driver

1.4.5 Elderly driver training

This should be used when:

- The driver was aged over 70 and their physical movements/eyesight due to their age contributed to the collision.

Elderly drivers need to be aware of restricted neck movement and loss of peripheral vision and the need to take additional care to gain the necessary view at junctions.

1.5 Enforcement

1.5.1 Graduated driver / rider licensing

This should be used when:

- The rider was a learner or newly qualified and their inexperience contributed to the collision
- The driver was a learner or newly qualified and their inexperience contributed to the collision

Graduated driver licensing is where beginners gain experience under less risky conditions. For example, on-road riding is phased in gradually for motorcyclists, typically comprising of an 'extended learners stage' (supervised riding only) and a stage of restricted but unsupervised riding (e.g. no night-time riding or riding with a pillion).

1.5.2 Speed enforcement

This should be used when:

- The rider was travelling above the posted speed limit and this contributed to the collision
- The driver was travelling at a speed above the posted speed limit and this contributed to the collision

This measure is similar to the in-vehicle speed alert. Measures described earlier should be considered whenever speed alert is considered and vice versa. Instead of using in-vehicle warnings or interventions it relies on the increased use of infrastructure based enforcement techniques such as speed cameras. Speed cameras have been shown to

reduce the number of collisions involving fatal and serious injuries, for example, Gorell & Sexton, 2004.

1.5.3 Drinking and driving/riding

This should be used when:

- The driver was found to be over the legal limit of alcohol and this contributed to the collision.
- The motorcyclist was found to be over the legal limit of alcohol and this contributed to the collision.

1.5.4 Driving/riding without a licence/uninsured

This should be used when:

- The driver was found to not have the appropriate licence and/or was uninsured and this contributed to the collision.
- The motorcyclist was found to not have the appropriate licence and/or was uninsured and this contributed to the collision.

A review Greenaway, 2004 for the Department for Transport of the extent and costs of uninsured driving in the UK reported that 5% of vehicles are being driven without insurance, uninsured drivers are more likely to be involved in a collision, more likely to be non-compliant with other road traffic requirements and obligations and potentially to be involved in other criminal activity. Education, training and publicity addressing uninsured driving could be considered with the corresponding enforcement intervention.

1.5.5 Ensure compliance with all traffic law

This should be used when:

- The driver/rider was found to be impaired by drugs and this contributed to the collision.
- The driver/rider was found to be not displaying lights at night and this contributed to the collision.
- The driver/rider was found to be using a mobile phone and this contributed to the collision.
- The driver/rider was found to be driving/riding carelessly or dangerously and this contributed to the collision.
- The driver/rider was breaking any other traffic law and this contributed to the collision.

The vehicle or bike was stolen or being used in the course of a crime

Please record the relevant traffic law category(ies) in the notes. Note enforcement is one way to try to improve compliance but there are others such as incentives and education.

1.5.6 Targeted enforcement

This should be used if you can identify in the police file whether the offence committed in this accident was one of a long history of motoring offences. If so, then it could be argued that the enforcement authorities could have used that data to identify this was a higher risk rider/driver and targeted additional enforcement measures at him. These additional measures MAY have made the rider more compliant and MAY have prevented this collision. Effectiveness would depend on the specific measure (e.g. occasionally stopping him at side of road would be less likely than requiring a GPS enabled system to be fitted that reported any speeding offence to the nearest police station). Take the objective approach of assuming it would have prevented the non-compliant behaviour in all cases.

2 Secondary safety interventions

These interventions are measures that may reduce the severity of the injuries in the event of a collision.

2.1 Engineering - environment

2.1.1 Removal or re-engineering of crash barriers

This should be used when:

- The motorcycle rider collided with a crash barrier and this contributed to the severity of their injuries

Crash barriers are designed to reduce crash severity for other types of vehicles, but in some cases they can be hostile to motorcyclists. This countermeasure should be coded when there is evidence to suggest that the severity of the injuries, and particularly the cause of death, was related to a contact with the barrier. If the road environment was such that removing the barrier would have meant that the rider did not suffer a collision (large run-off area) or would have collided with a less hostile object then the injury severity may have been reduced. Similarly re-engineering the barrier so that it is less hostile to a motorcyclist (in very general terms avoiding hard and narrow points of contact) could also reduce the severity of injury.

2.1.2 Motorcycle friendly furniture

This should be used when:

- The motorcyclist came off their bike impacted street furniture and this contributed to their fatal injuries

The logic of this measure is similar to that described above for crash barriers

2.2 Engineering – vehicle

2.2.1 Alternative design of motorcycle (e.g. roll-over bars, roofs)

Alternative design of motorcycles can be used to offer greater protection to riders. For example the BMW C1 and the recently-designed C1-E (an electric motorcycle) have

safety features including a 'roof' over the rider's head as well as a seat belt and roll-over bar.

2.2.2 Dynamic suspension to reduce 'front end dive' of the motorcycle under heavy braking conditions

This should be used when:

- The motorcyclist braked heavily and the injury pattern suggests the effect of the heavy braking contributed to the fatal injury.

2.2.3 Introduce airbags and leg protectors for motorcycles

This could potentially be used when:

- The motorcyclist has collided with the side of a car, particularly where the angle of impact is approaching 90 degrees and is in the region of the front or rear door, and suffered a fatal head, neck or chest injury (AIS 3 or greater).

When cars pull out from junctions in front of motorcyclists, the front of the motorcycle collides with the side of the car. When the collision is near the front of the car the rider will be thrown forward over the bonnet and usually onto the road beyond that car. Sometimes when the impact is in the passenger compartment area of the side of the car the same will happen, particularly if the car has a low roof line. However, frequently the rider will move forward and the head, neck or chest will collide with the roof rail and side of the car. The roof rail in particular can present a very serious risk of head injury even when helmets are worn.

The concept of using leg protectors and airbags in combination is that in a frontal collision the leg protectors will stop the lower part of the body from moving too far forward from the riding position. The rider will pivot around the knee such that the head continues to move forward. However, the inflating airbag will get between the head and the structure of the car thus reducing the severity of injury received. Tests undertaken at TRL suggest this measure would be very effective at preventing fatal injury in motorcycle front to car side collisions where the rider collided with the side/roof structure of the car. It is less likely to be effective where the rider was thrown over the top of the car structure. It has been demonstrated at normal urban speeds i.e. 30 mile/h, but effectiveness is likely to be reduced at higher collision speeds

Airbags fitted within jackets which attach to the motorcycle are commercially available and again these will be considered as they offer an effective countermeasure to reduce injury from collision with the road surface.

2.3 Education - motorcyclist

2.3.1 Use of helmets (including correct fastening)

This could be used when:

- The motorcyclist was known to not be wearing a helmet, the helmet was not fastened, the helmet came off in the accident and the head injury was an AIS 3 or greater

Helmets have been proven to reduce the risk of head injury. Open and full face helmets are available, with the latter being associated with a greater reduction in facial injury but also with the disadvantage of being heavier and having a greater tendency to mist over. However, helmets are a generally well-used countermeasure and effective when fastened correctly. Helmets also vary in their performance, which is rated vis DfT's SHARP programme.

2.3.2 This code was not used

2.3.3 Use of protective clothing (jackets, trousers, gloves etc.)

This should be used when:

- abrasions and lacerations caused by sliding along the road surface after a collision were a contributory factor in the cause of death

Protective clothing can include leather gloves, jackets and trousers designed to reduce injury to the soft tissue. These protective devices substantially reduce abrasions and lacerations caused by sliding along the road surface after a collision.

2.3.4 Use of PPE – back protector

This could be used when:

- The motorcyclist had an AIS 3 or greater injury to their Spine

2.3.5 Ensuring good roadworthiness of motorcycle

This could apply if:

- If a defect is detected on the motorcycle and this defect contributed to the severity of the injury received by the rider. This could include a situation where defective brakes meant that a collision speed was higher than it would have been with compliant brakes but could also be taken to include where a defective helmet failed to prevent injury.

2.3.6 Reducing impact speed

This could apply when:

- A motorcycle front was in collision with the rear of another vehicle on a straight road in good weather where a collision mitigation braking system could have reduced the impact speed and this reduction would have been sufficient to prevent the fatal injury
- In any collision where the rider was breaking the speed limit prior to the accident and reducing the travel speed to that of the speed limit would have resulted in a reduction in impact speed sufficient to have mitigated a fatal injury to serious.

2.4 Education – driver

2.4.1 Reducing speed

This could apply when:

- As 2.3.6 but applied to another vehicle driver

2.4.2 Ensuring good roadworthiness of vehicle

This could apply if:

- As 2.3.5 but applied to another vehicle driver

2.5 Enforcement

2.5.1 Helmet use

This could be used when:

- Countermeasure 3.2.1 is thought applicable

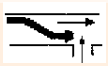
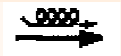
Helmets have been proven to reduce the risk of head injury.

