



Ministry of Infrastructure and the
Environment

Action plan for improving road safety for motorcyclists

Strategic approach



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Preface

This action plan was drawn up in consultation with the members of the *Motorplatform* (Dutch Motorcycle Platform): the Royal Dutch Touring Club ANWB, the association of motor car, garage and allied trades BOVAG, the Central Office for Motor Vehicle Testing (CBR), the federation for historical car and motorcycle clubs FEHAC, the Netherlands Police Agency (KLPD), the motorcycle association KNMV, the national consultation body for touring clubs LOOT, the motorcyclists lobby group MAG, the Dutch mobility research MON, the *Politieacademie* (Police Academy), the cycle and automobile association RAI Vereniging, the Dutch admissions authority for vehicles RDW, the Gelderland regional body for road safety ROVG, the institute for Road Safety Research (SWOV), and the Dutch association for road safety VVN. The Ministry of Infrastructure and the Environment is very grateful to the members of the Motorplatform for their recommendations.

Table of contents

	Preface	2
	Summary	4
1	Introduction	7
1.1	Background	7
1.2	Aims of the Ministry of Infrastructure and the Environment	8
1.3	Preconditions for this action plan	9
2	International knowledge	11
2.1	Introduction	11
2.2	Motorcycle use	11
2.3	Accident data for the Netherlands	11
2.3.1	Age, driving experience, gender	12
2.3.2	Accident situations	13
2.3.3	Intersection type	14
2.3.4	Road type	14
2.3.5	Accident risk according to month	14
2.3.6	Infrastructure	16
2.3.7	Vehicles and technology	16
2.4	Accident analyses and databases from abroad	17
2.5	EU developments with respect to motorcycles	18
2.6	The first sunny weekends	20
2.7	Conclusion	21
3	Choice of measures	23
3.1	Introduction	23
3.2	Assessment framework for choice of measures	23
3.3	Measures targeting behaviour	23
3.3.1	Teaching advanced motorcycle skills	23
3.3.2	Provision of information for motorcyclists; promoting the use of protective gear	24
3.3.3	Provision of information for motorists	25
3.3.4	Specific attention for motorcyclists completing category B driving instruction	25
3.4	Vehicle measures	26
3.4.1	Visibility of motorcyclists	26
3.5	Infrastructural and general measures	27
3.5.1	Drafting of CROW guidelines	27
3.5.2	Implementation of the third EU Directive on driving licences	28
3.6	Overview of measures	28
3.7	Preconditions	28
4	References	31

Summary

Over the last 15 years, the number of motorcycles and motor scooters in the Netherlands has increased by an average of 5% each year. Motorcycles have a natural place in the transport system and offer a number of benefits over other modes of transport: limited negative environmental impact and a contribution to reducing traffic congestion and inner-city parking problems.

However, motorcycle use can also have detrimental consequences. Motorcyclists made up 10% of road fatalities last year (70 out of 720), and the risk of accidents faced by motorcyclists is 25% higher than for those travelling by car. The key causes of motorcycle accidents are failure to yield the right of way (in a high proportion of the cases, the motorist did not see the motorcyclist) and lack of control of the motorcycle.

The aim of this action plan is to reduce the perkilometre risk of accidents faced by motorcyclists with a view to reducing the number of motorcycle casualties. Although the multi-year trend does reflect a reduction in the number of fatalities (cf. figure on page 3), the number of motorcyclists killed in road accidents has not decreased in the past three years, providing additional impetus for the introduction of this action plan.

This action plan is part of the Strategic Plan for Road Safety 2008-2010 (*Strategisch Plan Verkeersveiligheid 2008-2010*). The implementation of additional protective measures for vulnerable road users (including motorcyclists) is one of the cornerstones of this Strategic Plan, the guiding principle of which is that all measures must be proportional, i.e. increasing motorcycle road safety must not come at the expense of the freedom of motorcyclists to use the road in a responsible manner. The Ministry of Infrastructure and the Environment believes that this action plan will facilitate achieving the ambitious aims mentioned above, while adhering to this principle.

The set of measures presented here impacts all aspects of road safety, including driving behaviour, vehicles and infrastructure, and addresses both motorcyclists and motorists. The measures outlined below tie in with the key causes of accidents: failure to yield the right of way and loss of control of the vehicle. A greater degree of control of the motorcycle and improved compliance with the rules governing the right of way by motorists and motorcyclists will reduce the risk of accidents and the number of motorcycle casualties.

The measures to be implemented to achieve this are outlined briefly below.

1. In conjunction with the providers of advanced driving instruction, an advanced driving course will be developed to teach advanced skills, including the ability to focus on matters relevant to road safety, assess traffic situations and satisfactorily predict at an early stage how traffic situations will develop. When taking decisions, motorcyclists must be able to factor in potential errors on the part of other road users. It may also be possible to develop specific courses in risk perception.
2. In conjunction with the Ministry of Infrastructure and the Environment, interest groups will provide their members with information (e.g. at the start of the motoring season) on how to approach 'hitting the road again'.
3. Interest groups will provide their members with information on the benefit and importance of wearing protective gear.
4. The Ministry of Infrastructure and the Environment will provide motorists with information on how to share the road with motorcyclists, for example, the traffic congestion-motor-

cyclists code of conduct and the visibility of motorcycles in situations where the right of way must be yielded.

5. The Ministry of Infrastructure and the Environment will investigate whether sharing the road with motorcyclists is covered sufficiently in motorist driving instruction (in accordance with the principle of reasonableness and fairness).
6. The Ministry of Infrastructure and the Environment will commission a comprehensive study into the visibility of motorcyclists, including such aspects as brightly coloured/reflective gear, strategies for ensuring the visibility of motorcycles, lighting and position on the road. The aim of the study is to gain an understanding the impact of the visibility of motorcyclists on road safety.
7. Via the Dutch motorsport association NMB, the Ministry of Infrastructure and the Environment will ask road managers to work together to update the information in the handbook for motorcyclists of the information and technology centre for transport and infrastructure CROW and to include it in relevant CROW guidelines. This approach ensures that all road managers are informed in a logical manner of the safest possible infrastructure design for motorcyclists.
8. In 2011, the Ministry of Infrastructure and the Environment must enforce the third EU Directive on driving licences, which stipulates additional requirements for the motorcycle test, as part of which young people will only be permitted to ride heavy motorcycles in accordance with a phased system. In any event, it will be possible for 17-year-olds in the Netherlands to start lessons in preparation for the A1 category test.

