

European Agenda for Motorcycle Safety



OUTLINE
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Introduction

The purpose of this document

The motorcycling community has extensive, experience based, knowledge of why accidents happen. The motorcyclists and their organisations are in many ways the "real experts" on motorcycle safety.

The purpose of this document is to give legislators and decision makers a brief summary of riders' analyses of why motorcycle accidents happen and recommendations on how to improve motorcycle safety in some selected areas of particular concern.

This document may form the basis of further development.

What is FEMA?

The Federation of European Motorcyclists' Associations (FEMA) is the representative federation of powered two-wheeler users throughout Europe.

FEMA represents the interests' of 22 citizens' national associations at the European Union and the Transport Division of the United Nations Economic Commission for Europe (UN-ECE). FEMA is taking an active part to the road safety debate in these arenas.

The FEMA secretariat is based in Brussels, in the heart of the European Union. It employs three full time members of staff dedicated to safeguarding riders' interests.

Within the framework of FEMA, experience based knowledge of motorcycle safety is refined and systematised. As opposed to some organisations and institutions keeping a high profile in the motorcycle safety debate, FEMA has no "hidden commercial agenda".

A brief introduction to motorcycling

The number of motorcycles on European roads has more than doubled over the last two decades.

Motorcycling is no longer a "youth-phenomenon": The average age of the European motorcyclist is considerably higher than it was twenty years ago.

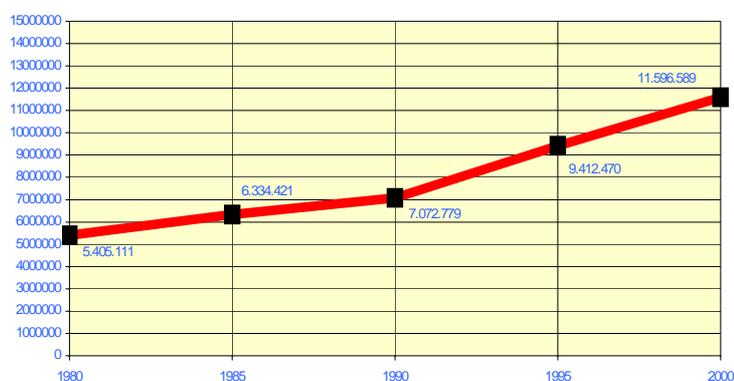
People from all classes and professions have taken up motorcycling. Also, today more women are riding motorcycles than ever before.

Motorcycling offers two major advantages:

1. It is an inexpensive, environmentally friendly and effective means of transport
2. It is a meaningful leisure activity, improving the quality of life for millions of European citizens

Motorcycling has only one major disadvantage: high injury risk. However, in most European countries, the motorcycling community has, with few governmental incentives, reduced the accident involvement rate substantially over the last 20 years.

With nearly 12 million motorcycle riders, the financial aspects of European motorcycling are considerable: Industry, jobs, tourism and tax revenues.



The "myth" describes the typical rider as an extreme individualist. The truth is, however, that most motorcyclists prefer the company of those who are like-minded: Riding together, meeting at roadside cafes, participating in the numberless motorcycling events taking place all over Europe.

Many riders are members of motorcycle clubs, which often comprise the core of the national Riders' Rights organisations.

The motorcycling community is probably better organised than any other group of road-users, interlinked in a worldwide social and political "Motorcycling Network".

Within the motorcycling community there is strong sense of group-identity and solidarity: If a rider suffers a roadside engine failure, other riders always stop and offer assistance. If the motorcycling community is put under political pressure, motorcyclists will join forces and stand up and fight for their rights.



A brief introduction to motorcycles

Motorcycle use can be divided in three main categories: Commuting, leisure riding and a combination of the two. Different types of motorcycles are chosen by different groups of motorcyclists for different purposes:

Standard

Traditional motorcycles mainly designed as practical transportation. This category falls in the middle of the spectrum in most areas of ergonomics and performance, including power, handling and braking.



Cruiser

Once dominated exclusively by Harley-Davidson, the cruiser category has now attracted competition from all major manufacturers. The profile is long with a low saddle height. The emphasis is on appearance, style and sound, with less emphasis on performance.



Multi-Purpose

With long suspension travel, these machines are designed to be used both on asphalt and unmade roads. The category is growing more and more popular and are often called "adventure bikes", as they offer the comfort, luggage capacity and durability needed for long-distance touring.



Touring

Large, often very expensive motorcycles with luggage capacity and weather protection, designed to transport rider and passenger in comfort. Touring bikes are heavy with moderate power outputs. Their intended purpose is comfortable, long-distance travel.



Sport-Touring

These motorcycles combine the comfort and some of the luggage capacity of touring bikes with the responsive handling of sportbikes. Usually powerful with high-performance brakes. The ideal mission of a sport-touring machine is medium and long-distance travel via challenging roads.



Supersport

Styled and constructed in the manner of road-racing motorcycles with streamlined bodywork and forward-leaning riding position. The emphasis is on handling, acceleration, top speed, braking and cornering. Often lighter and more technologically advanced than other types of motorcycles, they are favoured for riding on twisting roads.



