Analysis of Cycle Law Scotland Case Data

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1. Executive Summary

This report presents a study of cyclist casualties known to a legal practice called Cycle Law Scotland (CLS). This practice specialises in seeking compensation for cyclists injured in crashes. During a period of just over two years ending August 2013, 151 cases became known to CLS, and the details collected on a spreadsheet. These data have been analysed in terms of:

- sex and age group of cyclist
- geographic location of incident
- severity of injury
- helmet use
- road class and speed limit
- month and time of incident
- weather
- visibility of cyclist
- unreported incidents
- where the incident happened
- what happened in the incident

In each case, a short commentary highlights any interesting implications of the findings. It should be noted that this is not a random sample, but a self-selected group amounting to about 5% of the reported cycling casualties in Scotland in the period. As such, it is not necessarily representative of all cyclist casualties. However, a number of comparisons have been drawn with public data. These show that the dataset is representative in most respects. The main exceptions were that helmet use in the CLS dataset was higher than is typical, and the CLS dataset contained no incidents in which the cyclist was obviously at fault. Children were under-represented in the CLS data, whereas the 18-30 age group somewhat over-represented.

A number of interesting observations may be drawn from the CLS and public data:

- Most cyclist casualties in collisions are due to errors by drivers;
- The main risk of collision is at junctions, at least on urban roads;
- At junctions, vehicles turning off the road of travel are just as much risk as those pulling out from side roads;
- The PM Peak period appears to incur twice the risk to cyclists as the AM Peak period;
- Beneath the reported cyclist casualties is a significant extent of unreported casualties, many of which involve non-trivial injuries such as fractures and severe bruising. This number may be similar to reported “slight” casualties. This may also be true – and on a greater scale – for pedestrians.
- Cyclists and pedestrians inflict negligible harm on each other.

2. Introduction

Cycle Law Scotland is a law practice that represents cyclists seeking compensation following injury believed to have been due to the negligence of a third party. CLS collected information on a total of 151 incidents, which occurred between May 2011 and August 2013. This report is an analysis of those 151 incidents. The objective was to collate the data and comment on any significant patterns or tendencies that emerged.

It should be noted that this is not a random sample of cyclists, nor a random sample of cycling accidents. These cases became known because the cyclist chose to seek compensation through legal process. This means that the dataset is the outcome of "selective recruitment". As a result, certain types of incident may be under- or over-represented. To check this point, the dataset has been compared with three public analyses of reported cycling accidents:

- the On The Spot (OTS) Survey[1] of road accidents by the Department for Transport (DfT), which draws on urban incidents reported in Nottinghamshire & Thames Valley regions since 1999.
- the Bicycle Incident Analysis Report[2] (2012) (BIAR) of Edinburgh City Council (ECC), an investigation of reported cycling accidents in Edinburgh during 1996-2010.
- The annual report[3] of reported road casualties in Scotland produced by Transport Scotland.

3. Number of Cases

The 151 crashes happened during a 28 month period ending August 2013. There are no published data on the specific number of reported cycling accidents in Scotland during this period. During the two complete years 2011 and 2012, the most recent for which figures are available, there were a total of 1,725 reported cycling accidents in Scotland. The CLS dataset includes 57 incidents that were not reported to the police (or if they were, this was not made known to CLS). Therefore, it may be estimated that the CLS dataset amounts to about 5% of reported cycling accidents in the 28 month period.

4. Sex and Age Group of Cyclist

Sex of Cyclist	Male	Female	Total
	126	25	151
%	83%	17%	100%

The strong predominance of males in the CLS dataset matches the national profile of cycling participation. The National Travel Survey[4] (NTS) reports that males account for 80% of distance travelled by bicycle in the UK.

Age Group of Cyclist	<18	18-30	31-40	41-50	51-60	>60	No	Total

							Record	
	2	43	41	40	15	9	1	151
o/w male	2	33	34	35	12	9	1	126
% male	100%	77%	83%	88%	80%	100%	100%	83%

The CLS age group profile is also fairly consistent with national participation. NTS data show that the age groups 31-40 and 41-50 are the keenest cyclists. In the CLS dataset, the 18-30 age group appears over-represented, while Under 18's are severely under-represented. The latter age group covers 12% of UK miles cycled, and Under-16's made up 17% of reported cycling casualties in Scotland during 2011 and 2012. It is possible there is a significant "invisible" social grievance of child cyclists being injured and not seeking compensation.

