

Chapter 3: Files

Complete information, in good usable form, is vital to the effective management of bridges. Such information provides a record that may be important for repair, rehabilitation, replacement and future planning of the bridges. Items that should be assembled as part of the bridge record are discussed in this Chapter. Guidance to assigning bridge inventory information and creating, retiring and assigning Structural File numbers may be found in the ODOT Bridge Inventory Coding Guide available online within the Office of Structural Engineering/Bridge Management Section.

Some or all of the information pertaining to a bridge may be stored in electronic format, including the Structure Management System (SMS), as part of a file management system. Bridge files are prepared to maintain and record the following:

- Significant bridge file components
- Results of bridge inspections together with notations of any action taken to address the findings of such inspections
- Relevant maintenance and inspection data to allow assessment of current bridge condition
- Findings and results of bridge inspections.

Ohio Structure Management System (SMS)

Bridge Structure Inventory and Appraisal Information (SI&A) is warehoused by the department's Structural Management System (SMS), an online centralized reporting and management database.

The screenshot shows the SMS Main Dashboard with three main panels. The top right corner has an 'Add Wid' button. The panels are:

- My Reports for Review:** Contains one report with Asset Name 'FUL-C011F-F020 _ (2632160)' and Asset Code '2632160'.
- Last Accessed Reports:** Contains five reports with Asset Names and Asset Codes: ALL-00066-1097 _ (0201588), FRA-00070-0893 _ (2504316), ALL-00066-1097 _ (0201588), HEN-00003-0185 _ (3530175), and ALL-C0240-0046 _ (0247960).
- Last Accessed Assets:** Contains five assets with Asset Names and Asset Codes: FUL-VDEWI-WI00 _ (2660334), ALL-00066-1097 _ (0201588), HEN-00003-0185 _ (3530175), ALL-C0240-0046 _ (0247960), and FRA-0062D-0130 _ (2503689).

Figure 26 - SMS Main Dashboard

Non-ODOT employees may retrieve a username and password through <https://myodot.dot.state.oh.us> and upon receiving a username/password then communicate with the SMS team by email at sms@dot.state.oh.us in order to obtain access to the assets as delegated by the Ohio Revised Code or by contract. The SMS login URL is <https://sms.transportation.ohio.gov>.

People, who sign (or log into SMS) inspection reports fraudulently or without meeting the minimum NBIS qualifications or the minimum qualifications in this manual, may be subject to prosecution for forgery under section 2921.11 of the Ohio Revised Code or other applicable state or federal laws.

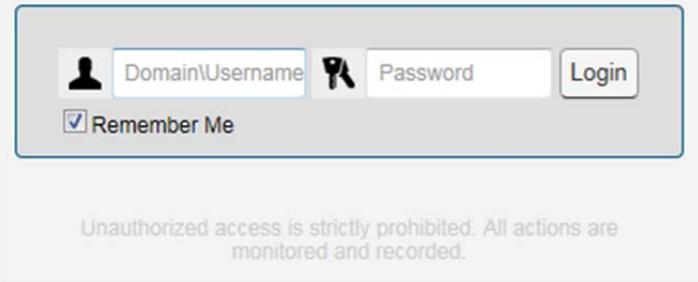


Figure 27 - SMS Log-in

The Federal NBIS bridge data, designated in the Recording and Coding Guide items 1-118, is forwarded to FHWA on a regular basis for compliance verification. Per federal law, State Agencies (including NHS NBIS bridges under the jurisdiction of Local Authorities) have a maximum of 90 and Local Agencies have 180 days to submit bridge data after the field inspection. In order to effectively collect, process and update SI&A data, State and Local governments use the centralized online SMS to not only satisfy Federal and State regulation but to also manage bridge assets. All personnel performing inspection work for entities must establish a user account in SMS. See the OSE website in the SMS link for details and manuals.

Purpose of Inspection Records and Files

Control Authorities are to maintain complete, accurate, accessible and up-to-date records for each of their bridges. These records are needed to:

- Meet regulation
- Establish an inventory of infrastructure assets
- Document the condition and functionality of infrastructure, including the need and justification for bridge restrictions, for public safety
- Identify improvement and maintenance needs for planning and programming
- Document improvements and maintenance repairs performed
- Meet documentation requirements for work performed using Federal and State funding

- Provide available information in a timely manner for inspections

Record Retention Period

Unless otherwise noted, one copy (or the original) of each document in the bridge inspection file must be maintained for the life of the structure. The following documents may be destroyed after the indicated retention period:

- Routine inspections older than 10 years for bridges in service
- Retain all inspections, load ratings, design computations and maintenance records for 3 years after a bridge is replaced
- Retain all load ratings for 3 years after a new rating is complete
- For Department bridges that are turned back, given or sold to local municipalities or private/public organizations, all bridge inspection file information should be given to its new owner. The District needs only a file with contents similar to other local bridges. A record of the ownership transfer should be maintained in the bridge file.

