

687.16026
N7191523em
1967

(Confidential Report)

The Effect of the New York State
Motorcycle Helmet Law
On Injuries Sustained
by Motorcycle Occupants

by Barry Negri

NEW YORK
JAN 14 1997
STATE LIBRAR

Approved

Philip K. Raeder, Jr.

Philip K. Raeder, Jr.
Director



B00060292B

I. INTRODUCTION

In an effort to protect the occupants of motorcycles involved in an accident, the New York State Department of Motor Vehicles initiated various motorcycle safety equipment requirements. Among others, a law, which became effective January 1, 1967, required all motorcycle occupants to wear a protective helmet of a type approved by the Commissioner.

The purpose of this report is to indicate the effect of the helmet requirement on injuries sustained by motorcycle occupants involved in accidents before and after the effective date of the regulation. The data presented in this report is a part of the data collected in a special study, all of which will be available soon in a final report.



B00060292B

II. METHODOLOGY

The fundamental basis of this report is the comparison of data on 1966 motorcycle accidents and 1967 motorcycle accidents. This represents one year of data prior to and one year after the effective date of the protective helmet requirement.

The Division of Research and Development maintains accident research computer tapes which contain information on many variables. However, the detail of information necessary to properly evaluate the motorcycle safety problem is available only from the raw accident reports. Therefore a sampling technique was used for selection of motorcycle accident cases for an in-depth analysis. All fatal motorcycle accident cases were selected for review as well as a 25% systematic sample of the personal injury cases. For the 25% sample, every fourth case was selected and used only if a police accident report was available. The sampling procedure was repeated using only data from police reports until the frequency of the sample totaled 25% of the population.

A sample based upon police reported data provides a more accurate accident picture than using the universe with non-police reported data. Moreover, police reports were necessary to give an indication of the frequency with which persons involved in accidents in year 1967 were not conforming to the equipment requirements. It was found that only .6 percent of the motorcyclists were not in conformance with the equipment requirements and therefore the assumption that all motorcycle occupants in 1967 accidents were

wearing the protective helmet is valid. There was no method of determining which or how many motorcyclists in 1966 had a protective helmet on and consequently the findings of this report concerning the reduction of head injuries will necessarily be a lower limit due to the assumption that all persons in the 1966 accidents were not wearing a protective helmet.

In summary, the following data is based upon an analysis of all fatal accidents and a 25% sample of personal injury police reported cases. The data has been expanded to represent the motorcycle accident population.

III. FINDINGS

A. Frequency of Accidents

In 1967 there was a dramatic decrease of 39% in the total number of motorcycle accidents as compared with 1966.* The distribution by severity of the accidents remained virtually unchanged.

Frequency of Motorcycle Accidents

<u>Severity</u>	<u>1966 Number</u>	<u>% of Total</u>	<u>1967 Number</u>	<u>% of Total</u>
Fatal	85	1.6	51	1.6
Personal Injury	4,792	92.4	2,983	94.4
Property Damage	<u>307</u>	<u>5.9</u>	<u>127</u>	<u>4.0</u>
Total	5,184	100.0	3,161	100.0

* At the present time comment on this reduction would be premature, and is not the purpose of this report. Conclusions in this report are based on distribution of severity, which is similar in 1966 and 1967. The final report will address itself to the reduction of accident frequency.

B. Effectiveness of the Helmet Requirement

One of the fundamental indicators of the effectiveness of the helmet regulation is the percentage of motorcycle occupants who were killed with respect to the total number who were killed and injured. This percentage represents the probability of an injured person dying. The data presented in Chart A shows that in 1966, 87 motorcycle occupants, or 1.6% of the total of 5,346 occupants injured, died. In 1967 of the total of 3,310 persons injured, 52, or 1.6%, died. The percentage of persons who were killed before and after the helmet regulation is consistently equivalent. Therefore, there is no supporting evidence (obvious at this time) that the helmet regulation has reduced fatal injuries or, similarly, the probability of an injured motorcycle occupant suffering a fatal injury.

There are several hypotheses why there has not been a change in this probability of fatal injury.

The most significant characteristic of the fatal motorcycle accidents is the force with which the occupants of the motorcycle are ejected. In all cases in which the motorcycle occupant died, ejection took place. The data available for study indicates that under some of the accident conditions present when a motorcyclist is fatally injured, it would not be feasible to prevent a fatality from occurring.

