



AUDITS SCRUTINIZE ROADWAYS FOR SAFETY ISSUES

In 2005, nearly 3 million people were injured and some 43,200 were killed on U.S. roadways. That means there were 117 traffic fatalities every day on average. There are economic implications as well — a “societal cost” of \$230 billion annually or \$630 million daily, according to the Federal Highway Administration. One of the numerous initiatives to reduce crash rates is FHWA’s promotion of road safety audits.

WHAT IS AN RSA?

An RSA is a formal examination of the safety performance of a roadway or intersection by an independent, multidisciplinary team of transportation professionals. RSAs are a comprehensive and effective tool for proactively improving road safety while a facility is still in the planning or design stage, or for identifying and mitigating safety issues on existing roadways.

Many state DOTs have shown increased safety resulting from the process. “The road safety audit process looks at the roadway from a purely technical safety viewpoint without outside influences,” says the district engineer with the Mississippi DOT.

In short, RSAs can make safe roads even safer.

The basics

Most DOTs have established traditional safety review processes through their high-hazard identification and correction programs. However, an RSA and a traditional safety review are different processes.

ROAD SAFETY REVIEWS VS. ROAD SAFETY AUDITS

Traditional safety reviews RSAs

Generally, an RSA involves more people from more disciplines who are looking only at the issue of safety and have not been involved in the project’s design or implementation. This approach allows for greater objectivity and a fuller report on a roadway’s safety problems.

RSAs help produce designs that may reduce the number and severity of crashes, promote awareness of safe design practices, and reduce costs by implementing safety issues and correcting them before projects are built. Highway authorities formally respond to the suggestions of the RSA team and either implement them or document the reasons for not doing so.

The keys to success in implementing an RSA program are top-level agency support, willingness to incorporate findings and willingness to investigate new ideas outside the traditional scope of work.



Table 1. Road Safety Reviews Versus Road Safety Audits

Traditional Safety Reviews	RSAs
Performed by a safety review team that is usually not completely independent of the design team.	Performed by a team independent of the project.
Typically performed by a team with only design and/or safety experience.	Performed by a multidisciplinary team.
Often concentrate on motorized traffic.	Consider all potential road users.
Do not normally consider human-factor issues.	Account for road user capabilities and limitations as essential elements of an audit.
Often do not generate a formal report.	Always involve generating a formal RSA report.
Often do not generate a formal response report.	Always include a formal response report.

Table 2. Steps in an RSA Process

Step	Process	Team
1	Identify project or existing road to be audited.	Design Team/Project Owner
2	Select interdisciplinary audit team.	Design Team/Project Owner
3	Conduct a pre-audit meeting to review project information and drawings.	Audit Team/Design Team/Project Owner
4	Perform field reviews under various conditions.	Audit Team
5	Conduct audit analysis and prepare report of findings.	Audit Team
6	Present audit findings to project owner/design team.	Audit Team/Design Team/Project Owner
7	Prepare formal response.	Design Team/Project Owner
8	Incorporate findings into the project when appropriate.	Design Team/Project Owner

Evaluation of results

Early returns on RSAs in the United States are positive. For example, the safety director for the South Carolina DOT sees a beneficial impact from the state's program.

"We view RSAs as a proactive, low-cost approach to improve safety," she says. "The RSAs helped our engineering team develop a number of solutions incorporating measures that were not originally included in projects. The very first audit conducted saved SCDOT thousands of dollars by correcting a design problem."

STEPS IN THE RSA PROCESS

SCDOT has conducted six RSAs since 2003. Their results are now available, and although department officials acknowledge that the findings are preliminary, they believe that the numbers are promising.

For example, in the RSA on State Route 14 in Greenville County nine safety improvements were suggested, and all were implemented. Fatalities on the highway were reduced by 60 percent from 2003 to 2004, avoiding more than \$3.6 million in estimated potential economic losses.

In practice

In late 2004, FHWA's Office of Safety initiated a series of 10 RSAs to show the variety of applications in different parts of the country, on different roads and intersections, and at different stages of the project development process.

