



National Bridge Inspection Program Update – Illinois



FHWA ILLINOIS DIVISION

2017

ILLINOIS BRIDGE INVENTORY

- **Total No. of Bridges = 26,574**
State: 7,828
Local: 18,746
- **Average Age**
State: 42 yrs.
Local: 39 yrs.
- **Load Posted**
State: 10
Local: 780
- **Fracture Critical**
State: 183
Local: 329
- **Scour Critical**
State: 49
Local: 84
- **Structurally Deficient**
State: 604
Local: 1,586

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Federal Oversight of the NBIP

As the 2017 inspection season is upon us, we have recognized the need to quickly inform bridge owners of past National Bridge Inspection Standards (NBIS) review observations. We created this report format focused on informing local bridge owners, Team Leaders, and Delegated Program Manager’s of the program’s major highlights and issues.

Most of you are now familiar with FHWA’s annual assessment of IDOT’s Bridge Inspection Program. Many ask why FHWA is always changing the requirements of the program? To answer this question, we offer the following:

In the past, FHWA issued a single compliance determination for the **overall** NBIS program in Illinois. The common finding was “IDOT is in substantial compliance with the NBIS”, even though some problems existed. The old process was often criticized as inconsistent and too subjective. In addition, several high-profile structural failures in other states, specifically the I-35 bridge collapse in Minnesota, brought bridge safety to the national forefront, prompting Congress to direct FHWA to develop a data-driven, risk-based oversight program. That is why the 23 NBIS Metrics were created.

Since their creation in 2011, the new metrics cover 23 distinct aspects of the NBIS and is focused on **consistency** throughout the country. While a small number of

changes have occurred through the five-year life of the metrics assessment program, IDOT has responded by making process



improvements, many of which take a few inspection cycles to implement and fine tune. The review process is now well-defined and stable and no major changes are anticipated in the near term. However, future NBIS revisions (if any) may or may not affect our current assessment process.

As a NBIS Delegated PM, Here’s What You Need to Know:

Each metric is assessed annually and determined as either: **Compliant, Substantially Compliant, Conditionally Compliant, or Non-Compliant.**

Deficiencies which hinder the overall effectiveness of the program must be resolved by Dec. 31st. By this date, a **Plan of Corrective Action (PCA)** must be developed outlining the process to correct noncompliant issues. Through negotiations and after FHWA approval of a PCA, a metric be-

comes Conditionally Compliant.

The inability to reach an agreement on acceptable corrective actions or to adhere to milestones documented in an approved PCA will result in **Non-Compliance for Illinois** for that metric, and may subject **bridge owners** to the federal penalty provision. The penalty requires IDOT to dedicate a portion of their federal funds normally used for bridge improvement projects to correct noncompliance. Of course, imposing penalties is a **last** resort to ensure compliance with the NBIS. IDOT continues to be very cooperative and proactive in ensuring NBIS compliance.

It is very important to note that Illinois’ overall compliance determinations are based on the **cumulative efforts of all agencies** (state and local) that have bridges subject to the NBIS. Compliance deficiencies in only one local agency can directly and negatively affect the entire state’s compliance status.

If you have any questions, please don’t hesitate to contact us. We look forward to another great inspection year!

Sincerely,

Dan Brydl, Division Bridge Engineer

Micha Loesch, Assistant Bridge Engineer

Metric Performance - Past 5 Years

Illinois has made tremendous improvement over the past 5 years. Last year’s assessment resulted in best overall performance to date.

Since 2011, there have been major updates to policies and procedures, better bridge file content, higher quality inspections, improved and updated load ratings (where necessary), and most notably and importantly, a substantial reduction in

inspection delinquencies: down to less than 5% in 2016 statewide.

Additionally, the IDOT Bureau of Bridges and Structures now has the Bridge Management Unit, which has been instrumental in ensuring a high quality and uniform inspection program in Illinois.

Areas which are still being improved are:

1. **Proper identification of critical findings.**
2. **Inspection quality and documentation.**
3. **Procedures for fracture critical and underwater inspections.**
4. **Re-load rating of certain structures.**

See inside for more information.

H-Pile Section Loss - Part 1



As you may recall, Illinois has seen recent bridge closures and even failures due to H-pile section loss at the waterline. Most notably, in September 2013, a bridge over Rayse Creek in Jefferson County collapsed during passage of a legally loaded gravel truck due to H-pile corrosion (more info [here](#)).

Unfortunately, this has been a nationwide issue. The most recent example was on October 3, 2016, when a bridge on the National Highway System in Streetsboro, Ohio settled after all 12 piles supporting the two center piers buckled (more info [here](#)).

