

BRIDGE PRESERVATION: A WISE INVESTMENT

BY LORELLA ANGELINI

According to the National Bridge Inventory, there are more than 600,000 highway bridges in the United States. Most of these bridges (98%) are owned by state and local governments, whereas the remaining 2% are federally or privately owned. The average age of these bridges is 45 years with more than 30% exceeding their 50-year design life.

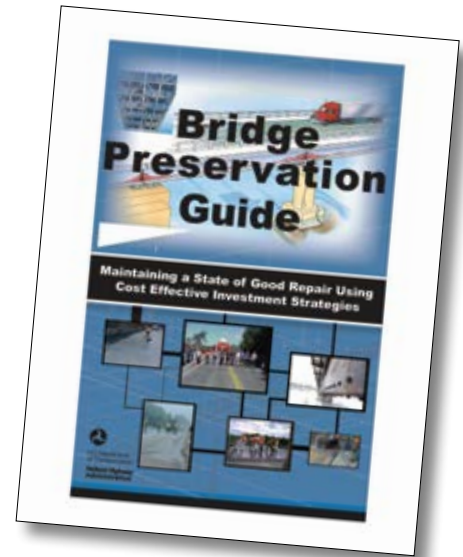
Over the next 15 years, almost half of the bridges in this country will exceed their design life and their need for repair, rehabilitation, or replacement will continue to increase. According to the National Bridge Inventory, more than 12% of bridges are currently classified as structurally deficient and another 13% are functionally obsolete and need upgrade or improvement.

To protect the safety of the traveling public, national investments, natural resources, and the environment, it is in our nation's best interest to adopt and implement cost-effective bridge preservation strategies. In response to this need, the Federal Highway Administration (FHWA) has developed the "Bridge Preservation Guide." This publication provides common bridge-related definitions, commentaries, and examples that assist bridge owners in developing and implementing programs that can preserve and extend the service life of an existing bridge.

The FHWA Bridge Preservation Expert Task Group defines bridge preservation as: "Actions or strategies that prevent, delay, or reduce deterioration of bridges or bridge elements, restore the function of existing bridges, keep bridges in good condition, and extend their useful life. Preservation actions may be preventive or condition driven." This definition represents a radical departure from the "worst first" approach, which often entails focusing on replacing bridges that are in poor condition. Preservation is a proactive and balanced approach with emphasis and priority given to bridges in relatively good or fair condition with the objective of maximizing their useful life.

Because bridge preservation activities often cost much less than major rehabilitation or replacement projects, preservation can be regarded as a more economical solution. To take advantage of these savings, it is essential to identify bridges that are good candidates for preservation so that expensive rehabilitation or replacement work can be eliminated or delayed.

In addition to the economic savings, bridge preservation can also be considered a sustainable



activity. Preservation work results in a smaller release of exhaust emissions from demolition procedures, production of cement or concrete, transportation of waste and new construction materials, and exhaust from other construction work than there is for new construction.

Examples of commonly used preservation activities include:

- Deck crack sealing;
- Repair of damaged concrete and cracks;
- Installation of deck overlays;
- Concrete surface sealing and waterproofing;
- Bridge painting;
- Seismic retrofit;
- Scour mitigation;
- Corrosion mitigation;
- Fatigue crack control;
- Expansion joint repair and replacement; and
- Bridge bearing realignment/repair.

Key to bridge preservation practices is establishing systematic preventative maintenance (SPM) programs. These programs are a documented methodology that is regularly applied to repeatedly achieve the desired outcome or goal. This work is eligible for federal funding. The basic attributes of this program are discussed at length in the "FHWA Bridge Preservation Guide" and include:

- Defining goals and objectives;
- Assessing condition;
- Assessing needs;
- Taking into consideration cost-effective preventative maintenance (PM) activities;
- Accomplishing the work; and
- Reporting and evaluating.

Innovative solutions that protect and improve the condition of bridges are being explored in response to this increased desire for preservation. Product manufacturers and research scientists are

introducing new products and technologies and smarter uses of existing technologies that better suit specific bridge environments. Technical service providers and consultants are partnering with product manufacturers to provide comprehensive solutions that simplify applications and improve long-term field performance. Designers are incorporating preservation-friendly design details such as facilitating access to bridge superstructure and substructure components for inspection and maintenance activities, eliminating expansion joints when possible, and taking into consideration construction sequences of future preservation and partial replacement activities.

Implementing an effective bridge preservation program calls for appropriate tools and resources. In addition to the “FHWA Bridge Preservation Guide,” other valuable information can be found on the websites listed in the Website References and Resources section. With the advancement of design practices, technologies, and materials,

today’s bridges are designed for a service life of 100 years and can last well beyond that with proper preservation techniques.



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WEBSITE REFERENCES AND RESOURCES

“BRIDGE PRESERVATION GUIDE”

FHWA publication

Website: www.fhwa.dot.gov/bridge/preservation/guide/guide.pdf

BRIDGING THE GAP

American Association of State Highway and Transportation Officials (AASHTO)

Website (discusses restoring and rebuilding the nation’s bridges):

www.transportation1.org/bridgereport/front-page.html

TRANSPORTATION FOR AMERICA

This site was developed by a coalition of national, state, and local officials and a diverse group of national, state, regional, and local groups to reform how federal, state, and local funds are spent

Website: www.t4america.org/resources/bridges/overview

BRIDGE PRESERVATION TOOLBOX

FHWA bridge preservation site

Website: www.fhwa.dot.gov/bridge/preservation

TRANSPORTATION SYSTEM PRESERVATION TECHNICAL SERVICE PROGRAM (TSP2)

AASHTO bridge preservation site

Website: www.tsp2.org/bridge