Project Summary

Texas Department of Transportation

0-4962: Development of Guidelines for Hurricane Evacuation Signing and Markings

Background

Over time, Texas has experienced numerous hurricanes that caused significant damage and loss of life. Even prior to the historic 2004 hurricane season, in which four hurricanes struck Florida, the State of Texas had developed hurricane evacuation routes and various tools necessary for enhancing evacuation efforts from its coastal communities.

In addition to the development of guidelines for hurricane evacuation signing and markings, the Texas Department of Transportation (TxDOT) directed this research project to include development of traffic operations recommendations for hurricane evacuation. At about the time that Hurricane Katrina struck Louisiana on August 29, 2005, the researchers produced *Recommended Practices for Hurricane Evacuation Traffic Operations*. The remarkable 2005 hurricane season prompted additional issues to be addressed within this research project.

What the Researchers Did

The researchers conducted focus groups in four Texas coastal communities among people who had attempted to evacuate from a hurricane. Researchers inquired about motorists' understanding of hurricane evacuation route signs and pavement markings, use of high-occupancy vehicle lanes and shoulders during evacuations, contraflow operations, and motorists' information needs during evacuation and re-entry. Subsequently, researchers used focus group findings to develop a human factors study to determine the most appropriate type and application of hurricane evacuation signs, pavement markings, and dynamic message sign (DMS) messages to use in Texas coastal areas.

Researchers also contacted transportation representatives in southeastern states including Texas to identify recommended practices for hurricane evacuation traffic operations, evacuation-related intelligent transportation systems (ITS) deployment, signal operations, and ideas for reducing evacuation field staffing. Researchers assessed evacuation traffic data needs for evacuation after-action review, analyzed the applicability of Houston's Beltway 8 East as a possible evacuation route, analyzed contraflow congestion points at various Texas locations, and developed contraflow brochures for the public.

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What They Found

Numerous findings emerged from the broad nature of this research. An example finding is that the public is largely unfamiliar with the term "contraflow" in the context of DMS messages. Additionally, hurricane evacuation route overhead signs with the text banner at the top and the hurricane evacuation symbol (as illustrated in sign 1) are comprehended by a larger portion of motorists than overhead signs with only the text banner (as illustrated in sign 2). Nevertheless, either of the two signs just mentioned is comprehended by a significantly greater portion of motorists than an overhead sign with only the hurricane evacuation symbol and no text banner.

Other findings include more than 100 recommendations in *Recommended Practices for Hurricane Evacuation Traffic Operations*. In addition to the recommended practices outlined in that document, the research produced *Guidelines for Hurricane Evacuation Signing and Markings* and a technical report. The technical report includes additional evacuation-related recommendations regarding the deployment of ITS devices, the use of DMS messages just prior to a hurricane evacuation, techniques for minimizing field staffing levels, and a proposed data collection program for hurricane evacuation routes.

Sign 1. Overhead Sign Showing Text Banner with Hurricane Evacuation Symbol.

Sign 2. Overhead Sign Showing Text Banner Only

What This Means

The state of Texas and TxDOT are better prepared for hurricane evacuation than in 2005. The research in this project contributed to the improved level of preparedness and provided recommendations for implementing further improvements. TxDOT has gained new ideas from among the recommended practices for hurricane evacuation traffic operations.

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