FHWA Long-Term Bridge Performance Program

With the passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU), the Federal Highway Administration (FHWA) Office of Infrastructure, Research and Development (R&D), initiated the Long-Term Bridge Performance Program (LTBPP). Dr. Hamid Ghasemi of FHWA is the LTBPP Program Manager.

The LTBPP is an ambitious 20+ year research effort that is strategic in nature with specific short- and long-term goals. The program will include detailed inspection, periodic monitoring, evaluation and testing, and forensic investigation of representative samples of bridges throughout the United States to capture and document their performance. The program will result in a high-quality, quantitative database, which will lead to the development of improved life-cycle cost and performance models, better understanding of bridge deterioration, improved effectiveness of maintenance and repair strategies, provide support for improved design methods and bridge preservation practices, and facilitate development of the next generation of bridges and bridge management tools.

The research team has been working to identify specific data to be collected that is most relevant to the objectives of the program; [establishing an open architecture, scalable, and extensible data management and data analysis infrastructure; developing protocols for data sampling and collection, and quality assurance; and developing a methodology for sampling bridges from the National Bridge Inventory database to determine the type, numbers, and locations of bridges to be inspected, monitored, evaluated, and instrumented in the pilot phase of the program.] In the pilot phase of the program researchers will validate protocols for data collection and management and ensure that all of the components needed to achieve the long-term objectives of the LTBPP are specified before commencing work on large populations of bridges nationwide. Just as bridge selection will play a vital role in the long-term data collection phase of the program it is also crucial in the selection of the bridges in the pilot study. The LTBPP team has selected seven states that should give a good representation of the many environmental conditions experienced throughout the United States. The states selected for the pilot program are California, Florida, Minnesota, New Jersey, New York, Utah and Virginia.

The LTBPP requires an active engagement between the research team, the States, FHWA, other stakeholders and government agencies, and industry for its success. FHWA has assembled an External Technical Working Group (ETWG) with representatives from transportation agencies and industry in support of the current and planned activities of the LTBPP which includes research, deployment, and education components. The role of the ETWG is to provide input and expert advice to the FHWA as needed in the successful completion of all tasks associated with the program. The ETWG is chaired...
by Dr. Sreenivas Alampalli, P.E., Director of the Bridge Evaluation Services Bureau at New York State Department of Transportation.

For additional information, please visit the LTBPP web site at http://www.tfhrc.gov/ltbp/ or contact Hamid Ghasemi, the LTBPP program manager at ltbp@dot.gov.

RESEARCH-IN-PROGRESS TO REDUCE BRIDGE IMPACTS

In March 2009, a tractor-trailer driver drove onto the Taconic State Parkway, hit a bridge, eventually lost control of his truck and crashed across both sides of the Parkway (see Photo below). As a result of the accident, much of the wood flooring he had been hauling to Queens was spilled. The Parkway was closed between Route 301 and Route 6 until about 11:30 a.m., when one northbound lane was reopened. According to Police, everything was cleaned up, the guardrail repaired and all of the parkway’s lanes reopened by about 1:30 p.m. Police noted that the driver illegally entered the Parkway after following directions from his GPS (Journal News, March 17, 2009). This accident has created considerable news coverage, but it is just one of approximately 200 bridge hits the NYSDOT Bridge Evaluation Services Bureau records every year.

Bridge hits can cause severe structural damage, vehicle damage, lost/damaged loads, traffic delays and in the worst cases, fatalities. Due to the large number of hits recorded annually and the severe consequences that can result due to a bridge hit, in 2008 the Department initiated a research project (C-07-10: Bridge – Vehicle Impact Assessment) to review NYSDOT’s most frequently hit bridges and to implement strategies/actions to reduce the number of hits. The project involves reviewing the major factors contributing to bridge impacts for each bridge that has been hit during the last two years; will provide recommendations to reduce the likelihood of future bridge hits; and will provide long-term, feasible, and economical suggestions to reduce the likelihood of bridge hits for the complete population of bridges in New York State. This project has the potential to significantly reduce bridge impacts in the future. Some data acquired during Task 1 of the project is noted below.

Bridge Hit Demographics

NYSDOT is experiencing close to 200 bridge impacts (hits) a year by over-height vehicles. There are several reasons for these occurrences, such as improperly stored equipment, violation of vehicle posting signs, illegal commercial vehicles on parkways, and lack of restricted highway information from online and trip planning software. More than 100 bridges have been hit at least twice over the last four years.

Figures below show histograms of total number of bridge hits and bridge hits by NYSDOT Regions with and
without parkways (Source: NYSDOT Bridge Evaluation Services Bureau Records). Figure 1 shows the number of recorded bridge hits in each NYSDOT Region during 1995-2008. Figure 2 shows regional bridge hits and hits on bridges over parkways for Regions 4, 5, 8, 10, and 11. It is observed from this figure that the presence of parkways contribute significantly to bridge hits. In fact, 196 out of 267 hits in Region 10 are on bridges over parkways. On the other hand, the number of hits on bridges in Regions without parkways is significantly lesser with Region 1 having 66 hits.

Figure 1: Number of Recorded Bridge Hits in Each NYSDOT Region during 1995-2008.