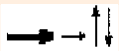
2.5.2 Speed enforcement

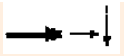
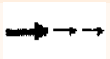
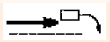
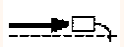
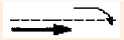
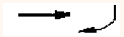
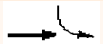
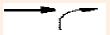
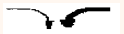
This could be used when:

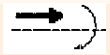
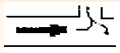
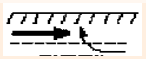
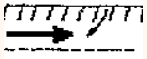
- As 2.3.6 but applied to another vehicle driver.

Appendix D Detailed analysis of conflict types

	Collision type		Single vehicle collisions	Multi-vehicle collisions[1] involving a motorcycle and……				Total
				Car / taxi	LGV	HGV	Other	
A	**Overtaking and lane change**		***4***	***6***	***1***	***3***	***2***	***16***
A1	• **Pulling out or changing lane to right**			1				1
A2	• **Head on**			1			1	2
A3	• **Cutting in or changing lane to left**			1				1
A4	• **Lost control (overtaking vehicle)**		4	2	1	1	1	9
A5	• **Side road**							0
A6	• **Lost control (overtaking vehicle)**							0
A7	• **Weaving in heavy traffic**					2		2
A8	• **Other**			1				1
B	**Head on**			***4***				***4***
B1	• **On straight**			1				1
B2	• **Cutting corner**							0
B3	• **Swinging wide**							0
B4	• **Both or unknown**							0

B5	• **Lost control on straight**			3		3
B6	• **Lost control on curve**					0
C	**Lost control or off road (straight roads)**		***17***	***4***		***21***
C1	• **Out of control on roadway**		6	4		10
C2	• **Off roadway to left**		8			8
C3	• **Off roadway to right**		3			3
D	**Cornering (bends)**		***9***	***1***		***10***
D1	• **Lost control turning right**		5			5
D2	• **Lost control turning left**		3	1		4
D3	• **Missed intersection or end of road**		1			1
E	**Collision with obstruction**			***2***	***1***	***3***
E1	• **Parked vehicle**			1		1
E2	• **Accident or broken down**			1		1
E3	• **Non-vehicular obstructions (including animals)**					0
E4	• **Workman's vehicle**				1	1
E5	• **Opening door**					0
F	**Rear end**			***3***		***2*** ***5***
F1	• **Slow vehicle**			3		1 4
F2	• **Cross traffic**					0

F3	• **Pedestrian**						0
F4	• **Queue**					1	1
F5	• **Signals**						0
G	**Turning versus same direction**		***1***	***1***	***3***		***5***
G1	• **Rear of left turning vehicle**						0
G2	• **Left swipe**				1		1
G3	• **Stopped or turning from left**						0
G4	• **Near centre lane**						0
G5	• **Overtaking vehicle**		1		1		2
G6	• **Two turning**			1	1		2
H	**Crossing (no turns)**		***1***	***1***			***2***
H1	• **Right angle (70 to 110 degrees)**		1	1			2
J	**Crossing (vehicle turning)**		***6***	***1***			***7***
J1	• **Right turn right side**		6	1			7
J2	• **Left turn left side**						0
J3	• **Two turning**						0
K	**Merging**		***3***	***1***			***4***
K1	• **Left turn in**						0
K2	• **Right turn in**		3	1			4
K3	• **Two turning**						0

L	**Right turn against**		**9**		**1**		***10***
L1	• **Stopped waiting to turn**						0
L2	• **Making turn**		9		1		10
M	**Manoeuvring**		***4***	***2***	***1***		***7***
M1	• **Parking or leaving**		3		1		**4**
M2	• **“U” turn**		1				**1**
M3	• **“U” turn**			2			**2**
M4	• **Driveway manoeuvre**						0
M5	• **Parking opposite**						0
M6	• **Angle parking**						0
M7	• **Reversing down**						0
	Total		**30**	**44**	**7**	**9**	**4** **94**

[1]This category includes 7 three vehicle collisions which have been grouped according to the first ‘other’ vehicle hit.

Appendix E Frequency of all variables collected

E.1 Environment variables

All tables give counts of collisions

Table E-1: Collisions in sample by time of day and year

Hour beginning	2006	2007	2008	2009	Total
00	3	1	0	1	5
01	1	0	1	0	2
02	0	0	1	0	1
03	1	0	0	0	1
04	1	0	0	0	1
05	0	1	0	1	2
06	2	2	2	0	6
07	2	1	1	0	4
08	0	1	2	0	3
09	2	1	0	1	4
10	1	0	1	1	3
11	0	0	0	0	0
12	2	1	2	0	5
13	1	1	1	0	3
14	2	3	2	0	7
15	1	1	0	1	3
16	1	2	1	1	5
17	2	1	3	2	8
18	3	2	0	1	6
19	5	2	1	1	9
20	4	0	1	0	5
21	0	2	1	0	3
22	0	2	0	2	4
23	2	1	0	0	3
Total	**36**	**25**	**20**	**12**	**93**

Table E-2: Collisions in sample by month and year

Month	2006	2007	2008	2009	Total
Jan	2	2	2	2	8
Feb	2	0	4	1	7
Mar	3	1	0	2	6
Apr	3	3	1	2	9
May	3	2	1	1	7
Jun	3	2	1	2	8
Jul	5	3	4	0	12
Aug	5	2	3	0	10
Sep	3	4	1	1	9
Oct	4	0	1	1	6
Nov	0	4	1	0	5
Dec	3	2	1	0	6
Total	**36**	**25**	**20**	**12**	**94**

Table E-3: Collisions in sample by light conditions and year

Light conditions	2006	2007	2008	2009	Total
Daylight	17	17	11	7	52
Darkness	17	7	6	5	35
Dusk/dawn	2	1	3	0	6
Total	**36**	**25**	**20**	**12**	**93**

Table E-4: Collisions in sample by weather conditions and year

Weather	2006	2007	2008	2009	Total
Fine	30	24	18	12	84
Rain	4	1	1	0	6
Snow	1	0	0	0	1
Hazardous fog / mist	1	0	0	0	1
Unknown	0	0	1	0	1
Total	**36**	**25**	**20**	**12**	**93**

Table E-5: Collisions in sample by speed limit and year

Speed limit	2006	2007	2008	2009	Total
20mph	1	0	0	2	3
30mph	23	16	14	7	60
40mph	6	3	3	1	13
50mph	3	3	2	1	9
60mph	1	0	0	0	1
70mph	2	2	1	0	5
unknown	0	1	0	1	2
Total	**36**	**25**	**20**	**12**	**93**

Table E-6: Collisions in sample by speed limit and year

Borough (AccStats)	2006	2007	2008	2009	Total
Barking & Dagenham	0	2	2	0	4
Barnet	2	1	2	0	5
Bexley	1	1	0	0	2
Brent	2	2	0	0	4
Bromley	4	1	0	2	7
Camden	1	0	1	0	2
Croydon	1	0	0	0	1
Ealing	2	2	2	0	6
Enfield	5	1	1	0	7
Greenwich	1	1	0	0	2
Hammersmith & Fulham	0	0	2	1	3
Haringey	3	1	0	0	4
Harrow	1	1	0	0	2
Havering	0	3	1	0	4
Hillingdon	2	1	0	0	3
Hounslow	1	0	1	0	2
Islington	0	1	1	0	2
Kensington & Chelsea	1	0	0	1	2
Kingston-Upon-Thames	1	0	0	1	2
Lewisham	0	0	0	3	3
Merton	1	0	1	0	2
Redbridge	0	1	1	0	2
Southwark	1	0	1	0	2
Sutton	1	1	0	1	3
Tower Hamlets	1	2	0	2	5
Waltham Forest	0	1	0	0	1
Wandsworth	3	0	0	0	3
Westminster	1	2	4	1	8
Total	**36**	**25**	**20**	**12**	**93**

Table E-7: Collisions in sample by road class and year

Road Class	2006	2007	2008	2009	Total
M	1	0	2	0	3
A(M)	2	0	2	0	4
A	25	16	10	4	55
B	0	1	4	2	7
Lower	8	6	1	3	18
Unknown	0	2	1	3	6
Total	**36**	**25**	**20**	**12**	**93**

Table E-8: Collisions in sample by road class, type and year

Road Class	Road Type	2006	2007	2008	2009	Total
M		1	0	2	0	3
A(M)		2	0	2	0	4
A	Dual	11	8	1	2	22
	Single	14	6	7	2	29
	One way	0	1	2	0	3
	Unknown	0	1	0	0	1
A Total		25	16	10	4	55
B		0	1	4	2	7
Lower		8	6	1	3	18
Unknown		0	2	1	3	6
Total		**36**	**25**	**20**	**12**	**93**

Table E-9: Collisions in sample by road class, type and year

Traffic conditions	2006	2007	2008	2009	Total
Heavy but free flowing	2	2	4	1	9
Heavy stop/start	3	3	3	0	9
Light	13	9	6	2	30
Moderate	10	4	3	4	21
Unknown	8	7	4	5	24
Total	**36**	**25**	**20**	**12**	**93**