Inspection Organization Unit File

The Control Authority is to maintain a general file of their organization for bridge safety inspection. The file shall define the scope of their jurisdiction. The organization file should contain:

- List of bridges and structures
- List of posted bridges with date of most recent signing verification
- List of FCM bridges
- List of bridges with special features and/or conditions that necessitate special or more frequent inspections
- List of bridges that require underwater inspection
- List of bridges to be inspected during/after high water events
- Contact list for key staff during bridge emergencies
- Inspection organization
- Organizational Chart listing key staff, Program Managers and Inspectors
- Certification credentials for the Program Manager, Inspectors and key staff
- List of Quality Control tools utilized by the entity (Metric 20)
- Latest findings from the Quality Assurance Review
- List of inspection equipment

- List of bridge design and inspection reference materials
- Past results of QA Reviews

Individual Structure Inspection File Contents

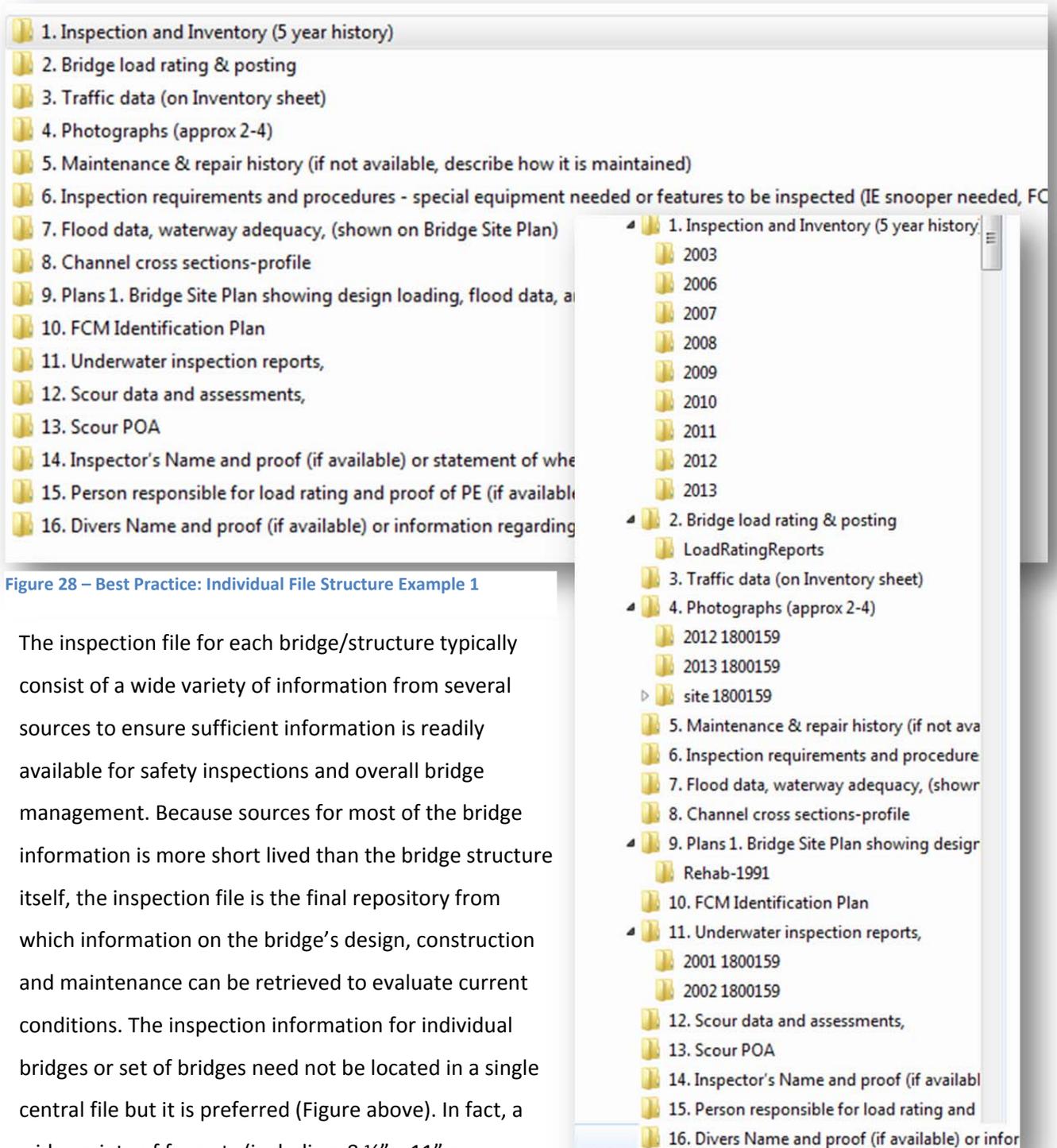


Figure 28 – Best Practice: Individual File Structure Example 1

The inspection file for each bridge/structure typically consist of a wide variety of information from several sources to ensure sufficient information is readily available for safety inspections and overall bridge management. Because sources for most of the bridge information is more short lived than the bridge structure itself, the inspection file is the final repository from which information on the bridge's design, construction and maintenance can be retrieved to evaluate current conditions. The inspection information for individual bridges or set of bridges need not be located in a single central file but it is preferred (Figure above). In fact, a wide variety of formats (including: 8 ½" x 11" paper

reports, 22" x 36" mylar/vellum drawings, microfilm aperture cards, microfiche, electronic drawings/documents, photos prints/negatives/digital images and management system databases) are now in use. A "single file drawer" concept for file management is typically impractical. For the purposes of this section, the generic term "Inspection File" is intended to encompass all of these records wherever they are physically stored.

