3-1 General

This chapter provides guidelines to inspect bridges*, including documentation.

The guidelines presented herein are those in use by the WSDOT Bridge Preservation Office (BPO). Local Agencies are encouraged to follow these guidelines so as to provide a consistent basis for evaluation and reporting of inspection data. Coding for non-mandatory items may deviate according to the needs of an individual agency. Agencies are encouraged to document such deviations in a manner so as to aid in the evaluation of the associated inspection data.

The basis for bridge inspection policies and procedures are referenced throughout the chapter by the updated versions of the two following manuals: The AASHTO Manual for Bridge Evaluation (MBE), Section 4, provides uniformity in the procedures and policies for determining the physical condition, maintenance needs, and load capacity of the nation's highway bridges.

The FHWA NHI 12-049 Bridge Inspector's Reference Manual (BIRM) is a manual on programs, procedures, and techniques for inspecting and evaluating a variety of in-service bridges. It provides guidelines regarding what preparation is necessary, how to inspect, what to look for, what equipment and tools are needed, how to document the results of the inspections, and provide appropriate follow-up to the inspection.

Depending on the inspection type, bridges submitted to the NBI and NTI have regular inspection intervals that must adhere to the intervals as defined within the NBIS and NTIS. When a bridge is inspected late, the agency must document a justifiable cause that pushed the inspection beyond the required interval. The justifiable cause, identified as an unusual circumstance in the preamble of the NBIS and NTIS regulation, should be documented within the inspection report. Some examples of unusual circumstances are as follows: severe weather, concern for inspector safety, concern for inspection quality, the need to optimize scheduling with other bridges, or other unique situations. The agency must also ensure that the next inspection is scheduled for the original inspection month during subsequent inspection cycles.

3-2 Inspection Types and Reporting

A number of different types of inspections have been developed to address specific needs. This section will identify and describe the inspection types used by both the state and local agencies. Below is a list of inspection types followed by a description of each inspection/report type.

- Routine (A)
- Nonredundant Steel Tension Member (NSTM) (B)
- Underwater (C)
- Special Feature (D)
- Interim (E)
- Underwater Interim (F)
- Damage (G)
- Primary Safety (H)
- Secondary Safety (I)
- Condition Safety (J)
- Short Span (K)
- Two-Man UBIT (L)
- Informational (M)
- Inventory (N)
- In-Depth (O)
- Geometric (P)
- Feature (Q)
- Scour Monitoring (R)

*Bridge is intended to mean all reportable structures which includes bridges, culverts and tunnels.
(A) Routine

1. Initial Inspection – The first inspection performed on any new, replaced, rehabilitated, or temporary bridge is the Initial Inspection. It verifies the data entered into BridgeWorks via the “Inventory” Report type. An Initial Inspection may also be performed when there is a change in bridge ownership. The initial inspection is typically reported to the NBI and NTI in conjunction with a Routine inspection.

The purpose of this inspection is to add the bridge to the inventory of bridges and to establish certain baseline information.

   a. Gathering Inventory Data – Establishing baseline information about the bridge from the original construction plans or as-built plans can be performed in the office prior to the site inspection. Agencies shall record the required WSBIS data into BridgeWorks along with the applicable Bridge Management System (BMS) elements for the structure. Any information not known or which cannot be determined from the plans can be left blank until the site inspection.

   Depending on the type of structure built, one or more of the following inspection types may also be required to be performed with the initial inspection:

      • A Routine Inspection
      • An NSTM Inspection if the bridge contains nonredundant steel tension members, see (B) Nonredundant Steel Tension Member (NSTM).
      • An Underwater Inspection is needed to inspect underwater portions of the bridge, see (F) Underwater Interim Inspection.
      • A Special Features inspection if the bridge contains unique design or construction elements, see (D) Special Feature.

   Conclusions and findings from these items should be incorporated into the Bridge Inspection Report (BIR) to support the applicable codes and ratings.

   Team Leaders should coordinate the planning and timing of the inspection with the appropriate project or construction offices prior to visiting the site.

   b. Site Inspection – After the bridge has been built, and preferably before it is placed into service, the Team Leader must visit the bridge site to verify the inventory information that has been coded and to establish any information that was not known or initially coded incorrectly. At the bridge site, the Team Leader can review the information to confirm the actual bridge dimensions and clearance measurements and to verify the list of bridge elements including the quantity and condition of each.

   Changes or additions to the WSBIS data, the BIR form, or BMS elements, must be noted on the inspection form and entered into BridgeWorks.

   c. Check Coding – The BIR form should note any inconsistencies found between the planned and the as-built bridge and should provide an explanation of any coding changes made. For example, if surface cracks have been found in a newly-poured bridge deck but these cracks do not warrant lowering the condition coding for the deck, the Team Leader should note the location and extent of the cracking so that it can be looked for and further evaluated during future inspections.
As part of the Initial Inspection, two photographs of the bridge shall be taken: an elevation and a deck photograph. The elevation photograph should be taken (looking north or east) when possible to show a view from one side of the bridge. The deck photograph should be taken (ahead on station) to show a view of the bridge looking onto the bridge deck.

See (A-2) Routine for instructions on completing the remainder of the BIR form.

d. **Updating the Bridge File** – The Inventory Record, the BIR, and the two photographs provide a record of the Initial Inspection. In addition to being stored within BridgeWorks, these items must be placed in the bridge file created for the given bridge. Each time the bridge is revisited, additional inspection reports, any new photos, and any updates to the WSBIS and to the BIR form are added to the file so that the bridge records remain current. See Section 2-2 for further details.

2. **Routine Inspections** – Routine Inspections are regularly scheduled inspections consisting of observations, measurements, or both, needed to determine the physical and functional condition of the bridge, to identify any changes from "Initial" or previously recorded conditions, and to ensure that the structure continues to satisfy present service requirements. Generally, a regular inspection of the entire bridge is to be performed on regular intervals not to exceed 24 months throughout the life of the bridge. The acceptable tolerance for intervals of 24 months or greater for the next Routine inspection is up to three (3) months after the month in which the inspection was due. The subsequent Routine inspection will be reset to the original target month. Changes to the target month will require Program Manager (PM) approval within BridgeWorks. The acceptable tolerance for intervals less than 24 months for the next Routine inspection is up to two (2) months after the month in which the inspection was due. The subsequent Routine inspection will be reset to the original target month. Changes to the target month will require PM approval within Bridgeworks. Routine Inspections are reported to the NBI and NTI.

a. **Inspecting Bridge Components** – The BIRM describes the general inspection procedures to be followed for inspecting any concrete, steel, or timber bridge, and the specific procedures to follow for inspecting a given bridge element (i.e., the bridge abutments). These steps can be used by the Team Leader as a checklist to help accomplish the inspection and to help spot particular types of problems a given bridge or bridge element will be prone to. Following these procedures will help ensure that a thorough and comprehensive inspection is achieved.

However, specific problems not covered in these general procedures may be encountered. If that is the case, the Team Leader may contact their respective WSDOT Bridge Program Support personnel.

b. **Inspecting for Scour** – The Routine Inspection of any bridge over water should include an assessment of existing scour conditions, the effect of scour on the bridge, effectiveness of countermeasures, and recommendations for repair, if appropriate. The following manuals, as well as the BIRM, discuss inspection procedures for bridges over water:

- **HEC 18 Evaluating Scour at Bridges**

  The field inspection is used in conjunction with the scour analysis, see Section 5-3, to identify and verify the potential of harmful effects of scour to the bridge.
The field inspection includes the specific location and extent of any deterioration, damage, or undermining in:

- The stream channel and stream banks.
- The substructure elements (i.e., intermediate piers, pier walls, web walls, columns, or shafts).
- The foundation (i.e., footings and seals).
- Channel protection devices (i.e., dams and levees).
- Scour countermeasures (i.e., riprap or shielding).

Measure and record the extent of foundation exposure and undermining.

Recommend any repairs, replacement, or maintenance required.

Perform soundings on bridges as identified by the Scour Engineer using the Scour Field Evaluation form.

The Scour Field Evaluation form was developed to supplement the BIR for water crossings by measuring the streambed cross-section (soundings) at a bridge to document observations related to scour. A copy of this form is shown in Section 3-5.

Soundings of streambed elevations should be taken during the Initial Routine Inspection and during subsequent inspections as required. The form should note the location and depth of the streambed at each point where a sounding was taken. This information should then be plotted in order to identify long term changes in the channel cross section over time.

c. **Bridge Inspection Report** – A Bridge Inspection Report must be prepared at the completion of each Routine Inspection to record the inspection findings, provide a narrative description of conditions at the bridge site, and note any changes in the WSBIS coding information. The Team Leader shall record and submit the findings of the Routine Inspection into BridgeWorks. A Routine Inspection will be included with an NSTM Inspection and a Special Feature Inspection. Bridge Inspection Reports must be completed within 90 days from the start of the inspection. A completed report is defined as a report that has been "Released" in the BridgeWorks program.

The Bridge Inspection Report form will have the following preprinted information that will identify the bridge:

- **Bridge Number** – The bridge number given by the owner agency that is associated with the particular structure.
- **Bridge Name** – The bridge name given by the owner agency that is associated with the particular structure.
- **Structure ID** – The unique federal structure identification number associated with the particular structure in the NBI and NTI assigned by WSDOT for the life of the bridge.
- **Route** – The number of the inventory route carried on or under the bridge.
- **Milepost** – The bridge's milepost location on the inventory route.
- **Intersecting** – The feature or features which intersect with the bridge.
- **Location** – The physical location of the bridge.
- **Structure Type** – The structure type (for local agency bridges, this field may be blank).
d. Completing the Bridge Inspection Report

(1) At the conclusion of the Routine Inspection, confirm the condition and adequacy coding for the various bridge elements and make any changes as necessary. Review the Adequacy Appraisal codes, NBI condition codes, BMS and SNTI elements and their respective condition states, and complete the narrative describing the existing conditions. Verify that the correct Program Manager is listed on the inspection report.

(2) Enter onto the inspection report: Team Leader initials, Team Leader identification number, Assistant Inspector initials, date of inspection, and total number of crew hours at the bridge site. The Team Leader and Assistant Inspector are required to sign the approved and released copy of the BIR that is placed in the bridge file.

(3) Prepare a list of any bridge elements in need of repair and recommend the type of repair that should be done. A photo of repair areas should be taken with each type of recommended repair. See Section 6-4 for additional repair instructions and procedures.

(4) If it is determined that a critical bridge deficiency has been identified resulting in an emergency load restriction, lane closure, bridge closure or a failed bridge, a Damage Inspection and/or a subsequent In-Depth Inspection may have to be performed, see (G) Damage for Damage Inspections, and (O) In-Depth for In-Depth Inspections.

e. Updating the Inventory Record – Any changes that need to be made to the Inventory Record shall be entered into BridgeWorks.

After the data is processed and updated, a new Inventory Record is generated for each bridge that has changes. On all Routine Inspections, all changes/updates to NBI and NTI data shall be released into the inventory within 90 days of the date of inspection.

The updated SI&A Report and other applicable reports shall be filed in their respective bridge file.

3. Routine Inspections with Extended Intervals – Routine Inspections with extended inspection intervals are structures with inspection intervals greater than 24 months not exceeding 48 months, and only with written FHWA approval. Reportable structures that have administrative load ratings (WSBIS ITEM NUMBERS 1551 & 1554 = 0) are not eligible for 48 month intervals.

The criteria approved by FHWA shall be re-evaluated after every inspection. Refer to the WSDOT letter sent to FHWA, dated July 28, 1998, see Appendix 3-C for further details. Please note that after June of 2024, this document, and the criteria it contains will no longer be valid based on the new guidelines of the 2022 NBIS. Revisions to policies and procedures for extended interval inspections will be addressed and finalized prior to the June 2024 deadline.

The Coding and Appraisal Unit will run an automated check annually on the entire database to ensure that the extended inspection interval is still valid and meets the criteria agreed upon between FHWA and WSDOT. Team Leaders for the State shall place the following note in the zero (0) note of the BIR within BridgeWorks for existing extended interval bridges and candidate bridges:
“Continue to validate the status of this bridge each inspection as a 48-month inspection candidate. Verify condition ratings, load ratings, vertical clearances, ADT, scour codes when applicable, and that no major maintenance has been completed in the last two years.”

The procedures and guidelines used for Routine Inspections at 24 month intervals shall be used for these structures as well.

4. **Routine Inspections with Inspection Intervals Less than 24 Months** – Bridges or culverts should be considered for more frequent inspections if the NBI Superstructure, Substructure or Culvert code is equal to or less than a 3 and where there are multiple elements with deficiencies that reduce capacity. The SPM will approve the need to perform routine inspections more frequently than 24 months.

**(B) Nonredundant Steel Tension Member (NSTM)**

The National Bridge Inspection Standards (NBIS) require that an NSTM Inspection be performed on regular intervals not to exceed 24 months on bridge members identified as NSTM’s. The acceptable tolerance for intervals of 24 months for the next NSTM inspection is up to three (3) months after the month in which the inspection was due. The acceptable tolerance for intervals of less than 24 months for the next NSTM inspection is up to two (2) months after the month in which the inspection was due. The subsequent NSTM inspection will be reset to the original target month. Changes to the target month will require PM approval within BridgeWorks. According to the MBE, a nonredundant steel tension member is a steel tension member in a bridge whose failure could result in the partial or total collapse of the bridge.

This section provides information to assist the Team Leader in identifying nonredundant steel tension bridge members, preparing written procedures, planning and performing effective NSTM Inspections and completing the required inspection report. The information presented here is meant as a summary of the main points of the NSTM Inspection. NSTM’s were previously referred to as fracture critical members and a complete description can be found in the BIRM. NSTM Inspections are reported to the NBI.

1. **General** – Each agency shall identify the bridges within its jurisdiction which contain NSTM’s. The agency can then identify, through documentation, the particular NSTM’s within each bridge. For the member to be considered an NSTM, two conditions must exist.

   a. The member must be a steel member in tension. The area of the bridge where the member is located is subject to tensioning (expanding) forces.

   b. There is no load path, system, or internal redundancy in the member or the bridge. There must be no other structural elements able to carry the load of the member if the given member fails.

   There are four types of redundancy: load path, structural, system, and internal. Bridge owners in the past have mainly identified structures with only load path redundancy to determine whether a member is an NSTM. Load path redundancy is the number of supporting elements, usually parallel, such as girders or trusses. AASHTO neglects structural and internal redundancies in determining whether a member is an NSTM. For a bridge to be redundant, it must have more than two load paths. An exception to this is where steel three girder systems have pin and hangers. In this case, the pin and hangers are considered as NSTM’s.
2. **Bridge Types** – The following is a list of the types of bridges in which NSTM’s will be found. Figures are also shown which illustrate these bridge types and note the location of the NSTM areas.

   a. **Steel Two-Beam or Two-Girder Systems (Exhibit 3-1)**

      (1) **Simple Spans** – Each beam or girder should be considered an NSTM as failure of either one could cause the bridge to collapse (Example A).

      (2) **Continuous Spans** – In general, at the midpoint of the span, the bottom of the girder should be considered as an NSTM and over the pier, the top of the girder should be considered as an NSTM. A structural engineer may need to assess the bridge to determine the actual redundancy and presence of NSTM’s (Example B).

      (3) **Cantilever-Suspended Span** – In addition to the bottom of the girder at mid-span and the top of the girder over the pier, the top flange and adjacent portion of the web in the area of the cantilevered support should be considered as an NSTM (Example C).

   **Exhibit 3-1** Steel Two-Beam or Two-Girder Systems

   Example A: Simple Beam

   ![Example A: Simple Beam](image1)

   Example B: Continuous Spans

   ![Example B: Continuous Spans](image2)

   Example C: Cantilever - Suspended Spans

   ![Example C: Cantilever - Suspended Spans](image3)
b. **Steel Truss Systems (Exhibit 3-2)** – Most truss bridges employ only two trusses and are thus considered as having NSTM’s. All truss members in tension should be regarded as NSTM’s. The exception is, when a detailed analysis by an experienced structural engineer, verifies loss of a member would not result in collapse of the bridge or major component.

The following elements within any truss bridge should also warrant special attention:

1. **Pin-Connections** – Any load bearing pin connection in an NSTM or steel three girder system is considered as an NSTM.