The Ministry of Infrastructure and the Environment will closely follow trends in the number of casualties and the impact of the measures outlined in this action plan. All relevant interest groups and experts were involved in drawing up this document, and various interest groups have already expressed an interest in contributing to the implementation of certain measures. Road safety is everyone's responsibility – it always has been and always will be.





1 Introduction

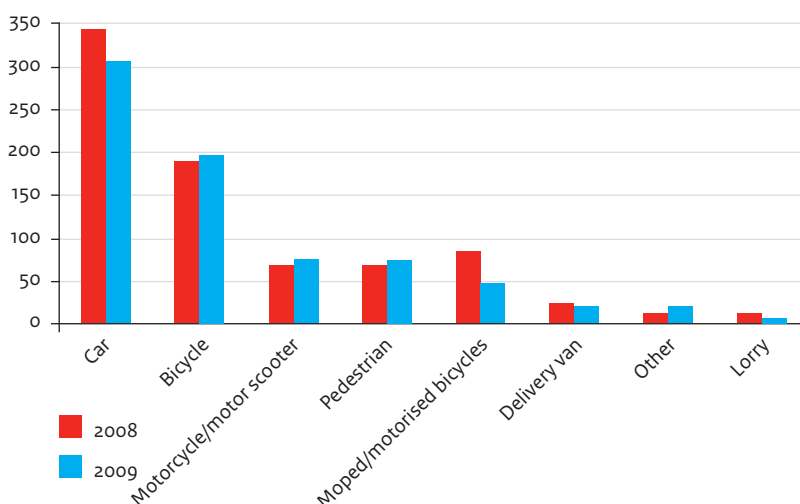
1.1 Background

Some not only consider the motorcycle a mode of transport for commuting and recreation, but also representative of a lifestyle.

In recent years, the number of motorcycles in the Netherlands and in other European countries has increased. Over the last 15 years, the number of motorcycles and motor scooters in the Netherlands has increased by an average of 5% each year. This already high demand for mobility continues to grow and may also result in continued growth in the number of powered two wheelers (PTWs) in the years to come. The advantages of PTWs are that they take up less of the existing infrastructure space and have limited negative environmental impact. Consequently, they contribute to reducing traffic congestion and inner-city parking problems. In cities such as Paris, London, Barcelona and Rome, motorcycles are an integral part of the street scene. The European project eSUM¹ already specifically addresses policy options in major cities such as these. Motorcycles have a natural place in the transport system.

However, motorcycle use can also have detrimental consequences. Motorcyclists made up 10% of road fatalities last year (70 out of 720). Unlike cars, the design of motorcycles does not incorporate any structural elements to increase safety, as a result of which the consequences of a motorcycle accidents are often quite serious for the motorcyclist and the passenger. The risk of injury for motorcyclists is 25% higher than that for those travelling by car. Compared to driving a car, operating a motorcycle demands more of the driver and involves a higher risk of accidents resulting in serious casualties. The key causes of motorcycle accidents are errors in yielding the right of way at intersections (41% of motorcycle casualties occur at intersections, involving a high proportion of cases in which the motorist did not see the motorcyclist) and lack of control of the motorcycle (single-vehicle accidents account for approximately 40% of motorcycle fatalities).

Figure 1: Number of casualties per mode of transport



¹ A European project, eSUM involves the collaboration of European manufacturers of PTWs, local authorities and the authorities of a number of large European cities – Barcelona, London, Paris and Rome – on the large-scale use of PTWs. The project aims to identify focus areas for which to develop targeted policy can to improve PTW safety. Launched in June 2008, the project will run continue December 2010. Since its launch, various instances of best practice have been made available for use by national authorities (www.esum.eu).

A similar improvement in road safety, as seen in recent years in the Netherlands, has not been proportionally reflected in the situation for motorcyclists. After motorists and cyclists, motorcycles represent the mode of transport associated with the third highest number of traffic casualties in 2009. This is presented in figure below.

The risk of road fatalities is declining across all road users. However, this risk is decreasing at a much higher rate for motorists, primarily due to the rapid tempo of developments in automotive technology (see Morsink, 2007). Consequently, when compared to motorists, the *relative risk* for motorcyclists is increasing, while the *number of motorcycle road fatalities* has gone down in recent decades. The relative vulnerability of motorcyclists motivated the **Ministry of Infrastructure and Environment** to fully commit to improving motorcycle road safety, of which this action plan is the result.

1.2

Aims of the Ministry of Infrastructure and the Environment

Published in 2008, the Strategic Plan for Road Safety 2008-2020 calls for the continuation of a general policy for all road users, but also identifies specific policy for a number of target groups that have not or have insufficiently benefited from the reduction in the number of road fatalities. These include:

- A tougher response to road users who create hazardous situations.
- Road users who exceed the speed limit and engage in drink driving cause relatively more accidents. As part of a new approach, these road users will face more immediate consequences, which are compulsory and in accordance with the principle of 'letting the punishment fit the crime', including an ignition interlock device, speed limiting devices or behaviour modification course, which they must pay for themselves. Such measures would not be compulsory for all road users, only for those who do not obey the law.
- Additional protective measures for vulnerable road users. For example, it has been shown that the elderly, motorcyclists, cyclists and children face relatively higher risks in traffic. Taking specific measures on behalf of these groups should improve their position. In an EU context, we rely on market forces to introduce technological innovations, invest in training, education and rewards, and engage in coalitions with, for instance, associations for cyclists and the elderly.



The Ministry of Infrastructure and the Environment has further developed protective measures for motorcyclists in this action plan. The aim of this action plan is to reduce the perkilometre risk of accidents faced by motorcyclists and to reduce the number of motorcycle casualties. As indicated in the Strategic Plan, the measures proposed in this action plan will be included in the Ministry of Infrastructure and the Environment's 2011-2012 road safety action programme. Having identified and selected a set of measures deemed proportional (i.e. measures that do not unreasonably restrict the freedom of motorcyclists), the Ministry of Infrastructure and Environment believes that this action plan will facilitate achieving the ambitious objective of reducing the risk of accidents and the number of motorcycle casualties.

1.3 Preconditions for this action plan

This action plan outlines how motorcycle road safety can be improved. While other two-wheelers, such as bicycles and mopeds are not taken into consideration, it does cover all makes and models of motorcycles.



