SWOT Analysis of the MAIDS Report
By the Motorcycle Action Group (MAG UK)
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Executive Summary

- The Association of European Motorcycle Manufacturers (ACEM) with the support of the European Commission and other partners conducted an extensive in-depth study of motorcycle and moped accidents during the period 1999-2000 in five sampling areas located in France, Germany, Netherlands, Spain and Italy. In this study a total of 921 accidents were investigated in detail.
- The Motorcycle Action Group UK (MAG UK) raised concerns about the methodology and findings of MAIDS with ACEM. The ACEM representative stated that the purpose of MAIDS was to identify ways of finding solutions because there are too many PTW fatalities; but as transpired, due to the lack of data, was unable to complete this task.
- ACEM states the MAIDS report is being presented as the base objective of scientific research and represents the first findings of the study but due to the fixed budget, further work on the report was not feasible. When MAG representatives requested that the authors accepted the limitations of the report and re-define it as a pilot study rather than as a definitive document on motorcycle accidents in Europe, the representative of ACEM declined because the EU Commission (a funding stakeholder) had insisted on publication of a final report.
- MAG UK has carried out a SWOT analysis: to identify the Strength, Weaknesses, Opportunities and Threats of the study. The greatest strength of the report is the finding that human error is the primary contributor of accidents – 50% of which are car drivers. This finding supports previous safety reports on motorcycling and opens up opportunities for educating the public on road awareness.
- The greatest weakness of MAIDS is that the report was commissioned and written for the Association of European Motorcycle Manufacturers. This becomes obvious on reading the report, for example the manipulation of the data has led to questionable findings regarding hardwiring and modified PTWs.
- After analysing the MAIDS report in detail, MAG UK has drawn its own conclusions and views it as just another study on safety by those with vested interests.

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Introduction

On the 24th of November 2004, the Association of European Motorcycle Manufacturers (ACEM) and its partners will present the Motorcycle Accident In depth Study (MAIDS) report to Members of the European Parliament, other stakeholders including the EU Commission as the final document of study as part of the launch of the industry safety strategy. In the UK, this report will be presented to the Department for Transport in early October. Therefore, the Motorcycle Action Group (MAG UK) requested a meeting with a representative from the Secretariat of ACEM. This was held on September 28th .in Brussels.

During the meeting issues arising from the report were discussed in relation to MAG's concerns about the methodology and findings of MAIDS. The ACEM representative stated that the purpose of MAIDS was to identify ways of finding solutions because there are too many PTW fatalities[1]; that the document is being presented as the base objective of scientific research and represents the first findings of the study. Furthermore that due to the fixed budget, further work on the report was not feasible.

While it was possible to clarify certain aspects of the document, overall the responses from the ACEM Secretariat did not satisfy the MAG representatives, who then asked that the publication of the MAIDS report be deferred or that the authors accepted the limitations of the report and re-define it as a pilot study rather than as a definitive document on motorcycle accidents in Europe. The representative of ACEM declined both options due to the fact that the EU Commission (a funding stakeholder) had insisted on publication of a final report.

Attending was a representative from the Federation European Motorcyclists Associations (FEMA) and a representative from the British Motorcyclists Federation (BMF). Following the meeting, a de-briefing was held at the FEMA office to discuss the outcome of the discussion. As a result, the MAG UK representatives decided to conduct a study of the MAIDS report and present a SWOT analysis: to identify the Strength, Weaknesses, Opportunities and Threats of the study.

Background

ACEM with the support of the European Commission and other partners conducted an extensive in-depth study of motorcycle and moped accidents during the period 1999-2000 in five sampling areas located in France, Germany, Netherlands, Spain and Italy.

In this study a total of 921 accidents were investigated in detail. To provide comparative information on riders and PTWs that were not involved in accidents in the same sample areas, data was collected in a further 923 cases who were interviewed at petrol stations. This was found to be the most expedient and reliable method to gather information, this collection technique is referred to as an exposure or case-control study. The exposure information on non-accident involved PTW riders was essential for establishing the

[1] This issue will be discussed in the section on weaknesses.

significance of the data collected from the accident cases and the identification of potential risk factors in PTW accidents.

