

Safety and Operational Effects of Geometric Design Features for Two Lane Rural Highways Workshop

Problem: Safety considerations have often not been included in the design of highway projects.

Based on a focus group study, NCHRP 362 identified safety as the most important transportation concern. Yet, there is little understanding by engineers of the safety outcomes of choices in geometric design parameters.

Putting it in Perspective

- While rural two-lane highways carry 40% of the traffic, they account for 60% of the traffic fatalities.
- Consideration of safety effects has often been omitted in project designs due to the lack of methods for quantifying the results.

Solution: Provide quantitative tools for assessing the safety performance of two-lane highway alternatives to engineers.

The NHI workshop, Safety & Operational effects of Geometric Design Features for Two-Lane Rural Highways, provides quantitative safety assessment methods to the design process. Emphasis is on the application of safety research results to design decisions for application of the requirements and guidelines detailed in the 2001 AASHTO Green Book for curvature, lane width, shoulder width, grade, and intersection. Each student receives a copy of the Safety and Operation Effects of Geometric Design Features for 2-Lane Rural Highways Workshop Manual.

The workshop includes discussion of the role and intent of design criteria, guidelines and standards along with known safety relationships from recent research for key geometric elements through a series of modules including;

- Lane and Shoulder Widths
- Roadside Safety
- Horizontal and Vertical Alignment
- Sight Distance
- Rural Intersections

The course then addresses putting the pieces together to solve operational and safety problems, and discusses advances in project development and highway safety.

What is the Substantive Safety Approach to Project Design?

Use of the actual crash performance of the geometric design choices rather than relying on design standards alone.

What are the advantages of Substantive Safety Approach to Geometric Design?

The advantage of the Substantive Safety approach is the ability to have a quantitative assessment of the safety of design alternatives before they are built rather than after. The emphasis is on the application of safety research results to design decisions for application of the requirements and guidelines detailed in the 2001 AASHTO Green Book for curvature, lane width, shoulder width, grade and intersection.

Successful Applications: States' Results Demonstrate Success

Several States have adopted the Substantive Safety approach to quantify safety of alternative designs in their design process:

Iowa

The Iowa Department of Transportation (DOT) has fully implemented the Substantive Safety Approach to project design by training all of the design engineering staff of their districts in a series of training workshops. Adoption of this new approach to difficult two-lane highway projects has allowed difficult high estimated cost projects to be adequately addressed in a reasonable cost context.

New York, Minnesota, Illinois, and Federal Lands

Project engineers of the state DOT's as well as engineers from local agencies have been trained in the quantitative methods to assess the safety of alternative designs and are implementing this new substantive safety approach in their projects.

Colorado, New Mexico, Wisconsin, Nebraska, Indiana, and Georgia

These state DOT's have conducted training workshops and are in the process of implementing the new substantive safety approach in their projects.

New Hampshire, Maine, Colorado, Virginia and Georgia

These state DOT's have scheduled the Safety and Operational Effects of Geometric Design Features for Two Lane Rural Highways Workshop for the spring and summer of 2004.

Benefits

- Provides a process to quantitatively assess the safety of the no-build option
- May reduce project cost in lieu of full Green Book nominal design
- Provides a means to quantify the safety implications of Context Sensitive Solutions issues of reduced geometric values
- Provides safety outcome information to respond to the public regarding the design of a project

Additional Resources

To learn more, visit the NHI catalog at:
www.nhi.fhwa.dot.gov/coursesec.asp
(Course Number 3800070A.)

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