Fact Sheet – Structure Technical Issues
Local Seismic Safety Retrofit Program
Version 1.4, February 13, 2009

Background:
The California Transportation Commission at its July 2007 meeting delegated authority to Caltrans for the 479 bridges remaining in the Local Seismic Safety Retrofit Program (LSSRP). Voters passed the Proposition 1B and created the Local Bridge Seismic Retrofit Account (LBSRA). Many of these bridges had seismic safety retrofit strategies and structural designs completed in the middle to late 1990's. Since the mid-1990's, considerable changes have been made to Caltrans design and construction standards.

Per Chapter 11 of Local Assistance Procedures Manual[1] and the letter to Public Works Directors dated June 11, 2008[2], projects must meet current Caltrans standards to ensure federal participation. These guidelines briefly describe the major areas of change and are intended as an informational aid for those LSSRP projects within the project development phase. Each project must be evaluated independently to determine the extent of changes necessary to meet these conditions to validate the existing approved seismic safety retrofit strategy, if applicable, and update the structure plans and details to conform to the current Caltrans Bridge Design Manuals[3].

Geotechnical/Seismology Issues:

- ARS curves have been revised and are found in the Caltrans Seismic Design Criteria v1.4[4].
- Additional faults or new information on previously identified faults have been placed in the errata for Caltrans Seismic Hazard Map 1996[5].
- Liquefaction and near fault effects must be considered, see "Guidelines For Structures Foundation Reports"[6] dated March 2006.

Analysis/Design Issues:

- Memos To Designers 1-47 "General Notes" dated October 2007.
- Memos To Designers 20-1 "Seismic Design Methodology" dated January 1999.
- Memos To Designers 20-3 "Restrainers at Support Joints" dated July 2008.
- Memos To Designers 20-4 "Seismic Retrofit Guidelines for Bridges in California" dated July 2008.
- Memos To Designers 20-7 "Use of Ductility Procedures and Tools in the Seismic Retrofit of Bridges" dated February 1994.
- Memos To Designers 20-9 "Splices in Bar Reinforcement Steel" dated August 2001.
- Memos To Designers 20-12 "Site Seismicity for Existing and Temporary Bridges Carrying Public Vehicular Traffic" dated February 2003.
- Memos To Designers 20-14 "Quantifying the Impacts of Soil Liquefaction and Lateral Spreading on Project Delivery" dated July 2008.
- Memos To Designers 20-15 "Soil Liquefaction and Lateral Spreading Analysis Guidelines" dated July 2008.

---

[1] Local Assistance Procedures Manual (http://www.dot.ca.gov/hq/LocalPrograms/lam/lapm.htm)
[2] Letter to Public Works Directors (http://www.dot.ca.gov/hq/LocalPrograms/seispage/documents/letter_pubWork08-06-11.pdf)
[3] Technical Publications (http://www.dot.ca.gov/hq/esc/techpubs/)
[4] Caltrans Seismic Design Criteria v1.4 (http://www.dot.ca.gov/hq/esc/techpubs/manual/othermanual/other-engin-manual/seismic-design-criteria/sdc.html)
[5] California Seismic Hazard Map 1996 (http://www.dot.ca.gov/hq/esc/techpubs/manual/othermanual/other-engin-manual/seismic-design-criteria/sdc.html)
[6] Guidelines for Structures Foundation Reports (http://www.dot.ca.gov/hq/esc/geotech/requests/guidelines.pdf)

- Bridge Design Aids 14-1 "Hinge Restrainer Design Method" dated December 2008.
- Steel bridges should meet the requirements of "GUIDE SPECIFICATIONS FOR SEISMIC DESIGN OF STEEL BRIDGES", dated December 2001 (1ST EDITION)
- SDC Section 7.8 "Abutments" dated June 2006. SDC requirements have replaced BDA Section 14 "Seismic" dated September 1989 regarding abutment stiffness design.

Specification Issues:
The construction specifications and estimates will be updated based on Caltrans' 2006 Standard Specifications[7] and amended using the Standard Special Provisions[4]. A partial list of major specification changes that may affect retrofits are listed below:

- Standard Specifications, Section 90: The entire chapter has been revised several times since 1994.
- Welding: Welding quality control now stringently follows the American Welding Society requirement. Welding changes affect column casings, piling, sign structures and rebar special provisions.
- Piling: New technologies have changed how piles are analyzed and constructed. In particular large diameter caisson specifications and construction techniques have evolved significantly in recent years.
- Bearings and Couplers: Testing and new technologies and have changed how these elements are designed and used on bridges. This has resulted in new materials and specifications. An example is a wider use of spherical bearings.

Cost Estimate Issues[8]:
- The bridge cost index has generally risen from 204 in 1995 to 460 in 2005. Considerable escalation has been seen since 2003, but has fluctuated over the recent years due to economic conditions.

Other References:
- California Transportation Commission, Local Bridge Seismic Retrofit Account (LBSRA) Guidelines.[9]
- Local Assistance Program Guidelines[10] - Chapter 7 describes program requirements.
- Local Bridge Seismic Safety Retrofit Program webpage [11]– information regarding program guidelines, program status, candidate projects, and specific project information.
- Local Assistance Webpage[12] - Provide general information regarding the Local Assistance Program.
- Office of Special Funded Projects, Project Development web page[13] – Provides project development information for structures projects.

[7] Caltrans Standard Specifications (http://www.dot.ca.gov/hq/esc/oe/index.html#standards)
[8] Cost Estimates (http://www.dot.ca.gov/hq/esc/estimates/)
[9] Proposition 1B Local Bridge Seismic Retrofit Account (LSBRA) Guidelines (http://www.dot.ca.gov/hq/transprog/ctcbooks/2008/0508/073_4.8.pdf)
[10] Local Assistance Program Guidelines (http://www.dot.ca.gov/hq/LocalPrograms/lam/lapg.htm)
[11] Local Bridge Seismic Safety Program webpage (http://www.dot.ca.gov/hq/LocalPrograms/seispage/main.htm)
[12] Local Assistance Web Page (http://www.dot.ca.gov/hq/LocalPrograms/)
[13] OSFP- Project Development (http://www.dot.ca.gov/hq/esc/osfp/project-development/project-development.htm)