

FEMA-NIBS BSSC PROJECT 17 PLANNING COMMITTEE

Burlingame, CA

August 12, 2015

Summary Minutes

Participants

BSSC

Ron Hamburger, Simpson Gumpertz & Heger (Chair)
David Bonneville, Degenkolb Engineers
C.B. Crouse, URS Corporation
Jim Harris, James Harris & Associates
William Holmes, Rutherford & Chekene
John Hooper, Magnusson Klemencic Associates
Charles Kircher, Charles Kircher & Associates
Robert Pekelnicky, Degenkolb Engineers

USGS

Art Frankel
Nicolas Luco
Morgan Moschetti
Mark Petersen
Sanaz Rezaeian

BSSC Board of Direction

Perry Haviland, AIA

FEMA/NIBS

Mai Tong, FEMA
Mike Mahoney, FEMA
Robert Hanson, University of Michigan
Philip Schneider, NIBS

Ron Hamburger opened the meeting by conducting introductions and restating the objectives of the Committee.

The Committee reviewed comments (attached) that accompanied the issue priority ballot submitted by the Project 17 Planning webinar (July 20 & 27) participants. In response to Jennifer Thornburg's comment requesting "stable seismic parameters", Ron Hamburger proposed a three-part model:

1. Seismic zones maps that most structural engineers will likely use. The zones would be similar to those in the IRC maps using one significant figure of accuracy, e.g., .4g, .5g, and account for short and long periods. Seismic zone maps would be updated when USGS contour maps are updated.
2. Seismic zone maps that would be used to establish the seismic design category for ELF, simplified or modal response spectrum analysis of structures with limited period, and not located on soft soil sites.
3. Site specific procedures A and B. A will utilize an enhanced USGS tool/applet to generate parameters that can be used for any structure or design technique. B will be a site specific analysis performed independently of the USGS analysis by an earth scientist or geotechnical engineer consulting on a project. Results will be limited to some percent of Procedure A.

The Committee offered comments on the three-part model: zones might also be based on population centers and geopolitical boundaries; simplicity brings step functions, particularly, site coefficients associated with the zones create step functions that give engineers problems; $S_{DS} = .61$ should be kept as the single number that comes with all other parameters for a geopolitical boundary; boundaries between SDC C and D are critical, as D trips higher design requirements; mapping should feature high resolution steps; the eastern U.S. prefers zones, but the western U.S. prefers contours; and, the eastern portion of the U.S. does not have good SDC mapping – site amplification factors are required, issues occur in setting boundaries between SDCs, and zones are unworkable near faults.

After the Committee voted 7 to 5 to offer one or more straw man resolutions associated with the three-part model (not simply issues), the Chair asked Committee members to include these as part of updating the issues summaries.

The Committee considered whether to address existing buildings, including ASCE 41, as part of the scope of the Project 17 effort. Committee members offered the following comments: Project 17 proposals to the PUC can only address new buildings; FEMA 356 would have to be updated and submitted to the ASCE 41 process as part of an existing buildings scope; the inconsistent approach to zones between ASCE 7 and ASCE 41 would need to be addressed; if guidance comes from Project 17 to the ASCE 41 committee, changes would not occur in the ASCE 41 2017 edition; and the Project 17 Committee would need to be expanded to address existing buildings. Based on the discussion, the Chair suggested that existing buildings not be in the Project 17 scope, however, Robert Pekelnicky (ASCE 41 Chair), Ron Hamburger, Peter Somers and Bryan Kehoe should be included on the Project 17 Committee, even if the focus is on new

buildings. General guidance can be provided to ASCE 41 from Project 17, especially, through the anticipated Project 17 report.

After reviewing the issues summary ballot results from the webinar participants, the Committee prioritized the issues as described in Attachment 1 (See Sheet 2). The Planning Committee discussed prioritizing issues to determine what is in or out, what was missed, if issues on the list can be accomplished in this cycle, and if there are enough persons to address an issue. Any proposed change requires a draft to be submitted to the PUC for review by 2018 to be in the 2020 Provisions. A separate research project might be needed to study some issues. Such studies will likely take three to four years to complete. Alternatively, issue teams could be marshalled to handle studies. In the next fiscal year, the Project 17 Committee will amend the list the Project 17 Planning Committee establishes at this meeting. Specific comments on each listed issue follows. Additional comments from the Chair are included in the Attachment 1 table. Bolded items below indicate a recommended issue for Project 17.

Basin Effects will take years to complete, but can be accomplished sooner for specific locations. No model yet exists for basin effects, but the Project 17 Committee can recommend accommodating them.

Use of 3-D Simulation to Develop Long Period Parameters also requires a long lead time. The development of the science to be applied to basins is ongoing but can be extended beyond them. This is not a Project 17 issue, but can be accommodated at a later date. USGS participants pointed out that ground motion values based on 3-D simulation models could result in additional significant change from the current map values. It is recommended that USGS keep the project 17 committee informed of any findings and related potential changes in the ground motions.

