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1.6 FIELD QUALITY CONTROL/QUALITY ASSURANCE

1.6.1 Introduction

An Inspection Team Leader has to keep track of a lot of information, from the planning phase of the inspection all the way through to submittal and/or data entry of the completed reports and forms. Given the complex nature of structure inspection work and the low tolerance for mistakes, it is imperative that structure inspectors use quality control and quality assurance methods to reduce the risk of errors or omissions. Refer to Section 1.2.5 for Program Quality Assurance.

1.6.2 Inspection Fieldworks

1.6.2.1 General

NBIS Metric #12: Inspection procedures – Quality Inspections states:

> Each bridge is inspected in accordance with the national recognized procedures in the *AASHTO Manual for Bridge Evaluation (MBE)* contributing to quality assessments, ratings, and documentation, as measured by the following criteria:
>
> - Condition codes within generally acceptable tolerances,
> - All notable bridge deficiencies identified, and
> - Condition codes supported by narrative that appropriately justifies and complements the rating or condition state assignment.
>
> A qualified team leader is at the bridge at all times during each initial, routine, in-depth, fracture critical member and underwater inspection.

The field investigation of a structure should be conducted in a systematic, organized, and efficient manner that minimizes the possibility of any structure element being overlooked. To achieve this objective, consideration should be given to standardizing the sequence for inspection of a structure.

Defects found in various portions of the structure will require thorough investigation to determine and evaluate their cause. The cause of most defects will be readily evident; however, it may take considerable time and effort to determine the cause of some defects and to fully assess their seriousness.

If possible, the inspector should observe bridges, culverts, and bridge-mounted sign structures during passage of heavy vehicle loads to determine if there is any excessive noise, vibration, or deflection. If a problem is detected, the inspector should investigate further until the cause is determined. Careful measurement of line, grade, and length may be required in this case. The seriousness of the condition can then be appraised and corrective action taken as deemed necessary.

Possible fire hazards near the structure should be noted, such as accumulations or storage of debris, combustibles, drift wood, brush piles, weeds, and garbage. If the land under or

around the structure is utilized by the public for other purposes, make a note of it on the report form and comment if any other safety issues are present.

1.6.2.2 Field Measurements

Field measurements are made to provide baseline data on the existing structure components and to track changes, such as crack width and length, which may occur over time.

Measurements may be required on structures for which no plans are available or to verify data shown on plans. Measurements are to be made only with sufficient precision to serve the purpose for which the measurements are intended. Unnecessarily precise measurements lead to a waste of time and a false sense of value of the derived results. The following limits of accuracy are generally ample for field measurement of overall lengths:

Timber Members	Nearest 1/4 inch
Concrete Members	Nearest 1/2 inch
Asphalt Surfacing	Nearest 1/2 inch
Crack Width	Necessary accuracy to identify future growth
Steel Rolled Sections	Necessary accuracy to identify section
Span Lengths	Nearest 0.1 foot

When plans are available for a structure that is to be load rated, dimensions, member types, and member sizes will normally be taken from the plans. However, many of the plans are not as-built plans and may not reflect all changes made to a bridge. Sufficient checking must be done during a field inspection to insure that the plans truly represent the structure before the plans are used in structural calculations. Special attention should be given to changes in dead load, such as alterations in deck geometry, additional overlays, and/or new utilities. Increased dead load may affect the load rating for the structure.

Measurements sufficient to track changes in joint opening, crack size, or rocker position should be made and recorded. Measurements to monitor suspected or observed substructure tilting or movement may also be required. In these cases, it is necessary that permanent markings be made on the structure and recorded in the field notes by the inspector to serve as a datum for future readings. A log of the readings should be kept in the inspection file and updated with the new readings after each inspection cycle. Direct measurements of the surface area and depth and location of defects are preferred to visual estimates of percentage loss.

1.6.2.3 Cleaning

It is a good inspection practice to clean selected areas to allow close, hands-on inspection for corrosion, deterioration or other hidden defects. Debris, vegetation, fungus, marine growth, vines, litter, and many other obscuring coverings can accumulate and hide problem areas. Some bird waste may harbor fungi that are harmful if inhaled. Respiratory protection equipment should be used when deemed appropriate.

On metal structures, particularly on fracture critical members, it may be necessary to remove cracked or peeling paint for proper inspection. Laminate or pack rust will require chipping with a hammer or other means to remove the corrosion down to base metal. If the overall paint system on an element is good, provisions should be made to recoat the bare metal areas exposed during the inspection. A coat of spray primer or cold galvanizing would be sufficient.

On concrete structures, leaching, lime encrustation, and debris may cover heavily-corroded steel reinforcing. Debris on piles can obscure heavy spalling or cracking. Vegetation can also obscure large defects such as cracks or spalls. All obscuring debris and vegetation should be moved aside or removed so that the inspector can see the obscured elements.

Timber structures are particularly susceptible to insect damage and decay in areas where debris causes a wet/dry condition. Inspectors should give particular attention to cleaning and carefully inspecting such areas, especially when a wet/dry condition is present near the end grain.

1.6.3 Report Preparation

The inspection report is the only documented permanent record of the inspection. The inspection report is considered a legal document, and all rehabilitation and replacement work decisions are based on the information it contains. Therefore, it is imperative that the inspection report has accurate and thorough information. Reports should include photos, sketches, addenda, or whatever is necessary to adequately and thoroughly document defects. On the other hand, the inspection report should be as concise as possible while still containing all of the relevant information. Do not include sketches, photos, etc. that are not necessary to communicate the nature of a defect. Likewise, when conditions are good/excellent and are so noted by the appropriate rating number, it is not necessary to provide narrative comments.

The HSIS is capable of uploading all necessary photographs for each bridge inspection. Insignificant photographs or additional photos of a particular defect may be uploaded but not selected to appear within the inspection report. Each bridge should have a roadway, and elevation photograph. Refer to 1.4.5 for additional information on the Bridge Inspection Photography Policy.