

**CHAPTER 6**  
**BRIDGE MAINTENANCE**





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## Chapter 6

# BRIDGE MAINTENANCE

### 6.1 MAINTENANCE OPERATIONS

Bridge maintenance is an essential element for extending the service life of structures. Maintenance and preservation activities assist in protecting the structural and operational performance of bridge structures and in minimizing future repair costs.

This chapter addresses all aspects of bridge maintenance from the identification of maintenance requirements during inspection to the coordination required to perform recommended maintenance.

#### 6.1.1 Maintenance Process and Procedures

The Bridge Management Division inspects every bridge in the bridge file at least once every two years. Bridge inspectors enter the bridge inspection findings and recommendations into the BMS. The bridge maintenance recommendations are automatically transferred from the BMS to the Region maintenance stations through the Operating Management System (OMS) via work requests. The Region maintenance stations and District Engineer receive a Structures Inspection Recommendations Memorandum from the Bridge Management Engineer; see [Appendix 6A](#). The Structures Inspection Recommendations Memorandum contains a list of the highest priority work requests.

The Bridge Emergency/Maintenance Coordinator contacts the Maintenance Station Supervisor approximately one month after the bridge inspection has been completed to verify that the maintenance station received the Structures Inspection Recommendations Memorandum and understood the maintenance recommendations entered in OMS. The Region maintenance stations track the work requests in OMS. When the maintenance station schedules the work, the work request becomes a work order and the maintenance is performed.

The Bridge Emergency/Maintenance Coordinator schedules station visits to discuss the maintenance recommendations, provide training on repair techniques and assist with other structure related issues as necessary. During the station visits, the Maintenance Station Supervisor closes out the completed work orders in OMS.

#### 6.1.2 Structures Inspection Recommendations Memorandum

Bridge inspectors recommend maintenance activities for each bridge. The activities are prioritized as high, medium or low and are classified as routine/responsive maintenance, signing, safety features or preservation activities, as described in the following:

1. Routine/Responsive Maintenance. Consists of prioritized routine/responsive maintenance activities to be completed by the maintenance station staff every spring

and fall. Because routine maintenance is performed semiannually, bridge inspectors only recommend routine maintenance items that presently need attention.

2. **Signing.** Indicates inadequate or misplaced signage on the structure, such as object markers, load posting signs or vertical clearance signs, to be replaced by the maintenance station staff.
3. **Safety Features.** Indicates issues regarding transition elements, approach guardrail, attenuation, parapets and any other safety items to be addressed by the maintenance station staff.
4. **Preservation.** Consists of bridge needs that are outside of the scope of routine/responsive maintenance. The needs are addressed through a project and not entered into OMS.

The Structures Inspection Recommendations Memorandum presents the high priority bridge routine/responsive maintenance, signing and safety feature needs within the specific maintenance station. [Appendix 6B](#) contains the standard language to use for recommendations.

### 6.1.3 Operational Management System

OMS is used to plan, track and schedule the work orders to be performed by the maintenance stations and clears the work orders once the activity is completed. OMS is used to monitor the staff hours and associated costs to complete each activity to assist in future planning and programming of bridge maintenance funds.

## 6.2 REGION MAINTENANCE STATION

### 6.2.1 Routine/Responsive Maintenance Activities

The Region maintenance stations complete routine maintenance and responsive maintenance activities. Routine maintenance is performed on a regular frequency, typically twice a year. Responsive activities occur on an as needed basis. Maintenance activities use Code One funding, which is the state funding designation for all maintenance related activities on the state highway infrastructure.

Routine maintenance tasks completed every spring and fall include:

- Sweep deck
- Remove debris from drain/drain boxes
- Remove vegetation from deck and approach areas
- Remove vegetation from slope protection
- Remove debris from expansion joints
- Remove debris from around bearings
- Remove weeds and seal slope protection joints

- Remove debris from culvert barrels and inlets/outlets
- Patch minor potholes on deck
- Seal relief/backwall joints
- Maintain general safety features
- Repair erosion around wingwalls
- Repair erosion in slope protection
- Clean and seal parapets
- Remove graffiti
- Power wash structural elements
- Update signing

Responsive maintenance tasks can include:

- Patch minor potholes on deck
- Remove loose concrete from structures over traffic lanes
- Respond to bridge collisions
- Any routine/responsive maintenance item requiring immediate attention; see [Appendix 6.B.1](#)

## 6.2.2 Maintenance Coordination

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The Region maintenance stations perform the following coordination:

1. Perform Preservation and Address Recurring Issues. The maintenance stations provide input to the Structures Division on repairs and recurring issues (e.g., drainage, collisions, ride quality) that are considered preservation items. The Region and Structures Division personnel use the input from maintenance stations to help identify opportunities to address the items in future projects. [Appendix 6.B.4](#) lists standard language for preservation recommendations.
2. Designate Bridge Week. Bridge week is implemented at the Region's discretion. During bridge week, the entire maintenance station spends one week focusing on structure maintenance, which is in addition to the spring and fall routine maintenance.
3. Plan Work Around Road Closures. During construction projects, maintenance stations can complete maintenance activities within the road closure limits. Maintenance stations coordinate project schedules and expected road closures with contractors to complete the work.

