Proposed Spotlight Conference 2009 Transportation Infrastructure Preservation and Management

The physical infrastructure of our surface transportation system – highways, bridges, pavements, signs and signals, intermodal facilities, etc., comprises the most obvious and essential components of the nation’s transportation system. In the U.S., transportation infrastructure is ubiquitous and extensive, supporting the ability to go anywhere and ship anywhere. The transportation system and its infrastructure play a critical role in supporting our economy, the welfare of our society, and the security of the nation.

Because of the extent of our transportation system, and the relative rarity of its major failures, it is easy for citizens and their leaders to take this system for granted. But surface transportation infrastructure clearly requires regular care and feeding – careful monitoring, planning, and management; continuing reinvestment to maintain condition and assure performance, safety, and security; capacity expansion, the addition of new connections and services; and the adoption of new, more effective and efficient technologies in response to efficiency and sustainability concerns. All of these require the thoughtful deployment of money and other resources.

Today, many elements of the U.S. surface transportation infrastructure are in deteriorating condition. Facilities are aging – the oldest components of the Interstate highway system have had fifty years of use – and some are stressed more heavily than ever expected: in many locations traffic volumes have exceeded reasonable forecasts, trucks and rail cars are heavier and operate in greater numbers than ever before, and control systems have outlived their functional lives. Many elements of the infrastructure are crumbling, subject to weight restrictions, and supported by shoring intended to be only temporary. The most dangerous of the deterioration is invisible and unsuspected. The burdens of preservation and rehabilitation are growing at a time when revenues from user fees are rising only slowly, and the costs of energy and materials are increasing rapidly.

The problems of surface transportation infrastructure are not exclusively in the hands of government. Private infrastructure is a key component of the nation’s transportation system, and there are obvious and important interconnections between public and private systems. This is especially evident for freight transportation, where mode choice options may exist that offer different – sometimes better – social, economic and environmental outcomes, thus calling for an integrated, systems view of surface transportation networks and facilities. In addition to these important interconnections, there are expanding opportunities for private investors to acquire franchises to build and operate large-scale public-use transportation infrastructure, presenting a new source of revenue as well as new challenges in contracting and performance and condition monitoring.

In this context there is a need for responsive and effective methods and technologies to monitor, preserve, protect and manage surface transportation infrastructure. These
include better ways to gather and organize data to produce useful information for decision support, advanced materials and technologies, and new resources to preserve this system. Many researchers in academia, industry and government are working on issues related to the preservation and management of transportation infrastructure. This spotlight conference will bring together these researchers to share progress and products and to identify, discuss and prioritize research needs for surface transportation system preservation and management. The conference will encompass a broad range of topics, but all presentations will focus on some aspect of surface transportation infrastructure preservation. Possible topic areas include the following:

- Infrastructure condition assessment, including technologies for intelligent structure health monitoring, remote, automated sensing and reporting, and advanced models of infrastructure deterioration processes.
- New materials and methods for preservation, restoration, and construction of transportation infrastructure.
- Methods to identify and secure critical transportation infrastructure components.
- Infrastructure preservation decision support tools, including transportation infrastructure asset management methods, tools to measure costs and benefits of infrastructure preservation, and models to predict the demands for transportation infrastructure capacity, reliability, and redundancy.
- Approaches to financing surface transportation infrastructure, including tolling, and privatization to bring private resources to bear on public infrastructure needs.

Scene-setting key note talks can be invited from senior representatives of the U.S. Department of Transportation (e.g., Federal Highway Administration or Federal Transit Administration), AASHTO, major railroads, and/or managers of large ports or intermodal terminals.

Breakout groups can assess progress in broadly-defined areas (e.g., the topic categories suggested above for presentations) and recommend where the next increment of research would be likely to produce high payoffs.