Summary Report

Human Factors

The Human Factors Research Program addresses human performance-related issues that affect highway system design. Current human factors research thrusts are in the areas of Highway Safety and Intelligent Transportation Systems (ITS).

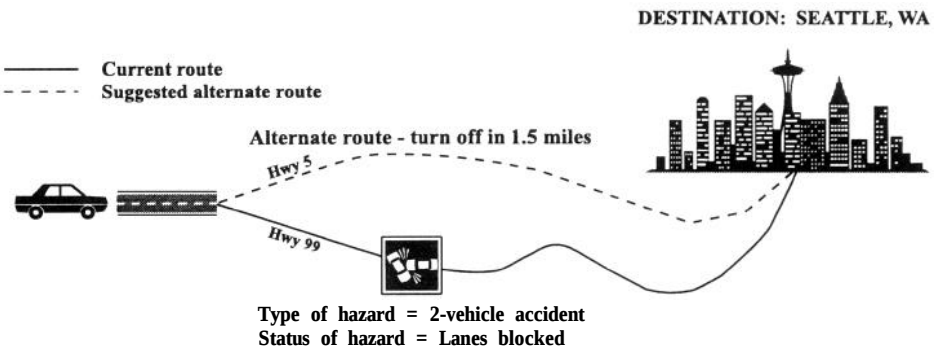
FHWA is placing special emphasis on the U.S. trend toward increasing numbers of older drivers and implications of this trend on highway safety and ITS design. Human factors research products include highway system design guidelines and handbooks based upon empirical human performance data collected in the laboratory and in controlled, on-the-road tests.

US Department of Transportation
Federal Highway Administration

Research and Development
Turner-Fairbank Highway Research Center
6300 Georgetown Pike
McLean, Virginia 22101-2296

PRESENTING HAZARD WARNING INFORMATION TO DRIVERS USING AN ADVANCED TRAVELER INFORMATION SYSTEM

Schematic Example of Presenting Immediate Hazard Warning Information



Background

Although Advanced Traveler Information System (ATIS) devices have the potential to improve travel safety, efficiency, and comfort, they represent a new frontier in ground transportation. In order to realize this potential, they must be designed in a manner consistent with the capabilities and limitations of the driving public. This summary presents some key results of a project to develop a precise and detailed set of preliminary human factors design guidelines for ATIS and Commercial Vehicle Operations (cvo) devices. A key subsystem of ATIS will be the In-Vehicle Safety Advisory and Warning Systems (IVSAWS), which will provide warnings of unsafe roadway conditions and situations affecting the driver. Some recommendations for presenting hazard warning information to drivers by means of an ATIS are presented in table 1.

What is Hazard Warning Information?

Hazard warning information may include information on the relative location of a hazard, the type of hazard, and the approach of emergency vehicles. This information may also include warning the driver of an accident immediately ahead, a stopped school bus, or other hazard in the road. Thus, this information focuses on the location and nature of specific incidents.

Table 7. Selected representations for presenting hazard warning information using as ATIS.

ATIS Information Element	Recommended Display Mode	Recommended Display Format
Location of the hazard	Visual	Iconic or graphic depiction, alone or with text description.
Type of hazard	Visual	Iconic or graphic depiction, alone or with text description.
Distance to the hazard	Auditory	Alerting tone, then speech.
Status of the hazard	Visual	Text description.
Alternate route	Visual	Iconic or graphic depiction, alone or with text description.

How Should Hazard Warning Information Be Presented to Drivers?

Reference 1 provides some general guidelines that can be used to aid in the design of hazard warning information. These guidelines are presented in table 1.

How is Hazard Warning Information Used by Drivers?

As described in reference 2, hazard warning information augments typical sources of information such as car radios, roadside signs, and passengers in the vehicle. However, limits on attention and memory will affect how much information the driver can process in a given period of time. Presenting hazard warning information through an ATIS can alert the driver more quickly and provide suggestions or route alternatives that will avoid the hazard. Hazard warning information should be designed in a manner that facilitates the driver's ability to:

Detect the warning information.

Identify the nature of the hazard.

Select an appropriate course of action.

How Will Commercial Drivers Benefit?

Hazard warning information can be especially useful to commercial drivers. The more limited maneuvering capabilities of trucks, combined with fewer routing options, make an advance warning valuable to truck drivers who need more time to respond to roadway accidents and other hazardous conditions. Emergency vehicles traveling at high speeds could also benefit from advance warning of roadway hazards. If the hazard is brought to their attention using an ATIS, commercial drivers may choose to direct their attention away from less important tasks (e.g., tuning the radio or communicating with dispatch centers) and focus on avoiding the hazard.

References

1. *Development of Human Factors Guidelines for Advanced Traveler Information Systems and Commercial Vehicle Operations Components of the Intelligent Transportation Systems: Identification of Strengths and Weaknesses of Alternative Information Display Formats,* Publication No. FHWA-RD-96-142, Federal Highway Administration, Washington, DC.

2. *Development of Human Factors Guidelines for Advanced Traveler Information Systems and Commercial Vehicle Operations Components of the Intelligent Transportation Systems: Description of ATIS/CVO Functions,* Publication No. FHWA-RD-95-201, Federal Highway Administration, Washington, DC.

For More Information

This research was conducted by the Batelle Human Factors Transportation Center Seattle, Washington. The FHWA contact is Joseph Moyer, Engineering Research Psychologist, HSR-30, ***703-285 2008.***

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