

**CENTER FOR ENVIRONMENTAL EXCELLENCE BY AASHTO
HISTORIC BRIDGES COMMUNITY OF PRACTICE**

STATE-OF-THE-PRACTICE REPORT

June 26, 2009

INTRODUCTION

The Center for Environmental Excellence by the American Association of State Highway and Transportation Officials (AASHTO), in cooperation with the Federal Highway Administration (FHWA), the Federal Transit Administration, and the Historic Bridge Alliance,* established a web-based Historic Bridge Preservation Community of Practice (COP). The CoP's purpose is to provide an on-line forum for invited participants to identify and discuss emerging needs and issues associated with the identification, evaluation, and management of our nation's historic bridges.

Individuals invited to join the Historic Bridges CoP included bridge engineers from the public and private sectors and academia; and historic preservation professionals, from the public and private sector, with experience in the identification, and evaluation, and management of historic bridges. The goal was to have an interdisciplinary group of professionals so multiple view points and experiences would guide the CoPs' efforts.

A Center for Environmental Excellence by AASHTO (Center) technical expert served as the moderator for the Historic Bridges CoP. The Center technical expert assisted AASHTO in the development of the CoP website, invited individuals to become members of the CoP, and monitored the CoP discussion threads.

The Historic Bridges CoP web site contains the following components:

Discussions: CoP members use this section of the website to post a discussion topic. Other CoP members can then respond to the initial post, creating a discussion thread.

Resource Library: CoP members can post documents that would be of interest to other CoP members. These documents include historic bridge rehabilitation case

This state-of-the practice report summarizes the discussions of CoP members who spoke as individual members of the community and do not necessarily represent their agency's or organization's views or positions. In addition, the contents of this report do not necessarily represent the views and positions of AASHTO or the Center for Environmental Excellence.

* The Historic Bridge Alliance (HBA) is a community of engineers, preservationists, historians, and other public and private sector members promoting effective practices in the identification, evaluation, management, rehabilitation, maintenance, and continued use of historic bridges. The HBA is administered through the Historic Bridge Foundation (<http://historicbridgefoundation.com/>)

studies; and reports, studies and articles on historic bridge identification, evaluation, management, and rehabilitation.

Contributing Participants: The website includes a list of all of the invited participants, along with their affiliation, contact information, and a short biography.

Glossary: This is a comprehensive glossary of bridge terminology developed by the AASHTO Standing Committee on Highways and Subcommittee on Bridges and Structures.

Related Web Links: This section includes a number of links to historic bridge websites, including the section of the Center's web site on historic bridges (http://environment.transportation.org/environmental_issues/historic_cultural/docs_reports.aspx#bookmarkHistoricBridgeResources).

Comments & Suggestions: CoP members can contact the CoP moderator by posting comments or suggestions in this section of the website. The CoP moderator receives these comments and suggestions as an email.

User Guide: A user guide is available to the invited CoP members, providing guidance and information on all of the functions of the CoP web site.

The Historic Bridges CoP steering committee conducted a beta test of the web site. Once the beta test was completed, the CoP moderator invited 60 individuals to become CoP members. The list of invitees was developed by the Center and the CoP steering committee. Forty-three (43) individuals agreed to participate in the CoP. Individuals who accepted the invitation to be Historic Bridges CoP members were assigned a user ID and password to access the website, in order to participate in the discussion threads.

Once all Historic Bridges CoP members received their user ID and password, they were asked to participate in an initial discussion thread, responding to a question posed by the CoP moderator. The results of this initial discussion thread are presented below. The web site went "live" and was opened for public viewing on April 1, 2009. The general public can view all components of the website but cannot participate in the discussions. Though non-COP members cannot participate in the discussions, they can send in comments to the CoP moderator using the "Comment & Suggestions" section of the website. The CoP moderator passes on the comment to the CoP members. The URL for the web site is:

http://environment.transportation.org/cop/groups/historic_bridges/default.aspx

In addition to asking the CoP members to participate in the first discussion thread, members were also asked to help populate the Resource Library section of the website. A description of some of the documents posted in the Resource Library is provided in the following discussion.

