The New Jersey Milepost System

NEW JERSEY DEPARTMENT
OF TRANSPORTATION

The New Jersey Milepost System

by
William T. Baker

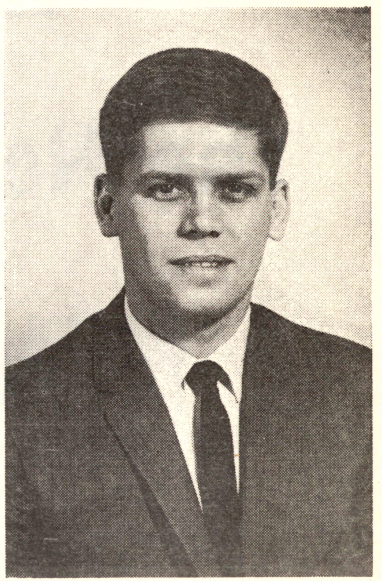
For many years highway mileposting has been suggested as ideal for locating traffic accidents; however, to date, very few states have used it to any extent. Furthermore, there is scant literature available covering the use of physical mileposts as an accident referencing medium.

Perhaps the primary reason for the limited use of mileposting is the fact that it must be attended by an effective accident-analysis program before it can be properly used. The passage of the Highway Safety Act of 1966 is proof that some states have not developed adequate accident records systems.

On March 27, 1967 the New Jersey Department of Transportation, in its first step towards the development of a comprehensive accident-analysis process, began the installation of milepost signs throughout the State Highway System. The work is being financed on a 50-50 basis by the State and the U.S. Bureau of Public Roads. In order to maximize the use of mileposts, a project was conducted to select the type of mileposting best suited to New Jersey's 2,000 miles of state highways.

Possible mileposts were classified into the following three categories:

A. *POST-MOUNTED SIGN* (Fig. 1)
This type consists of an upright sign placed along the roadway's edge, usually in line with roadside delineators.



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B. *NUMBERS ON PAVEMENT*
Although there is no evidence today of any use of this type, it was thought to be a likely alternative. The milepost may take the form of painted numbers or of numbers fabricated from the type of plastic material that is sometimes used for lane lines and crosswalk markings.

C. *NUMBERS AFFIXED TO BACK OF EXISTING SIGNS OR OTHER ROADSIDE OBJECTS*
Several states utilize this type because of its low cost per installation. Numbers painted or printed on a metallic tape are affixed to the back of common highway signs or attached to bridge abutments and other permanent roadside objects.

Only the first two types were field-tested in New Jersey. The third type was eliminated because of the requirement that a milepost should be discernible from a vehicle moving at normal highway speeds. A number on the back of a sign could require a vehicle to stop and the observer to search out the milepost on foot.

Field tests were conducted at night with representatives of New Jersey's Divisions of State Police, Motor Vehicles, Maintenance and Equipment, and Research and Evaluation in attendance. The following mileposts were developed for the tests:

1. Post-mounted sign.
2. Two-digit numbers painted on the pavement with white non-reflective highway paint.
3. Two-digit numbers painted on the pavement with phosphorescent paint.
4. Two-digit numbers made of plastic reflective striping material placed on the pavement.

Initially, plastic striping material was considered because of the possibility of longer life and less exposure to wear. It was estimated that a plastic number would outwear a painted number by three to one.

Since it is necessary to see a milepost from a distance so that the observer may adjust his speed or pull onto the shoulder for recording purposes, phosphorescent paint was considered because of its ability to retain light from the daylight hours.

A prior field test indicated that numbers on the pavement surface would have to be larger than one foot to be readable from a moving vehicle.

Table 1 illustrates the average cost per year in New Jersey for each of the three types of mileposts and is based on a number with two digits:

TABLE 1

	Estimated Life (Yrs.)	Cost Per Installation	Cost Per Year Per Installation
Post-Mounted Sign	5	$12.00	$ 2.40
Milepost Painted on Pavement — 3′ Size	1	3.00	3.00
Plastic Milepost on Pavement — 3′ Size	3	15.00	5.00

The proposed mileposts were observed from a moving vehicle at various speeds. The observers, representing the disciplines that would use a milepost most, unanimously considered the post-mounted sign to be the most effective.

