

CENTER FOR ENVIRONMENTAL EXCELLENCE BY AASHTO HISTORIC BRIDGES COMMUNITY OF PRACTICE

SUMMARY STATEMENT HISTORIC BRIDGE MAINTENANCE

June 29, 2010

INTRODUCTION

The Center for Environmental Excellence (Center) by the American Association of State Highway and Transportation Officials (AASHTO), in cooperation with the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and the Historic Bridge Alliance,¹ 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 state Departments of Transportation (DOT) and other public agencies, and bridge engineers from the private sector and academia. Historic preservation professionals, from the public and private sector, with experience in the identification, and evaluation, and management of historic bridges, were also invited to join the CoP. The goal was to have an interdisciplinary group of professionals so multiple view points and experiences would guide the CoPs' efforts.

A Center technical expert serves as the moderator for the on-line 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 monitors the CoP discussion threads.

The Historic Bridges CoP went on-line in March 2009. Initial discussion threads among the CoP members took place between March 2009 and June 30, 2009. A report on the results of these initial discussions is available on the Historic Bridges CoP website at: http://environment.transportation.org/cop/groups/historic_bridges/media/p/112.aspx.

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

¹ 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/>)

A second round of discussion threads was initiated with a December 15, 2009 teleconference, followed by a second teleconference held on February 16, 2010. A Summary Statement based on this second teleconference is available at: http://environment.transportation.org/pdf/communities_of_practice/histbridges.pdf. The statement examines the state-of-the-practice involving programmatic approaches to the management of historic bridges.

A third Historic Bridges CoP teleconference was held on April 27, 2010. This current Summary Statement discusses the results of the teleconference, which focused on historic bridge maintenance. This statement also provides a very preliminary review of the-state-of-the practice at both the national and state levels.

Why a discussion on historic bridge maintenance? Why is this particular issue important to state DOTs? The answer is the same whether a bridge is historic or less than 50 years old. Historic bridges are part of nation's transportation infrastructure, and the preservation of this infrastructure is one of the goals of FHWA, state DOTs and other transportation organizations. In 2000, AASHTO's Highway Subcommittee on Bridges and Structures published a report that identified and prioritized "the major themes for a coordinated national bridge engineering agenda." Bridge maintenance was one of the priority areas addressed by this report. The report's recommendations included the need for new products and procedures for preventative maintenance. The report states that the "business need is to identify, develop and apply efficient technologies, processes, and administrative methods that ensure quality and longevity, and enhance safety and that reduce construction and maintenance time, costs, and effects on the public." This report is available at: <http://bridges.transportation.org/Documents/2000strategicplan-websiteversion.pdf>

A relatively new organization on the scene is the Bridge Preservation Association. The mission of the Association is "to advance bridge preservation and maintenance practices, procedures, products, and technologies that help stakeholders enhance bridge performance, extend their service life and increase public safety." As noted on the first page of the Bridge Preservation Association's brochure, "Timely Preservation Performed Today...Better Bridge Infrastructure Tomorrow." The Association defines "bridge preservation" as "activities performed on bridge elements or components that aim to prevent, delay, or reduce deterioration. Bridge preservation activities do not entail structural or operational improvements of an existing bridge asset beyond its original designed capacity." The Association's website is located at: <http://bridgepreservationassociation.org/pdfs/bpa.pdf>.

As discussed further below, research is needed to determine if there is a difference between good overall bridge maintenance and the maintenance of historic bridges. Do publications addressing general bridge maintenance also apply to historic bridges? Are the practices the same? Are there different types of skill sets required for maintaining historic bridges?

BACKGROUND

As noted in the previous Historic Bridges CoP Summary Statement, there are several historic preservation laws and regulations that affect FHWA, FTA, and state DOT decision-making associated with historic bridges. These include Section 106 of the National Historic Preservation Act (NHPA), and its implementing regulation 36 CFR 800, and Section 4(f) of the Department of Transportation Act. Section 106 of NHPA requires federal agencies like FHWA and FTA to take into account the effects of their undertakings on properties (e.g. historic bridges) listed in and eligible for listing in the National Register of Historic Places, and afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the effects of these undertakings. Section 106 per se does not address the maintenance of historic properties, such as National Register-listed or eligible historic bridges. Maintenance, however, can be an outcome of the Section 106 consultation process if maintaining a historic bridge is an agreed upon action for resolving an adverse effect on a significant bridge. A requirement for maintenance would be stipulated in a Section 106 agreement document, such as Memorandum of Agreement, establishing the procedures for implementing maintenance activities appropriate to the historic bridge being affected.

