



BRIDGE ADVISORY
Construction & Technology Division
Bridge Operations Section

BRIDGE ADVISORY NUMBER: BA-2009-05

DATE: September 8, 2009

SUBJECT: Coding of NBI Item 41, Structure Open, Posted, or Closed

ISSUED BY: Robert Kelley, Bridge Management Engineer

REVIEWED BY: David Juntunen, Bridge Operations Engineer

Contact Information: Robert Kelley, Bridge Management Engineer, 517-322-1398 or kelleyr@michigan.gov

This Bridge Advisory is to provide additional guidance in coding NBI item 41. This is in order to promote uniformity in coding and eliminate coding errors. Note that NBI Item 41 must be updated with the new code, when applicable, within 90 days of the event for MDOT bridges and 180 days for all other bridges.

PURPOSE OF ITEM 41

The purpose of this item is to identify the operating status of a bridge, whether it is open to all legal loads, posted for weight restrictions, or closed. This information is vital for truck routing and an important bridge performance measure.

Before getting into the more complicated issues, the most common process is outlined below:

NORMAL SEQUENCE FOR NEW BRIDGES

Phase 1: New Bridge Proposed: Item 41 = S

When a bridge is first proposed, an ID must be assigned to it so that the designers can charge time to it. At this time, the Bridge Management Unit (BMU) will enter as much location type information as possible and at this time Item 41 is coded as "S", for "Scheduled Structure". The bridge will NOT be included in the inventory data sent to FHWA, nor will it trigger non-compliance for a late inspection. Note that at this time the inspection date will appear as 1901/01/01, indicating that an inspection has not yet occurred.

Phase 2: Bridge Construction Underway: Item 41 = G

At the time of letting, the BMU completes the basic bridge inventory data based on plans. The coding for Item 41 is changed to "G", for "New Structure not open to traffic at this time to reflect this change in status. The bridge will NOT be included in the inventory data sent to FHWA, nor will it trigger non-compliance for a late inspection. Note that at this time the inspection date will appear as 1901/01/01, indicating that an inspection has not yet occurred.

Phase 3: Bridge Open to Traffic: Item 41 = A

After construction is complete, the inspector conducts the required post-construction inspection (known in the AASHTO Manual as the Initial Inspection). At this time, Item 41 will normally be set to “A”, for “Open, No Restrictions”. From this point on, the bridge WILL be included in the inventory data sent to FHWA and inspections will be due at the frequency set by the inspector.

BRIDGES REQUIRING LOAD RATING

Phase 1: Possible Posting Need Identified: Item 41 = A

The inspector may observe damage, distress or deterioration that is of concern. In extreme cases of observed damage, distress or deterioration, the inspector must take appropriate emergency actions to protect public safety. Such possible actions can include the immediate full or partial closure of the bridge. When the concern is only sufficient to warrant structural analysis and load rating of the bridge, the extent and severity of the distress must be documented so that the analyst can compute an accurate load rating of the bridge. The inspector transmits this documentation to the appropriate party and with an appropriate level of urgency. For locally owned bridges, this will be the owning agency or their designated consultant, for state owned bridges this will be the Load Rating Engineer in the Bridge Operations Unit. If appropriate and until the analysis has been performed, the coding for Item 41 will remain as “A”, for “Open, No Restrictions”.

Phase 2: Posting Need Confirmed: Item 41 = B

If the analyst finds that bridge posting is not required, Item 41 remains coded as “A” and the process stops. If the analyst confirms that the bridge requires posting, then Item 41 is coded as “B” for “Open, Posted Recommended But Not Legally Implemented”. The analyst will give the recommendation for posting or closing the bridge to the owning agency or Region Engineer, or provide recommendations for temporary supports, or recommend repairs. In any case the analyst must provide appropriate documentation for the bridge file and, when the analyst finds that the load ratings have changed, regardless of the need for posting, the bridge inventory must be updated to reflect the new load rating results.

Phase 3: See Chart Below

The coding for Item 41 will depend on the action that is taken for the bridge, as seen below.

