

Motorcycle crash parameters and its influence on driver injuries

Tomasz Bońkowski¹, Radek Kottner², Luděk Hynčík³

1 Introduction

According to past studies: König at al. (2007) and DEKRA (2010) PTW (Power Two Wheelers) contribution of death on roads in OECD countries still remains at high level (14-15% of all road fatalities in 2001). Therefore, research on PTW riders' protection should be continued. Especially with reference to situation in the Czech Republic, where fatalities of motorcycle drivers are 5 times higher than EU average (Figure 1). The aim of this study is to find out which parameters and configuration during motorcycle accident cause greatest driver injury.

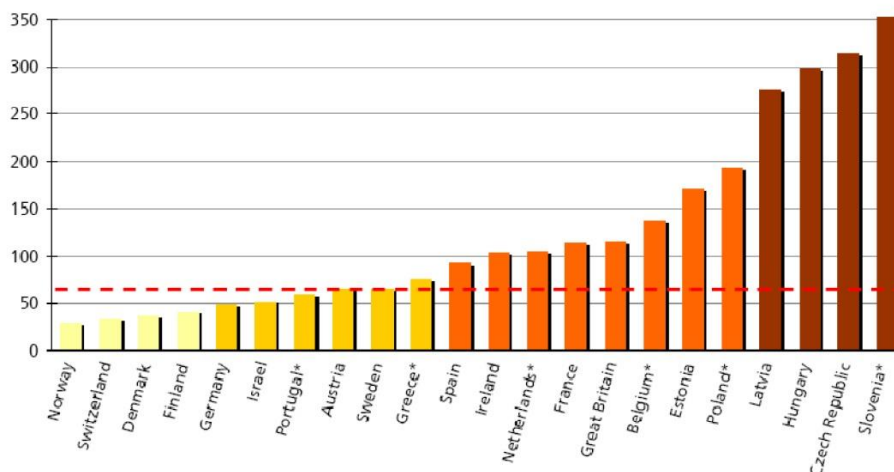


Figure 1: PTW rider deaths per billion km in 2006 (Perlot (2010)).

2 Motorcycle Accident Database

For direct access to accident data the ACEM MAIDS database was selected. MAIDS (Motorcycle Accidents In-Depth Study) can be described as an exhaustive in-depth database which contains PTW accident data from Europe. Using the support of European Commission ACEM with group of 9 partners started process of MAIDS creation in 1999. It was build using OECD common research methodology Yannis at al. (2013). Data was collected during 3 years from 5 EU countries, 921 PTW accidents have been investigated. Questionnaire which was used to describe accidents contains 2000 variables. Accident patterns were identified for each of 5 EU countries (France, Germany, Netherlands, Spain and Italy).

Crash speed was identified as a one of the most important parameters during an accident. With this primary assumption, analysis on the accident database was made. The

¹ student of doctoral study programme Applied Science and Informatics, field Mechanics, specialization Applied Mechanics, e-mail: tomasz@ntis.zcu.cz

² NTIS – New Technologies for Information Society, e-mail: kottner@kme.zcu.cz

³ NTIS – New Technologies for Information Society, e-mail: hyncik@kme.zcu.cz

cross-table (Table 1) of MAIS (Maximum Abbreviated Injury Scale) MacKenzie et al. (1985) versus crash speed was made using IBM SPSS statistical software.

Crash speed	MAIS								Total
	none	minor	moderate	serious	severe	critical	maximum	no further specified	
0-25 km/h	4	122	61	17	4	5	0	3	216
26-50 km/h	5	177	147	47	10	14	6	22	428
51-75 km/h	5	34	54	37	10	6	4	17	167
76-100 km/h	0	6	21	18	5	3	2	11	66
101+ km/h	1	7	10	6	1	6	3	10	44
Total	15	346	293	125	30	34	15	63	921

Table 1: Maximum injury vs. Crash speed.

3 Conclusion

Conducted analysis shows great influence of crash speed on motorcycle driver maximum injury. Share of injuries higher than AIS3 (serious – maximum) grows with increase of the crash speed. For speed higher than 50 km/h and lower than 75 km/h, AIS3+ injuries are more than 34 % of all injuries. It rises even higher in range 76-100 km/h to 42 % of all injuries in this speed.

Based on the study, we can make a conclusion that more attention should be paid to reducing crash velocity and protecting motorcycle occupant during high speed accidents.

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