

**ACEC – INDOT
BRIDGE INSPECTION COMMITTEE**

MEETING NO. 2 MINUTES

January 20, 2009

The meeting was called to order at 9:10 a.m. by Mike Cox. Those in attendance were:

Drew Storey	INDOT, Seymour District
Jim Mickler	INDOT, Greenfield District
Bill Dittrich	INDOT, Planning and Production Division
Keith Hoernschemeyer	Federal Highway Administration
Bill Williams	Monroe County Highway Director/Engineer
Michael Cox	Beam, Longest and Neff, L.L.C.
Mike Obergefell	USI Consultants, Inc.
Pete White	RQAW Corporation
Mike Garlich	Collins Engineers, Inc.
Adam Post	United Consulting Engineers & Architects
Jon Sera	Butler, Fairman and Seufert, Inc.

A meeting agenda had previously been distributed and the following items were discussed:

1. Mike Cox started off the meeting with a brief overview of the agenda and began introductions.
2. The minutes of the previous meeting were approved with a few minor revisions.
3. Bill Dittrich distributed two FHWA memorandums to the group (see attachments). The memos provided guidance on Plans of Action for Scour Critical bridges and elimination of bridges coded as unknown foundations. Bill stated that a plan of action will be required for the 650 scour critical bridges and 1100 bridges with unknown foundations in the state. The plan of action will be a specific plan of procedure for a bridge before, during, and after a flood event. The FHWA deadline for plan of action implementation for all bridges that are scour critical or have unknown foundations is November of 2009. The new bridge inspection software will include a general plan of action that will have to be updated for information specific to the individual bridge by the consultant. Keith Hoernschemeyer noted that the plan of action will have to be followed by the bridge owner to be considered implemented. All unknown foundation codes should have a target date for elimination by November of 2010 according to the FHWA memo distributed to the group. Keith recommended that instructions for performing a risk-based assessment of scour and foundation types be the first chapter(s) written for the new bridge inspection manual. The group agreed that this should be a priority and the chapter(s) could be released before the complete manual is finalized. Mike Garlich noted that Collins' target date for completion of the Bridge Inspection Manual is about a year from now. Bill Dittrich will distribute some information to the committee soon concerning scour critical assessments. Mike Cox passed around a plan of action document that he found on the internet (see attachments).

4. Pete White distributed a packet of information concerning load ratings. The group discussed the draft of the proposed INDOT Load Rating Policy (see attachments). Pete explained that under certain conditions the policy could allow a structure to go un-posted even though it has an HS-20 operation rating below 1.0. Once a structure is posted at 15 tons the posting is conservative. Pete's question to the group was whether INDOT's posting policy should be changed from the H-20 vehicle which was used for design before 1944. Mike Obergfell stated that no one is being penalized by crossing a bridge until the bridge is posted for 15 tons and at that point it is prudent to be conservative. Pete recommended that all legal vehicles be checked if the HS-20 vehicle load rating is below an operating level of 1.0. Keith Hoernschemeyer stated that he regularly gets questioned why bridges in Indiana, with inventory ratings below 36 tons, are not posted. Bill would like to have INDOT's policy in writing to be able to answer questions that he is regularly asked. The group discussed the draft of the posting policy. The group did not recommend that the posting policy be changed to multiple truck signs at this point. Bill Dittrich passed around a draft of the Interim Guidelines for the Load Capacity Rating of Local Bridges in Indiana (see attachments). Bill stated that the manual Collins is developing will cover all parts of bridge inspection. Pete will be developing a chapter on load ratings. The group felt that Pete's chapter should be included in the Bridge Inspection Manual developed by Collins. Bill recommended that consultants performing bridge inspections purchase Virtis Software to perform load ratings. Mike Obergfell recommended that load ratings be performed on a statewide level basis per structure type. He explained that the inspection consultant would stamp the condition ratings and the load rating consultant would stamp the load rating. Bill Dittrich didn't think that was feasible at this time. Mike Cox felt that having separate consultants working on the same bridge could put the inspection consultant under additional time constraints to submit data to INDOT. Mike was concerned with the timeliness of a revised load rating calculation based on increased deterioration of a structural member.
5. Bill Dittrich gave an overview of the bridge inspection software upgrade progress. Mike Obergfell asked what items should be left out of the required input. Drew Storey noted that the current level of required input is too time consuming to be able to complete the amount of inspections required. Keith Hoernschemeyer recommended that a small group be formed to decide the required level of data input, delete unnecessary items, and report back at the next meeting. Volunteers for the group included Keith Hoernschemeyer, Drew Storey, Jim Mickler, Mike Obergfell, and Bill Dittrich also recommended that Gerald Nieman be part of the group. Bill reported that there are still a lot of bugs to work out in the inspection software and many of the queries do not work correctly. Bill is having Gerald Nieman look into performing the queries using Oracle based on the data that they have. Bill stated that INDOT will not be able to have the consultants using the software as soon as they had hoped. Bill also noted that the application for the bridge inspection software has been placed on the same server as ERMS due to budget constraints.
6. Bill Dittrich recommended that Mike Cox and Gerald Nieman set up a meeting with administrative and legal personnel at INDOT to get a feel of what is needed to produce a standard contract for bridge inspections. Bill would like to get this process started soon.
7. Mike Cox asked about an e-mail that was distributed by INDOT last year concerning new bridge numbers and NBI numbers for replacement bridges. Mike questioned

whether it was necessary for a new county bridge number to be assigned. Bill said that the NBI number must be changed if a bridge is replaced. The county bridge number is just recommended to be changed, however it is not required. Mike requested an e-mail be sent to clarify this issue.

8. Mike Cox recommended that the group try to finalize some of the issues concerning load ratings and the bridge inspection software by the next meeting.
9. Jim Mickler questioned how to handle access problems to railroad over- and underpasses. He stated that the railroads require flagman and fees for entering their right-of-way and that coordination to do so is quite lengthy. Bill Dittrich stated that bridge inspectors have the right to perform their inspections within the railroad's right-of-way without coordination as long as no special access equipment is required for the inspection. Bill Williams questioned if easements would be required for some of the rather high and/or long railroad overpasses that are present in many of the southern counties. Bill Dittrich stated that the counties bridge inspectors would not be required to determine condition ratings for the railroad structures, only dimensions for horizontal and vertical clearances.

The next meeting for the ACEC - INDOT Bridge Inspection Committee is scheduled for 9:00 a.m. Tuesday, April 21st, 2009, at the Indiana State Police Museum.

Individuals are invited to comment on items presented in these minutes and/or submit additional topics for discussion at the next meeting. Please E-mail comments to Jon Sera at jsera@bfsengr.com.

This meeting was adjourned at 12:30 p.m.

Prepared by,

BUTLER, FAIRMAN and SEUFERT, INC.

c: Attendees



Memorandum

Subject: **ACTION:** National Bridge Inspection
Standards – Scour Evaluations and Plans of
Action for Scour Critical Bridges
(Reply Due: February 29, 2008)
/s/ Original Signed by

Date: January 4, 2008

From: King W. Gee
Associate Administrator for Infrastructure

In Reply Refer To: HIBT-20

To: Associate Administrator for RD&T
Directors of Field Services
Resource Center Director
Division Administrators

The purpose of this memorandum is to request your assistance towards ensuring that State and local agencies (referenced herein as bridge owners) complete the scour evaluation of their bridges over waterways (riverine and tidal). Also, we request your assistance towards ensuring that bridge owners develop and implement a Plan of Action (POA) for each bridge identified as scour critical to meet the requirement set forth in the National Bridge Inspection Standards (NBIS) regulation, 23 CFR 650.313(e)(3).

Status of Bridge Scour Evaluations and POAs for Scour Critical Bridges:

Bridge owners have been working for several years towards the evaluation of their bridges over waterways to determine foundation vulnerability against stream instability and scour. To date, about 93 percent of these bridges have been evaluated. We must, however, make sure that all bridges over waterways are evaluated for their vulnerability to stream instability and scour. As of August 2007, bridge owners reported on their National Bridge Inventory (NBI) data submission a total of 34,900 bridges over waterways that still remain to be evaluated as for their scour vulnerability. These are bridges that have been coded 6, T, or Null for Item 113 of the NBI. The FHWA established a target date of January 1997 for completing all scour evaluations by memorandum dated July 15, 1991; however, as the NBI data shows, we still have work to do to complete this important component of the NBIS. Table 1 presents the number of bridges over waterways on the National Highway System (NHS) and the non-NHS that still need a scour evaluation. Another 67,039 bridges over waterways identified by bridge owners as having unknown foundations remain to be evaluated for their scour vulnerability as of August 2007. We will address the subject of unknown foundations, including a process developed by the FHWA's Office of Bridge Technology to identify bridge foundations characteristics under a separate memorandum.

**MOVING THE
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ECONOMY**



Item 113 Code	NHS	Non-NHS	Total
6	3,311	30,589	33,900*
T	339	661	1,000
Total	3,650**	31,250***	34,900

* Includes 6,606 bridges not coded for Item 113.

** Includes 3,480 State-owned bridges; 162 local-owned bridges; and 8 other-owner bridges.

*** Includes 10,614 State-owned bridges; 20,546 local-owned bridges; and 90 other-owner bridges.

With regards to POA for scour critical bridges, the NBIS regulation, 23 CFR 650.313(e)(3), enacted January 13, 2005, requires that bridge owners prepare a POA to monitor both known and potential deficiencies and to address critical findings for bridges identified to be scour critical. The FHWA's Office of Bridge Technology issued a memorandum dated March 29, 2005, which advised FHWA's field offices of the January 13, 2006, target date for implementing the requirements of the NBIS regulation. In a follow-up memorandum dated March 23, 2006, the Office of Bridge Technology requested the FHWA's field offices to report by May 5, 2006, on their corresponding bridge owners' implementation plan, which should have included a schedule for developing a POA. To date, we have received only a few responses.