According to ACEM, the data collected during this study represents the most comprehensive in-depth data currently available for PTW accidents in Europe. It is expected that this data will provide much needed information for developing future research in relation to public policy issues. Recommendations for future countermeasures and investigations are provided.

The objectives of the MAIDS study were as follows:

1. To identify and indicate the causes and consequences of PTW accidents in a well-defined sampling area.
2. To compare the accident data to a control population in order to determine the risk associated with certain factors (e.g., alcohol).
3. To apply this comprehensive and reliable data source in the development of proper counter-measures that will reduce the frequency and severity of PTW accidents.

Seven chapters in the report review the following topics:

- General accident characteristics
- Accident causation
- Vehicles
- Environmental factors
- Human factors
- Powered two wheelers in a mixed traffic environment
- Rider protection

Annex Two lists the 26 main findings from the report.

SWOT Analysis

Strengths

Accidents are due to Human Error

According to the authors of the MAIDS report, the PTW accident data collected in the 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 another vehicle. Whilst each sampling area contained both urban and rural areas, the majority of the accidents took place in an urban environment.

Furthermore, the study found that travel and impact speeds for all PTW categories were found to be low, most often below 50 km/h. There were relatively few cases in which excess speed was an issue related to accident causation.

Overall, the study found that human factors were the primary accident contributing factor in approximately 87.5% of all cases indicating that vehicle operators are largely responsible for accident causation[2]. The research identified PTW riders as the primary cause factor in less than 1% of all cases while car drivers were identified as the primary cause factor in over 50% of all cases.

The study found that in general riders with more experience are less likely to be the primary contributory factor of an accident. Furthermore, 29% of riders with less than 6 months experience had insufficient skills and this percentage went down to 6.4% for riders with over 98 months of experience.

These findings from the MAIDS report have supported other United Kingdom studies[3] on PTW accidents by identifying the virtues of experience and road knowledge as the greatest defence against the prevention and avoidance of accidents. These issues will be discussed more fully in the section on Opportunities.

This specific finding has been identified by MAG UK as the most significant, positive result to come from the MAIDS report.

Lower Extremity Injuries

The data indicates that lower extremity injuries were most frequently reported (1159 injuries, or 31.8% of all injuries), followed by upper extremity injuries (871 injuries, or 23.9% of all injuries). These injuries included passengers. However, 58.4% of all lower extremity injuries sustained by riders were minor or moderate (e.g., lacerations or abrasions) and two-thirds of these were due to road/roadside contact. Serious lower extremity injuries were due mainly to Other Vehicle collision contact (e.g. 40.6% of all

[2] The environment was considered to be the primary accident contributing factor in 7.7% of all cases.
[3] ROSPA (Royal Society for the Prevention of Accidents – United Kingdom) Report of 2001, The Transport Research Laboratory (TRL) from the UK Department of Transport, Report Number 607, published in 2004,, Government Advisory Group on Motorcycling in the UK (GAGM); The Transport for London (TfL) Accident Statistics 2004.

serious cases) and PTW contact (33.8% of all serious cases). The data also indicate that 70% of accidents occurred under 50 km/h. This information suggests the majority of the injuries were minor, thus making the need for leg protectors redundant. These issues will be discussed more fully in the section on Opportunities.

Weaknesses

Methodology

The representative of ACEM explained that *"MAIDS is an epidemiological study, which aims at comparing two samples of the same population in a given area. Comparing a sample with a disease, i.e.: motorcycle accident, against a sample exposed at the same risk, but not experiencing the same disease, the risk factors can be identified, or the factors that increase the likelihood of getting such disease (i.e.: getting involved in a motorcycle accident). The discussion about the extrapolation is a total different thing"*[4].

