NCHRP 20-68A – “US Domestic Scan Program”

# Domestic Scan 17-03 Experiences in the Performance of Bridge Bearings And Expansion Joints Used For Highway Bridges

Damage related to bridge deck expansion joints in the United States costs agencies tens of millions of dollars each year. Damaged joints result in acceleration in deck deterioration as well as deterioration to the portion of the bridge beneath the opening that is exposed to debris and contaminants that leak through. Of specific concern below the joint in a bridge are the bridge’s bearings. Bridge bearings are required to transmit the loads from the superstructure to the, while permitting the superstructure to undergo necessary movement without developing overstresses. A bearing assembly that is frozen or damaged due to deterioration caused by inadequate joints may overstress the bridge components below resulting in the need to implement an extremely costly repair to insure bridge safety and serviceability.

As little national work has been done in this area in almost 15 years, this scan will facilitate the exchange of recent ideas and best practices for Bridge Bearings and Expansion Joint design, performance evaluation, maintenance and repair/reconstruction. Discussions will include design, construction, maintenance and operations staff of state and other transportation agencies that have experienced good performance of their bridge joints and/or bearings. Details for various bridge types (i.e. materials, span arrangements, geometry) and sizes will be examined.

Topics to be considered by the scan include:

* Design and details, construction specifications and maintenance procedures for durable bearings and expansion joints that have a history of good in-service performance history;
* Visual inspection and other testing of joint and bearing details;
* Specialized technology and standards used in monitoring, inspecting, and repair of joint and bearing details to ensure safety and serviceability with optimal performance and to minimize downtime during bridge construction and rehabilitation; and
* Relative costs for design, construction, maintenance, and inspection of various joint and bearing details.
* Lessons learned and suggestions for improvement.

In deciding on agencies to be visited considerations should be given to the climate challenges of the regions they are located, traffic volume, project size, etc. Based on an initial review of bearing and joint performance it is suggested that the following state DOT’s be studied:

1.      States with severe climate challenges (cold and freezing conditions) - Illinois, New York and Massachusetts

2.      States with considerable precipitation and cold climates - Washington State and Oregon.

3.      States very high ADT’s on many bridges - California, Texas, & New York

4.      Coastal states with large size bridges such as Florida, Virginia, and Louisiana

5.      States with success details (Minnesota) and lessons learned to offer (Pennsylvania).

This scan would be of specific interest to the AASHTO Subcommittee on Bridges and Structures Technical Committee T-2 “Bearings and Expansion Devices”, the AASHTO Subcommittee on Materials and the AASHTO Subcommittee on Maintenance. The scan report will provide current information on successful expansion joints and bearings to bridge owners. It will also provide valuable information to the AASHTO Committees for future consideration when developing their work plans and research needs. A synthesis of this information would also be of interest to State DOTs and FHWA offices, other Federal and local agencies involved in bridges, bearing and joint manufacturers, university researchers, consultants, county and local DOT's.

Original Scan Proposal Title(s): Performance Of Bearings And Expansion Joints Used For Highway Bridges

**Scan Team Membership**

TBD

**Execution Schedule**

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| **Milestone** | **Anticipated Date** |
| Chairs and Team Members Identified | July 2017 |
| Desk Scan Completed | October 2017 |
| Prescan Meeting Held | October 2017 |
| Scan Conducted | April 2018 |
| Draft PowerPoint submitted by SME | May 2018 |
| Draft Report Delivered to NCHRP and Panel | July 2018 |
| Final Report Delivered to NCHRP | November 2018 |

**Estimated Scan Cost:** $175,000

Anticipated Duration: 1 week (type 3 scan)

*Last Reviewed/Revised April 17, 2017*