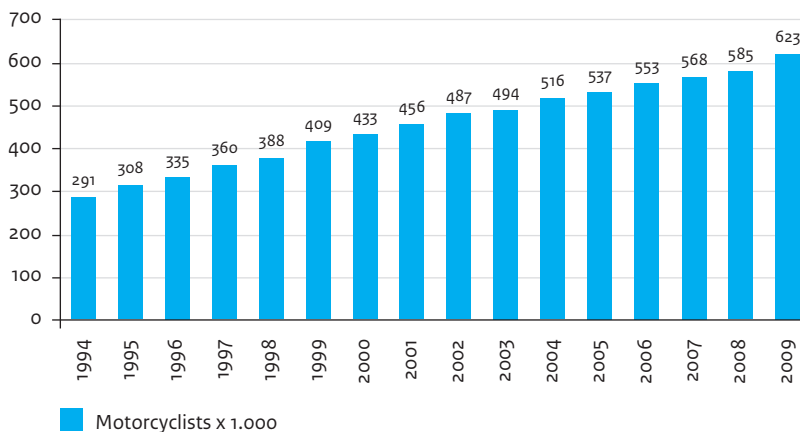
2 International knowledge

2.1

Introduction

This chapter summarises the key facts and figures regarding motorcycle usage and the cause of accidents. The information included has been compiled from various sources and studies conducted in the Netherlands and abroad. First, the facts will be presented, from which key conclusions will be drawn at the end of the section.

Figure 2: Number of registered motorcycles



2.2

Motorcycle use

In recent years, the SWOV has gathered data in the Netherlands on motorcycles and their safety (SWOV Factsheet 2009). Compared to the rest of Europe, motorcycle ownership in the Netherlands is neither particularly low nor high. The number of motorcycles owned in the Netherlands, however, has increased sharply in the last decade from 100,000 in 1980 to 623,000 in 2009.

2.3

Accident data for the Netherlands

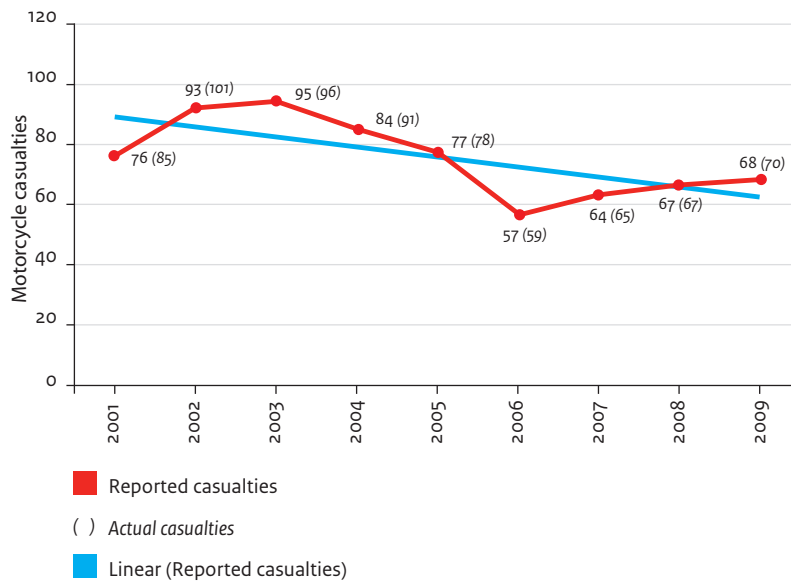
Data regarding the situation in the Netherlands was drawn primarily from the SWOV Factsheet (2009). In addition, 2004-2008 accident data and data compiled by Dutch mobility research

firm MON (*Mobiliteitsonderzoek Nederland*) was used. An overview of the key findings is presented below. Most of the data is for the 2004-2008 period.

2.3.1 Age, driving experience, gender

Figure 3 demonstrates the trend in the number of motorcycle casualties in recent years.

Figure 3: Number of motorcycle casualties



The figure above shows that, despite the general falling trend of the past decade, there has been a slightly upward trend in the last three years. The graph shows no correlation between the number of registered motorcycles and the number of road fatalities. During the most recent period, the number of motorcycle road fatalities decreased, while the number of motorcycles increased.

The table below reveals a decline in the number of motorcycle accidents in recent years, although the number of hospital-bound casualties did not.

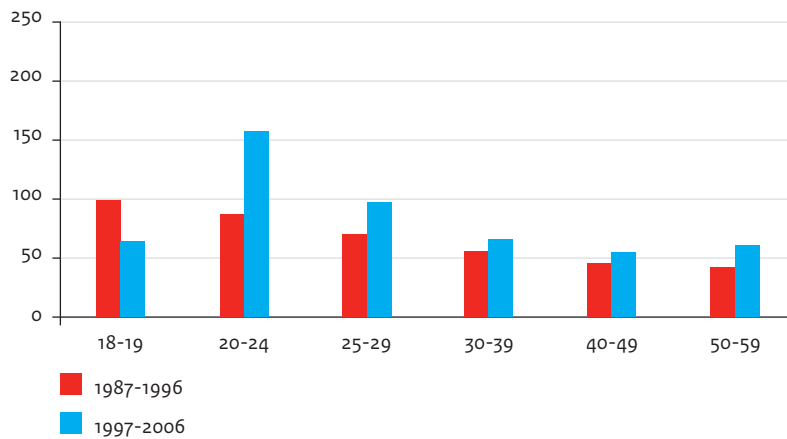
Table 1: Number of accidents involving motorcycles that result in hospitalisation of motorcyclists.

Year	Motorcycle accidents	Hospitalisation of casualties
2004	4091	694
2005	3916	702
2006	3523	653
2007	3747	713
2008	3192	695

Active motorcyclists primarily fall into the 35-54 age group and travel an average of 3700 km each year. Compared to the number of kilometres driven by motorists, the number of kilometres driven by motorcyclists is quite low. In addition, motorcyclists – unlike motorists – generally have little routine.

Age is a key factor in the number of fatal accidents. A relatively large number of fatal accidents involve those in the 20–24 age group (see figure 2). Lack of control of the vehicle (when making an evasive manoeuvre and braking), lack of traffic insight and inability to recognise danger are key factors (Morsink, 2007; ERSO, 2008.) The overwhelming majority of motorcycle casualties are men (SWOV Factsheet, 2009).

Figure 4: Data according to age on motorcycle risk in the Netherlands, measured during two periods. Risk is the number of road fatalities per billion kilometres driven (www.erso.eu, Powered Two Wheelers; last version 2008).



2.3.2 Accident situations

Of accidents resulting in motorcycle casualties, the most frequently occurring type (i.e. approximately 50%) involves a collision between a motorcycle and a passenger car/delivery van (source: SWOV Factsheet, 2009). Approximately 40% of accidents resulting in motorcycle casualties are the result of single-vehicle accidents, which do not take place at intersections but on sections of road between intersections. The cause is often attributed to a combination of poor vehicle control in bends in the road, slippery road conditions due to rain, oil on the road, road markings and excessive speed. In most motorcycle accidents, the motorcyclist is injured or killed. Of motorcycle accidents, 11% cause injury to someone else involved in the accident, i.e. not the motorcyclist (SWOV Factsheet 2009).