Table 2 shows that bridge owners reported 2,671 bridges over waterways as scour critical based on the observed scour condition at one or more of the bridge foundations (code 0, 1, or 2 for Item 113). Also, Table 2 shows that bridge owners reported 18,233 bridges over waterways as scour critical based on the assessed or calculated scour depths that, if developed, would make one or more of the bridge foundations unstable (code 3 for Item 113). A State-by-State breakdown for NBI Item 113 by NHS and non-NHS is presented in Attachment A. Please note that Attachment A includes tables titled "NHS Other-Owner Bridges" and "Non-NHS Other-Owner Bridges." The data shown on the latter tables represent owner codes identified as private, railroad, unknown and records with the owner code missing.

Scour Condition	Item 113 Code	NHS	Non-NHS	Total
	Observed	0	2	111
1-2		119	2,439	2,558
Total Observed		121	2,550	2,671
Total Assessed or Calculated	3	2,889	15,344	18,233
Total Scour Critical Bridges		3,010*	17,894**	20,904

* Includes 2,972 State-owned bridges; and 38 local-owned bridges.

** Includes 7,769 State-owned bridges; 10,117 local-owned bridges; and 8 other-owner bridges.

The FHWA's role and responsibility is to ensure that bridge owners complete the scour evaluation of all their remaining bridges over waterways, and that they develop, implement and maintain a POA for each of their bridges over waterways identified as scour critical to comply with the NBIS regulation.

Actions Requested:

After consulting with the FHWA Office of Chief Counsel and conducting a thorough review of the NBI database, there are several bridges that appear to not be in compliance with the NBIS regulation regarding scour. Since State departments of transportation (DOT) are responsible for overall NBIS compliance, we solicit your assistance to obtain the following information:

1. Verify with your corresponding bridge owner manager official that they still have bridges that are vulnerable to scour.

If bridge owners confirm that they still have bridges that are vulnerable to scour (code 6, T, or Null), we request that you notify them that their jurisdiction is not in compliance with 23 CFR 650.313(e). Noncompliance could lead to suspension of Federal-aid highway funds. Bridge owners that confirm having bridges that are vulnerable to scour must provide the following schedule to avoid possible suspension of Federal-aid highway funds:

- Schedule for completing the evaluation of all remaining scour vulnerable bridges within your State, local and other-owner jurisdiction. We recommend a target date of November 2008 for completing the scour evaluation of these bridges.

2. Verify with your corresponding bridge owner manager official the number of scour critical bridges (code 0, 1, 2, or 3 for Item 113) reported in the NBI database.

If bridge owners confirm that they have scour critical bridges, we will appreciate it if your corresponding staff can make sure that bridge owners have developed and implemented POAs for each of their scour critical bridges. If bridge owners have not developed and implemented a POA for each of their scour critical bridges, we request that you notify them that their jurisdiction is not in compliance with 23 CFR 650.313(e)(3). As we have already stated, noncompliance could lead to the suspension of Federal-aid highway funds. These bridge owners must provide the following schedules to avoid possible suspension of Federal-aid funds:

- Schedule for completing the development of all POAs for bridges identified as scour critical. We recommend a target date of November 2008 for bridges under State jurisdiction, and November 2009 for bridges under local and other-owner jurisdictions.

- Schedule for completing the implementation of all POAs for bridges identified as scour critical. We recommend a target date of April 2009 for bridges under State jurisdiction, and April 2010 for bridges under local and other-owner jurisdictions.

In addition, we request that bridge owners submit a status report to the FHWA Office of Bridge Technology every April and November on their progress made towards developing and implementing POAs. The status report should also include the following information:

- Percent of scour critical bridges with POAs developed by State, local, and other-owner jurisdiction, and
- Percent of scour critical bridges with POAs implemented by State, local and other-owner jurisdiction.

Bridge owners must continue to submit their status report until all bridges identified as scour critical in their corresponding jurisdiction have POAs developed and implemented.

We ask for your assistance in obtaining the information requested on these action items from all bridge owners through your corresponding State DOT manager official since the ultimate responsibility for complying with the NBIS requirement is at the State level. When a bridge owner code is missing or coded unknown, we ask that you work with the State DOT manager official to assign a proper owner code to the bridge record.

Please report the information requested herein regarding any actions taken by your division office to verify that bridges owners have reviewed their NBI data as for the number of bridges needing a scour evaluation (code 6, T, or Null for Item 113), and for the number of scour critical bridges within their jurisdiction (code 0, 1, 2, or 3 for Item 113). Also, please provide the schedules for completing scour evaluations, and for developing and implementing POAs for scour critical bridges. We request that you submit this information to the FHWA Office of Bridge Technology by February 29, 2008.

We are providing additional guidance to assist you in compiling the information requested herein in the document titled "Guidance for Reporting Schedule for Completing Bridge Scour Evaluations and Plans of Action for Scour Critical Bridges" (see Attachment B).

Also, we request that you report progress on these actions using a Web-based template, which can be accessed online at: <http://staffnet.fhwa.dot.gov/bridge/attachmentc/>. Once all fields are completed on this Web-based template, a summary table similar to that presented in Attachment C will be automatically generated on the Web.

If you have any questions please do not hesitate to contact Mr. Jorge E. Pagán-Ortiz, Principal Bridge Engineer – Hydraulics at (202) 366-4604, (jorge.pagan@dot.gov).

3 Attachments

Attachment A – Item 113 Code For NHS State-Owned Bridges

	0	1	2	3	4	5	6	7	8	9	N	U	T	NULL
AL	0	0	0	64	49	135	8	3	1,606	0	816	67	0	0
AK	0	0	0	26	0	20	7	24	175	4	58	33	16	0
AZ	0	0	0	97	0	15	0	131	1,662	0	684	0	0	2
AR	0	0	0	14	0	693	0	22	776	3	414	7	0	0
CA	0	0	2	49	16	864	30	130	1,658	26	4,529	30	67	4
CO	0	0	0	78	9	319	0	12	830	18	770	10	0	0
CT	0	0	0	30	2	45	10	1	338	2	1,134	0	0	0
DE	0	0	0	2	1	9	0	8	85	0	122	0	0	0
DC	0	0	0	0	0	0	20	2	3	4	79	3	0	0
FL	0	0	2	39	3	610	23	61	1,034	3	2,160	122	17	0
GA	0	0	0	32	0	409	1	0	733	0	900	429	6	3
HI	0	0	2	21	0	1	105	3	154	5	91	0	1	0
ID	0	0	2	88	1	31	5	2	303	15	282	2	0	0
IL	0	0	2	106	9	493	13	67	1,148	27	1,544	0	0	0
IN	0	0	47	13	13	131	0	95	955	4	1,181	0	0	0
IA	0	0	0	0	0	394	4	52	667	0	712	0	0	0
KS	0	0	0	81	0	435	177	2	683	17	986	1	0	0
KY	0	0	6	0	2	22	393	58	272	2	751	0	0	284
LA	0	0	3	155	0	0	86	61	693	1	933	18	0	704
ME	0	0	0	15	2	3	0	4	198	0	202	12	12	0
MD	0	0	0	24	0	17	0	6	471	0	842	8	2	0
MA	0	0	2	141	2	47	20	8	231	1	1,502	27	2	0
MI	1	0	2	215	2	69	72	48	428	3	1,571	53	0	0
MN	0	0	0	27	7	142	3	11	480	0	971	0	0	0
MS	0	0	1	39	38	118	380	0	874	8	691	15	2	0
MO	0	0	0	50	0	43	4	0	1,539	2	1,130	0	0	0
MT	0	0	0	10	212	145	104	15	195	0	578	3	0	0
NE	0	0	3	6	26	40	23	16	817	1	306	1	0	0
NV	0	0	0	41	0	13	5	5	204	3	426	1	0	0
NH	0	0	0	14	1	1	23	1	224	0	385	0	3	0
NJ	0	0	0	106	21	92	44	130	395	3	1,644	8	5	0
NM	0	0	0	19	0	251	4	2	949	0	486	13	0	0
NY	0	0	1	12	74	69	19	20	1,062	6	2,074	1	25	0
NC	0	0	0	19	1	28	5	4	1,254	1	1,257	38	27	0
ND	0	0	0	3	0	5	0	5	352	0	161	0	0	0
OH	0	0	0	1	18	419	36	54	918	25	2,211	6	0	0
OK	0	0	6	14	145	64	21	47	1,407	0	1,018	10	0	0
OR	0	0	2	333	8	161	1	15	283	7	567	75	46	0
PA	0	1	10	258	177	185	276	108	593	35	2,142	11	0	0
RI	0	0	0	7	0	9	2	0	28	11	215	0	0	0
SC	0	0	0	120	2	260	0	3	255	108	524	82	21	0
SD	0	0	0	0	0	0	13	0	491	0	307	0	0	0
TN	0	0	0	121	8	77	58	1	1,396	2	1,375	14	0	0
TX	0	0	3	158	23	478	126	153	7,843	43	5,269	30	16	20
UT	0	0	1	29	11	59	4	8	279	3	707	2	0	0
VT	0	0	0	7	0	0	17	2	153	0	271	1	0	0
VA	0	0	0	3	31	169	0	154	1,073	14	1,563	0	0	0
WA	0	0	18	145	10	227	0	42	396	20	1,213	0	25	8
WV	0	0	0	7	2	28	7	2	597	14	477	0	0	0
WI	0	0	0	6	37	293	4	36	708	3	1,559	18	0	0
WY	0	0	0	0	0	0	4	7	532	0	727	0	0	0
PR	1	0	1	8	2	8	3	82	128	3	338	3	2	0
TOT	2	1	116	2,853	965	8,146	2,160	1,723	40,528	447	52,855	1,154	295	1,025