2. **Category D and E Welds** – On a truss bridge, any tension member containing a Category D or E weld. (See Inspecting Steel Bridges for Fatigue Damage published by Pennsylvania DOT.)

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c. **Tied Arches (Exhibit 3-3)** – The tie girder which keeps the supports from spreading apart is in tension and should be considered as an NSTM.
d. **Suspension Spans (Exhibit 3-4)**

(1) **Cables** – If the main suspension member is a cable, the cable should be considered as an NSTM (Example A).

(2) **Cable Stayed Bridge** – The bridge is of such complexity that it should be reviewed by a structural engineer to determine the criticality of the various stays to fracture (Example B).

**Exhibit 3-4**  **Suspension Spans**

Example A: Cable Suspension Bridge

Example B: Cable Suspension Bridge
e. Other NSTM Bridge Details

(1) **Steel Cross Beams and Caps** – Tension zones of the I section or box beam should be considered as an NSTM (Exhibit 3-5).

![Exhibit 3-5 Steel Cross Beams and Caps](image)

(2) **Pin and Hanger Supports** – The pin and hanger connection used to support a suspended span from a cantilever span should be considered as an NSTM if the member is non-redundant. The pin connection and hanger support in a two-girder or three-girder system are considered as NSTM’s as the bridge has no built in redundancy. The same connections in a multi-beam system (more than 3 beams) are not NSTM’s as the bridge has a high degree of redundancy. Pin connections in such bridges should be inspected with the same techniques and methods as NSTM pins (Exhibit 3-6).

![Exhibit 3-6 Pin and Hanger Supports](image)

3. **Prepare Written Procedures** – Once the NSTM’s within a bridge have been identified, the agency must prepare a detailed plan as to how it will accomplish the NSTM Inspection. This written procedure may be developed by others being hired to perform the NSTM Inspection. However, if this is done, a qualified designee from the owner agency should carefully review the written plan to ensure that a sufficient analysis of the member will be made and that the task will be accomplished in a reasonable manner. These written inspection procedures are to be kept in each bridge file.
NSTM Inspections can prove costly; therefore, in the development of the inspection plan, particular attention should be given to each of the following:

a. **Scheduling** – Generally, it will be best to schedule an NSTM Inspection during cold weather (as cracks will be more visible), at low water (if the NSTM is underwater at high water), during daylight hours, and when traffic on the bridge will be lightest (as some form of traffic control may be necessary).

b. **Equipment** – The Team Leader will require close access to each NSTM; thus, some type of equipment may be needed to provide sufficient access. Ladders, scaffolding, aerial work platforms, or UBITs may be deemed appropriate for a given situation. The choice of equipment will depend on the cost of rental, the time needed to perform the inspection using that equipment, and equipment availability. If a UBIT is used, it should be determined, before its use, whether it could overload the bridge, operate on the bridge grade, has sufficient reach, and if it might damage the deck. Use of a UBIT may also create a need for traffic control.

c. **Workforce** – In order to keep the amount of time spent at the bridge site to a minimum, consideration should be given to the level of manpower needed. Once the number of individuals needed is determined, the duties to be performed by each individual should be clearly defined.

d. **Tools** – The standard tools common to any Routine Inspection should be on hand for the NSTM Inspection. In particular, a wire brush, a magnifying glass, and a light source able to provide 50 to 100 lumens should be considered. In addition, specialized tools for carrying out nondestructive testing may also be warranted (i.e., a dye penetrant kit or ultrasonic testing device).

e. **Inspection Procedures** – The NSTM inspection plan should identify the inspection interval and method(s) to be used. These should be developed depending on the criticality of the feature based on experience with other similar details or structures, calculated remaining fatigue life, current indications, material properties, consequences and likelihood of rapid failure, etc.

If several types of inspection are employed, identify when, where and how they are to be used. For example, a pinned truss bridge may require each of the pins to be examined visually during each inspection, supplemented by ultrasonic testing of ½ of the pins during each inspection. Therefore, all of the pins would be inspected ultrasonically in a 72-month period, if the inspection interval was 24 months.

4. **Perform the NSTM Inspection** – The purpose of the NSTM Inspection is to assess the structural condition of each bridge member identified as an NSTM. When inspecting these members, it is always best to err on the side of conservatism. The consequences of dismissing or failing to note a blemish on an NSTM are too great. Therefore, the inspection should be conducted carefully and thoroughly. Such close inspection of single members can be tedious; however, the Team Leader should work in a manner that insures the same degree of care and attention to the last area inspected as the first. The previous pages described the general areas within a bridge where NSTM’s will be located. The following pages describe the particular features to note.
First, the Team Leader must gain access to the area with NSTM's. The Team Leader should be no further than 24 inches from the surface being inspected and should work with a light source of at least 50 to 100 lumens. The best viewing angle is at approximately 120°. The Team Leader will want to look for deteriorated surfaces or surface cracks. The BIRM discusses inspection procedures and the types of problems that may be found.

The following areas or members should be checked:

• Areas vulnerable to corrosion (under deck joints, on surfaces where water collects and in places where dissimilar materials meet).
• Areas where there is a change in the bridge cross section, where stress is concentrated, or which show out-of-plane bending.
• Web stiffeners (especially at the ends).
• Coped sections and/or re-entrant corners.
• Eyebars.
• Shear connectors.
• Pin and hanger assemblies.
• Punched holes.
• Rivet and bolt heads.
• Tack welds and field welds (especially at weld ends or returns).

If any cracks, blemishes, or other irregularities are found, the Team Leader will need to evaluate these further, which may include the use of a magnifying glass. A dye penetrant kit can be used to establish the limits of a crack. Use of magnetic or ultrasonic testing devices may be required to detect internal problems not apparent to the eye. The agency will need to determine which devices will be the most cost effective and reliable for the given situation.

Finally, the Team Leader will need to record the location and size of any cracks found. Mark and date the crack ends in permanent marker for follow up on the structure. In most cases, it will be helpful to take a photograph of such cracks to provide visual documentation. This information and the photographs are to be included in the Visual Nonredundant Steel Tension Member Inspection Report.

5. Prepare the Visual NSTM Inspection Report – At the conclusion of the NSTM Inspection, a Visual NSTM Inspection Report should be prepared to provide detailed verification of the inspection findings. The report should provide qualitative and quantitative information concerning the NSTM's. This information is important for a number of reasons: it can offer insight about the condition of the member, it can provide a history of the bridge, and it can be used to substantiate the thoroughness of the inspection effort in the event of litigation arising from a bridge failure. See Section 3-5 for a copy of the Visual NSTM Inspection Report form.

The inspection report should:

• Identify what parts of the bridge were inspected and the location of each NSTM. (This can be shown on a photograph or sketch of the bridge.)
• Describe the procedures followed to inspect the NSTM.
• Describe the condition of the NSTM.
• Provide the following details about any defects found:
  – What the defect is.
  – Where the defect is located (a sketch may be used to illustrate its location relative to the ends of the member, and its position in the cross section of the member).
  – Summarize the inspection findings (addressing how individual defects affect the member’s overall condition).
  – Make any appropriate recommendations (i.e., repair the NSTM, recalculate load ratings, close the bridge).

6. **Updating the Inventory Record** – Any changes that need to be made to the Inventory Record shall be entered into BridgeWorks.

   On all NSTM Inspections, all changes/updates to NBI data shall be released into the inventory within 90 days of the date of inspection.

7. **Updating the Bridge File** – Place the signed and completed Visual NSTM Inspection Report within the bridge file. This report can be referred to if necessary to help determine the appropriate inspection interval for the bridge, evaluate the degree to which bridge conditions have changed from one inspection to the next, and determine what maintenance or repair may be required on the bridge.

8. **NSTM Inspections with Inspection Intervals Less than 24 Months** – NSTM Bridges should be considered for more frequent inspections if the NBI Superstructure or Substructure code is equal to or less than a 4 and where there are multiple elements with deficiencies that reduce capacity. The SPM will approve the need to perform NSTM Inspections more frequently than 24 months.

(C) **Underwater**

Bridges over water have special inspection requirements. If the bridge has members in water too deep to permit a visual or tactile (hands-on and/or wading) inspection from the surface at low water or during seasonal low stream flows, an underwater bridge inspection diver must conduct an Underwater Inspection. An evaluation of the bridge’s susceptibility to scour also needs to be conducted, see Section 5-3. Many bridge failures are due to underwater or scour problems; therefore, the importance of these types of inspection cannot be overemphasized. There may be environmental restrictions that need to be taken into consideration prior to conducting an Underwater Inspection.

An Underwater Inspection of submerged bridge elements is required on an interval not to exceed 60 months. The acceptable tolerance for intervals of 60 months for the next Underwater inspection is up to three (3) months after the month in which the inspection was due. The subsequent Underwater inspection will be reset to the original target month. Changes to the target month will require PM approval within BridgeWorks. The purpose of the Underwater Inspection is to examine the underwater elements to the extent necessary to determine their structural condition and adequacy. At a minimum, an underwater bridge inspection diver must swim by and examine all underwater portions of the bridge. If the underwater elements are covered with marine growth, portions of the structure need to be cleaned in order to positively ascertain the condition of the element. For concrete piers, this consists of cleaning 1 square foot patches near the surface, mid height, and bottom of all piers. For multiple pile bents, a one foot band must be cleaned near the surface, mid-height and bottom of one pile per bent, but no less than 10 percent of the piles. The underwater bridge inspection diver must also perform a visual or tactile inspection of the entire bridge.
footing at ground line to identify if any undermining of the footing exists, as well as probing
to determine if scour holes are being filled in. If significant problems are encountered during
the course of the inspection, a more detailed inspection of the bridge may be needed.

Existing scour conditions must be evaluated during an Underwater Inspection. The Team
Leader must assess condition and depth of the streambed, determine the susceptibility of
the streambed to scour, and determine what countermeasures can be taken to safeguard the
bridge. The primary requirement of the scour inspection is to establish a cross-section of the
streambed. This is accomplished by sounding and can be carried out with either a fathometer
(also known as a “fish finder”) or a lead line. See the BIRM and the MBE for guidance on
performing Underwater Inspections. Underwater Inspections are reported to the NBI.

1. **Prepare Written Procedures** – Written inspection procedures need to be developed for
each bridge requiring an underwater inspection. The inspection plan should detail as a
minimum:
   - Type and interval of required inspection.
   - Location of members to be inspected.
   - Type(s) of foundation.
   - Bottom of foundation elevation or pile tip elevation.
   - Identification of scour critical substructure units.
   - Special equipment requirements.
   - Follow-up actions taken on findings of last inspection.

2. **Document the Underwater Inspection** – Prepare a Daily Site Dive Log for each dive and
prepare an Underwater Inspection Report when inspection of the entire underwater
portion of the bridge is concluded.

   a. **Daily Site Dive Log** – The Daily Site Dive Log must be completed by the inspection
      Team Leader (in concert with the diver). Section 3-5, provides a sample of the Daily
      Site Dive Log form. The form should summarize what equipment was used in the dive,
      what procedures were employed, what problems were encountered (such as strong
      currents or underwater obstructions or accumulations of debris), and should provide
      any information which may be helpful for planning future dives. At the conclusion
      of every dive, the diver must go over the inspection findings with the Team Leader
      in order to verify that the notes taken by the staff on the surface are a correct
      representation of what the diver found. The diver should also go over all underwater
      photos, making sure that the photo numbers and descriptions are correct.

   b. **Underwater Inspection Report** – The Underwater Inspection Report must be
      completed by the underwater inspection Team Leader and reviewed by the diver. The
      report should be thorough and include the following information for the various levels
      of inspection performed.

      (1) For a Routine Underwater Inspection, note:
         - What conditions were found as a result of the visual inspection or cleaning.
         - The condition of any protective coatings.
         - Evidence of any significant defects or damage.
         - Evidence of scour or the build-up of debris at the piers.
         - The location of exposed foundation elements.
• Ground line elevations at the base of all piles or pile groups, elevations of the tops of all exposed footings and/or seals, and ground line elevations of all footings or seals at their corners.
• The condition of the streambed around each pier, including a description of any placed rock.
• The water flow (whether high, medium, or low) and an approximation of the velocity (ft/sec.).
• The influence of any significant environmental conditions (i.e., corrosive pollutants, salt water, etc.).
• Any changes to the surrounding area which have or may alter the flow characteristics around the pilings or piers (i.e., logs upstream, construction going on nearby).
• Any discrepancies between the bridge design and its actual configuration.
• Any recommendations for repairs, a subsequent scour inspection, a change in inspection interval, or an in-depth inspection.

(2) For an Interim Inspection, note:
• The specific areas inspected.
• The amount and type of testing performed.
• Testing results and/or findings.
• Any recommendations for repair

In addition to the written information provided in the Underwater Inspection Report, problem areas in the bridge should be carefully identified and documented with drawings, photographs, and/or video recordings. Although underwater photos and video recordings are often preferred, they may not always offer clear views of the problem areas so sketches and drawings are always needed to document findings.

3. **Updating the Inventory Record** – Any changes to the applicable inventory coding information (the date of underwater inspection, Team Leader initials, inspection hours and changes to the condition coding for the substructure) shall be entered so that the Inventory Record can be updated accordingly. On all Underwater Inspections, all changes/updates to NBI data shall be released into the inventory within 90 days of the date of inspection.

4. **Updating the Bridge File** – The completed Underwater Inspection Report and an updated copy of the Inventory Record shall be placed in the bridge file. These reports can be referenced to as necessary to help determine the appropriate inspection interval for the bridge, to evaluate the degree to which bridge conditions have changes from one inspection to the next, and to determine what maintenance or repair may be required.

5. **Underwater Inspections with Inspection Intervals Less than 60 Months** - Bridges that require an Underwater Inspection should be considered for more frequent inspections if the NBI Substructure code is equal to or less than a 4, or the Scour code is equal to or less than a 2 and where there are underwater elements with deficiencies that reduce capacity. The SPM will approve the need to perform Underwater Inspections more frequently than 60 months.
(D) **Special Feature**

Bridges with special features include structures such as movable bridges, floating bridges, suspension and cable-stayed bridges, and ferry terminals. Also included are bridges built with special materials such as high strength steel, and bridges that were built using techniques such as segmentally constructed post-tensioned concrete boxes. Bridges with pin and hanger connections are also considered to be special feature bridges. Written procedures must be developed and included in the bridge file for all Special Features Inspections. Procedures should include:

- Type, detail, and **interval** of required inspection.
- The location of members to be inspected.
- Special equipment required.

The first four bridge types listed below are considered “Complex Bridges” according to the NBIS. The remaining types are inspected as suggested by FHWA. See Appendix 3-D on FHWA letter for Bridge Special Feature Inspections. Special Feature Inspections are performed on regular intervals not to exceed 24 months. **The acceptable tolerance for intervals of 24 months for the next Special Feature inspection is up to three (3) months after the month in which the inspection was due. The acceptable tolerance for intervals of less than 24 months for the next Special Feature inspection is up to two (2) months after the month in which the inspection was due. The subsequent Special Feature inspection will be reset to the original target month.** Changes to the target month will require PM approval within BridgeWorks.

1. **Movable Bridges (Code ‘1’ in BridgeWorks)** – There are three basic types of movable bridges: vertical lifts, bascules, and swings. All of these structures are operated by either electro-mechanical drive systems or hydraulic systems. See the BIRM and the MBE for guidance on performing inspections on movable bridges.

2. **Suspension Bridges (Code ‘3’ in BridgeWorks)** – Suspension bridges consist of a pair of main cables hanging between and passing over two towers and anchored by backstays into large counterweights on opposite shores. Suspender ropes hang from the main cables and support a pair of stiffening trusses or girders that run the length of the suspended spans. The stiffening trusses or girders support floor beams, stringers, and a roadway deck. Orthotropic decks may be used in place of the stringers and roadway deck. See the BIRM and the MBE for guidance on performing inspections of suspension bridges.

3. **Cable-Stayed Bridges (Code ‘9’ in BridgeWorks)** – Cable-stayed bridges are very distinct structures with many unique details that require special inspection. On a cable-stayed bridge the longitudinal structural components that support the road deck are supported by inclined cables or stays that extend directly into anchors or saddles in one or two towers. One cantilevered component is balanced by another cantilevered component on the opposite side of the support tower. Typically, the deck is anchored to the ground in at least one spot to resist seismic forces and any unbalance in the cantilevered spans. See the BIRM and the MBE for guidance on performing inspections on cable-stayed bridges.