In order to carry out this epidemiological study, two groups were analysed using a statistical test known as the Chi-square statistics. This is an analysis to test whether relationships in cross tabulations are statistically significant or in other words, to provide adequate evidence of the existence of relationships in the population. In the case of the MAIDS study, it is to identify whether there is a relationship between the group involved in accidents and the exposure group – those not involved in accidents. In the report there is an explanation of the chi-square statistic[5], which for those who have no understanding of social methods of research, is rather difficult to comprehend. In fact, the continual mention of the chi square statistic throughout the report has had the effect of limiting the ability of readers to understand the meaning of the analysis.

In this context it is important to query the use of the chi-square statistic and its limitations thereof. We believe that it is necessary to challenge the presumption that this form of analysis is sufficient to determine the outcome of the MAIDS research. This is because the use of chi-square statistics to test whether relationships in cross tabulations are statistically significant (i.e. provide adequate evidence of the existence of relationships in the population) is often pivotal within social research involving categorical data. In fact there is much more to analysing a cross tabulation than just significance testing via the chi-square statistic; in addition, the chi-square statistic is not without its limitations (Pole and Lampard 2002:220-221[6]).

When looking at cross tabulations like those used in the MAIDS report, three related questions should come to mind:

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[4] However, he also stated that. "…we need some more sophisticated statistical analysis than those shown in the report, which are still at descriptive level, i.e.: describing characteristics rather than explaining causative links."

[5] **Statistical tests** "To understand the relationship between the accident data and the exposure data, a chi-square statistical test was conducted to test the null hypothesis that there was no relationship between the accident and exposure variables. If the significance level (i.e., the p value for a two tailed test) of the computed chi-square statistic is below 0.05, then the two groups are considered to be significantly different and the null hypothesis was rejected. If the difference between the exposure population and the accident population is found to be significant (i.e., $p<0.05$), then an odds ratio is computed for the variable. If the odds-ratio is found to be above 1.0, then the factor is considered to be over-represented in the accident data. Similarly, if the odds-ratio is found to be below 1.0, then the factor is considered to be under-represented in the accident data". Page 21, MAIDS report.

[6] Christopher Pole and Richard Lampard (2002): Practical Social Investigation; Qualitative and Quantitative Methods in Social Research. Prentice Hall, Harlow, Essex

- Is there adequate evidence of a relationship?
- How strong is the relationship?
- What is the form of the relationship?

In essence, the chi-square statistic usually allows us to answer the first of these questions, but does not help us much with the second and third questions. In other words, if a chi-square statistic has only been used to identify whether there is adequate evidence of a relationship, such a significance test does not contribute to the analysis beyond this (Ibid). This weakness is highlighted by the fact that the authors have made little use of national statistics or other studies in order to compare their findings which is contrary to the comment on page 12 (Methodology) in which the authors state *: "the results of such a study can be compared with national statistics and other studies when assessing the implications".*

In the report on Methodology and Process the authors state that within the primary objectives "*was the development of a common international methodology for conducting motorcycle accident investigations*". Point xiv states *"unbiased, in terms of sampling, results and interpretation.*

However, on page 28 of this report the authors state that *"The number of fatal cases collected by the German and French research teams may be the result of a sampling bias, possibly due to a bias in the local police notifications, or bias by the team sampling procedures. Further consideration of possible sampling bias and related factors including any deviations from the original sampling criteria and project methodology are planned to be described in the MAIDS final report".*

Furthermore, in a response to our initial queries, the authors replied *"…we can only produce tables based on the 103 fatal cases found in MAIDS. You will observe that the figures are very often too small to make solid conclusions"*[7]. This suggests that the data on fatalities are useless and negates the statement by the ACEM representative that the purpose of MAIDS was to identify ways of finding solutions because there are too many PTW fatalities. The implication is that this report is incomplete and should not have been published.

