

Moped and light-moped riders

Summary

Moped and light-moped riders run a relatively high risk of becoming crash casualties. This is mainly due to the high riding speed in relation to the riders' vulnerability. Moped riders are obliged to wear a helmet but light-moped riders are not. In addition, a high proportion of the kilometres ridden on mopeds and light mopeds is ridden by groups that are at higher risk. Specifically, these are young people (15-17 years, mainly moped riders) and older people (60 and older, mainly light-moped riders). In the (recent) past, the Netherlands have taken various measures to increase the safety of moped and light-moped riders (moped from the bicycle path to the carriageway, measures to prevent tuning up of mopeds and light mopeds, mandatory vehicle registration and moped driving licence). As yet, these have not been shown to have an effect on moped and light-moped casualties. The number of tuned-up mopeds and light mopeds has declined in recent years and is now about 20%. SWOV calls for an effort to achieve 100% use of helmets when riding mopeds. In addition, SWOV is in favour of mopeds and light mopeds being made two clearly recognisable vehicle categories again: the current moped and the (original) 'bicycle with auxiliary engine'.

Background

In comparison with other countries, many people ride mopeds and light mopeds in the Netherlands. However, moped and light-moped riders are at high risk of being involved in a crash. In this fact sheet, we will go more deeply into the causes of the matter and the measures that have been taken – and could be taken – to prevent these crashes.

Speed limit

Mopeds are delivered with a maximum speed of 45 km/h, which is termed the 'design speed'. Light mopeds have a design speed of 25 km/h¹. According to current legislation, moped riders must ride on the carriage way within urban areas (since 1999), with a speed limit of 45 km/h (since March 2008). On bicycle paths within urban areas and in 30 km/h zones, the speed limit for mopeds is 30 km/h. Outside urban areas, moped riders should ride on the bicycle path, with a maximum speed of 40 km/h. On roads outside urban areas (when no bicycle path is available) the limit is 45 km/h. Light-moped riders should ride on the bicycle path both inside and outside urban areas, with a maximum speed of 25 km/h. In the Netherlands, one can ride a moped or light moped from the age of 16. This makes mopeds and light mopeds popular modes of transport for young people who are not yet permitted to drive a car (16 and 17 years). Moped riders are obliged to wear a helmet, but light-moped riders are not.

Mobility

In 2007, there were 797,000 registered mopeds and light mopeds² in the Netherlands (source: Vehicle Technology and Information Centre, RDW) and 466,000 moped and light-moped owners (source: Netherlands Mobility Survey, MON). The difference is probably due to the fact that the MON data for this group of vehicle owners is not entirely reliable because of the small sample size. Furthermore, some people own more than one moped or light moped. Since 2005, there has been a rise in sales of new mopeds and light mopeds: 28,942 mopeds and 28,485 light mopeds were sold in the Netherlands in 2007 (source: BOVAG-RAI). In the years 2002-2007, Dutch moped and light-moped riders rode 0.9 billion kilometres per year on average (0.2 billion for light-moped riders and 0.7 for moped riders). By way of comparison: in this period, 138.8 billion kilometres were travelled on average per year by car, 13.8 billion kilometres by bicycle, and 1.1 billion kilometres by motorcycle. This mobility data has remained fairly constant over the period 2002-2007.

¹ Single-seat cars with moped engines are classed together with mopeds and light mopeds in the RDW category 'mopeds', but they are left aside in this fact sheet.

² In 2007, 815,281 registration numbers were issued for mopeds, of which over 18,500 were presumably for single-seat cars with moped engines.

How unsafe is it on the road for moped and light-moped riders?

In the Netherlands, in the period 2005-2007, there was an average of 60 fatalities and 1,632 in-patients per year among moped and light-moped riders in road traffic crashes. Of all the road casualties³ in this period, 17% were moped or light-moped riders: about 0.5% died and 16% were admitted to hospital. This ratio of 17% is high, considering that only 0.5% of all kilometres travelled in this period were travelled by moped or light moped. *Figure 1* therefore shows that the moped and light-moped riders run a higher risk of becoming the victim of a serious crash than people using other modes of transport. However, this risk has fallen in comparison with the previous 6-year period. This decrease is comparable to those for other modes of transport. In 2004, especially, the number of casualties among moped riders, light-moped riders and road users in general fell considerably. The decrease in the period 2001-2007 applies to all age categories.

