ACEC/NCIDOT BRIDGE SUBCOMMITTEE

Minutes of August 13, 2007 Meeting
Structure Design Conference Room B
August 13,2007, 10:00 am

Attendees

Allen Raynor - NCDOT
Lonnie Brooks - NCDOT
Jerry Carter - Vaughn & Melton
David Peterson - RK.&K
David Simpson - Simpson Engineers
Peter Graf - LP A
Derek Staton - HDR (Substituting for Domenic Coletti)
Rodney E. Money - T.Y. Lin International

New Members

Jerry Carter and David Peterson were introduced as new members to the committee.

Trainine

Domenic Coletti has scheduled the next two Bridge Design Workshops. A workshop on HPS Steel Bridges is scheduled for Monday, October 22 and a workshop on LRFR Load Rating is scheduled for Monday, December 3. The workshops will be held at the Wake Commons Building .

- HPS Steel Bridges - Monday, October 22, 2007
  PEF Speaker:' Ed Power (HDR Engineering)
  NCDOT Speaker: TBD

- LRFR Load Rating - Monday, December 3, 2007
  PEF Speaker: Bala Sivakumai' (Transystems/Lichtenstein)
  NCDOT Speaker: TBD

NCDOT may schedule a one day course on LRFD substructure design as a follow up to the NHI LRFD course completed in the May. No date has been scheduled for this course . . PEFs have expressed interest in scheduling a three day NHI LRFD course; Rodney Money will coordinate this with the Technology/Joint Training Subcommittee.

Conversion to LRFD

Allen Raynor stated the conversion to LRFD will occur in October. NCDOT has adopted the 3rd Edition of the AASHTO LRFD code with Interims through 2006 as the beginning point for this conversion. NCDOT will issue a new Structure Design Manual this fall that incorporates the Policy Memos to date and addresses LRFD design considerations. NCDOT in-house squads continue to do comparison designs between LFD and LRFD. The Structure Design Unit is working with the Geotechnical Unit with involvement from
FHW A to establish policy regarding acceptable pile capacities and overall foundation

~esigns. A letter from FHW A to NCDOT regarding the schedule for implementing the AASHTO LRFD code for bridge design is attached.

Desi21l-Build Proiect Design Scores

Peter Graf asked about receiving. design scores for design-build projects similar to traditional projects. It was agreed that this subject is more global than just bridge design - and should be discussed in the Design-Build Subcommittee or the Transportation Subcommittee. Staged submittals fo~, desjgn-build projects, level of plan review for design-build projects and the purpose of the design score (i.e. as part of the selection criteria on traditional projects) ,are factors to consider during discussion.

Structure Policy Memos

-Allen Raynor stated a new policy memo regarding Adhesively Anchored Anchor Bolts or Dowels has been issued. This memo addresses the requirements of field testing adhesively bonded anchors.

Anticipated Advertisements/W orkload

Lonnie Brooks identified the following projects as potential advertisements for PEFs.

- R-4047 (NC 209 at Lake Junaluska), 1 railroad underpass, February 2008 advertisement
- ,R-2633B (Wilmington Bypass), May 2008 advertisement
- U-2579B (Winston-Salem NE Beltway), 1 railroad overpass, April 2008 advertisement
  Note: 9 grade separations with a let date of September 2010, but no advertisement date is set.
- 1-3819 (1-40/1-77 Interchange), 17 bridge sites, October 2008 advertisement

Other

Allen Raynor shared discussion of construction loads on bridges as. well as Congressman Oberstar's Initiative for bridge reconstruction. FHW A issued a memorandum highlighting the importance of considering construction loads on bridges (See attachment). The National Highway System Bridge Reconstruction Initiative intends to improve bridge inspection requirements; provide dedicated funding for repair, rehabilitate and replace structurally deficient bridges; distribute funds based on safety and need; and establishNHS Bridge Reconstruction Trust Fund for the repair, rehabilitation and replacement of structurally deficient bridges (See attachment).

2007/2008 Subcommittee Goals

['he bridge subcommittee discussed goals for the 200712008 year. One goal is to continue to hold quarterly Bridge Design Workshops. Another goal discussed by the bridge subcommittee is to set aside some time during the quarterly meetings for technical discussionslreviews on ongoing or upcoming projects.