Attachment A – Item 113 Code for Non-NHS State-Owned Bridges

	0	1	2	3	4	5	6	7	8	9	N	U	T	NULL
AL	0	0	0	55	54	115	6	11	2,011	0	564	159	1	0
AK	0	0	0	137	0	23	9	20	199	3	25	65	26	0
AZ	0	0	0	134	0	16	0	102	1,373	0	406	0	0	0
AR	0	0	0	37	7	1,426	7	44	2,337	1	437	909	0	0
CA	0	0	5	49	14	479	55	47	979	21	2,920	122	38	9
CO	0	0	0	104	8	277	2	5	678	2	300	24	0	0
CT	0	0	1	116	10	123	13	22	445	1	503	0	0	0
DE	0	0	0	68	3	29	1	56	342	0	100	0	0	0
DC	0	0	0	0	0	2	26	0	3	2	64	3	0	0
FL	0	0	1	56	1	423	10	19	953	8	806	280	11	0
GA	0	0	0	35	0	224	10	0	1,645	0	1,015	1,087	17	1
HI	0	0	0	16	0	1	70	9	136	2	86	0	0	2
ID	0	0	3	45	1	23	4	3	290	10	176	9	0	0
IL	0	0	0	160	37	751	61	101	1,978	30	1,517	1	0	0
IN	0	0	132	13	24	280	0	76	1,831	2	775	9	0	0
IA	0	0	0	0	0	609	5	123	834	0	645	0	0	0
KS	0	1	0	179	9	618	141	8	1,233	17	695	26	0	0
KY	2	0	25	21	87	215	2,316	232	1,871	11	628	1	0	1,643
LA	0	0	5	450	0	1	79	48	1,362	4	277	1,465	0	1,508
ME	0	0	1	179	24	21	6	24	1,078	0	245	41	56	0
MD	0	0	0	142	0	22	6	18	739	0	492	35	0	0
MA	3	0	14	189	2	22	34	15	159	3	976	51	2	0
MI	0	0	0	164	6	45	50	44	274	1	1,304	60	0	0
MN	0	0	0	37	30	201	19	18	873	4	796	6	0	0
MS	1	0	1	156	142	271	938	22	1,349	0	487	102	0	0
MO	0	0	0	247	3	132	7	1	5,854	7	1,180	2	0	0
MT	0	0	0	12	404	103	198	12	226	1	201	7	0	1
NE	0	0	3	14	54	98	109	7	1,695	4	267	28	0	0
NV	0	0	2	39	3	14	9	0	138	0	105	3	0	0
NH	1	0	0	24	0	4	18	7	552	1	176	9	3	0
NJ	0	0	0	60	16	20	22	19	178	0	937	4	2	0
NM	0	0	3	49	0	250	17	1	655	3	149	101	0	0
NY	0	0	1	72	152	123	20	33	2,509	3	2,083	0	18	3
NC	0	0	1	71	9	272	126	35	6,978	2	1,642	4,943	52	0
ND	0	0	0	7	1	17	2	2	381	0	190	5	0	0
OH	0	1	0	12	71	1,097	115	151	2,369	97	1,788	6	0	0
OK	0	0	20	39	321	227	69	179	3,047	3	931	6	0	0
OR	0	0	3	254	7	192	1	8	198	8	375	121	18	0
PA	0	1	186	2,428	1,161	1,253	1,431	738	2,575	27	2,273	30	0	0
RI	0	0	0	72	1	3	4	3	39	39	161	6	0	0
SC	0	0	2	265	2	2,185	13	0	809	245	716	2,615	119	0
SD	0	0	0	0	0	1	16	1	813	1	175	0	0	0
TN	0	0	3	315	23	250	79	8	3,324	8	943	114	0	0
TX	0	0	34	326	76	984	167	237	14,168	23	2,316	253	37	9
UT	0	0	2	42	20	54	1	16	258	5	206	6	0	0
VT	0	0	4	21	0	7	131	12	317	1	111	22	0	0
VA	1	0	8	20	400	1,249	1	1,411	4,670	11	951	0	0	0
WA	0	0	21	129	8	201	1	25	257	24	348	1	6	4
WV	0	0	1	134	75	86	540	80	4,546	8	218	0	0	0
WI	0	0	0	28	39	324	11	27	942	2	814	34	0	0
WY	0	0	0	3	1	2	10	1	550	2	97	8	0	0
PR	1	1	17	32	57	95	13	181	564	8	148	89	29	0
TOT	9	4	499	7,257	3,363	15,460	6,999	4,262	83,584	655	35,740	12,868	435	3,180

Attachment A – Item 113 Code for NHS Local-Owned Bridges

	0	1	2	3	4	5	6	7	8	9	N	U	T	NULL
AL	0	0	0	0	1	2	10	0	10	0	1	4	0	0
AK	0	0	0	0	0	1	0	0	0	0	0	0	0	0
AZ	0	0	0	0	0	1	24	0	9	0	5	0	0	0
AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CA	0	0	0	0	0	1	0	0	5	0	8	0	0	0
CO	0	0	0	0	0	1	0	1	56	0	20	0	0	0
CT	0	0	0	0	0	3	0	0	6	0	0	0	0	0
DE	0	0	0	0	0	0	0	0	2	0	13	0	0	0
DC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FL	0	0	0	0	0	0	0	0	14	0	9	12	0	0
GA	0	0	0	0	0	1	1	0	4	0	1	4	0	0
HI	0	0	0	0	0	1	8	1	15	1	1	2	2	0
ID	0	0	0	1	0	1	0	0	2	0	1	0	0	0
IL	0	0	0	3	0	2	5	0	75	0	122	0	0	0
IN	0	0	0	0	0	1	0	0	3	0	2	0	0	0
IA	0	0	0	0	0	3	3	0	9	0	4	0	0	0
KS	0	0	0	0	0	3	0	1	7	0	3	0	0	0
KY	0	0	0	0	0	0	2	0	1	0	0	0	0	0
LA	0	0	0	0	0	0	0	0	1	0	4	5	0	4
ME	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MD	0	0	0	8	0	0	2	0	5	0	47	2	0	0
MA	0	0	0	1	1	1	1	1	10	1	13	6	0	0
MI	0	0	0	3	0	14	7	1	33	0	16	2	0	0
MN	0	0	0	0	0	0	2	0	5	0	6	0	0	0
MS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MO	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0	0	19	0	11	0	0	0
NV	0	0	0	3	0	1	1	4	47	0	34	0	0	0
NH	0	0	0	0	0	0	6	0	23	0	2	1	0	0
NJ	0	0	0	0	1	1	3	4	19	0	14	0	0	0
NM	0	0	0	0	0	5	0	0	37	0	12	4	0	0
NY	0	0	0	8	0	1	2	0	26	0	143	2	34	0
NC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ND	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OH	0	0	1	0	5	38	15	11	121	4	259	4	0	0
OK	0	0	0	0	0	0	0	0	1	0	0	0	0	0
OR	0	0	0	1	3	3	0	0	3	0	9	2	0	0
PA	0	0	0	0	0	1	0	0	1	0	0	0	0	0
RI	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SD	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TN	0	0	0	1	0	1	1	1	2	0	12	0	0	0
TX	0	0	0	2	3	18	12	59	545	1	231	258	1	0
UT	0	0	0	0	0	0	1	0	0	0	0	0	0	0
VT	0	0	0	0	0	0	5	0	6	0	0	2	0	0
VA	0	0	0	0	1	22	0	10	120	0	126	0	0	0
WA	0	0	1	4	2	36	5	9	65	11	67	12	5	0
WV	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WI	0	0	0	1	5	12	0	1	33	0	2	2	0	0
WY	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PR	0	0	0	0	0	0	0	0	1	0	0	0	0	0
TOT	0	0	2	36	22	175	116	104	1,341	18	1,198	324	42	4

Attachment A – Item 113 Code for Non-NHS Local-Owned Bridges

	0	1	2	3	4	5	6	7	8	9	N	U	T	NULL
AL	1	0	4	101	164	151	1,363	15	4,588	0	181	3,419	0	0
AK	0	0	1	19	0	13	7	0	27	0	11	45	5	0
AZ	1	0	0	150	6	49	362	19	1,503	9	85	87	0	1
AR	0	0	1	11	5	476	83	7	1,148	1	26	3,478	0	0
CA	1	1	169	209	6	2,177	67	78	6,168	20	787	1,694	41	91
CO	1	0	8	104	191	997	13	101	2,950	23	127	1	0	0
CT	0	0	3	238	15	212	48	10	674	0	25	0	1	0
DE	0	0	0	0	0	1	2	1	3	0	3	0	0	0
DC	0	0	0	0	0	0	0	0	0	0	1	1	0	0
FL	0	0	6	136	13	576	73	32	1,840	6	150	2,018	16	0
GA	4	2	0	5	0	91	12	0	3,526	0	287	3,804	19	1
HI	0	0	1	8	1	6	77	6	217	8	6	5	3	1
ID	0	0	19	74	31	38	64	14	1,551	9	22	480	0	1
IL	0	0	13	203	61	5,345	314	301	10,962	9	355	0	0	0
IN	0	2	376	503	775	5,299	1	518	3,802	11	189	1,350	0	0
IA	11	1	90	290	203	730	397	1,299	14,252	34	143	3,073	0	0
KS	19	3	16	43	966	7,261	861	209	10,131	364	110	13	0	0
KY	1	1	33	6	127	145	1,073	156	1,660	1	78	3	0	1,396
LA	0	0	1	104	0	0	28	0	648	4	64	3,444	0	876
ME	0	0	3	23	1	2	14	3	106	0	3	50	4	0
MD	0	1	5	335	2	83	86	70	1,046	0	188	311	7	0
MA	14	1	37	450	34	42	50	56	511	8	34	271	0	0
MI	9	0	32	144	92	1,135	2,364	102	1,766	11	131	549	10	0
MN	0	0	80	289	108	391	160	20	7,807	11	228	183	0	0
MS	0	0	4	159	20	32	2,421	4	1,874	0	77	6,291	5	0
MO	3	0	2	38	425	3,669	26	397	8,892	19	304	0	0	0
MT	0	0	0	1	74	9	40	1	96	1	16	1,667	0	2
NE	10	2	115	392	294	1,418	167	14	6,125	8	76	3,215	0	0
NV	0	0	2	13	0	14	35	0	375	0	83	35	0	0
NH	0	0	4	9	0	0	31	3	726	0	19	35	0	1
NJ	0	0	4	279	78	194	59	201	1,556	2	90	73	2	0
NM	2	0	1	5	2	22	73	1	220	0	12	296	0	0
NY	1	0	47	572	569	460	50	21	5,907	1	883	34	58	0
NC	0	0	0	0	1	1	30	3	356	2	104	246	0	0
ND	0	0	0	74	13	306	5	288	630	0	13	1,936	0	0
OH	0	2	2	86	507	3,931	3,823	712	7,077	862	729	321	0	0
OK	4	2	79	90	1,097	884	626	610	12,388	4	62	11	1	0
OR	1	1	322	407	33	207	2	79	1,125	7	148	1,635	5	0
PA	4	3	246	1,280	518	532	1,706	332	935	47	387	5	0	0
RI	0	0	0	43	1	4	9	0	32	28	26	1	0	0
SC	0	0	0	0	0	47	2	0	20	0	37	709	3	0
SD	0	0	0	0	0	0	572	1	3,407	0	22	0	0	0
TN	2	0	70	412	34	714	73	26	8,788	4	260	973	0	0
TX	7	3	6	10	23	92	186	295	6,632	27	371	8,468	8	2
UT	1	0	6	81	90	258	86	13	414	9	31	8	0	1
VT	3	2	55	197	3	14	235	60	793	0	15	216	0	1
VA	0	0	2	0	33	131	0	55	565	0	195	0	0	0
WA	0	1	29	420	87	688	41	217	1,623	122	183	203	38	6
WV	0	0	0	3	0	1	36	0	58	0	17	0	0	0
WI	0	0	2	51	152	498	66	364	5,765	11	274	1,546	0	0
WY	0	0	0	0	0	0	16	3	401	0	24	393	0	0
PR	2	2	9	13	14	25	5	77	139	2	15	22	0	0
TOT	102	30	1,905	8,080	6,869	39,371	17,940	6,794	153,805	1,685	7,707	52,618	226	2,380

