Brief Literature Review on Observation-Based Site Amplification

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CENA Site Amplification

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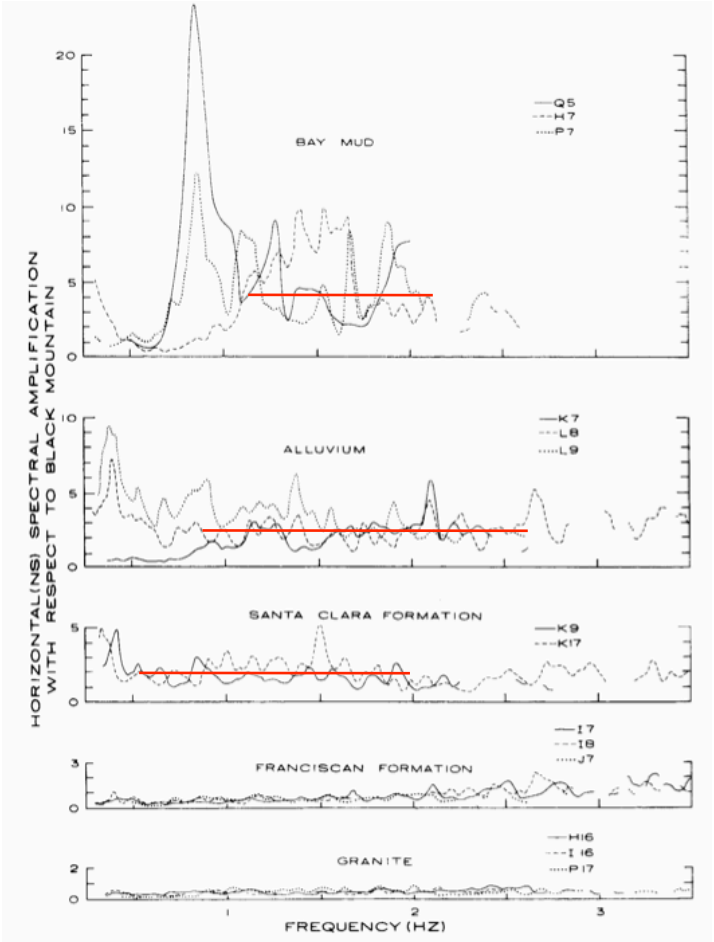
Observation-Based Ground Response Effects using Local Reference Rock Recordings

1. Borcherdt (1970), Borcherdt and Gibbs (1976)
2. Rodgers et al. (1984)
3. Bonilla et al. (1997)

Borcherdt (1970), Borcherdt and Gibbs (1976)

- Sites located in San Francisco, CA
- Nevada nuclear explosions
- Site conditions encompassed weathered rock, stiff, and soft sediments
- Fourier amplitude spectra

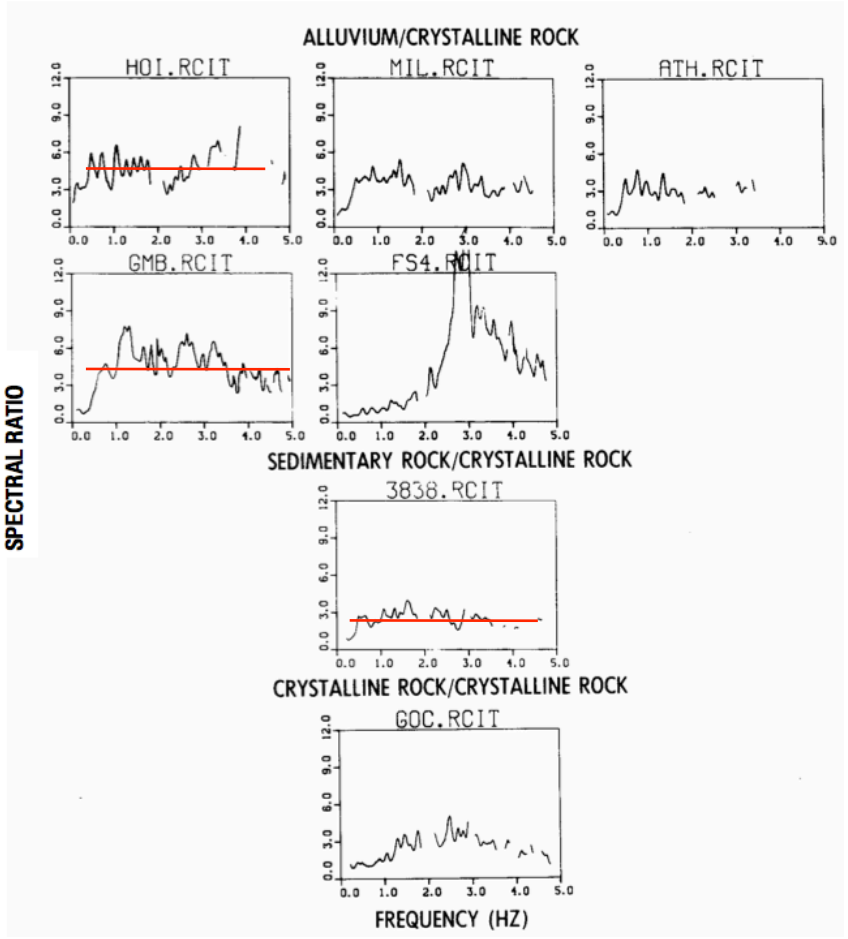
Borcherdt (1970), Borcherdt and Gibbs (1976)