'Meetine: **Schedule**

The next meeting is scheduled for Monday, November 5at 1O:30am in the Structure Design Conference Room B.

U.S. Department of Transportation
Federal Highway Administration

Memorandum

Subject: Technical Advisory 5140.28 - Construction Loads on Bridges Date: August 8, 2007

From: Frederick G. Wright (Bud)
Executive Director (HOA-3)

To: Division Administrators
Directors of Field Services
Federal Land Highway Division
Engineers

PURPOSE

In the ongoing investigation ()fthe collapse of the I-35W Bridge in Minneapolis, the National Transportation Safety Board has identified construction equipment and materials loading on the bridge as part of their review. While no conclusions have been reached, in an abundance of caution, we strongly advise the State Transportation Agencies and other bridge owners who are engaged in or contemplating any construction operation on their bridges to ensure that any construction loading and stockpiled raw materials placed on a structure do not overload its members.

For more discussion on this issue, please refer to the AASHTO Standard Specifications for Highway Bridges, 17th Edition, Division n, Section 8.15 or the AASHTO Load Resistance and Factor Design Bridge Design Specifications, 4th Edition, Section 3.

Please refer any questions to Benjamin Tang at 202-366-4592 or benjamin.tang@dot.gov.

MOVING THE AMERICAN ECONOMY

THE NATIONAL HIGHWAY SYSTEM BRIDGE RECONSTRUCTION INITIATIVB OF
THE HONORABIE JAMES L. OBERSTAR
CHAIRMAN, COMMITTEE ON'rRANSPORTATION AND INFRASTRUCTURE
A1Ill'Jt8,2007

HIGHWAY BRIDGE CONDmONS IN THE UNITED STAT~S

According to the U.S. Department ofTranspot1lJtion (<<])OT", one·of every eight bridges in the nation is structumlly deficient. Of the 597, *340 bridges in the United States, 154,101 bridges are deficient, inc1udit1f/* 73.784 *8truCtuml/y deficient bridges atld 80,317 functionally obsolete bridges/*

According to DOT, more thatl $(i5 billion could be iJJvested immediately in a cost-beneficia/ way to replace or otherwise address existing bridge deficiencies. [2]

The high percentage of deficient bridges and the large existing backlog ate, in part, due to the age of the network. One-half of all bridges in the United States were built before 1964. Interstate System bridges, which were primarily constructed in the 19608, pose a special challenge because a large percentage of these bridges are in the same period of their sexvice lives (e.g., 44 percent of these bridges, were constructed in the 1960s). Conctete and sted superstructure on the Interstate Highway System are, on average, 35 to 40 years old.

National Higbway System Briclges

The National Highway System r'NHS") is a 162,OOO-mile highway netwotk that consists of the 46,747-mile Interstate System, the Strategic Highway Network for military mobilizations, and other majo.t highways. While the NHS makes up only 4.1 percent oftota! U.S. mileage, it catties 45 percent of vehicle miles traveled.

NHS bridges cat:ty an even greater percentage of total travel NHS bridges cany more than 70 percent of aD tmRic on bridges. Oftbe 116,172 *bridges on the NHS (including more tban 55,000 Interstate System bridges),* '175 *NHS bricf8es are structurally deJicient. Almost one-half of these structumlly de6cient NHS bridges are bridges 011 the Interstate Highway System (2,8JO structura.lJy deBcient Interstate System b.tic1ges).*

According to DOT, the current NHS hridge investment backloll is cstimllted at $32.1 biUion (including $19.1 *bil/iOtl for the Interstate Highway Sy!Jtem bridge bsc/dog). ~*

Se, attachmenl1 for additional information on bridge intpection dandards.

1 A Stnicturllllly deficient bridge is a bridge thllt has major deterioration,cracks, or other flaws that reduce its ability to support vehicles. A functionally obsolete bridge is a bridge that does not have the lane widths, shoulder widths, or vertical clearances adequate to service traffic demand.

