FHWA Bridge Program Initiatives - Bridge Design and Analysis

2015 RADBUG

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Regulation Update

- National Performance Management Measures (PM2)
- National Bridge Inspection Standards (NBIS)
- National Tunnel Inspection Standards (NTIS)
NBIS

- NPRM being finalized for Secretary’s approval
  - Fall 2015 (tentative)
- Specifications for the National Bridge Inventory (SNBI)
Final Rule was published in July, 2015
- Information webinars conducted
Specifications for the National Tunnel Inventory (SNTI)
Tunnel Operations, Maintenance, Inspection, and Evaluation Manual (TOMIE)
NHI Tunnel Safety Inspection Training
Tunnels

- Port of Miami – Recently completed
- East End Crossing Tunnel – Louisville
- Midtown Tunnel – Norfolk/Portsmouth
- Alaskan Way Viaduct Tunnel – Seattle
- I-70 Twin Tunnels – Idaho Springs, CO
- Capitol Crossing – Washington, DC
- Chesapeake Bay Bridge Tunnel, Eastern Shore, VA
- I-90 Tunnels – Seattle / Bellevue
NBI Oversight Program: 23 Metrics
OIG and PMIT Findings

- OIG Bridge Safety Phase II
  - February 18, 2015
- PMIT Load Posting Enforcement
  - November 6, 2014
- PMIT Oversight of the National Bridge Inspection Program
  - February 24, 2015
Steel Bridge Technical Activities

- NHI Engineering for Stability in Bridge Construction (3½ day course now available)
- LRFD Superstructure Design Course update (complete)
- Bridge Information Modeling (BrIM) Standards (ongoing)
- Cooperative Agreement with Lehigh (ongoing)
  - Manual for Refined Analysis of Bridges
  - Tubular Member Design for Bridges
  - Reliability in Special Bridge Systems
- Strengthening of Bridge Members
- Orthotropic deck testing
Steel Bridge Technical Activities

- Steel Bridge Design Handbook update (12/15)
- NHI Fatigue and Fracture Course (late 2016)
- Design Specs for Non-composite Box Sections (late 2017)
Concrete Bridge Technical Activities

- Post-Tensioning Guidance & Training
  - PT Installation and Grouting Manual (E-doc on HIBS)
  - PT Installation and Grouting WBT (Available through NHI)
  - PT Bridge Inspection Module – NHI Bridge Safety Inspection Refresher Course (Available - NHI)
  - PT Box Girder Design Manual (Final Draft under Review)
  - Advanced PT Design Guidance (electrically isolated PT, replaceable grouted external PT)
  - Designing PT Systems to Accommodate NDE
    - Literature search complete & electrically isolated PT testing just starting
Concrete Bridge Technical Activities

- Advanced Precast Element Design Guidance & Training
  - Awarded to AASHTO w/ subcontract to PCI as primary developer (August 2014)
  - PCC Girder Design WBT (8 hrs)
  - Full-Depth Precast Deck Panel WBT (4 hrs)
  - PCC Girder Stability WBT (4 hrs)
- Bridge Geometry Guidance – Layout, Fabrication and Erection Considerations
- Curved U-Beam Design Guidance & Criteria
FHWA/NHI Bridge Design and Analysis Courses (www.nhi.fhwa.dot.gov)

- **NHI Course 130081**: LRFD for Bridge Superstructures (4 day)
- **NHI Course 130092**: LRFR for Highway Bridges (4 day)
- **NHI Course 130093**: LRFD Seismic Analysis and Design of Bridges (4 ½ day)
- **NHI Course 130094**: LRFD Seismic Analysis and Design of Tunnels, Walls and other Geotechnical Features (4 day)
- **NHI Course 130095**: LRFD Design and Analysis of Skewed and Horizontally Curved Steel Bridges (2 ½ or 4 ½ days)
FHWA Resource Center Seismic Design and Retrofit Seminar

Introduction to AASHTO LRFD Seismic Design Specifications, Guide Specifications, and FHWA Seismic Retrofit Manual for Low to Moderate Seismic Regions (1 ½ days)

Contact Tom Saad, FHWA, to schedule this seminar
2007 specifications (1988 maps)
500 year return period

Zone 1 - SDC "A"
Zone 2 - SDC "B"
Zone 3 - SDC "C"
Zone 4 - SDC "D"
LRFD & Guide Specs
(1000 year return period)

Zone 1-SDC “A”
Zone 2-SDC “B”
Zone 3-SDC “C”
Zone 4-SDC “D”

SITE CLASS “E”
Recent Seismic Activity

Seismicity Map - 1970 to May 27, 2015
Future Seismic Activity

Earthquakes in Oklahoma of M3+

Source: Oklahoma Geological Survey; 14–Apr–2015

Count

Year

1978 Average to 1999 Average


1.6 1 0 3 0 2 2 3 1 2 20 35 64 35 109 584 267 941

Projected
To further support State’s efforts in meeting the NBIS’s requirements in load rating and FHWA's initiative of implementing the LRFR method, a series of webinars have been planned to provide continued awareness for local, regional, and State transportation agencies.

No. 13: Bridge Load Rating for Overweight Load Permitting (10/20/2014)
No. 14: Bridge Load Rating for Overweight Load Permitting - State's Practice (1) (12/18/2014)
No. 15: Bridge Load Rating for Overweight Load Permitting - State's Practice (2) (03/25/2015)
No. 16: Bridge Load Rating for Overweight Load Permitting - State's Practice (3) (05/19/2015)

Recordings are available at https://www.fhwa.dot.gov/bridge/loadrating/
Southeast States Load Rating Program Peer Exchange – Sept. 1-3, 2015, Atlanta, GA

- AL, FL, GA, KY, LA, MS, NC, SC, and TN
- Discussion Topic Priorities
  - Staffing needs
  - Deterioration in load rating analysis
  - Types of posting signs
  - Re-rating triggers
  - Rating of concrete box culverts
  - Automation for rating and permitting
  - Software requirements/3D needs
  - Responsibility for local bridge ratings and postings
  - LRFR vs. LFR
  - Metric 13 and 14
SHRP 2

- Building bridges more quickly – Innovative bridge designs for rapid renewal
- Building on the proper foundation – GeoTechTools.org
- Using Specifications that deliver the right project – Performance specifications for rapid renewal
- Designing for longer-lasting bridges – Service life design for bridges
- Generating new LRFD Specifications
- Inspecting concrete bridge decks with greater accuracy
- New portable technologies to map and inspect tunnel linings
LTBPP – The Bridge Portal

- Contact your State’s LTBP Coordinator to evaluate the Bridge Portal
- Data and analysis infrastructure to manage, organize and utilize bridge data
- Integrate LTBP data with other data such as NBI, weather and traffic
- Provides a single source of data for bridge researchers, owners and other stakeholders
QUESTIONS