RESOURCE LIBRARY

Of particular note is a National Cooperative Highway Research Program (NCHRP) report entitled “Guidelines for Historic Bridge Rehabilitation and Replacement” (NCHRP Project 25-25, Task 19). This document presents

...nationally applicable decision-making guidelines for historic bridges. The guidelines are intended to be used as a protocol for defining when rehabilitation of historic bridges can be considered prudent and feasible and when it is not based on engineering and environmental data and judgments. The guidelines include identification of various approaches to bringing historic bridges into conformance with current design and safety guidelines/standards, and the effect or implications of remedial action on historical significance (NCHRP Project 25-25, Task 19, March 2007, page vii).

As noted above, the Resource Library also contains several historic bridge rehabilitation cases studies. These case studies are presented using a standard template developed by members of the Historic Bridge Alliance. The case studies include photographs of the rehabilitation project, a description and location of the bridge, and information on the rehabilitation project (date, cost, designer, client, owner, and sources for additional information on the project). A blank template for additional cases studies is provided in the Resource Library.

FIRST DISCUSSION THREAD

The first discussion thread addressed the following question, posed by the CoP moderator:

Identify what you consider to be the most important issue or topic associated with historic bridges and transportation project delivery. Please make your response as concise as possible, but do explain why you selected the issue or topic.

The discussion thread ran for three weeks. The CoP moderator reviewed all of the discussion postings and identified five issues that were repeated throughout the initial discussion thread. These issues were:

- A lack of funding and incentives for historic bridge rehabilitation
- A lack of funding and incentives for maintenance of historic bridges
- The conflict between rigid approaches to historic bridge preservation and rigid interpretation of engineering design guidelines
- The need for a national program or initiative for managing historic bridges (e.g., rehabilitation standards, design standards, alternative uses, etc.)

- The need for statewide historic bridge management plans

Here is a sample of some of the comments posted by CoP members on these issues during the initial discussion thread:

“I think there needs to be a set of special provisions developed for the rehabilitation of historic bridges that strikes a proper balance between National Park Service preservation briefs and typical Department of Transportation standard specifications for construction. The special provisions would help ensure owners are not starting from scratch when they try to put together specials for their projects.”

“I think some of us have learned that we need to not be dogmatic about our designs and insist on just ‘fixing what is broken,’ but rather we need to build in new when we can. We need many times to introduce new members to carry some or all of the loads, so that the owner has the confidence that we are not relying on the existing bridge.”

“Historians and those who have review approval from the environmental side need to understand that we cannot be ‘purists’ and not change the look of the bridge, but must accept some visual changes as long as they are done in a sensitive nature.”

“Funding is the most important issue. Many times we knew what needed to be done to repair a bridge but due to the lack of funding we had to postpone the work. If the need became critical we had to close the bridge until funds were available. Most of the damage to historic bridges has resulted from lack of maintenance, particularly proper cleaning and painting.

“If I had to identify a single issue it would be funding, specifically the lack of incentives to pursue the rehabilitation of historic bridges over replacement. For example, if replacement is equal or less than major rehabilitation there is often an understandable tendency to favor the former – especially if the transportation agency will get the same 80 cents on the dollar from the federal government in either case. But what if the federal government contributed 90 or 95 cents on the dollar for rehabilitation, versus 80 cents for replacement? That would give local decision-makers a significant incentive to favor rehabilitation, thus reserving more of the local or state match for other projects.”

“[One way] to improve historic bridge project development [is to have] individual bridge-specific management plans that have the backing and buy-in of the State Historic Preservation Office [SHPO], DOTs (not just the cultural resource/planning section but bridge design and bridge maintenance), bridge owners ... and the community... Success usually means that the appropriate individuals have participated in the planning to understand the various

perspectives, and the plans are specific to individual bridges. Not to say that there are no technical approaches that are universally applicable to specific populations of bridges.”

“We need a creative national initiative to encourage states to develop programs that identify alternative uses and sites for historic bridges at risk. That program should also serve as something similar to a clearing house, keeping tabs of bridges at risk and moving quickly to prevent crisis-mode decision making. Obviously funding is a key part of that, but creating public awareness about the value and feasibility of such a program is just as important. And, it should be coordinated with national programs aimed at building footpaths and bicycle paths, and also programs aimed at reclaiming urban and community growth centers...The national program should also explore ways to keep costs of adaptive use reasonable – competitive with the costs of building or purchasing a new bridge for bicycle or pedestrian purposes.”