Attachment A – Item 113 Code for NHS Other-Owner Bridges

	0	1	2	3	4	5	6	7	8	9	N	U	T	NULL
AL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AK	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AZ	0	0	0	0	0	0	1	0	0	0	0	0	0	0
AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CA	0	0	0	0	0	0	0	0	0	0	3	0	0	0
CO	0	0	0	0	0	0	0	0	38	0	50	0	0	0
CT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HI	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ID	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IL	0	0	0	0	0	2	4	1	1	0	3	0	0	0
IN	0	0	0	0	0	0	0	0	2	0	0	0	0	0
IA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KS	0	0	0	0	0	0	0	0	0	0	1	0	0	0
KY	0	0	0	0	0	0	1	0	0	0	0	0	0	0
LA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ME	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MD	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MI	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MN	0	0	0	0	2	0	0	0	0	0	3	0	0	0
MS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MO	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	1	0	0	0	0	0	0	0	0
NV	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NH	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NJ	0	0	0	0	0	0	0	0	1	0	10	0	2	0
NM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NY	0	0	0	0	0	0	0	0	0	0	1	0	0	0
NC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ND	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OH	0	0	0	0	0	0	0	0	2	0	0	0	0	0
OK	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OR	0	0	0	0	0	0	0	0	0	0	1	0	0	0
PA	0	0	0	0	2	0	0	0	1	0	24	0	0	0
RI	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SD	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TN	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TX	0	0	0	0	0	0	0	0	1	0	1	2	0	0
UT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VA	0	0	0	0	0	1	0	0	4	0	3	0	0	0
WA	0	0	0	0	0	0	0	0	0	0	1	0	0	0
WV	0	0	0	0	0	0	0	0	1	0	1	0	0	0
WI	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WY	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOT	0	0	0	0	4	4	6	1	51	0	102	2	2	0

Attachment A – Item 113 Code for Non-NHS Other-Owner Bridges

	0	1	2	3	4	5	6	7	8	9	N	U	T	NULL
AL	0	0	0	0	0	0	6	0	1	0	25	0	0	0
AK	0	0	0	0	0	1	1	0	2	0	0	0	0	0
AZ	0	0	0	0	0	0	0	0	0	0	2	0	0	0
AR	0	0	0	0	0	0	0	0	2	0	2	0	0	0
CA	0	0	0	0	0	1	0	0	1	0	16	0	0	10
CO	0	0	0	0	0	0	0	0	0	0	5	0	0	0
CT	0	0	0	1	0	1	1	0	1	0	133	0	0	0
DE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FL	0	0	0	0	0	0	2	0	0	0	4	7	0	0
GA	0	0	0	0	0	0	0	0	0	0	51	0	0	0
HI	0	0	0	0	0	0	2	0	0	0	0	3	0	0
ID	0	0	0	0	0	0	0	0	0	0	0	1	0	0
IL	0	0	0	0	0	11	19	0	13	0	85	0	0	0
IN	0	0	0	0	1	0	0	0	1	0	14	1	0	0
IA	0	0	0	0	0	1	4	3	43	0	80	17	0	0
KS	0	0	0	1	1	3	0	0	1	2	3	0	0	0
KY	0	0	0	0	0	0	4	0	0	0	20	0	0	3
LA	0	0	0	0	0	0	0	0	0	0	1	5	0	0
ME	0	0	0	0	0	0	0	0	1	0	24	1	0	0
MD	0	0	0	1	0	2	0	0	2	0	2	0	0	0
MA	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MI	0	0	0	0	0	0	1	0	0	0	2	0	0	0
MN	0	0	0	0	0	0	1	0	6	1	48	4	0	0
MS	0	0	0	0	0	0	0	0	2	0	25	5	0	0
MO	0	0	0	0	0	0	0	1	6	0	13	0	0	0
MT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	1	1	1	0	28	0	14	0	0	0
NV	0	0	0	0	0	0	1	0	4	0	1	4	0	0
NH	0	0	0	0	0	0	0	0	1	0	1	0	0	0
NJ	0	0	0	0	0	1	2	0	4	0	118	0	0	0
NM	0	0	0	0	0	0	0	0	0	0	3	0	0	0
NY	0	0	0	1	0	0	1	0	14	0	92	1	0	0
NC	0	0	0	0	0	0	0	0	0	0	2	0	0	0
ND	0	0	0	0	0	0	1	0	0	0	8	0	0	0
OH	0	0	0	0	0	0	0	0	5	1	56	0	0	0
OK	0	0	0	0	0	0	0	0	0	0	2	0	0	0
OR	0	0	0	0	0	0	1	0	0	0	3	5	0	4
PA	0	0	1	3	3	7	22	2	9	2	233	4	0	0
RI	0	0	0	0	0	0	0	0	0	0	1	0	0	0
SC	0	0	0	0	0	0	0	0	0	0	19	0	0	0
SD	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TN	0	0	0	0	0	0	0	0	0	0	2	0	0	0
TX	0	0	0	0	0	1	0	0	12	1	7	14	0	0
UT	0	0	0	0	0	1	0	0	1	0	0	0	0	0
VT	0	0	0	0	0	0	0	0	1	0	4	0	0	0
VA	0	0	0	0	0	27	0	0	16	0	67	0	0	0
WA	0	0	0	0	0	0	2	0	0	0	2	0	0	0
WV	0	0	0	0	0	1	1	0	2	0	2	0	0	0
WI	0	0	0	0	0	0	0	0	0	0	19	1	0	0
WY	0	0	0	0	0	0	0	0	0	0	1	0	0	0
PR	0	0	0	0	0	0	0	0	1	0	0	0	0	0
TOT	0	0	1	7	6	59	73	6	180	7	1,212	73	0	17

Attachment B

Guidance for Reporting Schedule for Completing Bridge Scour Evaluations and Plans of Action for Scour (POAs) Critical Bridges

- Schedule for completing the evaluation of all remaining scour vulnerable bridges (code 6, T, or Null for Item 113 of the NBI) within your State, local, and other owner jurisdiction.
 1. This must be a firm target date for completing the scour evaluations.
 - a) A target date of November 28, 2008, is recommended (e.g., The evaluation of all remaining scour vulnerable bridges within the State, local and other-owner jurisdiction will be completed by November 28, 2008).
 - b) Please make sure that bridges with a missing code (null code) on Attachment A are assigned a proper code for Item 113 after a scour evaluation is completed.
 2. Each FHWA division office must review the proposed target date by State, local and other-owner jurisdiction and notify the FHWA Office of Bridge Technology of any action taken such as concurring or nonconcurring with the target date.
 - a) Bridge owners must consult with their corresponding FHWA division office in the event that a previously concurred target date must be changed. The FHWA division office must review any information provided in support of the change and notify the FHWA Office of Bridge Technology of any further action(s) taken.
 3. Please continue to report on the progress made by bridge owners towards completing scour evaluations to the FHWA Office of Bridge Technology after your February 29, 2008, report. Bridge owners with less than 90 percent of their scour evaluations completed must report biannually in Calendar Year 2008 (April 30 and November 28), and owners with more than 90 percent of their scour evaluations completed must report by the November 28, 2008, target date.
- Schedule for completing the development of all POAs for bridges identified as scour critical.
 1. This must be a firm target date for completing the development of all POAs.
 - a) A target date of November 28, 2008, is recommended for bridges under your State jurisdiction, and November 27, 2009, for bridges under local and other-owner jurisdictions (e.g., POAs for State-owned bridges identified as scour critical will be developed by November 28, 2008; POAs for local-owned and other-owner bridges identified as scour critical will be developed by November 27, 2009).
 2. Each FHWA division office must review the proposed target date by their State, local and other-owner jurisdiction and notify the FHWA Office of Bridge Technology of any action taken such as concurring or nonconcurring with the target date.
 - a) Bridge owners must consult with their corresponding FHWA division office in the event that a previously concurred target date must be changed. The FHWA division office must review any information provided in support of the change

and notify the FHWA Office of Bridge Technology of any further action(s) taken.