4. **Segmental Bridges (Code ‘5’ in BridgeWorks)** – Segmental bridges are unique due to their construction. A segmental girder is a single or multiple box girder that is formed from segments post-tensioned together. This type of construction takes advantage of the standardization of the manufacturing process. See the BIRM and the MBE for guidance on performing inspections of concrete segmental bridges.
5. **Floating Bridges (Code ‘2’ in BridgeWorks)** – Floating bridges in Washington State consist of concrete pontoons that are bolted together longitudinally and are held in position by steel cables connected to anchors on the bottom of the waterway. Some of the bridges are reinforced with prestressing steel. Two of Washington State’s floating bridges contain movable spans that have unique operating characteristics.

6. **Ferry Terminals (Code ‘6’ in BridgeWorks)** – Ferry Terminals (Code ‘6’ in BridgeWorks) – Ferry terminals usually have a dock or holding area built over the water and a transfer span to carry traffic onto the ferry deck. The holding area can be constructed of treated timber, concrete, or steel components. The vehicle holding area or “dock” is typically considered a standard bridge structure and receives a Routine and Underwater Inspection. The transfer spans generally are steel trusses or girders with one end supported on the fixed pier and a free end which can be raised or lowered onto the boat to accommodate tidal changes. Transfer spans typically have their own structure I.D. and these structures are the ones with unique features which require the “Special Feature” inspection. Ferry Terminal transfer spans have enough unique features that specific BMS elements and inspection procedures have been developed to help the inspector navigate through a ferry terminal inspection. The *Ferry Terminal Inspection Procedures Manual* is published as a stand-alone document and can be found as publication M 3105 at [www.wsdot.wa.gov/publications/manuals/M3105](http://www.wsdot.wa.gov/publications/manuals/M3105).

7. **Pin and Hanger Connections (Code ‘4’ in BridgeWorks)** – A pin and hanger is a system used to connect suspended spans to cantilevered spans. The hanger is connected to a beam or girder by a pin on one or both ends. In two-girder and three-girder systems, the pin and hanger connection is considered as an NSTM. Even when used in a multi-beam system where the bridge has a high degree of redundancy, the connection should still be inspected similar to an NSTM. This is due to problems experienced in other states with pins in multi beam suspended spans. See the BIRM and the MBE for guidance on performing inspections of pin and hanger assemblies.

8. **A-514 High Performance Steel (Code ‘7’ in BridgeWorks)** – A-514 steel is used in high stress areas of larger steel bridges to reduce member size and total weight of steel. A typical location would be the top and bottom flanges of plate girders over the intermediate piers.

Bridges fabricated from A514 steel have suffered from hydrogen cracks which occurred during fabrication. Also, higher strength steels generally are subject to larger stress ranges than the lower strength steels. In tension zones, cracks may initiate and propagate faster than in the lower strength steels. It is important that Team Leaders check tension zones closely for cracks particularly at welds, bolt holes, copes, and other fatigue prone locations.

The Team Leader and Assistant Inspector are required to sign the approved and released copy of the Special Feature Report that is placed in the bridge file.

**(E) Interim**

Special inspections as defined in the MBE are called Interim inspections in the state of Washington. This inspection type is scheduled when a particular known or suspected deficiency needs to be monitored between Routine Inspections. Interim Inspections are not reported in the NBI or NTI.
Chapter 3 Inspections and Reports

1. **Identifying Need** – The Interim Inspection is performed to monitor a particular known or suspected deficiency and is carried out between regularly scheduled Routine Inspections. For example, if noticeable settling has occurred in the foundation, or if a particular bridge member shows signs of rapid deterioration. The Team Leader should observe and monitor this condition to determine the effect on the bridge or the danger posed to the bridge. Bridges or culverts **shall have** an Interim Inspection if the NBI Superstructure, Substructure or Culvert code is equal to or less than a 3.

   The inspection interval may vary depending on the type of deficiency being inspected. Interim Inspections may occur between regularly scheduled Routine Inspections on 24 month intervals, typically on the off year of the Routine Inspection. There are cases where Interim Inspections may occur several times during a calendar year on three or six month intervals. The inspecting agency along with the Team Leader will determine the appropriate inspection interval.

   Consider performing an Interim Inspection for load posted bridges. The Interim Inspection should occur in the year that the Routine Inspection is not due.

2. **Performing Inspection** – The Team Leader is free to schedule an Interim Inspection as the need arises. This type of inspection can be accomplished by any Team Leader who has some familiarity with the bridge. If someone other than the Team Leader who performed the Routine Inspection is scheduled to perform the Interim Inspection, they should be carefully instructed as to what to look for, what measurements to take, what results might be expected, and/or how the problem can affect the structural integrity of the bridge.

3. **Reporting** – A BIR documenting the inspection findings should be prepared by the individual who performed the inspection. Any of the following information may be appropriate to include:
   - The date of Interim Inspection.
   - The Team Leader’s name.
   - The applicable inspection interval.
   - The location of the element or elements inspected.
   - Any measurements taken.
   - The procedures utilized to analyze and assess the given bridge element(s).
   - The results of any testing performed.
   - Any recommendations for maintenance or repair.

4. **Updating the Inventory Record** – Any changes that need to be made to the Inventory Record shall be entered into BridgeWorks. The Routine inspection date should not be changed due to an Interim Inspection. On all Interim Inspections, all changes/updates to NBI and NTI data shall be released into the inventory within 90 days of the date of inspection.

5. **Updating the Bridge File** – A copy of the report and an updated copy of the Inventory Record (if applicable) must be placed in the bridge file at the completion of the Interim Inspection and must be cross referenced to the current Bridge Inspection Report.

(F) **Underwater Interim**

This inspection type is scheduled when a particular known or suspected deficiency needs to be monitored between the regularly scheduled Underwater Inspections. Underwater Interim Inspections are not reported in the NBI.
1. **Identifying Need** – Common examples of findings requiring a change in the Underwater Inspection *interval* are extensive scour or rapidly progressing deterioration. For example, spread footings normally buried and not visible for inspection which become exposed, or pile founded footings which become undermined need to be monitored closely. Foundation deterioration or damage may also warrant a visual inspection at an *interval* less than the mandatory 60 months. Bridges should be considered for an Interim Underwater Inspection if the NBI Substructure code is equal to or less than 3.

The inspection interval will vary depending on the type of deficiency being monitored, and how rapidly the deterioration may be progressing. For scour related findings where a normally buried spread footing is found exposed, or in the case of a pile supported footing which becomes undermined, the Interim Inspection is placed on a 12 month *interval*. During subsequent Interim Inspections, the *interval* may be adjusted upwards if the scour is determined to be stable and non-threatening to the structure. Adjusting a scour related Interim Inspection *interval* upwards is done slowly over time, i.e., 12 months, 24 months, 36 months etc., until the maximum 60 month inspection *interval* is reached. For non-scour related Underwater Inspection findings (i.e., foundation damage or deterioration) the Underwater Interim Inspection *interval* will usually be set at 24 months. There may be cases where Interim Inspections should occur several times during a calendar year on three or six month intervals. The inspecting agency along with the Team Leader will determine the appropriate inspection interval.

Consideration should be given to performing an Underwater Interim Inspection for load posted bridges, provided the load restriction is due to element’s that are only visible by Underwater Inspection techniques.

2. **Performing Inspection** – The underwater BIR will have specific language pertaining to the portions of the bridge needing the Interim Inspection, and what measurements need to be made. The Team Leader should carefully review the past inspection reports to become familiar with the bridge, and to assure that the correct portions of the bridge receive the Interim Inspection.

3. **Reporting** – A BIR documenting the inspection findings should be prepared by the individual who performed the inspection. Any of the following information may be appropriate to include:
   - The date of Interim Inspection.
   - The Team Leader’s name.
   - The applicable inspection interval.
   - The location of the element(s) inspected.
   - Any measurements taken.
   - The procedures utilized to analyze and assess the given bridge element(s).
   - The results of any testing performed.
   - Any recommendations for maintenance or repair.

4. **Updating the Inventory Record** – Any changes that need to be made to the Inventory Record shall be entered into BridgeWorks. The Underwater Inspection date should not be changed due to an underwater Interim Inspection. On all Interim Inspections, all changes/updates to NBI data shall be released into the inventory within 90 days of the date of inspection.
5. **Updating the Bridge File** – A copy of the report and an updated copy of the Inventory Record (if applicable) must be placed in the bridge file at the completion of the Interim Inspection and must be cross referenced to the current bridge inspection report.

### (G) Damage

A Damage Inspection is an unscheduled one-time inspection to assess structural damage resulting from an environmental or human event. The scope of inspection should be sufficient to determine the need for emergency load restrictions or closure of the bridge to traffic, and to assess the level of effort necessary to define a repair. Depending on the specific situation, a Damage Inspection may be cause to initiate Interim inspections. This determination is typically made by the Team Leader or their supervisor. Damage Inspections are not reported to the NBI or NTI.

Damage Inspections are categorized by type based on the damage received or how it was found or is being reported. Team Leaders should create a Damage Inspection Report in BridgeWorks and choose one of the following events:

- A – Over Height
- B – Lateral Damage to Vertical Member
- E – Flood
- G – Earthquake
- H – Bridge Rail
- O – Other
- S – Reported by Others - Overheight
- T – Reported by Others – Lateral
- U – Reported by Others - Bridge Rail

Damage Inspections do not have scheduled inspection intervals but subsequent In-Depth and/or Interim Inspections may be scheduled as a result of the damage to monitor the structure over time.

If called upon to perform a Damage Inspection, Team Leaders should get familiarized with the type of bridge and the location of the damage. Office review of as-built plans and photos should take place prior to inspecting the damaged structure.

1. **Assess Damage** – When damage occurs as a result of collision, earthquake, or other forces, a thorough examination of the damaged areas should be made, along with an assessment of any residual damage to other bridge components. The amount of time and effort required to make this assessment will depend upon the extent and seriousness of the damage.

If significant damage has occurred, the Team Leader will need to:

- Identify any fractured members.
- Determine any loss of foundation support.
- Compute the amount of any section loss.
- Measure the amount any member is out of alignment.
- Inform the bridge owner that an updated load rating may be necessary.

Any time flooding has occurred on the waterway the bridge crosses, an inspection should be conducted both during and immediately after the flooding to assess what effects the increased water flow is having, or had, on the bridge. The following explains these procedures:

(a) **During Event Inspection** – An inspection during the flood can provide information about the structure’s safety and condition under adverse conditions. Observations...
made during the flood may help the Team Leader recommend appropriate measures to protect the bridge from failure or damage due to any future flooding.

To the extent possible during the flood, the Team Leader should look for the suggestion or the presence of any of the following:

- Streambed scour around underwater bridge elements.
- Bank erosion.
- Lateral migrations in the channel.
- Sediment transport or accumulation.
- Debris transport or accumulation (especially around piers).

(b) **Follow-up Inspection** – The bridge should be revisited immediately after the flood to assess any damage to the bridge and to provide information about the actual impact of the flood. The Team Leader should assess the impact of any of the following:

- Streambed scour around underwater bridge elements.
- Bank erosion.
- Lateral migrations in the channel.
- Sediment transport or accumulation.
- Debris transport or accumulation (especially around piers).

2. **Critical Finding Damage Report (CFDR)** – Critical Finding Damage Report (CFDR) – If the bridge has been damaged to the extent that has resulted in a critical finding, a CFDR, which is part of the Bridge Damage Report, shall be used, see Section 6-2 for further instructions. A copy of this report shall be entered into BridgeWorks.

3. **Reporting** – After a Damage Inspection Report has been created within BridgeWorks, descriptions and comments shall be added under the appropriate BMS elements describing the damage. A Bridge Damage Report is also required for all Damage Inspections performed by the state, see Section 6-2 for further instructions.

Add the damage photos and revise the BMS condition state codes if necessary. The following information should also be noted:

- The location, extent, and type of any damage found.
- The amount of any section loss.
- The degree to which any members are out of alignment.
- The need for new load ratings, if applicable.
- Any recommendations for repair or maintenance.
- Vertical clearance at the point of impact and at the minimum opening of the span on over height damage inspections.

For prestressed concrete or steel bridges fill out the Prestressed Concrete and Steel Damage Report form or equivalent to supplement the Bridge Damage Report, see Section 3-5.

If the bridge is damaged as a result of the flood or if conditions have changed at the bridge site, a Bridge Damage Report and a new Scour Field Evaluation form must be completed. If the bridge is a scour critical structure, the instructions within the Plan of Action (POA) should be followed, see Section 5-3.2.
The report should provide the following information:

- Flood stage at which the bridge was visited. This information can be found at the NOAA National Weather Service website.
- Approximate streamflow volume and velocity at the time of the visit. This information can be found at the NOAA National Weather Service website.
- Location and extent of any damage to the bridge.
- Current condition of any bridge elements affected by the flood.
- Any recommendations for scour countermeasures, bank protection, channel protection, etc., which may protect the bridge from damage during future flooding or reduce the potential for future flooding.

When printing Bridge Damage Reports, only include the BMS elements, photos, repairs and files that pertain to the damage.

4. **Updating the Inventory Record** – If any changes to the Inventory Record (the inventory or load ratings, for example) are needed, they must be entered into BridgeWorks. On all Damage Inspections, all changes/updates to NBI and NTI data shall be released into the inventory within 90 days of the date of inspection.

5. **Updating the Bridge File** – A copy of the BIR and an updated copy of the Inventory Record (if applicable), a copy of the Bridge Damage Report and all other applicable forms and drawings shall be placed in the bridge file at the completion of the Damage Inspection.

**Primary Safety**

A Primary Safety Inspection (H) is used by an agency that chooses to inspect a structure owned by another agency. Some examples include:

- a railroad bridge over a state or local agency route
- a local agency owned pedestrian bridge over a state route
- a state owned bridge carrying traffic over a local agency route
- a state owned bridge inspected by a local agency

Agencies that own the structure and maintain a record in WSBIS cannot use the primary safety report types.

This inspection is performed at the discretion of the agency which has an interest in the structure, and the inspection scope and inspection interval is also entirely determined by that agency. These inspections are not reported to the NBI or NTI, and are not subject to the NBIS or NTIS. Generally speaking these inspections are intended to assess the safety of the structure for any immediate hazard to the route crossing under it, and the inspection is directed to only those portions of the structure that could affect that undercrossing route.

The agency performing a primary safety inspection should limit inspection notes to BMS element 378 – Undercrossing Primary Safety. Repair recommendations should be limited to only those findings that directly affect the safety for users of the route under the bridge. In cases where the bridge owner also maintains an inspection record in WSBIS, the repair can be added to the repair report. In cases where the bridge owner doesn’t use WSBIS (most railroads for example), entering repairs into the repair report will need to be supplemented with direct contact with the structure owner.
(I) Secondary Safety

A Secondary Safety Inspection is used by an agency that chooses to inspect a structure owned by another agency in cases where 3 agencies have an interest in the structure – the owning agency and two agencies with routes under the structure. The only current example is a sound transit structure with a record maintained in WSBIS that crosses over both state and local agency routes. In this case, the state would maintain the primary safety report type and the local agency would maintain the secondary safety report type.

Agencies that own the structure and maintain a record in WSBIS cannot use the secondary safety report types. All notes for the secondary safety inspection should be located in BMS Element 379 – Undercrossing Secondary Safety.

In all other respects, the primary safety and secondary safety report types are similar, see the primary safety report type for additional information.

(J) Condition Safety

A Condition Safety inspection is used in cases where an agency owns a structure that is not reportable to the NBI or NTI but is using WSBIS to maintain a comprehensive record of the structure for both public safety and long term maintenance. Examples include:

- A state or local agency pedestrian bridge, regardless of whether or not it crosses over a state or local agency route.
- A bridge that is undergoing phased construction and may require an inspection before final configuration.
- A transit structure where the owner chooses to maintain a record in WSBIS, again regardless of whether or not it crosses over a state or local agency route.

Short Span Inspections and Report types are separate from Condition Inspection and Report Types. See (K) Short Span.

This inspection is performed at the discretion of the agency which owns the structure, and the inspection scope and inspection interval is also entirely determined by that agency. These inspections are not reported to the NBI or NTI, and are not subject to the NBIS or NTIS. Generally speaking these inspections are intended to ensure both public safety and long term maintenance of the entire structure. In this regard they are similar to routine inspections, but without specific federally mandated requirements for inspection interval, level of detail, or appraisal coding.