The CoP moderator posted the list of five issues, and asked the CoP members to select (using a polling/voting function of the web site) what they consider to be the top issue. This top issue would be the focus of the next, more in-depth discussion thread. The CoP moderator asked the CoP members to think about what can be accomplished in the short term and in the current economic climate, before selecting their top issue. The goal was to identify and discuss actions and practices transportation agencies and their partners could implement today or within the next few years.

SECOND DISCUSSION THREAD

The top issue selected by the Historic Bridges CoP members was:

- The conflict between rigid approaches to historic bridge preservation and rigid interpretation of engineering design guidelines

CoP members were given four weeks to address this top issue. Not surprisingly, the comments posted by the CoP members on this topic shared some common themes. These themes include a) the need for close and continuous coordination among engineers and historic preservation specialists working on a bridge project, b) the setting of objectives at the beginning of a project, and c) providing bridge owners an incentive to preserve a historic bridge. The following is a sample of members’ comments related to these three themes.

“We will always have differences of opinion between engineers and historians regarding what effect the addition of reinforcement to the bridge has caused; but, this is healthy and it makes each perspective really think about what is important. We have come a long way in educating each other. In my experience we have usually come to agreement. Where we struggle is with safety systems and geometrics. We have on one side the engineering community headed by the

owners or administrators who are reluctant to deviate from the standards, policies and procedures of design manuals. On the other side we have historians who cannot understand why we cannot leave the railing as is or the roadway width unchanged if there has been no incidences of accidents. Yes, we have a method called "design exceptions" where we can deviate from accepted practice, if conditions warrant but there is a hesitancy in many instances to go this route as it only takes one accident to set the legal process in motion to seek financial remedies. We all know that a successful project should involve the engineering people working with the historic people from the outset. I suggest there are many times when we need to bring in the legal people to gain their insight into our concerns and help us with solutions when deviations from the standards are warranted. Are they the "third leg of the stool" that is missing? We can accomplish this in the short term by inviting a few of them to these discussions. We seldom have an opportunity to hear from them."

"One of the keys to success in preserving our bridges (historic and otherwise) is setting objectives at the outset of the project. In other words, what is the desired outcome, and what are the measures of success? A common default is to measure restoration and rehabilitation project results against current design codes. The desired outcome is assumed to be functionally a new bridge - one that meets all of the geometric, safety, strength, and serviceability standards of a new bridge. I say "assumed" because the criteria are not always consciously considered and developed. A concept study should be done early on, where the key parameters and people's expectations are set. It is in this phase of a project that the balance between budget, preservation, and on-going bridge performance is established. It is not very reasonable to expect the owner or the designer to continually adjust the project objectives and the resulting effects on the budget and schedule."

"I agree with...[the] statement about giving a bridge owner incentive to preserve a bridge...One way this may happen is through the green initiatives that agencies are implementing. Speaking just from the perspective of my agency, we are undergoing a wholesale revamping as a green agency under the direction of our new Director. For example, in [our Department's] Sustainability Assessment Report, the statement is made "As far as working toward a "Better than Before" environmental policy, the more [the Department] promotes reuse of historic buildings and bridges rather than demolition and removal to landfills, the more we will continue to have positive impacts on communities and the state in general in the areas of sustainability, historic preservation, and stewardship."

In addition to bringing up the concept of "green initiatives," one of the CoP members discussed the concept of "practical design."

"Currently there is a push nationally for "practical design." This is a concept that encourages States to design projects that are just good enough, not necessarily perfect. That is fostering an environment where designers can develop projects

that don't necessarily conform to all of the old design rules. This may help us with bridge restoration and rehabilitation.”