On page 47 second paragraph *"It was reported by the German team that some exposure data sampling was done at rider group meetings. For this reason, the validity of the exposure data for this particular variable is questionable and no statistical comparison can be made between the accident data and the exposure data*" (N.B. This specific variable referred to ABS brakes). Why did the German team decide to change from conducting interviews at petrol stations? Considering the Riders' Club in question was a BMW club (BMW offers ABS brakes as an option), this lapse of procedure in the study raises serious concerns and begs the question of whether further sampling for other issues was also carried out with the German riders' group at their meetings[8].

[7] Reference points 7 and 8 of the authors' response to the MAG UK document "Queries relating to the MAIDS Report" of 23rd July, 2004
[8] The fact that the authors indicated more than one meeting leads to the assumption that more than one question was asked.

Proportions of PTWs in the Five Countries Studied

The following table indicates the breakdown of PTW parcs in the countries studied.

Countries	Mopeds	Motorcycles	Total Parc[9] 2000	Motorcycles as % of parc
Italy	6,375,000	3,373,890	9,748,890	34.6
NL	533,000	144,000	677,000	21.3
Spain	2,202,521	1,445,644	3,648,165	39.6
Germany	1,724,945	3,337,848	5,062,793	65.9
France	1,442,000	968,000	2,410,000	40.1
	12,277,466	9,269,382	21,546,848	

Source: Parc data BOVAG NL and ACEM;

In the United Kingdom, the parc breakdown is 15% mopeds compared to 85% motorcycles. Thus while the authors do not believe that extrapolation is required, MAG UK believes that as the UK has the one of the best safety records in Europe[10], it would seem that this correlation (between types of PTWs and accidents) is relevant in order to identify best practices.

On pages 45 and 46 of the report, there is a breakdown of engine sizes in proportion to accidents. 42.7% of accidents are under 50cc engine size; while the category 501 to 750cc represented the next highest category of accidents (22.4%)[11]. All other groups e.g. 51-125cc, 126-250cc, 251-500cc, 751-1000cc, 1001 or more – reported less than 10% accidents.

Definitions of PTWs

In the context of the correlation of engine size, type of PTW and the proportion of L1 vehicles compared to L3 vehicles in the study, is in fact highlighted as a potential weakness by the authors of the MAIDS report themselves.

Percentage of PTWs in MAIDS report by category

	% Accident Group	% Control Group
L1 Mofa	3	5.3
L1 Moped	40.2	35.1
L3 Motorbikes	56.8	59.6

Source: MAIDS Report

We refer to the penultimate line in paragraph three on page 43. *"Note that the distribution of PTW 'styles' is perhaps more typical of the sampling areas than the whole (enlarged) European Union."* This is in our view, an admission that the data may be unreliable if extrapolated to other countries not involved in the study.

Further, the authors appear to have confused the meaning of 'style' with 'type' in their classification of PTWs. A style should indicate for example, sports, custom or cruiser

[9] Parc: Total PTWs registered and in circulation

[10] Reference GAGM Report (UK), Safety and casualty rates, point 12, page 11.

[11] In Great Britain the 501 to 750cc category represents one third of the parc (registered PTWs in circulation). One could infer therefore that the proportion of accidents in this category would implicitly be higher than the other >50cc groups but lower in relation to its parc. Countries such as Italy, Spain and France have higher proportions of PTWs under 50cc, the proportion of accidents would be representative of these groups.

motorcycles or a step through moped etc. The type should indicate the category of PTW e.g. moped, scooter or motorcycle – this is effectively what defines the categories L1, L2 and L3 vehicles. In the study, 73% of the L1 vehicles were scooters. The sports motorcycle 'style' represented 24.% the L3 vehicle types (not styles) and 20% were 'Conventional street style PTWs – however the photograph on page 16 (Fig. 2.1) should be defined 'Retro Classic'. There appears to be considerable confusion by the authors with regards to their definitions of types and styles of PTWs which makes comprehension of the report much more difficult and suggests that their findings are misleading as a result of this confusion.

