## Motorcycle Crash Analysis

<table>
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<th>Task</th>
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<tr>
<td>1. Literature Survey</td>
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<td>2. Survey of Best National and International Practices</td>
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<td>3. Analysis of New Jersey Motorcycle Accident Rates</td>
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<td>4. Needs for Enhancements to Motorcycle Training and Licensing</td>
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<td>5. Motorcycle Compatibility with the Highway and the Roadside</td>
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<td>6. Develop Strategic Plan and Recommendations for Improving Motorcycle Safety</td>
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<td>7. Final Report</td>
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ANALYSIS OF FATAL ACCIDENTS

Quarterly Progress Report – March 2007

Project Objectives:

The goal of this project is to develop a strategic plan for the reduction of New Jersey motorcycle accident rates in both fatal and non-fatal crashes. The specific objectives are to:

1) Determine the root causes for New Jersey both fatal and non-fatal motorcycle crashes.

2) Develop specific recommendations for reducing the NJ motorcycle rates which incorporate the unique nature of the New Jersey highway system.

Project Abstract:

Motorcyclists are vulnerable highway users. Unlike passenger vehicle occupants, motorcycle riders have neither the protective structural cage nor the advanced occupant protection systems, e.g. airbags, which are commonplace in cars and light trucks. In 2006, the most recent year of statistics available, there were 87 motorcyclist fatalities in New Jersey. Nationally, as motorcycles become increasingly popular, motorcycle deaths have increased dramatically in the U.S. In New Jersey, motorcyclist fatalities have more than doubled since 1991 while overall highway deaths in the state have remained relatively unchanged over the same time period (NHTSA, 2006).

![Figure 1. Motorcycle Fatalities in New Jersey (1991-2006)](chart.png)
The factors which lead to fatal motorcycle crashes are a complex combination of motorcyclist behavior, lack of awareness of other motorists, highway design and condition, and the degree of training or experience of the rider. The crash causation factors include the following:

**Road User Behavior**

- **Failure to wear helmets.** Our analysis of NJ fatal motorcycle accidents in 2006 shows that 12% of all fatally injured motorcyclists in New Jersey were either not wearing their helmets or were wearing an unapproved helmet.

- **Drinking and Motorcyclists.** Our analysis of NJ fatal motorcycle accidents in 2006 shows that 31% of all fatally injured motorcyclists (27 of 87) in New Jersey had been drinking. In contrast, 18% of all car drivers involved in fatal crashes had been drinking.

- **Older riders.** Nationally, motorcyclists involved in fatal crashes are increasingly older. Frequently, these baby boomers, with greater disposable income, riding higher performance motorcycles for which the rider may not be sufficiently experienced (Samaha, 2007). We can expect to see similar trends in coming years in New Jersey.

- **Other Motorists.** There is a need to educate other motorists to consider motorcycle safety. After crashes, many motorists state they never saw the motorcycle or were unaware of special constraints on motorcyclists, e.g., limits on braking distance.

- **Unlicensed motorcycle ridings and reckless driving.** There is a need to better understand the demographics of riders who either do not have a motorcycle endorsement or have no license at all.

- **Better Safety Information.** There is a need for more effective dissemination of safety information to motorcyclists. The effectiveness motorcycle safety improvement programs, e.g., post-licensing training programs, are well known among safety experts, but not among the public.

**Improved Highway Environments**

- **Crashes with the roadside** are frequently unforgiving for motorcyclists. Our study shows that nationally motorcycle-guardrail collisions now result in more fatalities than car-guardrail fatalities (Gabler, 2007).

- **Highway maintenance and upgrades** may create crash and injury risks for motorcyclists.

- **Highway and roadside designs** are focused on cars and trucks, and rarely consider the special needs of motorcyclists.

