

Additional Guidance for Sign Structure Inspection Contracts

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The following is a list of Frequently Asked Questions and General Guidance.

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General and Misc.

Accessing the database tables directly

Reminder (and warning) - Do not directly access the tables. Always go through the menu system. If you access and change the database file tables directly, and this causes the DB to not function properly, your Consultant Rating (CSC rating) will likely suffer.

Summary of Structural Condition

If less than Good, the SPECIFIC reason for downgrading must be stated. General comments like “due to reasons described below” is unacceptable. Also, just because one of the items is a 2 does not mean the entire structure is a 2. We are looking for your professional opinion on the overall performance level remaining in the structure. For example, the sign can be unreadable, but the structure could still be rated a 1 overall.

Material Type

In addition to entering a code for the material type, we include fields where the detailed material type can be entered. When performing an inventory we expect specific information on the exact material type to be entered from the contract plans (more than just "Steel" or "Aluminum").

Measuring the Number of Sign Panels

Is a VMS panel considered a "Sign Panel"?

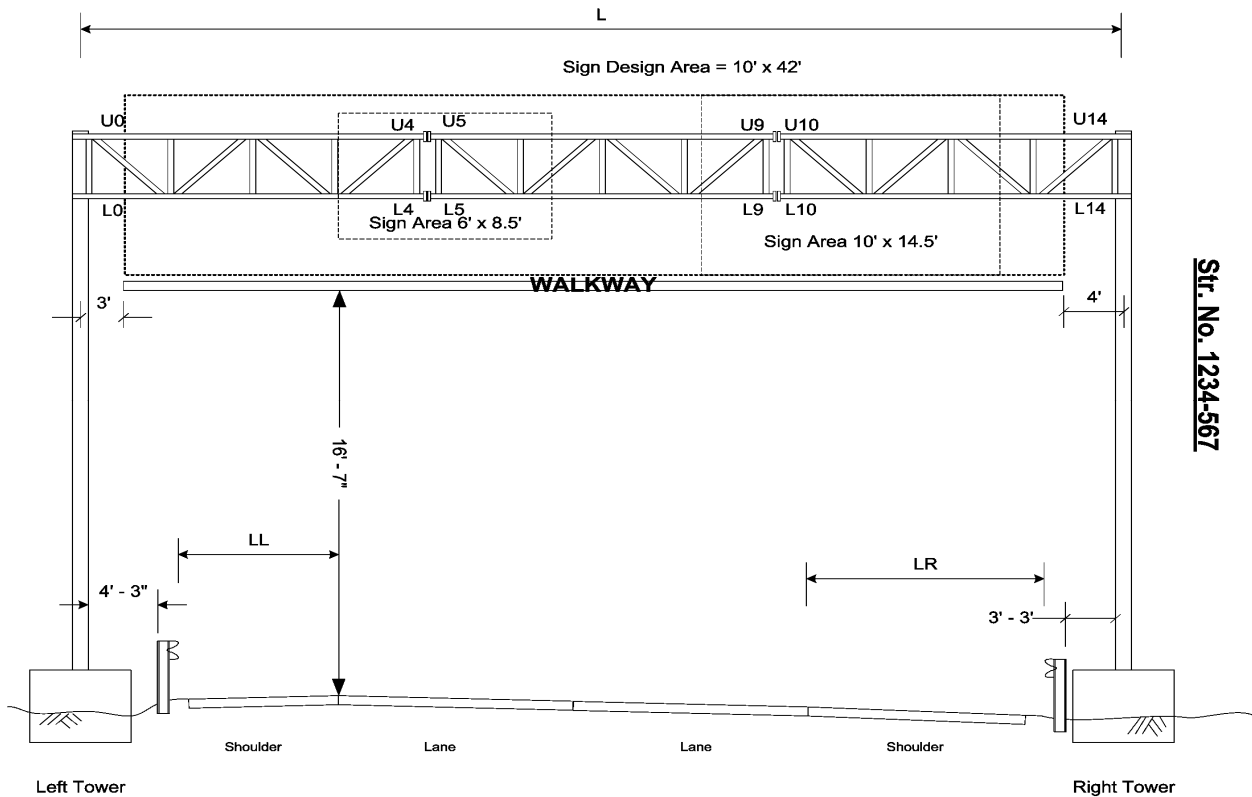
Count each VMS unit as one panel. (Why? If you don't count it as one panel our DB will often end up showing “0” panels on the structure. This is misleading as it will look like the sign structure is not in use at the moment. Also, it is a major sign on the structure).