Evidence of the magnitude of forces present when a motorcyclist is fatally injured is presented in Chart B. Information was obtained

on the nature of the fatal injuries on as many of the motorcyclists as possible. The details of injury were available on more than 70% of the fatalities for both years and therefore the data is representative. This information shows that while a large reduction in head injuries occurred, a corresponding increase in broken necks occurred. It is not possible to discuss this finding further without extensive clinical research performed by technicians such as physicians or pathologists.

CHART A

	<u>Year 1966</u>	<u>Year 1967</u>
(1) Number of Personal Injury and Fatal Accidents	4,877	3,034
(2) Number of Motorcycle Occupants Involved in the Personal Injury and Fatal Accidents	6,036	3,724
(3) Number of Motorcycle Occupants Injured	5,259	3,258
(4) Number of Motorcycle Occupants Killed	87	52

CHART B

Injuries Sustained by Motorcycle Occupants Killed

Data based upon a total of 69 fatalities in 1966 and 37 fatalities in 1967 which had the details of injury available for study.

<u>Injury</u>	<u>% of 1966 Fatalities</u>	<u>% of 1967 Fatalities</u>
Head - fracture, bleeding wound, concussion -	75.4%	45.9%
Neck - fracture, broken -	5.8%	37.8%

Another fundamental indicator of the effectiveness of the motorcycle helmet requirement is the reduction in the severity and frequency of head injuries sustained by motorcycle occupants who were injured. Chart C shows the percentage of motorcycle occupants who sustained head related injuries in the various severities. An examination of the data shows that in 1966 18.5% of the persons injured received severe head injuries (injury A, concussion, and injury B). The corresponding number for 1967 was 11.5%. Thus, there was a significant decrease of 38% in the percentage of persons suffering serious head injury.

Moreover, a 29% reduction in the percentage of serious face injury was observed, while neck injuries increased. However, since the frequency of neck injuries was minimal, the net result indicates that the total of head related serious injury was greatly reduced. In 1966 the total number of serious head, face and neck injuries as a percentage of the 5,259 persons injured was 33.9%, while the corresponding percentage for 1967 was 23.0%. This results in a 32% reduction in the percentage of serious head related injuries.*

Therefore, the probability of suffering a severe head related injury was reduced by approximately one-third after the effective date of the helmet regulation.

* These computations exclude "Injury C" because these may not be injuries in all cases, but only claim of injury without the support of physical evidence.

CHART C

Injuries Received by Motorcycle Occupants

<u>Nature of *</u> <u>Injury</u>	<u>1966</u> <u>% of the 5259</u> <u>Persons Injured</u>	<u>1967</u> <u>% of the 3258</u> <u>Persons Injured</u>
Head: injury A	11.6]	6.9]
Head: concussion	2.9]	2.8]
Head: injury B	4.0]	1.8]
Head: injury C	<u>1.1</u>]	<u>1.6</u>]
Total head injuries	19.6	13.1
Face: injury A	11.3]	7.7]
Face: injury B	3.3]	2.6]
Face: injury C	<u>.2</u>]	<u>.4</u>]
Total face injuries	14.8	10.7
Neck: injury A	.3]	.6]
Neck: injury B	.5]	.6]
Neck: injury C	<u>.3</u>]	<u>1.2</u>]
Total neck injuries	1.1	2.4

- * Injury A: Fracture, bleeding wound, distorted member, severe.
 Injury B: Abrasion, bruises, swelling, other visible.
 Injury C: Complaint of pain, no visible sign.

IV. SUMMARY AND CONCLUSIONS

The analysis of the data available for study does not find any support for the hypothesis that the safety helmet requirement has reduced fatal injuries. It is believed that under the conditions of many of the accidents in which motorcyclists are fatally injured, circumstances are such that it is not feasible to prevent death from occurring.

However, with regard to reducing serious non-fatal head related injuries, there is very good supporting data. The probability of suffering head injuries was reduced 38% and serious face injuries reduced 29%. The total serious head related injury probability was reduced by approximately one-third.

The data supports the hypothesis that serious head related injuries can be greatly reduced by the use of a protective helmet. However, beyond some level of accident condition, primarily speed, a motorcycle is a sufficiently dangerous vehicle that it may not be feasible to prevent death in the event of accident.