	Action Taken On Bridge			
	Posted For Loads	Closed	Install Temporary Supports	Repair Bridge
Description	A determination for load posting has been made and the appropriate signs have been placed.	A determination that the bridge must be closed to all traffic has been made and physical barricades are in place.	Temporary supports have been installed that eliminate the need for the bridge to be posted or closed.	Bridge has been repaired and the need to post or close has been eliminated.
Item 41 Coding	P	K	D	A
Other Action Required	Must code item 141 with the actual posted loading. Must revise inspection frequency in accordance with the MDOT Guidelines For Bridge Inspection Frequencies. Local agencies must send photo of actual posting to BMU. Must change overload class to D. Must code item 70 as other than "5"	Local agencies must send photo of closing to BMU. A closed bridge will no longer trigger non-compliance for late inspections. Must code item 70 as "0".	Must code item 103, Temporary Structure, as "T". Inspection frequency must be revised in accordance with the MDOT Guidelines For Bridge Inspection Frequencies and add special inspection of the temporary supports. Must code item 70 according to the unsupported condition.	The analyst must confirm that the repairs are adequate for the previous load rating or provide a new load rating based on the repaired structure. Must code item 70 as "5".

RECONSTRUCTION ENCOUNTERED DURING INSPECTION

At times an inspection becomes due while the bridge is being replaced or under reconstruction or rehabilitation. The inspection schedule must be followed and the post construction inspection must be performed and submitted within the time frame previously mentioned. There are two cases to consider, the case in which traffic is maintained on the bridge for part-width construction and the case in which traffic is detoured off the bridge during construction.

Traffic Maintained By Part Width Reconstruction

If the bridge is being reconstructed part width, the following coding procedures should be followed:

- Item 103 shall be coded “T” for Temporary Conditions Exist
- Item 41 shall be coded as per the portion of the bridge carrying traffic. If the bridge was previously posted and traffic is being carried by the original part of the bridge, Item 41 should remain as “P”. If the traffic is now on the new part of the bridge, Item 41 should change to “A”.

Traffic Maintained By Detour Off Bridge

If traffic is completely off the bridge during reconstruction, the following coding procedures should be followed:

- Item 41 shall be coded “K” for Bridge Closed.
- Item 103 shall be coded “T” for Temporary Conditions Exist.

It is extremely important that the temporary codings for items 41 and/or 103 be updated at the post construction inspection.

POST CONSTRUCTION INSPECTION

Item 41 should be checked at the time of the post construction inspection. Normally, Item 41 should be changed to “A” if it was coded something else previously and Item 103 should be set to null at this time. In rare cases where a reconstructed or rehabilitated bridge requires posting or continued temporary supports, code Items 41 and 103 accordingly.

COMPATIBILITY WITH ITEM 70

If Item 70, Bridge Posting, is coded other than “5”, then Item 41 cannot be properly coded as “A”.

REFERENCES

Excerpts from the Michigan Structure Inventory & Appraisal Coding Guide for Items 41, 70, and 103 are shown below.

Item 41 - Structure Open, Posted, or Closed to Traffic**(X)**

This item provides information about the actual operational status of a structure. The field review could show that a structure is posted, but Item 70 - Bridge Posting may indicate that posting is not required. This is possible and acceptable coding since Item 70 is based on the operating stress level and the governing agency's posting procedures may specify posting at some stress level less than the operating rating. Use the following codes.

<u>Code</u>	<u>Description</u>
A	Open, no restriction
B	Open, posting recommended but not legally implemented (all signs not in place or not correctly implemented)
D	Open, would be posted or closed except for temporary shoring, etc. to allow for unrestricted traffic
E	Open, temporary structure in place to carry legal loads while original structure is closed and awaiting replacement or rehabilitation
G	New structure not yet open to traffic
K*	Bridge closed to all traffic
P	Posted for load (may include other restrictions such as temporary bridges which are load posted)
R	Posted for other load-capacity restriction (speed, number of vehicles on bridge, etc.)
S	Scheduled for construction (new bridge)

*Note: This is intended to correspond to a code of "0" or "1" in any one or all of Items 59, 60, 62, or 67.

