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In choosing Ohio as the site for the compliance center, Secretary of Transportation John A. Volpe said that existing testing laboratories throughout the nation are heavily engaged with commercial contracts and also cannot conduct a full range of compliance tests. The Secretary further said that all standards cannot be tested at a central location, that vehicles and equipment must be transported between different testing laboratories, resulting in added costs and potential damage to the test item, and that commercial laboratories do business with segments of the automotive industry.

The Ohio operation will conduct tests and do research for private and governmental agencies alike and will work closely with universities and colleges engaged in research allied with the automotive and transportation industries.

California Explores Methods of Fighting Continuing Problem of Wrong-Way Driving

Wrong-way driving represents one of the most serious problems connected with limited-access highways. Whether the wrong-way driver enters via an off-ramp or merely makes a U-turn and drives back down a one-way traffic stream against the flow of traffic, the consequences can be extremely severe.

In California, a rash of wrong-way accidents in the summer of 1970 aroused public interest, and legislators demanded immediate action. Although it later transpired that the high concentration of wrong-way accidents during this period was a random phenomenon, final figures for 1970 showed that 53 people died in wrong-way accidents on the state's freeway system, representing 6.2 percent of the total freeway fatalities.

As a result of the problem, a 5-point program was initiated by the California Division of Highways. All of the Division's work in the prevention of wrong-way driving to date falls into three categories: research and evaluation, surveillance, and operational improvements.

Point 1 of the 5-point program was to reexamine the past 9 years of research and operational improvements carried out by the department to determine if any previously considered concepts were worthy of further consideration. This has now been expanded to include the evaluation of new concepts, with special emphasis on the night performance of any preventive measures, because 80 percent of wrong-way accidents occur at night.

Among the devices reviewed is a series of small bumps in the off-ramp, designed to attract the attention of the wrong-way driver. Experimentation has led to a design that it is hoped



Small bumps in the off-ramp are designed to alert wrong-way drivers without creating a hazard for the driver using the ramp properly.



Skull-and-crossbones sign is being evaluated on an experimental basis as a secondary warning to wrong-way drivers.

will maximize the effect of the bumps for the wrong-way driver without creating an objectionable ride or hazard for the right-way traffic. Additional development and testing of this device by the Headquarters Materials and Research Department is planned.

A skull and crossbones sign shows promise, with high attention-getting value for a secondary or "last chance" warning sign, and is especially impressive at night.

Division of Highways engineers are working closely with inventors and developers in the Los Angeles area on directional vehicle detectors and other devices with application to the problem, and a variety of new signs and delineation methods are being explored.

In conjunction with Headquarters Traffic, Materials and Research is developing a special warning light for possible placement in the pavement of an off-ramp, while various applications of the international-type symbol "Do Not Enter" signs are being considered.

Although the "Do Not Enter" warning at the off-ramp is important, positive directions into the on-ramp are at least equally important. Again, night effectiveness is being emphasized and in this respect the department is looking at ways to make the on-ramp signing more visible and eye-catching and the on-ramp easier to find. Among the possibilities are larger freeway entrance signs, neon or moving "attractor" signs. Some freeway entrance sign installations have been built using freeway entrance and cardinal direction signs with a route shield and an arrow pointing into the on-ramp entrance all on one post in a "totem-pole" arrangement.

Engineers have reviewed the operational improvements and wrong-way research of other states in connection with point 2 of the 5-point program. Other states rely almost entirely on signing and delineation to combat the wrong-way driving problem. Many states use some sort of secondary warning on off-ramps. One state has tried a light and sound device, actuated by the wrong-way vehicle, which is very similar to the one being used in California at a few locations.

Point 3 of the program was to enlist the help of the California Highway Patrol and other enforcement agencies to identify locations where wrong-way movements are occurring. In October 1970 the Patrol began gathering information about origins and causes of wrong-way driving violations on freeways. Copies of the wrong-way driving citations and the officers' comments are forwarded to the Division of Highways. To date, about 48 percent of the wrong-way drivers cited entered the freeway via an off-ramp. The others were guilty of some sort of U-turn or intentional median crossing. Almost one-third of the drivers cited were over 65 years of age. The wrong-way involvement of these older drivers appears to be comparatively very high, since they represent only about 6 percent of the total registered drivers.

Studying of these citations is also apparently leading to discovery of a few locations where an unusually high number of wrong-way movements have occurred. These locations are being investigated and corrective measures are being applied.

The Division's heavy artillery in the area of wrong-way surveillance is the program to place a one-way counter on each off-ramp in the state for at least one month in an effort to identify any problem locations. This is fulfillment of point 5 of the program to continue camera studies of off-ramps.

Point 4 of the program was to form investigation teams to conduct field investigations of ramps. A day and night review of all on- and off-ramps was completed in November 1970. Results of this inspection showed that standard signing was generally in place but that the signs might not, in many cases, be in the most desirable locations, especially for night visibility. In order to find the optimum signing and placement of signs and guide markers in the vicinity of ramp terminals, Division engineers have decided to choose a number of ramps in one of the districts for some trial installations and to start clean at these locations and put back only those things that are necessary in the light of the present thinking. They hope to come up with a clean and uncluttered look and are considering eliminating some signs and guide markers. They also intend to emphasize the on-ramp and right-way move. One method that has been suggested to accomplish this is to relocate luminaires so that they illuminate the on-ramp rather than the off-ramp. From evaluation of these test locations, especially at night, they will be able to determine what changes should be made statewide.

Researchers have also decided that they should not revamp existing ramp terminals on a large scale and at the same time keep their existing standards in force; therefore, once they have determined what the ramp terminal treatments are to be, they should first get these new standards into effect on new construction and then go back and do whatever is economically feasible toward bringing their existing ramps into conformance with the new standards.

In addition to these general improvements, treatments are being considered for ramps that are experiencing an abnormally high amount of wrong-way driving. These treatments include "cat-tracking" lane lines through ramp intersections, extension of the double yellow line of the crossing street at some types of ramp intersections, physical division of crossing street, removal of curbed islands and other geometric revisions. It is expected that these treatments, as well as new concepts resulting from research, can be applied to problem ramps and evaluations of their effectiveness can be made using the one-way counters.

In summary, general operational improvements are planned, aimed at decreasing wrong-way driving based on best engineering judgment. Since the major factors associated with this problem are alcohol, darkness, and old age and are ones over which the Division has no control, it has also initiated a program of surveillance to detect wrong-way movements. At locations of concentrations of these movements, it plans to apply methods that research and evaluation indicate may have merit.

Since the number of wrong-way accidents is small, Division representatives acknowledge that they must be on their guard against implementation of anything that might cause accidents and therefore result in a net increase in the total accident picture.