Scooters

These two-wheeled vehicles are often small, mostly low-power designs in moped and light motorcycle categories with small-diameter wheels suitable for use on surface streets in urban environments. Their appearance differs significantly from motorcycles because of their bodywork and the "step-through" frame design. Although less common, a new generation of super scooters with engine capacities of up to 650 cc is becoming increasingly prevalent. They combine the virtues of traditional scooters with a long distance capability.



Safety Consciousness within the Motorcycling Community

Most riders are safety conscious

It is often said that riding a motorcycle is five, ten or even twenty times more dangerous than being a car occupant. In one respect this is correct: The rider is subject to a greater risk of being killed or injured when an accident takes place. A minor collision between two cars usually causes material damage only, while a similar collision between a car and a motorcycle often results in an injured rider. Motorcyclists are vulnerable and have a high *risk of injury*.

In another respect, however, insurance statistics show that motorcycles are not involved in more "unwanted" road traffic incidents than cars, e.g. motorcyclists *do not* have a higher *accident involvement risk* than motorists. Thus, it should not be constantly claimed that motorcyclists are a "careless" group of road-users!

On the contrary: Most riders are fully aware of the fact that they are vulnerable road users and that motorcycling requires skills and a focused, conscious behaviour. The level of safety consciousness, however, may differ from country to country, depending on the general attitude towards road safety in that particular country

The fact that millions of European riders have purchased protective equipment worth millions of Euro indicates that motorcyclists are safety conscious. Also, the fact that the motorcycling community organises voluntary post-licence training courses and first aid courses, and that thousands of European riders, at their own expense, participate in these courses, indicates that motorcyclists want to improve safety.

It has been suggested that motorcyclists who are members of organised groups are more safety conscious than those who are not.

In many European countries, the motorcycling community has, with few governmental incentives, reduced the accident involvement rate substantially over the last 20 years.

However, regardless of any road safety initiative, by Governments or by the riders themselves, motorcycling can never be made risk-free – a fact confirmed by the US Supreme Court as early as 1972: "*Safety is not the equivalent of risk-free*".

The extreme "high risk takers"

It cannot be denied that motorcycling sometimes attracts "high risk takers" with an extreme behaviour. This minority often provokes other road users, giving motorcycling a bad public reputation.

It is doubtful whether *any* road safety initiative will change the attitude and behaviour of these individuals. The extreme "high risk takers" should instead be motivated to practise their extreme "joie de vivre" in closed circuit riding, instead of on public roads, where they often violate Highway Codes.

In some countries, insurance statistics show that motorcycles with a "sharp" image, attracting the extreme "high risk takers", stand for as much as 70% of the settlement of insurance claims, while constituting only 10% of the total number of motorcycles in the country, indicating a high accident involvement rate. Motorcycles with a "sharp" image may also have "built-in-expectations" of hard and aggressive riding.

Motorcycles with a "sharp" image do not necessarily have the most powerful engines or the highest power-to-weight ratio. Therefore, restrictive legislation based on engine capacity, power output or high power-to weight ratio would not at all solve the problem.

Industry advertising is often designed to confirm the dreams and expectations of the extreme "high risk seekers". It could help motorcycle safety if industry redesigned their advertising campaigns.



The "Safety Dialogue"

The "safety dialogue" among motorcyclists is an important, often overlooked, instrument for passing on vital safety information and forming positive attitudes towards safety: Experienced riders share their knowledge of riding techniques, traffic strategies and machine maintenance with the novice riders, preventing accidents caused by ignorance.

Experienced riders bring novice riders "back to reality" when exaggerated self-confidence makes their riding dangerous. When motorcyclists meet at the clubhouse or the local roadside cafe, or ride together in groups, safety issues are often brought up and debated. Thus, the "safety dialogue" among motorcyclists should be encouraged and developed.

Even though extremely useful and positive, the "safety dialogue" is often anecdotal, lacking structure. The "safety dialogue" would benefit largely from Pan-European educational programmes (booklets, CD Rom, website) providing accurate and precise information on key subjects.

Information distributed through articles in motorcycle magazines are an important part of the "safety dialogue".

Accident Research and Statistics

Crash reports

Official motorcycle accident reports - and as a consequence, the media coverage of motorcycle accidents - do not always communicate the true story.

Two examples:

- When a motorist violates a give way sign and hits a motorcyclist, a common explanation is that the rider was speeding, or that the rider was impossible to see because he was wearing black leathers
- When a rider loses control on a curve, a common explanation is that he was speeding, the real reason often being diesel spills or use of extremely slippery asphalt sealer, causing the motorcycle's tyres to lose traction

To better utilize data collected by traffic police, FEMA recommends that a uniform Pan-European traffic crash report form is developed and introduced. Also, better education of traffic police officers is needed to improve their understanding of the likely course of events in motorcycle accidents.

Usable Research

Effective initiatives preventing motorcycle accidents require precise knowledge of *why accidents happen*. Thus, we need focused research, based on valid hypothesis, involving research institutions with motorcycle expertise.

It is important that various research projects use a common methodology. To establish a correct understanding of the major factors causing

motorcycle accidents, FEMA recommends further looking into the possible advantages of adopting the Commission supported project, MAIDS (Motorcycle Accident In Depth Study).