Do we count Exit panels as a panel?

The exit panel can either be integrated with the larger panel or attached directly above it, depending on the way the particular sign was fabricated. Our intention is to be aware of the large panels out there. Therefore, in the “Number of Signs” field, we ask that you DO NOT count exit panels as separate panels (please correct this in the current inspection if necessary). Please DO show the panel in the elevation sketch, and do provide dimensions in the design panel sizes area.

Lateral clearances (clearance measured from edge of normal travel lanes to guide-rail, barrier; ramp/exit/entrance lanes included in clearance calculation)

The New Jersey example in Appendix C (page C-9) of the FHWA Guide Specification does NOT follow New Jersey standards! Our standard is as follows (from the 2001 drawing):



Please notice that this is different than how lateral clearances are measured for NBIS structures as the intention is different. These values provide, among other things, the amount of “recovery room” a vehicle has before hitting an obstacle. Also, it gives you the amount of room you have to park a vehicle on each side without fouling traffic (maximum width of shoulder closure available).

Max. Span Length (c-c truss vs clear-span for span type structures)

As you can see in the detail above, our original intention for span type structures was to code this distance from c-c of the towers. However, the way it was written in the manual, for span type structures, was clear-span. For the moment, we are going to live with this discrepancy for existing structures. However, for newly coded structures, code as shown above.

Labeling Near Face and Far Face

The following is from our:

NJDOT Comments for Sign Structure Inspection Based on Publication No. FHWA NHI 05-036 - dated March 2005

12.2.7	Orientation of Members	Figure 24 essentially represents NJ method, EXCEPT: 1. NJ standard for referencing structures is Near Face and Far Face (not front and back). 2. Where sign panels are on both faces, the Near Face (Front) of the Sign structure is based on a vehicle traveling from low mile-point towards a higher mile-point.
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How to include Priority Letters into the report and database

Include a copy of the Priority Repair letter in back of the hard copy of the report.

In the Additional Comments field add the following (for example):

Priority 1 Letter issued for cracks in the main chord of the truss on 3/18/2009 (copy attached).”

When to request and where to place structure decals

The following is from the current Scope of Work:

Place sign structure decals on any structures not yet displaying a structure number that is visible from the road. Remove and replace decals that are incorrect or deteriorated. Request these decals as early in the process as possible (so we can get them to you prior to the field inspection).

The decal needs to be placed such that it is clearly visible to a vehicle driving on the road. Before placing the decal, please ensure that the placement location is clean so the decal will adhere properly.

Are we Expected to Provide Values for “Sign Structure Sufficiency Rating” and “Remaining Life Values?”

From page 12 of the “Explanation of Scope” document:

25. *If we provide you with criteria, then include a sign structure sufficiency rating and remaining life values (if requested, these will be based on simple tables).*

Some of the guidance provided herein will make the provision of these values easier.

When we finalize how to develop these we will provide the information to you.

SS Reinspection Rules & Guidelines

Please also refer to the following document:

“Guidelines for Coding Interim Inspections for NJDOT Sign Structures”

The standard inspection interval to be specified is 60 months. Internally, we consider a shorter time frame if there is a situation with the structure that warrants a shorter time frame for inspection. This is done by us for many structures based on our judgment of the remaining life of the structure. For example, we try to look at all aluminum sign structures (based on available funding) every 3 to 4 years. A shorter time frame for these issues does not need to be coded by you.