Table E-10: Collisions in sample by presence of bus lane and year

Bus lane	2006	2007	2008	2009	Total
Yes	0	1	2	1	4
No	24	16	15	11	66
Unknown	13	8	3	0	24
Total	**37**	**25**	**20**	**12**	**94**

Table E-11: Collisions in sample by presence of traffic controls and year

Traffic controls	2006	2007	2008	2009	Total
Yes	3	3	2	1	9
No	21	16	14	11	62
Unknown	12	6	4	0	22
Total	**36**	**25**	**20**	**12**	**93**

Table E-12: Collisions in sample by junction detail and year

Junction Detail (AccStats)	2006	2007	2008	2009	Total
0 No Jun In 20m	18	10	7	4	39
2 Mini roundabout	0	2	0	0	2
3 T/Stag Jun	13	8	6	3	30
5 Slip Road	2	0	2	1	5
6 Crossroads	2	4	2	4	12
8 Private Drive	1	0	0	0	1
9 Other Junction	0	1	3	0	4
Total	**36**	**25**	**20**	**12**	**93**

Table E-13: Collisions in sample by road surface condition and year

Road surface condition	2006	2007	2008	2009	Total
Dry	29	21	17	10	77
Unknown	0	0	1	1	2
Wet/Damp	7	4	2	1	14
Total	**36**	**25**	**20**	**12**	**93**

Table E-14: Collisions in sample by site maintenance and year

Site maintenance	2006	2007	2008	2009	Total
Debris	0	1	0	0	1
Ironwork	0	1	0	0	1
None	33	19	18	11	81
Oil or diesel	0	1	0	0	1
Potholes	0	1	0	0	1
Unknown	3	2	2	1	8
Total	**36**	**25**	**20**	**12**	**93**

Table E-15: Collisions in sample by presence of high friction surfacing and year

High friction surfacing	2006	2007	2008	2009	Total
Yes	2	1	1	0	4
No	3	9	11	12	35
Unknown	31	15	8	0	54
Total	**36**	**25**	**20**	**12**	**93**

Table E-16: Collisions in sample by conflict type and year

Conflict type	2006	2007	2008	2009	Total
A	9	5	1	1	16
B	2	1	1	0	4
C	5	6	6	3	20
D	6	1	1	2	10
E	1	1	1	0	3
F	0	3	1	1	5
G	2	1	1	1	5
H	1	1	0	0	2
J	4	2	1	0	7
K	1	0	2	1	4
L	2	3	2	3	10
M	3	1	3	0	7
Total	36	25	20	12	93

Table E-17: Collisions in sample by conflict and year

Conflict	2006	2007	2008	2009	Total
A1	1	0	0	0	1
A2	1	0	0	1	2
A3	1	0	0	0	1
A4	5	3	1	0	9
A7	1	1	0	0	2
A8	0	1	0	0	1
B1	0	1	0	0	1
B5	2	0	1	0	3
C1	2	2	4	2	10
C2	3	3	1	1	8
C3	1	1	1	0	3
D1	3	1	1	0	5
D2	2	0	0	2	4
D3	1	0	0	0	1
E1	0	0	1	0	1
E2	1	0	0	0	1
E4	0	1	0	0	1
F1	0	2	1	1	4
F4	0	1	0	0	1
G2	0	0	1	0	1
G5	2	0	0	0	2
G6	0	1	0	1	2
H1	1	1	0	0	2
J1	4	2	1	0	7
K2	1	0	2	1	4
L2	2	3	2	3	10
M1	2	1	1	0	4
M2	0	0	1	0	1
M3	1	0	1	0	2
Total	**37**	**25**	**20**	**12**	**94**

Table E-18: Collisions in sample by whether the road was closed following the collision and year

Road closed following collision?	2006	2007	2008	2009	Total
Yes	24	20	13	12	69
No	1	0	2	0	3
Unknown	11	5	5	0	21
Total	**36**	**25**	**20**	**12**	**93**

Table E-19: Collisions in sample by day of week and year

Accident Day (accSTATS)	2006	2007	2008	2009	Total
Monday	3	2	3	0	8
Tuesday	4	7	1	1	13
Wednesday	5	5	4	2	16
Thursday	3	3	2	1	9
Friday	4	2	5	4	15
Saturday	10	3	4	3	20
Sunday	8	3	1	1	13
Total	**37**	**25**	**20**	**12**	**94**

Table E-20: Collisions in sample by number of vehicles involved and year

No of Vehicles in Acc (ACCSTATS)	2006	2007	2008	2009	Total
1	11	8	5	3	27
2	16	13	9	6	44
3	8	4	4	2	18
4	1	0	2	1	4
Total	**36**	**25**	**20**	**12**	**93**

E.2 Motorcycle / motorcyclist variables

Table E-21: Number of motorcycles in sample by motorcycle registration year and collision year

Motorcycle registration year	2006	2007	2008	2009	Total
1981	0	0	1	0	1
1989	0	1	0	1	2
1990	0	0	1	0	1
1993	1	0	0	1	2
1995	2	0	1	0	3
1996	1	0	0	0	1
1997	1	6	0	0	7
1998	2	2	0	0	4
1999	3	1	0	1	5
2000	2	1	1	1	5
2001	5	3	0	1	9
2002	2	0	3	0	5
2003	1	5	2	0	8
2004	4	3	2	0	9
2005	6	0	1	1	8
2006	3	1	3	2	9
2007	0	2	3	3	8
2008	0	0	1	0	1
-9	1	0	0	0	1
Offroad	0	0	0	1	1
Q- original age is undetermined	1	0	0	0	1
unknown	1	0	1	0	2
Total	**36**	**25**	**20**	**12**	**93**

Table E-22: Number of motorcycles in sample by motorcycle type and year

Motorcycle type	2006	2007	2008	2009	Total
Cruiser	0	1	0	0	1
Retro	8	5	5	2	20
Scooter	7	4	5	3	19
Sports	17	14	8	6	45
Tourer	1	0	1	0	2
Trail	1	1	1	0	3
unknown	2	0	0	1	3
Total	**36**	**25**	**20**	**12**	**93**

Table E-23: Number of motorcycles in sample by engine size and year

Engine size	2006	2007	2008	2009	Total
49cc	0	0	0	1	1
50cc	1	0	1	0	2
96cc	0	0	1	0	1
107cc	0	0	0	1	1
124cc	0	1	0	0	1
125cc	6	4	1	2	13
125sp	1	0	0	0	1
172cc	0	0	1	0	1
200cc	0	0	1	0	1
250cc	1	0	0	0	1
400cc	1	0	0	0	1
500cc	1	0	0	0	1
600cc	9	6	5	2	22
650cc	4	1	0	0	5
750cc	2	2	0	2	6
850cc	0	2	0	0	2
900cc	2	3	2	0	7
918cc	0	1	0	0	1
953cc	1	0	0	0	1
955cc	1	0	1	0	2
1000cc	2	3	3	3	11
1100cc	1	0	0	0	1
1200cc	2	0	1	0	3
1300cc	0	1	1	0	2
unknown	1	1	2	1	5
Total	**36**	**25**	**20**	**12**	**93**

Table E-24: : Number of motorcycles in sample by pre-event motorcycle condition and year

Pre event motorcycle condition	2006	2007	2008	2009	Total
No defects contributed	26	22	17	10	75
Defective brakes and under-inflated tyres	1	0	0	0	1
Defective front suspension unit & under-inflated front tyre-may have had an effect on handling & stability	0	0	0	1	1
Defective rear tyre and low friction material on brakes. These were not contributory factors	1	0	0	0	1
Front side bulb was defective, front tyre was worn below the legal tread depth, rear tyre had the cords exposed, nearside fork seal badly worn, chain badly adjusted, exhaust not legal for road use.	1	0	0	0	1
Front tyre pressure lower than recommended and front tyre was subject to uneven tread pattern wear	1	0	0	0	1
Low tyre pressure in front tyre	0	1	0	0	1
Not registered for rd use & not fitted with lighting, no pillion foot pegs	0	0	0	1	1
Rear brake defective, not suitable for use on road. Insufficient tyre tread.	0	1	0	0	1
Rear shock absorbers upside down	1	0	0	0	1
Rear wheel bearings were badly worn, seat didn't lock in place, front wheel size was changed	0	0	1	0	1
Under inflated rear tyre	0	0	1	0	1
Unknown	5	1	1	0	7
Total	**36**	**25**	**20**	**12**	**93**

Table E-25: Number of motorcyclist fatalities in sample by fatality age group and year

Fatality age	2006	2007	2008	2009	Total
15-19	6	0	2	2	10
20-24	6	6	3	1	16
25-29	8	5	4	2	19
30-34	4	7	1	2	14
35-39	5	2	4	1	12
40-44	4	2	3	2	11
45-49	2	1	3	2	8
50-54	0	2	0	0	2
55-59	2	0	0	0	2
Total	**37**	**25**	**20**	**12**	**94**

Note that there was one collision involving two fatalities where it was unclear which of the two fatalities was the rider and which was the passenger – both are included in the above table.

