

SAFETY AUDIT

GOAL

Improve roadway safety through review by an independent audit team.

CREDIT REQUIREMENTS

Conduct a road safety audit (RSA) on the project roadway in accordance with the procedures set forth in FHWA's *Road Safety Audit Guidelines*. The *Guidelines* define three general phases of a project during which a RSA may be conducted.

1 point is awarded for each RSA conducted up to a maximum of **2 points**.

1. **Preconstruction phase RSA.** Performed before construction begins. Recommended changes are generally less costly and result in less delay.
2. **Construction phase RSA.** Performed during preparations construction. They allow the roadway to be viewed as built and offer a last chance to assess safety before it is opened to the public.
3. **Post-construction phase RSA.** Performed on existing roads to identify road safety issues for different road users.

Note: For a given roadway project, it is likely that preconstruction and construction phase RSAs are appropriate. A post-construction phase RSA in addition to these two RSAs would typically be redundant and is therefore not advisable. See the "Examples" section for situations where a post-construction phase RSA may be appropriate.

Details

The FHWA *RSA Guidelines* are available at:

- <http://safety.fhwa.dot.gov/rsa/guidelines>.

Many owner agencies already have safety audit programs that meet RSA guidelines, but the programs may be called other names. Such a program must meet the intent of an RSA as defined in the FHWA's *Road Safety Audit Guidelines*. Specifically, the RSA must involve a review by an independent team and focus solely on safety.

DOCUMENTATION

- Submit a copy of the "RSA report" and "formal response" as defined in the FHWA's *Road Safety Audit Guidelines* (2006) for each RSA.

OR

- For agencies with existing safety audit programs, provide a letter, signed by the agency representative for the project, stating that the existing agency program meets or exceeds the requirements defined in the FHWA's *Road Safety Audit Guidelines* (2006). Submit a copy of agency program documents that meet the criteria defined in FHWA's guidelines as noted above.



AE-1

1-2 POINTS

RELATED CREDITS

- ✓ PR-1 Environmental Review Process
- ✓ AE-3 Context Sensitive Solutions

SUSTAINABILITY COMPONENTS

- ✓ Equity
- ✓ Expectations

BENEFITS

- ✓ Improves Human Health & Safety

APPROACHES & STRATEGIES

- Follow advice given by the FHWA Publication No. FHWA-SA-06-06, available at: http://safety.fhwa.dot.gov/rsa/guidelines/documents/FHWA_SA_06_06.pdf.
- Refer to the recommendations in the FHWA's *Road Safety Audit Guidelines* (Chapter 2) for introducing RSAs into an organization as an internal program. These recommendations note that effective and successful RSAs require a management commitment, an agreed-upon policy, informed project managers, an ongoing training program, and skilled auditors (FHWA, 2006).

Example: Hypothetical Case Study

A 2-inch overlay is scheduled for 20 lane-miles of a 2-lane rural road. A pre-construction RSA is conducted and makes recommendations on moving warning signs to better locations and installing a rumble strip along the centerline. The overlay project adopts these recommendations and includes them in the project. The project would receive 1 point for the pre-construction RSA. A construction phase RSA could be conducted to achieve another point however the project team did not see benefit in this and elected not to conduct one.

Example: When to Consider a Post-Construction RSA

A post-construction RSA could be useful in the following situations:

1. An owner agency undertakes a roadway project on a section of road that previously had a RSA conducted on it as an existing facility. This RSA would provide input into the planning and design phase of the project and make the pre-construction RSA redundant.
2. An owner agency is inventorying all *Greenroads* points it can obtain for a given network rather than using *Greenroads* to certify an individual project it might be able to improve its network score by including the RSAs it has conducted on existing facilities.
3. An owner agency desires a list of modifications that could result in future safety issue changes.

Examples: FHWA Case Studies

For further examples, the FHWA's *Road Safety Audit Guidelines* contains six RSA case studies.

POTENTIAL ISSUES

1. RSA use when it is not part of a formal agency policy may seem arbitrary and RSA execution may be cumbersome.
2. The RSA process as described in the FHWA's *Road Safety Audit Guidelines* (2006) allows a design team to essentially disagree with all audit recommendations. Therefore, it is possible, if not likely, that no recommendations are implemented and the roadway's overall safety does not benefit from the RSA.

RESEARCH

Roadway crashes and their resultant injuries and costs have an immense impact on society. Each year highway crashes in the U.S. injure 3 million, kill 43,000 and cost over \$230 billion (Wilson and Lipinski, 2004). Generally, society views these deaths, injuries and costs as avoidable and has placed a high premium on reducing their number and severity. Three examples of this viewpoint follow:

- "...the toll of deaths and injuries on our roadways is among the most compelling public health issues of our time." (AASHTO, 2007)
- "...road traffic injuries (pose) a global public health crisis requiring urgent national and international action." (United Nations, 2008)
- "Safety is our top priority..." (acting FHWA administrator Jim Ray in *Roads Can be Safer...*, 2008)

Most of this section provides a summary of road safety audits from two main documents:

- *NCHRP Synthesis 336: Road Safety Audits* (2004), which summarizes RSA processes and their current usage in the U.S. and worldwide.
- *Road Safety Audit Guidelines* (2006) from the Federal Highway Administration, which provides guidance for agencies to draw upon when developing RSA policies and procedures.