Comparable statistics

To better monitor the effects of various road safety initiatives, road safety targets should reflect casualty *rates*, not casualty *numbers*: Fatalities/injuries per 10.000 registered vehicles (easily accessible) or fatalities/injuries per annual distance travelled (require extensive data-collection). This takes into account the size of the motorcycle parc so that when there is an increase in motorcycle use with a commensurate increase in exposure to risk, motorcycling is not interpreted as becoming an increasingly hazardous activity.

Official, national accident statistics should be available no later than spring the following year.

Road Infrastructure

Failure to consider the safety needs of motorcyclists

Roadway design, maintenance and construction are generally directed towards the needs of multi-track vehicles, with the needs of motorcycles often not taken into consideration. A possible explanation could be a lack of experience or awareness by engineers and maintenance staff.

Poor road design and maintenance contribute to motorcycle accidents, particularly single vehicle accidents. FEMA has identified a variety of common road conditions and design factors, rarely hazardous to multi-track vehicles, but which pose hazards to a powered two-wheeler.

Unfortunately, Public Roads Authorities in Europe have done little to improve roadway characteristics with regard to motorcycle safety. We cannot believe that it is caused by prejudice or anti-motorcycling attitudes, the explanation rather being that Public Roads Authorities have little competence and experience in this field of responsibility.

Thus, highway standards must be revised and developed to reflect the safety needs of motorcyclists, encouraging motorcycle-friendly design, construction and maintenance procedures. It follows that road design and maintenance personnel must be educated about conditions posing hazards to motorcyclists. Above all there is a need for quality audits, in which motorcyclists' needs are included, to be undertaken on a regular basis.

FEMA appreciates that some of the improvements needed will require both research and investments, and therefore probably will take some time to accomplish. Other improvements, however, are easily accomplished, simply requiring a shift in focus and level of consciousness by Public Roads Authorities.

Road Construction

Fundamental conditions for road planning and quality/safety audits during this phase are required.

Metal road surface components such as manhole covers, tramlines, offer almost no traction, especially when wet. Metal road surface components should be positioned outside the roadway or the line taken by single-track vehicles.

Roadside barriers are often placed where they are not needed. Most barrier systems, in the form of prefabricated safety fence, designed to retain cars and reduce injuries to automobile occupants, are deadly to motorcyclists who collide with them. The problem is carefully described in the FEMA Crash Barrier Report (2000). The course of events in collisions between riders and roadside barriers is usually that the rider for some reason falls from his motorcycle, followed by his body sliding across the road surface until it collides with a safety fence post, *beneath* the steel beams or cables. FEMA has identified the exposed safety fence posts as the single most hazardous part of commonly used roadside barrier systems. The Netherlands, Germany, Norway and France have developed and tested motorcycle-friendly barrier designs, and attenuation devices as additions to existing designs of safety fence, solving the problem of the hazardous exposed safety fence posts and bolts. Continuous cast concrete barriers are also less hazardous to fallen riders.



FEMA recommends Public Roads Authorities in other Member States to consider and adopt these designs. FEMA also recommends a review of roadside barrier standards (EN 1317) should include motorcycles in tests and impact attenuation devices within its scope.

Some types of **asphalt** offer almost no traction when wet. The types of asphalt known to offer poor traction should be banned. Existing forms of low-friction asphalt should be improved or replaced.

With only two points of support, aquaplaning is extremely dangerous for motorcyclists, often causing the motorcycle to fall over and crash. Thus, good **water drainage** is important.

All sharp edged objects in the immediate vicinity of the roadway could constitute a danger to motorcyclists. Thus an improved **kerb design** is required.



Positioning and construction of **road signs**, lighting standards and other road furniture must include the safety needs of motorcyclists.

A motorcycle's traction can be seriously compromised by **plasticized adhesive road-marking tape** and **slick road-marking paint**. Research and development of better road-marking paints, offering more traction is needed.

Road Maintenance

Repair materials and procedures often do not respect the original specified quality standards.

Potholes are a hazard that can cause motorcycle crashes. Potholes should be detected and remedied through regular roadway inspection routines. If, for some legitimate reason, impossible to remedy immediately, motorcyclists should be warned of hazard by appropriate traffic sign.



Bituminous asphalt sealer used for crack repair is extremely slick, especially when wet, and is well known for causing motorcycle accidents. Alternative repair methods exist and should be adopted. Further research and a review of standards (EN 1423) are needed. A replacement for existing bituminous asphalt sealer such as the cold-setting Austrian product Stohflex which retains high frictional properties when subject to wear is recommended.

Longitudinal roadway ridges caused by heavy goods vehicles wear, road settlement or road repair can be a significant hazard to motorcyclists. Hazard often occur in connection with resurfacing work. Longitudinal roadway ridges of more than 2 cm should always be tapered. If not possible to remedy immediately, motorcyclists should be warned of hazard by appropriate traffic sign and longitudinal roadway ridges should be marked with cones.