The mileposts on the pavement were distinguishable only when the vehicle was within about 50 feet, and then the speed had to be reduced to under 15 m.p.h. Due to the flat angle of observation, the phosphorescent numerals had a tendency to "black out" and were all but obscure. It was the opinion of the observers that a milepost on the pavement would have to be considerably larger than the tested three-foot size to be sufficiently visible, and possibly as large (eight feet or more in height) as the word markings set forth in the *Manual on Uniform Traffic Control Devices for Streets and Highways.*

Experience has indicated that a vertical sign of the type selected in this study yields a "flash" of about 800 feet on a level, tangent highway. A commonly used rule of thumb is that a one-inch letter can be read at a distance of 50 feet with perfect (20-20) vision. Therefore, a milepost utilizing reflective sheeting with six-inch numerals can be read at a distance of 300 feet.

The post-mounted sign evaluated in this study meets the specifications set forth in the *Manual for Signing and Pavement Marking of the National System of Interstate and Defense Highways.*

Proposed Use of the Mileposts

As the signs are being installed, a milepost number, accurate to 0.01 mile, will be assigned to every at-grade intersection and ramp terminal in both rural and urban areas. These numbers will be stored in a computer and will serve to define the locations of all intersections and ramps on a given route.

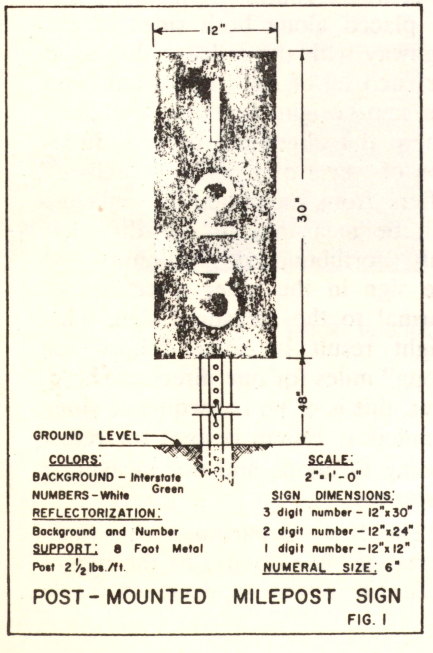
The police, investigating an accident in a rural area, will record the odometer reading of their vehicle at the accident scene and again when they pass the first milepost as they proceed on normal duty. This provides an accident location to within 0.1 mile.

Mileposts will not be installed in highly developed urban areas. In a block-by-block area, locating accidents to the nearest intersection is considerably more accurate than a 0.1 mile measurement. Most municipal police measure in feet to the nearest intersection, and since each intersection has an assigned milepost it is a simple matter for a coder, consulting a listing of intersection names and of their corresponding milepost numbers, to record on a data card the milepost accurate to 0.01 mile. Thus, accidents can be located by intersection, and by non-intersection to within 0.1 mile in rural areas and 0.01 mile in urban areas.

The treatment of interchanges and traffic circles will be somewhat different. If an accident occurs at a location within an interchange or circle on a ramp or distributor road, it will be defined by a pair of numbers indicating route and direction "from" and route and direction "to".

The interchange itself will be located by any one of the ramp terminal mileposts. This will not provide a highly accurate milepost location of the accident, but it will delineate the exact ramp or section of ramp where a problem exists. In this way, mileposting need not be carried throughout the many ramps of a complicated interchange, since the ramp termini on the main through routes are defined by the directions.

Although a more accurate accident-location method could be devised for interchanges and traffic circles, it would probably require the use of diagrams and manual location files. It is felt that utilizing a simple methodology, amenable to data processing, compensates for the less accurate procedure described above.



POST-MOUNTED MILEPOST SIGN
FIG. 1

Another significant aspect of the mileposting will be its use as a base referencing system for sufficiency rating purposes. A complete road inventory, which is now in the final stages of completion, will allow the coordination of accident data at a particular location with the geometric features at the same location. Therefore, a more comprehensive description of the physical features of the roadway is available than is normally found on an accident report. By placing this mileposted inventory on disk files for computer use, convenient access to the geometrics of any section of road can be made for either accident analysis or sufficiency ratings.

