

The Project Concept for: The Inspection of two Cable-Stayed Bridges, near Columbus, Indiana.

I65 Bridge over SR-46 (I65-68-7910).

1. The 3-phase inspection process, found in the Inspection and Maintenance Manual, (conducted over a six year period), shall be used as a guide for the inspection of this bridge.
2. Since the bridge has not yet had an In-Depth, Arms-Length Inspection with NDT, more than one phase listed in the Inspection and Maintenance Manual may need to be completed in the first year of this contract. The amount of money for the phase #2 & #3 inspections shall be based on how much is done in phase #1, and what is found. (No money has been budgeted yet for phase #2 & #3.)
3. Unless at the Scoping Meeting, the Consultant brings up good reasons to change the inspection sequence already listed in the Inspection & Maintenance Manual, the inspection shall start with having the Steel Box Transverse (Floor Beam) Beams Inspected.

The Inspection of the Steel Box Transverse Beams shall consist of inspecting 100% of the exteriors at Arms-Length, with special attention given to any field welds, category D, E, and E' Fatigue details, and the Anchor Brackets for the Stay-Cables. The Access Covers on the Transverse Beams shall be opened and a visual inspection of areas easily reached from these access holes shall be conducted. Viewing devices such as Bore-scopes would not need to be used on the first phase inspection, but shall be required on either the phase #2 or phase #3 inspections. NDT of the field welds and/or Fatigue Details may be done at selected areas during phase #1, but INDOT does not want to damage the new paint job too much at this time. Areas that can be reached inside of the Transverse Beams can be tested. Any paint damage shall be restored to good condition. In addition the Post-tensioning Anchorage areas need to be visually examined (grouted areas on the copings), to see if anything out of the ordinary exist. INDOT does not expect any grout to be removed to expose the Anchorages during phase #1. However if the grout is removed, then grout of equal or better quality and color shall be placed.

4. The next item to be inspected shall be the Steel Arch Ribs. These Steel Arch Ribs may be partially inspected in phase #1, if funds allow. What can not be inspected in phase #1 shall become the main items to inspect in phase #2.

The Inspection of the Steel Arch Ribs shall consist of inspecting 100% of the exteriors at Arms-Length, with special attention given to any field welds, category D, E, and E' Fatigue details, and the Anchor Brackets for the Stay-Cables. The Access Covers on the Steel Arch Ribs shall be opened and a visual inspection of areas easily reached from these access holes shall be conducted. Viewing devices such as Bore-scopes would not need to be used on this inspection, but shall be required on the phase #3 inspection. NDT of the field welds and/or Fatigue Details may be done at selected areas during phase #2, but INDOT does not want to damage the new paint job too much at this time. Areas that can be reached inside of the Steel Arch Ribs shall be tested. Any paint damage shall be restored to good condition. In addition, any areas from the phase #1 inspection that may need to be re-inspected shall be re-inspected, along with any needed NDT.

5. After inspecting the Steel Box Transverse Beams and the Steel Arch Ribs, the next item to be inspected shall be the Cable-Stays (Hangers).

The Inspection of the Cable-Stays (Hangers) shall consist of inspecting 100% of the exteriors at Arms-Length, with special attention given to the Black Tape Wrap and the Rubber Boots, to ensure that they are in good condition and are not allowing moisture to get inside of them. The alignment and lengths of the Cables shall be checked verses Design and As-Built dimensions to a degree to determine if there have been any significant changes. The Access Covers on the Steel Arch Ribs and the Transverse Beams shall be opened and a visual inspection of areas easily reached from these access holes shall be conducted. The anchorages shall be checked and a random number opened-up and checked inside, and then properly greased and closed back-up, per manufacturer's recommendations. A random number of

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Rubber Boots shall be pulled-up to check the condition of items underneath. The Boots shall be re-set and made water tight.

Viewing devices such as Bore-scopes shall be used to inspect inside both the Steel Arch Ribs and the Transverse Beams. NDT of the field welds and/or Fatigue Details shall be done at selected areas identified during phase #1 and #2, both on the interiors and exteriors. Any paint damage shall be restored to good condition. In addition NDT shall be done on selected areas of the Transverse Post-tensioning as well as the Longitudinal Post-tensioning in the Edge-Beams.

All or some of the Cable-Stays shall be tested using NDT. The best type of NDT to use to test the Cable-Stays shall be decided on by the time the phase #3 inspection commences.

Any miscellaneous items that need to be inspected shall be included here, as well as any areas identified in earlier inspections that need to be looked at again.

Finally, a detailed survey (using surveying equipment) shall be conducted of the deck, to see if there are any areas that show deflections or sags, since the bridge was constructed.

6. As a general item, reports, photos, and inspection/testing data shall be managed for this bridge in an organized way that will make finding data and using the reports easy. Two sets of bound paper reports as well as data/reports in an electronic format shall be provided to INDOT. INDOT would be looking for ideas to develop stand alone files for this bridge, but also to have them tied to our existing NBI Data Base/Application and made so they can easily be added to and up-dated in the future, (from both INDOT and Consultant Inspections).

The Inspection and Maintenance Manual shall be updated after each of the three inspections. This shall include more detail on what and how to inspect various items, and an updated schedule for conducting these inspections.

SR-46 over the East Fork of the White River (46-03-7495 EBL).

1. 1. The 3-phase inspection process found in the Inspection and Maintenance Manual, (conducted over a six year period), shall be used as a guide for the inspection of this bridge, however, it will not be followed in the order listed in the Manual. The order shall be described below.

2. Unless at the Scoping Meeting, the Consultant has good reasons to change the sequence below, the inspection work shall start with the inspection of the **Steel Pylons and Pylon Head**, and then the **Cable-Stays**, and finally the **Steel Transverse Beams and Post-tensioning**.

