

New design specs for support structures

Bracing winds, vibrations from passing trucks, and fatigue damage all impact the structures that support highway signs, luminaires, and traffic signals. State DOTs look to AASHTO's standard specifications for guidance in designing and constructing structures that will withstand these challenges.

Previous NCHRP work (Project 17-10) resulted in an extensive revision of AASHTO's support structure specifications in 2001, but several technical issues still needed to be resolved. NCHRP initiated a follow-up study to address these topics, including further research on wind loading, fatigue and vibration, and foundations and anchor bolts.

The study results were published as NCHRP Report 494, *Structural Supports for Highway Signs, Luminaires, and Traffic Signals*. Several of the results have been incorporated into the AASHTO specifications, while others will be part of future code revisions.

"Report 494 addresses 10 different design issues, and provides enhancements and improvements to the current structural supports specifications," says Fouad H. Fouad, principal investigator for the project and a professor at the University of Alabama at Birmingham.

"We use all the NCHRP reports as references. When there's a question, we'll refer back to them time and time again."

Guidelines ready to implement

State DOTs are making use of the new guidelines. Gregg Fredrick, state bridge engineer at Wyoming DOT and chair of AASHTO's technical committee on support structures, says Report 494 produced specific, practical guidelines that AASHTO and the states have readily implemented.

"One very useful aspect of the research was the explanation of the differences in the wind speed maps and the resulting design loads," Fredrick says. "This helped many states understand the differences between the proposed wind loads on support structures compared to those of the previous design specification."

Detailed guidance

Report 494 has also allowed state DOTs to build on the guidance in the current AASHTO specifications. For example, California DOT turned to the report's guidance on anchor bolt design for help in testing a new design method, says Stan Johnson, senior technical specialist for signs and overhead structures.

"Design of anchor bolt connections to concrete is not well covered by the current AASHTO code," Johnson says, "so we have experimented with the design provisions in Report 494 for these connections."

Florida DOT has used Report 494 in implementing fatigue-related aspects of the revised AASHTO specifications, says Andre Pavlov, assistant state bridge engineer.

"We use all the NCHRP reports as references," Pavlov says. "When there's a question, we'll refer back to them time and time again."

Looking ahead

Beyond its value in addressing current design



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challenges, Report 494 is helping state DOTs keep an eye toward the future.

"We use Report 494 to help us stay up to speed with future changes that may be coming in the code," Johnson says. "It lets us plan ahead by researching how potential developments in the future might affect us."

As design specifications evolve, Report 494 promises to be influential for years to come. Loren Risch of Kansas DOT, vice chair of the AASHTO technical committee on support structures, says the research that went into Report 494 will be key when NCHRP initiates a project to develop AASHTO Load and Resistance Factor Design specifications for support structures.

"When they start developing the new LRFD specification, Report 494 is going to be very important work," Risch says.

NCHRP Report 494 is available online at http://www.trb.org/news/blurb_detail.asp?id=1550, and may be purchased from the TRB Bookstore at <http://www.trb.org/bookstore/>.



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ACKNOWLEDGEMENT OF SPONSORSHIP Work was sponsored by the American Association of State Highway and Transportation Officials, in cooperation with the Federal Highway Administration, and was conducted in the National Cooperative Highway Research Program, which is administered by the Transportation Research Board of the National Academies.

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