

## **BSSC PUC Meeting Minutes**

SIMPSON GUMPERTZ & HEGER Conference Room  
100 Pine Street, San Francisco, CA

April 4, 2018, 8:30 am – 5:00 pm; April 5, 2018, 8:30 am – 4:30 pm

### **Participants**

#### *Provisions Update Committee*

David Bonneville, Degenkolb Engineers (Chair), April 4 &5  
Pete Carrato, Bechtel Corporation, April 4 &5  
Kelly Cobeen, Wiss Janney Elstner, April 4 &5  
C.B. Crouse, AECOM, April 4 &5  
Dan Dolan, Washington State University, April 4 &5  
Anindya Dutta, Simpson Gumpertz & Heger, April 4 &5  
S.K. Ghosh, S.K. Ghosh Associates, April 4 &5  
John Gillengerten, Consulting Engineer, April 4 &5  
Ron Hamburger, Simpson Gumpertz & Heger, April 4 &5  
Jim Harris, James Harris & Associates, April 4 &5  
William Holmes, Rutherford & Chekene, April 4 &5  
John Hooper, Magnusson Klemencic Associates, (absent)  
Gyimah Kasali, Rutherford & Chekene, April 4 &5  
Charles Kircher, Charles Kircher & Associates, April 4 &5  
Philip Line, American Wood Council, April 4 &5  
Bret Lizundia, Rutherford & Chekene, April 4 &5  
Jim Malley, Degenkolb Engineers, April 4 &5  
Bonnie Manley, American Iron and Steel Institute, April 4 &5  
Robert Pekelnicky, Degenkolb Engineers, April 4 &5  
Rafael Sabelli, Walter P. Moore, April 4 &5  
John Silva, Hilti, April 4 &5  
Greg Soules, CB&I, April 4 &5  
Jonathan Stewart, University of California Los Angeles, April 4, call in on April 5

#### *BSSC Members and Associates*

Sandy Hohener, Degenkolb Engineers (IT 2 Chair), April 4 &5  
Stephen Harris, Simpson Gumpertz & Heger Inc. (IT 7 Chair), April 4 &5  
Jason Collins, PCS Structural Solutions, Corresponding member, April 4 &5  
Julie Furr, Rimkus, P17 member, April 4  
Leigh Arber, AISC, April 4 &5  
Jon-Paul Cardin, AISI, April 4 &5

Larry Kruth, AISC, April 4 &5  
Jon Heintz, ATC, April 4&5  
Philip Caldwell, SE, April 4 &5 (remote call in)  
Jennifer Goupil, ASCE/SEI, April 4 &5 (remote call in)  
Michel Bruneau, University of Buffalo, April 4  
Amit Varma, Purdue University, April 4  
Ben Schafer, Johns Hopkins University, April 5

*USGS*

Nicolas Luco, April 4  
Sanaz Rezaeian, April 4

*FEMA /NIBS*

Mai Tong, FEMA, April 4 &5  
Michael Mahoney, FEMA, April 4 &5  
Andrew Herseth, FEMA, April 4&5  
Philip Schneider, NIBS/BSSC, April 4 &5  
JQ Yuan, NIBS/BSSC, April 4 &5

**1. CALL TO ORDER.**

David Bonneville opened the meeting at 8:30 a.m. with member introductions, a reading of the anti-trust statement, and a review of the agenda (Attachment 1).

**2. Approval of PUC November, 2017 Meeting Minutes.**

The minutes were approved unanimously. The meeting minutes and attachments are posted on the BSSC website. [https://www.nibs.org/?page=bssc\\_PUC](https://www.nibs.org/?page=bssc_PUC)

**3. 2020 NEHRP Schedule/ASCE SSC Schedule**

David Bonneville and Jennifer Goupil reviewed the 2020 NEHRP schedule and the ASCE SSC schedule (included in Attachment 2).