(K) Short Span

Short Span (I) – This inspection type is used for bridges/culverts that have an opening of 20 feet or less. This is measured along the center of the roadway between undercopings of abutments, spring lines of arches, or extreme ends of openings for multiple boxes. Short Span bridges may also include multiple pipe culverts, but the clear distance between openings must be less than half of the smaller contiguous opening. Short Spans are not reported to the NBI.

Even though short span bridges are not reported to the NBI, there remains concern about their deterioration and performance. Therefore, it is recommended that agencies inspect short span bridges similar to a full NBI inspection for informational purposes. The interval of the inspections for these bridges will be at the discretion of the owner agency. An Assistant Inspector who has 3 years of bridge condition inspection or the approval of their supervisor...
and has successfully completed a FHWA approved comprehensive bridge inspection training course can perform as a Team Leader for Short Span Inspections.

1. **Inspection Criteria** – Inspections are recommended for the following short span bridges:
   - Timber structures that meet the criteria in Appendix 3-A1 and Appendix 3-A2.
   - Single span concrete or metal structures, other than metal corrugated pipes that meet the criteria in Appendix 3-A1 and Appendix 3-A2.
   - Multiple span structures that meet the criteria in Appendix 3-A3.
   - Metal corrugated pipes with an opening greater than 8 feet.
   - Multiple pipes with a structure length from 10 feet to 20 feet, see (1340) in Appendix 2-C for structure length definitions.

This criteria is presented as a guideline and is not intended to replace sound engineering judgment. When in doubt, a conservative approach should be taken.

   a. **Short Span Bridges Inspected** – If the short span bridge is inspected, agencies should follow these guidelines on reporting:
      
      (1) Fill in all the applicable fields listed on the WSBIS coding form. The bridge number should be unique for short span bridges.
      
      (2) Take deck and elevation photographs.
      
      (3) Fill out the Scour Field Evaluation form (if applicable).
      
      (4) Complete a BIR.
      
      (5) Determine the inspection interval needed. Recommended intervals are as follows:
         - **12 Months** – Timber with red/yellow tags, any other material in poor condition needing monitoring, scour issues, load posting, etc.
         - **24 Months** – All other timber structures, any other material that has BMS elements in Condition States 3 or 4.
         - **48 Months** – Metal structures in good condition and concrete structures with minor problems.
         - **72 Months** – Concrete structures in good condition.
      
      (6) Submit the data through normal bridge inspection reporting procedures.

   b. **Short Span Bridges Not Inspected** – If the short span bridge is not inspected, the following are some guidelines to follow:
      
      (1) WSDOT Team Leaders should note the milepost, type of bridge, features carried, features intersected, take elevation and deck photographs, and notify maintenance personnel that future inspections of the bridge are their responsibility.
      
      (2) Local Agency Team Leaders should note the milepost, type of bridge, features carried, features intersected, take elevation and deck photographs, and determine if the need for any future inspection of the bridge is necessary and coordinate with their maintenance personnel.
2. **Performing the Inspections** – The inspection procedures for short span bridges are the same as those for NBI bridges.

An Underwater Inspection is performed on short span bridges with structural elements underwater. If the Team Leader is unable to assess the condition of the elements either visually or by probing, an underwater bridge inspection diver must conduct the Underwater Inspection. This inspection determines the structural condition and adequacy of the short span bridges underwater elements.

3. **Updating the Inventory Record** – Following the inspection procedures used on NBI bridges insures consistency of reporting. State-owned bridges are added to the WSDOT Bridge List while local agency bridges are added to their own local inventories.

After the bridges are inspected, the procedures for creating and updating the Inventory Record are followed. On all short span inspections, all changes/updates to the data shall be released into the inventory within 90 days of the date of inspection.

4. **Updating the Bridge File** – The minimum information maintained in the bridge file for short span bridges should include:
   a. Inventory data, including location maps.
   b. Completed inspection forms.
   c. A sketch of the bridge showing dimensions and depth of fill (barrel length should be taken as one pass distance, regardless of the number of barrels).
   d. Deck and elevation photographs
   e. Scour Field Evaluation Form (if applicable).
   f. Correspondence.

(L) **Two-Man UBIT**

This inspection type is used when the UBIT, its driver and the UBIT operator are supplied to an outside agency by the BPO, but the responsibility for the inspection and reporting resides with the Team Leader. The sole purpose of this inspection type is to facilitate the scheduling of future inspections and the internal accounting and billing of current inspection work. The **inspection interval** for Two-Man UBIT inspections is set by the Local Agencies. This inspection type is not reported to the NBI.

1. **Identify Need** – Through signed agreements between the State and Local Agencies, the State can assist those agencies with inspections requiring the use of specialized equipment by performing two-man UBIT inspections.

   The inspection interval may vary depending on terms of the agreement between the State and the Local Agency. The Local Agency shall determine the level and inspection interval for their structures within the agreement.

2. **Performing the Inspection** – Typically, an Assistant Inspector and UBIT driver will make up the inspection team that represents the State. A Local Agency Team Leader will accompany the state team to perform the inspection. The Assistant Inspector will coordinate with the Local Agency Team Leader as to how the work will proceed for the time period assigned.
3. **Updating the Inventory Record** – The responsibility of generating the BIR and editing the WSBIS and any applicable inspection forms and entering the data into BridgeWorks shall reside with the Team Leader from the Local Agency.

4. **Assistant Inspector/Local Agency Team Leader Responsibilities** – The Assistant Inspector from the State or the Local Agency Team Leader under advisement of the State Assistant Inspector shall ensure that the following items are completed during and after the inspection of each local agency bridge.
   a. While at the bridge site, take a Deck and Elevation photo of the structure.
   b. Log the actual UBIT hours on site.
   c. Create a Two-Man inspection type within BridgeWorks.
   d. Enter the Local Agency Team Leader’s initials as ZZZ and a certification number of Z9999.
   e. The bucket operator’s initials will be entered as the Assistant Inspector. The Assistant Inspector should attach the deck and elevation photos taken at the site into BridgeWorks.
   f. Add the appropriate resources and dates for future inspections.

**Informational**

This report type is used as a means to add notes, data, files or photos to a report between scheduled inspections. Additionally the Informational Report can be used to change the inspection interval if necessary or to just assign a next scheduled inspection date without having to change the normal inspection interval. An Informational Report type does not involve field work and is typically used by inspection staff and the Bridge Information Group. Data that is updated through an Informational Report can be accessed from the SI&A report on BEIS. Depending on the type of data updated through an Informational Report, it may be necessary to print out and sign a new report for scanning into BEIS. This will be determined by the Team Leader and their supervisor. An example of an Informational Report that may require a signature is one that changes the NBI or Bridge Management System (BMS) or SNTI codes. In these cases, a statement in the applicable area of the notes section of the report should state why the changes made were made. Informational Reports are not reported in the NBI or NTI. An Assistant Inspector who has 3 years of bridge condition inspection experience or the approval of their supervisor and has successfully completed a FHWA approved comprehensive bridge inspection training course can create an Informational Report.

**Inventory**

This report type is used to notify the inspection team that a structure is either new or altered and needs field verification to track construction progress and update the record when the work is completed. This report type will also provide detailed information on the new or altered structure to assist the inspection team in field verification. This report type is intended to stay in the bridge record until the construction work is completed, then removed thereafter.

For WSDOT structures, the Inventory report type is always created and removed by the BPO Information Group, and is closely coordinated with the ContractHistory database. BPO inspection teams shall always review the information in an inventory report type and update the record as needed, including clearly indicating when the construction work is completed.
Examples of construction work that tracked by this report type include:
- New structures
- Retrofits and rehabilitation (deck replacement, seismic retrofits, strengthening, etc)
- Any new or replaced BMS elements (new joints, rails, overlays, etc)
- Utility work
- Roadway alterations UNDER bridges that affect vertical and horizontal clearances (new pavement, roadway widening, etc)
- Functional changes (bridge changed from 2 way to 1 way traffic due to construction of new parallel bridge, for example)

Examples of construction work NOT tracked by this report type include:
- Repair work tracked in the Repair List
- Any changes to the structure record which are not performed in the field by inspectors (updated ADT, NHS designation, etc)

An Assistant Inspector who has 3 years of bridge condition inspection experience or the approval of their supervisor and has successfully completed a FHWA approved comprehensive bridge inspection training course can create an Inventory Report. This report type is not reported to the NBI or NTI.

(O) In-Depth

Any time a bridge element or portion of the bridge requires further evaluation, analysis, or investigation to accurately assess its condition, complete an In-Depth Inspection. This inspection may involve testing, monitoring, or conducting specific analyses of given bridge elements. In-Depth Inspections are performed as needed and do not have a set inspection interval. They are not reported in the NBI or NTI.

1. **Identify Need** – Any time the structural condition of an element cannot be determined in the course of a Routine Inspection, an In-Depth Inspection may be required. The In-Depth Inspection is performed to obtain more sophisticated data, perform special testing, and/or bring in other experts to assess a particular problem.

   The need for an In-Depth Inspection generally arises as a result of a Routine Inspection; however, such a need may also be the result of a damage, flood, or Interim Inspection. Whenever such a need is discovered, an In-Depth Inspection should be performed.

   In-Depth Inspections do not have inspection intervals and are treated as one-time only inspections. If the inspecting agency feels that subsequent inspections are needed on regular intervals, Interim Inspections should be utilized instead.

2. **Performing the Inspection** – The In-Depth Inspection should include as detailed analysis as necessary to determine the condition of the given bridge element. There can be no standard set of procedures to follow or observations to be made. Many factors will influence the depth and extent of analysis required. To facilitate accomplishment of the inspection, the Team Leader should make sure that any traffic control measures or necessary special equipment will be available.
3. **Reporting** – There is no standard form to be completed for reporting In-Depth Inspection findings. When the inspection is concluded, the Team Leader should prepare a BIR along with any additional documentation to note:
   - The location of each bridge element inspected.
   - The procedures used to analyze and assess the particular bridge element.
   - The names, titles, and observations made by any specialists who were consulted.
   - The results of any testing performed.
   - Any recommendations for maintenance or repair.

4. **Updating the Inventory Record** – Any changes that need to be made in the Inventory Record shall be entered into BridgeWorks. On all In-Depth Inspections, all changes/updates to NBI or NTI data shall be released into the inventory within 90 days of the date of inspection.

5. **Updating the Bridge File** – A copy of the report and an updated copy of the Inventory Record (if applicable) shall be placed in the bridge file at the completion of the In-Depth Inspection and must be cross referenced to the current Bridge Inspection Report.

**(P) Geometric**

This inspection type is used to collect vertical and horizontal roadway clearances for routes both on and under bridges and would also include a complete review and update of all the vertical clearance cards associated with the bridge. Vertical and horizontal roadway clearances are collected at an 8 year frequency for minimum vertical clearances of 16.5 feet and less, and at a 16 year frequency for minimum vertical clearances greater than 16.5 feet. An Assistant Inspector can perform as a Team Leader for Geometric Inspections. Geometric data that has been collected using LIDAR can be used to update bridge inventory data as a Geometric Inspection as long as the Team Leader has reviewed the LIDAR data. This inspection type is not reported to the NBI or NTI.

**(Q) Feature (Local Agency use only)**

This inspection type is used for certified and non-certified inspectors to document time spent in bridge inspection activities. It is also used for scheduling non-reoccurring inspections. When a new UCD is created in BridgeWorks over top of a Feature Inspection, the Feature Inspection report tab will not be perpetuated.

Examples:
- A Co-inspector working on road crew documents bridge rail damage observed while in the area of the bridge.
- One time only chain drag of deck
- Evaluation of bridge for overload permit.
(R) **Scour Monitoring**

This inspection type is used when scour monitoring is performed as required by a Scour Plan of Action (POA) for a triggering storm event, see Section 5-3.2. This typically involves post-event inspections by regional maintenance crews who then reports the findings to the BPO Scour Engineer. If multiple site visits occur for a triggering storm event, this report type only needs to be recorded for that storm event.

### 3-3 Bridge Inspection Orientation

Designation of the bridge orientation and a component numbering system for the bridge elements are needed for consistency within the inspection reports. Typical bridge orientation convention has the structure beginning at and going from the west end of the structure to the east, or from the south to the north, or in some cases, the direction of increasing mile post. The subcomponents of a structure are typically numbered from the left to the right looking ahead on stationing. The orientation and component numbering system typically follows the convention of the inspecting agency. If the State inspects bridges for other agencies, they will follow State convention (see Exhibit 3-7 through Exhibit 3-10) or follow established agency orientation.
Chapter 3 Inspections and Reports

Exhibit 3-7  Bridge Nomenclature
Exhibit 3-8  Component Location

BOB = Beginning of Bridge  
EOB = End of Bridge

Orientation:
B.O.B. normally south or west ends following route orientation.

Exceptions Include:
One way ramps – B.O.B. = First end to receive traffic.
Selected bridges that follow plan orientation.

There is no golden rule about orientation except that B.O.B. Must always be identified in the '0' note along with basis for this assumption. It is helpful to refer to geographical markers (streets, rivers, etc) when describing the B.O.B.

Exhibit 3-9  In-Span Hinge Callout

IN-SPAN HINGE CALLOUT
(Do not Quantify Crossbeams in BMS for Box Girder)
Section 3-4 provides guidelines for inspection processes and procedures specific to the State and the Office of Local Programs. These guidelines can be used as a reference or can be implemented.
3-4 **Policy and Procedures**

This section discusses the specific policies and procedures that are utilized in BPO or LP that are supplementary guidelines for field work and inspection report writing. These best management practices are utilized by inspection teams and are specific to each program.

3-4.1 **BPO Policy and Procedures**

3-4.1.A **General Inspection and Report Writing**

- Columns on the first page of the BIR contain NBI and agency specific items with associated coding information for each structure within the inventory. The numbers within parenthesis next to these item titles are WSBIS item numbers and are unique to the BridgeWorks program that corresponds to FHWA items and/or agency specific items. For example, the first code at the top of the BIR form is the Structural Adequacy Appraisal code and is denoted by WSBIS item number (1657).

- When circumstances (including obstruction of bridge elements) prevent any required work from being completed at the time of inspection, report this fact to your supervisor so a determination can be made whether or not the bridge needs to be rescheduled in the current inspection year. It is the responsibility of the Team Leader to ensure that the bridge inspection is completed unless the supervisor delegates the responsibility. Bridges that cannot be inspected due to high water will be rescheduled in the current inspection year during lower flows. Bridges that need cleaning or vegetation removed will require coordination with maintenance for dirt and/or vegetation removal prior to re-inspection. If the supervisor determines that the bridge does not need to be rescheduled in the current inspection year, clearly identify why the work wasn't completed and what is required of the next team leader to achieve the task.

- Traffic lanes on a structure are numbered from right to left looking in the direction of traffic on one-way multilane routes. For reversible lanes assumed orientation should be described in the report.

- Whenever an in-span hinge separates two bridges, the bearings, restrainers, and joint are to be coded with the "dependent" structure. Explain any exceptions to this rule in the 0 note.

- Whenever measurements are taken, for joint openings, monitored conditions, or anything else, include in the report the date and the air temperature when the measurements were taken. Unless there is a warranted condition, only measurements from the last three inspections need to be maintained.

- Refer to specific joints by pier or span numbers instead of joint numbers. There may be unique circumstances where using joint numbers are justified. Under these circumstances, justification for using joint numbers must be documented in the report.

- Investigate fully and report any and all joint noises and their origination.

- Compare Curb to Curb Deck Width (1356) with Horizontal Clearance (1491 and 1495) and investigate differences (typically they should be the same, except for non-mountable medians).

- Detailed notes are to be entered separately under each Bridge Management System (BMS) element. NBI notes should reference the appropriate BMS element note. Maintain any details of flagged defects or damage within the BMS element note.
• Inspection report summary comments are required for any BMS element in Condition State (CS) 2, 3 or 4.

• Avoid using phrases for significant defects such as "open crack" without a further description such as width, and any repetitive nature. Mark the specific defect location on the bridge with any measurement and the date. Consider taking a photo of the marked defect to include in the inspection report. For concrete crack size guidelines, see the table in Section 4-4.

• When submitting reports for initial review, include field notes in the review package along with a clean copy of the report, the WSBIS sheet, the inspection photographs, and other relevant reports (NSTM, soundings, etc.). The WSBIS sheet is required to reflect all current changes associated with the inspection.