Human error has been identified as the key cause of a majority of accidents. Errors in perception are heavily represented. It should be noted here that there is a clear difference between ‘seeing’ and ‘perception’. ‘Seeing’ is a physical process, whereby the eye detects an object. ‘Perception’ refers to everything that follows, as part of which a road user applies judgment and prioritisation to create a mental image of the environment (known as a ‘world view’) which is used as the basis for interpretation and subsequent action.

Motorists (i.e. the other party) often make errors in perception. Although the motorcyclist may have been ‘seen’, this road user remains an unexpected element, as a result of no account is taken of motorcyclists when developing the ‘world view’. Errors whereby the motorcyclist is ‘perceived’ too late or not at all occur in 36% of accidents involving motorcycles (Morsink, 2007). Risk awareness presents another area of risk for motorcyclists. Limited visibility demands offensive driving skills (SWOV Factsheet).

2.3.3 Intersection type

Of accidents resulting in motorcycle casualties, 41% occur at intersections and 59% on sections of road. Failure to yield the right of way is a key cause of motorcycle accidents and is an error made primarily by the other party, i.e. not the motorcyclist. In 43% of the accidents occurring at intersections, the other party does not yield the right of way, often resulting from an error in perception (seeing, but not perceiving). Table 3 presents an overview of the types of accidents.

Table 3: Motorcycle accidents according to type during 2004–2008 period, average number per year.

Type of accident	Fatalities	Hospitalisations
Flank	25	276
Rear-end	7	90
Head-on	11	78
One-sided and fixed object	27	216
Other	3	46

2.3.4 Road type

Compared to accidents involving cars, a relatively high number of motorcycle accidents occur in built-up areas (41%), while relatively few occur on motorways (11%). Almost half of the motorcycle casualties are the result of accidents that occur on the secondary road network outside of built-up areas (see table 4) (SWOV Factsheet, 2009; Morsink, 2007).

Table 4: Motorcycle casualties according to type of road (road manager) during the 2004–2008 period, average number per year.

Road manager	Fatalities	Hospitalisations
Municipal authorities	39	438
Provincial authorities	19	143
National government	14	103
Water boards and other authorities	1	22

2.3.5 Accident risk according to month

Figure 5 presents an overview of the number of kilometres driven by motorcyclists each month in the years 2004, 2005, 2006, 2007 and 2008.

² Accident risk refers to the likelihood of death as the result of an accident per million kilometres ridden.

The risk of accident² according to month can be calculated by dividing the number of fatalities by the number of kilometres driven. Table 5 presents the number of fatalities, the number of kilometres driven (in millions) and the risk of accident per month.

Figure 5: Distance driven by motorcyclists according to month during the 2004-2008 period (Source MON 2008)

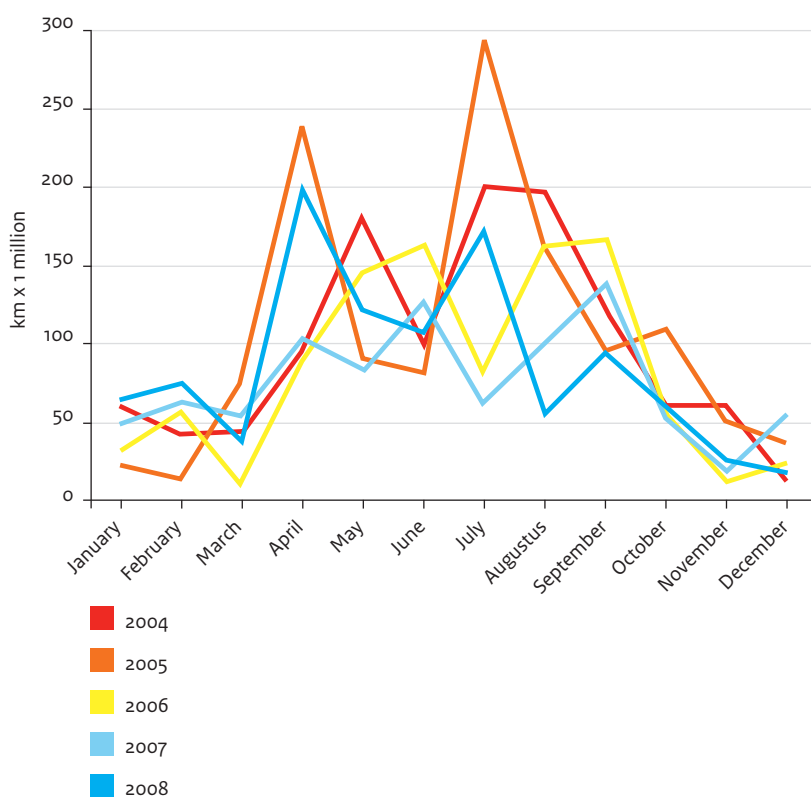


Table 5: Number of motorcycle fatalities according to month during the 2004-2008 period and the risk of motorcycle accidents according to month (i.e. number of fatalities divided by the number of kilometres driven (in millions)).

Month	2004	2005	2006	2007	2008	2009	Total	km driven (x million)	Accident risk
January	2	4	1	2	3	2	12	231,5	0,052
February	2	3	1	5	4	1	15	256,3	0,059
March	2	6	1	6	4	7	19	225,7	0,084
April	7	6	9	11	8	13	38	723,0	0,053
May	16	13	8	6	6	10	47	623,7	0,075
June	12	13	9	3	7	8	40	579,8	0,069
July	16	7	6	8	2	9	39	809,3	0,048
Augustus	6	9	9	6	10	6	38	677,5	0,056
September	7	8	5	7	11	4	37	618,0	0,060
October	7	6	3	8	10	4	33	343,1	0,096
November	4	2	3	1	2	4	11	174,3	0,063
December	3	0	2	1	0	0	6	151,4	0,040
Total	84	77	57	64	67	68	335	5413,5	0,062

2.3.6 Infrastructure

Areas of risk relating to infrastructure primarily concern the condition of the road and the road surface, unevenness, slippery road conditions, road markings (raised, slippery etc.) and the characteristics of speedreductions measures. Exposed obstacles can also present problems. Despite their infrequent occurrence, accidents involving crash barriers present a significant danger to motorcyclists (CROW, 2003). This motivated the Ministry of Infrastructure and the Environment in part to install more than 60 km of motorcycle-friendly crash barriers at the most dangerous bends in the trunk road system in 2009.