- **Hot spots analysis.** There is a need to regularly screen New Jersey crash records to identify locations or hot spots which are particularly dangerous to motorcyclists for possible remediation.
Enhanced Training and Licensing Requirements

- Training instructors for courses, e.g. presented by the Motorcycle Safety Foundation have unique insights into novice rider perceptions and attitudes on safety. There is an opportunity to better understand and improve motorcycle rider performance by drawing on their expertise through interviews or focus groups.
- Need to quantify the crash reduction benefits of novice rider training in practice on New Jersey roads.
- Need for post-license training assessment and assessment. Many riders maintain a motorcycle license endorsement for years after they last rode a motorcycle resulting in rusty skill sets if they resume riding.
- Need to evaluate new strategies for graduated licensing of younger riders. Some states, e.g. Maryland, are now experimenting with GDL programs which do not require adult accompaniment.

The Need for a Strategic Plan
Reductions in motorcycle crash rates will require the joint efforts of all parties involved in motorcycle safety. Stakeholders include motorcycle riders, motorcycle associations, the NJ Motor Vehicle Commission, motorcycle trainers, highway design and maintenance engineers, motorcycle dealers, and law enforcement. Many of these groups have only infrequently worked together in the past, and may view motorcycle safety from completely perspectives. Needed is a strategic plan which, working with these stakeholders, identifies the root causes for New Jersey’s high motorcycle crash rates, and develops specific recommendations for improving motorcycle safety in New Jersey.

1. Progress this quarter by task:

Task 1 –Literature Survey

A preliminary literature survey has been completed drawing on the research presented at the Transportation research Board. An expanded literature survey which will also incorporate international data linking experience is currently underway.

Task 2 – Identify Existing Fatality – Related Databases and Fatality Data Sets in New Jersey.

- In November 2007, the PI, Yusuf Mehta, met with Tom Wright and Scott McNear from New Jersey Motor Vehicles Commission for the kick-off meeting and developed. At the kick-off meeting it was established that the focus of the study would be on training and licensing.
• In December 2007, the Co-PI, Dr. Clay Gabler met with Tom Wright, Scott McNear, and Bill Beans to determine how NJ Crash data could be obtained electronically.

• Based on the kick-off meeting and subsequent discussions with the research team three survey instruments were developed, a) Rider survey, b) Rider coaches survey, and c) Dealer survey. The objective of the survey is to understand the attitudes of the riders and their perception about the training courses and the MVC test. These surveys were discussed by a conference call in February 2008 and a subsequent visit by Tom Wright at Rowan University in March 2008. The surveys are attached in Appendix A. The surveys will be distributed by NJMVC with registration and the riders can take the survey online. These surveys will be connected by a unique Identifier. The dealer and rider coaches survey will be distributed by NJMVC and the survey can be taken online or by hard copy.

• The Rowan University Institutional Review Board (IRB) application has been prepared for review and approval of the research team’s plan for maintaining the confidentiality of the data.

• Our project team has secured access to the NJCRASH electronic database.

• Preliminary analysis of the NJ Crash datasets is underway.

2. Proposed activities for next quarter by task

• Distribute the survey and collate data as the survey results are received
• Conduct field investigation of crash sites closer to Glassboro, NJ.

3. List of deliverables provided in this quarter by task

• Surveys are attached in the appendix.

4. Progress on Implementation and Training Activities

• None Scheduled

5. Problems/Proposed Solutions

• None Scheduled

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<th>199561.50</th>
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<td>19561.15</td>
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<tr>
<td>% of Total Project Budget Expended</td>
<td>10</td>
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1. What year were you born?

2. What is your sex?
   ① Male
   ② Female

3. What type of motorcycle do you ride?
   ① Cruiser
   ② Sport Touring
   ③ Sport
   ④ Dual Sport
   ⑤ Standard

4. What reason(s) do you ride?
   (Please check all that apply)
   ① Recreation
   ② Fuel Economy
   ③ Touring
   ④ Social Activities
5. How many years have you been actively riding?
   ① Less than 2 years
   ② 2 years to 5 years
   ③ 5 years to 10 years
   ④ 10 years to 20 years
   ⑤ More than 20 years

6. How often do you wear a helmet?
   ① Never
   ② More than 0% but less than 25%
   ③ More than 25% but less than 50%
   ④ More than 50% but less than 75%
   ⑤ More than 75% but less than 100%
   ⑥ 100%

7. If there was no helmet law, what percentage of the time would you wear your helmet?
   ① Never
   ② More than 0% but less than 25%
   ③ More than 25% but less than 50%
   ④ More than 50% but less than 75%
   ⑤ More than 75% but less than 100%
   ⑥ 100%