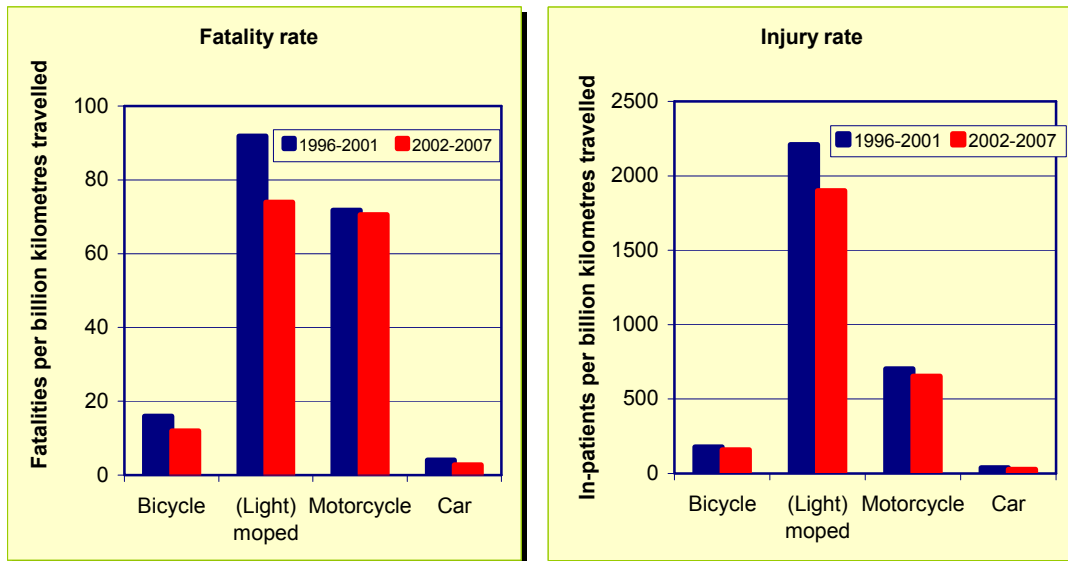


Figure 1. The fatality and injury rates for cyclists, moped riders, light-moped riders and car drivers in the periods 1996-2001 and 2002-2007 (number of recorded deaths and casualties per billion kilometres travelled for each mode of transport). Source: Ministry of Transport, Public Works and Water Management

Where does the Netherlands stand from the international perspective?

In the SUNflower project, the road safety of three European countries (Sweden, the United Kingdom and the Netherlands) was compared. It was shown that, in 2006, the number of fatalities among moped riders in the Netherlands was 1.6 times higher than in Sweden and twice as high as in the United Kingdom. In the Netherlands, in particular the risk to young riders (15-17 years) is relatively high (four times as high as in Sweden). This is probably due to the fact that traffic is less complex in Sweden (fewer road users) and that mopeds are not often used in the winter (Wegman et al., 2006).

What are the characteristics of crashes involving moped and light-moped riders?

Crash opponent

In 52% of the crashes in 2005-2007, in which a moped or light-moped rider became a casualty, the crash opponent was a car. In 9% of cases it was a delivery van, in 6% a cyclist and in 5% another moped or light-moped rider.

The moped or light-moped riders also inflict casualties. Most of these are among cyclists (51% of all casualties among crash opponents of crashes with moped or light-moped riders). In addition, moped riders, light-moped riders and pedestrians are relatively frequently casualties in crashes with (other) moped or light-moped riders (27% and 18%, respectively). Car and delivery van drivers are casualties to a lesser extent: 3% and 0.3% of the total number of casualties among the crash opponents of moped and light-moped riders.

³ In this fact sheet, the 'casualties' referred to are severe casualties, i.e. fatalities or in-patients. Furthermore, no distinction is made between moped and light-moped riders because this distinction is unreliable in the accident data.

Circumstances

In 2005-2007, the crashes in which moped or light-moped riders were casualties largely occurred under the following circumstances: failure to give right of way (31%), failure to give right of way to traffic travelling straight ahead along the same road (18%) and losing control over the vehicle (15%). Of the crashes in which moped and light-moped riders were casualties, 78% had another road user as a crash opponent and 22% were single-vehicle crashes (e.g. riding into a ditch or against a lamp post).

