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LIVES TO SAVE
European Road Safety Charter
www.maids-study.eu
MAIDS
In-Depth investigation of motorcycle accidents

Safety: a major challenge for road transport

The growing amount of traffic on European roads requires to address the issue of safety with a thorough and scientific understanding. Effective strategies need to be devised if we want to reduce fatalities. Powered Two-Wheelers are part of the transport mix, however PTW riders form one of the most vulnerable groups of road users. As a competent and reliable stakeholder in transport ACEM is committed to improving the road safety of powered two-wheeler users.

European citizens increasingly use PTWs because of their convenience and intrinsic advantages in terms of door to door mobility, flexibility, parking, costs and fuel consumption. The current fleet of PTWs in Europe amounts to approximately 30.000.000 vehicles and between 2.000.000 and 2.500.000 new PTWs are sold per year. Over the last few years, EU market trends clearly show that PTWs answer the mobility needs of an increasingly higher share of the European population.

Improving the knowledge about motorcycling safety

It is essential to deepen the knowledge about motorcycling accidentology in order to further improve the safety of this valuable mode of transport. The MAIDS study answers to a real need to understand the nature and the causes of moped and motorcycle accidents. ACEM, the Motorcycle Industry in Europe, conducted

this extensive in-depth study of motorcycle and moped accidents over a two-year period in five countries: France, Germany, Italy, Netherlands and Spain.

Maids - the most up to date and comprehensive in-depth study in Europe

MAIDS, Motorcycle Accident In-Depth Study, was co-funded by the European Commission. It is the only database entirely dedicated to PTW accidents. The information collected during this study represents the most comprehensive in-depth data currently available for PTW accidents in Europe. Since its publication in 2004 the MAIDS study provided much needed information for developing public policy issues and formed the basis for further research projects in road safety.

MAIDS investigated 921 accidents and 923 exposure cases

A total of 921 accidents were investigated in detail, resulting in approximately 2000 variables being coded for each accident. The investigation included a full re-construction of the accident; vehicles were inspected; witnesses to the accident were interviewed; and, subject to the applicable privacy laws, with the full cooperation and consent of both the injured person and the local authorities, pertinent medical records for the injured riders and passengers were collected. From this data, all the human, environmental and vehicle factors which contributed to the outcome of the accident were identified.

OECD methodology

The MAIDS team adopted the methodology developed by the Organisation for Economic Co-operation and Development (OECD) for on-scene in-depth motorcycle accident investigations in order to maintain consistency in the data collected in each sampling area.

Case control

To provide a basis for comparison data was collected in a further 923 cases on riders and PTWs that were not involved in accidents. The collection technique was specifically developed to meet the circumstances of this study and is commonly

referred to as an exposure or case control study. The information on PTW riders not involved in accidents was essential for establishing the significance of the data collected from the accident cases and the identification of potential risk factors in PTW accidents. For example, if 20% of non-accident involved PTWs in the sampling area were red, it would be significant if 60% of those PTWs involved in an accident were reported to be red, suggesting that there is an increased risk of riding a red PTW. On the other hand, if none of the PTWs in the accident sample were red, it would be an interesting finding, needing further study.

FIRST EVIDENCES

The PTW accident data collected in this study indicated that the object most frequently struck in an accident was a passenger car. The second most frequently struck object was the roadway itself, either as the result of a single vehicle accident or of an attempt to avoid a collision with an OV. Whilst each sampling area contained both urban and rural areas, the majority of the accidents took place in an urban environment. Travelling and impact speeds for all PTW categories were found to be quite low, most often below 50 km/h. There were relatively few cases in which excess speed was an issue related to accident causation.

The cause of the majority of PTW accidents collected in this study was found to be human error. The most frequent human error was a failure to see the PTW within the traffic environment, due to lack of driver attention, temporary view obstructions or the low conspicuity of the PTW.