The bridge was built in 1985 and had no load restriction. The substructure condition rating was reported to be “7”. The failure was speculated to be caused by an overloaded vehicle, but H-pile corrosion at the waterline was a definite contributor.

In response to this incident, the Ohio DOT issued advice regarding the design and inspection of bridges with steel bents. [Illinois inspectors should heed the same advice.](#)

The following recommendations were provided:

1. **Get a good look.** Make sure you get up close and always use a hammer!
2. **Always take photos!** Recommended for every inspection.
3. **Low water?** Inspect during low water conditions or use underwater inspections techniques.
4. **Encase them.** Especially if they're in water.
5. **Get the rating correct.** Follow proper procedures and take measurements.



H-Pile Section Loss - Part 2

Recently, the IDOT Bureau of Bridges and Structures required closure of two structures due to [severe deterioration](#) of exposed steel piles **directly under the concrete pier cap**. This phenomenon is unique and was discovered unexpectedly.

Due to these findings, [the importance of thorough inspection of exposed steel H-piles cannot be overstated!](#)

So what should you do?

Give extra attention to and **sound all exposed steel H-piles**, especially at the waterline (as mentioned above), and also directly under the pier cap during all routine inspections.

Piles are often not fully exposed during the routine inspection. It may be necessary to perform a supplemental inspection when the water level is down, or to perform a hands-on underwater inspection of the piles to verify the condition.

If excessive section loss (greater than 10% in critical areas) causes the substructure condition rating (ISIS Item 60) to drop to a “4” or less, a load rating will be required. Illinois section loss requirements can be found [here](#).

And always remember, a **visual** inspection is only one part of a routine bridge inspection. Another part, and perhaps the most important, is the **physical** aspect. [A hammer should always be used to sound areas for signs of deterioration.](#)



Box Beam Condition Rating

Adjacent concrete box beams are a common bridge type in Illinois, particularly on the local system. Although they can be an economical bridge option, they are [prone to rapid deterioration](#), especially if de-icing salts are used on the bridge.

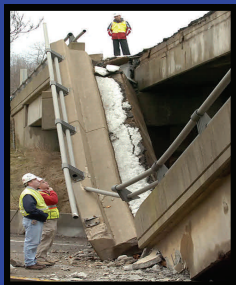
In addition to this, there has been confusion on the proper condition rating of box beams during routine

bridge inspections. Proper rating criteria for the superstructure condition rating (ISIS Item 59) can be found [here](#).

Note that any keyway leakage automatically drops the rating to a “6”, and any independent movement of the beams drops the rating to a “5”, regardless of any other section loss or delamination. Pay special attention to the criteria

for a rating of “4” or less.

Once corrosion begins, the integrity of the pre-stressed strands and the structural capacity of a beam can quickly be compromised. To properly document exposed reinforcement, [it is critical to sound the underside of the beams.](#) A hammer should always be used! A ladder or other suitable access is suggested, if possible.

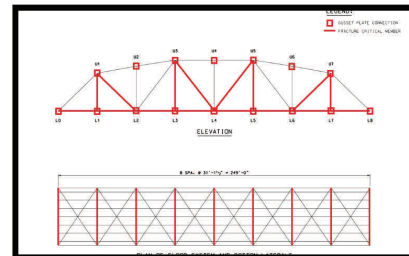


Inspection Procedures

Written inspection procedures **specific** to the bridge are required for all Underwater (UW), Fracture Critical Member (FCM), and Complex (Moveable, Cable-Stayed, Suspension) bridge inspections. In recent reviews, there was a lot of inconsistency and confusion on what constitutes acceptable inspection procedures. To help, IDOT has developed forms and templates to assist bridge owners with developing these procedures.

1. IDOT Form BBS UIP, **Underwater Inspection Plan**, must be developed for all bridges requiring an underwater inspection, in addition to required cross sections, etc.
2. A **Fracture Critical Member Inspection Plan** must be developed for all bridges with Fracture Critical members. A template can be found in the Structural Services Manual.

We are pleased to report all **complex bridges** have had specialized procedures recently developed thanks to the hard work of several program managers around the state.



Here are some important points to consider regarding inspection procedures:

- The intent is to communicate specific items (special procedures, access equipment, problematic details, etc.) to the Team Leader *ahead of time* to ensure a quality inspection
- The *inspection report* documents what an inspector found. Inspection procedures lay out what should be done.
- They describe **Risk Factors** unique to the bridge

The important next step is to **inspect each bridge according to those procedures**, and to properly document those actions in the report!

Inspection Documentation

Proper documentation is crucial when completing a high quality bridge inspection.

One of the ways IDOT has worked to increase quality and consistency throughout Illinois was by developing a short training video on proper bridge inspection documentation.