So, when do YOU code a shorter time frame than 60 months?

A time frame of less than 60 months is warranted if some condition exists on the structure that needs to be monitored frequently (for example, cracks are present in a critical location or there has been impact damage to the structure that warrants monitoring).

Note: Please do not drop a structure below 60 months unless it really needs to be. As we said above, we automatically scan for and call for more frequent inspections for various types of structures as a class (based on funding availability).

PLEASE NOTE the impact that an Overall Structure Rating of 3 or 4 will have on the inspection schedule. Please do not code a 3 or 4 unless it is appropriate to be in these categories.

Code 48 months if:

There is a bad foundation to tower detail – for example, the tower to foundation detail is an aluminum casting.

Code 36 months if:

This structure needs to be checked more frequently, or the structure has an Overall Inspection Rating of 3. ALWAYS discuss this with the NJDOT Project Manager before coding 36 months.

Cracking is of significant concern. If one or more truss cracks are in a critical location, but countermeasures known to be in place, or if one critical tower crack, but no reason to believe it is propagating

If there is non-critical impact damage that warrants monitoring.

Code 24 months if:

This structure needs to be monitored closely, or the structure has an Overall Inspection Rating of 4. These structures are only able to be kept in service if they receive closer than typical attention. ALWAYS discuss this with the NJDOT Project Manager before coding 24 months.

Cracking is of very significant concern. The structure is nearing the end of its useful life. There are no countermeasures in place, or countermeasures do not cover all critical cracks.

If the structure cannot be watched with at least a frequency of 24 months, then it needs to be removed.

Coding 12 months:

At present, this is rarely practical due to the time it takes to receive final databases. We may revisit this possibility in the future. Please also refer to the following document:

“Guidelines for Coding Interim Inspections for NJDOT Sign Structures”

Comments on Coding the Individual Rating (S.xx) fields.

S.08 Cracks Flag

This key Item is used in our upcoming prioritization formula. It is important that it is coded correctly.

This is a flag, therefore if it does not apply (as in no cracks observed) the value is to be “0.” (Note: Some have coded this as a “1” in error)

This field is to indicate the presence of cracking, but it’s more important function is to indicate how much the cracking is compromising the overall safety and remaining life of the structure.

When evaluating the structure, the risk of failure, rather than just the number of cracks, is primary. From a safety perspective, two or three cracks in non-critical locations is not as severe as one in a critical location. However, the presence of multiple cracks does likely indicate that the structure (or at least that component) is at the end of it’s useful life. For example, on a span tower, a couple of cracks may present a very low risk to the overall structure. However, if there is one crack at a key location on a cantilever tower, the risk of failure could be very high. Evaluate this item accordingly.

Document cracks in the field pertaining to the component where the cracks were found. Only document in S.08 the reason for the value given to S.08 (unless you run out of room in the appropriate field).

Photograph all cracks in each cycle.

Generally, the ratings of 1 to four mean:

*Value	Description	** Overall Rating	Frequency of Insp.***
1	One or two cracks that, were they to propagate, would not cause failure of the structure. For example, one or two cracks in a non-critical location.	No impact	No impact
2	One or two cracks that, were they to propagate (turn across the lower chord), would cause reduced safety or could possibly cause failure of the structure. However, there is no evidence of risk at this time. For example, more than one crack in non-critical locations, or one or two small cracks in a critical location. Crack in critical location has shown no signs of propagating.	Cannot be 1	No impact to 36 mo.
3	One to a few cracks that, were they to propagate (turn across the lower chord), will	3 (if no counter-	36 or 24 mo.

	likely cause failure of the structure. There is little to no evidence of imminent risk, however there is reason for concern. For example, more than one crack in critical locations. Cracks may be propagating, but not in a way that imminently threatens the structure.	measures)	
4	One to many cracks that, were they to propagate, will cause failure of the structure. There is evidence of risk at this time, or there are so many cracks that it is clear that the structure is at the end of it's effective life (time to remove the truss). For example, multiple cracks in critical locations. Cracks are propagating in a way that imminently threatens the structure.	4 (if no counter-measures)	24 mo. Plus immediate counter-measures, or remove

Notes:

1. Nowhere in the above do we refer to repairs. This is because repairs (such as Diwidag bars or fiber wrap) are considered to be temporary repairs (more in the sense of countermeasures).