## 6.3 TRAINING

### 6.3.1 Maintenance Academy

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The Maintenance Division conducts a maintenance academy twice a year to train new employees. The Bridge Management Division provides training on basic bridge components,

maintenance activities and inspection. The training provides knowledge and structural awareness to maintenance staff.

### **6.3.2 Transportation Education Program**

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The Maintenance Division created the Transportation Education Program (TEP) to better train maintenance transportation technicians who work in both construction and maintenance. The technicians are placed into three experience levels to assist in all types of construction inspection and maintenance activities. Individuals participating in the training have typically completed the maintenance academy training. The Bridge Management Division provides training through the TEP, which describes structural elements, bridge inspection, structure maintenance activities and bridge construction inspection in more detail than the maintenance academy.

### **6.3.3 Snow School**

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The Regions conduct an annual snow school training every fall to refresh maintenance personnel on winter maintenance activities. The Bridge Management Division provides training on bridge maintenance and emergency response.

### **6.3.4 Road School**

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Each April, the Utah League of Cities and Towns, in cooperation with the Utah Local Technical Assistance Program Center, presents a conference specifically for public works department personnel from throughout the state. Workshops present state of the art techniques, money saving alternatives, various compliance regulations, safety procedures and management skills. The Bridge Management Division provides various training at the conference.

## Appendix 6A

# STRUCTURES DIVISION RECOMMENDATIONS TO MAINTENANCE STATIONS



### MEMORANDUM

#### STRUCTURES INSPECTION RECOMMENDATIONS

To: Supervisor Name  
Station Supervisor, Station XXXX

From: Joshua Sletten  
Bridge Management Engineer

Date: June 11, 2013

The Structures Division bridge inspectors recently completed bridge inspections for station XXXX. The following is a summary of the *High Priority* maintenance recommendations for the station:

1. Routine/Responsive Maintenance
  - Bridges XC XXX (list all applicable structure numbers) Patch minor potholes on deck.
  - Bridges XC XXX Remove debris from expansion joints.
  - Bridge XF XXX Place riprap around west abutment to repair exposed footing issues.
2. Safety Features
  - Bridges XF XXX Repair approach barrier.
3. Signing
  - Bridge XC XXX Update clearance sign to read 14 feet 5 inches

The Bridge Emergency/Maintenance Coordinator will be doing a follow-up visit 6 to 8 weeks after the inspection to go over Routine/Responsive Maintenance, Safety Features, Signing, and any other bridge related issues.

If you have any questions or concerns, please contact Mike Ellis, Bridge Emergency/Maintenance Coordinator, at 801-633-6224.

Thank you for your efforts.

Figure 6.1 — STRUCTURES INSPECTION RECOMMENDATIONS MEMORANDUM

## Appendix 6B

# STANDARD LANGUAGE FOR RECOMMENDATIONS

### 6.B.1 List of Routine/Responsive Maintenance Recommendations

- Sweep deck
- Clean joints
- Remove weeds and seal slope protection joints
- Overlay approach slab settlement
- Patch minor potholes on deck
- Remove debris from expansion joints
- Seal relief/backwall joints
- Remove debris from drain/drain boxes
- Remove debris from around bearings
- Remove large vegetation debris and vegetation growth from channel
- Remove debris from culvert barrels and inlets/outlets
- Remove loose concrete from structures over traffic lanes
- Remove graffiti
- Repair chain link fence damage
- Extend drain pipes below girders
- Repair erosion around wingwalls
- Repair erosion in slope protection
- Place riprap around abutments to repair or prevent scour
- Replace missing parapet delineators
- Remove debris from deck, shoulders and sidewalks
- Crack seal deck asphalt wearing surface
- Crack seal approach asphalt wearing surface
- Clean and seal parapets
- Remove vegetation from deck and approach areas
- Seal slope protection
- Remove vegetation from slope protection
- Maintain general safety features
- Power wash structural elements
- Update signing

### 6.B.2 List of Standard Safety Recommendations

- Update approach barrier to meet current standards
- Repair approach barrier
- Update bridge parapet to meet current standards
- Repair bridge parapet

### 6.B.3 List of Standard Signing Recommendations

- Install missing object markers to meet current standards
- Update (clearance/load limit ) signs to read (X)
- Install (clearance/load limit ) signs to read (X)
- Install (X) advance warning signs

### 6.B.4 List of Preservation Recommendations

- Apply deck overlay treatment
- Replace deck overlay treatment
- Replace deck
- Replace parapets
- Repair parapets
- Replace approach slab
- Replace expansion joints
- Remove and close expansion joints
- Install deck shoring
- Install polymer overlay
- Repair settlement/ride
- Repair spalls/delaminations/potholed areas
- Apply healer/sealer on the deck and parapets
- Install waterproof membrane and asphalt overlay
- Clean and seal parapets
- Repair chain link fence damage
- Extend drain pipes below girders
- Remove and patch all loose concrete from structures
- Repair girder ends
- Replace girders
- Repair bent cap
- Repair collision damage in girders
- Clean and repaint structural steel
- Install carbon fiber wrap on girders and girder ends
- Epoxy inject cracks in girders
- Repair, replace or reset bearing units
- Clean and paint bearing units
- Place riprap around abutments/bents to repair or prevent scour
- Wrap columns with carbon fiber
- Install scour countermeasures
- Repair and restore channel
- Fill/repair erosion holes in aprons

