

FACTS ABOUT HELMETS

Dinesh Mohan

Henry Ford Professor for Biomechanics and Transportation Safety

Transportation Research and Injury Prevention Programme

Room MS 808, Main Building

Indian Institute of Technology

Hauz Khas

New Delhi 110016

Compared with cars, motorcycles are especially dangerous. Per km traveled, the number of deaths on motorcycles is about 14 times the number in cars. Motorcycles often have excessive performance capabilities, including especially rapid acceleration and high top speed. They're less stable than cars in emergency braking and less visible. Motorcyclists are more prone to crash injuries than car drivers because motorcycles are unenclosed, leaving the rider vulnerable to contact hard road surfaces. This is why wearing a helmet is so important. Helmets are the principal countermeasure for reducing crash-related head injuries, the leading cause of death among unhelmeted riders.

- 1. How effective are helmets?** Helmets decrease the severity of injury, the likelihood of death, and the overall cost of medical care. They're designed to cushion and protect riders' heads from the impact of a crash. Just like safety belts in cars, helmets can't provide total protection against head injury or death, but they do reduce the incidence of both. The National Highway Traffic Safety Administration (NHTSA) of the USA estimates that helmets reduce the risk of death in a motorcycle crash by 29 percent, and the risk of fatal head injury by 40 percent. Helmets are even more effective in preventing brain injuries, which often require extensive treatment and may result in lifelong disability. Studies show unhelmeted motorcyclists are three times more likely to suffer traumatic brain injuries in a crash than helmeted riders. Helmets are particularly effective at lower speeds and this is important as severe head injuries can be caused in impacts at 20-30 km/h.
- 2. Are there drawbacks to helmet use?** Claims have been made that helmets increase the risk of neck injuries and reduce peripheral vision and hearing, but there's no credible evidence to support these arguments. A study reported in the Annals of Emergency Medicine in 1994 analyzed 1,153 motorcycle crashes in four midwestern states in USA and determined that "helmets reduce head injuries without an increased occurrence of spinal injuries in motorcycle trauma."
- 3. Regarding claims that helmets obstruct vision,** studies show full-coverage helmets provide only minor restrictions in horizontal peripheral vision -- less than 3 percent from that of an unhelmeted rider. A 1994 study by A. James McKnight analyzed the effects of motorcycle helmet use on seeing and hearing. The study found that wearing helmets "restricts neither the ability to hear horn signals nor the likelihood of visually detecting a vehicle in an adjacent lane prior to initiating a lane change." To compensate for any restrictions in lateral vision, riders increased their head rotation prior to a lane change. Subjects in the hearing study showed no differences in hearing thresholds under three helmet conditions: no helmet, partial coverage, and full

coverage. The noise generated by a motorcycle is such that any reduction in hearing capability that may result from wearing a helmet is inconsequential. Sound loud enough to be heard above the engine can be heard within a helmet, a NHTSA study concluded.

4. How many motorcyclists wear helmets when not required by law to do so?

Without a helmet law less than 20% of motorcyclists wear helmets in India. Helmet use is 90-100 percent when a law requiring all motorcyclists to wear helmets is implemented.

5. How do helmet laws affect motorcyclist deaths and injuries? In the states that either reinstated or enacted a motorcycle helmet law in the past decade, helmet use has dramatically increased, and motorcyclist deaths and injuries have decreased in India. Similar experiences have been documented in other countries:

- California's use law covering all riders took effect on January 1, 1992. Helmet use jumped to 99 percent from about 50 percent prior to the law. During the same period, the number of motorcycle fatalities decreased by 38 percent, from 523 in 1991 to 327 in 1992
- Nebraska reinstated a helmet law on January 1, 1989 after repealing an earlier law in 1977. As a result, the state saw a 20 percent reduction in motorcyclist head injuries.
- Texas had a universal helmet use law from 1968 to 1977, estimated to have saved 650 lives, but the law was amended in 1977 to apply only to riders younger than 18. The weakened law coincided with a 35 percent increase in motorcyclist fatalities. Texas reinstated its helmet law for all motorcyclists in September 1989. The month before the law took effect, the helmet use rate was 41 percent. The rate jumped to 90 percent during the first month of the law and had risen to 98 percent by June 1990. Serious injury crashes per registered cycle decreased by 11 percent. But in September 1997, Texas again weakened its helmet law, requiring helmets only for riders younger than 20.
- A study done by the Indian Institute of Technology in New Delhi and AIIMS (write this in full) showed that helmeted two-wheeler riders sustained fewer and less severe injuries than those not wearing helmets. This study showed that wearing any helmet was better than not wearing any helmet at all.
- A study done at the National Institute of Mental Health and Neuro Sciences in Bangalore (India) showed that deaths and injuries were significantly less when Bangalore had a compulsory helmet law than when it did not.

6. How have courts resolved challenges to helmet use laws? Courts have repeatedly upheld motorcycle helmet use laws under the U.S. Constitution. In 1972 a federal court in Massachusetts told a cyclist who objected to the law: "The public has an interest in minimizing the resources directly involved. From the moment of injury, society picks the person up off the highway; delivers him to a municipal hospital and municipal doctors; provides him with unemployment compensation if, after recovery, he cannot replace his lost job; and, if the injury causes permanent disability, may assume responsibility for his and his family's subsistence. We do not understand a state of mind that permits plaintiff to think that only he himself is concerned." This decision was affirmed by the US Supreme Court. The Andhra Pradesh High Court in *T. Jagdish vs Union Of India* (1988) 2TAC (350) ruled that requiring the use of helmets does not violate any constitutional provisions.

7. **Are motorcycle education/training courses a substitute for helmet laws?** There is no scientific evidence that motorcycle rider training reduces crash risk. "Numerous studies have shown that formal motorcycle education and training is not an effective loss reduction strategy," state authors of a 1989 Traffic Injury Research Foundation of Canada report. Some support for motorcycle training was found in a California study in which training was associated with reduced motorcycle crash risk. However, later research contradicted the results of this study, finding an increased crash risk associated with training. The most thorough analysis of motorcycle rider training was conducted in New York between 1981 and 1985 by the New York Department of Motor Vehicles. Motorcycle operator's license applicants were randomly assigned to one of three training programs or to New York's standard knowledge and driving test. Despite the fact that more riders were licensed sooner under New York's standard procedures, these riders had fewer motorcycle crashes in the subsequent two years than riders in the three experimental groups.