Statistical analysis Identified risk factors

Once all the data had been collected, it was entered into a database for each sampling area and compared with the exposure data referred to above. Statistical analysis identified PTW accident risk factors by comparing the accident data to the exposure data. Thus, for example, the exposure data indicated that whilst scooters represented the majority of accident cases, they were not overrepresented in accidents in comparison with their presence in the sampling area (i.e., their exposure).

Our partners

- European Commission
- FEMA - Federation of European Motorcyclists Associations
- FIM - Fédération Internationale de Motocyclisme
- BMF- British Motorcyclists Federation
- CIECA - Commission Internationale des Examens de Conduite Automobile

MAIDS main findings

The 921 on-scene, indepth accident investigations have provided a large volume of data related to the general characteristics of PTW accidents; including accident causation and rider and passenger injury information. The outcome of these investigations can be considered in the identification, development and introduction of countermeasures.

In 37% of cases, the primary accident contributing factor was a human error on the part of the PTW rider. In some situations, the human errors that occurred involved skills that were beyond those that typical drivers or operators might currently have. This is often due to the extreme circumstances of some of the accident cases, including an insufficient amount of time available to complete collision avoidance.

Among the secondary contributing factors, PTW riders failed to see the other vehicle (OV) and they also made a large number of faulty decisions, i.e., they chose a poor or incorrect collision avoidance strategy. In 13% of all cases, there was a decision failure on the part of the PTW rider.

The number of cases involving alcohol use among the PTW riders was less than 5%, which is low in comparison to other studies, but such riders were more likely to be involved in an accident.

FIRST EVIDENCES

When the accident riders were compared to the exposure population, the data demonstrated that the use of alcohol increased the risk of being in an accident, although the percentage was lower than in other studies. Unlicenced PTW operators who were illegally riding PTWs that required a licence, were also found to be at greater risk of being involved in an accident when compared to licenced PTW riders.

In comparison to the exposure data, unlicenced PTW riders, illegally operating a PTW for which a licence is required, have a signifi cantly increased risk of being involved in an accident.

PTW riders between 41 and 55 years of age were found to be under-represented, suggesting that they may have a lower risk of being involved in an accident when compared to other rider age categories.

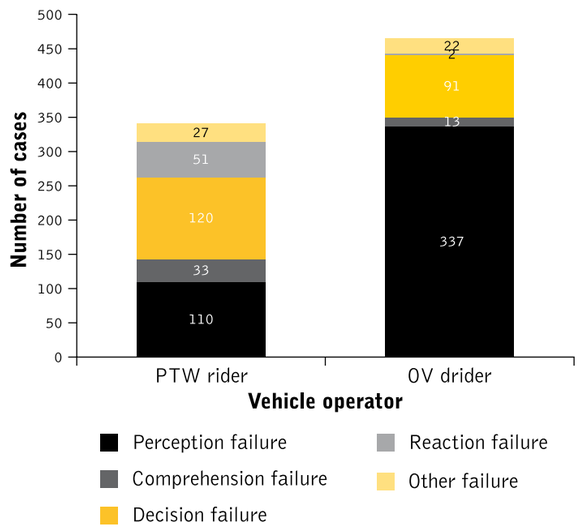
When compared with the exposure data, 18 to 25 year old riders were found to be over-represented.

In 50% of cases, the primary accident contributing factor was a human error on the part of the OV driver. (see chart A)

OV drivers holding PTW licences were less likely to commit a perception failure than those without a PTW licence, i.e., they did not see the PTW or its rider. (see chart B)

In about 1/3 of accidents PTW riders and OV drivers failed to account for visual obstructions and engaged in faulty traffic strategies.

Chart A



Traffic control violations were frequently reported, in 8% of the cases for PTW riders and in 18% for OV drivers.

Amongst the wide diversity of PTW accident and collision configurations that were observed in this study, not one confi guration dominated.

90% of all risks to the PTW rider, both vehicular and environmental, were in front of the PTW rider prior to the accident.