2 U.S: Department ofTtMsportation, *2006 Stalin fJjtht N41io11's High1VtfY$, Bri~/, and Transit: Conditionl & Pttformanfl,*]anUll1}' 22, 2007, p. 7-17, The economic backlog of bridge deficienl;ie$ consists of all improvements to bridge elements that would be justified on both engineering and economic grounds. It includes improvements on bridges that Wlttant repair but whose overall condition is not sufficiendy deteriorated for the bridges to be classified as structurally deficient *Id.,* p; 7-16 ..

1 U.S. Department of Transportation, *2006 Stalin fJj the Nation's Highwt!Ys, Britf.ges, al1d Tmn.rit: Conditions & Pttjorma1lfl,*]anullty 22. 2007, p. 12-12, 11-17.

TIm NATIONAL HIGHWAY SYSTEM BRIDGE RECONSTRUCTION INITIATIVE

The NHS Bridge Reconstruction Initiative provides dedicated funding to States torepait, rehabilitate, and replace structurally deficient bridges on the National Highway System.

The Initiative has four main components:

Significantly Improves Bridge Inspection Requirements. Requires the Federal Highway Administration ("FHW *A")* and States to significantly improve the processes for. inspection of structurally deficient bridges.

Ptovides Dedicated Funding. Provides dedicated funding to repair, rehabilitate, and replace structurally deficient bridges on the National Highway System;

Distributes Funds based on Public Safety and Need. Requires the U.S. Department of Transportation to develop an ad.tn:inisttative formula for distributing all funds. Prohibits any Co~essiopa1 or AdministratiOfl earmarks.

Establishes NHS Bridge Reconstruction Trust Fund. Establishes an NHSBtidge Reconstruction Trust Fund to finance the repair, rehabilitation, and replacement of structurally deficient NHS bridges.

SIGNIFICANTLY IMPROVES BRIDGE INSPECTION REOUIREMENTS

The Initiative requires FHW A and States to significandy improve the proCesses for inspection of sttucturally deficient bridges, including:

Requires FHWA to inunediateJ,y update National Bridge Ins,pection Standards r'NBIS'? regarding the frequency of bridge inspections, inspection procedure~ and techniques, qualifications of inspection personnel. inspector training requirements, and data to be collected;

Requires States to immediately inflllect aU sttucturalJ,y deficient bridges on the National ~hway System and provide updated information to the National Bridge Inventory ("NBI");

Requires States to recalculate the load rating for al1sttucturalJ,y deficient NHS bridges and ensure that muimum weight limits fQr such bridges are propetJ,y posted:

> cRequires FHW A to conduct annual compliance reviews of States' inspections, load ratings. and weight limit postings of structurally deficient bridges; .and .

Requires FHW A and States to institute computerized bridge management systems to i~prove the bridge ins.pection process and <lll tity of data collected and ~ported to the NBI.

PROVIDES DEDICATED FuNnING

The Initiative provides dedicated fundmg to repair~ rehabilitate. and replace structurally deficient bridges' on the National Highway ~stem. A small percentage of funding may also be used to finance FHWA and States' administrative expenses for inspection of structurally deficient NHS bridges and developtlleJ)t of computerized bridge management systems.

The Federal share for the NHS Bridge R:ehabilitation Initiative is 90 percent for structurally deficient Inteistate bridges and 80 percent for other structutally deficient NHS bridges. Funds are made available for fom years. All Federal-aid Highway requirements under tide 23, United States Code, apply to the NHS Bridge Initiative .

. DISTRIBUTES FuNDs BASBD ON PuBUC SAFETY AND NBED

The Initiative reQJJires FHWA to develop a fonnula based on public safety and ne~d that weighs the relative risk of structurally deficient NHS bridges in ~a~h State. In developing the fonnula for apportionlnent to the States, the. Secretary shall consider:

- the threat to public safety of the conditions of the structutally deficient NHS bridges in each State;

- the importance of the structurally deficient NHS bridges to regional and national mobility (mcludi1;lg freight movement);

- vehicle miles traveled on the structw:ally deficient NHS bridges;

- the relative share of total cost to repair, rehabilitate, or replace the structurally deficient NHS bridges; and

- the Sta~'s financial commitment to reconstruction of all structurally deficient bridges in the State.