Table E-26: Number of motorcyclist fatalities in sample by gender

Gender	2006	2007	2008	2009	Total
Female	2	0	1	0	3
Male	35	25	19	12	91
Total	**37**	**25**	**20**	**12**	**94**

Note that there was one collision involving two fatalities where it was unclear which of the two fatalities was the rider and which was the passenger – both are included in the above table.

Table E-27: : Number of motorcyclist fatalities in sample by casualty class

Casualty class	2006	2007	2008	2009	Total
Driver	35	25	20	12	92
Unknown	2	0	0	0	2
Total	**37**	**25**	**20**	**12**	**94**

Note that there was one collision involving two fatalities where it was unclear which of the two fatalities was the rider and which was the passenger – both are included in the above table as unknowns.

Table E-28: : Number of motorcyclist fatalities in sample by ethnicity

Ethnicity	2006	2007	2008	2009	Total
White British	15	12	10	3	40
White Other	6	2	0	0	8
African	0	1	0	0	1
Other black	0	0	1	0	1
Indian	0	1	0	0	1
Other Asian	0	0	1	1	2
White & black Caribbean	1	0	0	0	1
Unknown	15	9	8	8	40
Total	**37**	**25**	**20**	**12**	**94**

Note that there was one collision involving two fatalities where it was unclear which of the two fatalities was the rider and which was the passenger – both are included in the above table.

Table E-29: Number of motorcyclist fatalities in sample by area of residence

Residence	2006	2007	2008	2009	Total
From inner London	8	10	9	4	31
From outer London	23	10	7	6	46
From other UK region	5	5	3	1	14
Foreign occupation related traveller	1	0	1	0	2
Foreign unknown	0	0	0	1	1
Total	**37**	**25**	**20**	**12**	**94**

Note that there was one collision involving two fatalities where it was unclear which of the two fatalities was the rider and which was the passenger – both are included in the above table.

Table E-30: Number of motorcyclist fatalities in sample by level of motorcycle training

Level of motorcycle training	2006	2007	2008	2009	Total
None	4	3	1	0	8
CBT (Compulsory Basic Training)	4	2	2	1	9
DAS (Direct Access Scheme)	1	0	1	0	2
UK Advanced	0	1	1	0	2
Other-1week advanced training	1	0	0	0	1
Unknown	27	19	15	11	72
Total	**37**	**25**	**20**	**12**	**94**

Note that there was one collision involving two fatalities where it was unclear which of the two fatalities was the rider and which was the passenger – both are included in the above table.

Table E-31: Number of motorcyclist fatalities in sample by type of licence held

Type of licence held	2006	2007	2008	2009	Total
Full PTW	21	10	13	2	46
No licence	6	3	1	2	12
Provisional PTW	6	5	5	2	18
Unknown	4	7	1	6	18
Total	**37**	**25**	**20**	**12**	**94**

Note that there was one collision involving two fatalities where it was unclear which of the two fatalities was the rider and which was the passenger – both are included in the above table.

Table E-32: Number of motorcyclist fatalities in sample by journey purpose

Journey purpose	2006	2007	2008	2009	Total
Journey to/from work	6	4	4	3	17
Leisure	14	6	5	2	27
Part of job	1	0	0	1	2
Pupil going to/from school	1	0	0	0	1
Shopping	1	1	0	0	2
Other	0	0	0	1	1
Unknown	14	14	11	5	44
Total	**37**	**25**	**20**	**12**	**94**

Table E-33: Number of motorcyclist fatalities in sample by journey start point

Journey start point	2006	2007	2008	2009	Total
Postcode or place	10	8	4	3	25
Generic description	5	3	0	2	10
Unknown	22	14	16	7	59
Total	**37**	**25**	**20**	**12**	**94**

Table E-34: Number of motorcyclist fatalities in sample by knowledge of route/location

Knowledge of route/location	2006	2007	2008	2009	Total
Familiar	7	5	3	1	16
Regular commuting	8	3	2	4	17
Unfamiliar	0	0	0	1	1
Unknown	20	16	14	6	56
Very familiar	2	1	1	0	4
Total	**37**	**25**	**20**	**12**	**94**

Table E-35: Number of motorcyclist fatalities in sample by distraction

Distractions	2006	2007	2008	2009	Total
Following other PTW	0	1	1	0	2
None	23	10	12	9	54
Other	0	1	1	0	2
Unknown	14	13	6	3	36
Total	**37**	**25**	**20**	**12**	**94**

Table E-36: Number of motorcyclist fatalities in sample by impairment

Impairment	2006	2007	2008	2009	Total
Alcohol	6	0	2	0	8
Drugs	1	1	1	2	5
Fatigue	0	1	0	0	1
Multiple	0	1	0	0	1
None	26	20	16	9	71
Unknown	4	2	1	1	8
Total	**37**	**25**	**20**	**12**	**94**

Table E-37: Number of motorcyclist fatalities in sample by helmet worn

Helmet worn	2006	2007	2008	2009	Total
Not worn	1	1	1	0	3
Worn, fastened	9	10	5	2	26
Worn, unfastened	1	1	0	0	2
Unknown	26	13	14	10	63
Total	**37**	**25**	**20**	**12**	**94**

Table E-38: Number of motorcyclist fatalities in sample by whether the helmet was displaced by collision

Helmet displaced by collision	2006	2007	2008	2009	Total
Yes	22	11	6	5	44
No	8	9	11	5	33
Unknown	7	5	3	2	17
Total	**37**	**25**	**20**	**12**	**94**

Table E-39: Number of motorcyclist fatalities in sample by high visibility clothing

High visibility clothing	2006	2007	2008	2009	Total
Yes	1	0	3	1	5
No	12	13	9	11	45
Unknown	24	12	8	0	44
Total	**37**	**25**	**20**	**12**	**94**

Table E-40: Number of motorcyclist fatalities in sample by headlight on

Headlight on	2006	2007	2008	2009	Total
Yes	14	1	8	2	25
No	2	2	2	1	7
Unknown	21	22	10	9	62
Total	**37**	**25**	**20**	**12**	**94**

Table E-41: Number of motorcyclist fatalities in sample by motorcycle jacket worn

Jacket	2006	2007	2008	2009	Total
Yes	13	11	6	5	35
No	9	5	6	3	23
Unknown	15	9	8	4	36
Total	**37**	**25**	**20**	**12**	**94**

Table E-42: : Number of motorcyclist fatalities in sample by motorcycle trousers worn

Trousers	2006	2007	2008	2009	Total
Yes	6	5	3	4	18
No	17	10	9	4	40
Unknown	14	10	8	4	36
Total	**37**	**25**	**20**	**12**	**94**

Table E-43: : Number of motorcyclist fatalities in sample by motorcycle gloves worn

Gloves	2006	2007	2008	2009	Total
Yes	10	5	5	4	24
No	7	3	3	3	16
Unknown	20	17	12	5	54
Total	**37**	**25**	**20**	**12**	**94**

Table E-44: : Number of motorcyclist fatalities in sample by motorcycle kneepads worn

Kneepads	2006	2007	2008	2009	Total
Yes	0	1	0	1	2
No	8	3	3	5	19
Unknown	29	21	17	6	73
Total	**37**	**25**	**20**	**12**	**94**

Table E-45: : Number of motorcyclist fatalities in sample by motorcycle elbow pads worn

Elbow pads	2006	2007	2008	2009	Total
Yes	0	1	0	1	2
No	5	3	3	5	16
Unknown	32	21	17	6	76
Total	**37**	**25**	**20**	**12**	**94**

Table E-46: : Number of motorcyclist fatalities in sample by motorcycle boots worn

Boots	2006	2007	2008	2009	Total
Yes	9	5	1	2	17
No	12	6	6	5	29
Unknown	16	14	13	5	48
Total	**37**	**25**	**20**	**12**	**94**

Table E-47: : Number of motorcyclist fatalities in sample by vision restriction

Vision restriction	2006	2007	2008	2009	Total
Helmet	1	1	1	0	3
None	21	13	16	9	59
Other	0	1	0	0	1
Unknown	13	10	3	3	29
Visor	2	0	0	0	2
Total	**37**	**25**	**20**	**12**	**94**

Table E-48: : Number of motorcyclist fatalities in sample by carrying passenger

Carrying passenger	2006	2007	2008	2009	Total
Yes	5	0	1	1	7
No	29	24	19	10	82
Unknown	3	1	0	1	5
Total	**37**	**25**	**20**	**12**	**94**

Table E-49: : Number of motorcyclist fatalities in sample carrying load

Carrying load	2006	2007	2008	2009	Total
None	13	3	8	6	30
Backpack	4	3	0	1	8
Bag over shoulder	0	1	0	0	1
Held by passenger	1	0	0	0	1
Load in panniers	0	0	0	1	1
Other handbag	1	0	0	0	1
Other- M/C black bag	1	0	0	0	1
Unknown	17	18	12	4	51
Total	**37**	**25**	**20**	**12**	**94**