Environmental Factors

In Chapter 6 on page 73 there is a low presence of highway defects. No SCRIM tests appear to have been conducted so it is difficult to accept the findings.

NB: **SCRIM** - Is the test used by highway engineers to measure the coefficient of friction of a road surface. It is measured by a rig basically comprising a tyred wheel being towed, at an angle, along a road. It measures the sideways coefficient i.e. "grip" between tyre and wheel. The test, using SCRIM or any equivalent system, is fundamental to pronouncing judgment on the quality of a road surface.

Mistakes

The data analysis from the MAIDS report from pages 75 and 76 is different. There is a variation of 21.9% between the table and the written text (29.8% versus 7.9). This is a mistake.

From page 75: *"For the PTW pre-crash path, there was no traffic control reported in 64.7% of all cases. Table **6.10** shows that PTW riders violated traffic controls in **29.8%** of cases in which a traffic control was present. There were 17 cases in which the team was unable to determine if the traffic control had been violated by the PTW rider".*

Table 6.10 (from MAIDS report): Traffic control violated by PTW rider, page 76

	Frequency	**Percent**
No	235	25.6
Yes	73	**7.9**
Unknown if traffic control was present or if traffic control was violated	17	1.8
Not applicable, no traffic control present	596	64.7
Total	921	100.0

There are further mistakes in the main findings (see below). There are more in the report, but the purpose of identifying these specific mistakes was to make the point that in consideration of the importance of this report, they are unacceptable.

(Main finding 2) Among the secondary *(N.B. this in incorrect – it should read primary)* 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. *(Sources: Figure 4.1, Table C.5)*

(Main finding 5) 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. *(Source: Table 7.1 this in incorrect – this table refers to gender and should read Figure 7 .1)*

(Main finding 6) When compared with the exposure data, 18 to 25 year old riders were found to be overrepresented. *(Source: Table 7.1 this in incorrect – this table refers to gender and should read Figure 7 .1)*

Opportunities

Road Awareness Education

The analysis of the MAIDS document highlights positive issues such as the need for educating the public in the United Kingdom – specifically young people – about road awareness and responsibility in order to develop knowledge and experience not only to drive cars but also to ride PTWs[12]. In MAG's view, this does not mean a need for more training or restricting access to motorcycling for young people by increasing the age limit to Direct Access to 27 or 29. Quite the contrary, we believe that the age for Direct Access should stay at 21 years in order to develop much needed experience, while the age limit to ride mopeds should be standardized with other European countries, by lowering it to 14 years.

MAG is of the opinion that educating the public could easily be achieved by starting with the young through teaching road awareness in schools - including how to drive cars, ride mopeds, scooters or motorcycles – which could become part of a curriculum. Clearly, this is a medium, long term solution, but one which would ensure that when the time comes, the young people of our country would be capable of joining the rest of society as responsible road-wise drivers and riders rather than restricting them and praising them just for surviving.

Lower Extremity Injuries

The data indicates that lower extremity injuries were most frequently reported (1159 injuries, or 31.8% of all injuries), followed by upper extremity injuries (871 injuries, or 23.9% of all injuries). These injuries included passengers. However, 58.4% of all lower extremity injuries sustained by riders were minor or moderate (e.g., lacerations or abrasions) and that two-thirds of these were due to road/roadside contact. Serious lower extremity injuries were due mainly to OV collision contact (e.g. 40.6% of all serious

[12] In the Government Advisory Group on Motorcycling (GAGM) report points 59 and 60, page 21, The Advisory Group suggests enhancing the role of road user education by bringing it to schools as a course in its own right. A GCSE on road safety is already offered in Northern Ireland and this should be extended to Great Britain. Also see Review of the Road Safety Strategy – a submission from the Motorcycle Industry Association.

cases) and PTW contact (33.8% of all serious cases). The data also indicate that 70% of accidents occurred under 50 km/h.