3. The development of a POA means that bridge owners have held meetings involving the appropriate personnel from internal units within their corresponding agency (design, construction, inspection and maintenance, districts and others as applicable) and with external entities (local authorities such as a commissioner, police department, fire department and others as needed) to identify and document:
 - a) General information about the bridge, responsibility for POA, scour vulnerability, recommended countermeasure(s) or alternatives, NBI coding information, countermeasure selection(s) including priority ranking and cost, bridge closure plan, detour route and any other supportive information.
 4. Guidance for developing POAs for scour critical bridges is presented in the FHWA's POA training seminar, which was distributed on a CD-ROM to our field offices by memorandum dated May 22, 2007, (see copy of this memorandum at <http://www.fhwa.dot.gov/engineering/hydraulics/bridgehyd/20070522.cfm>). Copies of this CD-ROM can be obtained from NHI at the following Web site: http://www.nhi.fhwa.dot.gov/training/NHIStoreSearchResults.aspx?get=&COURSE_NO=135085&KEYWORD=&TITLE=. In addition, the POA training seminar is available online at no cost at <http://fhwa.acrobat.com/n135085seminar>.
- Schedule for completing the implementation of all POAs for bridges identified as scour critical.
 1. This must be a firm target date for completing the implementation of all POAs.
 - a) A target date of April 29, 2009, is recommended for bridges under your State jurisdiction, and April 29, 2010, for bridges under local and other-owner jurisdictions (e.g., POAs developed for State-owned bridges identified as scour critical will be implemented by April 29, 2009; POAs developed for local-owned and other-owner bridges identified as scour critical will be implemented by April 29, 2010).
 2. Each FHWA division office must review the proposed target date by State, local and other-owner jurisdiction and notify the FHWA Office of Bridge Technology of any action taken such as concurring or nonconcurring with the date.
 - a) Bridge owners must consult with their corresponding FHWA division office in the event that a previously concurred target date must be changed. The FHWA division office must review any information provided in support of the change and notify the FHWA Office of Bridge Technology of any further action(s) taken.
 3. The implementation of a POA means that bridge owners have completed disseminating POAs to the appropriate personnel within their internal offices/units and external entities and have met with these offices/units and with external entities to communicate:
 - a) General information and instructions contained in each POA (e.g., individuals responsible for the POA implementation, detour routes, when to close/open a bridge, countermeasure selection, and design and installation schedules).
 1. Bridge owners should make sure that responsible parties identified in the POA understand their roles and responsibilities and that they are provided with periodic training on the implementation of selected components of a POA such as bridge closure/opening procedures.

- b) Frequency to conduct periodic reviews and updates of the information presented in a POA.
- Percent of scour critical bridges with POAs developed by State, local and other-owner jurisdiction.
 1. Please report the percent of scour critical bridges that have been developed for Item 113 code 0-2, and for Item 113 code 3.
 2. Please continue to report progress after your February 29, 2008, report on a biannual basis (April and November) to the FHWA Office of Bridge Technology until POAs have been developed for each scour critical bridges.
 3. We encourage bridge owners to prioritize the development of POAs for bridges coded 1 or 2 for Item 113 that are critical to the transportation system of a locality or region such as Interstate bridges and other NHS bridges on arterial and primary routes.
 - Percent of scour critical bridges with POAs implemented by State, local and other-owner jurisdiction.
 1. Please report the percent of scour critical bridges that have been implemented for Item 113 code 0-2, and for Item 113 code 3.
 2. Please continue to report progress after your February 29, 2008, report on a biannual basis (April and November) until POAs have been implemented for each scour critical bridge.
 3. We encourage bridge owners to prioritize the implementation of POAs for bridges coded 1 or 2 for Item 113 that are critical for the transportation system of a locality or region such as Interstate bridges and other NHS bridges on arterial and primary routes.

Attachment C: Action Items for Scour Evaluations of Bridges over Waterways and POAs for Scour Critical Bridges								
Agency	System	Schedule for Completing all Bridge Scour Evaluations	Schedule for Completing the Development of All POAs	Schedule for Completing the Implementation of All POAs	Percent of Scour Critical Bridges with POAs Developed		Percent of Scour Critical Bridges with POAs Implemented	
					Codes 0-2	Code 3	Codes 0-2	Code 3
State DOT	NHS							
	Non-NHS							
Local	NHS							
	Non-NHS							
Other Owner	NHS							
	Non-NHS							
Reporting State:	Name and Title of Individual Updating Action Items:			Telephone Number:		Report Date:		



U.S. Department
of Transportation
Federal Highway
Administration

Memorandum

Subject: **ACTION:** Technical Guidance for Bridges
over Waterways with Unknown Foundations
/s/ Original Signed by

Date: January 9, 2008

From: King W. Gee
Associate Administrator for Infrastructure

In Reply Refer To: HIBT-20

To: Associate Administrator for RD&T
Associate Administrator for
Federal Lands Highway Program
Directors of Field Services
Resource Center Director
Division Administrators

The purpose of this memorandum is to provide technical guidance on a process that should be considered by Federal, State and local agencies (referenced herein as bridge owners) to identify foundation characteristics such as width, depth and length for bridge foundations identified as unknown. The goal of this process is to reduce or eliminate the population of bridges over waterways identified as having unknown foundations, which in turn would allow bridge owners to evaluate these bridges for their scour vulnerability.

Background:

The term "unknown foundations" has been traditionally associated with examining the population of existing bridges over waterways (riverine and tidal) where foundation details are unknown and therefore, foundations could not be evaluated against the hydraulic hazards related to scour. Most of the bridges having unknown foundations were identified by owners while screening their bridges over waterways (riverine and tidal) for their scour vulnerability. These bridges received a Code U for Item 113 of the FHWA's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (Coding Guide).

The FHWA exempted this population of bridges from being evaluated for their scour vulnerability due to the lack of a process and guidance that would have allowed bridge owners to determine their foundation characteristics and therefore, evaluate these bridges. This exemption did not apply to bridges on Interstate designated routes for which FHWA recommended bridge owners to consider technology available to determine their foundation characteristics and evaluate their scour vulnerability. The use of geophysics technology such as non-destructive testing (NDT) has been available for quite some time; however, cost and reliability of results may be the leading reason for their limited use for determining foundation characteristics.

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The National Bridge Inspection Standards (NBIS) regulation, 23 CFR 650.313.e.3, requires that bridge owners develop a plan of action (POA) for bridges identified as scour critical bridges. We are concerned that some bridges within the unknown foundation population may be scour critical and as such need to have a POA as required by the NBIS regulation.

An additional growing concern, primarily related to our aging bridge population and increasing load and performance demand on all bridges, is our limited “body of knowledge” to assess the structural and geotechnical load capacity and deterioration mechanisms of foundation elements in both the short and long-term. When examining the “body of knowledge” from a broader view point, a more global definition of unknown foundations appears to be appropriate as we have to consider the potential of having another population of unknown foundations on land bridges currently reported in the Coding Guide. In general, the topic of unknown foundations presents a broad based challenge to bridge owners, which warrants FHWA’s attention.

Status of Bridges with Unknown Foundations:

As of September 2007, the National Bridge Inventory (NBI) data showed that bridge owners reported 67,240 bridges over waterways as having unknown foundations. Table 1 presents the number of bridges over waterways on the National Highway System (NHS) and the non-NHS with unknown foundations by Federal, State and local agencies. It is important to highlight that the NHS population of unknown foundation bridges presented in Table 1 includes 144 bridges with Interstate designation. The number of bridges over waterways having unknown foundations is presented by bridge owner in Attachment A.

Agency	NHS	Non-NHS	Total
Federal	0	238	238
State	1,155*	12,864	14,019
Local	324	52,577	52,901
Other Bridge Owners	2	80	82
Total	1,481	65,759	67,240

* Includes 144 bridges with Interstate designation

Guidance on Process for Reducing the Number of Bridges with Unknown Foundations:

The following steps outline a process developed by the FHWA Office of Bridge Technology’s Hydraulics and Geotechnical Team that bridge owners may consider to reduce or eliminate the population of bridges over waterways identify as having unknown foundations:

1. Screen all bridges coded U to ensure that they are correctly coded as having unknown foundations. In addition, bridges with unknown foundations that may have been coded 6 for

Item 113 should be recoded as U and undergo a screening as well. Bridge owners that assigned a Code 6 to Interstate bridges with unknown foundations based on the current definition of Code U should keep these bridges with a Code 6 and follow the guidance presented in this process. Direct and specific communication between bridge inspection and bridge design and construction units should expedite and improve the results of this activity.

- Most bridge owners may have some form of historical technical inventory of project plans; standard sheets, construction specifications, and design guidance. A concerted effort to “mine” this historical data by cross referencing coded U bridges construction dates should yield valuable preliminary information regarding foundation practices in that period. This information could also be coupled with knowledge on bridges with known foundations constructed in the same time period. Similar to current foundation practices, historical practices were very repetitive and rather simple in concept.
2. For bridges over waterways that are determined to be correctly identified as having unknown foundations:
- Prioritize these bridges based on their functional classification. We recommend that this prioritization be as follows: Principal Arterial – Interstate; Principal Arterial – Other Freeways or Expressways; Other Principal Arterial; Minor Arterial, Major Collector; Minor Collector.
 - Consider using the following criteria for determining, with a reasonable accuracy, foundation characteristics:
 - a) Collect and document historical knowledge of foundation design and construction practices for the period of original construction.
 - b) Consider geologic, subsurface conditions, bridge standards, and information that may be available from nearby bridges.
 - c) Consider applying “proven” surface and subsurface NDT tools to confirm foundation type and determine foundation length.
 1. NCHRP 21-05(2) “Determination of Unknown Subsurface Bridge Foundations” specifically examined NDT tools for the application. The unedited final report and accompanying guideline document can be obtained for loan by contacting NCHRP at NCHRP@nas.edu. More information on this project is available at <http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=667>.
 - a) Pertinent results of this study are summarized in FHWA’s Geotechnical Notebook Issuance No. 16 (GT-16) of the same title, which is available at <http://www.fhwa.dot.gov/engineering/geotech/policymemo/gt-16.pdf>.
 - b) Since the completion of project NCHRP 21-05(2) further advancements in computer software and hardware have greatly advanced to provide improved result reliability. The current state of knowledge is such that the combined suite of surface and subsurface NDT tools has limitations based on foundation access (surface or down-hole) foundation material type and dimension and the best results require the user to consider each situation for undertaking a testing program.
 - Conduct a scour evaluation based on this determination and consider recoding the bridge for Item 113 according to the outcome of the evaluation.

