

MINNESOTA DEPARTMENT OF TRANSPORTATION

OFFICE OF BRIDGES & STRUCTURES

**National Bridge Inspection Standards (NBIS)
Quality Assurance Review of Bridge Owners**

This Questionnaire must be completed by the individual in charge of the Agency’s Bridge Safety Inspection Program.

BRIDGE OWNER	
ADDRESS	

PERSON(S) RESPONSIBLE FOR BRIDGE INSPECTION PROGRAM

State regulations require the individual in charge of the bridge inspection and inventory for each organizational unit must be registered in Minnesota as a Professional Engineer.

	NAME	POSITION TITLE	PE REGISTRATION #
A			
B			

INSPECTION TEAM LEADER(S) OR ASSISTANTS

State regulations require the individual in charge of the inspection team must be a registered engineer, or have 5 years bridge safety inspection experience and have completed comprehensive bridge safety inspection training. The Bridge Safety Inspection Certification Program documents the inspector qualifications. Team Leaders must be certified as Level E, N, or 2. Assistants may be certified as Level 1 upon completion of one week of classroom training.

	NAME	POSITION TITLE	PE REGISTR #, INSP CERT # WITH LEVEL (E, N, 1, 2)
C			
D			
E			
F			

TEAM MEMBER QUALIFICATIONS

Enter a number of years of inspection experience. Put an "X" in the appropriate boxes for courses taken. Enter the month & year of two most recent bridge inspection seminars attended.

QUALIFICATIONS	TEAM MEMBER					
	A	B	C	D	E	F
YRS BRIDGE INSPECTION EXPERIENCE						
TAKEN 1-WEEK COURSE: <i>Engineering Concepts for Bridge Safety Inspectors</i>						
TAKEN 2-WEEK COURSE: <i>Safety Inspection of In-Service Bridges</i>						
CONTINUING EDUCATION: <i>Attendance at two bridge inspection seminars in a 4-year period are required to maintain Inspector Certifications. Call (651) 747-2132 for attendance information.</i>						
	DATE 1					
	DATE 2					

ACTUAL BRIDGE INSPECTIONS

While it is recommended that bridge inspections be performed by a two or more person team, bridge inspections may be performed by either one or more person teams. Please describe who performed the bridge inspections during the last inspection cycle and whether the inspectors performed the inspections as a one or more person team. It is possible that inspections can be performed as a combination of one person and multiple person teams. Therefore, please place an "X" in the boxes that apply.

TEAM COMPOSITION	TEAM MEMBER					
	A	B	C	D	E	F
ONE PERSON TEAM(s)						
TWO or MORE PERSON TEAMS						

BRIDGE INSPECTION RECORDS

All bridges located on public roads are required to be inspected each year **unless** the bridge meets specific condition criteria and the bridge has been submitted and approved by Mn/DOT for inspection on a 24 month cycle. Call the Bridge Inspection Engineer for more information. **Review the attached list of inspection frequencies. For each bridge with a proposed inspection frequency of 24 months, send a request to the Bridge Inspection Engineer (use form on website, see address at the end of this document). Bridges with a proposed inspection frequency of 12 months will automatically be changed by the Bridge Office. Notify the Bridge Inspection Engineer about any errors in the list.**

NUMBER OF BRIDGES INSPECTED ON A 24 MONTH SCHEDULE	
NUMBER OF BRIDGES INSPECTED ON A LESS THAN 12 MONTH SCHEDULE (INTERIM)	

Interim inspections should be scheduled if the individual in charge of the inspection program has reason to suspect that condition of a critical element may deteriorate substantially before the next regularly scheduled inspection cycle.

NUMBER OF BRIDGES INSPECTED DURING DECEMBER, JANUARY, AND FEBRUARY	
MAXIMUM NUMBER OF BRIDGES INSPECTED IN ONE DAY	

An annual inspection involves, at a minimum, visually checking all bridge elements in order to determine if there has been any change from the previous inspection. If these inspections are conducted in the winter, the inspector should return during more favorable weather conditions to complete the inspection. Follow-up inspections should be noted in the comments section of the inspection report.

COMMENTS	
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INSPECTION REPORTS

The District or Local Agency is required to keep signed copies of condition and special inspection reports. The Team Leader and the individual responsible for the inspection program are responsible to sign each inspection report.

WHO REVIEWS AND SIGNS INSPECTION REPORTS?	
WHO REVIEWS STRUCTURE INVENTORY INFORMATION FOR ACCURACY?	