In consideration of past threats by legislators to introduce leg protectors, the information provided in the MAIDS report suggests that although the percentage of leg injuries was slightly higher than upper extremity injuries, the majority of the injuries were minor, thus making the need for leg protectors redundant. In MAG's view the MAIDS report has provided the motorcycling community with an opportunity to send a clear message to legislators that no action on leg protectors is required.

Threats

Hardwiring

On page 99 of the MAIDS report, the teams indicated that *"in 24.4% of the accidents collected, the headlamp was not in use at the time of the accident. In many cases, a switched off headlamp was likely to have been a contributing factor to accident causation"*. However the report continues *"it was not possible to make a determination of whether or not the lack of headlamp usage had increased or decreased the risk of being in a PTW accident because the exposure data collection procedure involved an evaluation of PTWs that were refuelling and stopped at the time of the evaluation, and thus not riding"*.

However, it is unclear why according to the authors *"the use of the PTW headlamp has been recognised as an aid to conspicuity"*. In light of this comment the MAIDS report does not appear to have identified any document to support the authors' claim which in any case contradicts their own findings. Furthermore if the investigators found the exposure data to be unreliable, then how can the results on this issue be presented at all? Indeed how can they come to the conclusion that *"In many cases, a switched off headlamp was likely to have been a contributing factor to accident causation"*?

This comment seems gratuitous and can be construed as support for the manufacturers' position with regards to hardwired headlamps and is contrary to the position taken by the Government Advisory Group on Motorcycling in the UK which, in its recommendation (ix) stated *"That (Department for Transport) DfT seek to find a compromise solution through the UN-ECE in Geneva that would require machines to be fitted with an AHO override switch"*.

Modified PTWs

Number 16 of the Main Findings states: *"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"*.

This suggestion of an increased risk for modified motorcycles is illogical. This appears to be an attempt to extrapolate conclusions beyond a direct analysis of the data. The reason for saying this is that it is impossible to know the level of modifications, globally across all riders, to be able to set a baseline for comparison. Numbers within the sampled

data would have to be compared with the level of modifications of all PTWs as a whole, not included in the study. Furthermore, modified vehicles are not a "style" of bike. There are a vast range of modifications from smaller indicators to more powerful headlights, different seats, paint jobs, aftermarket silencers and the like. Modifications are present on every style of bike. What concerns MAG UK is that in number 17 of the main findings the authors claim that *"There were no cases found by the teams in which an accident was caused by PTW design or manufacture"*. Furthermore, number 16 of the main findings appears to contradict the rest of the main finding Number 17 which states: *"Technical machine problems feature in less than 1% of accidents and those were mainly related to tyres"*, because if you cross reference this with claims about the significance of modified bikes, it would appear that modifications do not cause any "technical problems".

Due to the nature of the main funding organization, the question that we have to ask is - who is intended to benefit from this report?

Conclusions

MAG UK believes that there are important issues which the authors of the MAIDS report (and in fact all safety reports on motorcycling) have not taken into consideration. These are Risk Compensation, Risk Management, Social Control and the Rights of Citizens to choose.

Risk Compensation

Every individual is comfortable with a certain level of risk and aims to balance the rewards of risk-taking against perceived hazards. When a safety device is introduced that leads to a perception of lessened risk, the rewards of risk-taking become more attractive and engender a compensatory increase in risk-taking (risk compensation), which may bring accident rates back to their original level. In other words, this may produce a rearrangement of hazard with the new risk being transferred to others - this is termed 'risk displacement' (Adams and Wilde, 1994). The idea that interventions to reduce risk may be subverted by compensatory changes in behaviour has triggered fierce debate among safety experts. There is published experimental work to support the hypothesis, but governments have invested little in exploring this issue, given the huge resources that are invested in risk management. At present, the most authoritative support for the concept of risk compensation (which confines itself to road safety) is an OECD report of 1990, which states that "behavioural adaptation exists (. . .) and reduces the effectiveness of road safety programmes in a number of cases".

