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**Summary:**

# Fatal accidents with motorcycles in Norway in 2005-2014

## Analysis of results from in depth studies by The Norwegian Public Roads Administration

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*In 2005-2014 249 fatal motorcycle crashes occurred in Norway. Compared to 2005-2009, the annual number of fatal motorcycle crashes was reduced by 40% in 2010-2014. Among the factors that may have contributed to the reduction are an increase of average age of fatally injured riders by 6 years, a reduction of non-wearing of motorcycle helmets from 9% to 1% among fatally injured riders and a reduction of riding under the influence of alcohol or drugs among fatal crash involved riders from 14% to 7%. Other characteristics of fatal motorcycle crashes are about unchanged over time. Over half of all fatal motorcycle crashes (54%) were collisions with other motor vehicles. In almost half of all collisions (44%) the motorcycle has been the triggering party, In 42% of collisions the other part has been the triggering party, while responsibility for the crash was unclear or shared in the remaining 14% of collisions. Among all fatal motorcycle crashes, the motorcycle lost control in 54% of crashes, often followed by lane departure or a collision with an oncoming vehicle. Road related crash contributing factors were present in about every fourth crash (mostly curve geometry or intersection design) and in about two out of five crashes road related factors had contributed to the fatal outcome.*

The current report is based on in-depth studies of 249 fatal motorcycle crashes that occurred in Norway in 2005-2014, conducted by Crash investigation teams by the Norwegian Public Roads Administration. The Police and the Norwegian Motorcycle Union (NMCU) have contributed to the analyses as well. The main aim of the analyses was to increase insight into serious motorcycle crashes and contributing factors, and to identify promising safety measures.

### **Fatal motorcycle crashes decreased over time**

The annual number of fatal motorcycle crashes has decreased by about 40% from 2005-2009 to 2010-2014, despite an increase of the number of registered motorcycles by 22% during the same period of time. The total number of killed or injured motorcyclists has decreased by 21% and the number of fatalities per motorcycle injury crash has decreased by 22%, indicating that crashes have become less severe over time. Some specific factors could be identified that may explain at least a part of the decrease in crash risk and severity:

- Average age of fatally injured riders has increased from 35 to 41 years
- Non-wearing of motorcycle helmets has decreased from 9% to 1% among fatally injured riders

- Riding under the influence of alcohol or drugs among fatal crash involved riders has decreased from 14% to 7%
- The proportion of riders who had ridden at inappropriate speed has decreased from 19% to 19%
- The proportion of motorcycles in fatal crashes that were equipped with anti-lock brakes has increased from 1% to 14%.

In the following, a short summary is given of the findings of the analyses about crash, rider, road and vehicle related factors that have contributed to the crashes.

### **Crash related factors**

- Over half of all crashes involved loss of control over the motorcycle, often followed by lane departure or (in 20% of loss-of-control crashes) a collision with oncoming traffic.
- Over half of all crashes (54%) were collisions with another motor vehicle, 42% of crashes were single vehicle crashes, and 4% were due to factors outside the control of the motorcyclist or other road users (mostly animal collisions).
- Most collisions with another motor vehicle (46%) were head on collisions (25% of all crashes), in 19% were collisions a motorcycle was hit by an oncoming left-turning car.
- 17% of all crashes are likely “looked-but-failed-to-see” collisions, in which the driver of another motor vehicle could have seen, but did not see the motorcyclist.