ACTION REQUIRED: Due to changes in Bridge Management Programs over the past 5 years, it is important that information on the Bridge Inventory records be reviewed during a bridge inspection to check the accuracy of the inventory data. In any case, items of the inventory that are subject to change, such as wearing course /overfill depth and bridge signage, should be checked periodically. Call in or mail bridge inventory sheet changes to Mn/DOT’s Bridge Management Unit so that we can update the inventory data. Please call if you have any questions.

BRIDGE RATINGS

A new rating is required when new surfacing appreciably increases structure dead load, or the bridge becomes damaged, or load carrying elements otherwise deteriorate such that the engineer responsible for the bridge inspection program should suspect the live load capacity of the bridge has significantly changed from its last rating. Example bridge rating calculations are explained in the AASHTO Manual for Condition Evaluation of Bridges. If you have questions about bridge ratings or their calculation, please call the Mn/DOT Ratings Engineer. Enter the bridge numbers of any bridges that require new ratings.

WHO PERFORMS BRIDGE RATINGS?					
WHO REVIEWS BRIDGE RATINGS?					
BRIDGES REQUIRING NEW LOAD RATING					

BRIDGE POSTINGS

A letter should be sent to Mn/DOT’s Bridge Management Unit whenever a bridge is load posted so that our bridge inventory can be updated. It’s sometimes appropriate to use engineering judgment to supplement calculations when assessing reduction of load capacity of damaged or deteriorated bridge members. Revised rating calculations or other documentation supporting a bridge posting should be included in your bridge file.

Review the attached list of load posted bridges. Enter how many posted bridges your agency owns. Enter the bridge numbers of any bridges that should be added to or deleted from the list.

NUMBER OF POSTED BRIDGES						
BRIDGE POSTINGS TO BE ADDED						
BRIDGE POSTINGS TO BE DELETED						

Bridges that have less than legal load capacity are statutorily required to have signs posted at each end of the bridge to inform drivers of the load restriction. Missing signs should be replaced promptly.

Review the attached list of bridges with missing posting signs. Inspection reports indicate these bridges are missing either load posting or clearance signs. Enter how many bridges are missing load-posting signs.

NUMBER OF BRIDGES WITH MISSING POSTING SIGNS	
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BRIDGES WITH FRACTURE CRITICAL MEMBERS

Fracture critical bridges have at least one critical tension member whose failure would be expected to result in collapse of the bridge. Bridges supported by only 2 main girders, or most truss type bridges are examples of fracture critical bridge types. If you have questions about if a bridge should be classified as fracture critical, call the Bridge Inspection Engineer.

Mn/DOT Structures Inspection Unit is available to conduct the fracture critical inspections, and while on site will complete an inspection that will satisfy the annual inspection requirement. With the exception of traffic control (traffic control is the responsibility of the bridge owner), Mn/DOT will be responsible for inspection costs. The local agency is still responsible for conducting routine safety inspections

In-depth inspection of fracture critical bridges is required every 5 years. Review the attached list of F.C. bridges. Enter how many bridges have overdue fracture critical inspections. Enter the bridge numbers of any bridges that should be added to or deleted from the list.

NUMBER OF OVERDUE FRACTURE CRITICAL BRIDGE INSPECTIONS					
FRACTURE CRIT. BRIDGES TO BE ADDED					
FRACTURE CRIT. BRIDGES TO BE DELETED					

??? Why do we ask this ??? Do you want to participate in this program?

ACTION REQUIRED: Once the fracture critical inspection report has been completed, copies are sent to the District and Local Agency bridge owners. You are responsible to review the report for any “Critical Findings” or other high priority maintenance issues and to take appropriate action. Copies of the report should be placed in the bridge file

BRIDGE SCOUR

Historically, more bridges have collapsed due to scour than vehicle overload. Minnesota counties were required to assess all bridges for potential collapse under scour conditions by 1993. A screening process identified bridges with low scour potential. Bridges that did not meet criteria required more detailed consideration and/or analysis. For new bridges, scour screening and evaluation tasks are often done by the bridge designer. **Review the attached list of bridges with scour concerns, note any errors, and enter the number of bridges in each scour category.**