Oil and diesel spills can cause loss of traction and a resulting crash. Oil and diesel spills should be detected and removed through regular roadway inspection routines. If, for some legitimate reason impossible to remedy immediately, motorcyclists should be warned of hazard by appropriate traffic sign. Also, the construction of diesel tanks should be redesigned, making it impossible to over-fill, warning driver if filler-cap is not in place. A fast-track system of reporting spillages to responsible highways authorities through the emergency services should be put into place

Roadway debris, such as gravel or sand, often resulting from uncovered loads, pose a greater hazard to motorcycles than to multi-wheel vehicles. Roadway debris should be detected and removed through regular roadway inspection routines. If, for some legitimate reason, impossible to remedy immediately, motorcyclists should be warned of hazard by appropriate traffic sign. Sweeping of roadways should be part of regular maintenance routines, particularly in parts of Europe where sand/salt is used to increase traction on icy roads in winter. A similar fast-track reporting system for debris similar to that suggested for spillages should be implemented.



Specific hazard signposting for motorcyclists

Roadway conditions posing hazards to motorcyclists are rarely signposted, simply because these conditions do not pose hazards to the majority of road-users, namely multi-track vehicles. Specific signposting (combination of existing traffic signs), particularly aimed at warning motorcyclists of hazards is tried in some European countries, e.g. Germany and Norway.



FEMA is quite certain that motorcyclists will react to such signposting by immediate speed reduction, readiness to brake and greater alertness. Use of specific signposting would be an extremely cost-effective road safety initiative.

However, specific signposting warning motorcyclists must never be used as an excuse for not taking action to remedy road hazards.

Black Spot management

Specific roadway sections are, for known and unknown reasons, notorious for causing motorcycle accidents. FEMA recommends identification and signposting of these "Black Spots".

FEMA recommends looking into the circumstances creating "Black Spots" and, when identified, measures to improve conditions being taken. Signposting black spots must never be used as an excuse for not taking action to remedy road hazards.

Handbook for Motorcycle Safety

As mentioned, roadway design, maintenance and construction are generally directed towards the needs of multi-wheel vehicles, with the needs of motorcycles often addressed as an afterthought or not taken into consideration at all.

In many European countries, roadway construction and maintenance contracts are out-sourced to private companies with little experience in motorcycle safety who are, therefore, likely to disregard or neglect motorcycle safety.

Thus, Public Road Authorities in some European countries, e.g. in Norway and France, have, in close cooperation with the motorcyclists' organisations, produced a Handbook for Motorcycle Safety, with detailed guidelines for all personnel working with roadway construction and maintenance. FEMA would welcome similar initiatives in all Member States.



Roadway Hazard Report Form

Riders are the first to recognize conditions hazardous to motorcyclists, and in several European countries, the motorcyclists' organisations have designed and utilized a Roadway Hazard Report Form.

Developing and deploying a uniform, Pan-European Roadway Hazard Report Form, as an instrument of assistance to Public Roads Authorities, may prove effective - particularly when official inspection routines are failing.

If supported by National Public Roads Administrations, FEMA may take on the task of creating a uniform Roadway Hazard Report Form to be put on the websites of the national motorcycle organisations, both as an electronic script and as a printable version.

Intelligent Transport Systems

The development of Intelligent Transport Systems applications may have the potential to significantly improve Road Safety. FEMA is therefore addressing ITS, within the EU e-safety forum and the UN-ECE Working Groups, in conjunction with riders' organisations (AMA, MRF, FIM), the motorcycle industry (ACEM, IMMA) and the IHVO.

The present focus of ITS is on four-wheeled vehicles. Some ITS applications will need specific development to enable them to be used on motorcycles. The use of ITS applications which can influence the behaviour of a motorcycle – for example by applying the brakes or regulating the fuel management system – should always be optional. They should only be considered when it has been demonstrated that they will not destabilise a motorcycle in a range of conditions and circumstances. Because of PTWs' dynamics, some ITS applications will not be able to be adapted to motorcycles, or may not be cost effective if it should be possible.

FEMA demands that the recognition of the principle that "where a vehicle or a category of vehicles are not compatible with an ITS application, it is accepted that the vehicles' incompatibility will not result in its being excluded from any part of the road system that utilises that ITS application". Traffic management applications of ITS should, therefore, be developed to include motorcycles and could usefully be adapted to give them priority over other vehicles.

For road pricing applications of ITS, while the technology to include motorcycles is feasible, a political decision should be made to exempt them from road pricing as part of the solution to many traffic problems which exist throughout Europe.

Another principle FEMA demands to be recognised is that "no ITS application should be developed if it can put at higher risk a specific group of vehicles or users".

Rider Training and Licence Test

Basic training is essential

Riding a motorcycle with an acceptable level of safety require skills, knowledge, a focused attitude and a conscious behaviour. Thus, no one should start riding a motorcycle without having undertaken structured, relevant and cost-effective basic training.

Initial rider training programmes vary enormously from Member State to Member State - from virtually non-existent to extensive, compulsory and very expensive. It is not necessarily true that very advanced and expensive training gives the greatest road safety benefits. In addition, if initial rider training becomes too comprehensive, and therefore very expensive, A-licence candidates will probably try to avoid all non-compulsory parts.