Section 4(f) of the Department of Transportation Act prohibits federal transportation agencies from using land from properties listed in and eligible for listing in the National Register, in addition to publicly owned parks, recreation areas, and wildlife and water fowl refuges, unless there is no feasible and prudent alternative to the use of this land, and the agency undertaking includes all possible planning to minimize harm to the property, resulting from this use. Similar to Section 106, this statute per se does not address the maintenance of historic properties, unless maintenance becomes a condition for minimizing harm to a property, such as a National Register-listed or eligible historic bridge which is “used” by a transportation project.

The Highway Bridge Program, established at 23 U.S.C. 144, does address the maintenance of historic bridges. Section 144(o) allows a historic bridge being replaced by new construction to be preserved off-system, provided a state, local or private entity agrees to take responsibility for its future preservation and maintenance. The same provision allows federal funds not to exceed the estimated cost of demolition to be used for this effort; however, any bridge preserved using such funds will not be eligible for any further funding assistance under Title 23. Detailed information on this program may be found on FHWA’s website on historic bridges at: <http://environment.fhwa.dot.gov/histpres/bridges.asp>.

Because maintenance of historic bridges is not directly addressed (or required) through any federal statutes, there are no standard, national approaches to historic bridge maintenance. Some states have developed their own decision-making process and procedures for historic bridge maintenance, while other states have no established protocols or standards. As a result, historic bridge maintenance practices are inconsistent from state to state. There are also no formal mechanisms for states to share information on historic bridge maintenance best practices. Given the current state-of-the-practice, on-going discussions among the Historic Bridges CoP members continually return to the issue of historic bridge maintenance.

STATE-OF-THE PRACTICE: NATIONAL OVERVIEW

CoP members discussed what they thought were the key issues associated with historic bridge maintenance. The following are the main points raised during the discussion:

- AASHTO has a 2007 manual on roadway and bridge maintenance, but this manual focuses on repair.
- One recommendation was to build a Wiki-like website or other on-line information tool on historic bridge maintenance, leading toward a synthesis of all available manuals and guidance. For example, the Maryland State Highway Administration has a manual on historic bridge maintenance (in hard copy). Maine DOT also has a manual that may be in a PDF. There are also a few programmatic agreements on bridge maintenance, such as Pennsylvania's program for masonry arch bridges. This type of information, in particular, should be made available to owners of county and city/town historic bridges.
- The *Secretary of the Interior's Standards for Rehabilitation* can work for historic bridges since they represent common sense approaches to maintaining historic structures. However, these standards and guidance can be expanded to better deal with historic bridges.
- One area of research/study is to determine if there is a difference between good overall structure maintenance and the maintenance of historic bridges. Do publications addressing general bridge maintenance also apply to historic bridges? Are the practices the same? There was a general consensus among the teleconference participants that the answer was yes, with different methods required for different bridge materials. However, there may be different types of skill sets required for maintaining historic bridges. It would be important to make information on the skills needed for maintaining historic bridges available to engineers and historic preservation professionals.
- An important question that needs to be explored is at what level do you maintain a state's bridges (including locally-owned bridges)? The goal is to maintain the entire system, but do you maintain historic bridges (or other types of bridges) at a higher level than other bridges in the system?
- A big problem is having the funding to maintain any type of bridge, historic or non-historic. Local resources, in particular, are more constrained than at the state level. Also, given many historic bridges are on low-volume roads, state and local funding priorities would most likely be on those structures that are on high-volume roads.
- Another recommended study would look at the long-term maintenance costs for historic and non-historic bridges. The objective is to measure and compare the long-term costs for continued maintenance versus the absence of regular maintenance (which may result in the eventual replacement of the bridge). The study might examine a sample of different classes of bridges.

Clearly, an important element of historic bridge maintenance is the sharing of best practices and lessons-learned among state DOTs and others involved in the identification, evaluation, and management of historic bridges. The following is a very preliminary list of readily available manuals and guidance on historic bridge maintenance, providing an initial view of the state-of-the-practices from a state perspective.