The Motorcycle Accident In-Depth Study (MAIDS) showed that 8% of motorcycle accidents were primarily caused by a shortcoming in the road infrastructure. In 2004, CROW produced a handbook on the design and maintenance of infrastructure.



2.3.7 Vehicles and technology

The following motorcycle-related risks areas are cited in the literature:

- In the event of accident, motorcycles offer limited or no protection against injury. This lack of protection in and on the vehicle results in relatively serious motorcycle accidents for the driver and passenger. Noordzij et al. (2001) concluded that around 66% of fatalities were the result of head and neck injuries. More than 60% of the casualties involving severe injuries included damage to the legs (Morsink, 2007).
- Compared to cars, motorcycles offer limited stability.
- Perceiving motorcycles is more difficult than perceiving cars due to their smaller silhouette.
- Riding a motorcycle requires balance. Panic situations and over-braking can give rise to hazardous situations. The sector addressed this risk area several years ago, by ensuring as many motorcycles as possible were equipped with an anti-lock braking system (ABS) as standard.

The ETSC has produced several reports stating that the average motorcyclist is unable to use more than 56% of available braking capacity in emergency situations (ETSC, 2008; Ecker et al., 2001, in: ETSC Speed Factsheet 6, 2009). It has also been shown that the average motorcyclist underestimates the power of the front brake. As a result, the reduction in speed in emergency situations is far below the motorcycle's capacity (Vavryn and Winkelbauer, 1998, in ETSC Speed Factsheet 6, 2009). It is expected that this stateoftheart braking system could achieve a reduction in the number of brakingrelated accidents. In 2004, the European Road Safety Charter was supported by the Brake Commitment, which was developed in 2008 with the addition of proposals designed to ensure that 75% of the product range for use on the road would be equipped with ABS by 2015.

2.4

Accident analyses and databases from abroad

Numerous studies have been conducted abroad in order to gain a better understanding of trends in motorcycle accidents.

Safety data reveal a much more negative picture for motorcyclists than motorists.

Motorcyclists have significantly higher rate of accidents per kilometre.

With the support of the European Commission (EC) and other stakeholders, the Association of European Motorcycle Manufacturers (ACEM) conducted the extensive Motorcycle Accident In-Depth Study (MAIDS) during the 1999-2000 period. The study addressed motorcycle accidents in five EU Member States, namely France, Germany, The Netherlands, Spain and Italy (ACEM, 2009). The OECD developed the study methodology. MAIDS produced a large database of 921 motorcycle and moped accidents. The key findings were:

- More than half of all motorcycle accidents occur at intersections.
- Most fatal and non-fatal accidents occur between 2pm and 6pm, with a peak between 5pm and 6pm. The peak for fatal accidents is an hour later (between 7pm and 8pm).
- Table 6 presents the key causes of accidents. Most serious accidents are caused by the driver of the other vehicle, rather than the motorcyclist.

Table 6: Key causes of accidents involving powered two wheelers (PTW) (ACEM, 2009).

	Number	%
Human error on the part of the PTW operator	344	37,4
Human error on the part of the other driver	465	50,5
Vehicle (tyres, brakes)	3	0,3
Infrastructure/environment	71	7,7
Other	38	4,1
Total	921	100%

The MAIDS methodology distinguishes between four types of human error: errors in perception, errors in assessment, decision-making errors and errors in response.

The findings demonstrate that errors in perception are the most common error made by the other party (usually a motorist). This generally involves seeing the motorcyclist too late or not at all. A recent study that used MAIDS data also confirmed that an error in perception is often the cause of accident. An error in perception is more often made by the driver of the other vehicle than by the motorcyclist (McCarthy et al, 2009). It should, however, be noted that the MAIDS was not limited to motorcycles alone, but also encompassed other forms of PTWs. As a result, relevant conclusions about motorcycles cannot be drawn from the MAIDS results.

MAIDS also showed that the age of the motorcyclist is a contributing factor in motorcycle accidents. Motorcyclists in either the 18-21 or the 22-25 age groups were involved in relatively more accidents, while motorcyclists between 41 and 55 were involved in fewer accidents. It was also demonstrated that poorly instructed motorcyclists and motorcyclists without a valid driving licence were overrepresented in the accident figures. Other studies also report a correlation between driving experience and accidents. Inexperienced motorcyclists more often experience a lack of vehicle control (when making an evasive manoeuvre and braking, for instance), a lack of traffic insight and an inability to recognise hazards (Morsink, 2007; ERSO, 2006).

Secondary factors also contribute to motorcycle accidents. Key secondary factors include motorcyclists taking the wrong or less than optimal decision when an incident arises, opting, for example, for a less effective or wrong evasion strategy. It is possible that a lack of driving experience is a contributing factor in poor decision making. MAIDS reveals that 71% of PTWs were making an evasive manoeuvre just before the accident. Of these, 31% were experienced a lack of vehicle control to some degree.

A range of studies have also been conducted in the UK. A recent study investigated the profile of motorcyclists that primarily ride heavy motorcycles (Jamson & Chorlton, 2009), given the growing number of these being sold in the UK. The study revealed that a large number of motorcyclists start or restart riding a motorcycle later in life and in many cases also use the motorcycle for recreational purposes. The findings show that many of the motorcyclists who primarily buy heavier motorcycles are older, married males, who also drive a car, have motorcycling experience, drive motorcycles as a recreational activity, have completed voluntarily instruction and have a higher income. The authors emphasise that it is important that those with heavier motorcycles follow a supplementary training course that focuses on the determination of appropriate speed, hazard recognition and vehicle operation skills.

The Community database on Accidents on the Roads in Europe (CARE) and SafetyNet are also relevant databases. CARE comprises accident data for EU Member States, while SafetyNet is an integrated project supported by the EC to develop a framework for road safety data and expertise. These databases make it possible to compare accident data from different countries.

2.5 EU developments with respect to motorcycles

Several EU Member States are doing everything necessary to improve the motorcycle safety. On 10 June 2008, the Motorcycling Safety Workshop was held in Lillehammer (Norway). The aim of the workshop was to bring together various stakeholders to identify actual – rather than perceived – problems in motorcycle safety. Practical solutions were also discussed and many of these (e.g. intensified collaboration between stakeholders and taking motorcyclists into account in transport policy and research) can be found (whether in whole or in part) in the current plans.