In 10% of crashes in which a moped or light-moped rider was a casualty, one of the parties had consumed alcohol. In the crashes in which there were casualties among other road users, this figure was 7%. This means that moped and light-moped riders are more frequently casualties in alcohol-related crashes than other road users.

Location and time of day

In 2005-2007, 73% of crashes in which moped or light-moped riders were casualties occurred in urban areas; 27% occurred outside urban areas. In urban areas, moped and light-moped riders more often fall victim to crashes at junctions than on ordinary road sections (about 1.3 times as many). Outside urban areas, on the other hand, more moped and light-moped riders fall victim to crashes on road sections (about 1.4 times as many as at junctions).

Most crashes in which moped and light-moped riders are casualties occur in daylight: 68%. This matches the percentage for all vehicles (69%).

Why do moped and light-moped riders have a higher crash rate?

Moped and light-moped riders (just like motorcyclists) do not really fit in with a sustainably safe traffic system. This is because moped riders, in particular, are vulnerable on the road in relation to the speed at which they travel. The speed of light-moped riders may be lower, but riding without a helmet increases the risk of head injury. Furthermore, a considerable proportion of the kilometres travelled by moped and light moped is travelled by groups that are at increased risk on the road.

What are the risk groups?

Within the moped and light-moped rider group, there are two categories with a higher than average risk: the young and the elderly. Of the Dutch moped and light-moped crash casualties from 1996 to 2007, 38% were in the 15-17 age category; for other modes of transport, that figure was 3.8%. However, these young people were responsible for a high proportion of the kilometres travelled by moped and light moped - 26% - whereas 15 to 17 year-olds were responsible for 2.5% of the kilometres travelled by other modes of transport. The other group with an increased risk is people of 60 and older. From 1996 to 2007, they made up 8% of the casualties among moped and light-moped riders, although they were responsible for 6% of the kilometres travelled by moped and light moped. Young people in the 16-17 age group mainly ride mopeds and people in the ≥ 60 age group mainly ride light mopeds.

Figure 2 shows the casualty rates of the various age groups among moped and light-moped riders and among cyclists. Moped and light-moped riders are at higher risk than cyclists. Older cyclists and moped and light-moped riders are at higher risk than younger road users using the same mode of transport. However, whereas young people are at higher risk when riding mopeds and light mopeds, they do not have an increased casualty rate when cycling.

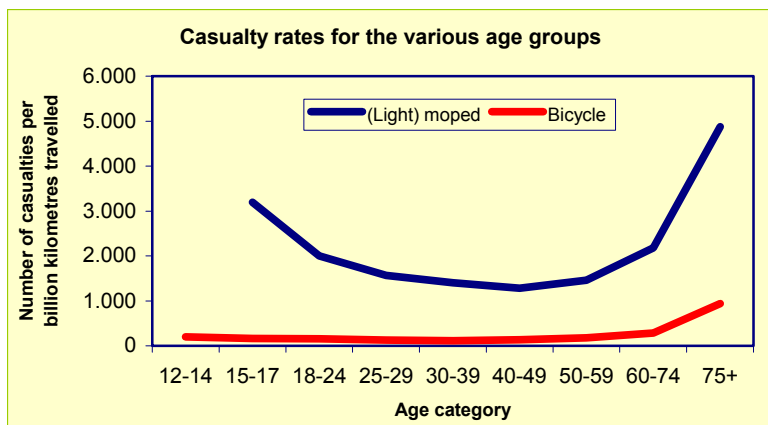


Figure 2. The casualty rates among moped and light-moped riders and cyclists in relation to their ages (number of recorded deaths and in-patients per billion kilometres travelled). Source: Ministry of Transport, Public Works and Water Management

