Domestic Scan 19-01 Leading Practices for Detailing Bridge Ends and Approach Pavements To Limit Distress and Deterioration

Bridge owners seek to design and construct structures with details and materials that will minimize maintenance and repair costs. One strategy for doing so in design is to minimize the number of joints in the structure. While this approach has proven to improve durability of the structure itself, thermal expansion and contraction of the structure must still be accommodated and loads must be transferred between structural segments when joints are required. Detailing and maintaining joints at bridge ends are notoriously challenging not only because the transition from one structure to another often becomes noticeable to road users as “bump at the end of the bridge,” but also because the displacements and forces at these locations are particularly prone to cause damage to riding surfaces and structural elements. Bridge owners have adopted a wide variety of design details to avoid this damage and have sought to understand the causes of observed distress. This scan will seek out leading design and management practices for minimizing structural distress and surface discontinuity on approaches to jointless bridges.

This scan team will meet with agencies having experience in dealing with distresses observed on approaches to jointless bridges and will explore such leading-edge solutions as the Minnesota Department of Transportation's differentiation criteria for the selection of appropriate abutment types based on geometric characteristics, wingwall configurations, abutment height and superstructure beam depth. The team will seek to identify tools that can assist in the selection of the appropriate details for use at the ends of bridges. Sharing of these tools nationwide will improve the performance and durability of jointless bridges. The key information to be gained is the identification of details that have been implemented at the ends of structures that achieve a jointless bridge while minimizing the structure distress, maintenance and repair costs, considering issues and strategies such as

1) Isolating the approach stab from the backfill material beneath it at the end of the bridge to allow for adequate movement.

2) Connections between components at the ends of bridges including, but not limited to bridge decks, abutment backwalls, abutments, abutment foundations, and the approach pavement.

3) End of bridge drainage systems.

4) Structure length, substructure skew, and other geometric characteristics that dictate the use of unique components or details.

5) Supporting design calculations critical to the resolution of issues.

6) Rehabilitation solutions to repair the deterioration and distress associated with the details at the ends of bridges that are not functioning as anticipated.

This scan is anticipated to be conducted as Type 3- Peer Exchange. The scan report will provide current information on successfully detailing jointless bridges by sharing both successes and lessons learned in planning, designing, specifying, permitting, construction and performance to all agencies considering the use of jointless bridges in their bridge design strategies. The audience for this information are state and local bridge design engineers and geotechnical engineers who can use the information to improve the end of bridge details currently in use. The scan results are likely to be of interest to several AASHTO committees including the AASHTO Committees on Bridges and Structures, Construction, Maintenance, Materials and Pavements, and possibly Design.

**Original Scan Proposal Title:** Best Practices for Detailing Bridge Ends And Approach Pavements To Limit Distress And Deterioration

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**Execution Schedule**

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| **Milestone** | **Anticipated Date** |
| Chairs and Team Members Identified | June 2019 |
| Desk Scan Completed | August 2019 |
| Pre-scan Meeting Held | August 2019 |
| Scan Conducted | November 2019 |
| Draft PowerPoint submitted by SME | December 2020 |
| Draft Report Delivered to NCHRP and Panel | March 2020 |
| Final Report Delivered to NCHRP | July 2020 |

**Estimated Scan Cost:** $200,000

**Anticipated Duration: 1 weeks (type 3 scan)**