- a) A risk-based prioritized schedule for conducting the scour evaluations of these bridges may be considered.
1. Factors other than functional classification, such as the amount and reliability of the determined information should be considered in a risk-based prioritization schedule in order to target the scour evaluation of the bridges most in need of attention.
 2. It is likely that only partial foundation information may be determined on some bridges and that some information may be qualitative rather than quantitative resulting in some uncertainty in the scour evaluations for that population.
 3. Several projects funded by the NCHRP have addressed the topic of unknown foundations and produced valuable though limited information and guidance. The concept of a risk based approach was addressed in the NCHRP project 24-25, Risk-based Management Guidelines for Scour at Bridges with Unknown Foundations (Web-only document 107). This project advanced a template for a risk-based approach and computer software. While this project might not meet the needs of all bridge owners, it provides a protocol of how a risk-based approach could be structured to manage bridges with unknown foundations. We encourage bridge owners to consider this product as a beginning draft to develop their own risk based approach. The Web-only document 107 could be downloaded at: http://www.trb.org/news/blurbs_detail.asp?id=8000.
3. For bridges that were previously coded as U for Item 113 of the NBI and whose foundations are completely and accurately identified after completing the screening:
- Conduct scour evaluations following the guidance presented in the FHWA publication Hydraulic Engineering Circular No. 18, Evaluating Scour at Highway Bridges, Fourth Edition dated May 2001.
 - a) Prioritize the scour evaluation of these bridges based on the functional classification previously recommended.
 - Code Item 113 according to the outcome of the evaluation.

We request that your appropriate staff disseminate and discuss this technical guidance with their appropriate Federal and State department of transportation management official. We plan to monitor the progress made by bridge owners towards reducing their number of bridges with unknown foundations by reviewing the NBI data every year in April. November 2010 is the target date for eliminating the number of bridges with unknown foundations from the NBI. We are contemplating amending the NBIS regulations so that any remaining bridge reported as having unknown foundations after November 2010 would be kept with a Code U for Item 113, considered scour critical and subject to the plan of action requirement of the NBIS regulation, 23 CFR 650.313(e)(3), until properly designed countermeasures are installed to protect the bridge foundations or until the bridge is replaced.

If you have any questions please do not hesitate to contact Mr. Jorge E. Pagán-Ortiz, Principal Bridge Engineer – Hydraulics at (202) 366-4604 (jorge.pagan@dot.gov), or Jerry DiMaggio, Principal Bridge Engineer – Geotechnical at (202) 366-1569 (jerome.dimaggio@dot.gov).

Attachment

Attachment A

Number of State, Local and Other Bridge Owner Bridges Coded U (Unknown Foundations) for Item 113

	State		Local		Other Bridge Owners		Interstate*	Total
	NHS	NNHS	NHS	NNHS	NHS	NNHS		
AL	67	159	4	3,419	0	0	0	3,649
AK	33	65	0	45	0	0	8	143
AZ	0	0	0	87	0	0	0	87
AR	7	909	0	3,478	0	0	0	4,394
CA	30	122	0	1,694	0	0	4	1,846
CO	10	24	0	1	0	0	2	35
CT	0	0	0	0	0	0	0	0
DE	0	0	0	0	0	0	0	0
DC	3	3	0	1	0	0	1	7
FL	122	280	12	2,018	0	7	13	2,439
GA	429	1,087	4	3,804	0	0	3	5,324
HI	0	0	2	5	0	3	0	10
ID	2	9	0	480	0	1	0	492
IL	0	1	0	0	0	0	0	1
IN	0	9	0	1,350	0	1	0	1,360
IA	0	0	0	3,073	0	17	0	3,090
KS	1	26	0	13	0	0	0	40
KY	0	1	0	3	0	0	0	4
LA	18	1,465	5	3,444	0	11	7	4,943
ME	12	41	0	50	0	1	10	104
MD	8	35	2	311	0	0	9	356
MA	27	51	6	271	0	0	2	355
MI	53	60	2	549	0	0	7	664
MN	0	6	0	183	0	4	0	193
MS	15	102	0	6,291	0	5	0	6,413
MO	0	2	0	0	0	0	0	2
MT	3	7	0	1,667	0	0	2	1,677
NE	1	26	0	3,183	0	0	0	3,210
NV	1	3	0	35	0	4	0	43
NH	0	7	1	28	0	0	0	36
NJ	8	4	0	73	0	1	0	86
NM	13	101	4	296	0	0	1	414
NY	1	0	2	34	0	1	0	38
NC	38	4,943	0	246	0	0	0	5,227
ND	0	5	0	1,936	0	0	0	1,941
OH	6	6	4	321	0	0	4	337
OK	10	6	0	11	0	0	1	27
OR	75	121	2	1,635	0	5	20	1,838
PA	11	30	0	5	0	4	5	50
RI	0	6	0	1	0	0	0	7
SC	82	2,615	0	709	0	0	27	3,406
SD	0	0	0	0	0	0	0	0
TN	14	114	0	973	0	0	4	1,101
TX	30	253	258	8,468	2	14	5	9,025
UT	2	6	0	8	0	0	0	16
VT	1	22	2	216	0	0	0	241
VA	0	0	0	0	0	0	0	0
WA	1	1	12	201	0	0	1	215
WV	0	0	0	0	0	0	0	0
WI	18	34	2	1,546	0	1	5	1,601
WY	0	8	0	393	0	0	0	401
PR	3	89	0	22	0	0	3	114
TOTALS	1,155	12,864	324	52,577	2	80	144	67,002

* Included under State NHS

Attachment A
Federal Bridges Coded U (Unknown Foundations) for Item 113

	NHS Fed	Non NHS Fed	All Fed
ALABAMA	0	0	0
ALASKA	0	2	2
ARIZONA	0	0	0
ARKANSAS	0	2	2
CALIFORNIA	0	4	4
COLORADO	0	13	13
CONNECTICUT	0	0	0
DELAWARE	0	0	0
DIST. OF COL.	0	5	5
FLORIDA	0	30	30
GEORGIA	0	6	6
HAWAII	0	0	0
IDAHO	0	0	0
ILLINOIS	0	1	1
INDIANA	0	0	0
IOWA	0	5	5
KANSAS	0	7	7
KENTUCKY	0	0	0
LOUISIANA	0	0	0
MAINE	0	0	0
MARYLAND	0	7	7
MASSACHUSETTS	0	0	0
MICHIGAN	0	1	1
MINNESOTA	0	0	0
MISSISSIPPI	0	69	69
MISSOURI	0	1	1
MONTANA	0	1	1
NEBRASKA	0	1	1
NEVADA	0	0	0
NEW HAMPSHIRE	0	0	0
NEW JERSEY	0	4	4
NEW MEXICO	0	1	1
NEW YORK	0	4	4
NORTH CAROLINA	0	12	12
NORTH DAKOTA	0	1	1
OHIO	0	0	0
OKLAHOMA	0	1	1
OREGON	0	1	1
PENNSYLVANIA	0	6	6
RHODE ISLAND	0	0	0
SOUTH CAROLINA	0	0	0
SOUTH DAKOTA	0	0	0
TENNESSEE	0	4	4
TEXAS	0	23	23
UTAH	0	1	1
VERMONT	0	0	0
VIRGINIA	0	13	13
WASHINGTON	0	6	6
WEST VIRGINIA	0	0	0
WISCONSIN	0	3	3
WYOMING	0	3	3
PUERTO RICO	0	0	0
TOTALS	0	238	238

SCOUR CRITICAL BRIDGE - PLAN OF ACTION

1. GENERAL INFORMATION

Structure number: _____	City, County, State: _____	Waterway: _____
Structure name: _____	State highway or facility carried: _____	Owner: _____
Year built: _____	Year rebuilt: _____	Bridge replacement plans (if scheduled): _____ Anticipated opening date: _____
Structure type: <input type="checkbox"/> Bridge <input type="checkbox"/> Culvert		
Structure size and description: _____		
Foundations: <input type="checkbox"/> Known, type: _____ Depth: _____ <input type="checkbox"/> Unknown		
Subsurface soil information (<i>check all that apply</i>): <input type="checkbox"/> Non-cohesive <input type="checkbox"/> Cohesive <input type="checkbox"/> Rock		
Bridge ADT: _____	Year/ADT: _____	% Trucks: _____
Does the bridge provide service to emergency facilities and/or an evacuation route (Y/N)? _____ If so, describe: _____		

2. RESPONSIBILITY FOR POA

Author(s) of POA (name, title, agency/organization, telephone, pager, email): _____

Date: _____

Concurrences on POA (name, title, agency/organization, telephone, pager, email): _____

POA updated by (name, title, agency, organization): _____ Date of update: _____
Items update: _____

POA to be updated every _____ months by (name, title, agency/organization): _____
Date of next update: _____

3. SCOUR VULNERABILITY

a. Current Item 113 Code: 3 2 1 Other: _____

b. Source of Scour Critical Code: Observed Assessment Calculated Other: _____

c. Scour Evaluation Summary: _____

d. Scour History: _____

4. RECOMMENDED ACTION(S) (see Sections 6 and 7)

	<u>Recommended</u>		<u>Implemented</u>	
a. Increased Inspection Frequency	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
b. Fixed Monitoring Device(s)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
c. Flood Monitoring Program	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
d. Hydraulic/Structural Countermeasures	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No

5. NBI CODING INFORMATION

	<u>Current</u>	<u>Previous</u>
Inspection date		
Item 113 Scour Critical		
Item 60 Substructure		
Item 61 Channel & Channel Protection		
Item 71 Waterway Adequacy		
Comments: (drift, scour holes, etc. - depict in sketches in Section 10)		

6. MONITORING PROGRAM

- Regular Inspection Program w/surveyed cross sections
Items to Watch: _____
- Increased Inspection Frequency of ___ mo. w/surveyed cross sections
Items to Watch: _____
- Underwater Inspection Required
Items to Watch: _____
- Increased Underwater Inspection Frequency of ___ mo.
Items to Watch: _____

- Fixed Monitoring Device(s)
Type of Instrument: _____
Installation location(s): _____
Sample Interval: 30 min. 1 hr. 6 hrs. 12 hrs. Other: _____
Frequency of data download and review: Daily Weekly Monthly Other _____
Scour alert elevation(s) for each pier/abutment: _____
Scour critical elevations(s) for each pier/abutment: _____
Survey ties: _____
Criteria of termination for fixed monitoring: _____

Flood Monitoring Program

Type: Visual inspection
 Instrument (*check all that apply*):
 Portable Geophysical Sonar Other: _____
Flood monitoring required: Yes No
Flood monitoring event defined by (*check all that apply*):
 Discharge _____ Stage _____
 Elev. measured from _____ Rainfall _____ (in/mm) per _____ (hour)
 Flood forecasting information: _____
 Flood warning system: _____
Frequency of flood monitoring: 1 hr. 3 hrs. 6 hrs. Other: _____
Post-flood monitoring required: No Yes, within _____ days
Frequency of post-flood monitoring: Daily Weekly Monthly Other: _____
Criteria for termination of flood monitoring: _____
Criteria for termination of post-flood monitoring: _____
Scour alert elevation(s) for each pier/abutment: _____
Scour critical elevation(s) for each pier/abutment: _____

Note: Additional details for action(s) required may be included in Section 8.
Action(s) required if scour alert elevation detected (*include notification and closure procedures*): _____
Action(s) required if scour critical elevation detected (*include notification and closure procedures*): _____

Agency and department responsible for monitoring: _____

Contact person (*include name, title, telephone, pager, e-mail*): _____

7. COUNTERMEASURE RECOMMENDATIONS

Prioritize alternatives below. Include information on any hydraulic, structural or monitoring countermeasures.