The Initiative specifically prohibits Co~gtessional or Administration earmarks of a~ NHS Bridge Reconstruction Initiative funds. If any funds are eatmarlred by Congressional or Acbninistration ell11I1arks (including earmRrks in Congressional reports), the Secretary of the Treasury is required to immediately stop all transfers of dedicated revenue from the Treasury to the NHS Bridge Reconstruction Trost Fund

ESTABlJSHES NHg BRIDGB RECONSTRUCTION TRUST FUND

The Initiative establishes an Nag Bridge Reconstruction Trost Fund to finance the< repair, rehabilitation, and re-placement of structurally deficient Nag bridges. The Trost Fund will be modeled after the Highway Trost Fund. The Trost Fund will collect dedicated revenue to finance the Initiative.

The SOU1'ces and amount of dedicated revenue wID be determined after FHW A and States provide additional data on the costs to finance the ~pair~ rehabilitation. and replacement of structurally deficient NHS brldges. The revenue' will be dedicated sources of func1iog that will only be available to finance the NHS Bridge Reconstruction Initiative. Qptions. include a te1nporary user fee on gasoline and diesel fuel dedicated specifically for this Initiative, or a . tax on each banel of oil imported to the United States. For instance, each one-cent-per-gallon user
. fee on gasoline and diesel fuel could generate approxitnatdy $1.7 biDon each year for the NHS Bridge Reconstruction Initiative. Therefore, a three-year, five-cent-per-gallon user fee on gasoline and diesel fuel could generate approxi1nately $25 billion to repair, rehabilitate, and replace sttuctumlly deficient bridges in the United States. Similarly, a $1.00 fee on each barrel of oil at the refinery, two-thirds of which is imported to the United States, could generate $5.5 billion per year or more than $1 ~ billion over three years.

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Attachment 1

THE NATIONAL HIGHWAY SYSTEM BRIDGE RECONSTRUCTION INITIATIVE OF THE
HONORABLE JAMES L. OBERSTAR
CHAIRMAN, COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE *AHuut*
8, *2007*

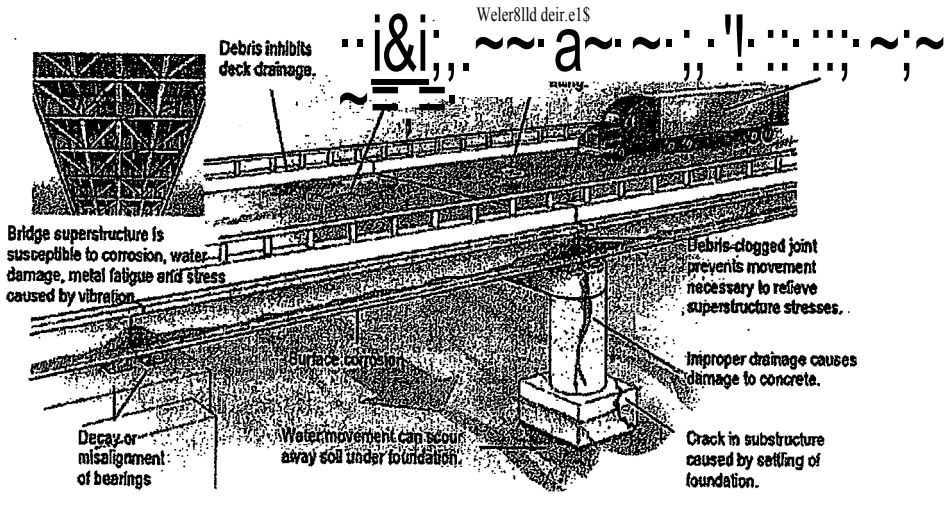
BRIDGE INSPECTION STANDARDS

Most bridges are inspected every two years.[1] Infonnation is collected documenting the conditions and composition of the structures. The periodic inspections determine the adequacy of the structure to service the current demands for structural and functional pmposes. Each State's Department of Transportation performs bridge inspections. 'This information is maintained in the National Bridge Inventory maintained by the Federal Highway Administration ~'FHWA").