Risk Management

When the editors of the British Medical Journal[13] banned the word 'accident' from its pages, their reasoning was that "most injuries are predictable and preventable therefore the word accident should not be used to refer to injuries or events that produce them" (2001:1320). While accepting that there are occasions whereby events causing injuries may be due to bad luck or 'acts of God' even in cases such as avalanches or earthquakes,

[13] "BMJ bans "accidents": British Medical Journal 2 June, 2001, p.1320.

they claimed that it is possible to take preventative measures simply by adopting precautionary strategies or in other words, by not being there in the first place.

In fact, the common response to tragedies such as train crashes or a child dying from an accident, is that "this must not happen again" as if to state that by learning the true meaning of the tragedy, a similar event can be avoided and that something good must come from their child's tragic ending. The act of being seen to do something conveys the message that the event has meaning even if it is no more than an unexpected accident. So, rather than attribute death to an act of God or chance, our culture has moved towards blaming a person or institution.

In this context, the development of accident claims companies has taken the responsibility of an accident from the injured person to one of blaming someone else. Therefore what once seemed as a risk worth taking is now open to interpretation as culpable negligence and in our litigious society blame has taken over from personal responsibility. (Frank Furedi:2002[14]).

Social Control

MAG UK recognises that human beings need to take risks and perhaps they will sometimes experience an adverse outcome. But, risk is part of life and a society that adopts the view that preventing injury is an end in itself, will have to ban a variety of creative and challenging activities such as motorcycling. MAG believes that safety at any price is a symptom of compulsive behaviour rather than a virtue of scientific thought and takes the view that the MAIDS report and indeed the majority of motorcycling safety reports suffer from the same symptoms.

The Right to Choose

The fear of taking risks is creating a society that celebrates victims rather than heroes. So the individual who does not choose wisely becomes reckless, blameworthy and responsible for their own acts of imprudence (Ibid). This signifies a world view in which technical factors outweigh social ones and that risk analysis developed in relation to technological domain with the growth of the risk discourse does nothing to stimulate a healthy society, quite the contrary, safety at any cost restricts freedom of choice, consumer rights and suffocates individuality.

MAG believes that educating young people how to take risks and live comfortably in our modern society would have a far greater impact to reduce injuries and accidents, while at the same time accepting that the occasional outcome of an accident or injury is a risk, but that risk, exploration and adventure is part of life.

In conclusion, studies on the severity of motorcycle accidents are frequently contradictory in their representation of nature and cause, and solutions inevitably point to more costs or draconian legislation to restrict this form of transport. For this reason, MAG UK views the MAIDS report as just another study on safety by those with vested interests.

[14] Frank Furedi, "*Culture of Fear, Risk Taking and the Morality of Low Expectation Risk-Taking*" 2002; Continuum, London

Annex One

MAIDS Executive Summary

In these days of increasing congestion on our roads, powered two wheelers (PTWs)[15] continue to provide a valuable contribution to mobility in Europe. Their relatively small size and low cost enable them to blend efficiently into in the traffic flow while needing less space compared to other vehicles (OVs). However, PTW riders form one of the most vulnerable groups of road users and road accidents involving injuries to them are a major social concern. It is therefore essential that all parties work together to understand and further improve the safety of this valuable mode of transport.

In order to better understand the nature and causes of PTW accidents better, the Association of European Motorcycle Manufacturers (ACEM) with the support of the European Commission and other partners conducted an extensive in-depth study of motorcycle and moped accidents during the period 1999-2000 in five sampling areas located in France, Germany, Netherlands, Spain and Italy. The methodology developed by the Organisation for Economic Co-operation and Development (OECD) for on-scene indepth motorcycle accident investigations was used by all five research groups in order to maintain consistency in the data collected in each sampling area.