• Describe photos with respect to bridge orientation, not geographic direction. Photos should identify the orientation, location, and what is photographed. All photos, except deck and elevation photos, must be numbered and referenced in the notes or in an attached file such as a NSTM inspection Report.

• Photos no longer relevant to the report should be deleted. Keep repair photos in the report for an additional inspection cycle so the Bridge Preservation Supervisor can compare them.

• Deck and Elevation Photos should be assessed at each inspection. Update photos if there are new conditions or changes to the structure.

### 3-4.1.B Bridge Inspection Notes Standard Practice

A. Cardinal directions (north, south, east, and west) are never capitalized, except at the beginning of a sentence. These directions are also not abbreviated. The directions northeast, southeast, northwest, and southwest may be abbreviated NE, SE, NW, and SW.

B. For acronyms, follow the standard practice of spelling out the first time use with the acronym in parenthesis following (e.g., Local Programs (LP)).

C. Use of abbreviations should be limited. Common abbreviations:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>F</td>
<td>Fahrenheit</td>
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<tr>
<td>in. or &quot;</td>
<td>inch (inches)</td>
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<tr>
<td>ft. or '</td>
<td>foot (feet)</td>
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<tr>
<td>symbol only used when followed by a dimension in inches.</td>
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<tr>
<td>L</td>
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<td>W</td>
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<td>sq. ft.</td>
<td>square feet or SF</td>
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<tr>
<td>psi</td>
<td>pounds per sq. in.</td>
</tr>
<tr>
<td>psf</td>
<td>pounds per sq. ft.</td>
</tr>
<tr>
<td>ACP</td>
<td>asphalt concrete pavement</td>
</tr>
<tr>
<td>BST</td>
<td>bituminous surface treatment</td>
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<tr>
<td>SR</td>
<td>State Route</td>
</tr>
<tr>
<td>I</td>
<td>Interstate</td>
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<tr>
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<td>a.m.</td>
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<tr>
<td>P.M.</td>
<td>p.m.</td>
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<tr>
<td>LF</td>
<td>linear feet</td>
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<tr>
<td>YT</td>
<td>Yellow tagged</td>
</tr>
<tr>
<td>RT</td>
<td>Red tagged</td>
</tr>
<tr>
<td>LMC</td>
<td>latex modified concrete</td>
</tr>
<tr>
<td>HMA</td>
<td>hot mix asphalt</td>
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<tr>
<td>US</td>
<td>National Highway</td>
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<tr>
<td>Jan</td>
<td>January, etc.</td>
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</table>
D. Limit the use of symbols to ° for degrees and % for percent.

E. Dimensions are noted with a space or hyphen between feet and inches, and a hyphen between whole inches and fractions of an inch. When combined with other dimensions, a '0' should precede bare fractions of an inch. Measurements greater than 12” may be listed in inches, if appropriate. Decimal inches may also be used. For example:

- 1′ 1-1/16” × 6′ 0-7/8”
- 6” × 14” timber stringers
- 8” × 14” × 1/2” deep spall
- 3 ft. wide × 14 ft. long × 2.5 ft. tall bridge corbel
- 12 ft. (L) × 15’ 6” (W) × 3” (D) popout in south face of Pier 2
- 1′ 0-3/4”(l) × 0.125”(w) crack in east face of Girder 2F
- 42.2” long anchor bolts

3-4.1.C Report Notes Within BridgeWorks

0 Note – Orientation

- Bridge orientation and identification of the pier/span numbering system is always required, stating the basis of orientation such as "increasing mileposts," "ramp direction," or per plans. Any potentially confusing orientation issues or deviations from standards (west to east or south to north) must be clearly identified. Identifiable physical features at beginning or end of bridge may also be used. See Section 3-3 for bridge orientation examples.

- Place any special instructions and information that doesn't fit anywhere else under the 0 note.

- Use the following note for bridges eligible for a 48 month inspection interval:

  Continue to validate the status of this bridge each inspection as a 48-month inspection candidate. Verify condition ratings, load ratings, vertical clearances, ADT, scour codes and that no major maintenance has been completed in the last two years.

1 Note – This note is maintained by the Team Leader and is used for explanatory information regarding bridges that contain NSTM's and/or require a Special Feature Inspection. Use this note to explain any special features, procedures, areas to be inspected or complicated scheduling. Do not use this note to redundantly repeat resource information or dates that an inspection occurred.

5 Note – Program Management Engineer maintains this note. It contains information regarding scheduled rehabilitation or replacement, and other upcoming program management items.

9 Note – The 9 note is used to create the executive summary for an Underwater Inspection Report.

11 Note – The Load Rating Engineer maintains this field. It is used to explain any load posting placed on a bridge. This note is closely associated with the Revise Rating flag (2688), see Section 3-4.1.E.
3-4.1.D Operating Level Code (1660)
Verify that load posting signs are in place at the bridge and in advance of the bridge. Advance load postings must be placed in advance of the nearest intersecting road, ramp or wide point in the road where a driver can detour or turn around. Verify that load posting signs and advance load posting signs match the posting requirements in Note 11 and write a note within BridgeWorks under Operating Level Code (1660) to that effect. Take a photo of any existing posting signs and advance posting signs. Ensure that (1293) (open or closed) is coded appropriately.

3-4.1.E Revise Rating Flag (2688)
For State owned bridges, any load rating issues should be addressed within the body of the BIR in the (2688) note. Delete any notes that don’t have relevance to the existing condition of the bridge.

3-4.1.F Scour Code (1680)
The Scour Engineer maintains the Scour code (1680) field and notes. Any scour comments by the Team Leader should be placed in BMS Element (#361) Scour Flag or Channel Protection (1677), depending upon which is most appropriate.

3-4.1.G Soundings Resource
When preparing for an inspection that requires soundings, print any existing stream profile file to include in your inspection field packet. The Scour Engineer determines which State bridges need stream cross sections (soundings) by placing a “Y” in the Soundings Flag (2693). When this is required as part of the inspection, perform the following:

1. Enter data into the Scour Field Evaluation Form, see Section 3-5.
   a. If you could not take soundings on the initial inspection trip, plan on getting them on another trip, either by coordinating with another Team Leader or by doing it yourself.
   b. If there is a reason soundings should be taken at a different time of the year (e.g. low water, low tide, or fish windows), add a resource with an explanation under the Report Types Tab.

2. Save the file under the bridge number (e.g., 5_24S.xls) in the appropriate year “Soundings” folder found on the W drive at W:\Data\Bridge\RegionalInsp\Common\Soundings.

3. Attach the completed form to the appropriate bridge inspection report File Tab, replacing any already existing form and remove the old one.

4. Change the Soundings Flag (2693) from “Y” to “***” for State bridges only.

5. When you return to the office submit an email to the scour section (to: Scour Assistant cc: Scour Engineer) with the Scour Field Evaluation attached. The email shall include any significant findings and/or repair need that need to be brought to the Scour Engineer's immediate attention.

6. The Scour Engineer will email an electronic stream profile file that you will attach to the report Files tab.
   a. Replace any existing stream profile file with the updated one and remove the old one.
   b. Print the new stream profile file and include it with your inspection review packet.
3-4.1.H  Timber Structures

- Yellow Tagged (YT) members have rot and a shell greater than or equal to 1-½". A YT member requires a Priority 2 repair. The need for Interim Inspections is determined by the lead.
- Red Tagged (RT) members have rot and a shell less than 1-½". A RT member requires a Priority 1 repair. Schedule an Interim Inspection. Determine the extent, location and significance of decay. Provide details for the Load Rating Engineer.

3-4.1.I  Culverts

- Structure Length, NBI Length and Maximum Span are determined in accordance with (1340), (2346), and (1348).
- The BMS quantity is determined by measuring from inlet to outlet of one barrel/pipe and is not dependent upon the number of barrels or pipes.

3-4.1.J  Vertical Clearances (1370, 1374 and 2694)

Every Routine, Short Span, Safety or Condition inspection shall include verification of the vertical clearance (VC) card comparing it with the current condition and any significant changes (new asphalt, additional lanes, new curb/gutter, etc). Verification will also include at least one vertical clearance measurement if traffic allows, and ideally at the low point if possible. If changes in conditions or conflicts with the VC card are identified, note discrepancies and collect all new clearances if possible. If no changes or discrepancies are identified, no further action is required.

For structures in excess of 16'-6", with no other noted changes or discrepancies, the verification of a vertical clearance measurement is optional.

Each Inspection

- Check for all postings on bridge, and in advance, are in place.
- Check that Posted clearances are consistent with existing conditions and documentation.
- Update 2694 as applicable
- Update the WSBIS as applicable.

When to Collect or Verify Vertical Clearances

- Whenever a clearance card is missing, incomplete or inaccurate. High traffic volumes may prevent the ability to acquire this information without traffic control.
- When changes in alignments, geometry or conditions affecting current measurements are identified.
- At bridges where the clearances box has been populated with a "V".
- When Team Leader feels that over height hit damage is occurring significantly enough to check the existing clearance information.
- As a part of over height load damage inspections.
Where to Collect or Verify Vertical Clearances

- Minimum clearances along all lane stripes, edges of pavement/curb or controlling grade breaks between these points.

- Appurtenances (lights, signs, utilities) that control minimum vertical clearances should be documented as well, but in most circumstances will be used only to create a repair recommendation to relocate appurtenance. Provide vertical clearance information to the Sign Bridge Engineer.

- For existing postings verify lowest accessible clearance location first and verify other locations as required.

- For Damage Inspections, measure all accessible lane stripe locations in the area of the damage and at the point of impact.

Documenting Vertical Clearances

- Document all measured clearances. Drawings should be neatly transcribed and turned in to the Bridge Geometry Engineer. Photos are to be placed in the Photos/2694 Clearance folder in BridgeWorks and the Bridge Geometry Engineer notified of this action.

- 2694 Note should reference: Vertical clearances taken or checked on (date). Minimum clearance below the bridge measured to be (measured minimum clearance) below (exact location). See photo #. REPAIR #00000. In situations where multiple structures are controlled by one structure that requires posting, the recommended posting locations and the presence or omission of signage shall be appropriately documented in the 2694 notes of each of the involved structures.

- Update WSBIS fields (1370), (1374) and (1499). Appurtenances are not coded. Consult with the Bridge Geometry Engineer for questions.

Posting Requirements and Recommendations

- Bridges with field measured minimum clearances over the traveled lanes equal to 14’ 3” up to and including 15’ 3” require posting on the structure at the controlling location and advance warning signs at one or both shoulders.

- All bridges with field measured minimum clearances less than 14’ 3” require additional advance posting signs in advance of nearest intersecting roads, ramps or a wide point in the road where a driver can detour or turn around.

- All posted clearances shall be 3” less than the actual lowest measured clearance, except as follows:

  1. In some cases, WSDOT intentionally posts clearances with more than a 3” buffer. This decision will be documented in the 2694 note, identifying the posting clearance required.

  2. The City of Spokane has a 1” buffer rule, so bridges are intentionally posted only 1” less than measured. This will be documented in the 2694 note for all affected bridges inspected by BPO staff.

  3. A tolerance to the 3” buffer for existing bridge posting signs is allowed. See criteria listed below.

    - If the actual measured opening for a bridge or tunnel increases by 2” or less the existing signing may remain. (e.g. a bridge clearance changes from 15'-0" to 15'-2", the existing warning sign of 14'-9" may remain.)
• If the actual measure opening for a bridge or tunnel increases by more than 2" the signs shall be replaced. (e.g. a bridge clearance changes from 14'-9" to 15'-0", the existing warning sign of 14'-6" shall be corrected.)

• If the actual measured opening for a bridge or tunnel decreases by 1" or less the existing signs may remain. (e.g. a bridge clearance changes from 15'-0" to 14'-11", the existing warning sign of 14'-9" may remain.)

• If the actual measured opening for a bridge or tunnel decreases by more than 1" the existing signs shall be replaced. (e.g. a bridge clearance changes from 14'-10" to 14'-8", the existing warning sign of 14'-7" shall be corrected.)

There are situations where bridges should be posted for minimum vertical clearances in the shoulders (outside traveled way). Check with the Bridge Geometry Engineer for details. Appurtenances such as lights or signs that suspend below those bridge elements are to be noted. Those that are 15’3” or less within a traveled path or have evidence of traffic impact damage are to be written up as a repair to be removed or relocated.

**Vertical Clearance (V) Repair**

• A Priority 1 or 2 Vertical Clearance (V) Repair is warranted as follows:
  • Priority 1: When vertical clearance posting is found deficient (for example less than 2" buffer), missing, or where the signage on and in advance of the bridge do not match.
  • Priority 2: When a vertical clearance posting on and in advance of the bridge is found conservative (more than 5" buffer) without prior documentation from the Region or other authorized authority.

• Each repair written should identify and include the following language:
  • (Minimum clearance measured to be (measured clearance) located at (controlling location) on (date measured). Post for (3" less than measured clearance) in accordance with the most current WSDOT Low Vertical Clearance Signing Policy. Contact Bridge Geometry Engineer at Bridge Preservation 360-570-2544 with any questions.

**3-4.1.K Horizontal Clearances**

• Collect minimum shoulder widths on both sides of roadway and edge of traveled way (fog line) to permanent obstruction (columns, abutments, retaining walls, toe of slopes). See Item 1379 for ramps, gores and other more complex configuration examples.

• Collect horizontal clearances where the clearance flag has been populated with an “H”.

• Update WSBIS fields (1379) and (1383) (Minimum Lateral under Clearance Right & Left).

**3-4.1.L Inspection of Structures Under Contract**

• Information organized by the Bridge Inventory Technician will include the Project Office contact and contract numbers.

• For structures under contract, the BPO inspector MUST make contact with the Project Office (Project Engineer if possible) prior to performing inspection. Do not directly talk to contractor.

• If construction defects or safety issues are found during inspection:
  Emergency contacts:  1st – Region Project Engineer
                        2nd – BPO
                        3rd – HQ Bridge Construction Office

• Routine Maintenance, contact the Project Office and Regional Maintenance Staff.
3-4.1.M Bridge Scour for Local Agency Bridge Inspections

- Bridges with Scour Code (1680) of 2 and 3 are scour critical. For reports with a scour code of "6", "U" or "T" the bridge is assumed to be scour critical.

- Bridges with a scour code of "6", "U", or "T" need a priority 1 repair called out in the (1680) note.

  The call out in the (1680) note should read as follows: “This inspection report assumes the bridge is scour critical. REPAIR #XXXXX"

  The Repair should read as follows: “(1680) is coded ["U", "T", or "6"] indicating that the bridge foundation is not known, is tidal, and/or has not been evaluated. Perform evaluation of scour potential and any required mitigation. Indicate determination and any requirements under the (1680) note.”

- Scour critical bridges, and those that are assumed to be scour critical, that have exposed footings or have a history of exposed footings due to scour, REQUIRE a priority 1 scour repair documented in the BMS Element (#361) – Scour flag note in BridgeWorks. This repair should read as follows: “Scour mitigation needs to be evaluated.”

- All scour critical bridges need soundings at every Routine Inspection. The (2693) note needs the following comment: “Take soundings every Routine Inspection on this scour critical bridge.” Also ensure that the (2693) flag is set to “Y” at all times. This will help the process stay in place over time.

- Bridges that are not scour critical do not need cross sections unless there is some specific need that is documented in the report.

3-4.1.N Rental Equipment

The Enterprise and Risk Management Office has declared that equipment damage insurance must be purchased when renting access equipment. If the rental company does not offer insurance, insurance can be purchased through the Department of Enterprise Services (DES). The DES insurance option can take up to two weeks to process so plan accordingly.

For rented access equipment the following is required:

- Review the paperwork, when receiving the equipment, to insure that it reflects insurance for the rented equipment.
- Review the invoice when you receive it from the BPO Accountant, making sure that the rate and time used are correct.
- Notify the rental office of any discrepancies found.
- Write the bridge number and dates used on the invoice.
- Return it to the BPO Accountant for processing.

3-4.1.O Bridge Inspection Safety

A Pre-Activity Safety Plan (PASP) is required prior to any field activity. A copy of the PASP form is located at W:\Data\Bridge\RegionalInsp\FORMS\SAFETY
3-4.1.P  Identifying The Purpose Of Inspections in the Bridge Inspection Report

Indicate the purpose and schedule of any Interim or Special Inspections that are required, similar to the following format: "Interim Inspections of RT timber are done in odd numbered years and Routine Inspections of the entire bridge are done in even numbered years." Statement should briefly describe what is to be accomplished during the Interim or Special Feature Inspection. This information is placed in the "Notes" box under the specific inspection tab, but may sometimes be more completely explained here. It can additionally be placed in the 0 note.