StructuraUy Deficient Bridges

A structurally deficient bridge is a bridge that has major deterioration, cracks, or other flaws ~ that reduce its ability to support vehicles. The load-carrying elements of the bridge are found in poor or worse condition due to deterioration and/or damage. When left open to traffic, a structurally deficient bridge typically requires significant maintenance and repair to remain in service and eventual rehabilitation or replacement to address deficiencies. In a 2006 audit of structurally deficient bridges on the National Highway System, the DOT Inspector General ("IG'} illustrated common causes of structurally de£iciency.[2]

HOW BRIDGES BECOME STRUCTURALLY DEFICIENT



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Dlusl ration fil'!llappeared in Se'lentific Junerican. Match 111&3.

[1] The National Bridge Inspection Stllndards (ICNBIS'1zequires biannual safety inspections for bridges on public roads that are in excess of 6.1 metecs (approximately 20 feet) in total length ..

[2] U.S. Department ofTzansportation Inspector General. *Audit ojOlJtf'Sight ojLoad '&au/I!l and POl/ii/ill on StrHrlumltJ Deftdml Bridgu on the National Highlllq)1 SYlf6m,* MH-2006-043, March 21, 2006, p. 2.

The primary considerations in classifying structural deficiencies are the bridge component conditional ratings. The National Bridge Inventory contains ratings on the three primary components of a bridge: the deck, superstructure, and substructure. Bridge inspectors assign condition ratings by evaluating the severity of the deterioration or disrepair and the extent that it has spread through the component being rated.[3] Condition ratings of 4 and below indicate poor or worse conditions and result in structural deficiencies.

Bridge Condition Rating Categories[4]

Rating	Condition Category	Description
9	Excellent	
8	Very Good	
7	Good	No problems noted.
6	Satisfactory	Some minor problems.
5	Fair	All primary structural elements are sound but may have minor section loss, cracking, spalling, or scour.
4	Poor	Advanced section loss, deterioration, spalling, or scour.
3	Serious	Loss of section, deterioration, spalling, or scour have seriously affected the primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
2	Critical	Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may be removed substructure support. Unless closely monitored, it may be necessary to close the bridge until corrective action is taken.
1	Imminent Failure	Major deterioration or section loss present in critical structural components, or obvious loss present in critical structural components, or obvious vertical or horizontal movement affecting structural stability. Bridge is closed to traffic, but corrective action may put back in light service.
0	Failed	Out of service; beyond corrective action.

[3] The condition ratings provide an overall characterization of the general condition of the entire component being rated and an indication of localized conditions.
[4] U.S. Department of Transportation, *2006 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance*, January 22, 2007, Exhibit 3-9.

Load Ratings and Postings on Sttucturally Deficient Bridges

In the 2006 audit, the DOT IG found that States erred in calculating the load rating for structutally deficient bridges on the NHS. Properly calculating the load !:acing of structuta11y deficient bridges and, if necessaty, posting signs to keep heavier vehicles from c.rossing them, serves to protect stmctutalIy deficient bridges from powerful stresses caused by loads that exceed a bridge's capacity. The load rating is an estimate of the weight-carrying capacity of a bridge and is performed separately from the bridge inspection.[5]

According to the DOT IG, inaccurate or outdated maximum weight limit calculations and posting entries were recorded in bridge databases of the state depattments of transportation and the National Bridge Inventoty. The DOT IG projects that among structurally deficient bridges on the NHS:

> one of 10 structurally deficient NHS bridges had load rating calculations that did not accurately reflect the condition of the strUctutej

signs 'were not posted on 7.8 percent of bridges that were required to have maximum safe weight signs posted; and

procedures were not properly followed in the calculation of load ratings for 10 percent of the bridges.[6]

FHW A Division Offices did not ensme that states' bridge load ratings were properly calculated and corresponding posrings were performed. In addition, FHW A does not require its Division Offices to analyze bridge inspection date to better identify and target specific structutally deficient bridges most in need of load limit recalculation and posting. [7]

5 U.S. Department ofTranspomtion Inspector General, *Andi/ ojOvtfJitPJ ojI.Afld &/h/t' alIli PDllingl DN SlrtleJrlfallJ Deji&ielr/ Brid,gp 011 the Natit»lal Hishwqy* Symm, MH-2006-043, March 21, 2006, p. 3.
6 *[d.,* p. 6.
7 *[d.,* p. 13.