Table E-50: : Number of motorcyclist fatalities in sample by manoeuvre

Manoeuvre	2006	2007	2008	2009	Total
Going ahead left hand bend	1	0	1	3	5
Going ahead other	25	22	16	7	70
Going ahead right hand bend	3	0	1	0	4
O'taking stationary vehicle on it's offside	0	1	0	0	1
Overtaking moving vehicle on it's offside	8	1	0	1	10
Overtaking on nearside	0	0	1	0	1
Turning right	0	1	0	0	1
Waiting to go ahead but held up	0	0	1	0	1
Waiting to turn left	0	0	0	1	1
Total	**37**	**25**	**20**	**12**	**94**

Table E-51: : Number of motorcyclist fatalities in sample by filtering

Filtering	2006	2007	2008	2009	Total
Yes	3	3	0	0	6
No	16	13	15	9	53
Unknown	18	9	5	3	35
Total	**37**	**25**	**20**	**12**	**94**

Table E-52: : Number of motorcyclist fatalities in sample by appropriate signalling

Appropriate signalling	2006	2007	2008	2009	Total
Unknown	37	25	20	12	94
Total	**37**	**25**	**20**	**12**	**94**

Table E-53: : Number of motorcyclist fatalities in sample by first point of impact

1st point of impact	2006	2007	2008	2009	Total
Front	10	11	6	5	32
Front-nearside	3	1	0	0	4
Front-offside	1	1	1	0	3
Nearside	8	1	3	1	13
Offside	5	3	3	3	14
Rear	0	1	0	0	1
Rear-nearside	0	0	1	0	1
Rear-offside	0	1	0	0	1
Top	3	0	0	1	4
Unknown	7	6	6	2	21
Total	**37**	**25**	**20**	**12**	**94**

Table E-54: : Number of motorcyclist fatalities in sample by compliance with law

Compliance with law	2006	2007	2008	2009	Total
Yes	6	4	4	0	14
No	25	18	15	10	68
Unknown	6	3	1	2	12
Total	**37**	**25**	**20**	**12**	**94**

Table E-55: : Number of motorcyclist fatalities in sample by compliance with The Highway Code

Compliance with highway code	2006	2007	2008	2009	Total
Yes	4	3	4	0	11
No	22	15	15	11	63
Unknown	11	7	1	1	20
Total	**37**	**25**	**20**	**12**	**94**

Table E-56: : Number of motorcyclist fatalities in sample by line of vision affected by

Line of vision affected by	2006	2007	2008	2009	Total
Not affected	17	13	16	8	54
Other	1	1	0	1	3
Vehicle in front	0	1	0	0	1
Other vehicle	0	0	0	1	1
Rain, sleet, snow or fog	2	0	0	0	2
Road layout	1	1	0	0	2
Unknown	16	9	4	2	31
Total	**37**	**25**	**20**	**12**	**94**

Table E-57: : Number of motorcyclist fatalities in sample by evasion attempted

Evasion attempted	2006	2007	2008	2009	Total
Yes	10	10	8	3	31
No	1	4	4	2	11
Unknown	26	11	8	7	52
Total	**37**	**25**	**20**	**12**	**94**

Table E-58: Number of motorcyclist fatalities in sample by impact with objects

Impact with objects	2006	2007	2008	2009	Total
Bollard/refuge	0	1	0	0	1
Bus stop/shelter	0	0	1	0	1
Crash barrier	4	1	1	1	7
Further vehicle(s)	7	4	3	1	15
Guard railing	1	1	0	0	2
Kerb	9	5	2	3	19
Nothing further	11	10	10	7	38
Road sign	1	0	0	0	1
Road sign / Lamp/Electricity pole	1	1	2	0	4
Tree	2	1	0	0	3
Wall	1	0	0	0	1
Unknown	0	1	1	0	2
Total	**37**	**25**	**20**	**12**	**94**

Table E-59: Number of motorcyclist fatalities in sample by motorcyclist trajectory

motorcyclist trajectory	2006	2007	2008	2009	Total
Knocked to ground - not run over	1	1	0	2	4
Not thrown but run over	0	0	1	0	1
Rolled/skidded from POI to POR/2nd impact	10	6	3	2	21
Run over but throw not known	2	0	1	0	3
Stopped at or within 2m of POI	3	3	5	3	14
Thrown forwards - then run over	0	0	1	0	1
Thrown over top of vehicle	3	2	1	1	7
Thrown to side of vehicle	1	2	0	0	3
Thrown/knocked forwards - then run over	0	1	0	0	1
Thrown/knocked to side of vehicle	0	0	3	3	6
Vaulted above ride height to POR/2nd impact	3	1	1	1	6
Other	1	0	0	0	1
Unknown	13	9	4	0	26
Total	**37**	**25**	**20**	**12**	**94**

Table E-60: Number of motorcyclist fatalities in sample by cause of death

Cause of death: Injury to	2006	2007	2008	2009	Total
Abdomen	3	1	0	0	4
Head	4	5	6	2	17
Neck	0	1	0	0	1
Thorax	1	1	2	2	6
Multiple	28	16	12	7	63
Unknown	1	1	0	1	3
Total	**37**	**25**	**20**	**12**	**94**

Table E-61: Number of motorcyclist fatalities in sample by motorcycle useable after collision

Was motorcycle useable after collision?	2006	2007	2008	2009	Total
Yes	1	4	4	0	9
No	6	5	2	1	14
Unknown	30	16	14	11	71
Total	**37**	**25**	**20**	**12**	**94**

Table E-62: Number of motorcyclist fatalities in sample by conviction history

Conviction history	2006	2007	2008	2009	Total
Criminal record - court conviction(s)	3	3	2	0	8
DVLA offences only	2	1	1	3	7
No conviction history	17	6	7	2	32
Other	0	1	0	0	1
Youth offender only (warning/reprimand)	0	0	1	1	2
Unknown	15	14	9	6	44
Total	**37**	**25**	**20**	**12**	**94**

Table E-63: Number of motorcyclist fatalities in sample days to die

Days to die	2006	2007	2008	2009	Total
0	31	23	15	11	80
1	4	0	0	1	5
2	1	1	0	0	2
3	0	0	2	0	2
6	0	0	1	0	1
8	0	1	0	0	1
22	0	0	1	0	1
unknown	1	0	1	0	2
Total	**37**	**25**	**20**	**12**	**94**

E.3 Other vehicle variables

Table E-64: Number of PTW user fatalities by number of other vehicles involved

Number of other vehicles	2006	2007	2008	2009	Total
0	14	8	6	2	30
1	20	14	13	10	57
2	3	3	1	0	7
Total	**37**	**25**	**20**	**12**	**94**

Remaining tables in this section are counts of the other vehicles in the collision (i.e. 57 + 2 x 7=71). All of these accidents had one motorcycle fatality (the accident which involved 2 fatalities was a single vehicle accident).

Table E-65: Number of other vehicles in collisions by registration year

Registration year	2006	2007	2008	2009	Total
1986	1	0	0	0	1
1989	0	1	0	0	1
1993	1			1	2
1995	2	1	1	0	4
1996	1	0	0	0	1
1997	1	1	1	0	3
1998	1	3	1	0	5
1999	2	1	0	0	3
2000	1	3	0	1	5
2001	2	1	2	2	7
2002	4	1	0	1	6
2003	3	2	1	0	6
2004		1	1	1	3
2005	3	2	1	3	9
2006	2	1	1	0	4
2007	0	0	4	1	5
2008	0	0	2	0	2
Unknown	2	2	0	0	4
Total	**26**	**20**	**15**	**10**	**71**

Table E-66: Number of other vehicles in collisions by whether the vehicle was insured

Insurance	2006	2007	2008	2009	Total
Yes	13	10	8	7	38
No	1	0	0	0	1
Unknown	12	10	7	3	32
Total	**26**	**20**	**15**	**10**	**71**

Table E-67: Number of other vehicles in collisions by whether the vehicle was taxed

Tax	2006	2007	2008	2009	Total
Yes	13	8	9	8	38
No	2	0	0	0	2
Unknown	11	12	6	2	31
Total	**26**	**20**	**15**	**10**	**71**

Table E-68: Number of other vehicles in collisions by pre-event vehicle condition

Pre event veh condition	2006	2007	2008	2009	Total
No defects	23	17	13	7	60
Defective brakes, uninflated tyres- non contributory	1	0	0	0	1
Front brakes showed excessive imbalance- "could have been contributory"	0	0	0	1	1
Poorly inflated tyres, no other defects	0	1	0	0	1
Worn fns tyre below legal limit, both dipped beams inoperative, handbrake poorly adjusted and ineffective, driver's seat belt not bolted to seat. Driver received fines for these, but none of these contributed to accident.	0	0	0	1	1
Unknown	2	2	2	1	7
Total	**26**	**20**	**15**	**10**	**71**

Table E-69: Number of other vehicles in collisions by driver age group

Other vehicle driver age group	2006	2007	2008	2009	Total
19-24	4	2	1	1	8
25-59	19	14	14	6	53
60+	2	2	0	1	5
unknown	1	2	0	2	5
Total	**26**	**20**	**15**	**10**	**71**

Table E-70: Number of other vehicles in collisions by driver gender

Driver gender	2006	2007	2008	2009	Total
Female	8	2	0	3	13
Male	17	16	15	6	54
Unknown	1	2	0	1	4
Total	**26**	**20**	**15**	**10**	**71**