An index of the information available is critical to enable the inspector to quickly access information needed to evaluate a structure. A good index for each bridge should identify the types of records available, their format, storage location, and date of record (Figure to the right). This index must be a document that is readily available to the Control Authority, Program Manager, Inspectors, and key staff.

Complete, accurate, and current records are maintained for each bridge under their jurisdiction. Records of recent and past bridge inspections including Routine and Special Inspections must be legible, accurate, and accessible.

Inspection reports and records must be filed in an orderly manner. All state-owned bridge files must be stored at the district offices. Locally-owned bridge files must be stored under the authority of the County Engineer, or City Engineer. Where bridge plans, repair plans, and/or rehabilitation plans are available, a set must be placed in the file folder with all other information about the bridge. Additional information such as correspondence, agreements, memos, etc. must also be placed in the bridge file.

Bridge files shall have the following components:

- a) Significant bridge file components, for example:
 - Inspection reports
 - Load Rating calculations
 - Waterway information – channel cross-sections, soundings, stream profiles, scour assessment, Scour Plan of Action

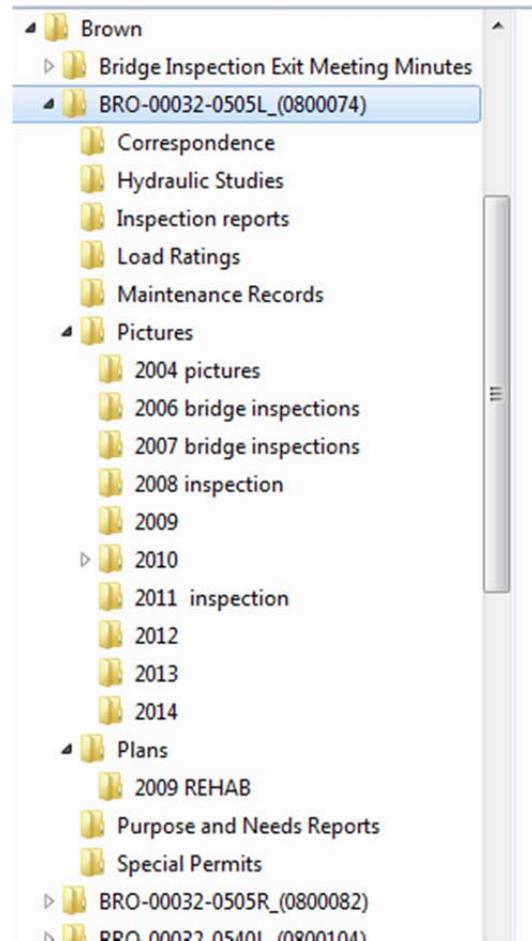


Figure 29 – Best Practice: Individual File Structure Example 2

- Significant correspondence
 - Special inspection procedures or requirements
 - Plan information (when available), Load rating documentation, including load testing results
 - Posting documentation
 - Critical findings and actions taken
- b) Inventory and evaluation data and collection/verification forms
 - c) Results of bridge inspections together with notations of any action taken to address the findings of such inspections
 - d) Relevant maintenance and inspection data to allow assessment of current bridge condition
 - e) Findings and results of bridge inspections