8. Why do you wear a helmet?
   (Please check all that apply)
   ① I don’t
   ② It’s the law
   ③ Safety
   ④ My friends wear helmets
9. What kind of helmet is your PRIMARY helmet?
   ① Half
   ② 3/4- Face
   ③ Full Face/Flip-up
   ④ Novelty
   ⑤ None

10. Do you wear any other protective gear, on a regular basis?
    (Please check all that apply)
    ① Gloves
    ② Protective Pants (Not Jeans)
    ③ Boots
    ④ Protective Jacket
    ⑤ Joint/Spine protectors

11. Have you ever consumed alcohol before riding your motorcycle?
    ① Yes, less than 2 drinks
    ② Yes, more than two, but less than 4 drinks
    ③ Yes, 4 or more drinks
    ④ No

12. Do you have a valid NJ drivers license?
    ① Yes
    ② No

13. Do you have a valid Motorcycle endorsement?
    ① Yes
    ② No

14. How did you obtain your Motorcycle endorsement?
    ① Motor Vehicle Commission Road Test
    ② Motorcycle Safety Foundation Course
15. What motorcycle did you use to take the test/course?
   ① My own  
   ② A friend’s  
   ③ A rented motorcycle  
   ④ A rented scooter  
   ⑤ Course supplied motorcycle

16. What was the engine displacement of the bike you used for the test / course?
   ① Less than 100cc  
   ② 101cc - 500cc  
   ③ 501cc - 1200cc  
   ④ Over 1200cc

17. If you took the NJMVC Road Test, do you think it accurately tested your ability to operate a motorcycle properly?
   ① Yes  
   ② No  
   ③ I didn’t take the NJMVC Road Test

18. Have you ever taken the Motorcycle Safety Foundation course?
   ① Yes  
   ② No

   If you answered **YES** to question 18, please answer the following questions, **if not please skip to question 21**.

19. Please rate the courses overall effectiveness based on skills learned:
   ① Not effective  
   ② Somewhat effective  
   ③ Effective  
   ④ Very effective  
   ⑤ Extremely effective
20. Do you feel the course covered enough information?
   - 1. Not enough information
   - 2. Less than enough information
   - 3. Enough information
   - 4. More than enough information
   - 5. Too much information

21. Please rate your interest in taking a motorcycle safety course:
   - 1. Not interested
   - 2. Somewhat interested
   - 3. Interested
   - 4. Very interested
   - 5. Extremely interested
   - 6. Did not know it was offered

22. What factors kept you from taking one?
   (Please select all that apply)
   - 1. It is too expensive
   - 2. I don’t have the time for one
   - 3. I am not interested
   - 4. I don’t think it will be helpful
   - 5. I don’t know where they are
   - 6. I didn’t know they existed
   - 7. Not convenient to my location

23. Have you ever been involved in an accident with your motorcycle?
   - 1. Yes
   - 2. No

If you answered **YES** to question 23, please answer the following questions, if not please skip to question 29.
24. What were the circumstances?
   ① Single vehicle
   ② Multiple vehicle my fault
   ③ Multiple vehicle other driver’s fault
   ④ Animal or other road hazard

25. Where did the accident occur?
   ① An intersection
   ② Highway
   ③ Two lane rural road
   ④ Parking lot
   ⑤ Residential road/area
   ⑥ Off road

26. When you got into your accident, what protective gear were you wearing?
   (Please check all that apply)
   ① Gloves
   ② Protective Pants (Not Jeans)
   ③ Boots
   ④ Protective Jacket
   ⑤ Joint/Spine protectors
   ⑥ None

27. Was medical attention required?
   ① Yes, overnight hospitalization
   ② Yes, but no overnight hospitalization
   ③ No

28. Did you feel the severity of the accident required reporting it to law enforcement?
   ① Yes
   ② No
29. What types of situations do you feel are most dangerous to a motorcyclist?
   ① Intersections
   ② Highways
   ③ Two lane rural roads
   ④ Parking lots
   ⑤ Residential roads/areas

30. What do you feel is the most likely cause of motorcycle accidents?
   ① Inattentive or Distracted car and truck drivers
   ② Wildlife / Animals
   ③ Stunts/Excessive Speed
   ④ Inexperienced Riders
   ⑤ Curves

31. Do you feel that the conditions of roadway surfaces ever compromises your safety as a rider?
   ① Yes
   ② No

32. Do you have any additional comments that you feel will help to reduce motorcycle fatalities?
   (Please print, limit 200 characters)

   ________________________________

   We appreciate your time filling out this survey.
We need your help!