Table E-71: Number of other vehicles in collisions by driver ethnicity

Driver ethnicity	2006	2007	2008	2009	Total
Bangladeshi	0	0	1	1	2
Caribbean	2	0	0	0	2
Indian	0	2	1	0	3
Other Asian	1	0	0	0	1
Other black	0	1	1	0	2
White & black Caribbean	0	1	0	0	1
White British	9	5	4	4	22
White Other	1	3	1	0	5
Unknown	13	8	7	5	33
Total	**26**	**20**	**15**	**10**	**71**

Table E-72: Number of other vehicles in collisions by area of residence

Driver residence	2006	2007	2008	2009	Total
Foreign occupation related traveller	1	0	0	0	1
From inner London	5	3	4	3	15
From other UK region	5	5	3	1	14
From outer London	10	8	7	5	30
Unknown	5	4	1	1	11
Total	**26**	**20**	**15**	**10**	**71**

Table E-73: Number of other vehicles in collisions by driving licence

Driving licence appropriate?	2006	2007	2008	2009	Total
Yes	18	15	13	7	53
No	1	1	1	0	3
unknown	7	4	1	3	15
Total	**26**	**20**	**15**	**10**	**71**

Table E-74: Number of other vehicles in collisions by journey purpose

Journey purpose	2006	2007	2008	2009	Total
Journey to/from work	4	3	2	2	11
Leisure	8	3	1	2	14
Part of job	8	8	9	3	28
Shopping	1	1	1	1	4
Other	0	0	1	0	1
Unknown	5	5	1	2	13
Total	**26**	**20**	**15**	**10**	**71**

Table E-75: Number of other vehicles in collisions by knowledge of route / location

Knowledge of route / location	2006	2007	2008	2009	Total
Regular commuting	8	4	4	3	19
Very familiar	7	7	3	2	19
Familiar	4	2	6	2	14
Unfamiliar	0	2	0	0	2
Unknown	7	5	2	3	17
Total	**26**	**20**	**15**	**10**	**71**

Table E-76: Number of other vehicles in collisions by driver distraction

Driver distraction	2006	2007	2008	2009	Total
Mobile phone- possibly	1	0	0	0	1
Other distraction in vehicle	0	0	0	1	1
None	17	13	15	8	53
Unknown	8	7	0	1	16
Total	**26**	**20**	**15**	**10**	**71**

Table E-77: Number of other vehicles in collisions by driver impairment

Driver impairment	2006	2007	2008	2009	Total
Fatigue	1	0	0	0	1
Illness or disability	0	1	0	0	1
None	21	15	15	9	60
Unknown	4	4	0	0	9
Total	**26**	**20**	**15**	**10**	**71**

Table E-78: Number of other vehicles in collisions by vision restriction

Vision restriction	2006	2007	2008	2009	Total
None	19	9	14	9	51
Unknown	7	11	1	1	20
Total	**26**	**20**	**15**	**10**	**71**

Table E-79: Number of other vehicles in collisions by number of vehicle occupants

No of occupants	2006	2007	2008	2009	Total
0	4	1	3	3	11
1	12	10	8	3	33
2	5	4	3	0	12
3	1	1	1	1	4
4	3	1	0	1	5
12	0	1	0	0	1
25	0	0	0	1	1
(blank)	1	2	0	1	4
Total	**26**	**20**	**15**	**10**	**71**

Table E-80: Number of other vehicles in collisions by vehicle manoeuvre

Manoeuvre	2006	2007	2008	2009	Total
Going ahead left hand bend	0	0	1	0	1
Going ahead other	10	9	6	4	29
Moving off	1	1	1	0	3
Overtaking moving vehicle on its offside	2	0	0	0	2
Overtaking on nearside	1	0	0	0	1
Parked	1	1	0	1	3
Reversing	1	0	0	0	1
Turning left	0	0	3	1	4
Turning right	8	6	2	4	20
U turn	0	1	1	0	2
U turn- turn in road	0	1	0	0	1
Waiting to turn right	2	0	0	0	2
unknown	0	1	1	0	2
Total	**26**	**20**	**15**	**10**	**71**

Table E-81: Number of other vehicles in collisions by appropriate signalling

Appropriate signalling	2006	2007	2008	2009	Total
Yes	12	8	9	7	36
Unknown	14	12	6	3	35
Total	**26**	**20**	**15**	**10**	**71**

Table E-82: Number of other vehicles in collisions by compliance with law

Compliance with law	2006	2007	2008	2009	Total
Yes	16	11	12	7	46
No	6	3	2	2	13
unknown	4	6	1	1	12
Total	**26**	**20**	**15**	**10**	**71**

Table E-83: Number of other vehicles in collisions by non-compliance with law

If no state non compliance with law	2006	2007	2008	2009	Total
careless	0	1	0	0	1
Defects on vehicle? (non-contributory)	0	0	0	1	1
Driver was turning right in contravention of two clearly marked 'no right turn' signs	1	0	0	0	1
Exceeding speed limit Failure to stop at scene of accident	1	0	0	0	1
failed to give way as required	0	1	0	0	1
failed to see approaching motorcyclist	1	0	0	0	1
Failed to stop at scene of accident	1	0	0	0	1
Failure to stop at the scene of an accident and/or failure to report (Road Traffic Act 1988)	0	1	0	0	1
parking on cycle lane	0	0	1	0	1
speeding	0	1	0	0	1
Speeding, disobeyed red ATS	1	0	0	0	1
Uninsured and untaxed	1	0	0	0	1
(blank)	20	16	14	9	59
Total	**26**	**20**	**15**	**10**	**71**

Table E-84: Number of other vehicles in collisions by compliance with The Highway Code

Compliance with Highway Code	2006	2007	2008	2009	Total
Yes	16	12	12	5	45
No	5	1	3	3	12
Unknown	5	7	0	2	14
Total	**26**	**20**	**15**	**10**	**71**

Table E-85: Number of other vehicles in collisions by non-compliance with The Highway Code

If no state non compliance with HC	2006	2007	2008	2009	Total
"If another driver flashes his headlight, never assume it's a signal to go..." Rules 91,146&187	0	0	1	0	1
defects on vehicle, lack of maintenance (non-contributory)	0	0	0	1	1
Didn't assess other vehicle speed?	0	0	0	1	1
Driver was turning right in contravention of two clearly marked 'no right turn' signs	1	0	0	0	1
Exceeding speed limit, failure to stop at scene of accident	1	0	0	0	1
failed to give way as required	0	1	0	0	1
failed to see approaching motorcyclist	1	0	0	0	1
Manoeuvre was 'strange' but not illegal	1	0	0	0	1
not known whether driver checked mirrors properly prior to moving	0	0	0	1	1
parking on cycle lane	0	0	1	0	1
See above	1	0	0	0	1
speeding	0	1	0	0	1
Speeding, disobeyed red ATS	1	0	0	0	1
Turning right in face of oncoming traffic	0	0	0	1	1
(blank)	20	18	13	6	57
Total	**26**	**20**	**15**	**10**	**71**

Table E-86: Number of other vehicles in collisions by line of vision affected

Line of vision affected by	2006	2007	2008	2009	Total
Not affected	7	10	12	7	36
Other vehicle	0	1	0	0	1
Parked vehicle	2	1	1	0	4
Rain, sleet, snow or fog	1	0	0	0	1
Road layout	1	0	0	0	1
Slow moving vehicle	0	0	1	0	1
Vegetation	1	0	0	0	1
Other	1	0	0	0	1
Unknown	13	8	1	3	25
Total	**26**	**20**	**15**	**10**	**71**

Table E-87: Number of other vehicles in collisions by whether an evasion was attempted

Evasion attempted	2006	2007	2008	2009	Total
Yes	3	3	6	2	14
No	14	12	5	6	37
Unknown	9	5	4	2	20
Total	**26**	**20**	**15**	**10**	**71**

Table E-88: Number of other vehicles in collisions by first point of impact with motorcycle

1st point of impact with motorcycle	2006	2007	2008	2009	Total
Front	3	2	0	2	7
Front-nearside	0	2	1	2	5
Front-offside	11	0	2	1	14
Nearside	2	0	5	2	9
None	0	1	0	0	1
Offside	3	3	2	0	8
Rear	0	2	1	1	4
Rear-nearside	4	4	1	1	10
Rear-offside	2	2	1	0	5
Underneath	0	2	1	0	3
Unknown	1	2	1	1	5
Total	**26**	**20**	**15**	**10**	**71**

Table E-89: Number of other vehicles in collisions by first object hit

First object hit	2006	2007	2008	2009	Total
PTW user	26	19	15	9	69
unknown	0	1	0	1	2
Total	**26**	**20**	**15**	**10**	**71**

Table E-90: Number of other vehicles in collisions by whether the vehicle was driveable after the collision

Was vehicle driveable after the collision?	2006	2007	2008	2009	Total
yes	16	9	10	5	40
no	0	1	0	0	1
Blank	10	10	5	5	30
Total	**26**	**20**	**15**	**10**	**71**