* Note: Severity of cracking and crack locations are the main differentiators between a rating of 2,3, and 4. For example, the crack in the bottom chord of a trilon truss at mid-span is typically much more critical than a crack located near the tower.

** Note, the above values do not reflect the actual presence of any countermeasures. The flag simply represents the degree of cracking in the structure. The presence of countermeasures will mitigate any impact on the Overall Rating of the structure.

*** Structures with countermeasures for cracking in place should be listed as a maximum inspection frequency of 36 months. A frequency of 24 months is appropriate when 36 months simply seems too risky (longer or more heavily loaded structures [at or above their full design load], or cracking rated a 4). ALL cracks will be inspected in EACH cycle. For structures with an overall rating of 2, this could require an InDepth inspection if the crack is in a section of the truss not over the shoulder.

When a Structure Has Been Repaired

When a structure has been repaired, and the existing cracks are no longer visible, then maintain the previous crack descriptions (and label as existing). If new cracks are found, clearly indicate which are new.

Overall Inspection Comments - Based on inspection.

Additional Comments - In this field, include a note that repairs (type) obscure the ability to evaluate existing cracks.

Item S.08 will not be raised due to countermeasures being in place, however Overall Inspection rating will be if appropriate. If the current rating for S.08 does not match the visual evidence, then indicate in the comments area that the rating carries over from a previous cycle. If further cracking appears, ALL previous cracking needs to be taken into account when properly evaluating this item (regardless of countermeasures).

The following comments were submitted by a Consultant. We have adjusted these comments to make them consistent with our intent:

Item S.05 – Tower to Truss Chord/Arm Connection(s)

1. If there are gaps in the truss to tower connection for cantilever sign structures that result in more than 25% of the connection (s) not being in contact, we will code as condition 3 and write Priority 2 repair letters. (See page A9 of the NHI Manual/Guidelines.)
2. Loose bolts that we cannot tighten because they are stripped or cross threaded will be coded as condition 3, and a Priority 1 Repair letter will be issued if the bolt is in a critical area (for example the tension area of a cantilever sign structure with 6 or fewer connection bolts), otherwise it will be coded as condition 2 and a Priority 2 letter will be issued.

Items S.09 – Chord Splice Connections

1. Loose bolts that we cannot tighten because they are stripped or cross threaded will be coded as condition 3, and a Priority 1 Repair letter will be issued if the bolt is in a critical area (for example the tension area of a cantilever sign structure with 6 or fewer connection bolts), otherwise it will be coded as condition 2 and a Priority 2 letter will be issued.

Item S.10 – Sign Frame and L Brackets

1. A missing U-bolt that cannot physically be installed (and was not installed during construction) will be coded as condition 1 and will be noted in Description of Deficiencies as missing. Structures with multiple missing U-bolts will be evaluated individually.

Item S.11 – Sign Panels

1. Legible button type lettering will be coded as condition 2 for deficiencies and 3 for repairs. If there are not any defects to the actual sign structure, we will note the structure as being in good condition, but will add a note in the Description of Deficiencies noting that it has button type lettering. (i.e. we will not downgrade the structure to Fair just because of the legible button type lettering.)

Item S.17 – Protection

1. If steel spacer blocks are present, we will code the item as 2 for deficiencies and 3 for repairs. If there are not any defects to the actual sign structure, we will note the structure as being in good condition, but will add a note in the Description of Deficiencies noting

that steel spacer blocks are present. (i.e. we will not downgrade the structure to Fair just because of steel spacer blocks.)