The full report containing summaries of RSAs conducted by the Oklahoma DOT; Clark County, Washington DOT; the city of Cincinnati, Ohio's transportation department; the Sioux Tribe transportation department in North Carolina and South Carolina; plus those listed below can be found on FHWA's Web site at <http://safety.fhwa.dot.gov/rsa>.

Illinois: The state DOT uses RSAs as a tool to look at locations that have had a history of severe crashes and to identify safety issues and potential low-cost countermeasures.



Road Safety Audit team observing traffic on a rural highway

Findings from the RSAs include signage issues, existence of vulnerable users (pedestrians and bicyclists), turning radius issues, signal displays out of alignment, clear-zone violations, exposed culverts and openings in guardrails.

IDOT has hosted three RSA training courses taught by FHWA and plans to host one in each of the state's districts.

Yellowstone National Park: Currently, traffic conflicts occur between pedestrians and vehicles after each eruption of the Old Faithful geyser. Short-term mitigation measures identified during a recent RSA include changing the traffic flow to reduce post-eruption conflicts, developing signage plans and providing a shoulder plus exclusive merge/diverge lanes at an overpass.

Longer-term remedies suggested include using roundabouts, considering older-driver needs, maintaining emergency response and government access routes, and matching road design with speed.

Wisconsin: In late 2003, an RSA on the Marquette Interchange (interstates 43, 94 and 794) was the first done on a megaproject in the United States.



An intersection in Grand Rapids, Michigan, before and after an RSA suggested improvements.

The RSA team was limited in what it could feasibly review given the volume of documentation associated with the \$800-million project, its advanced design stage, the completion of the public involvement process, and the limited time available for the RSA.

Nevertheless, the team identified six categories of safety issues, ranging from location-specific to general project conditions for WisDOT to consider. Suggestions included revising advance signage for a specific ramp, adding flexible delineators or lengthening concrete barriers to reduce the chance of inappropriate exiting maneuvers, improving pavement markings at various locations, and conducting additional micro-simulation modeling.

Pedestrian guidelines

Nearly all transportation projects today contain some pedestrian elements. Accordingly, FHWA has developed a report, *Pedestrian Road Safety Audit Guidelines*, and a companion, *Pedestrian Road Safety Audit Prompt List*, that can be used together during the RSA process. Available in 2007, they contain detailed information on issues that audit teams should address.

Instead of checks to verify that minimum standards are being met, the prompt list will assist auditors in looking for potential issues such as those not addressed by vehicle-oriented standards.

The guidelines will parallel the prompt list and will provide a more detailed explanation of potential issues. Photographs illustrate good and poor designs.

Instead of focusing exclusively on pedestrian needs and issues, the guidelines and prompt list look at how pedestrians and other transportation modes interact.

For example:

- Are left-turning drivers so focused on finding an opening in congested traffic that they may neglect to look for crossing pedestrians?
- Do larger corner radii, which make it easier to turn a corner without slowing down, encourage higher speeds?

Resources

FHWA offers two RSA training courses for transportation professionals in state and local agencies and tribal governments. The first is a two-day course available through the National Highway Institute, called "Road Safety Audits and Road Safety Audit Reviews," FHWA-NHI-380069. Information on course scheduling can be found on-line at www.nhi.fhwa.dot.gov.

The second course, "RSA for Locals," is geared toward local agencies, tribal governments and federal land management agencies. This course is free and can be presented in one-day and two-day formats, with the longer course including information on low-cost safety improvements and a field exercise RSA. (For more on the "RSA for Locals" course, see contact information at the end of this article.)

Because technical or procedural questions often arise before and during an RSA, FHWA has established the RSA Peer-to-Peer (P2P) program to provide assistance, at no cost, to agencies either considering the use of or actually conducting RSAs. A state, local or tribal agency may request assistance either by e-mail at SafetyP2P2fhwa.dot.gov or by calling the toll-free number 866-P2P-FHWA and talking with the FHWA-sponsored P2P coordinator.



The coordinator will match the agency with a knowledgeable transportation professional. The matched peer then will contact the agency to work out the details of the assistance, which may include a site visit.

More information, or to schedule the "RSA for Locals" course

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For additional information, contact the Nevada T2 Center at the address shown below.

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