RESEARCH PAYS OFF

INFORM: Precursor to Intelligent Vehicle-Highway Systems

Moving people and goods efficiently in a congested urban environment demands a corridor traffic management system designed for better use of the existing highway facilities. Under a cooperative agreement, the New York State Department of Transportation, the Federal Highway Administration, and local Long Island governments developed INFORM (Information for Motorists), a precursor to all comprehensive intelligent vehicle-highway systems.

Problem and Solution

INFORM was conceived as a proving ground for traffic control technology as well as an operational system for addressing local needs. The system was devised in a 64-kilometer (40-mile) highway corridor on Long Island chosen for the demonstration in the early 1970s. The nearby parallel freeways were an important factor in the selection because they provide for traffic diversion when congestion occurs.

Application

The INFORM corridor contains two freeway facilities--the Long Island Expressway (Interstate 495) and the Northern State Parkway/Grand Central Parkway--and several parallel and crossing arterial streets and freeways; surface streets total 206 kilometers (128 miles). The corridor extends east from the borough of Queens in New York City, through Nassau County, and into Suffolk County.

Elements of INFORM include

- A computer-aided control facility that provides traffic monitoring control, and incident response;
- Twenty roadside citizens band radio monitors, 25 closed-circuit television cameras, and 2,400 roadway vehicle detectors that monitor traffic;
- Signals at 50 ramps that meter traffic entering freeways (Figure 1);
- Variable message signs at 80 locations

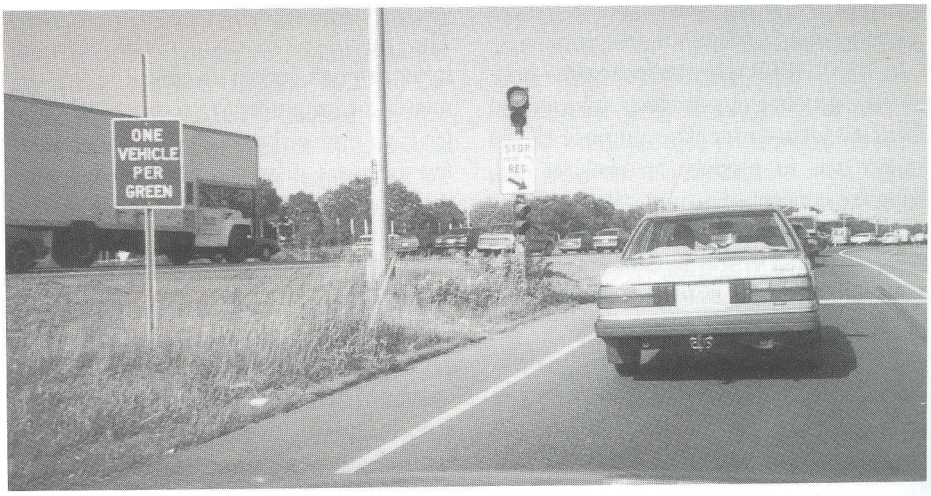

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FIGURE 1 Automobile waits at typical ramp meter on INFORM corridor.

that inform motorists about congestion and delays (Figure 2); and

- Traffic signals at 125 street intersections that operate under INFORM control.

Benefits

Data were collected recently in a time-series fashion; beginning in spring 1987, each sample in the time series represents about two weeks. In March 1990, two of the samples were actually conducted in a three-week period on alternating days of active and inactive ramp metering.

The comparison of March 1990 metering with March 1990 nonmetering demonstrates the effects of metering; the comparison of March 1990 metering with spring 1987 (before ramp metering began) shows the changes of volume and in commuting patterns caused by metering; it also shows the response to information given by variable message signs.

Variable message signs are an effective part of INFORM. Case studies of accidents and other incidents indicate that drivers do modify their routes if given consistently accurate information. The incident-related effects of variable message signs are estimated to save 300,000 vehicle hours of delay a year. Some delay savings are also due to INFORM's effects on recurring congestion, construction activity, and special events, but such savings are difficult to quantify.

Freeway speeds for the a.m. peak from March 1990 metering increased 3 to 8 percent over March 1990 nonmetering; vehicle miles of travel (VMT) either were higher or remained stable. For the p.m. peak period, speeds and VMT were nearly unchanged.

A benefit/cost analysis was performed. INFORM costs $35 million to construct and $5 million a year to operate and maintain. The analysis assumed a 10-year life for INFORM construction and a 10 percent discount rate, resulting in an annualized cost of $10 million. Benefits were computed assuming a value of $8 per vehicle hour of delay saved. Excluded from the benefits estimate were safety, time savings of using INFORM to assist during construction, and provision of information from INFORM to radio traffic reporting services. Only the weekday delay savings from the major east-west freeways were included. The resulting benefit/cost ratios were 1.8 for March 1990 metering versus March 1990 nonmetering and 8.3 for March 1990 metering versus spring 1987.

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FIGURE 2 Variable message sign shows delay information on approach to Long Island Expressway.

A public perception survey revealed that 96 percent of the residents in the corridor were aware of the variable message signs. Approximately 45 percent of drivers change routes in response to the messages. About 25 percent of drivers believe that the system is quite helpful, and 40 percent think that the system helps once in a while. Relatively few drivers indicated that it had worsened problems. Another widely recognized benefit was that INFORM keeps traffic moving smoothly.

Ramp meters--or merge lights, as they are known in the INFORM corridor--received mixed reviews from the traveling public. Approximately a fifth of drivers have no opinion on merge lights, and the rest are split evenly on whether metering is a good idea or not. The most widely perceived benefit for drivers was that metering can aid in the reduction of merge accidents. Motorist compliance with the ramp metering was measured at 96 percent.

INFORM has broken ground, but not without the pain involved in building a system of its scale. INFORM continues to change and improve: experience with this system has taught many lessons that are important to designing, constructing, and operating corridor traffic systems.

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Suggestions for "Research Pays Off" topics are welcome. Contact Crawford F. Jencks, Transportation Research Board, 2101 Constitution Avenue, N.W., Washington, D.C. 20418 (telephone 202-334-2379).