A total of 921 accidents were investigated in detail, resulting in approximately 2000 variables being coded for each accident. The investigation included a full reconstruction 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.

To provide comparative information on riders and PTWs that were not involved in accidents in the same sample areas, data was collected in a further 923 cases. 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.

This exposure information on non-accident involved PTW riders 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 an interesting finding, needing further study.

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.

[15] The term “powered two-wheeler” includes all types of road motorcycles, mopeds and mofas

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.

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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.

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, scooters were not over-represented in accidents in comparison with their presence in the sampling area (i.e., their exposure).

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.

The data collected during this study represents the most comprehensive in-depth data currently available for PTW accidents in Europe. It is expected that this data will provide much needed information for developing develop future research in relation to public policy issues. Recommendations for future countermeasures and investigations are provided.

Annex Two

The major findings of this study are as follows:

1. 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. *(Sources: Tables 4.1, 5.23)*

2. Among the secondary (N.B. this in incorrect – it should read primary) 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. *(Sources: Figure 4.1, Table C.5)*

3. 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. *(Source: Table 7.9)*

4. In comparison to the exposure data, unlicenced PTW riders, illegally operating a PTW for which a licence is required, have a significantly increased risk of being involved in an accident. *(Source: Table 7.5)*

5. 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. *(Source: Table 7.1)*

6. When compared with the exposure data, 18 to 25 year old riders were found to be overrepresented.*(Source: Table 7.1) (Source: Table 7.1)*

7. In 50% of cases, the primary accident contributing factor was a human error on the part of the OV driver. *(Source: Table 4.1)*

8. 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. *(Sources: Figure 7.8, Table C.17)*

9. In about 1/3 of accidents PTW riders and OV drivers failed to account for visual obstructions and engaged in faulty traffic strategies. *(Sources: Tables 4.11, 4.12, 8.3, 8.4, 8.5, 8.6)*

10. Traffic control violations were frequently reported, in 8% of the cases for PTW riders and in 18% for OV drivers. *(Sources: Tables 6.10, 6.12)*

11. Amongst the wide diversity of PTW accident and collision configurations that were observed in this study, not one configuration dominated. *(Sources: Figure 3.4, Table C.4)*

12. 90% of all risks to the PTW rider, both vehicular and environmental, were in front of the PTW rider prior to the accident. *(Source: Figure 5.6)*

13. Among the primary contributing factors, over 70% of the OV driver errors were due to the failure to perceive the PTW. *(Sources: Figure 4.1, Table C.5)*

14. The roadway and OVs were the most frequently reported collision partner. In 60.0% of accidents, the collision partner was a passenger car. *(Source: Table 3.4)*

15. 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. *(Source: Table 5.30)*

16. 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. *(Sources: Figure 5.1, Table C.6)*

17. 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. *(Sources: Tables 4.1, 4.25, 4.26)*

18. In over 70% of the cases the PTW impact speeds were below 50 km/h. *(Source: Table 5.14)*

19. 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. *(Source: Table 4.13)*

20. 71.2% of all PTW riders attempted some form of collision avoidance immediately prior to impact. Of these, 31% experienced some type of loss of control during the manoeuvre. *(Source: Tables 5.20 and 5.21)*

21. 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. *(Sources: Tables 9.5, 9.8, 9.11, 9.12)*

22. 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. *(Source: Figures 9.3, 9.13)*

23. Roadside barriers presented an infrequent but substantial danger to PTW riders, causing serious lower extremity and spinal injuries as well as serious head injuries. *(Source: Figure 6.1, Table C.9)*

24. For PTW riders, a roadway maintenance defect caused the accident or was a contributing factor in 3.6% of all cases. *(Source: Table 4.17)*

25. For PTW riders, a traffic hazard caused the accident or was a contributing factor in 3.8% of all cases. *(Source: Table 4.19)*

26. Weather-related problems either caused the accident or contributed to accident causation in 7.4% of PTW accidents in the study. *(Source:Table 4.23)*