5. Geographic Location of Incident

Geographic Location	Edinburgh	Glasgow	Aberdeen	East	West	North	No Record	Total
	45	45	5	30	20	6	0	151
%	30%	30%	3%	20%	13%	4%	0%	100%

Key: "East" means from Borders up to Perth,
"West" means from Dumfries & Galloway up to Callander,
"North" means north of Perth-Callander line.

The geographic distribution is dominated by the Central Belt and the two largest cities. It is notable that the catchment is from all of Scotland, indicating the lack of any satisfactory legal representation in other parts of Scotland.

6. Severity of Injury

Severity of Injury (Police classification)	Slight	Serious	Fatal	No Record	Total
	57	34	3	57	151
%	38%	23%	2%	38%	100%

From national reported casualties one would expect, for each fatal injury, 20 serious injuries and 85 slight injuries. The very small number of fatal injuries in the CLS data make comparison with the Scottish national casualties subject to wide confidence limits. It is clear, though, that "slight" injuries are under-represented. This might appear reasonable, in that individuals may be less motivated to seek compensation for lesser injuries. On the other hand, this sensible explanation is contradicted by the large proportion of unreported accidents in the CLS dataset (more than a third). Almost all unreported accidents would be classed as “slight” casualties by the police. Could there be as many unreported accidents as reported “slight” ones?

7. Helmet Use

Injury Severity	Slight	Serious	Fatal	No record	Total
Helmet Used	38	28	1	32	99
Y%	67%	82%	33%	56%	66%
No Helmet	13	5	1	15	34
No Record	6	1	1	10	18
Total	57	34	3	57	151

Concerning helmet use, the main observation is that the general wearing rate was high relative to observed use. The DfT carried out national surveys of helmet wearing between 1994 and 2008. The last survey[5] showed the national average was 34%. In the five years since, helmet use has probably increased further, although it is hard to accept it has doubled. The DfT research did note, though, that helmet use was higher in Scotland than in the rest of the UK (although did not publish a separate figure).

The relatively high helmet use found in the CLS dataset could be because those who wear a helmet are more likely to use the legal process. This suggestion arises from a wide range of data showing that helmet use is strongly associated with social class.

It is noted that helmet wearing was higher amongst serious casualties than slight. However, the numbers are small and subject to many confounding factors due to the data not being a random sample. Therefore, no conclusion is drawn on this point.

8. Road Class and Speed Limit

Class of Road	A	B	Uncl'd	No Record	Total
	73	17	57	4	151
%	48%	11%	38%	3%	100%

Speed Limit	Slight	Serious	Fatal	No Record	Total
Up to 20		1		2	3
>20 to 30	45	28	1	40	114
>30 to 40	5	0	1	2	8
>40	7	5	1	9	22
No Record				4	4
Total	57	34	3	57	151

DfT (and other) analyses[6] show that cycling risk increases with traffic speed. Therefore one would expect to see the most serious cases tending to have happened within higher speed limits. This can in fact be observed. Comparing the ">20 to 30" class with ">40", the latter has a higher proportion of fatal or seriously injured casualties. In addition, it is probably significant that half of all the cases occurred on A-roads.

However, two of the three fatalities occurred on B-roads.

9. Month and Time of Incident

Month of Incident	Jan	Feb	Mar	Apr	May	Jun
CLS	4	5	6	11	16	20
CLS %	3%	3%	4%	7%	11%	13%
Transport Scotland	6%	5%	7%	7%	10%	10%

Month of Incident	Jul	Aug	Sep	Oct	Nov	Dec	Total
CLS	6	21	15	28	12	7	151
CLS %	4%	14%	10%	19%	8%	5%	100%
Transport Scotland	10%	11%	11%	9%	9%	5%	

Time of Incident	AM Peak	PM Peak	Night	Day	No Record	Total
	0700-0900	1600-1900]	1900-0700	0900-1600	n/a	
CLS	29	36	24	47	15	151
CLS %	19%	24%	16%	31%	10%	100%
Transport Scotland	16%	30%	18%	36%	n/a	100%

Reported road casualties from Transport Scotland show that May to September are the peak months, with 10-11% of the annual number in each month. This summer plateau declines to 5% in December. The CLS dataset follows a broadly similar trend, with the exception of October, which shows a distinct excess of incidents. Suspicions might be raised by October being the month in which the clocks change. However, inspection of the times of the CLS incidents in October month shows just over half occurring in the AM Peak or PM Peak periods. This is similar to the average for all months. The high October %age is probably chance.