3-4.1.Q  Agreements Inspections

Team Leader will provide the complete submittal package for each bridge inspected, which includes the signed inspection report, the SI&A sheet, the inventory sheet, all photos and files is given to the Bridge Resource Technician (BRT) who checks them against the scope of work. If there is anything missing, the BRT needs to check with the inspectors and follow up with the Bridge Preservation Accountant (BPA) if there are problems with providing a complete submittal package. The complete submittal package for each bridge is scanned and loaded onto BEIST, and a hardcopy filed in the unofficial letter file in the resource room. The complete submittal packages for each bridge are sent to the agency via USPS to the address in the agreement along with a transmittal letter listing all inspection reports provided. A copy of the transmittal letter is given to the BPA for filing with the invoices and agreements.

3-4.2  LP Policy and Procedures

Local Agency Policy and Procedures are detailed in the Local Agency Guidelines (LAG). Electronic copies of the LAG are available on the WSDOT Local Programs website at www.wsdot.wa.gov/localprograms.

Local agencies are encouraged to review the BPO Policies and Procedures in the preceding section and adopt or modify the advice to the benefit of their Bridge Program. Local Agency bridge personnel are encouraged to contact the WSDOT Local Programs personnel for guidance and advice on bridge program questions.
3-5  Forms

This section contains inspection forms typically used by the State. Local agencies have the option of developing their own forms with similar information or utilizing the forms in this section.

Exhibit 3-11  Bridge Inspection Report  
Exhibit 3-12  WSBIS Form  
Exhibit 3-13  Scour Field Evaluation  
Exhibit 3-14  Daily Site Dive Log  
Exhibit 3-15  Visual NSTM Inspection Report  
Exhibit 3-16  DOT Form 234-030 Prestressed Concrete Damage Drawing Template  
Exhibit 3-17  DOT Form 234-048 Girder Elevation Template  
Exhibit 3-18  DOT Form 750-001 Fall Protection Plan - Emergency Action Plan  
Exhibit 3-19  DOT Form 750-060 Lead Exposure Control Work Plan  
Exhibit 3-20  DOT Form 750-090 Respirator Record  
Exhibit 3-21  DOT Form 750-094 Confined Space Entry Permit  
Exhibit 3-22  Ultrasonic UT Inspection Report  
Exhibit 3-23  UT Inspection Schedule  
Exhibit 3-24  Pins Summary Sheet  
Exhibit 3-25  Pin and Hanger Visual Inspection Report  
Exhibit 3-26  Special Features Inspection Report  
Exhibit 3-27  Vertical Clearance Card Generic  
Exhibit 3-28  Vertical Clearance Card Steel  
Exhibit 3-29  Vertical Clearance Card Tunnel
Exhibit 3-11  Bridge Inspection Report

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<td></td>
<td></td>
<td>Special</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Interim</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UWI</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Damage</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Safety</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Short Span</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Geometric</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BMS Elements</th>
<th>Element Description</th>
<th>Total</th>
<th>Units</th>
<th>State 1</th>
<th>State 2</th>
<th>State 3</th>
<th>State 4</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Notes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Repairs</th>
<th>Repair No</th>
<th>Pr</th>
<th>R</th>
<th>Repair Descriptions</th>
<th>Noted</th>
<th>Maint</th>
<th>Verified</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Inspections Performed and Resources Required</th>
<th>Report Type</th>
<th>Date</th>
<th>Freq</th>
<th>Hrs</th>
<th>Insp</th>
<th>CertNo</th>
<th>Coinsp</th>
<th>Note</th>
</tr>
</thead>
</table>

Page 3-44  Washington State Bridge Inspection Manual  M 36-64.13  February 2023
### WSBIS Field Inventory Report

**Washington State Department of Transportation**

<table>
<thead>
<tr>
<th>Bridge ID WB71</th>
<th>Structure ID</th>
<th>Bridge Number</th>
<th>Bridge Name</th>
<th>Year Built</th>
<th>Year Refurb</th>
<th>Bridge Length</th>
<th>NBIS Length</th>
<th>Maximum Span Length</th>
<th>Lane(s) On</th>
<th>Curb(s)/Curb Deck Width</th>
<th>Out to Out Deck Width</th>
<th>Sidewalk(s) Left</th>
<th>Sidewalk(s) Right</th>
<th>Min Vert. Over Deck</th>
<th>Min Vert. Under Deck</th>
<th>Min Lat. Under Left</th>
<th>Min Lat. Under Right</th>
<th>Lat. Code</th>
<th>Longtitude Code</th>
<th>Location</th>
<th>City</th>
<th>County</th>
<th>Owner</th>
<th>Bridge Number</th>
<th>WSBIS Form</th>
</tr>
</thead>
</table>

#### Facilities WB72

<table>
<thead>
<tr>
<th>Feature Intersected</th>
<th>Facilities Carried</th>
<th>Region</th>
<th>Custodian</th>
<th>Permanent</th>
<th>Temporary</th>
<th>Permissible</th>
</tr>
</thead>
</table>

#### Layout WB73

<table>
<thead>
<tr>
<th>Year Built</th>
<th>Year Refurb</th>
<th>Bridge Length</th>
<th>NBIS Length</th>
<th>Maximum Span Length</th>
<th>Lane(s) On</th>
<th>Curb(s)/Curb Deck Width</th>
<th>Out to Out Deck Width</th>
<th>Sidewalk(s) Left</th>
<th>Sidewalk(s) Right</th>
<th>Min Vert. Over Deck</th>
<th>Min Vert. Under Deck</th>
<th>Min Lat. Under Left</th>
<th>Min Lat. Under Right</th>
<th>Lat. Code</th>
<th>Longtitude Code</th>
<th>Location</th>
<th>City</th>
<th>County</th>
<th>Owner</th>
<th>Bridge Number</th>
<th>WSBIS Form</th>
</tr>
</thead>
</table>

#### Crossing Route On WB74

<table>
<thead>
<tr>
<th>Route Number</th>
<th>Milepost</th>
<th>ADT</th>
<th>Truck %</th>
<th>Crossing Description</th>
<th>Fund Class</th>
<th>Lane Use</th>
<th>Design</th>
<th>Total Lanes Under</th>
<th>Horizontal Clearance Route Dir</th>
<th>Overhead Clearance Route Dir</th>
<th>Max Vert Clearance Route Dir</th>
<th>Min Vert Clearance Route Dir</th>
<th>Max Vert Clearance Route Dir</th>
<th>Min Vert Clearance Route Dir</th>
<th>Detour Length</th>
<th>Printed Date</th>
</tr>
</thead>
</table>

#### Crossing Route Under WB74

<table>
<thead>
<tr>
<th>Route Number</th>
<th>Milepost</th>
<th>ADT</th>
<th>Truck %</th>
<th>Crossing Description</th>
<th>Fund Class</th>
<th>Lane Use</th>
<th>Design</th>
<th>Total Lanes Under</th>
<th>Horizontal Clearance Route Dir</th>
<th>Overhead Clearance Route Dir</th>
<th>Max Vert Clearance Route Dir</th>
<th>Min Vert Clearance Route Dir</th>
<th>Max Vert Clearance Route Dir</th>
<th>Min Vert Clearance Route Dir</th>
<th>Detour Length</th>
<th>Printed Date</th>
</tr>
</thead>
</table>

#### Design WB75

<table>
<thead>
<tr>
<th>Main Span Material</th>
<th>Main Span Design</th>
<th>Appr Span Material</th>
<th>Appr Span Design</th>
<th>Number Main Spans</th>
<th>Number Appr Spans</th>
<th>Service On</th>
<th>Service Under</th>
<th>Deck Type</th>
<th>Width of Superstructure</th>
<th>Meriennage</th>
<th>Deck Protocols</th>
<th>Over Rating Method</th>
<th>Over Rating Points</th>
<th>Over Rating Factor</th>
<th>Inspectors Name</th>
<th>Inspectors Date</th>
<th>Inspectors Report Form</th>
</tr>
</thead>
</table>

#### Inspection Report Types

<table>
<thead>
<tr>
<th>Routine Inspection</th>
<th>Fracture Critical</th>
<th>Special Feature</th>
<th>Underwater</th>
<th>Safety</th>
<th>Short Span</th>
<th>Geometric</th>
<th>Info</th>
<th>Inventory</th>
</tr>
</thead>
</table>

**Sufficiency Rating:**

<table>
<thead>
<tr>
<th>Items</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>090</td>
<td>Inspection Date</td>
</tr>
<tr>
<td>096</td>
<td>Inspector Name</td>
</tr>
<tr>
<td>096</td>
<td>Comment</td>
</tr>
</tbody>
</table>

**Legend:**

- Shaded fields are to be reviewed each inspection.
- Fields in italics are for information only & are not editable.
### Scour Field Evaluation

<table>
<thead>
<tr>
<th>Bridge Number</th>
<th>Bridge Name</th>
<th>Structure ID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Lead Inspector</th>
<th>Co-Inspector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Heavy Growth Along Banks
- Ice/Debris in Channel
- Channel/Embankments are Eroding/Sloughing
- Damage to Riprap/Abutments/Piers
- Scour Holes Near Piers/Abutments
- Riprap in Place at Piers/Abutments
- Boat Required
- Divers Required
- UBIT Required
- Winter Inspection
- Repair Required
- Monitoring Required

#### Soundings

<table>
<thead>
<tr>
<th>Location</th>
<th>Measurement (ft)</th>
<th>Thalweg (ft):</th>
<th>Distance to thalweg (ft):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- (Taken from top of the upstream bridge rail)
- Distance was measured from:

- Rail Height from Deck (ft):

- Inspector's Remarks:

- Repairs Warranted:

---

**Exhibit 3-13  Scour Field Evaluation**
### Exhibit 3-15  Daily Site Dive Log

**Daily Site Dive Log**

<table>
<thead>
<tr>
<th>Inspector</th>
<th>Generic WSDOT UBITOOPER</th>
<th>Date</th>
<th>1/1/2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge No.</td>
<td>00000000</td>
<td>Bridge Name</td>
<td>XGOCOUGS</td>
</tr>
<tr>
<td>Bridge Type</td>
<td></td>
<td>Waterway Name</td>
<td></td>
</tr>
<tr>
<td>Dive Objective</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Diving Operation

<table>
<thead>
<tr>
<th>Type of Operation</th>
<th>SCUBA</th>
<th>Snorkel</th>
<th>ROV</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Suit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Air Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inspection Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

#### Conditions

- **Water**
  - □ Salt
  - □ Fresh
  - □ Brackish
  - Temperature: □ °F
  - Visibility: □ ft
- **Surface**
  - □ Calm
  - □ Choppy
  - □ Rough

- **Surf**
  - □ Small
  - □ Medium
  - □ Large
  - □ N/A

- **Tide**
  - □ High
  - □ Low
  - □ Flood
  - □ Ebb
  - □ N/A

- **Current**
  - □ Fast
  - □ Moderate
  - □ Slow
  - Velocity: □ ft/sec

- **Weather**
  - □ Sunny
  - □ Cloudy
  - □ Overcast
  - □ Rain
  - Air Temp: □ °F

- **Thermocline**
  - Temperature: □ °F
  - Depth: □ ft

#### Diver Checks

- □ First Aid Equipment on Site
- □ Communication for EMS
- □ Diver Gear Inspected
- □ Air Source Checked
- □ Pre-Activity Safety Plan Reviewed
- □ Physical Condition of Diver(s) Checked
- □ Communications for Diver(s) Checked
- □ Team Briefed and Understands Dive Plan
- □ Special Site Hazards Noted

#### Dive Plan and Dive Team Procedures

Assess site conditions and determine type of dive operation. Hold on-site pre-dive meeting to discuss and plan dive operation, determine roles and responsibilities, review emergency procedures, and check physical condition of diver(s). Assemble and check dive gear. Check communication for diver(s). After completion of dive, review notes, check condition of diver(s), take soundings and photos as required.
Exhibit 3-15  Visual NSTM Inspection Report
(Page 1 of 2)

**VISUAL FRACTURE CRITICAL INSPECTION REPORT**

<table>
<thead>
<tr>
<th>Bridge Name:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge No:</td>
<td>Hours:</td>
</tr>
<tr>
<td>Structure ID:</td>
<td>Inspector ID #:</td>
</tr>
<tr>
<td>Structure Type:</td>
<td>Lead Inspector Intials:</td>
</tr>
<tr>
<td>Agency:</td>
<td>Co-Inspector Intials:</td>
</tr>
<tr>
<td>Milepost:</td>
<td>Lead Inspector Signature:</td>
</tr>
<tr>
<td>Inspected items:</td>
<td>Co-Inspector Signature:</td>
</tr>
</tbody>
</table>

**Procedures:**

**FCM Location** | **FCM Type** | **FCM Per Girder or Truss Line** | **Rivet Server Plans**
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sh. No.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FCM Location</th>
<th>FCM Type</th>
<th>FCM Per Girder or Truss Line</th>
<th>Rivet Server Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sh. No.</td>
</tr>
</tbody>
</table>

Note: FCM = Fracture Critical Member
### Visual NSTM Inspection Report

<table>
<thead>
<tr>
<th>Feature Inspected</th>
<th>Location</th>
<th>Span</th>
<th>Truss / Girder</th>
<th>Remarks</th>
</tr>
</thead>
</table>

**Bridge Name:**

**Bridge No.:**

**Structure ID:**

**Structure Type:**

**Agency:**

**Milepost:**

**Date:**

**Hours:**

**Inspector ID #:**

**Lead Inspector:**

**Co-Inpector:**

**Exhibit 3-15 Visual NSTM Inspection Report**

(Please note that the table is visible in the image but not transcribed due to the nature of the task.)

Washington State Bridge Inspection Manual  M 36-64.13  Page 3-49  February 2023
Exhibit 3-16  DOT Form 234-030 Prestressed Concrete Damage Drawing Template

| Bridge Number: _________ | Inspected By: ______________
| Bridge Name: ______________ | Notes: _____________________
| Date: _____________________ | ___________________________
| Looking: ___________________ | ___________________________
| Location: __________________ | ___________________________ |
Exhibit 3-17  DOT Form 234-048 Girder Elevation Template
Exhibit 3-18  DOT Form 750-001 Fall Protection Plan – Emergency Action Plan
(Page 1 of 2)

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Supervisor</th>
</tr>
</thead>
</table>

### Description of Work

**Recognized Fall Hazards 4’ or more above ground or lower level**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catwalks</td>
<td>Drilling shafts</td>
</tr>
<tr>
<td>Sloped access</td>
<td>Work decks</td>
</tr>
<tr>
<td>Work over water</td>
<td>Floor opening</td>
</tr>
<tr>
<td>Welding at height</td>
<td>Wall openings</td>
</tr>
<tr>
<td>Set girders</td>
<td>Open-sided ramps</td>
</tr>
<tr>
<td>Leading edge</td>
<td>Bridge deck</td>
</tr>
</tbody>
</table>

* Catwalks, Drilling shafts are considered walking/working surfaces (i.e., roofs, open-sided floors).
* Overhead hazards - Surfaces that do not meet the definition of a walking/working surface (i.e., top plate beam).

