

Seismic Hazard Review for Construction of Schools and Hospitals in California Tutorial

Wednesday – April 19, 2006
LEARNING FROM THE PAST



Quake'06 Tutorial – School/Hospital Review



Seismic Hazard Review for Construction of Hospitals in California

What projects require geologic and geotechnical reports?

- 2001 CBC Section 1637A.1.1
- Not required for
 - Non-structural only projects
 - Associated structural or non-required structural alterations.
 - Incidental structural additions or alterations: see section 1638A.3.2 for non-conforming hospital buildings and 1640A.2.1 for conforming buildings for definition of incidental work.
 - Structural repairs for other than earthquake damage.



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– Required for

- Minor and major alterations.
- Seismic retrofits.
- New construction except
 - Light framed wood or steel buildings under 4,000 s.f. without a structural floor.
 - Not located in an Alquist-Priolo special study zone
 - Prescriptive worst case values shall be used under this exception.
- New large equipment and large equipment replacement with replacement unit being bigger than the original unit, require a geotechnical report and engineering geologic report.



- Things to be aware of
 - Note that existing SPC 1 and SPC 2 buildings cannot be retrofitted to a SPC 3 or SPC 4 levels. They must be upgraded under current code directly to SPC 5.



Mechanics of Submitting Reports To OSHPD

Routing of reports – what, to who & where

- **All submittals need to be sent to the appropriate OSHPD region for processing.**
 - Geotechnical reports can be submitted as a preliminary submittal, but complete OSHPD application is required.
 - Do not contact CGS about the status of your project.
 - Contact the OSHPD project manager to see what the status of your project. See our website for a phone list.
- **Submittal requirements**
 - Three copies of reports and supplemental reports are required.
 - All reports need to be wet signed and sealed by at least, the geotechnical engineer of record / engineering geologist of record.
 - Copies of “information only” material do not need to have wet signatures.



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- Addendums, revisions, consultations.
 - Submit 3 copies to OSHPD region with wet signatures and seals.
 - Submit to OSHPD as soon as possible for CGS review
 - **Projects will not be approved without CGS and OSHPD approval of geotechnical reports.**



Alternative Means of Compliance

- Foundation systems not in the code; so if they are to be used on a project,
 - An Alternative Means of Compliance package must be submitted to OSHPD for review and approval.
 - The non-codified systems include such things
 - Micropiles,
 - Auger cast piles,
 - Rock anchors
 - Tie-back retaining systems.
 - Alternative Means of Compliance packages need to include enough information on the system to be used for an evaluation to be performed. The required information at a minimum should include
 - Design Criteria explaining the system, loading cases, load factors, and specifications. OSHPD will review and approve, it is an iterative process.
 - Any additional information of a geotechnical nature.
 - Corrosion protection systems for permanently installed systems.



Alternative Means of Compliance

(cont.)

- Tie-back anchors used for “temporary” construction whose failure would affect the safety of an existing hospital building are required to be reviewed and constructed under an OSHPD project.



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Seismic Retrofit

- Required geo-hazard report were to be submitted to OSHPD by the end of 2000. If not yet approved, this geo-hazard report can be included in a full geotechnical report submitted for the facility in support of a new project or retrofit project.



Alterations to Existing Buildings

- Division VI-R (Section 1640A through 1650A)
 - Division VI-R is the section of the code dealing with
 - Seismic retrofit of hospital buildings.
 - Minor and major alterations to existing non-conforming buildings (pre-1973 buildings and buildings constructed without OAC/OSA/DSA or OSHPD approval).
 - Alterations and additions to existing conforming (OSA and OSHPD approved) buildings.



Alterations to Existing Buildings (cont.)

- Division VI-R has two design methodologies
 - Method A
 - Use for SPC 1 to SPC 2 upgrade retrofits for simple buildings.
 - Minor alterations of SPC 1 building may not yield a SPC 2 building.
 - Method B.
 - “Any approach to analysis and design may be used ...”



Alterations to Existing Buildings (cont.)

- Method B (cont.)
 - Open approach to design criteria.
 - Design criteria developed in consultation with OSHPD on a project specific basis.
 - May require 3rd party peer review.
 - Criteria can be tailored to specific structures on specific sites.
 - Concurrence on criteria can be a lengthy process.



Alterations to Existing Buildings (cont.)

- Division VI-R Ground Motion
 - Method B requires additional information not required for new building design.
 - Refer to Sections 1648A.2.4.2 and 2.4.3.
 - Note: A SPC 2 upgrade using Method B may not require the calculation of the maximum considered earthquake.



2007 CBC

- Anticipated Changes to the 2007 CBC (note that these items have not been approved by the Building Standards Commission and are only for talking purposes only)
- Applicability
 - Projects submitted after official date of code change are to be done under the “new” code.



2007 CBC (cont.)

- New code will be major change for those doing work in jurisdictions using the UBC.
- New code is based on 2006 IBC with state amendments. ASCE 7 – 2005 is the reference for earthquake loading.
- UBC zones 3 and 4 are no longer used.



2007 CBC (cont.)

- New determination of seismic loading is based on Maximum Considered Earthquake (MCE).
 - Design Spectral Acceleration is calculated as $2/3$ of MCE
 - Design Response Spectrum calculated from the Design Spectral Acceleration.
 - Spectral parameter curve is the basis for the design of the lateral force resisting system.



2007 CBC (cont.)

- MCE spectral parameters can be determined
 - Maps in ASCE 7- 2005,
 - Given very small scale of maps, very dense contours, and difficulty locating project site makes these maps less than useful.
 - Computer programs from USGS utilizing latitude and longitude producing MCE spectral parameters.
 - 2003 IBC CD is superseded.
 - 2006 IBC / ASCE 7-2005 CD is not available yet.
 - Provided by the geotechnical engineer.



2007 CBC (cont.)

- Code requirements for structural retrofit of existing buildings are also changing.
 - Some hospitals have received an extension from the December 31, 2007 deadline.

