

DRIVER USE OF EN ROUTE REAL-TIME TRAVEL TIME INFORMATION

Travel Time Information to Improve Driver Decisions

Travel time is an important piece of information that can be given to motorists. Communications and display technologies now permit the provision of key travel information to drivers in real time, using changeable message signs. Travel time information has the potential to improve driver decision making, with benefits to the individual traveler and roadway system performance. Real-time travel time displays are increasingly used in the United States, and more extensive use and innovative displays are seen in other countries. Guidance does not currently exist on how to effectively provide this information, which must be useful, understandable, timely, credible, and safely used and should result in predictable effects on route choice and route diversion.

Purpose and Approach of the Project

The purpose of this project was to conduct human factors research to establish a basis for more effective provision of real-time travel time information. Such real-time travel time systems will only work well if they are designed with consideration of driver information needs and an understanding of the perceptual and cognitive aspects of motorist use of the signs. The project addressed these issues through various analytical and empirical activities. These included:

- Review of literature on travel time information and driver behavior.
- Identification of current practices and their rationale.
- Focus groups with drivers who commute along corridors with real-time travel time displays, in three cities with different signing practices and traffic system characteristics (Atlanta, Milwaukee, Seattle).
- Trip logs kept by commuters in the same three cities, documenting the driver's experience with travel time displays and with influences on route choice, confidence in decisions, and other driver perceptions and beliefs.
- A laboratory study of the comprehension and interpretation of travel time displays. The experiment systematically manipulated numerous features of the travel time displays and measured the effects in terms of how long it took to extract the relevant information from the sign, the ease of processing the information, confidence in one's knowledge of the best route, and degree of willingness to change to a different route.

Project Findings and Recommendations

Taken together, the results of the various project activities provided a number of findings regarding how drivers perceive and use travel time displays and the effects of various display features. A few of the findings are highlighted here:

- Drivers (regular commuters in particular) like having travel time displays and consider them useful and reasonably accurate. The displays help set expectations for the trip and are felt to reduce frustration.
- Despite the positive attitudes toward travel time displays, it is difficult to find substantial effects of these displays on actual route decisions. Part of the reason for this may be that because the signs are typically located on freeways, drivers often feel committed to their initial choice and (for many commutes) do not see viable options, except under extreme conditions. There is some indication that travel time displays on the *approach* to freeways might result in greater route diversion, but this practice is quite limited in the U.S. and data on its effectiveness are lacking.
- Travel time to a destination is the primary information drivers want and is what is typically provided in current practice. Alternative or additional types of information do not appear necessary or particularly helpful and may even increase the demands on the driver in processing the sign information. Such information includes average speed, distance to the destination, time estimate ranges, time stamps, time trend indicators, and color coding to indicate congestion level.
- Simple diagrammatic signs, with linear depiction of the roadway and travel times to two or three destinations, appear acceptable. More complex diagrammatic signs appear difficult to readily interpret (although familiarization or training may mitigate this).
- An effective layout is to left justify the destination and right justify the travel time. A header message (TRAVEL TIME TO) may be centered and although it is typically used, it may not be necessary.
- Travel time displays may place undesirable demands on drivers if they exceed three lines of text or six information units.

The project report provides a number of recommendations for the design of en route real-time travel time displays, based on these and additional findings. The project also identified limitations to current knowledge and pointed to areas where additional research or experimentation might help develop more effective practices, with greater influence on individual route choice.

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