Most initial rider training schemes are influenced by the existing licence test. Thus, the quality of training inevitably reflects the quality of the licence test. Some rider training programmes may be criticised for just "teaching the skills needed to pass the licence test", instead of teaching the essential skills and knowledge needed to survive on the road.

Thus, it is vital to identify the key factors in basic training that effectively make the novice rider capable of safely operating a motorcycle in normal traffic situations on public roads. The motorcycling community can provide essential input in developing and implementing training programmes, but unfortunately, consultation of riders by responsible authorities is often insufficient.



Key factors

FEMA has identified three key factors in effective basic rider training programmes:

1. Learning, and understanding the intentions of, laws and regulations intended to promote and maintain road safety
2. Learning basic rider traffic strategies, such as rider attitude and behaviour, interactions with other road users, speed choice, lane positioning, visual directional control, active hazard search, perception and anticipation are currently missing in most countries.
3. Learning precise and effective machine control skills, based on the laws of physics, enabling the rider to be in control of the motorcycle when accelerating, cornering and braking; the only three manoeuvres a motorcycle is capable of.

Commitment needed

An impediment to a cost-effective Pan-European initial rider training scheme is lack of consensus: Various private companies and organisations offering rider training throughout Europe seem unable to agree on the basic guidelines, strongly defending their own particular approach, burying themselves in rather meaningless disagreements on minor, insignificant details. The 2002 Bike Safety Symposium in Assen (NL) to a large extent confirmed the unfocused and negative situation created by the lack of consensus.

Thus, it is vital to start a process, finding a common definition of concepts, developing a harmonized and precise syllabus and textbook, developing a precise and effective common methodology, defining realistic and helpful training exercises and developing a harmonized, truly quality assuring licence test.

The input of the riders in this process is essential. Therefore, FEMA recommends realisation of the FEMA/FIM/ACEM proposal for an EC co-funded, Initial Rider Training Project.

The Initial Rider Training Project

Presently many European initial rider training arrangements only address machine control skills. Frequently these are aimed at the exercises in the national licence test rather than what the rider needs to control a motorcycle on today's roads. Rarely do national initial rider training arrangements address the crucial areas of hazard awareness and avoidance and rider attitudes and behaviour.

For the past two years FEMA, together with ACEM and FIM, have been seeking the support of the European Commission to undertake a project to address the serious shortcoming in European Initial Rider Training.

The Initial Rider Training project will seek in the first stage to define the essential elements of and the means by which a comprehensive, affordable and relevant European model for pre- licence rider training can be developed.

Such a European model will place proper emphasis on relevant machine control skills, together with an understanding of the hazards that a rider will face and how they can be avoided and managed, and an appreciation of the importance of rider attitudes and behaviour.

Instructor competence

The quality and effectiveness of training is highly dependent upon the instructor's competence. Thus, no one should be allowed to offer training if not having participated in a recognised instructors training programme.

In a road safety and consumer perspective: If basic rider training comprises a precise syllabus and methodology and competent instructors, more is learned in a shorter period of time, e.g. the society benefits from a better trained, safer rider and the consumer gets "value for money".

Instructors education vary enormously from Member State to Member State - from virtually non-existent to official requirement of a two-year education at college level. European motorcycle safety would benefit largely from basic guidelines for education of motorcycle instructors.



FEMA therefore welcomes the improvements proposed in Annex IV of the 3rd Driving Licence Directive.

Licence test

The main purpose of the licence test is quality assurance of the candidate's basic skills and knowledge, meaning: The minimum skills and knowledge needed to safely operate a motorcycle on public roads. Thus, it is of great importance that the licence test is designed to do exactly that.

Unfortunately, most European test regimes still expose candidates to some rather peculiar exercises with absolutely no relevance to real-life road safety. As a consequence, perfectly competent candidates may fail the test, while questionable candidates, who have "learned the tricks", may pass.

All initial rider training schemes are influenced/steered by the existing licence test. Thus, the quality of training inevitably reflects the quality of the licence test. The task of evaluating an A licence candidate requires a "trained eye". It is questionable whether a person without extensive motorcycle experience is able to do the job properly. The retrospective amendments to the 2nd EC Driving Licence Directive, which will bring changes to the motorcycle licence test, are an attempt to address this problem. However it is questionable as to whether they will improve candidates' competence or introduce more 'tricks' to learn and make access to motorcycles more difficult.

European motorcycle safety would benefit largely from basic guidelines for a truly quality assuring motorcycle licence test.

Training facilities

The quality and effectiveness of rider training would benefit to some extent if designated and safe areas for training were available.

By the very fact that most training schemes in Europe are operated by privately owned companies, one could say that investments in training facilities are the responsibility of the training providers. However, it is a fact that very few companies are in a financial situation that allows such large investments.



In a road safety perspective, it could therefore prove cost-effective if governments and local authorities would assist in providing for training facilities. Such training facilities could be used for both initial rider training, licence test and voluntary post-licence training.

Voluntary post-licence training

There is a variety of voluntary post-licence training courses available throughout Europe: From simple, almost cost free "freshen-up-courses" organised by motorcycle clubs, to highly advanced, track based courses, costing up to 400 Euro per day.

Voluntary post-licence training is extremely useful for those attending, but presently such courses are insignificant in the overall motorcycle safety picture, simply because a minority of European motorcyclists make use of the offers.