Timing for Updated Map Publication should be taken off the list since this is strictly a USGS topic. The timing for placing the maps in ASCE 7 is a PUC issue. For this a structure is needed to facilitate communication between the USGS and the PUC. If there is a change in how USGS does the maps, engineering input is needed to determine how the maps will be adopted.

Duration as a Mapped Parameter should be taken off the list. It could be recommended, but the issue requires a long term study.

Damping Levels also should be taken off since 5% is the standard in use. For base isolation, Non-Linear Response analysis is the preferred method and this will automatically compute the damping effect on response, without resorting to spectral adjustment factors. However, considerable research on this issue has been accomplished. Since the damping values in the Provisions can be improved the PUC could directly consider a proposal to do this. This need not be part of Project 17's scope. A suggestion was made to add the damping values as a map layer, but engineers would not appropriately use the values. The Committee voted 7 to 2 to not include damping levels as a Project 17 issue.

Vertical Motion Parameters also should be taken off the list since it is only addressed in Chapter 15 and a site specific study that could be used to determine vertical motion. Chapter 23A vertical

ground motions for seismic design in the 2015 NEHRP Provisions provides vertical ground motion response spectrum primarily used by non-buildings, it is considered a PUC topic.

Design Value Conveyance was suggested as the most important on the list, but it a USGS website issue, not a Project 17 issue.

Charlie Kircher indicated that Collapse Risk Definition should be taken off since it includes a large range of possible values (termed a yo-yo factor), and the values in P-695 cannot be changed without another study. Charlie also indicated Acceptable Collapse Risk also should be taken off because it shares the same problems as Collapse Risk Definition. However, the current use of 2% in 50 years creates a large yo-yo factor, and the 1000 year event should be on the table for collapse risk as it may remove the need for deterministic ground motions. Since the risk target needs consideration, Acceptable Collapse Risk will be changed to **Acceptable Risk** and with the inclusion of the Collapse Risk Definition will be recommended as a Project 17 issue.

Precision and Uncertainty will be included as a Project 17 issue. The above mentioned zone maps were suggested to be considered as one of possible approaches to address the issue.

Multi-Period Spectral Values will be included to address site factors and basin effects in some form. Basin Effects, previously off the list, will be combined with **Multi-Period Spectral Values**. It was suggested that this topic may need more than volunteering effort if a complete solution is pursued, as an alternative, a less resource intensive approach could be considered.

Maximum Direction Ground Motion Components is off the list since it is up to the PUC to consider directionality effects.

Use and Definition of Deterministic Parameters will be included since it is necessary for long-period analysis, and provides a check on probabilistic analysis. Significant research will be needed to develop engineering recommendations, even is deterministic caps are abolished.

For Induced Seismicity the technology is not to a state of understanding for inclusion in Project 17. In the Project 17 Planning Committee report, a rationale for not considering this issue will be included.

All of the members of the Project 17 Planning Committee indicated that they would be willing to serve on the Project 17 Committee. The Committee identified possible additional members for the Project 17 Committee: Dan Dolan and John Siu (CRSC) reps, Ron LaPlante, Ted Droessler, Tim Ryan, Marshall Carmen, Julie Furr, Kirk Harman, Tom Heausler, Will Jacobs, Brian Foley, Bob Paullus, and an east coast rep to be named by NCSEA.

The Committee identified four Tasks Groups to support the Project 17 Committee:

- *Precision & Uncertainty* to include, Dan Dolan (Chair), an additional structural engineer, a building official in a high seismic zone (John Siu), two geotechnical engineers, a California Earthquake Authority rep, a city planner and two USGS reps.

- *Acceptable Risk* to include Robert Pekelnicky (Chair), an additional IT2 rep, one high seismic zone person and one low seismic zone person (Robert Paullus), and a resilience expert (Charlie Scawthorn).
- *Multi-Period Spectral Values* to include Charlie Kircher (Chair), two design procedures experts, a geotechnical engineer (C.B. Crouse), and two USGS reps.
- *Deterministic Parameters* to include C.B. Crouse (Chair), two engineers, and two USGS reps.

In the next fiscal year three Project 17 Committee meetings are planned for January/February, June and August/September 2016. Two sets of task group meetings are planned to occur between the three meetings, for a total of eight Task Group meetings.

Ron Hamburger will generate a report according to the outline in Attachment 2. He asked the committee to rework the summaries for all of the issues, particularly, the four issues considered high priority. The webinar presentations will be appended to the report to be developed according to the following schedule:

September 4 - Draft report issued for Committee comment.

September 18 – Committee comments due

September 21 – Draft final report

September 23 – Final report submitted to FEMA

FEMA will share the draft report by the planning committee with the NEHRP agencies for comments, and the report eventually will be made available to the general public.

The meeting adjourned at 3:30 pm.