<p>F - NO EVALUATION – FOUNDATION KNOWN <i>Most state bridges were screened by 1993. Therefore, bridges rated F typically are new bridges. Either you or your designer should complete the screening process for these bridges and results should be reported to the bridge management unit.</i></p>	
<p>G - NO EVALUATION – FOUNDATION UNKNOWN <i>Bridges with unknown foundations require further evaluation, which may involve foundation investigations or be subjective based on engineering judgment derived from observations of stream flow or performance during past high water events. This will often require a monitoring plan to be developed and filed in the bridge file.</i></p>	
<p>J - SCREEN – SCOUR SUSCEPTIBLE <i>Bridges that have been screened as scour susceptible require further evaluation to develop a scour protection plan, or to plan for monitoring the bridge during a specified flood depth, or stage. After the evaluation has been completed, change the Scour Code to P, R, or U.</i></p>	
<p>O - STABLE – ACTION REQUIRED <i>Bridges that have been screened as stable</i></p>	
<p>P - STABLE DUE TO PROTECTION <i>Bridges that have been identified as Stable due to protection require no further action. Annual, or underwater inspections should note the condition of scour protection systems.</i></p>	
<p>R - CRITICAL – LOCAL MONITOR <i>Bridges that have been determined to be Scour Critical need to be monitored during certain flood events or before reopening the bridge after a flood event. A Scour Action Plan needs to be developed for each bridge rated R to define at what flood stage to begin monitoring the bridge. A copy of the action plan is required to be placed in the bridge file.</i></p>	
<p>U - Critical – Protection Required <i>Bridges that are rated Critical Protection Required have been determined that such frequent monitoring is required or may be too risky, and that installation of a protection system is a priority repair to this bridge. Until protection is installed, the bridge must be monitored during certain flood events or before reopening the bridge after a flood event. A Scour Action Plan must be developed and for each bridge rated U to define at what flood stage to begin monitoring the bridge. A copy of the action plan is required to be placed in the bridge file.</i></p>	

Enter the number of bridges with monitoring plans on file, and protection systems in place.

NUMBER OF BRIDGES RATED “R” THAT HAVE MONITORING PLANS IN BRIDGE FILES	
NUMBER OF BRIDGES RATED “U” THAT HAVE REQUIRED PROTECTION INPLACE	

FOR BRIDGES THAT REQUIRE MONITORING, HOW DO YOU TYPICALLY DETERMINE IF SCOUR IS BEGINNING TO THREATEN YOUR BRIDGE, OR WHEN IT IS SAFE TO REOPEN?

The AASHTO Manual for Condition Evaluation of Bridges states that an assessment of scour vulnerability of substructures should be included in the bridge file. In addition, channel profiles and cross-sections from current and past inspections should be plotted to observe scour or stream instability. Refer to Section 2.4 of the manual and to Mn/DOT Scour Screening Guidelines for more information. **Enter scour categories for which bridges are cross-sectioned, or "none".**

FOR WHICH SCOUR CATEGORIES ARE CHANNELS CROSS-SECTIONED?	
IF SO, AT WHAT FREQUENCY?	

If you have any questions about scour screening, protection, or monitoring plans call the Bridge Hydraulics Engineer.

UNDERWATER INSPECTIONS

Routine inspection of underwater portions of the substructure is limited to observations during low-flow periods and/or probing for signs of undermining, and the condition to be monitored should be noted on the annual bridge inspection report. For bridges with underwater elements that cannot be inspected visually or by wading and probing, or examined by feel due to excessive water depth or turbidity, a special underwater inspection is required to be completed at an interval not to exceed 5 years. Bridges requiring underwater inspections have been identified by districts and state agencies, and are inspected by a diver under a statewide underwater inspection consultant contract. **Please review the attached list of bridges that are included in the underwater bridge inspection program. Enter the bridge numbers of any bridges that should be added to or removed from the list.**

NUMBER OF BRIDGES THAT REQUIRE UNDERWATER INSPECTION BY A DIVER	
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ACTION REQUIRED: After the underwater inspection report has been completed by the consultant, copies are sent to the District and Local Agency bridge owners. You are responsible to review the report for any "Findings" or other high priority maintenance issues and take appropriate action. Copies of the report should be placed in the bridge file.

CRITICAL FINDINGS

A critical finding is a situation discovered during a scheduled NBI, Fracture Critical, or Underwater inspection of a bridge that if not promptly corrected, could cause failure or partial failure of a bridge, or could pose a serious traffic safety hazard. Bridge failures have occurred nationally that might have been avoided if prompt attention had been given to concerns noted on bridge inspection reports. Reporting critical findings is a process developed to assure that the existence of critical deficiencies is promptly communicated to decision makers within the agency who can initiate action to correct the problem and to preserve public safety. The AASHTO Manual for Condition Evaluation of Bridges requires that bridge owners should implement standard procedures to address such deficiencies. Attached for your information is a process we've developed to standardize how critical findings are handled statewide.