Young moped and light-moped riders have a higher casualty rate because they have little experience in (motorized) road use or with driving a motorized vehicle. This is reinforced by the fact that young people more often overestimate their own skills and underestimate the risks associated with road use (Goldenbeld & Houwing, 2001; SWOV fact sheet [Young novice drivers](#)). This gives rise to risky behaviour. In this respect, young men run more risk than women of the same age. A possible explanation is that they overestimate their own skills more, and are more inclined to take risks than young women (Nyberg & Gregersen, 2007). Young cyclists are less at risk than young moped and light-moped riders because of their lower speed and because they have more experience as cyclists. After all, most children have already learned to cycle at a young age in a safe environment. The problems are very different for older road users. In general, they are reasonably aware of their reduced abilities and will adapt their riding behaviour accordingly. For example, older car drivers generally do not take to the road in difficult circumstances (in the rush hour, in bad weather or in the dark). However, their biggest problem is the consequences of a crash. Due to their lesser physical condition, older people will more easily incur serious injuries; as a result, they are more likely to require hospitalisation and are also more likely to die of their injuries than younger people (Table 1; see also SWOV fact sheet [The elderly in traffic](#)). In addition, older people wear helmets less often because they more frequently ride light mopeds.

	15-17 years	18-59 years	60 years and older
Deaths	2%	3%	9%
Casualties	98%	97%	91%
Total	100%	100%	100%

Table 1. The proportion of deaths and casualties among moped and light-moped casualties for various age groups in 2005-2007. Source: Ministry of Transport, Public Works and Water Management

What legal measures are in place in the Netherlands and what effect do they have?

Mandatory wearing of crash helmets

Since 1974, Dutch moped riders have been obliged to wear a crash helmet; this is not mandatory for light-moped riders. Wearing a helmet does not prevent crashes, but it does help to reduce the severity of injuries. The risk of fatal injury is reduced by 40% and the risk of serious injury by 30%, providing the helmet is worn correctly (see SWOV fact sheet [Motorcycle and moped helmets](#)). In 2007, 92% of moped riders wore a helmet; this percentage has remained fairly constant over recent years (Henkens, Ermens & Hijkoop, 2007).

Moped on the carriage way

For considerations of safety, the policy is to get the speed of mopeds to match that of other users of the same section of the road. Expressed in terms of the 'Sustainable Safety' policy, this benefits both homogeneity (of speed) and predictability. Before 1999, many crashes occurred at junctions because

moped riders rode on bicycle paths at a higher speed than expected, and were noticed too late or not at all. For that reason, moped riders have been required since 1999 to ride on the carriage way in urban areas. A year after the introduction of this 'Moped on the carriage way' measure, it was found that the number of crashes involving mopeds and light mopeds in urban areas had fallen by 31%. About half of this decline (15%) was the result of this measure (Transport Research Centre AVV, 2001); the other half (16%) could be ascribed to the general decline in casualties among moped and light-moped riders.

Measures to prevent tuning up

A moped has a design speed of 45 km/h and a light moped has a design speed of 25 km/h. In 2007, 22% of the moped and light-moped riders stopped on Dutch roads were riding tuned-up vehicles. This percentage was the same as in 2006, but lower than in 2005 (28%) and 2004 (31%). These figures are based on approximately 15,000 test rig measurements per year (source: Bureau Traffic Enforcement of the Public Prosecution Service BVOM). The police perform these measurements by spot checks at the roadside. If the number of moped and light-moped riders encountered is small, the police can stop them all; the check is then non-selective. If many are encountered, there may be an element of selectivity because the police prefer to look out for offenders. This means that the percentages of tuned-up mopeds and light mopeds for the entire population will probably be somewhat lower than the figures quoted here.

It is fairly easy to tune up a moped or light moped; tuning-up sets can be bought via the internet and fitted by anyone who is reasonably handy with tools. In 2004, the *Moped Self-regulation Accord including Advertising Code* ('Akkoord Zelfregulerend Bromfietsen inclusief Reclamecode') was signed by the Dutch Association of the Bicycle and Automotive Industries RAI and the Association of Motor Car Garage and Allied Trades BOVAG (BOVAG-RAI, 2004). It is a declaration by the industry that they will not tune up any more mopeds or light mopeds, will actively inform customers about the law on tuning up, and will not advertise tuning-up sets. It was also agreed that moped and light-moped riders will always be presented with a safe image in advertisements (models with helmet on etc.) There has been no independent evaluation of this covenant. However, various checks by the RAI Association in 2008 led to some businesses losing their RAI Association and/or BOVAG membership for infringement of the covenant (RAI Association, 2008).

