IMPLEMENTATION OF NEAR-FAULT FORWARD DIRECTIVITY EFFECTS IN SEISMIC DESIGN CODES

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Abstract Near-fault ground motions exhibiting forward directivity effects are critical for seismic design because they impose very large seismic demands on buildings due to their large-amplitude pulselike waveforms. The current challenge in seismic design codes is to recommend simple (easy-to-apply) yet proper rules to explain the near-fault forward directivity (NFFD) phenomenon for seismic demands. This effort is not new and has been the subject of research for over two decades. This paper contributes to these efforts and proposes an alternative set of rules to modify the elastic design spectrum of 475-year and 2475-year return periods for NFFD effects. The directivity rules discussed here are evolved from a relatively large number of probabilistic earthquake scenarios (probabilistic seismic hazard assessment, PSHA) that employ two recent directivity models. The paper first gives the background of the probabilistic earthquake scenarios and then introduces the proposed NFFD rules for seismic design codes. We conclude the paper by presenting some cases with the proposed rules to see the extent of spectral amplifications due to directivity

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