2. If wood or composite spacer blocks are present with a BCT or other inadequate end terminal, we will code the item as 2 for deficiencies and 3 for repairs. If there are not any defects to the actual sign structure, we will note the structure as being in good condition, but will add a note in the Description of Deficiencies noting that steel spacer blocks are present. (i.e. we will not downgrade the structure to Fair just because of the end terminal.)
3. If steel spacer blocks are present and there is a BCT or other inadequate end terminal, we will code the item as 3 for deficiencies and 3 for repairs. If there are not any defects to the actual sign structure, we will note the structure as being in good condition, but will add a note in the Description of Deficiencies noting that steel spacer blocks are present. (i.e. we will not downgrade the structure to Fair just because of the end terminal and steel spacer blocks.)

New and Old Structures and Structure Number Issues

Cycle 1 Inventory - Proper completion of Year Constructed and other fields:

Year Constructed - We expect sufficient research to be done to always complete the Year Constructed field. If better information is not available, input the Year Constructed as either the year the plans are issued (signed), or the year after (using your best judgment as to when the SS would reasonably have been constructed).

Plans Available - We expect this field to always be checked for recently constructed structures. Even if the plans were unavailable during the time of your research, they will become available once the construction project has been completed.

Const[ru]ction] Cont[ra]ct] Designation - Is always to be completed for new structures. If plans are not available through document control, contact the Division of Project Management and ask:

- Which contract the section of highway was re-constructed under.
- What year to enter.
- Ask them if there is a way to get a copy of the plans.
(if not, at least get the Project Manager's name and, in the Additional Comments area, indicate them as the source of the information)

Design Based on SDA (Sign Design Area)

As you know, the Sign Design Area is typically shown in the Elevation View of the Contract Plans for the sign structure when the structure was designed based upon this. We expect this field to be properly completed. Unknown is not acceptable.

To make coding of structures for which plans are not fully available, for the purpose of coding this field, you can assume that ALL overhead (span and cantilever type) sign structures constructed after 1985 are based on sign design area, and that almost all constructed after 1980 were.

FYI - A brief history (thanks Hannah)

For span-type support structures, from early 1970s (I couldn't trace what year; I could trace the 1983 Edition, but the 1st Edition was earlier), NJDOT started using a standardized configuration, that is, all 4-chord truss, standard span and height, standard sign area etc. For cantilevered support structures, standard drawings were started in 1984 - all 2-chord planar truss. Although the configuration was standardized, materials and connection details were not. Over the years, materials have been all-aluminum, aluminum-steel mixed, then all steel since 1996/1997. Connection detail changed a lot.

Before the 1970's, all designs were individual - that's why you can see on road all different types - 3-chord span type whereas 4-chord cantilever type etc. If you see these non-standard configuration, you can judge they are probably old, at least over 35 years old. If you see aluminum members in a structure, you will know they are at least 10-15 years old. By knowing the configuration, material, and connection type etc., you may approximately make a judgment and narrow down the range for what years they were constructed.

JBE - As there is always a lag between the implementation of a new standard, and when plans already in the works fully clear the system, it is likely that several years went by before all structures were designed using sign design area.

How to establish a structure number during a Cycle 1 Inventory:

1. Assign a temporary structure number using the Control Section listed in the Straight Line Diagram, combined with C01 or S01. For example: 1312C01.
2. Request plans from NJDOT Document Control.
3. Based on information provided, formally request a structure number. Complete the [Request for Sign Structure Number](#) form, located at:
<http://www.state.nj.us/transportation/eng/structeval/structnumber.shtm>
Instructions on how to fill out the form are located there as well.

Note: In September 2012, Structural Evaluation & Bridge Management took over the task of assigning all structure numbers for bridges, culverts, overhead (span & cantilever) sign structures, and High Mast Light Poles.

4. After our response, with formal structure number assignment, change the Structure number in the database to the final number. Also, change the Structure Number Verified field to “Final” (until this time, it needs to remain “Preliminary,” as we sometimes request beta DB submissions and we do not want to be confused by an incorrect number in the DB). See below for additional instructions.