Roadway Safety Audits

One method that has shown promise in improving roadway safety is what is commonly referred to as a Road Safety Audit (RSA). “An RSA is a formal safety performance examination of an existing or future road or intersection by an independent audit team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users” (FHWA, 2006). RSAs are generally thought of as an additional tool to improve safety rather than a replacement for other established practices such as safety impact studies, modeling, safety impact studies and safety compliance reviews (FHWA, 2006).

Applicable Project Types

RSAs can be beneficial to all types of projects. The FHWA (2006) specifically mentions the following types of projects and benefits:

- **Capital improvement projects.** RSAs can provide significant safety benefits in the design process.
- **Rehabilitation projects.** The scope and funding of such projects makes incorporating RSA recommendations often achievable with only minor changes in overall design.
- **Surface improvement projects.** Have the greatest potential to benefit from RSAs. Often low-cost, high-impact solutions can be identified and implemented.
- **Bridge reconstruction projects.** All projects, but especially broadly scoped ones, can be successful in incorporating major safety improvements recommended by an RSA.
- **Safety projects.** These may only use reactive techniques in identifying hazards and could benefit from the proactive nature of RSAs.
- **Developer-led projects.** Generally, they are candidates by no specific evidence is offered.

When to Conduct an RSA

RSAs are generally conducted at one or more points in the project timeline:

- **Preconstruction phase RSA.** Performed before construction begins. Recommended changes are generally less costly and result in less delay.
- **Construction phase RSA.** Performed during preparations construction. They allow the roadway to be viewed as built and offer a last chance to assess safety before it is opened to the public.
- **Post-construction phase RSA.** Performed on existing roads to identify road safety issues for different road users. Performing a RSA at this stage may be the most beneficial for future projects as changes after construction can be costly.

RSAs can impact project schedule but the impact depends on their recommendations and how they are addressed.

Safety Benefits

Both U.S. and international evidence suggests that RSAs are low-cost and can provide substantial, measurable benefits. Benefits generally come from reducing reconstruction costs associated with safety deficiencies, reducing life-cycle costs, reducing societal costs associated with collisions and reducing liability claims. Some specific examples are (Wilson and Lipinski, 2004; FHWA, 2006):

- A UK study analyzed crash data from 19 audited and 19 non-audited sites. It found a casualty savings of 1.25 per year (fatal crash rates dropped from 2.08 to 0.83 per year) for the audited sites and only 0.26 per year (fatal crash rates dropped from 2.6 to 2.34 per year) for the non-audited sites.
- A UK study analyzed 22 audited trunk road sites and placed the average savings per site at £11,373 per site.

- Austroads described 9 audited design-state sites that reported 250 findings with benefit/cost ratios between 3:1 and 242:1.
- The New York Department of Transportation reports a 20-40% reduction in crashes at more than 300 high-crash locations that had received safety improvements recommended by RSAs.
- Early South Carolina Department of Transportation results (at the 1-year point) showed decreased crashes and economic savings. One site implementing 4 of 8 recommendations showed a 12.5% decrease in crashes with a savings of \$40,000, a second site had a 15.8% increase in crashes when only 2 of 13 recommendations were implemented, a third site that implemented all 9 recommendations saw a 60% reduction in fatalities resulting in a \$3.66 million savings, and a fourth site that implemented 25 of 37 recommendations had a 23.4% reduction in crashes and a savings of \$147,000.

Costs & Legal Considerations

Generally RSAs cost between \$1,000 and \$8,000 (Wilson and Lipinski, 2004), which usually represents a small fraction of engineering design costs. Therefore, analyses that calculate rate of return generally give values of over 100%. This is especially true when even one life saved is attributed to the RSA. In practice, however, it is difficult to attribute saving a life to any one audit, recommendation or action.

The FHWA (2006) mentions that some agencies have been reluctant to conduct RSAs due to a fear that reports will be used against them in tort liability lawsuits. In states where training on RSAs was conducted local legal staffs gave a common message: RSAs are a positive approach and do not increase the agency's liability and, in fact, help in the defense of tort liability (Wilson and Lipinski, 2004).

GLOSSARY

FHWA	Federal Highway Administration
RSA	Road safety audit

REFERENCES

- American Association of State Highway and Transportation Officials (AASHTO). (2007). *Transportation: Invest in Our Future*. AASHTO, Washington, DC. Available at http://www.transportation1.org/tif5report/safer_america.html
- Federal Highway Administration (FHWA). (2006). *Road Safety Audit Guidelines*. Publication No. FHWA-SA-06-06. FHWA, U.S. Department of Transportation. Available at <http://safety.fhwa.dot.gov/index.cfm>.
- United Nations. (2008). *General Assembly Adopts Resolution on Easing Global Road Safety Crisis*. GA/10694. Sixty-second General Assembly, Plenary, 87th meeting (AM).
- U.S. Department of Transportation Office of Public Affairs. *Press release: Roads Can Be Safer, Top Federal Highway Official Says*. (2008). Available at <http://www.fhwa.dot.gov/pressroom/fhwa0816.htm>.
- Wilson, E.M. and Lipinski, M.E. (2004). *NCHRP Synthesis 336: Road Safety Audits*. Transportation Research Board, Washington, D.C.