The EC is currently working on the European Road Safety Action Programme 2011-2010, which was presented to the Member States in July 2010. The EC's policy line regarding motorcyclists is largely in line with the measures that we, the Netherlands, propose in this plan, although the EC focuses on vehicle aspects. The concrete proposals are as follows:

- The introduction of functional safety measures, including making state-of-the-art braking systems and automatic lights compulsory, updating measures to prevent tinkering with certain categories of PTWs (ensuring that speed limiting devices cannot be removed).
- The development of technological standards for protective measures, such as protective gear. Researching the feasibility of equipping motorcycles with an airbag and/or whether the airbag can be integrated into protective gear.
- Expansion of EU legislation regarding the technical audit/inspection of motorcycles and other PTWs.

We see the first two measures as a supplement to the Dutch action plan. The last point will be considered in more detail in the next chapter.

A number of EU Member States, including Spain and France, also have strategic plans specifically for motorcyclists, the main features of which largely overlap with this Dutch plan.

In some Member States, the minimum age for motorcycling is 18 and requirements are set for instruction and tests. Efforts are being made to improve the quality of driving instruction at EU level. For instance, the Initial Rider Training programme has been jointly developed by the Federation of European Motorcyclists' Association (FEMA), the International Motorcycling Federation (FIM), and ACEM. The IRT programme focuses on the learning processes that precede passing the driving test and emphasises the importance of an approach that balances driving skills with hazard recognition and social responsibility (FEMA, 1997). In 2008, ACEM also launched an EU-wide safety campaign to increase awareness among motorcyclists of potential hazards on-road and traffic hazards (ACEM, 2008). ERSO (2006) also noted that in most Member States, motorcyclists start with a motorcycle with limited engine capacity. In 2008, the EC proposed a directive, addressing the enforcement aspects, to 'facilitate cross-border enforcement in the field of road safety', which also specifically addressed PTWs. The focal points are the enforcement of speed limits, helmet use, visibility and registration plates (ETSC, 2008), the latter of which is key to enforcement, as it is the first way to identify a vehicle and, consequently, its owner.

The European Committee for Standardisation (CEN) granted the mandate to amend the EU standards for testing crash barriers and other roadside safety constructions. In the future, the development and testing of these constructions will take the safety of motorcyclists into account.

A number of research programmes addressing motorcycle safety are currently being implemented by the EU, including:

- SafeRider: EC initiative to consider the implementation of telematics in safe motorcycling
- ROSA: Established with the support of the EC, the aim is to develop a Handbook of Good Practices. This programme is primarily driven by the southern Member States, where motorcycling is more prevalent than in the Netherlands.



Finally, the third EU Directive on driving licences should also be mentioned. Established in 2006, this Directive will regulate who is authorised to drive motor vehicles, including motorcycles. Three categories of vehicles have been distinguished:

A1 – up to 11 kW

A2 – up to 35 kW

A – unlimited

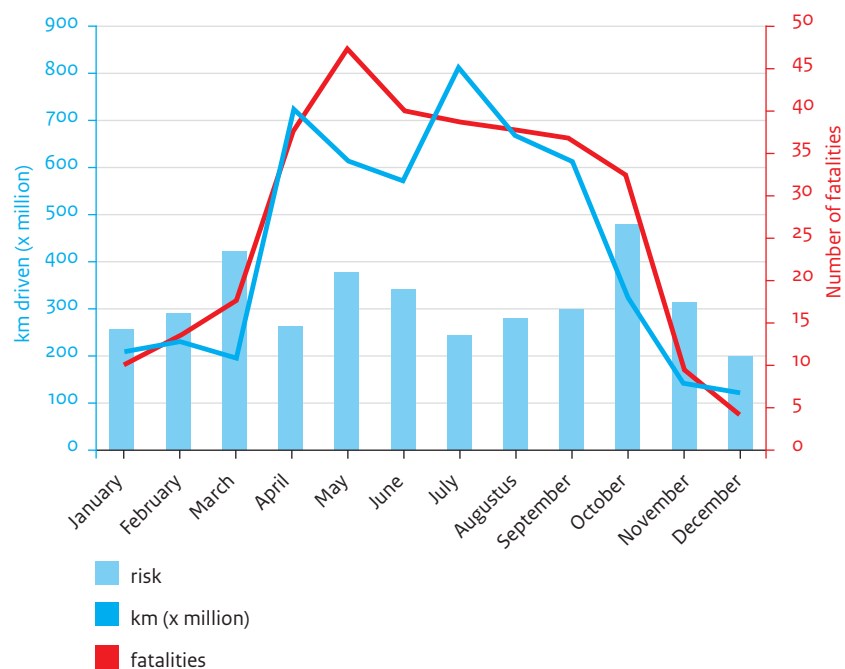
Age requirements will be attached to these categories, and it will no longer be possible to progress to riding a motorcycle with a greater capacity without first passing a test or examination. The Directive will come into force in the Netherlands in January 2013.

2.6 The first sunny weekends

The cause of the increase in the number of motorcycle fatalities during the first sunny weekends of the year has also been investigated. The data in table 5 shows that the accident risk at the beginning of the motorcycling season (March-April) is not significantly higher than in other months. It also shows that the number of kilometres driven only starts to increase in April. It therefore seems that, certainly in April at least, the number of fatalities can be attributed to the increase in the number of kilometres driven by a much larger number of motorcyclists. See the figure below.

All things considered, we can conclude that the cause of the increase in motorcycle fatalities during the first sunny weekends of the year cannot be directly attributed to a significantly higher risk (caused by not riding during the winter, for example). The risk in April is actually relatively low. The cause must therefore be attributed to a much greater number of kilometres driven by many more motorcyclists.

Figure 6: Risk per kilometer driven in relation to the number of fatalities



2.7 Conclusion

Despite the increasing number of motorcycles on the roads in the Netherlands, the number of motorcycle fatalities has decreased over the past decade. However, motorcyclists still account for 10% of road fatalities (70 out of 720 in 2009). The majority of motorcyclists are men between the ages of 35 and 44, who drive their motorcycle an average of 3700 km per year and who, unlike motorists, develop little routine. The number of fatal accidents is relatively high among the 20–24 age group.

Human error (both on the part of motorcyclists and other drivers) is a key cause in approximately 90% of motorcycle accidents. Human error relates to errors in yielding the right of way (the motorist did not see the motorcyclist in a relatively high number of cases) and lack of control of the motorcycle. Nearly 8% of the cases could be attributed to shortcomings in the infrastructure, including such factors as the poor condition of the road surface or slippery road conditions. A fault in the vehicle (e.g. tyres or brakes) is the key cause of 0.3% of accidents. Accordingly, the state of the vehicle is very rarely the cause of accident. As such, the Ministry of Infrastructure and the Environment does not believe that a periodic motor vehicle test (*algemene periodieke keuring, APK*) for motorcycles, as the EU wishes to propose in 2010, will be beneficial.

