



Bridge Inspection – Criteria for Assigning Increased Frequency and Levels of Inspection

December 2022

Bridge Division

1.0 Purpose

The Federal Highway Administration Metric #11, Inspection Frequency – Frequency Criteria, requires that criteria be established to determine level of inspection and frequency for the following inspection types:

- Routine inspections – for less than 24-month intervals
- Fracture Critical Member inspections – for less than 24-month intervals
- Underwater inspections – for less than 60-month intervals
- Damage inspections
- In-depth inspections
- Special inspections

The purpose of this document is to establish and define the criteria to trigger more frequent inspections for uniformity within the TxDOT bridge inspection program. The content in this document will be incorporated into the next TxDOT Bridge Inspection Manual update.

2.0 Routine Inspections

Routine Inspections are described in detail in the TxDOT Bridge Inspection Manual. Chapter 6 of the Bridge Inspection Manual includes a load rating flow chart for concrete bridges without plans. This flow chart requires that concrete structures which have no plans showing reinforcing details, are new to the Inventory, and are without structural distress will be inspected at either 12- or 24-month intervals. Those bridges which have not been carrying unrestricted traffic for at least 4 years will receive inspections every 12 months. Additional clarifications are made for those bridges exhibiting distress or those which do not follow other geometric characteristics. Chapter 6 also includes flow charts for load posting guidelines that includes TxDOT policy on inspection frequency for on-system and off-system bridges. The increased inspection frequency for routine inspections is summarized in the table below. The level of inspection for routine inspections on structures with decreased frequency will be the same as that required for those scheduled on a 24-month frequency.

Criteria for Change in Inspection Frequency from 24 months	Inspection Frequency (months)
Concrete Bridge without plans, without structural distress, and structure age \leq 4 Years	12
Off-System Structure with IR < HS 3, OR \geq HS 3, and posted based on inventory rating	6
On-System Structure with IR < HS 3, OR \geq HS 3, and posted based on inventory rating	6

3.0 Fracture Critical Member Inspections

The TxDOT Bridge Inspection Manual describes Fracture Critical Inspections in Section 7 of Chapter 4.

Chapter 4 states that these inspections are typically performed every 24 months but can be performed more frequently if conditions warrant. If the fracture critical inspection cannot be performed due to unsafe access, weather, equipment malfunction, or the structure is found to be closed or under construction, the inspection should be performed as soon as possible when conditions permit.

The following outlines TxDOT policy for changing the frequency of fracture critical inspections. The level of inspection for fracture critical inspections with decreased frequency will be the same as that required for those scheduled on a 24-month frequency.

Criteria for Change in Inspection Frequency from 24 months	Inspection Frequency (months)
Coding for Fracture Critical Superstructure (NBI Item 59) Condition Rating < 5	6 or 12*
Coding for Fracture Critical Substructure (NBI Item 60) Condition Rating < 5	6 or 12*

*6 or 12 assigned based on engineering judgement considering the severity or recent activity of the deficiency. An active crack or identification of a new crack may be considered recent activity. The reasoning used in the choice of either a 6-month or a 12-month frequency must be clearly documented in the inspection report.

4.0 Underwater Inspections

The TxDOT Bridge Inspection Manual describes Underwater Inspections and levels of inspections in Section 8 of Chapter 4. Chapter 4 requires that underwater inspections be performed every sixty months or more frequently if conditions warrant. For 60-month (“routine”) underwater inspections, all submerged components receive a 100% Level I inspection and 10% of components receive a Level II inspection. Known problems on submerged components can, at the discretion of the Underwater Program Manager, received a Level III inspection. In general, the level of inspection for underwater inspections with decreased frequency will be the same as that required for those scheduled on a 60-month frequency.

The following outlines TxDOT policy for changing the frequency of underwater inspections.

Criteria for Change in Inspection Frequency from 60 months	Inspection Frequency (months)
Coding for condition rating for one of the following items is less than 5 due to a deficiency identified through UW inspection <ul style="list-style-type: none"> • Substructure Component (NBI Item 60) • Channel and Channel Protection (NBI Item 61) • Culvert (NBI Item 62) 	12 or 24*
Coding for Scour Critical Bridge (NBI Item 113) = 1, 2, 3, or 5	12 or 24*

*12 or 24 assigned based on the severity and recent progression of the deficiency. The reasoning used in the choice of either a 12-month or a 24-month frequency must be clearly documented in the inspection report.

An underwater inspection resulting in a change in coding for Pier or Abutment Protection (NBI Item 111) to a 3 due to a notable reduction in protection provided by the protection feature will be cause to perform special underwater inspections on a frequency of 12 or 24 months. The frequency assigned is based on the severity of the damage to the protection feature. The special underwater inspection will be limited to the pier or abutment protection and the substructure components adjacent to the damaged feature. The level of inspection for substructure components inspected will be the same as that for routine underwater inspections.

5.0 Damage Inspections

The TxDOT Bridge Inspection Manual describes Damage Inspections and the assessment performed in Section 5 of Chapter 4. Damage Inspections do not have a set frequency as recognized in the FHWA Metrics since they only occur after damage is identified to have occurred to a bridge outside of another scheduled bridge inspection. The Level of inspection effort will vary based on the type of damage but shall be sufficient in scope and detail to collect all necessary information that an engineering decision can be made on repair, need for full or partial closure, etc.

6.0 In-Depth Inspections

The TxDOT Bridge Inspection Manual describes In-Depth Inspections in Section 6 of Chapter 4. These inspections are used to identify deficiencies not easily detected by routine means and methods. These are usually planned inspections with a frequency and level of inspection determined on a case-by-case basis with input from the Bridge Inspection Program Manager, District Bridge Engineers, and others as required. The level of inspection will vary based on the type of potential deficiency but shall be sufficient in scope and detail to collect necessary information that an engineering evaluation can be made.

As an example, TxDOT has implemented in-depth inspections of pin and hanger connections in non-fracture critical members. This in-depth inspection is scheduled to occur on a 48-month frequency and involves ultrasonic testing of the pins and visual inspection of the entire pin and hanger assembly as well as the girder in the immediate area of the assembly.

7.0 Special Inspections

The TxDOT Bridge Inspection Manual describes Special Inspections in Section 9 of Chapter 4. These inspections are performed to monitor a known or suspected deficiency, often at a specific location. Due to the variability of Special Inspections, frequency and level of inspection are determined on a case-by-case basis with input from the Bridge Inspection Program Manager, consultant employees, District Bridge Engineers and Coordinators, and others as required. The level of inspection will vary based on the type of deficiency but shall be sufficient in scope and detail to collect all necessary information that an engineering evaluation can be made.