Note: If this Item coded "B", "D", "E", "P" or "R", Item 91 (Insp. Freq.) should be less than 24 months.

Item 70 - Bridge Posting**(X)**

The National Bridge Inspection Standards require the posting of load limits only if the maximum legal load configuration in the State exceeds the load permitted under the operating rating. If the load capacity at the operating rating is such that posting is required, this item shall be coded 4 or less. If no posting is required at the operating rating, this item shall be coded 5.

This item evaluates the load capacity of a bridge in comparison to the State legal load. It differs from Item 67 - Structural Evaluation in that Item 67 uses Item 66 - Inventory Rating, while the bridge posting requirement is based on Item 64M - Michigan Operating Rating.

Although posting a bridge for load-carrying capacity is required only when the maximum legal load exceeds the operating rating, highway agencies may choose to post at a lower level. This posting practice may appear to produce conflicting coding when Item 41 - Structure Open, Posted or Closed to Traffic is coded to show the bridge as actually posted at the site and Item 70 - Bridge Posting is coded as bridge posting is not required. Since different criteria are used for coding these 2 items, this coding is acceptable and correct when the highway agency elects to post at less than the operating rating. Item 70 shall be coded 4 or less only if the legal load of the State exceeds that permitted under the operating rating.

The use or presence of a temporary bridge affects the coding. The actual operating rating of the temporary bridge should be used to determine this item. However, the highway agency may choose to post at a lower level. This also applies to bridges shored up or repaired on a temporary basis.

<u>Code</u>	<u>Description</u>
4 or less	Posting required
5	No posting required

The degree that the operating rating is less than the maximum legal load level may be used to differentiate between codes. As a guide and for coding purposes only, the following values may be used to code this item. Note: loads are given in **U.S.** tons

Code	77 Ton Mich Vehicle 42	Ton Mich Vehicle	HS Truck
5	≥tons	≥42 Tons	≥36 tons
4	69.4 – 76.9 tons	37.8 – 41.9 tons	32.4 – 35.9 tons
3	61.7 – 69.3 tons	33.6 – 37.7 tons	28.8 – 32.1 tons
2.	54.0 – 61.6 tons	29.4 – 33.5 tons	25.2 – 28.7 tons
1	53.9 – 46.3 tons	25.2 – 29.3 tons	21.6 – 25.1 tons
0	<46.3 tons	<25.2 tons	<21.6 tons

Item 103 - Temporary Structure Designation**(X)**

Code this item to indicate situations where temporary structures or conditions exist. This item should be blank if not applicable.

<u>Code</u>	<u>Description</u>
T	Temporary structure(s) or conditions exist.

Temporary structure(s) or conditions are those which are required to facilitate traffic flow. This may occur either before or during the modification or replacement of a structure found deficient. Such conditions include the following:

- Bridges shored up, including additional temporary supports.
- Temporary repairs made to keep a bridge open.
- Temporary structures, temporary runarounds or bypasses.
- Other temporary measures, such as barricaded traffic lanes to keep the bridge open.

Any repaired structure or replacement structure which is expected to remain in place without further project activity, other than maintenance, for a significant period of time shall not be considered temporary. Under such conditions, that structure, regardless of its type, shall be considered the minimum adequate to remain in place and evaluated accordingly.

If this item is coded T, then all data recorded for the structure shall be for the condition of the structure without temporary measures, except for the following items which shall be for the temporary structure:

- Item 10 - Inventory Route, Minimum Vertical Clearance
- 41 - Structure Open, Posted, or Closed to Traffic
- 47 - Inventory Route, Total Horizontal Clearance
- 53 - Minimum Vertical Clearance Over Bridge Roadway
- 54 - Minimum Vertical Under clearance
- 55 - Minimum Lateral Under clearance on Right
- 56 - Minimum Lateral Under clearance on Left
- 70 - Bridge Posting