Single-vehicle accidents (i.e. accidents involving no other road users, with the exception of any passengers) occurring on sections of road between intersections account for approximately 40% of the total number of motorcycle casualties. The cause is often a combination of poor vehicle control in bends, slippery road conditions due to rain, oil on the road, road markings and excessive.

The risk of accident varies according to month and is clearly linked to the season. During the sunny months of the year, motorcyclists drive more kilometres. These figures, however, vary per year and according to the weather.



3 Choice of measures

3.1 Introduction

Before choosing measures, an assessment framework was established to better clarify the choice made. The measures and the steps the Ministry of Infrastructure and the Environment would take were then determined for each focus area (behaviour, vehicle, infrastructure, general). Finally, the complete set of proposed measures was presented. These measures will be developed over the coming biennium and implemented in collaboration with civil society partners. It is promising that various interest groups have expressed an interest in contributing to the implementation of certain measures. We appreciate this support, as road safety is everyone's responsibility – it always has been and always will be.

3.2 Assessment framework for choice of measures

The final choice of measures was based on the following criteria.

First, the measures respond to the key causes of accidents. The previous chapter concluded that the key causes of accidents are the lack of vehicle control and the failure of motorcyclists and other road users to yield the right of way. Improving motorcycle control and observance of the rules for motorists and motorcyclists governing the yielding of the right of way could reduce accident risk.

Second, the measures must adhere to the principle of this Strategic Plan, which is that all measures must be proportional, i.e. increasing motorcycle road safety must not come at the expense of the freedom of motorcyclists to use the road in a responsible manner.

Finally, the measures must address all aspects of road safety: behaviour, vehicles and infrastructure and address both motorcyclists and motorists.

3.3 Measures targeting behaviour

3.3.1 Teaching advanced motorcycle skills

The driving instruction received when obtaining a motorcycle driving licence emphasises basic skills, such as vehicle control and road position. Recognising, analysing and responding to risks are considered advanced skills, which can only be acquired once the basic skills have largely become automatic reflexes.

Advanced driving instruction focuses on the recognition and analysis of hazards and on the solving of problematic situations. As a motorcycle driving licence is a prerequisite for driving a motorcycle, 'second phase training' would have to be voluntary. It has actually been shown that motorcyclists are more prepared than any other group of road users to follow advanced instruction voluntarily, at their own expense, in their free time and using their own vehicle.

What action will the Ministry of Infrastructure and the Environment take?

Measure 1: Train advanced motorcycle skills

In conjunction with providers of advanced driving instruction, an advanced driving course will be developed to teach advanced skills, including the ability to focus on matters relevant to road safety, assess traffic situations and satisfactorily predict at an early stage how traffic situations will develop. When taking decisions, motorcyclists must be able to factor in potential errors on the part of other road users. The instruction must therefore focus on the cognitive, rather than the mechanical aspects of motorcycling.

Deadline: 2012

3.3.2 Provision of information for motorcyclists; promoting the use of protective gear

Wearing protective gear can significantly reduce the impact of accidents for the riders of motorcycles, motor scooters, mopeds and scooters. Gear designed specifically for motorcycling is available on the market. Protectors are a good example. These are body protectors specifically designed for motorcycle gear and can be bought separately if it's not integrated in the clothing. They protect against injury if the motorcyclist falls on the ground or road surface in an accident. They must have a CE marking as proof that they meet EU standards. All interest groups recognise the benefits of protective gear and intend to encourage motorcyclists to wear protective gear voluntarily.



What action will the Ministry of Infrastructure and the Environment take?

Measure 2: Provision of information for motorcyclists; promoting the use of protective gear

Interest groups will provide their members with information (e.g. at the start of the motoring season) on how to approach 'hitting the road again' and on the benefits and importance of wearing protective gear. The material from eSUM will likely serve as part of the basis for this. **The Ministry of Infrastructure and the Environment** will support the interest groups, for example, by commissioning the design and production of information materials. The specific form and design of the information will be addressed in collaboration with the interest groups.

Deadline: Information material ready by 2011, continuous information provision.

3.3.3 Provision of information for motorists

In recent years, several information campaigns and other activities targeted at motorists and motorcyclists have been launched (although none in the mass media), including the *oog voor motorrijders* (Watch out for motorcyclists!) and the *Let op, Val op* (Look, be seen!) campaigns and information on the traffic congestion code of conduct for motorcyclists. In addition to the above-mentioned efforts targeting motorcyclists, information should also be provided for motorists. As demonstrated in the previous chapter, accidents involving motorcyclists and motorists are primarily caused by errors in yielding the right of way on the part of the motorist. Although this can be attributed to several causes, two are worth mentioning. First, the motorist does not 'see' the motorcyclist. Second, motorcyclists are insufficiently taken into account as a fully fledged road user.

What action will the Ministry of Infrastructure and the Environment take?

Measure 3: Provision of information and education for motorists

The Ministry of Infrastructure and the Environment will explore effective ways to communicate information to motorists on such issues as the traffic congestion-motorcyclists code of conduct or the observation of motorists in situations when the right of way must be yielded. As much as possible, these activities will be centrally coordinated by *Motorplatform*.

Deadline: 2011

3.3.4 Specific attention for motorcyclists completing category B driving instruction

Anticipating a motorcyclist is key to motorist behaviour at intersections. Studies will **investigate whether sharing the road with motorcyclists is covered sufficiently in motorist driving instruction. As it stands, the traffic congestion-motorcyclists code of conduct is addressed in the theory examination.**

What action will the Ministry of Infrastructure and the Environment take?

Measure 4: Specific attention for motorcyclists completing category B driving instruction

The Ministry of Infrastructure and the Environment will investigate whether sharing the road with motorcyclists is covered sufficiently in motorist driving instruction (in accordance with the principle of reasonableness and fairness).

Deadline: 2011

3.4 Vehicle measures

3.4.1 Visibility of motorcyclists

As outlined in the previous chapter, a key cause of accidents is the failure to yield the right of way when the motorist does not see the motorcyclist or sees the motorcyclist too late. The cause of this is not yet known. There is also no known research that establishes the impact of wearing brightly coloured/reflective gear and a helmet on motorcycle safety.

For this reason, the Ministry of Infrastructure and the Environment intends to investigate the impact of the visibility of motorcyclists on road safety, and, if a correlation is established, how the visibility of motorcyclists can be improved.

As mentioned previously, motorcycle gear can offer protection, while also improving the visibility of the motorcyclist. Position on the road, visibility of the vehicle and the provision of information for motorists, as mentioned in the previous section, can also contribute to this aim. Only thorough research can provide a decisive answer to how these key causes of accidents can be addressed effectively.