Proposed Analysis Procedures

Analysis of the accident data will be based on the following two types of computer output:

1. *Accident and/or Dollar-Loss Profile*

   This output is principally for use in indicating the exact locations of hazardous sections and their lengths.

   The computer, in conjunction with a data plotting device, using number of accidents and/or dollar-loss values for the ordinate and tenths-of-a-mile increments for the abscissa, will draw the profiles in histogram form. The degree of hazard at a particular location will be noted from the peak of one or more histograms, while the length of the section, in tenths of a mile, will be seen from their spread. Once the high accident locations are delimited, a subse-

quent run on these sections can be made using hundredths-of-mile increments for the abscissa so that more exact locations can be made.

By producing an accident profile for an entire route, the total number of hazardous locations can be observed, as well as some measure of their severity in relation to the rest of the route. In this way the traffic engineer need not choose an arbitrary cut-off point for either the length or magnitude of a hazardous section.

2. *Accident Details*

Once the high accident sections are determined, further computer processing will provide details on every reported accident at each location. The accidents will be listed under two separate categories, "Intersection" and "Non-Intersection", with the length of each section defined by its mileposts. Since a given intersection can have only one milepost assigned to it, a manual will be consulted for the proper names of all intersections on each route.

The following details about each accident will be listed:

General Characteristics—day, date, hour, light conditions, weather and road conditions, type of accident, number of vehicles involved, and the area of the intersection in which the accident occurred (zone).

Description of Each Vehicle—year, make, and body type; what maneuver the vehicle was making immediately prior to the accident; direction of travel; and any particular vehicle condition and/or driver condition that the investigating officer feels may have contributed to the accident.

Manner of Collision—what each vehicle struck.

Contributing Circumstances — the primary causal factor from the police viewpoint and the driver viewpoint.

Severity—number killed, number injured, and an estimation of accident costs based on amount of property damage and degree of injury.

Accident Record Number—ties the description to the accident case file as found in the Motor Vehicle Division's records, should there be a need to consult the original report form.

Installation

It was recommended that "zero" mileage be at the south or west state lines and at the south or west junctions where routes begin. Signs will be placed along both sides of the highway with the mileage displayed for each set of signs measured from the same origin. In those few cases where the alignment of one direction of travel of a divided highway differs from the other, the mileage will be measured in one direction only (northbound or eastbound) and the sign in the other direction set normal to the measured sign. This might result in some "short" or "long" miles for one direction; however, this is of no consequence since a milepost system is used for referencing locations and not measuring distances.

The N. J. Department of Transportation, in response to the urgent need for action to decrease traffic deaths and injuries, feels that an effective milepost system is only a beginning step. Integrating a comprehensive accident analysis program with a philosophy of hazard improvement that first approaches those locations where accident severity is high, should provide the maximum in engineering capability.

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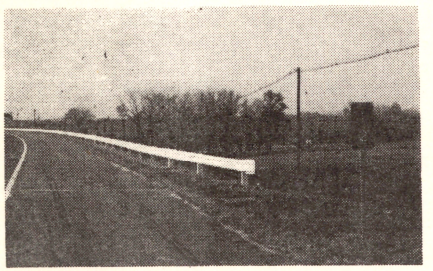

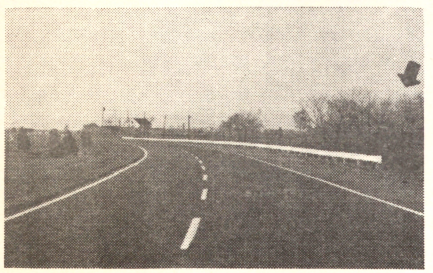

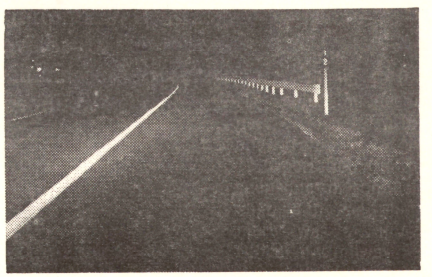

Typical installation of New Jersey milepost.

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