UTC Spotlight
University Transportation Centers Program
November 2009
This month: Iowa State University's Midwest Transportation Consortium


Chip Moore

This monthly report from the University Transportation Centers Program highlights some of the recent accomplishments and products from one of the University Transportation Centers (UTCs). The UTC Program is administered by the U.S. Department of Transportation's Research and Innovative Technology Administration.

U.S. Department of Transportation
Research and Innovative Technology Administration

usRAP: A New Tool for Road Safety Management

Roadway crashes are a leading cause of death in the United States. Yet, little information on crash risks is readily available to travelers and highway planners. Raising public awareness of these risks is one of the primary objectives of the U.S. Road Assessment Program (usRAP) pilot program, initiated in 2004 by the American Automobile Association Foundation for Traffic Safety (AAAFTS).

The objectives of the usRAP pilot program are to assess crash risk on U.S. roads and provide that information to the public and to highway agencies in accessible formats. Crash-risk information can help roadway users make informed driving decisions and help agencies make strategic decisions about route standards and roadway improvements and countermeasures. The overall goal of usRAP is to reduce fatal and serious-injury crashes in the United States.

Overview of usRAP

Eight states—Florida, Illinois, Iowa, Kentucky, Michigan, New Jersey, New Mexico, and Utah—are participating in the pilot program.

Midwest Research Institute (MRI) in Kansas City, MO, is the lead organization. MRI acts as liaison to participating state highway agencies, develops program methodologies, collects crash data and other road safety-related data from state agencies, and addresses related organizational issues.

The Midwest Transportation Consortium (MTC) at Iowa State University, a University Transportation Center Tier One center, is a technical partner to MRI in the usRAP work for AAAFTS. Iowa State University's role in the project focuses on mapping crash and other safety data from the pilot states in various formats, using data integration, geospatial analysis, and MRI-developed rating systems. Three protocols are being conducted in the participating states:

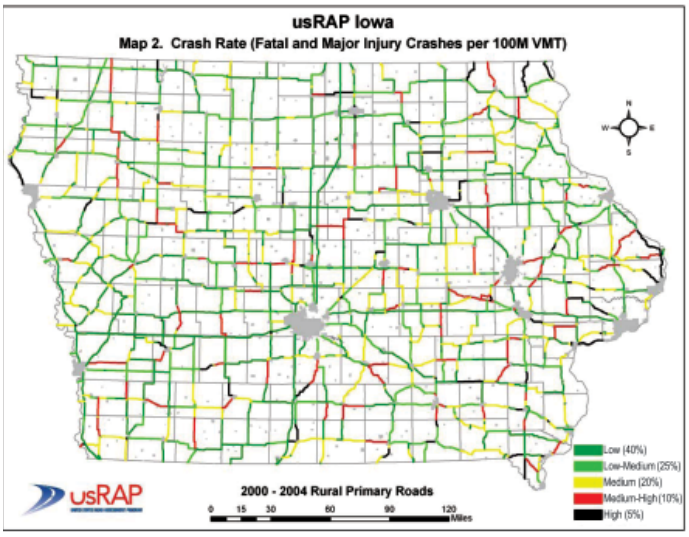
- Creation of roadway risk maps
- Development of roadway star ratings maps
- Performance tracking

Risk Maps

Based on crash history data, risk maps identify the locations of greatest crash risk on roadway segments. One type of risk map cannot tell the entire story, so usRAP has developed four types with differing risk measures:

Map 1: Crash density
Map 2: Crash rate
Map 3: Crash rate ratio
Map 4: Potential crash savings

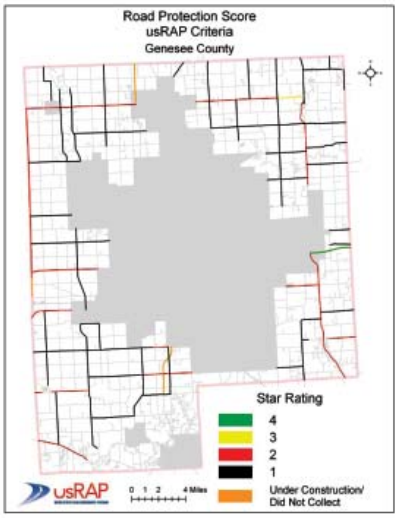
Using several years of crash data provided by state and local road agency crash databases, Iowa State University has created risk maps for all eight pilot states.



Example of Risk Map 2 Using State-Specific Risk Categories (Percentages Listed Refer to Roadway Length)

Star Rating Maps

When state or local-jurisdiction crash data are not available or adequate for creating risk maps, potential improvement locations can be identified by rating roads based on specific roadway design and traffic control features related to safety.



Example of Star Rating Map for Genesee County, Michigan

These "star ratings" are generated by a computer program that correlates relevant design features with crash risk, using a database developed by trained usRAP technicians working off of video logs. MTC students have been trained as usRAP technicians and performed much of this work. Star ratings are then mapped and can be used to develop safety improvement programs. So far, Iowa State University has developed star rating maps for selected highways in two states.

This project provides an optimum educational experience for MTC students. While learning about the relationship between roadway design and safety, students complement their coursework and gain professional skills like time management, quality control, and balancing product quality with cost considerations. They also experience working as part of a professional team, giving and receiving feedback in the map development process.

Future of the Project

Phase III of the project is currently wrapping up. This phase includes creating risk maps for four additional pilot states, updating information for the previous pilot states, testing star rating maps in Iowa and Michigan, and conducting performance tracking, or monitoring changes in road safety performance over time and as safety improvements are made.

Additional states are considering joining the program.

Project sponsors and partners are considering ways to implement the maps so that both highway agencies and roadway users can have convenient access to the maps and can experience the potential benefits.

Potential Benefits and Applications

AAAFTS sees many potential benefits to and applications for the usRAP risk maps and star rating maps. State agencies could use risk maps to identify the 5 percent of roadways with the most severe safety needs and to identify roadways that are eligible for road improvement programs. And, states could use the usRAP performance benchmarks to satisfy future congressional requirements for accountability and transparency expected to be in the next Highway Bill.

Motorists could use the geographic information about risk locations to plan traveling routes. When traveling on roadways associated with various kinds of possible risks, motorists could drive with heightened awareness of roadway features and other drivers' behavior.

The common availability of these maps to highway agencies, the public, auto clubs, etc., could help start a national dialogue that may lead to more investment in road safety.

About This Project

Dr. Shauna Hallmark (shallmar@iastate.edu) is the director of the Midwest Transportation Consortium (MTC) at Iowa State University (ISU). Dr. Reginald Souleyrette, professor in the Department of Civil, Construction, and Environmental Engineering at ISU, is principal investigator for the MTC on the usRAP team. More information about the project can be found on the usRAP website, www.usrap.us/home/. More information about AAAFTS's work to improve highway safety, including its leadership in usRAP, can be found on its website, www.aaafoundation.org/home/.

The usRAP pilot program is modeled after European and Australian initiatives, EuroRAP and AusRAP, respectively. Together EuroRAP, AusRAP, and usRAP have founded the International Road Assessment Program (iRAP), a non-profit organization that partners with government and non-government organizations to address global road safety. The Fédération Internationale de l'Automobile (FIA) Foundation for the Automobile and Society and iRAP have both contributed a portion of the funding for the project.

In addition to working with usRAP, students at the Midwest Transportation Consortium have been instrumental in creating star ratings maps for iRAP countries in Latin America. For more information about iRAP, see www.irap.net/home-page.aspx.