Only monitoring required (see Section 6 and Section 10 – Attachment F)
Estimated cost \$ _____

Structural/hydraulic countermeasures considered (see Section 10, Attachment F):

<u>Priority Ranking</u>	<u>Estimated cost</u>
(1) _____	\$ _____
(2) _____	\$ _____
(3) _____	\$ _____
(4) _____	\$ _____
(5) _____	\$ _____

Basis for the selection of the preferred scour countermeasure: _____

Countermeasure implementation project type:

Proposed Construction Project Maintenance Project
 Programmed Construction - Project Lead Agency:
 Bridge Bureau Road Design Other _____

Agency and department responsible for countermeasure program (if different from Section 6 contact for monitoring): _____

Contact person (include name, title, telephone, pager, e-mail): _____

Target design completion date: _____

Target construction completion date: _____

Countermeasures already completed: _____

8. BRIDGE CLOSURE PLAN

Scour monitoring criteria for consideration of bridge closure:

- Water surface elevation reaches _____ at _____
- Overtopping road or structure
- Scour measurement results / Monitoring device (See Section 6)
- Observed structure movement / Settlement
- Discharge: _____ cfs/cms
- Flood forecast: _____
- Other: Debris accumulation Movement of riprap/other armor protection
 Loss of road embankment

Emergency repair plans (include source(s), contact(s), cost, installation directions): _____

Agency and department responsible for closure: _____

Contact persons (name, title, agency/organization, telephone, pager, email): _____

Criteria for re-opening the bridge: _____

Agency and person responsible for re-opening the bridge after inspection: _____

9. DETOUR ROUTE

Detour route description (route number, from/to, distance from bridge, etc.) - Include map in Section 10, Attachment E.

Bridges on Detour Route:

Bridge Number	Waterway	Sufficiency Rating/ Load Limitations	Item 113 Code

Traffic control equipment (detour signing and barriers) and location(s): _____

Additional considerations or critical issues (susceptibility to overtopping, limited waterway adequacy, lane restrictions, etc.) : _____

News release, other public notice (include authorized person(s), information to be provided and limitations): _____

10. ATTACHMENTS

Please indicate which materials are being submitted with this POA:

- Attachment A: Boring logs and/or other subsurface information
- Attachment B: Cross sections from current and previous inspection reports
- Attachment C: Bridge elevation showing existing streambed, foundation depth(s) and observed and/or calculated scour depths
- Attachment D: Plan view showing location of scour holes, debris, etc.
- Attachment E: Map showing detour route(s)
- Attachment F: Supporting documentation, calculations, estimates and conceptual designs for scour countermeasures.
- Attachment G: Photos
- Attachment H: Other information: _____

INDOT Posting Policy

A bridge must be posted to restrict the gross vehicle weight and/or axle weight when the structure can no longer safely support the maximum legal vehicle weight. The maximum weight restrictions for vehicles are described in the Indiana Code. INDOT's policy is to require posting on any structure that rates lower than 16.0 tons for the H20 rating vehicle at the inventory level. Most Indiana Counties follow this policy. However, a bridge may also be posted at other load levels if deemed appropriate by the local authority. Factors that may influence posting levels include practicality of enforcing load limits, traffic volume, and the likelihood of overweight vehicles. The lowest level at which a bridge may be posted is 3 tons using the HS-20 vehicle at either inventory or operating level. Any bridge that is not capable of carrying this minimum load must be closed.

Posting a bridge for weight should be avoided if possible. Bridges that rate low using allowable stress rating (ASR) should be re-rated using load factor rating (LFR) or load and resistance factor rating (LRFR) to determine if the structure can accommodate higher loads based on currently accepted code criteria. Similarly, bridges that rate low using LFR should be re-rated using LRFR prior to posting. If a posting is required or warranted, the gross vehicle weight and/or axle weight allowed should be indicated on signs at each end of the bridge. The signs should conform to the requirements of the Indiana Manual on Uniform Traffic Control Devices (MUTCD) and should be legible from a distance not less than 50 feet, as stated in the Indiana Code. Posting signs should be placed in advance of the structure in accordance with Table 2C-4 of the Manual. Signs must be maintained during the life of the bridge, or until repairs have been made to remove the weight restriction. Postings or closings on INDOT Routes should be done according to INDOT's current Bridge Restriction or Closure Protocol. It is recommended that Indiana Counties follow a similar Protocol.

Comment [pw1]:

Is this policy currently documented anywhere?

Are any counties using a different criteria?

This policy could allow a structure to go un-posted even though it has an HS-20 operating rating below 1.0. Is this policy adequately evaluating the safe load capacity of a bridge for a multitude of vehicles?

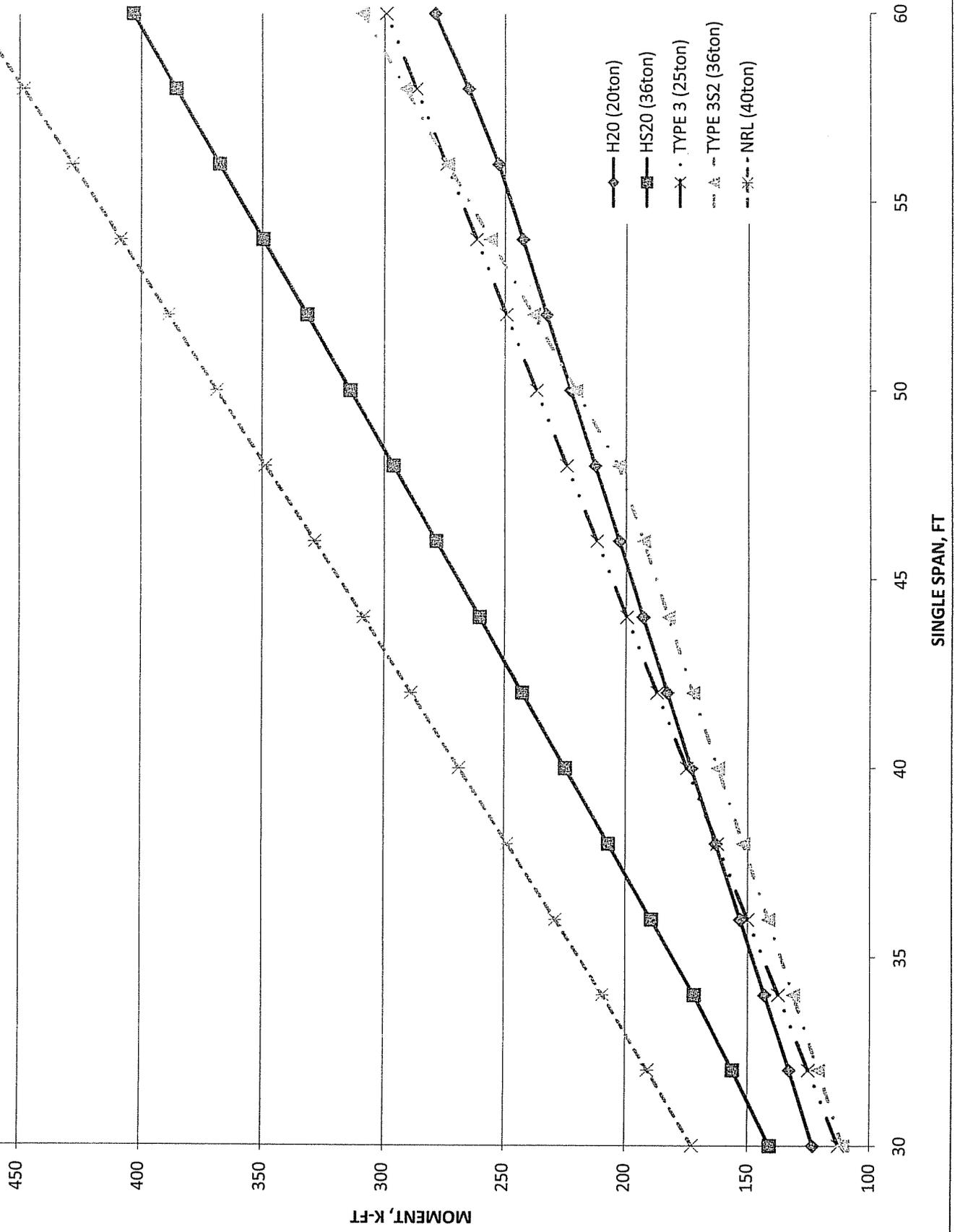
Comment [pw2]:

Are INDOT and Counties currently using both gross weight and maximum axle weight signs?