Everyone is highly encouraged to watch this short video!

[Click here to watch it!](#)

Remember to always:

1. Document all defects with their **description, size, severity, and location**. Written descriptions are required for all condition ratings of "5" or less.
2. Include enough information on each report to assess the change of condition over time.
3. Don't rely on pending Load Rating inspections to provide the detailed documentation of deficiencies.

In addition, with better technology (including smartphones), pictures should be taken to properly document deficiencies during bridge inspections, particularly if any condition rating is coded as "4" or less.

Note the AASHTO Manual for Bridge Evaluation, Section 2.2.4 states:

"Each bridge record should contain at least two photographs, one showing a top view of the roadway across and one a side elevation of the bridge. Other photos necessary to show major defects or other important features... should also be included."

Load Rating Efforts in Illinois

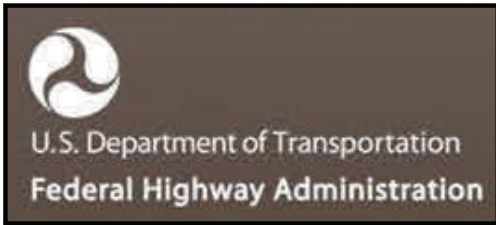
Due to recent scrutiny by FHWA related to assigned load ratings (more info [here](#)), IDOT has been working very hard to ensure their load rating practices meet all federal requirements.

In response to this, IDOT is reaching out to program managers throughout Illinois to gather the necessary information. This important activity is under a current Plan of Corrective Action with associated deadlines, so your cooperation is needed and greatly appreciated!

In addition, recent federal FAST ACT legislation (more info [here](#)) has significantly increased the weight limits for certain vehicles on the interstate and adjoining routes, most notably for emergency and tow recovery vehicles.

Due to this, additional postings on the interstate and other major routes may be necessary in the near future. IDOT and FHWA are working together to assess the current status in Illinois and to decide how best to move forward.





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*“Working with Our Partners to
Improve Bridge Safety in
Illinois, and the Nation”*

Inspection Delinquencies

Complying with designated bridge inspection intervals remains an important and highly visible aspect of the bridge inspection program.

Although very significant improvements have been made in the recent past, our continued goal is to ensure every single bridge is inspected on time. As you know, occasional only minor delinquencies are allowed (up to one month) as long as there are well documented and acceptable reasons for those delinquencies. It is extremely important to report those reasons as required.

As you know, even one bridge in the entire state of Illinois that is

delinquent for inspection by 4 months or more is grounds for a non-compliance determination for the entire state. **Every effort should be made to avoid delinquencies.**

The Bureau of Bridges and Structures has a consultant in place to inspect any bridge that appears to be heading for a four-month delinquency. Upon completion, invoices will be sent to any owner to cover the costs of this inspection.

A final reminder for bridge owners: please ensure the checkbox system remains implemented showing inspection completion so the Bridge Management Unit can properly track progress.

Resources for Local Public Agencies

If you are looking for a comprehensive overview of the National Bridge Inspection Program (NBIP), be sure to visit Federal-aid Essentials for Local Public Agencies by clicking [here](#):

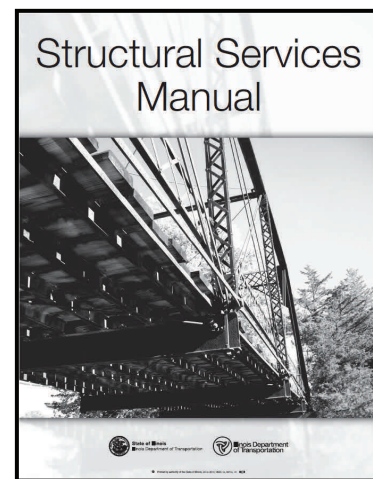
This module is one of several training modules designed to help Local agency professionals navigate the NBIP. The site is structured for busy agency staff who want further understanding of Federal policies, procedures, and practices. You will find quick answers, straight to the point, and presented in plain language to help you make the right decisions in successfully complying with the NBIS.

The Federal-aid Essentials Web site also contains a resource library of informational videos regarding the Federal-aid Highway Program.

Other FHWA resources pertaining to the NBIS, including inspection manuals, policy and guidance, etc. can be found [here](#).

Additionally, IDOT has many excellent resources available online such as state specific policies, inspection forms, and available training. Be sure to stay updated by subscribing to the IDOT Bureau of Bridges and Structures NBI subscription service. To join the NBI subscription service send a blank e-mail [here](#). An archive of all subscription service announcements can be found [here](#).

Also, don't forget to read Chapter 3 of the **Structural Services Manual** ([here](#)) It is a great resource for all bridge inspection related policy and procedures in Illinois.



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