USE OF ACCIDENT DATA TO IDENTIFY WET-PAVEMENT LOCATIONS IN PENNSYLVANIA

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•IDENTIFICATION of wet-pavement accident locations is one of the specific uses of the accident data bank that has been in operation in Pennsylvania since January 1966. The responsibility for all statewide accident analysis was assigned to the Accident Analysis Section of the Bureau of Traffic Engineering.

Accident reports are received from state and local police and from involved motorists. The forms used by the state and local police are almost identical. The local police are furnished the forms by the commonwealth if they agree to supply a copy of each completed investigation. Drivers involved in accidents resulting in death, injury, or property damage of more than $100 are required to file reports. Reports of 293,000 accidents were analyzed during 1969.

The essential data for accidents that might have been affected by wet-pavement conditions are date, severity, location, weather, pavement condition, vehicle type, collision diagram, and description of the event. The value of all subsequent analysis depends on the quality and accuracy of the information provided by these reports.

It should be noted that information not subject to change, such as speed limit, traffic volume, roadway width, and type of pavement, is not included in accident reports. Those data are included in the road log that is in computer storage, and they can be matched against the accident data for any section of state highway that is being studied.

The commonwealth has also established a reference system that is primarily based on station markers for the state highway system and on mile markers for the Interstate system. Highways are identified by legislative route numbers, rather than by traffic routes, because the legislative route system covers all highways under state jurisdiction and is the index for road log and other records. Locations on other than state highways are identified by street name, township road name or number, and block face. The need for a more complete reference system on rural roads not under state jurisdiction is recognized. However, a study of reported accidents indicates that 94 percent of those accidents occurring on the state system can be adequately located for remedial purposes within the location framework now in use and that all but 2½ percent of the accidents on other roadways can be located adequately by route name or cross route. Achieving this coverage is based on the assumption that knowledge obtained from nearby residents or maintenance personnel in rural areas can pinpoint locations if the problems are serious enough to warrant a field study.

ANALYSIS

Reports received from police and operators are correlated and given sequential identifying numbers. All papers referring to a particular accident are stamped with the same number, which is used to cross-reference driver files. After the analysis is completed the papers are filed by number for future detailed reference. Because of this correlation reports can be grouped by county or city, which somewhat simplifies the location process.

As a first step in analysis, a team of about 15 people reads the reports to determine the location as accurately as possible. The team depends primarily on large-scale county maps, but they also use all available reference material such as logs, telephone books, and street indexes.

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Another group of about 15 analysts record the vital information for each accident for placement on magnetic tape. The analysts do not simply record the information given in the reports. They read the reports thoroughly and then form an opinion as to what actually occurred.

As a result of this analysis, information is coded that shows the following items pertinent to wet-pavement accidents: accident record number; location; date; weather; road surface condition; accident type; identification of offending vehicle by type, movement, and causation factors; identification of other vehicles involved; and severity of accident. For each accident this information is available in a broken-English abstract for electronic data processing.

DATA PROCESSING

More than 80 different programs have been written for analysis and tabulation of the data available from the accident data files. Three programs are of particular interest in an analysis of wet-weather accidents.

Cluster listings based on the criterion of 12 accidents or more within 1,000 ft during a 3-year period are prepared for the state highway system. The threshold figure obviously varies with the time period being studied, and a somewhat larger number must be used for a shorter period and must be developed with experience. The distance criterion is based on a "moving" 1,000 ft, not on successive segments. The information is printed on a single line for each location and shows the county, legislative route number, limiting stations, number injured, number killed, and number of accidents. This information is printed in sequential order by route number for ready reference and in descending order by number of accidents for priority action. Engineering personnel, who are part of the surveillance team in each district, are assigned to review all locations on the cluster lists, to determine the relationship between the highway environment and the reported accidents, and to suggest countermeasures. Obviously, some of the clusters will relate to wet-pavement accidents and will be treated accordingly.

Tabulations are also made of those sections of highway on which an apparently high proportion of accidents has occurred during wet weather. In those printouts the data are arranged by legislative route number and are subdivided by change in pavement type and abutting construction sections. Information is shown for the number of accidents, the rate per hundred million vehicle-miles of travel, the accidents per mile of road, and the percentage of accidents occurring on wet pavement. (These accidents are defined as those for which the accident report shows the weather as "rain" or the pavement as wet or both. Snow-covered or icy pavement is excluded.)

As part of a "search-by-hazard" program, another type of cluster report has been developed for accidents occurring on wet pavements. A minimum of five accidents must occur within a 3,000-ft segment of road during a 3-year period for the information to be listed. This information is printed on one line and is similar to that described in the previous paragraph.

FIELD STUDIES

The various printouts of wet-pavement accidents are studied, and a list of highway sections to be skid-tested is prepared for each engineering district. Two skid trailers are used in the statewide testing program, which includes tests on other sections reported to be slippery, retests, and research studies. Present procedure calls for any section with a skid number of less than 30 to be treated immediately and those with a skid number of between 30 and 40 to be placed on future programs for resurfacing or other corrective treatment.

In cooperation with the National Highway Traffic Safety Administration, the department has established accident investigation and surveillance teams of engineers and state police in each of the 11 engineering districts. Their work is divided into two phases, the first of which is in-depth accident investigations. Although some accidents that involve slippery pavement are investigated, the total number is not great enough to give wide coverage or statistically stable results. However, if slippery pavement is suspected to be a causal factor in a specific accident, that location will be skid-tested.

The second phase of the teams' work is involved with the review of all cluster locations, as indicated previously.

GENERAL COMMENTS

The program for correcting pavement surfaces with low skid numbers based on accident studies has not been in operation long enough to allow for after studies of accidents, although these are obviously desirable. It is anticipated that the 1971 accident records will provide a basis for this comparison.

As noted earlier, it is incumbent on testing personnel, pavement specialists, and automotive engineers to recognize that the quality of an analysis is dependent largely on the data provided. If more specific data are needed, changes will have to be made at the reporting level. Meanwhile, available information will provide for a program that uses all available skid-testing equipment and financial resources for corrective treatments.