WHAT PROCEDURE DO YOU CURRENTLY FOLLOW TO ASSURE THAT "CRITICAL FINDINGS" ARE REPAIRED?
HOW ARE THESE REPAIRS CURRENTLY DOCUMENTED?

BRIDGE FILES

The AASHTO Manual for Condition Evaluation of Bridges states in chapter 2 that “ Bridge Owners should maintain a complete accurate and current record of each bridge under their jurisdiction. Complete information in good usable form is vital to the effective management of bridges. It should provide a full history of the structure including damage and all strengthening and repairs to the bridge. The bridge record should provide data on the capacity of the structure, including computations substantiating reduced load limits if applicable.”

As a minimum each bridge file should include a chronological record of Inventory and Appraisal sheets and inspections performed on the bridge, including special underwater and fracture critical inspection reports, bridge rating and posting records, photographs, and relevant correspondence. Other suggested items for the file are listed in Section 2.2 of the AASHTO Manual for Condition Evaluation of Bridges.

WHERE ARE YOUR CURRENT REPORTS FILED?	
WHERE ARE REPORTS FROM PAST YEARS FILED?	
WHERE ARE STRUCTURE INVENTORY SHEETS FILED?	
WHERE IS CORRESPONDENCE FILED?	
WHERE IS PAST BRIDGE MAINTENANCE, AND REPAIR INFORMATION FILED?	
WHERE ARE BRIDGE PHOTOGRAPHS FILED?	

HOW IS BRIDGE REPAIR WORK PRIORITIZED AND SCHEDULED?

INSPECTION EQUIPMENT

Indicate whether or not the following inspection is readily available to the bridge inspection team (Y/N)

LADDER		BOAT		SNOOPER	
MEASURING TAPE		CALIPER		100 FT MEAS. TAPE	
UNDERCLEARANCE ROD		SCREWDRIVER		SHOVEL	
CARPENTER LEVEL		CHIPPING HAMMER		SCRAPER	
PLUMB BOB		BINOCULARS		FLASHLIGHT	
WADERS / HIP BOOTS		CAMERA			
TIMBER INCREMENT BORER		STRAIGHT EDGE			
SOUNDING EQUIPMENT		MANUAL FOR CONDITION EVALUATION OF BRIDGES Available at www.transportation.org			

FIELD INSPECTION REVIEW

A Mn/DOT Review Team may briefly inspect one or more bridges under the Owners jurisdiction prior to the meeting. The purpose of the inspection is to review NBI and PONTIS ratings and comments reported during the last inspection cycle, and to review Structural Inventory Data. The results of that inspection and the Review Team’s comments will be reported to the Owner at the meeting.

Generally, the team will determine if their evaluation of element conditions agree reasonably with the ratings on the inspection report, and if the comments for each element have sufficient detail so that the individual responsible for the bridge inspection program (and new inspection and engineering staff) will recognize changes in condition that require additional consideration or maintenance. Typically elements that are rated in lower than condition state 2 should have comments recorded.

The Review Team’s comments and recommendations will be added to this report and returned to the Owner within about six weeks following the date of this meeting. If you have any questions before then, or additional comments you would like included in this report, please contact the following persons:

Gary Peterson State Bridge Construction and Maintenance Engineer 3485 Hadley Ave N, Oakdale, MN 55128-3307 gary.peterson@dot.state.mn.us	(651) 747-2101
Todd Niemann – Bridge Inspection Engineer 3485 Hadley Ave N, Oakdale, MN 55128-3307 todd.niemann@dot.state.mn.us	(651) 747-2132
Jim Pierce – Bridge Management Engineer 3485 Hadley Ave N, Oakdale, MN 55128-3307 james.pierce@dot.state.mn.us	(651) 747-2119
Lowell Johnson – Bridge Ratings Engineer 3485 Hadley Ave N, Oakdale, MN 55128-3307 Lowell.johnson@dot.state.mn.us	(651) 747-2118
Andrea Hendrickson– Bridge Hydraulics Engineer 3485 Hadley Ave N, Oakdale, MN 55128-3307 andrea.hendrickson@dot.state.mn.us	(651) 747-2161
Bridge Office Websites: Bridge Main - http://www.dot.state.mn.us/bridge Bridge Inspection - http://www.dot.state.mn.us/bridge/inspec Bridge Management - http://www.dot.state.mn.us/bridge/mgmt Bridge State Aid - http://www.dot.state.mn.us/bridge/StateAidBridge	