Inspection Reports

Bridge Control Authorities are to keep track of the type of inspections performed during the annual inspection cycle. Each bridge shall be inspected at least once each calendar year with no time between inspections of a bridge exceeding 18 months. The bridge inspection report should be reviewed and submitted within 90 days for State and Federal bridges and 180 days for Local Agency bridges from the date of inspection. Under normal circumstances, the inspection should be performed and submitted as close to the 12-month interval as possible, to avoid the possibility of filing two inspections on a bridge in any one calendar year and none in the next year. Include any special access or requirements needed to fulfill the inspection of the structure for its remaining useful life.

Inspection Comments, photos or sketches are required for degradation resulting in a primary member being coded a 4-Poor or worse. These shall be placed in the bridge file and available to the next inspector. SMS may be utilized as the one-stop location bridge file. At a minimum these photos are recommended within SMS:

- **Endview** – From the rear, looking forward or upstation, stand back far enough to catch the entire width of the bridge plus 20 feet of approach guardrail. It is important to include warning signs and restriction signs at the bridge.

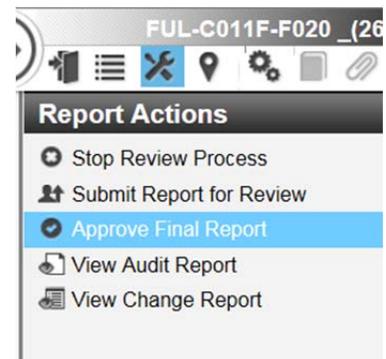


Figure 30 - Submit and Approve Final Reports

- **Elevation** - Stand back far enough to catch the entire length of the bridge and, where applicable, show any poor alignment of stream.
- **Abutment** - Verify that flash works on camera, show as much of the abutment and bearings as possible, show areas of major deterioration if possible, try to show typical overall conditions. Take additional photos to include all utilities on the bridge.
- **Underside** - Include as much of the beams, slab and deck bottom as possible and include areas of major deterioration if possible.
- **Example Degradation** of controlling primary member's 5-Fair or worse.
- **Restriction Signage:** Load Posting, Vertical Clearance, One-lane, No Trucks, Closed etc.

Waterway Information

Information that assists in evaluating the waterway opening and the bridge's resistance to scour must be included in the individual structure file:

- Hydrology and Hydraulics Reports (H+H)
- Observed Scour Assessment Report
- Scour depth computations (may be part of H+H or standalone calculations)
- Flood data, waterway adequacy, often shown on Bridge Site Plan
- A plan of action (POA) shall be prepared to monitor known and potential deficiencies and to address critical findings for all bridges determined to be scour critical. The bridges that are scour critical must be monitored in accordance with the plan.
- An assessment, when performed, shall also be within the bridge file.

Inspection Procedures

Preparation requirements for the field phase of an inspection vary greatly. Variations may be due to structure type, site accessibility, traffic volume, or channel conditions. Documenting field preparation requirements can reduce budgets by maximizing mobilization efficiency. These areas of preparation, where applicable, are to be documented for each bridge.

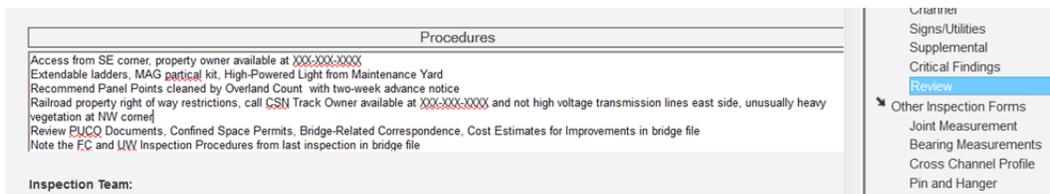


Figure 31 - Inspection Procedures in SMS within the Inspection/Review tab

Procedures lay out what should be done, looked at, etc. Bridges that require a Fracture Critical or Underwater inspection must have a unique inspection procedure associated with the bridge. The required procedures are often found in the report, as an introductory section. The procedures should:

- Identify any specialized tool or piece of equipment necessary that is not ordinarily carried by the bridge inspector. Example tools might be extendable ladders, special non-destructive testing equipment, power tools, lights, special safety equipment, special underwater tools or diving gear.
- Record any special services that are required. Example services might be traffic control, structure cleaning operations, inspection access such as structure rigging, an under bridge inspection vehicle, or special working platforms such as a barge.
- Document specific scheduling needs for non-routine inspections. This includes manpower needs for larger structures that require an extended duration inspection effort with multiple Inspectors, bridges subject to seasonal flooding conditions, fracture critical bridges where special services are required, and underwater bridge inspections.
- Identify unique site conditions that require more than routine preparation. Unique site conditions include railroad property right of way restrictions, navigable waterway restrictions, high voltage transmission lines, unusually heavy vegetation, mud, pollution, insect or animal droppings, unusually high water level or unique traffic safety procedures.
- Other documents that may be maintained as part of the inspection file include PUCO Documents, Confined Space Permits, Bridge-Related Correspondence, Cost Estimates for Improvements.
- Inspection Procedures for unique structures (a detailed list may be found in the next chapter within the specific “Inspection Type”)
 - Fracture Critical Bridges: The Identification of all steel members in tension that are non-load-path-redundant shall be in the bridge file for every fracture critical bridge. Additionally, locations of AASHTO E and E’ details (category examples may be found in Appendix. Fatigue Prone Details), retrofits and other poor connections should be identified. Consideration should be given to include AASHTO D details. This plan must be available for all inspectors at each Fracture Critical Inspection. These fracture critical members shall be inspected within a 24 month interval. An example Identification Plan is available in Appendix. Fracture Critical Plan. The procedures shall include how inspectors should access the FCM’s and who needs to be contacted.
 - Underwater Inspection Procedures: Each bridge requiring an underwater dive inspection must have the underwater elements identified, the location of the underwater elements,

the inspection frequency (when less than the minimum 60 months) and any procedures established described in the records. Those elements requiring underwater inspections must be inspected according to the procedure. A checklist is available in Appendix.

Underwater Inspection Procedure Checklist.

Plan Information, Load Rating/Posting Information and Traffic Data

Information generated during the design of the bridge that should be incorporated into the permanent inspection file includes:

- Design plans for original construction or rehabilitation
- Design Computations
- Design Exception Approval letters (Used in Rating Appraisal Items)
- Foundation Report
- Surveys

Construction and maintenance records considered to be important for the bridge inspection file include:

- As-Built drawings
- Shop Drawings
- Pile Hammer Approvals and Pile Driving Records
- Field Change Orders
- Jacking and/or Demolition Schemes
- Documentation of latent defects
- Maintenance Work Orders, Sketches
- Repair Records

Entities are to maintain in the SMS accurate and up-to-date load capacity information for all bridges and structures that carry public traffic. The Load Rating Analysis is part of the safety inspection of a bridge which include:

- Analysis and Rating (All calculations, and computer output and input files and supporting calculations)
- Justification for an Engineering Judgment must include documentation of the condition of the bridge and date of the inspection that the load rating is based upon
- Bridge load rating & posting recommendations, including load rating calculations or load test data, dates and signing recommendations. The relevant posting information must be kept on file. Examples include:
 - Posting Evaluation
 - Posting Recommendation Data Sheets
 - Posting Approval Letter
 - Pertinent Correspondence
 - Commissioner Resolution

Each bridge or structure carrying vehicular traffic requiring inspection under this Manual shall be rated to determine its safe load carrying capacity in accordance with Bridge Design Manual Section 900. If it is determined that the maximum legal load configurations exceeds the load allowed at the Operating Rating level, then the structure shall be posted for load restriction in accordance with ODOT Bridge Design Manual, Section 900, and AASHTO Manual For Bridge Evaluation. Local Agencies who require posting based off of the Inventory Rating or a combination Operating/Inventory due to heavy water truck, logging truck or industrial activity may opt to restrict below the Operating Rating. Sufficient justification must be placed in the bridge file. **Controlling Summary Items less than or equal to a “Poor” or any Condition State in CS4 should be reanalyzed i.e. load rated using the in-service condition of the bridge.**

Average Annual Daily Traffic, Average Annual Daily Truck Traffic are fields within the bridge inventory and the data should be updated and re-sent.

Maintenance and Repair History

One of the functions of the bridge (and structure) inspection program is to identify the needs of bridges for repairs, maintenance, preservation, reconstruction and replacement. Bridge authorities need this information to respond to those critical deficiencies warranting immediate attention and for the long-term management of these

critical infrastructure assets. The FHWA requires the major improvement needs for NBIS bridges for nation-wide planning. If a history is not available then place a description in the file of how it is maintained.

Maintenance items may be tracked and assigned using the SMS (Figure to the right Maintenance Dashboard in SMS).