SUMMARY

As part of the beta test of the Historic Bridges CoP web site, the CoP moderator asked the testers to identify what they thought were the most effective approaches to enhancing and streamlining Section 106 compliance for transportation projects that involve National Register eligible or listed historic bridges. One beta tester’s response serves as an excellent summary of the issues raised during the two CoP discussion threads:

“From my perspective, the most effective approaches are:

- *Comprehensive historic bridge inventories and databases* – Local, regional, state, and national inventories and databases which are linked to bridge management systems and are periodically updated.
- *Programmatic Section 106 and Section 4(f) compliance approaches* – Local, regional, state, and national approaches which satisfy...eligibility, effect, use, and mitigation requirements.
- *Historic bridge management plans* – Local regional, state, and national plans to preserve historic bridges.
- *Advance bridge recordation*- Historic American Engineering Record recordations in advance of project development.
- *Historic bridge rehabilitation analyses during transportation system planning* – Conduct historic bridge rehabilitation analyses during transportation system planning rather than in project development”

This response highlights an important theme among the Historic Bridges CoP discussion threads: the value of replacing case-by-case and project-by-project decision-making with a statewide comprehensive historic bridge management program. A statewide program could include elements such as a computerized inventory of a state’s historic bridges, decisions on the preservation value of each bridge (or category of historic bridge), and a management plan that establishes the process and methods for dealing with each bridge or group of like-bridges. The management plan could also include decisions on rehabilitation, adaptive reuse, and replacement; balancing issues of cost, historic preservation, and bridge performance.

A historic bridge management program would ideally be developed and maintained with the full participation of several individuals, agencies, and local organizations. These would include, but not necessarily limited to, the owners of the historic bridges, the state DOT (including the historic preservation staff, bridge engineers, and legal staff), the state FHWA division office, the State Historic Preservation Office, local governments, and local historic preservation groups.

The development of comprehensive state historic bridge programs is an emerging trend. This trend is in keeping with national efforts to consider environmental factors during transportation system planning. As noted in NCHRP Report 541⁽¹⁾:

National experience has shown that waiting until the project development stage of transportation decision-making to deal with environmental issues that might have been resolved earlier (for example, during systems planning) can result in significant delays in project completion. In addition, identifying, defining, and prioritizing projects that occur in transportation planning and programming might have had different (and better) results if more information on likely effects had been available earlier (NHRP Report 541, 2005, page 8).

The goal of considering environmental factors during planning (and these factors include historic properties) is to reduce project development time, lead to better projects, and enhance environmental stewardship.

Indiana DOT's historic bridge program is one of the prime examples of this emerging trend to develop comprehensive statewide programs. The Indiana program was created because Indiana DOT and the FHWA

...needed a process that identified which bridges were National Register eligible and which were the best candidates for preservation from a historical and engineering perspective. The two agencies also wanted a program where bridge owners would know instantly what compliance issues they had to deal with, and how to proceed on projects that involved a historic bridge (NCHRP 25-25, Task 49, in press).

Using State Planning and Research funds, Indiana DOT and FHWA, working with their transportation and historic preservation partners, developed and executed a programmatic agreement (PA) establishing the program, and then implemented the program. The program included completion of the statewide historic bridge inventory, and developing methods and criteria for identifying National Register-eligible and listed historic bridges most suitable for preservation and that were excellent examples of a given historic bridge type.

Bridges that met these criteria were identified as "select bridges." All other historic bridges were placed in a "non-select" category. Following the stipulations of the programmatic agreement, the DOT cannot use federal-aid monies to demolish a select bridge. The procedures for managing these bridges are detailed in the programmatic agreement. The agreement also stipulates the process for managing non-select bridges (NCHRP 25-25, Task 49, in press).

More information on the Indiana program is available in the Historic Preservation section of the Center's website.

Developing these types of statewide programs provides the foundation for effectively balancing historic preservation needs and transportation project delivery. Implementing these programs requires a close cooperative working relationship between engineers, historic preservation specialists, and local governments and organizations; and, as noted by a state DOT bridge engineer who is a member of the Historic Bridges CoP

If you have the inventories, databases of historic resources with the elements that make the resource historic identified, and management plans developed, this would position an owner agency and its engineers to develop that give-and-take, cooperative relationship that is necessary to preserve historic resources to the fullest extent.”

References

(1.) A. Amekudzi and M. Meyer. *NCHRP Report 541: Consideration of Environmental Factors in Transportation Systems Planning*. Transportation Research Board, Washington, D.C. 2005