Among the primary contributing factors, over 70% of the OV driver errors were due to the failure to perceive the PTW. (see chart A)

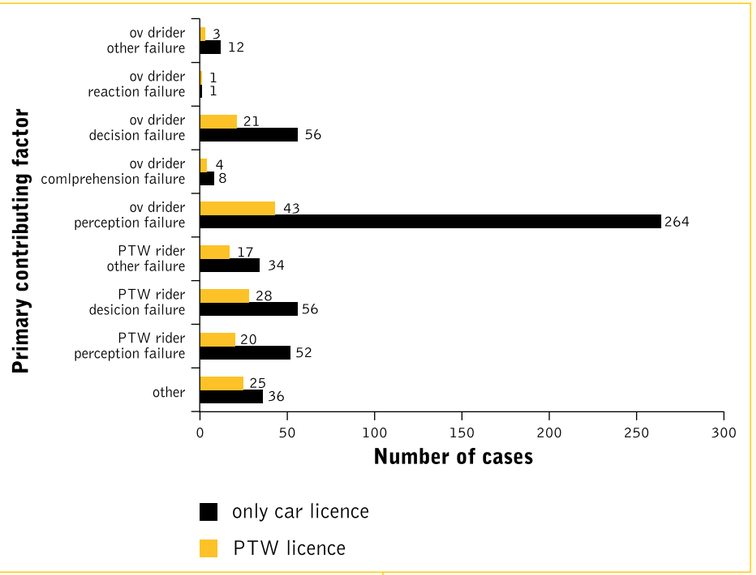
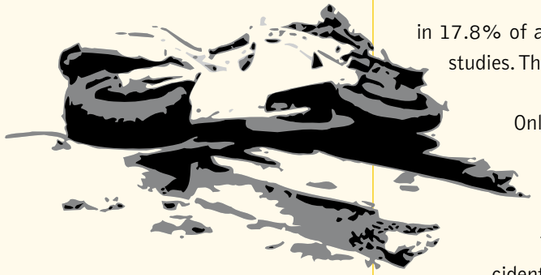


Chart B

The roadway and OVs were the most frequently reported collision partner. In 60.0% of accidents, the collision partner was a passenger car.

Tampering in order to increase performance was observed by visual inspection



in 17.8% of all moped cases. This value is lower than those reported in other studies. The exposure study only shows 12.3% of tampering.

Only modified conventional street motorcycles were found to be over-represented in the accident data. There was no evidence of an increased risk associated with riding any other PTW style.

There were PTW technical problems in less than 1% of the accidents. Most of these were related to the tyres, illustrating the need for regular PTW inspections by the owner. There were no cases found by the teams in which an accident was caused by PTW design or manufacture.

In over 70% of the cases the PTW impact speeds were below 50 km/h.

In 18% of all cases, PTW travelling speeds were greater than or less than the surrounding traffic and this speed difference was considered to be a contributing factor.

73.1% of all PTW riders attempted some form of collision avoidance immediately prior to impact. Of these, 32% experienced some type of loss of control during the manoeuvre.

90.4% of the PTW riders wore helmets. However, 9.1% of these helmets came off the wearer's head at some time during the accident, due to improper fastening or helmet damage during the accident. Overall, helmets were found to be an effective protective device to reduce the severity of head injuries.

55.7% of PTW rider and passenger injuries were to the upper and lower extremities. The majority of these were minor injuries, e.g. abrasions, lacerations and contusions. Appropriate clothing was found to reduce, but not completely eliminate,many of these minor injuries.

Roadside barriers presented an infrequent but substantial danger to PTW riders, causing serious lower extremity and spinal injuries as well as serious head injuries.

For PTW riders, a roadway maintenance defect caused the accident or was a contributing factor in 3.6% of all cases.

For PTW riders, a traffic hazard caused the accident or was a contributing factor in 3.8% of all cases.

Weather-related problems either caused the accident or contributed to accident causation in 7.4% of PTW accidents in the study.

ACEM makes the MAIDS database available to external research projects. Since the publication of the MAIDS report several analysts have referred to MAIDS and partnerships have been built in order to continue to make the most of the data gathered by the MAIDS team.

The complete study is available on

www.maids-study.eu

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