



Impacts on Structural Design from New Ground Motion Predictions – Review Framework and Technical Challenges

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March 13, 2008



Background

- Advances in seismological research have led to updated Source Characterization for earthquakes in the Central & Eastern United States (CEUS).
- Predicted Ground motions from the updated model for rock sites in the CEUS show increased energy at frequencies > 10 Hz.
- Updated ground motion spectra at higher frequencies may exceed the Certified Seismic Design Response Spectra
- A new review framework was needed to address these exceedances.

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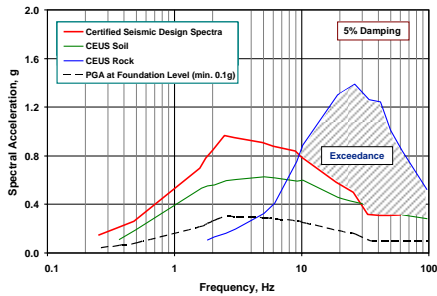
Definitions

- Certified Seismic Design Response Spectra (CSDRS)
- Ground Motion Response Spectra (GMRs) – site specific
- Peak Ground Acceleration (PGA) at Foundation Level – site specific
- Structures Systems & Components (SSC)
- In-Structure Response Spectra (ISRS)
- Soil-Structure Interaction (SSI) Analysis

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CSDRS & GMRS COMPARISON





Review Approach

- A framework to address the issue was developed and incorporated in the Standard Review Plan (SRP)
- The staff issued interim staff guidance (ISG) to implement the SRP framework.
- The SRP/ISG permits use of advanced analytical method for seismic analysis.

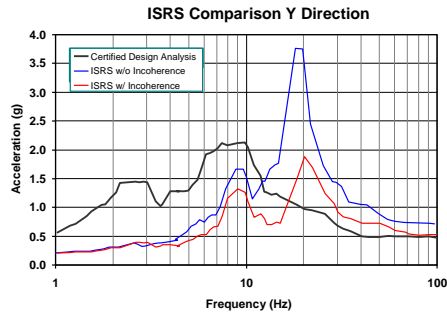


Review Approach (Contd.)

- IF CSDRS > GMRS – OK
- IF Not - Detailed SSI Analysis and Compare site specific ISRS with the design basis ISRS
- IF Not OK – Further demonstrate acceptability



Comparison of ISRS



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Challenges to the Applicants

- Confirmation of seismic adequacy of SSC when GMRS or ISRS exceeds corresponding CSDRS values at high frequencies (>10 Hz).

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Approaches under consideration

- Screening process to identify high frequency sensitive SSC
- Adequacy of structural model
- Use of existing test data
- Generic tests covering frequencies of interest
- Needs to be demonstrated on a design center basis

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Summary

- SRP & ISG provides a high frequency review framework
- Use of advanced analytical approach for site specific SSI analysis
- Address high frequency issues on a design center basis