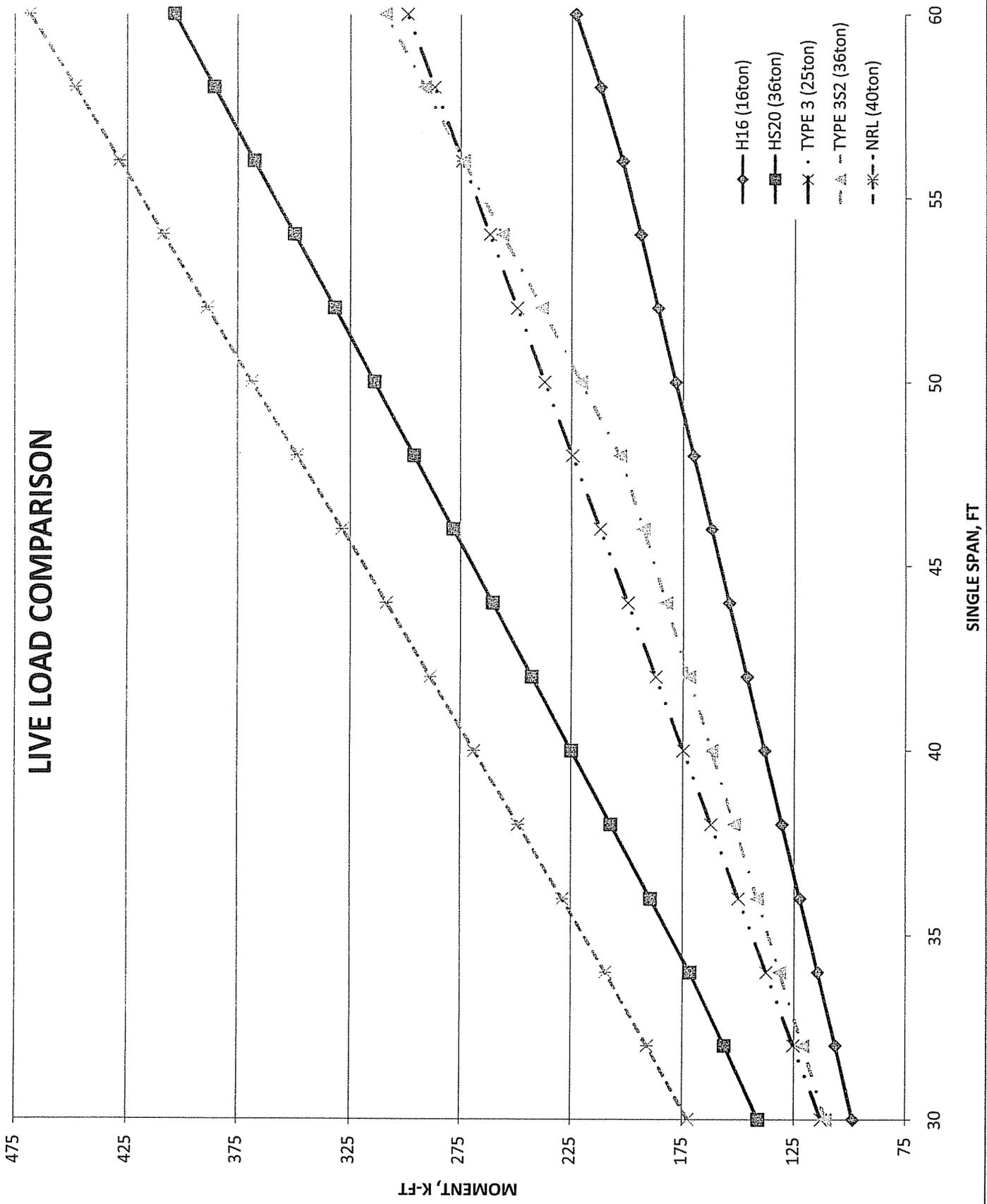
Do any counties use the 3-truck (R12-5) sign? If so, which trucks are used as the basis for these ratings?

Should INDOT allow the 3-truck sign to be used?

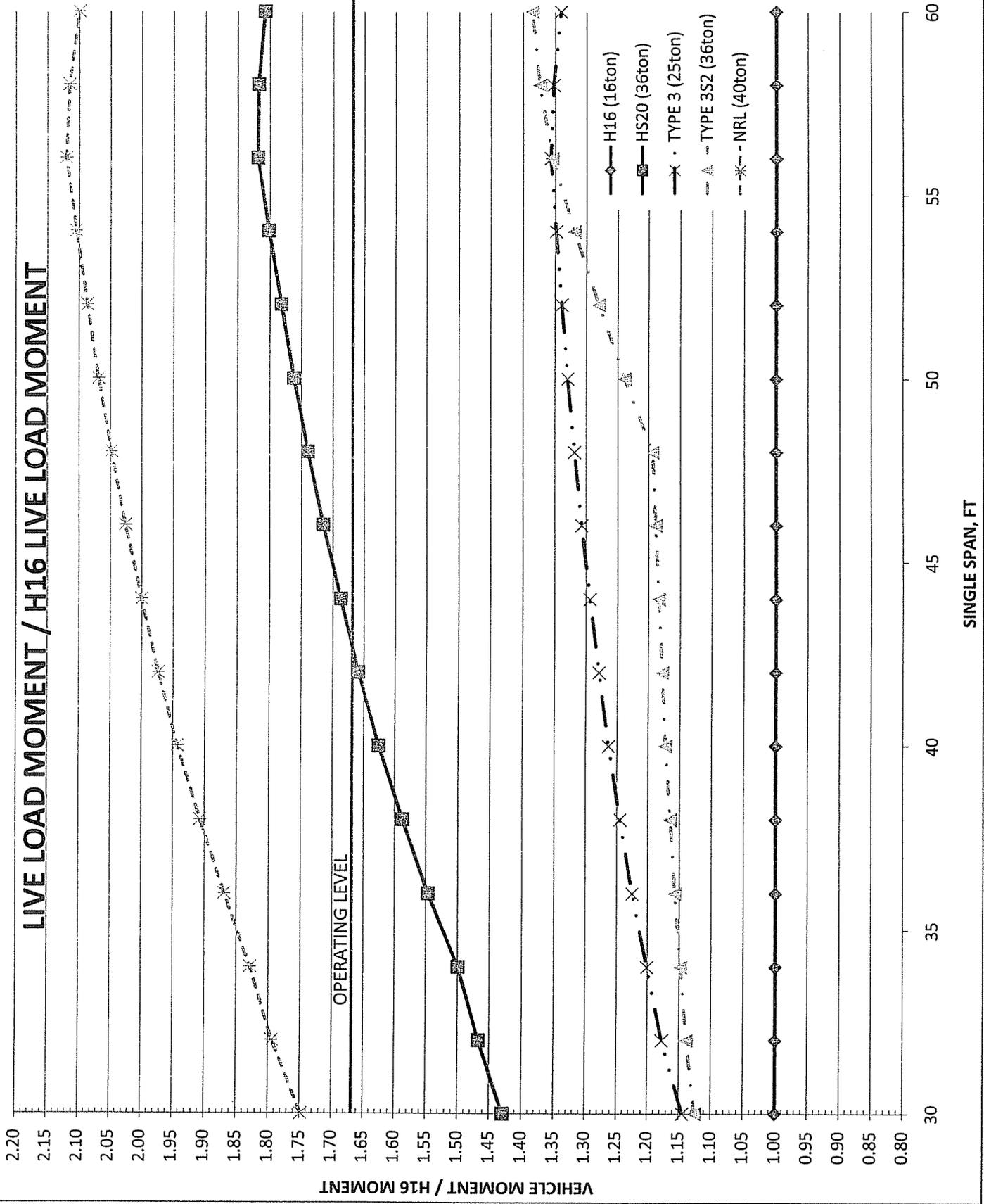
LIVE LOAD COMPARISON



LIVE LOAD COMPARISON



LIVE LOAD MOMENT / H16 LIVE LOAD MOMENT



Interim Guidelines for the Load Capacity Rating of Local Bridges in Indiana.

June, 2008

These Guidelines are to be used until permanent guidelines are developed and published in Bridge Inspection Procedure Manuals currently under development by INDOT.

Beginning on _____, Inspection Consultants shall submit a Load Rating Summary for each bridge rated, in electronic format, and shall include the following information:

1. Date Bridge was Load Rated
2. Person(s) that conducted the calculations and those that reviewed the results
3. Load Rating Method
4. Load Rating Program(s) used
5. Data Sources (Design Plans, As-Built Plans, Measurements, etc.)
6. Basic Data (Deck Thickness, Overlay Thickness, Concrete/Steel Capacity, etc.)
7. H-Vehicle Rating Results (Moment, Shear, Serviceability, etc.)
8. HS-Vehicle Rating Results (Moment, Shear, Serviceability, etc.)
9. Plans and field measurements shall be scanned into a pdf. file

As a minimum, all items on the INDOT Bridge Load Rating sheet that apply shall be submitted, as well as an overall summary of all Load Ratings completed for each County.

This information shall become a part of the permanent bridge file for each bridge and available to other Consultants that may work on the bridge besides the one that developed that information.

Beginning sometime in 2009, most of the required Load Capacity Rating Data shall be included on a form in a new Bridge Inspection Database/Application, and additional or related data can be attached to each bridge. This will allow Inspectors to have access to detailed Load Capacity information in the field during inspections, and help them gather important measurements on deteriorated and damaged structural members.

All County Bridges are required to be Load Rated and/or have their Load Ratings reviewed every two years after Regular Inspections are conducted, or if conditions change on a bridge. A licensed engineer is required to review and sign off on all Load Ratings. Bridges with Design Plans and/or As-Built Plans or those where structural elements can be measured to determined structural capacity, shall be Load Rated using an acceptable AASHTO Load Rating Method. All structural members shall be checked for moment, shear, and where applicable axial loading and serviceability. Deck Elements, Substructure Elements, and Underfill structures such as pipes and boxes shall have either their Load Capacity calculated or "assessed" in a systematic manner, especially when Condition Ratings indicate that there may be a structural capacity concern.

Bridges designed using ^LPRFD shall load rated using LRFR.

For bridges where Design Plans exist and are stamped by a Licensed Design Engineer, it can be assumed that the minimum capacities for the Design Vehicle(s) were met when the structure was originally constructed and/or rehabilitated. However, since AASHTO's requirements are constantly being revised, all structures shall be load rated and/or reviewed, including those that have been stamped by a Licensed Design Engineer or if Condition Ratings indicate that there may be a structural capacity concern. All County Bridges that may currently fall under this category are now required to be Load Rated and/or have their Load Ratings reviewed every two years after Regular Inspections are conducted, or if conditions change on a bridge.

As part of the Indiana Bridge Inspection Program's "Quality Assurance Program", each year a number of structures shall have their Load Ratings reviewed in detail to ensure their completeness and accuracy. This review shall also be used to identify areas where deficiencies exist in calculations, records, or processes, for individual bridges, a large segment of bridges, individual Consultants, and Statewide problems.