Rodgers et al. (1984)

- Sites located in Los Angeles, CA
- Nevada nuclear explosions, 1971 San Fernando EQ
- Site conditions encompassed rock and sediments
- Fourier amplitude spectra

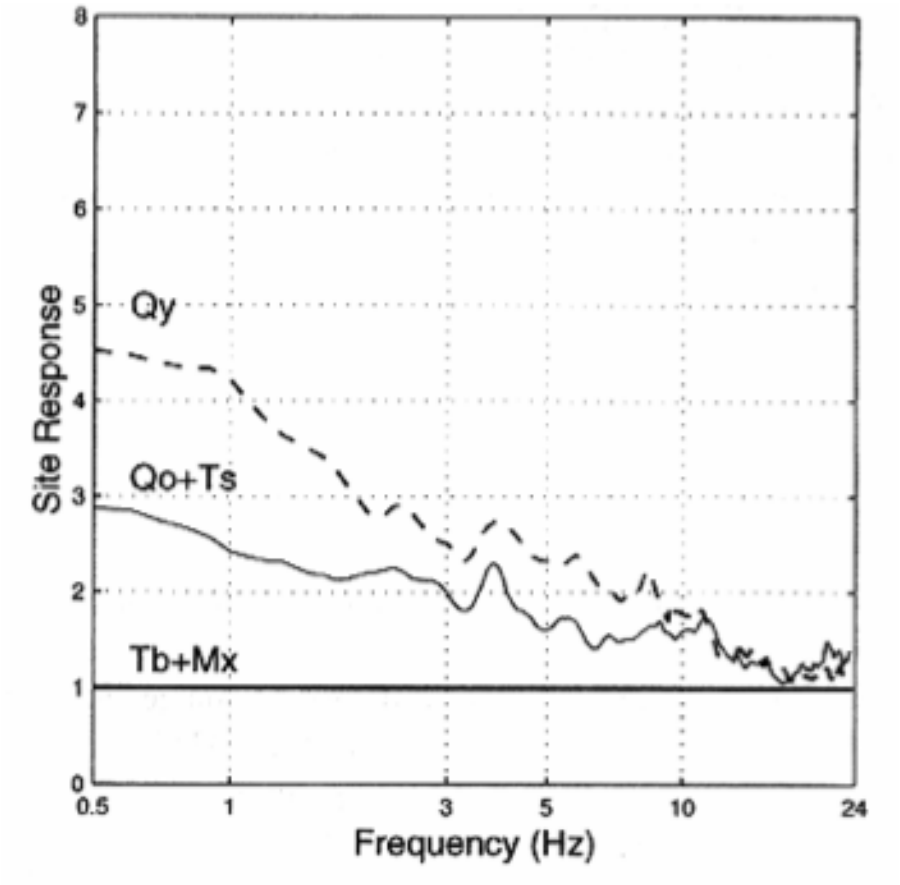
Rodgers et al. (1984)



Bonilla et al. (1997)

- Sites located in Los Angeles, CA
- 1994 Northridge EQ aftershocks
- Site conditions encompassed weathered rock and stiff sediments
- Fourier amplitude spectra

Bonilla et al. 1997



Summary

- Empirical studies using weak ground motions (aftershocks and nuclear explosions, etc.)
- Plotted FA ratios between nearby soil and rock sites
- Consistent trend within frequency range of interest is that amplification increases as soil gets softer

References

- Bonilla, L.F., Lavallee, D., and Archuletta, R.J. (1997). Site amplification in the San Fernando Valley, California. *Bull. Seism. Soc. Am*., 87, 710-730.
- Borcherdt, RD (1970). Effects of local geology on ground motion near San Francisco Bay. *Bull. Seism. Soc. Am*., 60, 29-61.
- Borcherdt, R.D., and Gibbs, J.F. (1976). Effects of local geological conditions in the San Francisco Bay region on ground motions and the intensities of the 1906 earthquake. *Bull. Seism. Soc. Am*., 66, 467-500.
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- Stewart, JP, S-J Chious, JD Bray, RW Graves, PG Somerville, NA Abrahamson (2001). Ground Motion Evaluation Procedures for Performance-Based Design. *PEER Report 2001/09*, Pacific Earthquake Engineering Research Institute, Berkeley, CA.