Concerning the incident times, the CLS data follow the pattern of Transport Scotland reported casualties. It is notable that twice as many casualties (in Transport Scotland data) are suffered in the evening peak relative to the morning peak. This strongly suggests the evening peak is a riskier time to cycle.

Note that weekends were not separated as day of the week was not recorded in the CLS spreadsheet.

10. Weather

The weather was recorded using a variety of descriptions. Keywords were used to class broadly similar conditions:

Weather Conditions	Not Known	Fine, good, clear, bright	Wet or raining	Dark/dusk	Other/overcast
	29	66	11	20	25
%	19%	44%	7%	13%	17%

Given the Scottish climate, wetness features surprisingly rarely. Cycle use is significantly affected by the weather, and whether daylight. The relatively few incidents at night is because cycling is less common at night, rather than it being safer at night. In fact, the risks of cycling are higher at night[7] (this will be to some extent affected by intoxication). Similarly the greater proportion of incidents in fine weather is due to more cycling when it is dry and clear, which is also when cycling is safest.

11. Visibility of Cyclist

A wide range of descriptions was used to describe clothing in the CLS spreadsheet.

To simplify the analysis, all descriptions were collected into three groups: bright, fluorescent, or high vis clothing, including the use of lights; other clothing, or without lights; and no info:

Bright, high vis, fluorescent, reflective, light, yellow, lights or bright	53	35%
Other clothing	48	32%
No info	50	33%

As with other results, it must be borne in mind that this is not a random sample of casualties. In addition, one third of cases have no information. It is therefore difficult to draw any conclusion from these figures.

Formal research[8] finds that by far the most effective visibility aids are “biomotion” reflectors. These include pedal reflectors and reflective ankle straps. Fluorescent clothing is relatively ineffective, as it requires ultra-violet light, which is lacking at night or poor light. It is even suggested that wearing bright clothing may create a sense of visibility that is not justified.

12. Unreported Incidents

"No Record" of injury classification (assumed unreported)	Involved a motor vehicle?		
	Yes	No	Total
	46	11	57
	Police attended?		
	Yes	N/a or unclear	
	17	40	

57 of the 151 incidents in the spreadsheet had no injury classification assigned by the police and were assumed to have been unreported. If the police did attend the incident, it would appear they did not complete a STATS19 form.

Cyclist crashes not involving a collision are rarely attended by the police and are not usually reported in the STATS19 system. However, of these 57 incidents, 46 did involve collision with a motor vehicle. Inspection of the description of the injuries show that a number were non-trivial, involving fractures, severe bruising and some head injuries. None of the incidents were recorded as requiring hospital admission.

This supports other evidence that, beneath the visible injury record of reported casualties, is a substantial extent of injury from motor vehicles not becoming known through police reporting. It would be useful to know if this were also true for pedestrian injuries.

However, it should be stressed that few genuinely serious casualties go unreported by the police. Comparison of police "serious" casualties with hospital admissions show good agreement in cases of motor vehicle involvement[9]. On the other hand, cyclists hospitalised after simply falling off their bikes are unlikely to be recorded by the police, as already noted.

13. Where the Incident Happened

Where the Incident Happened	At Junction?		
	Yes	No	Total
CLS data	84	67	151
%	56%	44%	100%
DfT OTS Urban Survey	60%	40%	100%
Transport Scotland RRC's	69%	31%	100%

The CLS dataset shows a modest tendency towards accidents happening at junctions. This tendency is actually less marked than is found in other data. The Department for Transport has run an On The Spot (OTS) accident analysis since 1999. This involves teams based in Thames Valley and Nottinghamshire regions investigating a random sample of about 250 reported road accidents per year. The OTS results presented here were from 100 randomly selected urban cycling accidents. An additional comparison comes from the reported road

casualty record for cyclists available from the Transport Scotland web site. All of these data support an established conclusion that junctions are places of particular hazard for cyclists.