Note: Never submit a final report with a temporary structure number.

How to note a NEW structure with the SAME number as an old structure:

IF there is no number out there, make sure YOU work with us to get a new, unique structure number assigned.

However, if it turns out that an old number has been reused, we need to know that this is in fact a new structure and not a data error (for example: noting Cycle “1” by mistake).

As you are performing an inventory, be sure to verify the structure number AND NOTE THE SOURCE OF THE STRUCTURE NUMBER in the “Additional Comments” area.

Examples:

“Structure number in plans is 1241-212”

How to note a NEW structure with a unique structure number:

Normal procedures apply.

As you are performing an inventory, be sure to verify the structure number and, in the “Additional Comments” area, note the structure number shown on the design plans.

Examples:

“Structure number in design plans is 1241-212”

“Structure number in plans is Overhead Sign structure No. 3”

How to note when Design Plans list a different structure number than in our DB.:

In the “Additional Comments” area, note the structure number shown on the design plans.

Examples:

“Structure number in design plans (Contract: Rt. I-287, Section 3L & 4R) is 1241-212”

CODE the field “Structure Number Listed in the Plans.”

How to note the removal of a SS after inspection completed:

If you have inspected the SS, then that information would be expected to remain in the DB. However, as you discovered the SS was later removed, it is appropriate to note this clearly.

For Structure Status - indicate:

Truss Removed - if just truss removed

Super Removed - if towers & truss removed (foundation is still there)

(Note: If this option is not available, then type it in exactly as shown).

Removed - if all removed including foundation

For Status Date - give today's date (or an earlier date if you know when you first determined this).

For Recommended Insp Freq - indicate: “structure removed” or “truss removed” or, etc.

Without changing existing notes, add this note or something similar to the following areas (if room):

Location Description
Modifications Since Construction
Additional Comments

"20080722--ABC Eng. confirmed structure and foundation have been removed."

(Note: If just the truss, or the truss & towers removed, then note this.)

CODE the fields “Estimated Remaining Life”, “Was Structure Removed (flag)”, “Was Structure Replaced.”

How to note the removal of a SS prior to inspection:

If you have NOT inspected the SS, then all you are providing is an updated record so we know what we have out there. It is appropriate to note this clearly.

For Structure Status - indicate:

Super Removed - if towers & truss removed (foundation is still there)
(Note: If this option is not available, then type it in exactly as shown).
Truss Removed - if just the truss was removed
Removed - if all removed including foundation

For Status Date - give today's date (or an earlier date if you know when you first determined this).

For Recommended Insp Freq - indicate: “structure removed” or “truss removed” or, etc.

Without changing existing notes, add this note or something similar to the following areas (as room permits):

Location Description
Modifications Since Construction
Additional Comments

"20080722--ABC Eng. confirmed structure and foundation have been removed."

(Note: If just the truss, or the truss & towers removed, then note this.)

As this is an UPDATE to the previous record, do NOT change the existing inspection date, cycle number, or any other data in the existing record (unless it is simply wrong). Especially, do NOT change the project reference (the entire “Inspection Team Info” screen) from the previous Consultant. We will use this record to overwrite the existing record in our DB.

In the letter you send transmitting this DB to us, please list which structure records are being provided for this reason.

CODE the fields “Estimated Remaining Life”, “Was Structure Removed (flag)”, “Was Structure Replaced.”

If JUST the truss has been removed:

A simple routine inspection is to be performed so we can document it’s status.

Update all records as appropriate and increment the Cycle Number.

For Structure Status - indicate:

Truss Removed - if just the truss was removed

Even though the structure has not truly been removed, we have to think of it as an “Out of Service” structure (as the truss, once removed, is almost never replaced).

Therefore:

CODE the fields “Estimated Remaining Life”, “Was Structure Removed (flag)”, “Was Structure Replaced.”