On behalf of the New Jersey Motor Vehicle Commission (NJMVC), and Rowan University, we are requesting your help for a very important project. The fatality rates of motorcyclist in New Jersey have reached an all time high. In 2006, 89 individuals were killed in motorcycle accidents. With your help we can make New Jersey roads more rider friendly.

All it takes is 5 minutes to fill out our survey by simply going to http://www.rowan.edu/njmvc and enter the code found on the reverse of this card. This code does not link any personal information, it simply lets us know that you only responded once.

Thank you in advance for your participation in this important project. If you have any questions about the administration of the survey, please contact the survey administrator, [name], [title] at [phone] or [email].

Simply respond by going to:

http://www.rowan.edu/njmvc

Your Access Code is:

R0123456789
March 24, 2008

Fellow Rider Coach,

On behalf of the New Jersey Motor Vehicle Commission (NJMVC), and Rowan University, we are requesting your help for a very important project. The fatality rates of motorcyclist in New Jersey have reached an all time high. In 2006, 89 individuals were killed in motorcycle accidents. Our purpose in writing to you today is to gather information. With this information the NJMVC will be able to make New Jersey’s roadways a safer place to ride.

Enclosed you will find a survey that we ask you to complete and mail back in the postage paid envelope. If you would like a faster and easier alternative, we suggest that you respond online using the instructions below. Your answers will be completely confidential. No personal information is requested or linked to the survey.

To respond online simply go to http://www.rowan.edu/njmvc and enter the code found below. This code does not link any personal data, it simply lets us know that you only responded once.

Thank you in advance for your participation in this important project. If you have any questions about the administration of the survey, please contact the survey administrator, [name], [title] at [phone] or [email].
1. What year were you born?

2. What is your sex?
   ① Male
   ② Female

3. How many years have you been actively **riding**?
   ① Less than 2 years
   ② 2 years to 5 years
   ③ 5 years to 10 years
   ④ 10 years to 20 years
   ⑤ More than 20 years

4. How many years have you been actively **training**?
   ① Less than 2 years
   ② 2 years to 5 years
   ③ 5 years to 10 years
   ④ 10 years to 20 years
   ⑤ More than 20 years

5. How did you obtain your Motorcycle endorsement?
   ① Motor Vehicle Commission Test
   ② Motorcycle Safety Foundation Course
   ③ No endorsement

6. In your opinion, how difficult is the basic rider course for the average rider?
   ① Not difficult
   ② Somewhat difficult
   ③ Difficult
   ④ Very difficult
   ⑤ Extremely difficult

7. Do you feel the MVC written test covers enough information?
   ① Not enough information
   ② Less than enough information
   ③ Enough information
   ④ More than enough information
   ⑤ Too much information

8. Do you feel the MVC road test covers enough information?
   ① Not enough information
   ② Less than enough information
   ③ Enough information
   ④ More than enough information
   ⑤ Too much information

9. Do you feel there are enough locations offering the course?
   ① Yes
   ② No
10. In the U.S. there are no restrictions on which bike a person can ride, regardless of their experience and skill. What do you believe should be done to keep riders from riding bikes beyond their skill level? (Please mark all that apply)
   ① Nothing, it is part of our freedom.
   ② Riders should be required to take more courses based on the size of their bike.
   ③ Riders should have to a certain about of time riding before being allowed to ride a larger bike.
   ④ There should be a certification system for different types of motorcycles.