Table E-91: Number of other drivers in collisions by conviction history

Conviction history	2006	2007	2008	2009	Total
No conviction history	16	9	6	7	38
Criminal record - court conviction(s)	0	0	1	0	1
DVLA offences only	0	2	1	0	3
Unknown	10	9	7	3	29
Total	**26**	**20**	**15**	**10**	**71**

Table E-92: Number of other driver in collisions by drink-driving convictions following collision with motorcycle

Drink driving	2006	2007	2008	2009	Total
Yes	0	0	0	1	1
No	26	18	13	8	65
unknown	0	2	2	1	5
Total	**26**	**20**	**15**	**10**	**71**

Table E-93: Number of other driver in collisions by speeding convictions following collision with motorcycle

Speeding	2006	2007	2008	2009	Total
Yes	0	0	0	1	1
No	26	18	13	8	65
unknown	0	2	2	1	5
Total	**26**	**20**	**15**	**10**	**71**

Table E-94: Number of other driver in collisions by careless driving convictions following collision with motorcycle

Careless driving	2006	2007	2008	2009	Total
Yes	4	4	1	2	11
No	22	14	12	7	55
unknown	0	2	2	1	5
Total	**26**	**20**	**15**	**10**	**71**

Table E-95: Number of other driver in collisions by dangerous driving convictions following collision with motorcycle

Dangerous driving	2006	2007	2008	2009	Total
Yes	0	2	1	2	5
No	25	16	12	7	60
unknown	1	2	2	1	6
Total	**26**	**20**	**15**	**10**	**71**

Table E-96: Number of other driver in collisions by construction and use convictions following collision with motorcycle

Construction and use	2006	2007	2008	2009	Total
Yes	0	0	0	1	1
No	26	18	13	8	65
unknown	0	2	2	1	5
Total	**26**	**20**	**15**	**10**	**71**

Table E-97: Number of other driver in collisions by convictions for other motoring offences following collision with motorcycle

Other motoring offences	2006	2007	2008	2009	Total
Yes	1	1	1	3	6
No	25	17	13	6	61
unknown	0	2	1	1	4
Total	**26**	**20**	**15**	**10**	**71**

Table E-98: Number of other driver in collisions by special personal circumstances of driver

Special personal circumstances	2006	2007	2008	2009	Total
Driver not in vehicle at time of collision	0	1	0	0	1
due to memory loss DVLA took licence away 1 year before accident	0	1	0	0	1
Had just finished night shift - possible fatigue	1	0	0	0	1
Lives in Germany, was given bail address	1	0	0	0	1
Mauritian/international driving licence. In UK for >1 year so should have UK licence	0	0	1	0	1
No suspect, deceased responsible for the collision.	0	1	0	0	1
purpose = driving girlfriend to work	0	0	1	0	1
Vehicle made no impact with PTW, however PTW manoeuvre was as a result of this vehicle doing a u-turn	0	1	0	0	1
Vehicle speed limited to 40mph	0	0	1	0	1
None	24	16	12	10	62
Total	**26**	**20**	**15**	**10**	**71**

Table E-99: Number of other vehicles in collisions by vehicle type

Vehicle Type (ACCSTATS)	2006	2007	2008	2009	Total
06 Private Hire - Licensed	0	0	1	0	1
08 Taxi	0	1	0	1	2
09 Car	16	8	8	6	38
10 Minibus (8-16 Pass)	1	0	0	0	1
11 Bus/Coach	0	1	0	1	2
14 Oth Mot Veh	0	1	3	0	4
19 Gds =< 3.5t	4	2	1	0	7
20 Gds 3.5-7.5t	1	3	0	0	4
21 Gds => 7.5t	3	2	2	1	8
unknown	1	2	0	1	4
Total	**26**	**20**	**15**	**10**	**71**

Table E-100: Number of other vehicles in collisions by vehicle manoeuvre

Vehicle Manoeuvres (ACCSTATS)	2006	2007	2008	2009	Total
01 Reversing	1	0	0	0	1
02 Parked	0	1	0	0	1
03 Going Ahead Held Up	0	0	0	1	1
04 Slowing Or Stopping	1	3	1	0	5
05 Moving Off	1	0	1	0	2
06 U-Turning	0	1	2	0	3
07 Turning Left	1	1	1	0	3
09 Turning Right	9	5	5	4	23
12 Change Lane To Right	1	0	0	0	1
13 Overtake Move Veh O/S	1	1	0	0	2
15 Overtaking Nearside	0	0	0	1	1
16 Going Ahead Left Bend	0	0	0	1	1
18 Going Ahead Other	10	6	5	2	23
unknown	1	2	0	1	4
Total	**26**	**20**	**15**	**10**	**71**

Table E-101: Number of other driver in collisions by driver sex

Driver Sex (ACCSTATS)	2006	2007	2008	2009	Total
1 Male	16	16	15	6	53
2 Female	7	2	0	3	12
3 Not Traced	2	0	0	0	2
unknown	1	2	0	1	4
Total	**26**	**20**	**15**	**10**	**71**

Table E-102: Number of other vehicles in collisions by foreign registered

Foreign registered vehicle (ACCSTATS)	2006	2007	2008	2009	Total
yes	1	0	0	0	1
no	24	18	15	9	66
unknown	1	2	0	1	4
Total	**26**	**20**	**15**	**10**	**71**

E.3.1 HGVs/buses only

Table E-103: Number of HGVs/buses/coaches in motorcyclist collisions in sample by presence of offside main mirror

Offside main mirror	2006	2007	2008	2009	Total
yes	4	2	2	0	8
unknown	0	4	0	2	6
Total	**4**	**6**	**2**	**2**	**14**

Table E-104: Number of HGVs/buses/coaches in motorcyclist collisions in sample by presence of nearside main mirror

Nearside main mirror	2006	2007	2008	2009	Total
yes	4	2	2	0	8
unknown	0	4	0	2	6
Total	**4**	**6**	**2**	**2**	**14**

Table E-105: Number of HGVs/buses/coaches in motorcyclist collisions in sample by presence of offside wide angle mirror

Offside wide angle mirror	2006	2007	2008	2009	Total
Yes	2	0	1	0	3
No	1	0	1	0	2
unknown	1	6	0	2	9
Total	**4**	**6**	**2**	**2**	**14**

Table E-106: Number of HGVs/buses/coaches in motorcyclist collisions in sample by presence of nearside wide angle mirror

Nearside wide angle mirror	2006	2007	2008	2009	Total
Yes	3	0	2	0	5
unknown	1	6	0	2	9
Total	**4**	**6**	**2**	**2**	**14**

Table E-107: Number of HGVs/buses/coaches in motorcyclist collisions in sample by presence of close proximity mirror

Close proximity mirror	2006	2007	2008	2009	Total
Yes	1	0	2	0	3
unknown	3	6	0	2	11
Total	**4**	**6**	**2**	**2**	**14**

Table E-108: Number of HGVs/buses/coaches in motorcyclist collisions in sample by presence of front mirror

Front mirror	2006	2007	2008	2009	Total
Yes	0	0	1	0	1
unknown	4	6	1	2	13
Total	**4**	**6**	**2**	**2**	**14**

Table E-109: Number of HGVs/buses/coaches in motorcyclist collisions in sample by presence of offside protective guard

Off-side protective guard	2006	2007	2008	2009	Total
unknown	2	5	0	2	9
No	0	0	1	0	1
Yes	2	1	1	0	4
Total	**4**	**6**	**2**	**2**	**14**

Table E-110: Number of HGVs/buses/coaches in motorcyclist collisions in sample by presence of nearside protective guard

Near-side protective guard	2006	2007	2008	2009	Total
unknown	2	5	0	2	9
No	0	0	1	0	1
Yes	2	1	1	0	4
Total	**4**	**6**	**2**	**2**	**14**

Appendix F Motorcyclist clothing and PPE

This appendix explains the options available to motorcyclists when choosing their riding gear, and the legal requirements that may be considered when those choices are made. A breakdown of the range of rider equipment suitable for road riders is described.

F.1 Legal requirements and limitations

There is just one legally-required item which must be worn by all motorcyclists: a helmet meeting the appropriate legislation. All other items are used at the rider's discretion; often, items of clothing used by motorcyclists will not be manufactured specifically for motorcycling.

Of items specifically designed for riding, eye protection (whether by goggles, visors or other equipment) is the only item which has a legal requirement to meet the appropriate standard – although there is no requirement for riders to wear any type of eye protection.

Purpose-designed clothing and equipment available to riders only qualifies as 'protective' if specific test standards have been met; individual standards cover:

- Gloves
- Boots
- Clothing (abrasion resistance, burst strength, cut resistance)
- Impact protectors
- Back protectors.

Clothing that has not been tested and approved to the available standards will not necessarily offer equivalent level of protection.