In a road safety context, the need for voluntary post-licence training is closely connected to the quality of basic rider training: If basic rider training is insufficient, there may be a greater need for voluntary post-licence training, as a "remedy". If such courses are to be effective, there is a perceived need for instructors to be shown to be competent through officially recognised registration schemes.

As long as there are major improvements to be made in initial rider training, FEMA can see no need for mandatory post-licence training. However, mandatory "remedial" training of offenders through rider improvement courses could improve their attitude and hazard perception skills.

As FEMA sees it, the motorcycling community will continue to play the leading role in the provision of voluntary post-licence training in the foreseeable future. The only imaginable governmental incentive needed is assistance in providing for proper training facilities.

Motorcyclists who participate in road safety orientated, voluntary post-licence training should be rewarded with a discount on their insurance premium.

Interactions with other road users

In many European countries, collisions between cars and motorcycles constitute nearly 50% of all motorcycle accidents. In a collision between a car and a motorcycle, it is almost inevitable that the rider suffers injuries of some kind.

Studies indicate that 8 of 10 collisions between cars and motorcycles are caused by inattentive car drivers, e.g. the car driver is the offending party, usually violating the motorcyclist's right-of-way. Thus, the most effective way to reduce fatalities and injuries resulting from collisions between cars and motorcycles is to emphasize driver awareness and rider collision-avoidance strategies.



Driver Awareness

Several factors have been put forward, trying to explain why car drivers tend to overlook motorcyclists:

- Motorcycles and their riders are a relatively small component of the total traffic mix and therefore their visual recognition is reduced
- Many drivers do not anticipate routine encounters with motorcyclists in traffic
- Motorcycles are smaller visual targets and are more likely to be obscured
- Drivers tend to scan for large rectangular objects with their main axis being horizontal (cars) rather than smaller objects with their main axis being vertical (motorcycles)
- Cars have blind spots, such as door pillars, that can hide a motorcycle and rider
- Objects and environmental factors, including other vehicles, roadside objects and light patterns can make it more difficult for drivers to identify motorcyclists in traffic
- Traditional driver distractions, such as eating, smoking, managing audio systems and operating mobile phones

However, a motorcycle is not at all *impossible to see*. Research shows that drivers who also ride motorcycles, and those with family members or close friends who ride motorcycles, are more likely to observe motorcyclists and less likely to collide with them. This more than indicates that the most

important factor causing car drivers to overlook motorcyclists is that the drivers' minds are not set to observe motorcycles.



One possible explanation may be that the car driver does not have a mental perception of a collision with lighter vehicles like motorcycles or mopeds being an impending danger to him personally, feeling protected by the bodywork of the car. Car drivers *can see* motorcyclists, whom they might otherwise overlook, if they are mentally trained to do so. Thus, better education of drivers is the single most important action to prevent collisions between cars and motorcycles.

FEMA therefore strongly recommends that awareness of motorcycles and moped becomes a compulsory element in initial driver training and licensing. FEMA also recommends Pan-European awareness campaigns, particularly focusing the life-long personal consequences for car drivers being responsible for having killed or injured a motorcyclist.

Also, traffic police must be trained to better understand the course of events in collisions between cars and motorcycles and drivers who are responsible for having killed or injured a motorcyclist must be prosecuted.

Conspicuity

Motorcyclists are constantly encouraged to enhance their conspicuity by use of daytime running lights and brightly coloured clothing. However, there are contradictory opinions about the effectiveness of DRL and conspicuous clothing:

- Under some circumstances, e.g. when riding on motorways in heavy rain, the positive effects of fluorescent rainsuits and daytime running lights are well known and accepted
- Under other circumstances, e.g. when riding in cities in bright sunshine, brightly coloured clothing and daytime running lights may have a "camouflaging" effect, in that they make the motorcycle and rider "blend" with colourful, bright objects in the traffic environment



Introducing mandatory DRL for all vehicles will obviously reduce the conspicuity-effect of daytime running lights on motorcycles only.

In countries already having introduced mandatory daytime running lights for all vehicles, studies of placing fluorescent tape on specific locations on the bike and using additional motorcycle light arrangements, such as triangular lights, to maintain conspicuity, show little or no effect.

FEMA is concerned that too much focus on DRL and brightly coloured clothing may take attention away from far more important factors preventing collisions between cars and motorcycles, namely increased driver awareness and conscious rider traffic strategies.

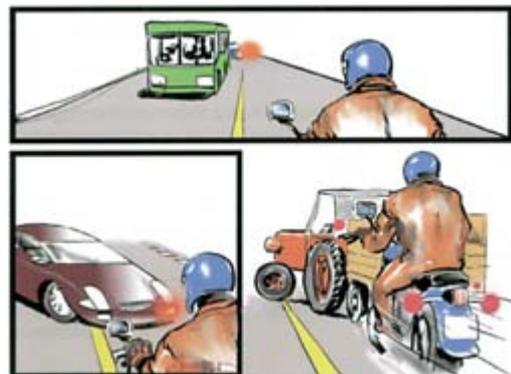
Rider traffic strategies

Motorcyclists cannot passively wait for future effects of awareness campaigns and better driver education. Motorcyclists must themselves take co-responsibility for avoiding collisions with cars.