11. In your opinion, how difficult is the experienced rider course for the average rider?
   ① Not difficult
   ② Somewhat difficult
   ③ Difficult
   ④ Very difficult
   ⑤ Extremely difficult

12. Do you believe more riders would enroll in ERC’s if there were increased incentives and availability?
   ① Yes
   ② No

13. Do you have any additional comments that you feel will help to reduce motorcycle fatalities? (Please print, limit 200 characters)

__________________________________  __________________________________
__________________________________  __________________________________
__________________________________  __________________________________
__________________________________  __________________________________
__________________________________  __________________________________

We appreciate your time filling out this survey.
March 24, 2008

Fellow Dealer,

On behalf of the New Jersey Motor Vehicle Commission (NJMVC), and Rowan University, we are requesting your help for a very important project. The fatality rates of motorcyclist in New Jersey have reached an all time high. In 2006, 89 individuals were killed in motorcycle accidents. Our purpose in writing to you today is to gather information. With this information the NJMVC will be able to make New Jersey’s roadways a safer place to ride.

Enclosed you will find a survey that we ask you to complete and mail back in the postage paid envelope. If you would like a faster and easier alternative, we suggest that you respond online using the instructions below. Your answers will be completely confidential. No personal information is requested or linked to the survey.

To respond online simply go to http://www.rowan.edu/njmvc and enter the code found below. This code does not link any personal data, it simply lets us know that you only responded once.

Thank you in advance for your participation in this important project. If you have any questions about the administration of the survey, please contact the survey administrator, [name], [title] at [phone] or [email].
1. What type of motorcycles do you sell? (Please Check all that apply)
   ① Cruiser
   ② Sport Touring
   ③ Sport
   ④ Dual Sport
   ⑤ Off Road

2. Do you require customers to obtain a motorcycle endorsement prior to purchasing a motorcycle?
   ① Yes
   ② No

3. Do you require customers to obtain a motorcycle endorsement prior to riding a purchased motorcycle off the lot?
   ① Yes
   ② No

4. Do you encourage new riders to take a safety course prior to purchasing a motorcycle?
   ① Yes
   ② No

5. Do you know what rider safety courses are available to your customers?
   ① Yes
   ② No

6. Do you believe there should be more locations offering the course?
   ① Yes
   ② No

7. Do you feel that motorcycle safety courses are effective tools to help riders?
   ① Not effective
   ② Somewhat effective
   ③ Effective
   ④ Very effective
   ⑤ Extremely effective

8. Do you feel the MVC written test covers enough information?
   ① Not enough information
   ② Less than enough information
   ③ Enough information
   ④ More than enough information
   ⑤ Too much information

9. Do you feel the MVC motorcycle road test adequately assesses weather a person has the skills to become licensed to operate a motorcycle?
   ① Yes
   ② No

10. Do you encourage customers to wear protective helmets when they ride?
    ① Yes
    ② No
11. If YES, what kind of helmet is your PRIMARY recommendation?
   ① Half
   ② 3/4- Face
   ③ Full Face/Flip-up
   ④ Novelty
   ⑤ None

12. Do you encourage customers to wear protective gear when they ride?
   ① Yes
   ② No

13. What kinds of protective gear do you suggest?
    (Please check all that apply)
   ① Gloves
   ② Protective Pants (Not Jeans)
   ③ Boots
   ④ Protective Jacket
   ⑤ Joint/Spine protectors
   ⑥ None

14. What kind of protective gear do you sell?
    (Please check all that apply)
   ① Gloves
   ② Protective Pants (Not Jeans)
   ③ Boots
   ④ Protective Jacket
   ⑤ Joint/Spine protectors
   ⑥ None

15. What types of situations do you feel are most dangerous to a motorcyclist?
   ① An intersections
   ② Highways
   ③ Two lane rural roads
   ④ Parking lots
   ⑤ Residential roads/areas

16. What do you feel is the most likely cause of motorcycle accidents?
   ① Inattentive or distracted drivers
   ② Wildlife / Animals
   ③ Stunts / Excessive Speed
   ④ Inexperienced Riders
   ⑤ Curves

17. Do you feel that the conditions of roadway surfaces ever compromises the safety of a rider?
   ① Yes
   ② No

MORE QUESTIONS NEXT PAGE
18. Do you have any additional comments that you feel will help to reduce motorcycle fatalities? (Please print, limit 200 characters)

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We appreciate your time filling out this survey.