

HIGHWAY RESEARCH

CIRCULAR

Number 131

Subject Area: Highway Safety
Traffic Measurement
Traffic Control and Operations

February 1972

RESEARCH PROBLEM STATEMENTS

During 1971, the Committee on Traffic Records assigned a high priority to the development of problem statements in its area of responsibility. The statements are considered to represent critical problem areas which require further research. Readers having knowledge of pertinent research in progress or planned are invited to communicate directly with Chairman David M. Baldwin.

COMMITTEE ACTIVITY

OPERATION AND MAINTENANCE OF TRANSPORTATION FACILITIES

Harold L. Michael, Chairman
Group 3 Council
Purdue University, Lafayette, Indiana

COMMITTEE ON TRAFFIC RECORDS

David M. Baldwin, Chairman
Chief, Traffic Performance and Analysis Division
Federal Highway Administration

James K. Williams, Staff Engineer

J. Stannard Baker
William T. Baker
E. H. Brezina
Noel C. Bufe
B. J. Campbell
John Carnaghi
William H. Franey
John D. Hromi
Alan F. Huggins
John C. Laughland
Ronald D. Lipps

Bruce B. Madsen
Curt A. Matyas
J. P. Mills, Jr.
Darrell E. Roach
Thomas H. Rockwell
H. Laurence Ross
Stephen E. Rowe
John L. Schlaefli
Langston A. Spell
John E. Taylor
Robert M. Williston



HIGHWAY RESEARCH BOARD

NATIONAL RESEARCH COUNCIL NATIONAL ACADEMY OF SCIENCES - NATIONAL ACADEMY OF ENGINEERING
2101 CONSTITUTION AVENUE, N.W. WASHINGTON, D.C. 20418

PROBLEM STATEMENT

Subject: Relation of Crash Involvement to Exposure

The Problem: The need for consideration of the exposure to accident has long been recognized as valid in evaluating traffic accident data. As the overall problem grows, however, and as the complexities of both the problem and possible countermeasures increase, simple exposure measures fail to produce significant identification of problems and solutions.

Problem Area: Traffic safety research has and is continuing to identify specific populations, roadways, roadway characteristics, traffic performance data, vehicle types, weather conditions and other parameters as to their relative contribution to the overall accident problem. It is hoped that by isolating characteristics significantly more often related to accidents that treatments may be developed and applied to specific identifiable sectors of the population, vehicle or highway and street system. Presently we are able to perform such isolations in only the most general way. For example, we can say that certain age strata have greater crash involvement than other age strata. It is also possible to identify the relative safety per mile of traffic by highway system. The usefulness of these general relationships is limited. There exists a need for the development of multi-parameter exposure models which take into consideration combinations of interrelated parameters; for example, such as sex, age, vehicle, type, trip purpose, highway classification, highway culture, weather and time. Multi-parameter exposure modeling will make generalities more difficult to state, but should make identifiable relationships more significant and, hence more amendable to successful treatment.

Objectives:

1. To define possible exposure parameters for vehicles, drivers, pedestrians, highways and other safety related features.
2. To determine logical combinations of parameters related to highway safety standard elements and subelements.
3. To test the feasibility of developing defined exposure measurement parameters as part of State and local safety management reporting systems.
4. To recommend future needs for traffic records related to exposure measurement.

PROBLEM STATEMENT

Subject: Relative Value and Usefulness of Field Reference Systems

The Problem: Many States are installing, or planning to install, systems for locating incidents on the highway. Impetus has been provided for these efforts by Highway Program Standards 9 and 10. These field reference systems vary from State to State, and even between political jurisdictions within some States. As a result of limited experience with the various systems, there is no clear-cut choice for a "best" system.

The Problem Area:

1. Knowledge of how to use field referencing as a base for a statewide coordinated data systems is not commonly known.
2. Present standards (as contained in the two official sign manuals) call for a milepost system.
3. Some systems now in use are not in conformance with the MUTCD, and in some States dual systems exist.
4. No in-depth evaluation has been made of the several systems in terms of original cost, maintenance costs, recognition by drivers, use in driver orientation, usefulness to highway and police officials, ease of coding, storage, and retrieval and other factors.
5. There are no existing criteria for field referencing systems other than what is contained in the two official manuals.

Objectives:

1. Develop criteria for field reference system.
2. Evaluate proposed systems against these criteria to determine the "best" system or systems.
3. Produce guidelines or instructions on installation and use of the system.

Urgency: States are making decisions in this area today, and early guidance is desirable.

PROBLEM STATEMENT

Subject: Loss Evaluation in Motor Vehicle Traffic Accidents

The Problem: In measuring accident experience, two yardsticks may be employed, one based on frequency of occurrence and one based on severity or extent of loss. For half a century, essentially the same crude description has been used to evaluate the harm or loss of a motor-vehicle accident: The accident is categorized as fatal, injury or non-injury. Thus, so far as input to the records system goes, an accident in which an elderly pedestrian is killed is as bad as a school bus collision killing five children; and a scraped fender on an old car is as serious as a tractor and trailer which overturns and burns with no injury to the driver.

The Problem Area: To determine the economic cost of accidents, usual practice is to apply an estimated average dollar cost per fatal accident to the number of fatalities, another average dollar value to the number of injury accidents and a third to the number of damage-only accidents. While these methods may be sufficient for a general idea of the dollar value of motor-vehicle accident losses for a State or city, they are entirely inadequate for evaluating the effect of traffic engineering, automotive engineering, or highway engineering when the number of accidents is small and the effect of countermeasures on severity as well as frequency has to be evaluated. Present methods are not sufficiently sensitive to probe change in severity with changes of programs, and are especially weak when cost effectiveness of programs has to be evaluated.

Some elements of improved loss evaluation readily suggest themselves. A direct dollar value for loss would appear to be most suitable, but has numerous stubborn defects: The value of the dollar changes from year to year so that long term trends and even before-and-after studies may have to be adjusted for inflation. The dollar value of given amount of damage depends greatly on style and age of vehicle. For example, complete destruction of a 12-year old car may mean a dollar loss less than a broken windshield in a new expensive car; and death of a young executive would mean a dollar loss in future earnings vastly greater than that of an unemployed grandmother.

Objectives:

1. Needed is a scale or index, a number that is the sum of component elements of loss. For cost effectiveness and other studies, this number or scale would have to be related to dollar values from time to time by sampling, as, indeed, our present system is.
2. To be workable, evaluation must be possible at the scene of an accident or from simple descriptions of the accident. It is unrealistic to think that police or other investigators will follow up on accidents to determine medical costs, or even medical treatment or to get repair estimates for damaged vehicles. It might be possible to have a manual or handbook with tables or charts for loss evaluation.
3. The system must be widely understood and used if it is to be effective in comparing States and cities. To be widely used, it must recommend itself or be recommended by highly influential or authoritative agencies.