Experienced riders are less likely to be involved in collisions with cars. This is probably caused by the fact that experienced riders have developed effective strategies for recognizing and avoiding "encounters" with inattentive drivers.

Key factors in a collision-avoidance strategy are:

- Active and conscious lane positioning, maximizing the rider's view on the traffic ahead and making the rider more visible to other road-users, such as car drivers waiting by or approaching a stop sign
- Observing techniques that enable the rider to foresee the actions of others
- Speed adaptation and braking readiness
- Attitude: A mind set on teamwork and cooperation



FEMA recommends that the key factors in a collision-avoidance strategy are emphasized in initial rider training. FEMA also recommends collision-avoidance strategies to be emphasized in educational programmes (booklets, CD Rom, website) supporting the "safety dialogue" within the motorcycling community.

Collision-avoidance skills

Under certain, favourable circumstances, motorcyclists may avoid a collision if mastering effective collision avoidance techniques, such as emergency braking and swerving. The retrospective amendments to the 2nd EC Driving Licence Directive requires braking and swerving exercises to be included in motorcycle licence test.

In real life, however, effective emergency collision-avoidance manoeuvres are among the most demanding vehicle operations a motorcyclist can perform, especially in wet conditions, requiring lots of practice and experience.

FEMA recognizes that basic collision-avoidance techniques should be part of basic rider training. However, experienced based knowledge shows that such manoeuvres are extremely difficult to utilise in real-life situations, particularly for inexperienced, novice riders.



Emergency braking and swerving training should always be practised in designated areas and not on public roads.

Personal Protective Equipment

Because motorcyclists usually become separated from their motorcycles at some time during a crash, it stands to reason that personal protective equipment is more likely to be effective than protective equipment attached to the motorcycle, e.g. so called "leg-protectors" or airbags.

Personal protective equipment may have injury-reducing effects when a motorcycle accident occurs, but such equipment does not *prevent* accidents. In the overall motorcycle safety picture, injury-reducing equipment is of far less importance than *accident-preventing* initiatives.

Personal protective equipment available on the European market:

- Integral and open helmets, in combination with visors/goggles
- Jackets, trousers and overalls, made of leather or abrasion-resistant synthetic material, with or without impact-absorbing shoulder, elbow, hip and knee protection
- Gloves, made of leather or abrasion-resistant synthetic material, with or without additional impact protection
- Leather boots, with or without additional impact and abrasion protection
- Back-protectors, bought separately or integrated in jacket



Helmets and helmet use

Helmets, designed to prevent head injuries, are regarded the most important piece of personal protective equipment. The injury-reducing effects of good quality helmets are well known by motorcyclists, and even though some national motorcycle organisations, on principle and philosophical grounds, are against *compulsion*, helmet use is widely accepted in the motorcycling community.

However, much can be done to improve helmet designs. FEMA recognise that helmet use in hot climates, e.g. during summer in the southern parts of Europe, is uncomfortable to the extent of being *unsafe*. This is the explanation of why helmet use, even where required by national law, seems to be less common in Southern Europe than in Northern Europe. Thus, research into developing helmet designs that are more suitable in a warm climate is needed.

An integral type helmet offers a combination of head- and face protection, but existing designs are extremely noisy and have a limited field of vision. Other serious safety problems are weight and fogging when riding in the rain. Research and product development is needed. Greater compliance with helmet wearing requirements, the use of better quality helmets and riders' renewing their helmets more frequently can be encouraged by permitting member states to levy a reduced rate of VAT on the purchase of new helmets.

Protective clothing

The motorcycling community is safety conscious and the riders have purchased protective clothing worth hundreds of millions of Euro. In principle, FEMA supports the voluntary use of protective clothing, but two major concerns must be taken into account, namely *comfort* and *cost*.

FEMA recognises that the use of protective jackets, trousers, gloves and boots is uncomfortable to the extent of being *unsafe* when weather gets really hot - the explanation why not even the motorcycle police officers in southern parts of Europe, riding officially marked police motorcycles, are using protective clothing!



In a road safety context, the positive attributes of personal protective equipment must always be balanced against their negative effects on a dangerously uncomfortable rider. Thus, research and development of affordable riding gear, more suitable in warm climate is needed.

The costs of buying good a quality helmet, jacket, trousers, gloves and boots are considerable: FEMA estimates the average cost of such equipment to approximately 1000 Euro. In addition, the equipment wears out, requiring replacement at regular intervals. High cost is one reason why riders do not purchase personal protective equipment. FEMA believes that a reduction in costs would lead to increased use. Fiscal incentives are an effective way of reducing costs, and FEMA recommends that personal protective equipment for motorcycle use is subject to a lower VAT rate.

Alcohol Impairment

Alcoholic beverages are frequently available and promoted at events targeted to motorcyclists. The effects of alcohol on judgement and vehicle operation skills are well known among motorcyclists and most motorcyclists are cautious about drinking alcohol before riding. However, the general attitude towards drinking and riding differs from country to country.