3. Since the bridge has not yet had an In-Depth, Arms-Length Inspection with NDT, more than one phase listed in the Inspection and Maintenance Manual may need to be completed in the first year of this contract. The amount of money for the phase #2 & #3 inspections shall be based on how much is done in phase #1, and what is found. (No money has been budgeted yet for phase #2 & #3

4. The Inspection of the **Steel Pylons and Pylon Head** shall consist of inspecting 100% of the exteriors at Arms-Length, with special attention given to any field welds, category D, E, and E' Fatigue details, and the Anchor Brackets for the Cable-Stays.

Any Access Covers on the Pylons that can be, shall be opened and a visual inspection of areas easily reached from these access holes shall be conducted. Viewing devices such as Bore-scopes would not

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need to be used on the first phase inspection, but shall be required on either the phase #2 or phase #3 inspections. NDT of the field welds and/or Fatigue Details may be done at selected areas during phase #1, but INDOT does not want to damage the paint job too much at this time. Areas that can be reached inside of the Pylons shall be tested. Any paint damage shall be restored to good condition. Access openings shall be tightly closed and sealed to prevent water intrusion. If access openings do not exist, into the Steel Pylons or the Pylon Head, plans shall be made for providing access in the phase #2 inspection.

If access is available to the inside of the Pylon Head, a visual inspection inside of areas shall be conducted. If access for an inspector is not available, viewing devices such as Bore-scopes would not need to be used on the first phase inspection, but shall be required on either the phase #2 or phase #3 inspections. NDT of the field welds and/or Fatigue Details shall be done at selected areas during phase #1. Any paint damage shall be restored to good condition.

5. The next item to be inspected shall be the **Cable-Stays**. The **Cable-Stays** may be partially inspected in phase #1, if funds allow. What can not be inspected in phase #1 shall become the main items to inspect in phase #2.

The Inspection shall consist of inspecting 100% of the exteriors at Arms-Length, with special attention given to the Polyethylene Pipes and their seams, and the Rubber Boots, to ensure that they are in good condition and are not allowing moisture to get inside of them. The alignment and lengths of the Cables shall be checked verses Design and As-Built dimensions to a degree to determine if there have been any significant changes. A random number of Rubber Boots shall be pulled-up to check the condition of items underneath. The Boots shall be re-set and made water tight.

A sampling of the Cable-Stays shall be tested using NDT. The best type of NDT to use should by this time (phase #2), have been decided on.

Any areas from the phase #1 inspection that need to be re-inspected shall be taken care of, along with any needed NDT.

6. After inspecting the **Steel Pylons and Pylon Head** and the **Cable-Stays**, the next item to be inspected shall be the **Steel Transverse Beams and Post-tensioning**.

The Inspection of the **Steel Transverse Beams and Post-tensioning** shall consist of inspecting 100% of the exteriors at Arms-Length, with special attention given to the category D, E, and E' Fatigue details, and the Anchor Brackets for the Stay-Cables. The anchorages shall be checked and a random number opened-up and checked inside, and then properly greased and closed back-up, per manufacturer's recommendations.

Viewing devices such as Bore-scopes shall be used to inspect inside both the Steel Pylons and any areas inside of the Pylon Head not accessible for visual inspections in phases #1 & #2. NDT of the field welds and/or Fatigue Details shall be done at selected areas identified during phase #1 and #2, both on the interiors and exteriors. Any paint damage shall be restored to good condition.

NDT shall be done on selected areas of the Post-tensioning elements and anchorages. If grout is removed to expose the Anchorage, then grout of equal or better quality and color shall be placed after the testing is done.

Any miscellaneous items that need to be inspected shall be included here, as well as any areas identified in earlier inspections that need to be looked at again.

Finally, a detailed survey (using surveying equipment) shall be conducted of the deck, to see if there are any areas that show deflections or sags, since the bridge was constructed.

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Note: The Steel Transverse Beams and Anchorages over the River may pose an access problem. If the cost of access to inspect these Beams is excessive, and problems are not found on the beam's initial inspections, INDOT may choose to only inspect these Beams every other phase #3 inspection. This shall be determined based on what is found overall on the bridge, and any recommendation made by the Inspection Consultant.

7. As a general item, reports, photos, and inspection/testing data shall be managed for this bridge in an organized way that will make finding data and using the reports easy. Two sets of bound paper reports as well as data/reports in an electronic format shall be provided to INDOT. INDOT would be looking for ideas to develop stand alone files for this bridge, but also to have them tied to our existing NBI Data Base/Application and made so they can easily be added to and up-dated in the future, (from both INDOT and Consultant Inspections).

The Inspection and Maintenance Manual shall be updated after each of the three inspections. This shall include more detail on what and how to inspect various items, and an updated schedule for conducting these inspections.

An Underwater inspection shall not be included in any phases of this inspection. The Underwater Inspections shall be conducted under the State-wide Underwater Bridge Inspection Contract.

General items for both Bridges:

A Scoping Meeting shall be held prior to commencing the inspection work for each phase.

The Consultant shall work closely with Seymour District Traffic Section on their traffic control schemes.

The Consultant shall repaint any areas damaged or removed for NDT or other inspection/testing work with paint of the same color and texture as the existing paint system, and applied in accordance with proper INDOT procedures.

It is anticipated that the Consultant awarded this inspection/testing work shall make additional recommendations to the inspection and testing schemes to better determine the condition of the structural elements of these two bridges. These ideas shall be worked into the actual Scope of Work developed for each phase of this contract. If serious deficiencies are found or suspected during any phase, an **interim inspection** between phases, may be required to investigate these issues further.