What action will the Ministry of Infrastructure and the Environment take?

Measure 5: Investigate the impact of visibility on motorcycle safety

Wearing brightly coloured/reflective gear is often cited as an effective measure for increasing the visibility of motorcyclists. The Ministry of Infrastructure and the Environment will commission a comprehensive study into the visibility of motorcyclists, including such aspects as brightly coloured/reflective gear, strategies to ensure the visibility of motorcycles, lighting and position on the road. The aim of the study is to gain an understanding of the impact of the various determining the visibility of motorcyclists on road safety.

Deadline: 2012

3.5 Infrastructural and general measures

3.5.1 Drafting of CROW guidelines

The design and maintenance of infrastructure is of particular importance for motorcyclists, who place higher requirements on infrastructure than motorists. The design and establishment of infrastructure that does not or cannot take these specific requirements into account for whatever reason can result in dangerous situations for motorcyclists. Road markings, dangerous road design and a lack of road maintenance, in particular, can result in dangerous situations.

Road markings include all markings applied to the road in paint or other materials, including lines, warning and other instructive markings, markings for bicycles, pedestrian crossings and other demarcations. In many cases, these markings are motivated by safety reasons and are necessary in most cases. However, the position on the road, the surface, the form, and the degree of wear and tear of the road markings can instead lead to dangerous situations for motorcyclists. One consideration would be not to apply markings which are not strictly necessary in order to safeguard the safety of PTWs.

Lamp posts located along the outer edge of bends in the road are an example of road design that is dangerous for motorcyclists, who may collide with them in an accident. Crash barriers, which are designed to benefit cars by preventing them from going off the road, are hazardous to motorcyclists, many of whom are severely injured or killed when they crash into them. Crash barriers are the cause of 10-15% of fatal motorcycle accidents in the EU.

Finally, proper road maintenance and a clear road are a matter of life and death for motorcyclists. Damaged or poorly repaired road surfacing can be extremely slippery, particularly when damp or wet. Materials such as oil, sand and grit on the road surface, which reduce contact between tyres and the road surface, also present a greater risk for motorcyclists than other road users.

What action will the Ministry of Infrastructure and the Environment take?

Measure 6: Drafting of CROW guidelines

Although each road manager has authority over the road design in its area, the CROW guidelines help inform this process. There is currently a handbook available on motorcycle-friendly road design and management, however, this information and knowledge has not yet been incorporated in applicable CROW guidelines. Via the Dutch motorsport association NMB, the Ministry of Infrastructure and the Environment will ask road managers to work together to update the CROW guidelines with the information and expertise from the CROW handbook. This approach ensures that all road managers are informed in a logical manner of the safest possible infrastructure design for motorcyclists.

Deadline: 2012

3.5.2 Implementation of the third EU Directive on driving licences

The Ministry for Infrastructure and the Environment will implement the third EU Directive on driving licences in the near future.

What action will the Ministry of Infrastructure and the Environment take?

Measure 7: Implementation of the third EU Directive on driving licences

The Directive makes the phased progression to the new categories A1 and A2 compulsory. In addition, the age for direct progression to the heaviest category of vehicle, category A (unlimited capacity), will be increased from 21 to 24. Category A1 covers light engines up to 125cc and is open to anyone 18 and older. Category A2 covers mid-range engines up to 35 kW and is open to anyone who has had a category A1 licence for two years (i.e. 20 and older). By means of phased progression, it is then possible to access the licence for the heaviest category of vehicle after holding a category A2 licence for two years (i.e. 22 and older). In the Netherlands, it will be possible for 17-year-olds to start lessons in preparation for the test for the category A1 licence.

Deadline: 2013

3.6 Overview of measures

Below is an overview of the measures detailed above, including the deadline and the stakeholder to take the lead in implementing each measure.

Type	Measure	Stakeholder	Deadline
G. 1	Teach advanced motorcycle skills by developing and providing advanced driving instruction.	Civil society organisations/ Ministry of Infrastructure and the Environment	2012
G. 2	Provide information to motorcyclists about responsible motorcycling, including the use of protective gear.	Civil society organisations/ Ministry of Infrastructure and the Environment	Continuous
G. 3	Investigate demonstrably effective ways of providing information to motorists about such issues as 'perceiving' motorcyclists and the traffic congestion-motorcyclists code of conduct.	Experts	2011
G. 4	Investigate whether sharing the road with motorcyclists is covered sufficiently in motorist driving instruction.	Experts	2011
V. 1	Investigate the effect of motorcyclist visibility (e.g. brightly coloured/reflective gear) on road safety; this includes support for any measures to be taken in this area.	Civil society organisations/ Ministry of Infrastructure and the Environment	2012
I. 1	Addition of the infrastructural aspects of road design relevant to motorcyclists in the CROW guidelines	Road managers	2012
GR.1	Implementation of the third EU Directive on driving licences	Ministry of Infrastructure and the Environment	2013

3.7 Preconditions

The measures discussed above will be ready for implementation during the 2011-2013 period. Commitment on the part of all stakeholders is essential in developing and implementing a number of the measures.





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Finally, a number of websites are included, which refer to the body of the text or background information or information about projects. The list is by no means exhaustive.

Fact and figures

- *Mobiliteit in cijfers tweewielers* (Two wheeler mobility in figures). Information about the Dutch market for two wheelers. www.bovagraimobiliteit.nl/mobiliteitincijferstweewielers/2009
- Motorcycle Accident InDepth Study (MAIDS). A recent in-depth analysis of PTW accidents in Europe over the last three years based on 921 accidents in 5 countries. www.maids-study.eu
- Disseminate good practice: www.rosaproject.eu
- Research into helmets: www.cost357.org
- CROW publication 190: Handboek voor inrichting infrastructuur voor motorrijders (Handbook for infrastructure design for motorcyclists) www.crow.nl/publicaties/publicatiedetail?code=190
- Information about the Lillehammer workshop in 2008. <http://www.internationaltransportforum.org/jtrc/safety/Lillehammer2008/lillehammer08.html>

European projects

- Mymosa. www.mymosa.eu
- Pisa. www.pisa-project.eu
- Safe Rider. www.saferider-eu.org
- ESUM. www.esum.eu

Organisations

- *Motorplatform* (Dutch Motorcycle Platform). www.motorplatform.nl
- FEMA. Federation of European Motorcyclists' Associations. www.fema-online.eu
- ACEM. Association of European Motorcycle Manufacturers. www.acem.eu
- FIM. International Motorcycling Federation. www.fim-live.com

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