Moped driving licence

In 2006, the moped certificate was replaced by the moped driving licence. However, the exam for the driving licence is still the same as it was for the certificate, consisting of only a theory section. It will be supplemented by a practical section in March 2010, as specified in the *Strategic Plan Road Safety 2008-2020* ('Strategisch Plan Verkeersveiligheid 2008-2020') of the Dutch Ministry of Transport, Public Works and Water Management (2008). Research has shown that a short training course in riding (for safe participation in traffic on mopeds) can considerably speed up the learning process (Goldenbeld, Houwing & De Craen, 2002). Furthermore, the introduction of a driving licence has the advantage that it becomes simpler to hand out penalties, and that a penalty point-based driving licence, like that already given to car drivers, can be instituted for first-time moped riders.

The *Strategic Plan Road Safety* also includes plans for instruction to moped and light-moped riders on responsible riding behaviour.

Mandatory Vehicle Registration

Since 1 January 2007, every moped and light moped is required to have a registration number. This distinguishes between light mopeds and mopeds in that light mopeds are issued a blue number plate instead of a yellow one. It is expected that the registration system will make it easier to enforce regulations and make vehicle theft more difficult. The effect of mandatory registration on the road safety of moped and light-moped riders is as yet unknown.

What additional measures could be taken?

In 2003, SWOV carried out a study of the effectiveness of additional measures for moped and light-moped riders (Schoon & Goldenbeld, 2003). A large effect on safety can be expected if the minimum age for using a moped is raised to 18. This would give younger people the opportunity to save up longer so that they can opt, when older, to buy a car, in combination (if desired) with supervised driving from the age of 17. The Minister of Transport, Public Works and Water Management watered down this measure and in Parliament proposed a starting age of 17. However, Parliament rejected this proposal because it would restrict the mobility of 16 year-olds.

The use of crash helmets has a major positive effect on the safety of moped riders. An effort to enforce 100% helmet use will therefore contribute to safety. If light-moped riders were also to wear helmets, this would make a positive contribution to the reduction of head injuries. Further research can give an indication of the benefits of helmet use by light-moped riders.

Among other things, the 'Sustainable Safety' vision calls for clearly recognisable vehicle categories. Although the registration system has introduced a better distinction between mopeds and light mopeds, the difference can only be seen when the rear of the vehicle is visible. This makes it difficult to enforce speed limits and the use of crash helmets. SWOV therefore calls for two clearly recognisable categories: the current moped and the 'bicycle with auxiliary engine', which is how the light moped was originally intended. This is a motorized bicycle with pedals and a light engine that cannot be tuned up.

Conclusions

Riding a moped or light moped involves a relatively high risk of becoming a crash victim. This is primarily due to the speed of mopeds and light mopeds in combination with the vulnerability of the rider. Moped and light-moped riders are frequently casualties in crashes caused by car drivers, but moped and light-moped riders also inflict casualties, especially on cyclists. Younger and older moped and light-moped riders are at particularly high risk. Younger riders have less experience of riding a motorised vehicle; they more frequently overestimate their riding skills and are more inclined to accept risk. Older riders are, in general, more careful on the road, but they are physically more vulnerable. One of the measures taken in the Netherlands to improve the safety of moped and light-moped riders has been to make it compulsory for moped riders to ride on the carriage way in urban areas (rather than on bicycle paths). In addition, mopeds and light mopeds are required to have a registration number, and a moped driving licence has been introduced. Not much research has been done on the effects of these measures on road safety; only the 'Moped on the carriage way' measure has been evaluated. This evaluation showed that, on the roads studied, part of the decline in crashes could be attributed to this measure. Although there is a general decline in the risk to moped and light-moped riders, we can also see this decline among other categories of road users. Improved tamper-proofing has had some effect in recent years on the number of tuned-up mopeds and light mopeds on the road, but at 20% the ratio of tuned-up mopeds and light mopeds detected by the police is still relatively high. SWOV calls for two measures that could improve the safety of moped and light-moped riders. Firstly, to strive for 100% crash helmet use by moped riders by putting this high on the agenda. Secondly, to make two clearly recognisable vehicle categories of mopeds and light mopeds: the current moped and the 'bicycle with auxiliary engine' (which is how the light moped was originally intended).

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