

## SCEC UGMS Committee

### Minutes of 1<sup>st</sup> Meeting (4-3-13) at SCEC Boardroom from 3:00 – 5:00 p.m

---

| <b>Member<br/>Attendees (in person)</b> | <b>Member<br/>Attendees (Remotely)</b> | <b>Members<br/>Absent</b> |
|---|--|---------------------------|
| C. Crouse – chair                       | R. Hamburger                           | J. Hooper                 |
| T. Jordan                               | A. Frankel                             | C. Haselton               |
| N. Luco                                 | N. Abrahamson                          | C. Kircher                |
| R. Bachman                              |  | F. Naeim                  |
| J. Bielak                               |  | J. Anderson               |
| R. Graves                               |  |                           |
| P. Somerville                           |  |                           |

---

**New Members & Corresponding Members:** Bob Bachman suggested Marshall Lew be added as member and Crouse agreed; SCEC will send invitation. **Action Item:** Bob will provide names of others in Southern CA to invite as Corresponding Members. Possibilities include local SE’s from City of L.A., L.A. County, and SEASC.

**Pilot Project Schedule:** Crouse presented a preliminary 6-yr schedule to complete the pilot project of producing long period response spectral acceleration maps of the Los Angeles Metropolitan region. An additional 2 yrs was estimated to pass through the NEHRP Provisions Update Committee next code cycle. (Schedule is attached)

**Technical Discussion:** Much of the meeting was devoted to a discussion of technical issues during and after Crouse’s presentation of the proposed pilot project. A few of the items were as follows:

- (a) The pilot project will proceed on two parallel tracks, in which PSHA/DSHA will be conducted from the 3-D numerical simulations using Cybershake and from the traditional empirical approach using the NGA-West GMPE’s. It was agreed that the results from the 3-D simulations could be used to refine the GMPE’s ultimately used in the empirical approach. The topic of how to use the results from the two approaches to construct the long period maps was discussed, but the decision will be deferred until the results are generated.
- (b) The mesh size for the simulations was discussed and questions were raised about the how fine the mesh needs to be near the surface. The answer depends on the availability of velocity data, the lowest natural period the simulations would reliably cover, and the increased computation time to make the mesh spacing finer.
- (c) Two horizontal components will be generated by the 3-D simulations, but Crouse and Bachman asked whether the vertical component could also be generated. Discussion on this item was deferred, but should be addressed and a decision made soon.

- (d) There was a brief discussion of the material damping in the 3-D model after J. Bielak raised the issue. T. Jordan said damping was modeled with  $Q_p$  and  $Q_s$ , the traditional seismological way to handle it. However, there was no time left to address the issue further, so it can be discussed during the next meeting.

**Focus of Next Meeting:** T. Jordan will present the 3-D Cybershake model, results it has generated so far, and results of additional PSHA/DSHA calculations, as time permits. Items the committee would like to see presented include:

- (a) Details of the derivation of the 3-D model and its parameterization.
- (b) PSHA results for selected L.A. sites, including (i) hazard curves for given natural periods in the 1 – 10 sec band, (ii) 5% damped, geometric mean horizontal component acceleration response spectra ( $S_a$ ), and (iii) color coded 2% in 50-yr maps of  $S_a$  similar to the 3-sec map in Graves et al (2010). The PSHA would be performed using UCERF2 model for the regional faults & their recurrence.
- (c) PSHA results for empirical approach using the three NGA-West GMPE's with basin-depth terms. Response spectra would be computed in 0.1 – 10 sec band.
- (d) Results from (b) and (c) compared.
- (e) DSHA results at same sites selected for PSHA in (b) using numerical simulation results for selected scenario earthquakes of given magnitude(s) on given fault(s). Do DSHA using the same maximum  $M_w$  the USGS used in developing the  $S_s$  and  $S_1$  maps in ASCE 7-10.
- (f) DSHA results obtained using same three NGA-West GMPE's in (c).
- (g) Results from (e) and (f) compared.
- (h) PSHA and DSHA results, obtained using rules in Chapter 21 of ASCE 7-10. To do this task, the max direction response spectra would need to be computed from the two horizontal component time histories of each simulation. The hazard curves would need to be convolved with a generic fragility function to obtain the  $MCE_R$  response spectra,  $S_a$ .

**Action Items.** Crouse and Bachman will assist Jordan in site selection and specifics on presenting the results prior to the meeting. Nico Luco to provide Jordan with (i) UCERF2 model USGS used for developing the 2008 national  $S_s$  and  $S_1$  maps, (ii) maximum  $M_w$  for faults that USGS used in its deterministic calculations, and (iii) computer code with iterative procedure for combining hazard curve with generic fragility curve to obtain  $MCE_R$   $S_a$ .

The calculations required for some of the items listed above may not be possible due to time constraints, and therefore it may not be possible to presents results for these items at the next meeting.