**Other Recognized Hazards**

- Environmental:
  - Sun
  - Rain
  - Snow
  - Heat/Ice
  - Cold
  - Noise
  - Darkness
- Live Hazards:
  - Birds
  - Insects
  - Reptiles
  - Humans
  - Other

**Method of Fall Protection to be Used (check all that apply)**

- Guardrail system
- Personal fall arrest system
- Vertical life lines and rope grab
- Warning line (LSO)**
- Personal fall restraint system
- Appropriate anchors for system used
- Warn line w/ safety monitor (LSO)**
- Positioning device system
- Catch platform
- Covers (floor holes and openings)
- Safety net
- Horizontal life lines

**Other Standards that Apply**

- Boom lift
- Scaffold w/ guardrail
- Aerial lift
- Excavation/Trenching
- Scissor Lift
- Ladders
- Forklift

**Personal Protection Equipment (PPE) to be used at the worksite**

- Hard hat
- Rain Gear
- Gloves
- Work boot
- Safety eyewear
- Face protection
- Protective clothing

**Securing tools**

- Tool belts
- Tool bucket
- Toe boards
- Other

**Procedure for Assembly, Maintenance, Inspection, and Disassembly of System**

Assembly, disassembly, and maintenance of all equipment will be done according to manufacturer’s recommended procedures. A visual inspection of all safety equipment will be done daily or before each use. Any defective equipment will be tagged and removed from service immediately.
### Emergency Action Plan

**First Aid / CPR**
- Names of Trained Personnel on Site
- Location of First Aid Equipment

**Emergency Services** (call or radio 911 if available)
- Location of Phone
- Phone Number of Sheriff or Police
- Phone No. of Emergency Resp. Team

Describe Procedure of Rescue Plan:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Yes</th>
<th>No</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crane</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoist</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block / Tackle</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other (Describe)

---

**Verification of Compliance**

<table>
<thead>
<tr>
<th>Employee Signature</th>
<th>Employee Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee Signature</td>
<td>Employee Signature</td>
</tr>
</tbody>
</table>

---

A Copy of This Work Plan Must Be On Job Site
Exhibit 3-19  DOT Form 750-060 Lead Exposure Control Work Plan
(Page 1 of 2)

<table>
<thead>
<tr>
<th>Project Location</th>
<th>Description of Work (e.g. equipment used, materials involved, special procedures/practices, responsibilities)</th>
<th>No. of People on Crew</th>
<th>Lead Exposure Control Work Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Use appropriate respiratory protection¹ for exposure level of treated persons to be at this level.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Treat as if exposed at this level.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Methods to Reduce/Control Lead Exposure (check all that apply).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prior removal with tool - equipped with dust control.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ventilation (mechanical).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Employee rotation to distribute lead exposed work.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dust suppression/wet methods.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹Supervisor/Competent Person means one who is capable of identifying existing and predictable lead hazards in the surrounding or working conditions and who has authorization to take prompt corrective measures to eliminate them.

When lead is present if doing these "trigger tasks" (check all that apply):

- Treat as if exposed at this level.

- Use appropriate respiratory protection for exposure level:

  - ≥2,500 μg/m³ (50 times the PEL or more)
  - ≥50 μg/m³ to 500 μg/m³ (10 times the PEL or more)
  - ≥5 μg/m³ (PEL)

- Methods to Reduce/Control Lead Exposure (check all that apply):

  - Prior removal with tool equipped with dust control.
  - Ventilation (mechanical).
  - Employee rotation to distribute lead exposed work.
  - Dust suppression/wet methods.

- Contact your safety office for guidance prior to job.

- Contact the safety office prior to job.

- Manual demolition of structures.
- Manual scraping.
- Manual sanding.
- Heat gun applications.
- Power tools cleaning with dust collection systems.
- Spray painting with lead paint.
- Manual demolition of structures.
1. If you have recent air monitoring on a similar job (e.g., tasks, equipment, environmental conditions, paint lead content), you can use that to determine exposure. Other appropriate options may be available. 2. Contact your safety office for more information. APF = assigned protection factor (see WAC 296-842-13005). 3. All feasible control options must be implemented to reduce exposures below the PEL. If respirators are the only method used to reduce exposures, describe in detail why other methods are not feasible.

### Requirements for All Lead Work

- All employees trained in lead-safe work practices
- Soap, water (drinking water quality), and towels available and used before eating, drinking, smoking, or other “hand to face” activities
  - on site or at facility no further than three minutes away
- Area for lunch and breaks that is free of lead contamination. List location: ______________________________________________________________________
- All employees exposed over the action level have completed the initial blood lead testing
- Other PPE (as applicable) gloves, hardhat, welding gloves, work boots, eye protection/hearing protection
- No eating, drinking, smoking, or other hand to face activities conducted in lead work zone
- Equipment, tools, work surfaces where lead dust may accumulate are cleaned with HEPA vacuum and/or wet cleaning methods at the end of project or work shift, whichever is sooner (If a project is less than 8 hours, clean at end of project. If a project is more than one shift, clean at end of each shift).
- Job will be routinely inspected by Supervisor/Competent person
- Air monitoring has been performed on similar jobs or will be treated as “trigger task” exposures levels listed on previous page

All items below are also required if exposures are at or above the PEL (50 micrograms per cubic meter of air) or doing trigger tasks with no representative monitoring showing exposures are below the PEL

- Coveralls: worn during all lead work, removed or HEPA vacuumed before entering lunch/break area or leaving work site, and removed at end of shift and placed in sealed and labeled bag or other container that will prevent dispersion of dust. Coveralls or other exposed garments must never be taken home.
- Respiratory protection used selected based on either:
  1. As required by trigger task level
  2. Recent air monitoring: contact the Safety Office to identify applicable air monitoring
- Employees medically cleared for respirator use and fit tested

All employees on job site must sign the lead control plan

<table>
<thead>
<tr>
<th>Name</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Supervisor/Competent Person Printed Name | Supervisor/Competent Person Signature | Date Signed
### DOT Form 750-090 Respirator Record

**Respirator Record**

<table>
<thead>
<tr>
<th>Name</th>
<th>Employee ID Number</th>
<th>Organization Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supervisor's Name</th>
<th>Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Exposure

- [ ] Welding/Cutting/Brazing
- [ ] Lead
- [ ] Solvents
- [ ] Pigeon Droppings
- [ ] Spray Painting
- [ ] Pesticides
- [ ] Bridge Maintenance
- [ ] Other (Specify)
- [ ] Vehicle Body Repair
- [ ] Asbestos
- [ ] Abrasive Blasting
- [ ] Grinding/Sanding
- [ ] Pavement Marking
- [ ] Silica
- [ ] Other (Specify)

#### Fit Test

- **Date of Fit Test**
- **Type of Fit Test Used**
  - [ ] Qualitative
  - [ ] Quantitative
  - [ ] N/A
- **Tester**
  - [ ] Pass
  - [ ] Fail

#### Respirator

<table>
<thead>
<tr>
<th>Size</th>
<th>Facepiece</th>
<th>Type</th>
<th>Manufacturer</th>
<th>Model Number</th>
<th>Approval Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] Small</td>
<td>[ ] 1/2 Mask</td>
<td>[ ] SCBA</td>
<td>[ ] North</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ] Medium</td>
<td>[ ] Full Face</td>
<td>[ ] PAPR</td>
<td>[ ] MSA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ] Large</td>
<td>[ ] Hood/Helmet</td>
<td>[ ] Air Line</td>
<td>[ ] Willson</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[ ] Dust / Mist</td>
<td>[ ] Survivair</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[ ] Other (Describe)</td>
<td>[ ] 3M</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[ ] Bullard</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- [ ] Chemical Cartridge
- [ ] Gas Mask
- [ ] Combination
- [ ] Other

#### Comments

DOT Form 750-090
Revised 02/2012
Exhibit 3-21  DOT Form 750-094 Confined Space Entry Permit

### Confined Space Entry Permit

<table>
<thead>
<tr>
<th>Location, Description and Classification of Confined Space</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Purpose of Entry/Work to be done</td>
</tr>
<tr>
<td>Division/Unit</td>
<td></td>
</tr>
<tr>
<td>Supervisor(s) in Charge of Crew</td>
<td>Type of Crew</td>
</tr>
</tbody>
</table>

#### Hazards in Confined Space
Check all that apply and ensure each hazard is eliminated or controlled before and during entry:

- (Potentially) Hazardous atmosphere
- Material with potential to engulf
- Electrical shock
- Moving parts
- Temperature extremes
- Trapping or asphyxiation hazard (inwardly converging walls or floor which slopes downwards and tapers to a smaller section)
- Any Other hazard that is capable of impairing self rescue or presents immediate danger to life or health (describe):

#### Requirements Completed (All applicable must be completed before entry)

<table>
<thead>
<tr>
<th>Requirements Completed (All applicable must be completed before entry)</th>
<th>Completed</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lockout - De-energize</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line(s) Broken, Capped or Blanked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purge, Flush, and Vent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventilation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lighting (explosion proof as necessary)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respirator (list type)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protective Clothing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standby Safety Personnel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Body Harness with “D” Ring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency Escape/Retrieval/Rescue/Equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifelines</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Atmospheric Checks

<table>
<thead>
<tr>
<th>Atmospheric Checks</th>
<th>Acceptable Conditions</th>
<th>Initial Checks</th>
<th>Checks After Isolation and Ventilation</th>
<th>Periodic Checks</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Oxygen</td>
<td>19.5% to 23%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.E.L.</td>
<td>≤ 10%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>&lt; 35 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td>&lt; 10 ppm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Atmospheric monitoring conducted by:

Note: continuous/periodic tests shall be performed throughout the job. Contact Region Safety Office with questions.

1 L.E.L. Lower Explosive Limit, also referred to as lower flammable limit (LFL).

Records must be maintained for at least one year.
Exhibit 3-21  DOT Form 750-094 Confined Space Entry Permit  
(Pages 2 of 2)

<table>
<thead>
<tr>
<th>Equipment Name</th>
<th>Model/Type</th>
<th>Date Calibrated</th>
<th>Identification Number</th>
</tr>
</thead>
</table>

Communication procedures between entrants and attendants

**Emergency Services**

Emergency services must be arranged prior to permit-required confined space entry (including 911 services). Only persons who have been trained and equipped for entry rescue may enter the space to perform rescue services. Do not attempt an entry rescue if you are not trained and equipped to do so. If a person is down for no apparent cause, you must assume that toxic gases or an oxygen deficiency exist.

Emergency/Rescue Service Provided by

Phone Number/Contact Information

Describe Procedures (include necessary equipment):

Print Name | Initial | Authorized Role
---|---|---

| Entrant | Attendant |
| Entrant | Attendant |
| Entrant | Attendant |
| Entrant | Attendant |
| Entrant | Attendant |
| Entrant | Attendant |
| Entrant | Attendant |

2 Check the person’s authorized role. Remember, a person cannot be both an attendant and entrant; they can only serve one role.

**Entry Supervisor Authorization - All Entry Conditions Satisfied**

Signature

Date

Permit expiration date and time (may not be longer than required to perform work)

Date

Time

Post entry review of permit conducted by

Date

Post entry reviews must be done within one year of entry.

DOT Form 750-094 Revised 08/2011

Distribution: Original to Division/Unit, Copy to Regional Safety Office
UT INSPECTION REPORT

<table>
<thead>
<tr>
<th>Bridge Name:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge No:</td>
<td>Hours:</td>
</tr>
<tr>
<td>Structure ID:</td>
<td>Inspector ID #:</td>
</tr>
<tr>
<td>Structure Type:</td>
<td>Lead Inspector Intials:</td>
</tr>
<tr>
<td>Agency:</td>
<td>Co-Inspector Intials:</td>
</tr>
<tr>
<td>Milepost:</td>
<td></td>
</tr>
</tbody>
</table>

Inspected items:

Procedures:

**Pins**
1. When possible, test from both ends of pins.
2. Verify pin length shown on back reflection with plans. If back reflection does not match the plans, conduct manual length measurement and document correct pin length.
3. Start test with transducer at or near pin center for back reflection check, then run transducer around full perimeter of pin, searching for indications or significant loss of back reflection.
4. Whenever the test suggests that there is a defect in a pin, store and print out the indication with all associated equipment and settings documented. The location of the transducer shall also be documented using a clock hand convention (1 O’clock to 12 O’clock).

<table>
<thead>
<tr>
<th>UTM Location</th>
<th>UTM Type</th>
<th>UTM Per Girdr or Truss Line</th>
<th>Rivet Server Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Note: UTM = Ultrasonic Tested Member
<table>
<thead>
<tr>
<th>Bridge Name:</th>
<th>Date:</th>
<th>Hours:</th>
<th>Inspector ID #:</th>
<th>Lead Inspector:</th>
<th>Co-Inspector:</th>
<th>Location</th>
<th>VT</th>
<th>UT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge No.:</td>
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<td>Structure ID:</td>
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<td>Agency:</td>
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<tr>
<td>Detail Description Redundant</td>
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<td></td>
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<tr>
<td>Next Inspection Date</td>
<td></td>
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</tbody>
</table>

Exhibit 3-23 UT Inspection Schedule
### Exhibit 3-24 Pins Summary Sheet

#### Pins Summary Sheet

<table>
<thead>
<tr>
<th></th>
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<td>Agency:</td>
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<td>Bridge No.:</td>
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<td>Structure ID:</td>
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<tr>
<td>Bridge Name:</td>
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<td>Hours:</td>
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<td></td>
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<tr>
<td>Inspector ID #:</td>
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</tr>
<tr>
<td>Lead Inspector:</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Co-Inspector:</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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**Washington State Department of Transportation**

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**Pins Summary Sheet.xlsx 1 of 1**
Exhibit 3-25  Pin and Hanger Visual Inspection Report
(Page 1 of 2)

PIN AND HANGER VISUAL INSPECTION REPORT

Bridge Name:  
Bridge No:  
Structure ID:  
Structure Type:  
Agency:  
Milepost:  
Inspected Items:  
Co-Inspector Signature:  
Hours:  
Date:  
Co-Inspector Intials:  
Lead Inspector Signature:  
Inspector ID #:  
Lead Inspector Intials:  

Procedures:

Hangers
1. As required, use mirrors or other equipment to check inside surfaces of members.
2. Check for loose or unevenly loaded member sub-elements.
3. Check all rivets at connection plates, with emphasis on first row. The first row is the row closest to the edge of the connection or gusset plate.
4. Check for any welds, including plug, tack, or repair welds. Record location of welds, regardless of condition, and document weld type and category.
5. Check members and associated connection or gusset plates for areas of heavy or pitted corrosion, nicks, gouges, sharp bends, and collision damage. Record location of all these conditions and estimated section loss, if applicable.
6. Check all heat straightened or repaired areas. Record location of these areas, regardless of condition.

Pins and Anchor Bolts
1. As required, use mirrors or other equipment to check inside surfaces of members.
2. Check for pitting, laminar rust, surface deformation, and pack rust. It is important to check the pin, pin nuts, and all members surrounding the pin for this kind of steel deterioration.
3. Check for mobility and noise of pin and surrounding members. If the pin is physically “frozen” it is important to note this because the added stress can affect other members in the structure.
4. Observe and record abnormalities like; alignment, pin wear, loose pin nuts, and amount of nut engagement. It’s important to note that full nut engagement is when the nut is flush with the pin or the pin is extending past the nut.
5. Check for paint system failure on pin nuts, pin, and surrounding members.

