Panel Overview

Assuring Bridge Safety and Serviceability (ABSS)

I. Background

U.S. engineers are in need of new, advanced tools and protocols to better assess and assure safety and serviceability of highway bridges. These tools include an overall, integrated approach to bridge analysis, design, evaluation and load carrying capacity (load rating). Present-day design specifications (LRFD) have assured safety by analyzing the effect of heavy, legal trucks throughout the United States, and applying calibration protocol utilizing limited Canadian site statistics. However, the calibration did not include serviceability calibration to assure bridge serviceability and performance, and it did not utilize comprehensive statistics available in the U.S. Therefore, it is desirable to identify design practices, design truck assessments, and detailed code calibration procedures utilized in other countries to assure the safety and serviceability of newly design bridges.

Further, the new AASHTO Manual for Bridge Evaluation was developed to assist bridge owners by establishing inspection, evaluation, load rating and posting practices and procedures. The Load and Resistance Factor (LRFR) load rating section of the manual is based on reliability theories to assure a certain level of safety for members and systems against truck traffic. However, certain serviceability checks were left optional as they are perceived to restrict the movement of goods. It is unclear as to whether or not making these checks optional would have an effect of the service life of the aging U.S. bridge infrastructure. Therefore, it is desirable to identify evaluation (load carrying assessment) practices and quantify the required level of safety and performance utilized in other countries to avoid failures, serviceability concerns, unnecessary expenditures and traffic restrictions.

Finally, knowledge and software have evolved to enable moving away from girder-by-girder approximate procedures to a system analysis utilizing advanced finite elements analyses. However, current U.S. specifications and practice still rely heavily on simplified, approximate analyses to determine the structural effects of vehicular loading on bridge girders. Problems contributing to impeding the utilization of advanced analysis in design and evaluation include the lack of software, lack of training, lack of specifications, complexity, and perceived high cost-to-benefit ratio. A growing number of bridge owners and experienced engineers in the U.S. are seeking to expand and mainstream the use of more rigorous design and evaluation approaches in everyday practice for both simple and complex bridges to achieve more economical use of materials, better understand the structural reliability, and assure the traveling public a quantifiable level of safety and serviceability.

II. Panel Purpose and Scope

The purpose of the scan is to identify best practices and processes for consideration by U.S. engineers to put these approaches into practice in the U.S. A comprehensive list of technical and operational process questions have been generated by the team and include topics on Safety and Serviceability concerns and the use of Refined Analysis during the design, construction and operational phases of a bridge's life. The panel will assemble answers to these questions by visiting host countries and participating in roundtable discussions.

III. Panel Sponsorship and Composition: The Panel is co-sponsored by the American Association of State Highway and Transportation Officials (AASHTO); the U.S. Federal Highway Administration (FHWA), an agency of the U.S. Department of Transportation; and the National Cooperative Highway Research Program (NCHRP). It will be composed of representatives of the FHWA, AASHTO, academia and U.S. private sector professional associations. Biographic information on panel members will be provided to international participants in January 2009.

IV. Panel Topics of Interest: Topics of interest include:

- Safety and Serviceability – Design and Construction
- Safety and Serviceability – Operations
- Refined Analysis – Design, Construction, and Operations

Specific questions that amplify the panel's interests in the foregoing topics will be provided to international participants in January 2009.

V. Panel Itinerary: The panel is presently scheduled to be available for meetings and site visits in Finland on 1 June 2009; in Austria from 2 to 4 June 2009; in Germany on 5 June 2009; in France from 8 to 9 June 2009; and in the United Kingdom from 10 to 12 June 2009.