



PACIFIC EARTHQUAKE ENGINEERING RESEARCH CENTER

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TO: End-Users Directivity Panel, GMPE Developers, and Directivity Model Developers
FROM: Jonathan Stewart, Chair, PEER Directivity End Users Panel
SUBJECT: Overview of the End-Users Panel for Directivity of Ground Motions
DATE: April 21, 2015

During the NGA-West2 project, five models were prepared to predict the effects of directivity, principally on the RotD50 component of ground motion. Currently there is a lack of clarity in practice regarding how these models should be applied. This lack of clarity stems to a large degree from substantial differences between model predictions, which are outlined in the *Earthquake Spectra* article by Spudich et al. (2014)¹.

PEER has assembled an End-Users Directivity Panel to evaluate the status of NGA-West2 directivity models and to develop recommendations for future research on near-fault effects. The panel consists of Yousef Bozorgnia, Jonathan Bray, Jennifer Donahue, I.M. Idriss, Robert Graves, Nico Luco, Stephen Mahin, Tom Shantz, and Jonathan Stewart (chair).

The panel is charged with providing the following:

- a. Recommendations for implementing directivity into ground motion predictions in the short-term, and
- b. A list of action items that PEER will undertake as research in the longer-term to further develop directivity models for practical implementation.

The panel discussions will occur in a 1-day meeting and a subsequent ½-day meeting. The first meeting will be to collect input from directivity model developers, compare directivity models, and receive input from the community. This first meeting will be held on **May 22, 2015** and the following questions will be posed to model developers to stimulate discussion during the meeting:

1. What data and/or simulation results were used in the development of your model? Please be as specific as possible in identifying the extent to which each (data and simulations) guided the selection of functional form and setting of coefficients.
2. How, if at all, was the issue of GMPE median predictions not being centered on a zero directivity condition (for large M, small R) considered in the development of your model?
3. Please describe the basic attributes of your model and the rationale behind the selection. Specific issues include:
 - a. Independent variables used in the model
 - b. Is the model predicting a change in RotD50 spectra only, or also directional issues?
 - c. Narrow-band vs broadband model
 - d. Application of distance tapers
 - e. Application of M tapers

The second meeting will be held on **July 10, 2015**. In this meeting, the panel will present their recommendations and seek further input.

ATTACHMENTS:

1. Spudich P, Rowshandel B., Shahi S K, Baker J W, and Chiou B S J Chiou (2014) Comparison of NGA-West2 Directivity Models. *Earthquake Spectra*: August 2014, Vol. 30, No. 3, pp. 1199-1221.
2. Agenda for Directivity Modeling End-Users Panel, May 22, 2015

¹ Spudich P, Rowshandel B., Shahi S K, Baker J W, and Chiou B S J (2014) Comparison of NGA-West2 Directivity Models. *Earthquake Spectra*: August 2014, Vol. 30, No. 3, pp. 1199-1221.