The implications for riders of equipment not displaying such accreditation are in two areas:

- Equipment which has not been accredited may not be advertised as giving 'protection'
- Purchasers will not be aware of the level of protection which their equipment might offer

F.2 Likely injuries

There are two main ways in which riders are likely to be injured during crashes:

- Impact, typically with the road surface or kerb, roadside objects such as signs, walls and trees, or with other vehicles. The severity of injury sustained may be reduced by impact protectors, which can either cushion or spread direct impact. These protectors are usually placed over joints (elbows, shoulders, knees), the back and occasionally other areas (collar bones, hips, chest).
- Abrasion, usually from sliding or rolling along the road surface. These injuries, which may result in the loss of skin, soft tissue, or bone, can be reduced or eliminated by the outer fabric of the rider's clothing. Historically, good quality leather has provided the highest levels of protection, but more recently some

man-made fabrics are achieving equivalent abrasion resistance. However, to provide protection the clothing must remain intact, relying on the material's tear resistance, abrasion resistance and seam strength. Additional thicknesses of material may be placed over vulnerable areas.

F.3 Options and choices

A wide variety of equipment is available to riders, who must select that appropriate to their specific requirements. Typically, these choices are based on certain criteria:

- The conditions they will be riding in (e.g. adverse weather)
- The machine ridden (e.g. 'race' leathers on a 'sports' motorcycle)
- The riding they will be doing (e.g. commuters wearing weather-proof 'motorcycle' clothing over 'office' clothing)

Similarly, riders will make comprises when selecting equipment:

- Protection; although the highest levels of impact and abrasion resistance are usually offered by racing leathers, these offer little or no protection against adverse weather conditions and will require the rider to change into other clothing when they reach their destination.
- Price; many riders are unable to commit to the cost of much high-end motorcycle clothing – some two piece 'touring' suits are priced at about £1000.
- Style; Some riders will demand that their riding equipment is matched to the image portrayed by their motorcycle, others will be influenced by fashion trends.

F.3.1 Helmet

A wide range of helmets are available, but they fall into three main categories:

- 'Open' face; in the event of a crash, these helmets offer no protection to the rider's face. However, in hot weather there is increase comfort for the wearer. When wearing these helmets, eye protection is usually provided by a supplementary visor or goggles.
- 'Full face'; these helmets have an integrated chin bar and pivoted visor. Although providing superior facial protection – both to injury and adverse weather protection- compared to the 'open' face helmets, since the rider's face is enclosed they can be hot and claustrophobic.
- 'Flip' front; these helmets feature a pivoting front section, usually the chin bar and visor, which can be raised when required (although not usually when riding).

The most important aspect of helmet selection is to ensure that the correct fit, both for comfort (a tight helmet can cause considerable discomfort) and safety (a loose helmet may leave the rider's head during a crash). An essential part of the process of helmet fitting is to ensure that the helmet cannot be removed with the strapped tightened.

Visors, as used on full face and flip front helmets, are typically coated to offer a degree of abrasion resistance. However, this is to resist light wear and scratching which would otherwise reduce the rider's vision, particularly at night where the scratches can cause 'starring' from light sources such as headlamps. Similarly, a range of anti-mist

treatments are available to reduce the problem of the visor misting on the inside, usually caused by the rider's exhaled breath.

Some riders who wear open face helmets also use face masks of various types to give additional protection from adverse weather. Also available are face masks which incorporate activated charcoal filters to remove dust etc.

SHARP – The helmet rating scheme

The Safety Helmet Assessment and Rating Programme (SHARP), helps motorcyclists to make informed choices when choosing a helmet. The SHARP website (http://sharp.direct.gov.uk/home) provides information on 'Helmet Fit', 'Testing' and 'Advice'.

The website states that

"The most important thing to consider when choosing your helmet isn't the brand name or how it looks. The secret to providing yourself better head protection is in getting the right fit."

A comprehensive study of motorcycle accidents across Europe (COST 327(2001) Final Report of the Action) showed that 12 % of helmets were lost during the course of the impact. Wearing a helmet that fits correctly dramatically increases your chances of surviving a crash.

"After all, even a SHARP five-star helmet won't protect you if it's not on your head at the point of impact."

SHARP publishes the results of helmet impact tests and compares different makes and models, giving a five star scoring system. The programme aims to provide independent and objective advice on the safety performances of UK motorcycle helmets

Finally, the programme offers up to date advice with respect to looking after the most important piece of kit a motorcyclist will own.

F.3.2 Clothing

Motorcycle clothing has to accommodate wide-ranging requirements dependant on the rider's intended use. Since these requirements vary considerably, there is a wide range of gear available.

However, some riders will choose to ride in 'normal' 'day-to-day' clothing, others will use clothing designed for alternative activities such as mountaineering or sailing, where similar adverse weather conditions are likely to be encountered.

Although the highest levels of protection against injury are likely to be provided by rider equipment designed for racing (such as 'heavyweight' leather suits), other aspects such as practicality, weather protection and carrying a change of clothes into work need to be considered.

Materials from which clothing is constructed range from leather (typically cowhide, although kangaroo, goat and sheep are also used) to man-made fabrics (under brand names such as Cordura and Kevlar). Some suits will incorporate both materials, such as man-made materials as inserts into leathers suits whether 'stretch' is need to maintain good fit, or leather onto man-made suits for additional abrasion resistance.

Although high levels of protection are traditionally associated with leather suits, there are several suits available, manufactured from man-made materials, which have CE certification for the suit itself as well as the impact protectors (which have separate certification). A wide range of clothing manufactured from both types of material are available with CE protectors inserted into 'pockets' within the clothing; when purchasing and using these suits the rider can only visually check the clothing to attempt to determine the build and material quality. Some guidance can be given to purchasers, for example on the quality and quantity of stitching; it is impossible, however, for the purchaser to determine material quality, for example the thickness of leather used.

Riders may be exposed to extremes of adverse weather conditions, so their riding equipment must reflect this. Clothing designed to meet these conditions may include removable thermal linings and zippered vents to allow air flow in hot weather. Similarly, a variety of waterproofing methods are used, although very few waterproof leather suits are available. However, removing thermal linings means that the fit of the suit may change; some suits allow adjustment to help ensure that impact protectors remain in the correct position.

Also, some rider clothing is designed to look 'non-motorcycle', examples of this include reinforced denim jackets and jeans, with abrasion-resistant linings and impact protectors. Undersuits are available which incorporate protectors, allowing the use of lighter-weight clothing.

F.3.3 Gloves

One of the main items of equipment where riders must compromise is gloves; this is necessary in order to maintain dexterity when using the controls (a motorcycle's main controls of throttle, front brake and clutch are typically controlled by hand). However, the rider's hands are susceptible to injury, so require both impact and abrasion protection. Furthermore, extremes of weather could require insulation and waterproofing, or ventilation. It is unlikely that one pair of gloves could provide high levels of protection and suitability for all weather conditions.

Unlined 'racing' gloves are more suited to good weather conditions. Typically, these gloves would have reinforced palms and armoured protection for the knuckles. Vents or small holes may be provided for hot weather use.

Winter-weight gloves are likely to use a combination of man-made and natural materials, with additional waterproof and insulating linings.

There are very few gloves available which carry CE certification.

F.3.4 Boots

The range of boots available to riders is extensive, both in the amount of protection given (whether impact or abrasion, or waterproofing) and styles available, such as lighter-weight 'race' or heavyweight off-road. However, similar to gloves, there are few CE certified boots available.

F.3.5 Additional Equipment

For riders requiring additional protection, extra equipment is available, although not CE certified:

- ‘Airbag’ technology, whether designed as part of the main garment (either in a leather suit or a man-made fabric jacket) or as a waistcoat worn over the rider’s main garment.
- Neck brace, originally designed for off-road riders to protect against neck injuries, is available in a ‘road’ version.

During cold weather, riders may choose to supplement their usual clothing with additional clothing. This can include electrically-heated clothing such as waistcoats and glove liners.

Appendix G Further collision details for fatalities with helmets displaced in collision

Table E-1: Number of fatalities with helmets displaced in collision by fatality age group

Fatality age group	Total
15-19	3
20-24	5
25-29	3
35-39	2
40-44	2
45-50	1
>50	1
Total	**17**

Table E-2: Number of fatalities with helmets displaced in collision by motorcycle type

Motorcycle type		Total
Scooter	Moped	3
	Other	3
Retro		4
Sports		5
Trail		1
unknown		1
Total		**17**

Table E-3: Number of fatalities with helmets displaced in collision by type of licence

Type of licence held	Total
Full PTW	6
No licence	2
Provisional PTW	6
Unknown	3
Total	**17**

Table E-4: Number of fatalities with helmets displaced in collision by experience

Experience	Total
Experienced	2
Inexperienced	7
known to have at least 5 years of experience	1
Unknown	7
Total	**17**

Table E-5: Number of fatalities with helmets displaced in collision by whether the motorcycle was exceeding the speed limit

Speeding	Total
Not speeding	8
Speeding	7
Unknown	2
Total	**17**

Table E-6: Number of fatalities with helmets displaced in collision by whether the motorcyclist was impaired

Impairment	Total
Alcohol	3
Drugs	1
Multiple (alcohol + drugs)	1
None	12
Total	**17**