Location | Type | Member Per Girder or Truss Line | Rivet Server Plans |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sh. No.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pin and Hanger Visual Inspection Report.xlsx 1 of 2
### Exhibit 3-25  Pin and Hanger Visual Inspection Report

(Page 2 of 2)

<table>
<thead>
<tr>
<th>Date:</th>
<th>Hours:</th>
<th>Inspector ID #:</th>
<th>Lead Inspector:</th>
<th>Co-Inspector:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Truss / Girder:</th>
<th>Span</th>
<th>Location</th>
<th>Inspected</th>
<th>Detail Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pins</td>
<td>Hangers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Agency:**

**Milepost:**

**Structure Type:**

**Structure ID:**

**Bridge No.:**

**Bridge Name:**

**Pin and Hanger Visual Report Form.xls 2 of 2**
### Special Features Inspection Report

#### Bridge Name:

#### Bridge No:

#### Structure ID:

#### Structure Type:

#### Agency:

#### Milepost:

#### Inspected items:

#### Procedures:

#### Date:

#### Hours:

#### Inspector ID #:

#### Lead Inspector Intials:

#### Co-Inspector Intials:

#### Lead Inspector Signature:

#### Co-Inspector Signature:

---

<table>
<thead>
<tr>
<th>Special Features</th>
<th>Special Features Type</th>
<th>Girder or Truss Line</th>
<th>Rivet Server Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**1 of 2**
### Special Features Inspection Report

<table>
<thead>
<tr>
<th>Date:</th>
<th>Hours:</th>
<th>Inspector ID #:</th>
<th>Lead Inspector:</th>
<th>Co-Inspector:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Girder Pier Location</th>
<th>Feature Inspected</th>
<th>Detail Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge No.</td>
<td>Bridge Name</td>
<td>Milepost</td>
<td>Agency</td>
</tr>
</tbody>
</table>
Exhibit 3-27  Vertical Clearance Card Generic

<table>
<thead>
<tr>
<th>Bridge Number:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure ID:</td>
<td></td>
</tr>
<tr>
<td>Looking:</td>
<td></td>
</tr>
<tr>
<td>Measurement Date:</td>
<td></td>
</tr>
<tr>
<td>Photo Date:</td>
<td></td>
</tr>
<tr>
<td>Inspection/Co Initials:</td>
<td></td>
</tr>
<tr>
<td>Minimum Vertical Clearance Posted For:</td>
<td></td>
</tr>
<tr>
<td>Posting on Structure:</td>
<td></td>
</tr>
<tr>
<td>Posting on Shoulder:</td>
<td></td>
</tr>
<tr>
<td>Advance Detour Intersection Posting for Vertical Clearance 14′-0″ or less:</td>
<td></td>
</tr>
</tbody>
</table>

Note:
Vertical measurements are actual measures rounded down to the nearest inch. Posted clearances are typically 3 inches less than the lowest clearance for a particular through movement.
Exhibit 3-28  Vertical Clearance Card Steel

<table>
<thead>
<tr>
<th>Location</th>
<th>Field Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:
Vertical measurements are actual measures rounded down to the nearest inch. Posted clearances are typically 3 inches less than the lowest clearance for a particular through movement.
Exhibit 3-29  Vertical Clearance Card Tunnel

Note:
Vertical measurements are actual measures rounded down to the nearest inch. Posted clearances are typically 3 inches less than the lowest clearance for a particular through movement.
3-6 Appendices

Appendix 3-A1  Bridge With Fill on Deck
Appendix 3-A2  Bridge With No Fill on Deck
Appendix 3-A3  Culvert With Fill on Deck
Appendix 3-B   UBIT Inspections and Procedures
Appendix 3-C   FHWA Letter for Routine Extended Frequency Inspections
Appendix 3-D   FHWA Letter for Bridge Special Feature Inspections
Appendix 3-A1  Short Span Bridge With Fill on Deck

Short Span Inspections are recommended and performed by the Washington State Department of Transportation (WSDOT) Bridge Preservation Office when the following criteria are met:

1. Depth of fill (D) must be less than B/2 (where B = Maximum opening distance).

2. CONCRETE Structures: Opening of 6 feet or more.  
   STEEL Structures: Opening of 6 feet or more.  
   TIMBER Structures: Opening of 4 feet or more.

3. If the criteria does not meet items 1 and 2 above, the structure is considered to be a maintenance structure. It is the responsibility of the maintenance office in that area to inspect and maintain.

4. The Team Leader that determines that a structure is now a maintenance responsibility shall ensure that this information is passed on to the proper contacts.
This page intentionally left blank.
Appendix 3-A2  Short Span Bridge With No Fill on Deck

Short Span Inspections are recommended and performed by the Washington State Department of Transportation (WSDOT) Bridge Preservation Office when the following criteria are met:

1. CONCRETE Structures: Opening of 6 feet or more.
   STEEL Structures: Opening of 6 feet or more.
   TIMBER Structures: Opening of 4 feet or more.

2. The Team Leader that determines that a structure is now a maintenance responsibility shall ensure that this information is passed on to the proper contacts.
This page intentionally left blank.
Appendix 3-A3  Short Span Culvert With Fill on Deck

Short Span Inspections are recommended and performed by the Washington State Department of Transportation (WSDOT) Bridge Preservation Office when the following criteria are met:

1. Depth of fill (D) must be less than B/2 (where B = total opening).
2. Total Opening of 8 feet or more.

3. If the criteria does not meet items 1 and 2 above, the structure is considered to be a maintenance structure. It is the responsibility of the maintenance office in that area to inspect and maintain.

4. The Team Leader that determines that a structure is now a maintenance responsibility shall ensure that this information is passed on to the proper contacts.
Appendix 3-B  UBIT Inspections and Procedures

The following explains the procedures for UBIT inspections.

1. **Determine Those Bridges Which Will Require Inspection With a UBIT** – On some structures, the team leader will not be able to gain sufficient access to determine the structural condition of the member (for example, floorbeam and stringer connections, a pier cap, or a bearing device at midspan or on top of interior piers that are too high for ladders). If this is the case, a UBIT, ladder, scaffolding, catwalk, boat, or some other means may be required to provide sufficient access.

The records for all structures that require inspection with a UBIT are all contained within the State Bridge Inventory. As part of scheduling for an upcoming inspection season, lists are generated from the inventory for bridges that are due for inspection with a UBIT.

2. **Provide for the Use of the UBIT** – The UBIT is an expensive piece of equipment and only a few agencies have the budget to purchase one. Along with the State, there are only a few UBIT owners in the Pacific Northwest. These trucks are complicated pieces of equipment which require special expertise to operate and a trained UBIT driver to drive and maintain the truck.

3. **Conduct the UBIT Inspection** – The UBIT inspection gives “hands on” access to under bridge elements for inspection. The team leader should make the same observations and assessments as would be made during a routine inspection. Given the expense of contracting for the use of this equipment, special care should be taken to ensure that the UBIT inspection is performed efficiently.

   It is a good idea to map out an inspection plan that will allow an inspection of the entire under portion of the bridge in as few steps as possible and with as few changes in the positioning of the UBIT as needed. Communication between the inspection team in the bucket and the truck operator should be maintained at all times to ensure the safety of the operation and to allow for proper positioning for the inspection. The team should have any and all inspection equipment required (test hammer, note pad, camera, etc.). Finally, the team leader should ensure that needed traffic control can be provided and that all other necessary special equipment will be available. If these steps are taken, the UBIT inspection can be accomplished quickly and at minimum expense.

4. **Record the Inspection Findings on the Bridge Inspection Report** – The UBIT inspection findings should be recorded on the Bridge Inspection Report. Follow the same procedures as described for Routine Inspection Reports in Section.

5. **Updating the WSBIS Inventory Record** – Any other changes needed for the WSBIS Inventory Record (add the inspection date for UBIT, Fracture Critical, and/or Special Inspections) should be entered into BridgeWorks.
6. **Interval** – The NBIS does not give specific instructions of how often a routine UBIT inspection needs to be completed. To determine the interval necessary, a history of the bridge condition and deterioration needs to be established. After a few Routine UBIT Inspections are completed the history and deterioration can be determined. For those bridges that do not need a UBIT Routine Inspection each time, the inspection interval can be rotated. For a "rule of thumb," the state of Washington has chosen the following:

<table>
<thead>
<tr>
<th>Type of Structure</th>
<th>Interval (Months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timber</td>
<td>24</td>
</tr>
<tr>
<td>Steel Trusses</td>
<td>24</td>
</tr>
<tr>
<td>Steel Bridges With Pins and Hangers</td>
<td>24</td>
</tr>
<tr>
<td>Non-Fracture Critical Steel Bridges</td>
<td>48</td>
</tr>
<tr>
<td>Concrete Bridges With Movable Bearings in the Interior Spans</td>
<td>48</td>
</tr>
<tr>
<td>Concrete Bridges With Fixed Bearings or No Bearings; Maximum</td>
<td>72</td>
</tr>
</tbody>
</table>

7. **Traffic Control** – A UBIT inspection will typically require some sort of traffic control where a temporary work zone such as closing a lane of traffic or equivalent shoulder width is set up to provide safety for the inspection team as well as the traveling public. The traffic control plan needs to follow the updated version of the Manual of Uniform Traffic Conrol Devices (MUTCD) for proper signing and flagging in the temporary work zone. Local events and traffic disruptions need to be checked before scheduling a UBIT Truck. Emergency response agencies, schools, the public, and businesses affected by the inspection need to be notified so they can adjust as necessary. All these items need to be checked before committing to the actual inspection date.

8. **Fall Protection Plans** – The Department of Labor and Industries (L&I) and the Washington Administrative Code (WAC) require a Fall Protection Plan be completed at each UBIT Inspection site. The retrieval systems and the safety emergency plans need to be known and signed on the Fall Protection Form by all in the work zone prior to beginning the inspection. The State utilizes a Pre-Activity Safety Plan (PASP) prior to all inspections, see Section 3-5 for a copy of the PASP.
Appendix 3-C    FHWA Letter for Routine Extended Interval Inspections

July 28, 1998

Mr. Gene Fong
Division Administrator
Federal Highway Administration
711 South Capitol Way
Olympia, WA  98501

Attn:  Mr. Barry Brecto

RE: Bridge Inspection Frequency Revision

Dear Mr. Fong:

This is in response to your letter of May 7, 1998. Attached is a revised list of bridges that meet our approved 48-month inspection criteria. We have reviewed the current database and have excluded those bridges with spans of more than 30-48 meters.

We have changed the inspection frequency to 48 months on the 233 bridges on this list. The extended inspection frequency will be re-evaluated during every future inspection. We will continue to monitor the 48-month inspection criteria and submit an updated list every April along with our annual master list update.

Again, this is the criteria used to create and maintain the 48-month bridge inspection list.

1. Common Designs - Concrete Bridges or steel culverts
   a. Prestressed girders (PCB)
   b. Box girders (CBOX)
   c. Slabs (CS)
   d. T-beams (CTB)
   e. Post-tensioned box girders (PBOX)
   f. Concrete culvert (CCULV)
   g. Steel culvert (SCULV)
Mr. Fong  
July 28, 1998  
Page 2

2. Structure Age - No maximum age limit. The condition ratings will be used to determine whether the structure should be on a four-year cycle.

3. Condition Ratings  
a. Superstructure greater than 6  
b. Substructure greater than 6  
c. Deck greater than 6  
d. Culvert greater than 6

4. Inventory Load Ratings  
a. **All bridge inventory ratings are greater than or equal to state legal loads**
   Inventory Rating Tons are equal to or greater than 36 or Rating Factor greater than 1.0

5. Vertical Underclearances greater than 14’ 00”

6. Bridges over water  
a. Not scour critical - Scour Code 5, 8, 9, T or N. 680  
b. Channel and channel code 6 or greater.

7. The maximum span length is equal to or less than 100 feet (In Accordance with FHWA Technical Advisory T 5140.21 dated September 16, 1988).

8. The maximum ADT is 100,000 vehicles and the ADTT 10,000.

9. No major maintenance has been performed on the bridge in the last two years.

10. The bridge has received at least one in-depth inspection in addition to its inventory inspection.

We appreciate the effort and assistance that the FHWA Division Bridge Engineer has provided in this matter. We have implemented this change and will continue to monitor the status of the criteria you set forth. If you have any questions, please call the Bridge Preservation Engineer at (360)753-4739.

Sincerely,

M. MYINT LWIN, P.E.  
Bridge and Structures Engineer

MML:Ir  
ORG/RPH  
Attachment  
cc: D. K. Nelson, EESC, MS 47323
Appendix 3-D  FHWA Letter for Bridge Special Feature Inspections

U.S. Department of Transportation
Federal Highway Administration

Washington Division
Suite 501 Evergreen Plaza
711 South Capitol Way
Olympia, Washington 98501-1254
(360) 753-8460
(206) 753-9860 (FAX)

February 17, 1993

HBR-WA/407.23

Mr. Duane Berentson
Secretary of Transportation
Department of Transportation
Olympia, Washington

Attention: Mr. Al Walley, PE

Dear Mr. Berentson:

Enclosed for your information and use is a memorandum from our Region 3 office, which lists criteria for selecting bridges that have special features needing inspection. The designation of these features is contained in Items 92C and 93C of the National Bridge Inventory. This guidance is provided to promote some uniformity in compiling the lists for these bridges.

The special features inspection list you furnished our office in January 1992 consisted of the following bridge types:

- Movable Bridges
- Floating Bridges
- Suspension Bridges
- Segmental Bridges
- Ferry Terminals
- Bridges with A514 Steel
- Bridges with Pans and/or Hangers
- Bridges with Temporary Supports

Please review the criteria developed in Region 3 to determine if modifications should be made to your criteria. We recommend you give serious consideration to adding two items, cable stayed bridges and bridges experiencing fatigue cracking or stress problems, to your list.

Please provide us an up-to-date list of those bridges with special features requiring inspection, including the selection criteria. This submission should be included with the upcoming April

(more)
progress update on the NBIS Critical Feature Inspections, due in our office by March 24, 1993. Since this information is needed for both State and local agency bridges, we are providing Mr. Dennis Ingham a copy of this letter.

Sincerely,

BARRY F. MOREHEAD
Division Administrator

By: Barry B. Brecto, P.E.
Division Bridge Engineer

Enclosure
Memorandum

National Bridge Inspection Standards (NBIS)
Guidance on Coding Items 92C and 93C in the National Bridge Inventory

November 13, 1992

From: Director, Office of Structures
Baltimore, Maryland

To: Division Administrators
Region 3

As discussed at our Region 3 Bridge Engineers meeting in Atlanta, we have been reviewing States’ criteria for coding items 92C and 93C in the National Bridge Inventory (NBI). Item 92C refers to special features other than fracture critical details and underwater inspection which need special evaluation. Item 93C is for coding the date of last inspection of the special feature.

As anticipated, we found a wide variation in the definition of special features. In some cases, the items were obviously coded incorrectly or not coded at all. The variation in coding is due primarily to the lack of specific guidance on types of bridges that would require "other special inspection." Development of specific criteria has generally been left up to each individual State.

Several FHWA documents provide examples of special features or attempt to broadly define bridges that require special inspections. Examples are as follows:

* Technical Advisory (TA) 5140.21, defines bridges with special features as those that by their nature or experience need special monitoring and evaluation. A second definition is provided in the same TA as bridges that because of location, strategic importance, or special design features, warrant special attention.

* 23 CFR, Part 650, defines bridges with unique or special features as those which require additional attention during inspection to ensure the safety of such bridges.

* The 1988 Coding Guide provides an example of a special feature as temporary shoring that is being inspected on a six month interval.

* The Bridge Inspector’s Training Manual (May 1991) provides three examples of bridge types which feature special elements and require special inspection procedures: suspension, cable stayed, and segmental concrete bridges.

Since each State is required to maintain a master list of bridges that require special inspections, some uniformity in the criteria used to compile the lists should exist. We recognize that there will
be differences in criteria due to individual State experiences, location, design policies, limits of acceptable risk, etc.; however, there are basic bridge types and features that are common among most of the States.

Based on the above definitions and examples along with our review of criteria in use by some States, we offer the following as a suggested list of bridge types or features that may require a special inspection:

1. Segmental, cable stayed, suspension, and movable bridges
2. Pin and hanger details on redundant structures.
3. Temporarily supported bridges
4. Bridges experiencing fatigue cracking or scour problems
5. Damaged bridges (e.g., due to vehicular or ship impact)
6. Concrete bridges showing signs of distress for which plans are not available
7. Interim inspection of bridges posted at operating rating
8. Long span metal culverts/structural plate culverts

With respect to movable bridges, inspection of the trusses, floor systems, and other structural elements requires typical inspection procedures; however, the electrical, mechanical and some structural components must receive a specialized inspection. Also, long span metal culverts are included on the list based on problems with cracking along the bolt line experienced by some States.

A few States use additional criteria such as bridges with steel box girders, electroslag welds, post-tensioned concrete channel beams, and panel type bridges (e.g., Acrow, Mabey, Bailey). These are good examples of features that may be specific to an individual State based on local experience.

We should note that a bridge does not have to be inspected more frequently than every two years to be included on the master list for item 92C. The "Individual in charge" of a State's inspection program is responsible for determination of time intervals between inspections based on the condition of the special feature or bridge. More frequent inspection should not be used as a crutch in lieu of repair or retrofit. When used for this purpose it should be a temporary measure where deficiencies can be corrected and considered as a deliberate measure where corrections are impractical. The attached December 20, 1990 Washington Office memorandum provides additional guidance on inspection frequency.

We request that each Division Bridge Engineer review their State's practices for coding items 92C and 93C with consideration given to the above suggested criteria. Where appropriate, changes or additions to the State's current criteria should be pursued. For those States that have either not coded these items or have coded them incorrectly, measures should be implemented to ensure accurate reporting in the NBI.
We further request that a brief status report be provided to our office by December 31, 1992. The report should indicate where your State stands in relation to our suggested criteria and outline any proposed actions to implement necessary changes. We are available to assist in this effort if desired.

Please contact Mr. Thomas Everett at 410-962-2486 with any questions or comments.

Louis N. Triandafilou
Louis N. Triandafilou

Attachment
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