Many organisers of motorcycling events are well aware of "the morning after" drink-riding problem and have invested in alcoholmeters for voluntary testing in the morning after an evening of drinking before attempting to ride a motorcycle.

Studies show that when motorcycles are stolen and then crashed, the joy-rider often was under the influence of alcohol. This type of "motorcycle accidents" is best prevented by motorcycle owners properly securing their bikes, and Anti-Bike-Theft campaigns may prove useful in a road safety perspective.



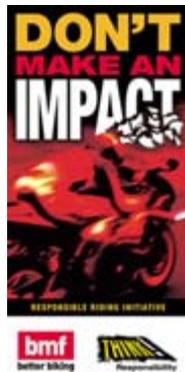
Pan-European Motorcycle Safety Campaigns

FEMA could identify several areas where Pan-European motorcycle safety campaigns would be extremely effective and useful:

- Motorcycle awareness campaigns
- Helmet awareness campaigns
- Road hazard awareness campaigns
- Anti-Bike-Theft campaigns
- Diesel Spills campaigns
- Educational programmes supporting the "safety dialogue"

However, the message could easily fail to reach their targets, and thousands of Euro be wasted, if such campaigns are not designed in close cooperation with user-groups.

Examples of previous motorcycle safety campaigns, organised by the motorcycling community:



Motorcycle Design

The design of motorcycles has made them increasingly more capable and specialised and generally reflects a greater emphasis on safety. Current motorcycles have better brakes, greater stability, more responsive steering, more effective controls, improved ergonomics for reduced fatigue and improved reliability in all systems, than those of even a decade ago.

Because motorcyclists are usually separated from the motorcycle at some time during a crash, protective equipment attached to the motorcycle, e.g. so called "leg protectors" or airbags, is less likely to be effective than protective clothing and should not warrant serious attention.

Tyres

Tyres, which are particularly crucial components on a two-wheeled vehicle, have advanced significantly and have contributed much to vehicle performance, reliability and safety. Modern tyres offer better traction for turning and stopping, particularly in wet conditions.

Braking Systems

Brakes are significantly more powerful, and most motorcycles now have hydraulically actuated disc brakes. The majority of motorcycles still have two separate brake-control systems, one for the front wheel and one for the rear wheel.

It requires skills and experience to be able to apply exactly the correct braking force to the two systems. Braking is one of the most difficult skills for a motorcyclist to master, especially in wet conditions. It is also one of the most critical, especially in panic situations. A typical error in a panic situation is the incorrect use of the brakes, causing the wheels to lock and the tyres to lose grip. Often riders fail to avoid collisions by their failure to use sufficient braking force through fear of overbraking and losing control.

To compensate for riders' tendency to overbrake the motorcycle in a panic-situation, several motorcycle producers have developed anti-lock braking systems (ABS) or linked front and rear applications (Combined Braking Systems). FEMA supports the progressive introduction of affordable advanced braking systems (anti-lock braking systems and/or combined braking systems) on all new motorcycles and scooters through voluntary commitments, respecting consumer choice.



Maintenance

Most motorcyclists have an "enthusiastic" relation to their vehicle and spare little effort and money keeping the bike in immaculate condition. Being enthusiasts, most motorcyclists have a certain degree of technical knowledge, enabling them to perform regular, qualified safety inspections of their bikes.

For many motorcyclists, enthusiasm for riding is closely linked to the technical condition of their bike, meaning: Riding is less fun if the bike is not in good technical condition. The fact is that most European riders know a lot more about their motorcycles than most vehicle-examiners!

Studies show that very few motorcycle accidents are caused by mechanical failure as a result of poor maintenance. Thus, FEMA can see no need for compulsory safety controls of motorcycles such as mandatory pan-European roadworthiness tests.

Through the "safety dialogue", experienced riders share their knowledge of machine maintenance with novice riders, preventing accidents caused by ignorance.

Modifications

A motorcycle's relatively simple design and availability of "bolt-on" replacement or accessory components make it easy and popular to modify. The quality and safety of "bolt on" aftermarket components have steadily improved and are many times significantly superior to equivalent standard components.

Some skilled motorcycle owners take modification even further and design and produce the components themselves. This creative approach has brought about innovative, highly functional designs, sometimes adopted by the motorcycle industry and used on standard, mass-produced motorcycles.

Accident research from some European countries show that modified motorcycles, such as so called "choppers, are under-represented in accident statistics. FEMA can see no road safety benefits from restricting the historic tradition of modifying motorcycles.



Concluding Remarks

Most European motorcyclists are perfectly willing to accept their responsibilities and take an active part in reducing motorcycle accidents.

European motorcyclists and their organisations support the safety targets in the proposed European Road Safety Action Programme. In fact, European motorcyclists and their organisations *demand* that they are given the opportunity to play an active role in achieving the targets of the European Road Safety Action Programme.

European motorcyclists and their organisations strongly believe that the success of the Road Safety Action Programme is dependent on the understanding, commitment and full co-operation of the motorcyclists themselves - "Shared Responsibility".

Thus, it is of great importance that the analyses and recommendations put forward by FEMA, in this document, are taken into consideration by legislators and decision makers, not only from the European Union's institutions, but from those of Europe's Member States.



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