Figure 2: Number of Recorded Bridge Hits during 1995-2008 in NYSDOT Regions with Parkways.
The Bridge – Vehicle Impact Assessment Project is being conducted by Dr. Anil Agrawal of City University of New York with James H. Flynn acting as Department Project Manager and is scheduled for completion in September 2010. The Department is also coordinating with the NYCDOT and the I-95 Corridor Coalition on finding ways to mitigate bridge hits.

For more information on the project, contact James H. Flynn (jhflynn@dot.state.ny.us) or Dr. Sreenivas Alampalli (salampalli@dot.state.ny.us) of the Bridge Evaluation Services Bureau at (518) 457-5498.

LIVING SNOW FENCE

Drifting and blowing snow is a major concern for NYSDOT maintenance managers. It causes safety challenges for motorists and workers and is costly to remove or control. Living snow fence allows managers to use vegetation instead of human-made fences to keep snow from blowing and drifting across a highway.

Depending on site conditions, living snow fence can trap snow less expensively and more efficiently than engineered snow fence.

While living snow fence has safety, operational and environmental benefits, NYSDOT staff cannot plant vegetation and get instant success. Living snow fence design and installation requires training and experience to:

- Negotiate with landowners
- Select the right location for the fence, and the right vegetation
- Plant the living snow fence in a manner so it grows without interference from weeds.

NYSDOT has a Statewide Planning and Research (SPR) project to develop standard guidance and training materials for living snow fence. The researcher, Dr. Timothy Volk of SUNY’s College of Environmental Science and Forestry (ESF), is developing guidance on living snow fence design and installation.

Working with his co-researchers Lawrence Abrahamson and Philip Castellano, Dr. Volk is also developing and refining a train-the-trainer course on designing and installing living snow fence. The research includes four train-the-trainer courses that will be offered over the next two years.

In late May, Dr. Volk, Region 3 and Onondaga East Residency hosted the first train-the-trainer session. At this session, 30 NYSDOT staff had an enlightening and productive two days learning how to design a living snow fence, and then actually installing it. The course was offered at SUNY ESF’s Heiberg Research Forest in Tully, south of Syracuse.

On Day 1, Dr. Volk and Mr. Abrahamson explained the living snow fence design process and offered advice on how to plant living snow fence plants so they survive and prosper. As part of this session, Darrell Kaminski, the Region 5 Regional Design Engineer and SPR research alumnus, showed students how SnowMan design software can simplify the design calculations for a living snow fence.

On Day 2, Dr. Volk, his co-researchers and Residency staff led by Sam Warner, taught class members how to install living snow fence. Dr. Volk and Region 3 staff chose shrub willows to install; they grow fast and can trap a significant amount of snow. Before the class, researchers and Residency staff prepared the site with herbicides, tilling the sections to be planted and trucking in woodchips for mulch.

In about four hours on Day 2, the researchers, Residency staff and students installed nearly 1,000 feet of living snow fence. The installation was like a roadside conga line. It was led by a tractor that helped lay down landscaping cloth. Behind the tractor were three groups of students: one to mark plant location on the fabric, one to cut the fabric for planting the willows and a third group who inserted the willows in the ground. Behind these students, Residency staff and students used shovels and a BobCat to place the mulch. This step is needed to help retain moisture and discourage weed growth.
The class received high ratings from the students. Dr. Volk, his research colleagues and NYSDOT’s Technical Working Group will use the experience from the first session to improve the next session, which is tentatively scheduled for late summer or early fall, 2009.

For more information on the project contact John Rowen at jrowen@dot.state.ny.us.
Check Out TRB's Redesigned Website

On August 14, 2009, TRB unveiled its redesigned website. The site is designed to make it easier for users to find TRB news, announcements, and publications based on more than 35 different transportation subject areas. The new site highlights selected transportation research-related products that have been developed at the federal and state levels, and within the academic and international transportation communities. The new RSS (really simple syndication), facebook, e-mail to a friend, twitter, and other functionalities makes it easier than ever to keep up with and share the latest on transportation research. In addition to providing enhanced navigation and communications, the new site continues to allow users to find content based upon TRB's existing programs. You may also share your comments about the new design, as TRB continues to improve its functionality. [More]

America's Energy Future: Technology and Transformation: Summary Edition

The National Academy of Sciences and the National Academy of Engineering have released a report that analyzes the potential of a wide range of technologies for generation, distribution, and conservation of energy. The report considers technologies to increase energy efficiency, coal-fired power generation, nuclear power, renewable energy, oil and natural gas, and alternative transportation fuels. It assesses the associated impacts and projected costs of implementing each technology and categorizes them into three time frames for implementation. TRB is a division of the National Academies, which include the National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council. [More]

Real Transportation Solutions for Greenhouse Gas Emissions

The American Association of State Highway and Transportation Officials has launched a new website designed to highlight strategies to reduce greenhouse gas emissions from transportation. [More]

Well-to-Wheels Energy Use and Greenhouse Gas Emissions Analysis of Plug-in Hybrid Electric Vehicles

The Argonne National Laboratory has released a report that explores the energy use and greenhouse gas emissions of plug-in hybrid electric vehicles. [More]

Transportation and Climate Change Newsletter - July 2009

The U.S. Federal Highway Administration's Office of Planning, Environment, and Realty has released the latest issue of its monthly newsletter designed to keep transportation stakeholders up-to-date on various issues related to transportation and climate change. [More]

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