STATE-OF-THE PRACTICE: STATE PERSPECTIVE

Minnesota

The *Management Plan for Historic Bridges in Minnesota* includes a section on recommended maintenance activities. The plan defined “maintenance” as work of a routine nature to prevent or control the process of deterioration of a bridge,” and that “routine structural maintenance is essential in ensuring the safety and functional life of a bridge.” The plan advises bridge owners to consult the DOT’s *Bridge Construction Manual* for specific instructions on maintenance, but also provides a list of maintenance activities that can be applied to different historic bridge types and to all bridge types. These include lubricating and re-setting expansion bearings, cleaning a bridge’s drainage system, and power washing and flushing bridge components exposed to salt-laden water or snow. Minnesota’s historic bridge management plan can be found at:

http://www.dot.state.mn.us/environment/pdf_files/mgmt-plan-historic-bridges.pdf

New York State

The New York DOT’s Historic Bridge Management Plan (2002), includes a section on maintenance, noting that maintenance activities should be conducted using the *Secretary of the Interior’s Standards for Rehabilitation*. This section of the plan provides a list of factors to be considered when assessing maintenance needs, such as patterns of bridge deterioration as identified through review of previous condition ratings and inspection reports, and the type of coating on steel elements of a bridge. There is also a list of routine maintenance needs, such as pressure washing and repairing damage from scouring. Appendix C1 of the plan provides guidelines for historic bridge maintenance based on the Secretary of the Interior’s standards. These guidelines are based on those presented in Virginia DOT’s historic bridge management plan (see below).

The New York DOT Historic Bridge Management Plan can be found at:

<https://www.nysdot.gov/portal/page/portal/divisions/engineering/environmental-analysis/repository/historicbridgemanagementplan.pdf>

Oregon

Oregon DOT’s historic bridge preservation plan provides a few paragraphs on maintenance, noting that maintenance is a “critical aspect of keeping historic bridges as functional components in the transportation system.” As with other historic bridge preservation plans, Oregon DOT’s notes that routine and preventive maintenance activities vary based on a bridge’s structural and material type, The Oregon plan also addresses the

role of the National Bridge Inspection System (NBIS) as a tool for historic bridge maintenance, recommending that historians be involved in any maintenance recommendations resulting from a NBIS condition assessments.

A copy of Oregon DOT's historic bridge preservation plan can be found at:
http://environment.transportation.org/pdf/historic_cultural/ODOTHistBrPresPlan.pdf

Pennsylvania

The Pennsylvania Department of Transportation (PennDOT) has developed a management plan for stone arch bridges in the southeastern portion of the state. The plan includes recommendations for maintaining these bridges, in addition to developing a regular maintenance program for those bridges selected for preservation. As part of the stone arch bridge management program, PennDOT developed a separate *Stone Arch Bridge Maintenance Manual*, which uses the *Secretary of the Interior's Standard for Rehabilitation* as its organizing foundation. The manual includes a number of recommended maintenance approaches, such as clearing vegetation from bridge surfaces and improving drainage on the bridge, reducing water infiltration.

The stone arch bridge management plan can be found at:
<http://www.pastonearch.org/docs/Plan.pdf>

The maintenance manual is available at:
<http://www.pastonearch.org/docs/10-02-07%20Revised%20WORD%20FORMAT%20REPORT.pdf>

Virginia

A Management Plan for Historic Bridges in Virginia includes individual management/treatment plans for bridges under the Virginia Department of Transportation's purview. Some of these individual plans provide maintenance recommendations. These recommendations include actions such as cutting back and removing vegetation, evaluating a deck's waterproofing system, monitoring wingwalls, and keeping weepholes at the base of columns clear of debris. The state's historic bridge management plan will be updated beginning later this year, providing more substantial maintenance recommendations for each of the bridges included in the plan.

The Virginia plan can be found at: (<http://www.virginiadot.org/programs/resources/01-r11.pdf>).

SUGGESTED RESEARCH AND FUTURE TOPICS

CoP members identified a number future action items and research topics involving historic bridge maintenance:

- Pull together all manuals and guidance into a single, readily accessible source, and spread the word on this source to all historic bridge owners.
- Develop and deliver workshops or other educational venues on historic bridge maintenance. Include discussions of historic bridge maintenance as part of existing general training on bridge/structure maintenance.
- Develop case studies on the use of transportation enhancement funds for maintaining historic bridges, where no other federal funds are being used for rehabilitation.
- Promote how historic bridge maintenance/preservation fulfills current sustainability/green program objectives, similar to what the National Trust for Historic Preservation is doing for historic buildings. Explain to the public the value of maintaining and preserving historic bridges.
- More informed and objective approaches on how bridges are determined to be eligible for listing in the National Register, providing examples from various states. And also clarify confusion about the availability of funding sources for maintenance and repair of historic bridges.
- Link historic bridge maintenance issues with overall federal/state bridge inspection programs.

ACRONYMS AND ABBREVIATIONS

The following acronyms and abbreviations are used in this report:

AASHTO	American Association of Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
CoP	Community of Practice
DOT	Department of Transportation
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HBA	Historic Bridge Foundation