Characteristics of Motorcycle Crashes in the U.S.

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Road safety data: collection and analysis for target setting and monitoring performances and progress

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Background

- Over the past 10 years (1997-2007), the U.S. has seen significant:
  - Increases in motorcycle use,
  - Changes in motorcycle driver demographics and engine sizes, and
  - Increases in fatal injury rates for motorcycle riders.

- In 2007, 5,154 motorcyclists died in vehicle crashes, an increase of 144% over the 2,116 motorcycle fatalities just 10 years earlier.
Study Objectives

Identify factors:
- Accident
- Vehicle
- Rider
- Environmental

associated with motorcyclist (rider and passenger) injury and fatality in U.S. crashes.
Data Sources

- Fatal crash data
  - FARS (1990-2007)

- Injury and crash data
  - NASS/GES (1990-2007)

- U.S. motorcycle registration data
  - R.L. Polk & Co.

- Miles travelled
  - FHWA estimates and State surveys

- Consumer complaints
  - NHTSA’s Office of Defects Investigation

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Vehicle Population by Type of Registered Vehicle (2006)

Source: U.S. Department of Transportation, Federal Highway Administration (FHWA).
Number of Registered Motorcycles by Year

Distribution of Crashes by Type (NASS/GES)

- There were about 42,000 motorcycle crashes/year in 1990-2007

- Frontal, 59%
- Side, 29%
- Rear, 10%
- Rollover, 2%
Distribution of Fatal Crashes by Type (FARS)

- There were about 4,000 *fatal* crashes/year in 2000-2007

![Pie chart showing distribution of fatal crashes by type: 79% Frontal, 17% Side, 3% Rear, 1% Rollover.](image)
Fatal Crash Locations

- About 30% of all fatal motorcycle crashes occurred on grade/hill roadways.
  - Trend seems to be towards an increasing percentage of motorcycle fatalities occurring on **rural** roads:
    - ~ 50.3% on rural roads in 2001-2007 vs.
    - ~ 44.7% on rural roads in 1990-1995
Fatal Rate per 10,000 Registered Motorcycles (FARS)

Factors Associated with Fatal Crashes, by Motorcycle Type (FARS)

Fatal Rates per 10,000 Registered Motorcycles, Sport Motorcycles, by Engine Size (FARS)

Rate per 10,000 Registered Vehicle Years


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Percent of Young Male Riders in Fatal Crashes, Sport Motorcycles, by Engine Size (FARS)

“Run Off Road” Crashes

- FARS data (2004-2007) shows “run off road” crashes account for:
  - ~40% of all fatal crashes
  - ~80% of all single-vehicle fatal crashes

- This type of crash is associated with:
  - Young male riders
  - Night/dark hours (8 P.M.-8 A.M.)
  - Higher speeds (55 mph or greater)
Helmet Use and Alcohol

- An un helmeted rider is 40% more likely to sustain a fatal head injury than a helmeted rider.

- The effectiveness of helmet is 67% in reducing brain injuries.

- A study of 3,600 motorcycle crashes shows that helmet use is the most SIGINIFICANT factor influencing survival.

- 44% of fatal riders were not using helmets; about 30% were alcohol impaired.
Percent of ODI Complaints for Motorcycles, by Component Type


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U.S. Crash Findings

- Sport motorcycles have a fatal rate that is 3 times higher than the corresponding rates for Cruisers or Touring bikes.

- The primary factors influencing motorcycle rider fatality are lack of helmet use, speeding, alcohol use, and rider age.

- Fatal crashes for Sport motorcycles are associated with young riders and risky driving behaviour, including speeding.
Other JP Research Studies

- Research on motorcycle crashes in other countries is also ongoing, including accident reconstruction and data collection efforts in India.

- In a recent fatal crash, two motorcyclists died due to head injuries after underriding the rear of a truck that had broken down on the shoulder in the dark. The most evident damage to the bike was severely bent handlebars.
Common Safety Issues

- Many safety issues in this case differ from those found significant in the U.S. study:
  - Paved shoulders are often used as motorcycle lanes.
  - No space to pull off safely.
  - Truck had no reflectors.

- **Common issues** include:
  - Road was DARK
  - Cyclists were YOUNG MALES
  - Neither wore a HELMET.

Motorcycle path of travel