14. What Happened in the Incident?

What Happened in the Incident?	CLS Data	%	DfT OTS Urban Survey	ECC BIAR Accident Study
Vehicle turned off into side road, or U-turned (TU)	36	24%	12%	27%
Vehicle pulled out from side road or parking space (F)	35	23%	35%	20%
Vehicle Overtaking (O)	32	21%	9%	14%
On Roundabout (R)	21	14%	n/a	n/a
Dooring (D)	9	6%	2%	8%
Non-Collision (N/A)	9	6%	n/a	6%
Other (OTH)	8	5%	8%	6%
Pedestrian (P)	1	1%	0%	1%
Cyclist's Action (CA)	n/a	n/a	34%	18%
TOTAL	151	100%	100%	100%

Notes:
The DfT OTS Survey is a random sample of urban cycling casualties (all severities)
The ECC BIAR data are K/SI casualties only in Edinburgh during 1999-2010.
Roundabouts were not separated in the public surveys and are assumed included in TU and F.

This section aims to investigate the events according to driver error. The resultant pattern is then compared with two available datasets, one being the DfT OTS study introduced in the previous section, the other being a report by Edinburgh City Council called the "Bicycle Incident Analysis Report". The datasets do not contain perfectly compatible presentations of events, but as much as possible they have been reclassified according to the breakdown used for the CLS data.

The CLS dataset is dominated by incidents due to drivers' incompetent turning manoeuvres. Almost half of the incidents were due to drivers turning off the road of travel, or pulling onto it, or U-turning. If roundabouts are added, the proportion rises to 61% of the CLS incidents. The other two data bases showed a similar pattern. It is notable that as many incidents were due to cars turning off the road of travel, as pulling on to it.

In contrast, casualties due to overtaking traffic were much less common, making up just over one fifth of the CLS cases and even less in the other datasets. Note that roundabouts were not distinguished in the two public datasets and are assumed included in classes TU, F and O.

Incidents attributed to error by the cyclist are, not surprisingly, absent from the CLS cases. However, even in the all-embracing datasets, cyclists' actions (CA) were a minority factor, making up about a third of the OTS urban casualties and less than a fifth of the Transport Scotland data.

Interaction with pedestrians was negligible in all the datasets.

Being "doored" made up 6% of the CLS cases, and similarly small percentages in the public datasets.

Overall, the analysis confirms what is already known:

- cyclists are primarily the victims of bad driving;
- they inflict negligible harm on others;
- only a modest %^{age} of casualties is due to cyclists' own errors.

These findings place an ironic frame around the common judgement that "cycling is dangerous".

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[1] Knowles J et al. Collisions involving cyclists on Britain's roads; establishing the causes. Technical Annex Appendix D of PPR445, Transport Research Laboratory, Crowthorne, 2009.

[2] Guild C. Bicycle Incident Analysis Report. Edinburgh City Council, 2012.

[3] Reported Road Casualties Scotland 2012. Transport Scotland.

http://www.transportscotland.gov.uk/analysis/statistics/TablesPublications/2012RCS-Cas

[4] National Travel Survey 2012. Department for Transport.

https://www.gov.uk/government/publications/national-travel-survey-2012

[5] Sharratt et al. Cycle helmet wearing in 2008. Report PPR 420. Transport Research Laboratory, 2009.

[6] See Table 30018 in Reported Road Casualties Great Britain 2011, Department for Transport, showing risk increases with road class.

https://www.gov.uk/government/publications/reported-road-casualties-great-britain-annual-report-2011

[7] Huhn R. Night-time cycling accidents, lights and laws in Europe. Paper presented at International Cycling Safety Conference, Helmond, NL November 2013.

http://www.icsc2013.com/abstracts/huhn2013nighttime-abstract.pdf

[8] Wood JM et al. Cyclist visibility at night; perceptions of visibility do not necessarily match reality. *Journal of the Australasian College of Road Safety*, Aug 2010 pp56-60.

[9] See p68 of Road Casualties Great Britain 2006, Department for Transport, 2007.