### **Rider-related factors**

- In almost half of all collisions (44%) the motorcycle has been the triggering party, In 42% of collisions the other part has been the triggering party, while responsibility for the crash was unclear or shared in the remaining 14% of collisions.
- Average age among fatally injured motorcycle riders has increased from 35 years in 2005-2009 to 41 years in 2010-2014. Younger riders were more often than older riders riding light, cross or sports motorcycles, they were more often the triggering party in the crash, had more criminal records, were more often unlicensed, and were more often riding at extreme speeds, and were more often under the influence of alcohol or drugs.
- The percentage of women is unchanged (8%). Female riders were more often than male riders riding a light motorcycle, were the triggering party in the crash, had fewer criminal records, had more often a valid license and were less often riding at extreme speeds or under the influence of alcohol or drugs.
- Non-use of helmets among fatally injured riders has decreased from 9% in 2005-2009 to 1% in 2010-2014. The proportion who lost their helmet in the crash is about unchanged at 13-14%. Non-wearing of helmets was most common among riders of unregistered cross motorcycles, among those who were riding at excessive speed or under the influence of alcohol or drugs. It is estimated that 3-4% of all fatally injured motorcyclists could have survived if all had been helmeted and that 6-9% could have survived if all had been wearing properly fitting and fastened helmets.
- The proportion of unlicensed riders was about 20%. Unlicensed riders were more often than others riding at excessive speed, under the influence of alcohol or drugs, and had more criminal records.

- The proportion of riders who had been under the influence of alcohol or drugs has decreased from 14% in 2005-2010 to 7% in 2010-2014 and it is on average lower than among fatal crash involved car drivers. Other factors related to riding under the influence of alcohol or drugs, are excessive speed, being the triggering party in the crash, criminal records, and riding a cross or sports motorcycle.
- The proportion riding at inappropriate speed has decreased from 29% in 2005-2009 to 19% in 2010-2014, while riding at excessive speed is about unchanged over time.
- Almost half (45%) of all fatally injured riders had been charged for at least one criminal offence during the last ten years previous to the crash. There is a strong relationship between the type of previous criminal charges and behavior in the crash (e.g. those with previous charges for drunk driving had far more often than others been riding drunk).
- The proportion of riders who had both a riders license and a motorcycle for more than ten years, has decreased from 13% i 2005-2009 to 6,5% in 2010-2014. The proportion of riders who had had a riders license for a very long time, but who had not owned a motorcycle for more than a few years, is about unchanged (13%).

### **Road related factors**

- Road related factors have contributed to 24-34% of crashes and were main contributing factor in 4% of crashes. The most typical road related crash contributing factors are curve geometry (15%), intersection design (6%), and road surface (6%).
- Road related factors have contributed to the fatal crash outcome in 36-40% of crashes. The most relevant factors were guardrails, light or sign poles and trees.

### **Motorcycle related factors**

- Technical defects were found on 16% of all crash involved motorcycles, but were crash contributing factors in only 3% of all crashes. The most typical technical defect were flat or worn tires.
- Most motorcycles were sports, classic or touring motorcycles (each account for about 25% of all crash involved motorcycles). 6% of all motorcycles were unregistered cross motorcycles. On these motorcycles, most rider related risk factors were strongly overrepresented and crash risk is likely to be far higher than for all other types of motorcycle.
- The proportion of motorcycles that were equipped with anti-lock brakes has increased from 2% in 2005-2009 to 14% in 2010-2014.
- Most crash involved motorcycles were owned by the rider, 21% were borrowed or stolen. Riding a stolen or borrowed motorcycle is strongly related to being unlicensed, riding at excessive speed, being under the influence of alcohol or drugs, being the triggering party in the crash, and riding an unregistered cross motorcycle.

### **Post-crash**

- In at least 2.8% of all crashes the motorcyclist was found dead several hours after the crash. In some, but probably not all these cases, automatic crash notification might have changed the outcome.

## **Suggested measures**

Based on the in-depth analyses of fatal motorcycle crashes the following safety measures are suggested to improve road safety for motorcyclists:

- Improved visibility for motorcycles (for example improved headlight configurations)
- Reduce unlicensed riding (for example electronic keys)
- Increased deployment of vehicle safety measures (for example antilock brakes and slipper-clutch)
- Measures against crashes in curves (for example rider assistance systems, curve improvements)
- Speed warning/Intelligent speed adaptation (adapted to motorcycles)
- Measures to reduce delay in medical treatment (for example automatic crash notification)
- Increased correct use of motorcycle helmets (for example information, campaigns)