- Substantive/complicated PUC proposals to SSC should preferably be submitted no later than Q3 of 2019.
- March 2020 = final date for all PUC proposals to SSC.
- The last PUC ballot during the 1<sup>st</sup> quarter 2020 should be only for reballoting items or minor issues.
- PUC passed ballots will be sent to SSC at the same time they are undergoing BSSC MO ballots.

PUC ballots #3-#5 schedule

	Proposal to BSSC	Post in BSSC Ballot system	PUC Ballot	Proponent Response	PUC discussion
<b>Ballot #3</b>	2/18/2018	Within 3 days	3 weeks	3 weeks	April 4-5, 2018
<b>Ballot #4</b>	6/27/2018	Within 3 days	3 weeks	3 weeks	August 15-16, 2018
<b>Ballot #5</b>	9/30/2018 <b>10/12/18</b>	Within 3 days	3 weeks	3 weeks	Mid <del>November</del> <b>December 4-5, 2018</b>

**4. FEMA Update**

Mai Tong from FEMA welcomed everyone. Members discussed forming a ground motion map IT under PUC to finalize the proposals from Project 17.

**5. BSSC Report (Attachment 3)**

- The ASCE 7-16 Adoption Report is available on the BSSC website [http://www.nibs.org/?page=bssc\\_pubs](http://www.nibs.org/?page=bssc_pubs)
- The FEMA/BSSC outreach effort includes the 2018 Structures Congress and 11NCEE
- The BSSC ballot system was reviewed with the PUC members.

**6. USGS National Seismic Hazard Model, Sanaz Rezaeian/Nico Luco (Attachment 4)**

- The 2018 USGS National Seismic Hazard Model (NSHM) will be used for NEHRP 2020, ASCE 7-22 and IBC 2024. The USGS will have another update on NSHM in 2020, which is not likely be included in the NEHRP 2020, ASCE 7-22 and IBC 2024 due to the time constraint.
- The 2018 NSHM will not include subduction events.
- Based on its schedule, USGS will document the NSHM (hazard map but not the design map) by July 2018, then seek public comment between July and October 2018.
- USGS will try to produce design maps based on multi-period spectra, but not likely deterministic caps (CB’s work group is still working on the rules), for review at the August 2018 PUC meeting. Ideally, it is suggested that USGS compare the multi-period values versus current values at BC boundary and then break the analysis into steps, first, the 2% 50 year comparison, and then  $S_{DS}$  and  $S_{D1}$  versus  $S_{MS}$ ,  $S_{M1}$  for multi-period.
- 2018 NSHM + Project 17 multi-period spectra proposal features and challenges:
  - No more site coefficient tables.

- Hazard curves for 21 periods (0.01 to 10 seconds) from the NGA study and 8 site classes. P17 members commented that all 21 periods might not be needed, especially for short periods, which could reduce USGS's computing effort.
- Challenges: current Ground Motion Prediction Equations (GMPEs) shortcomings for long T and soft soils:
  - CEUS: 2014 GMPEs only are applicable up to 2 sec and Site Classes A & BC are based on new NGA-East or seed models;
  - For WUS & subduction zones remove GMPEs not applicable to soft sites and long periods and reweight; and remove basin effects for long T (5 sec and above) and soft sites.
- Major Updates for 2018 NSHM
  - NGA-East: update based on 9 GMPEs in the 2014 NSHMs.
    - The change lies somewhere between -0.1g and 0.1g (2% in 50 yr value)
    - NGA-East is based on Site Class A. USGS plans to use the Stewart et al. site amplification model for CEUS.
  - Re-weighting and basin effects:
    - There are basin effects in the current maps which were based on recorded events where basin effects were not filtered out.
    - Basin effects will be possibly included only for Los Angeles, San Francisco, Salt Lake City and Seattle in the 2018 NSHMs. NGA-East does not include basin effects.
    - P17 members discussed whether basin effects only for four regions should be included in the 2018 NSHMs, vs waiting to have basin effects everywhere, which incidentally might never be possible.
    - Basin effects are more significant at longer periods (5 sec). Comparisons at a few locations for 2% 50 yr, 5 seconds, and site class D, using the local basin model vs default, show that there is deamplification in LA (-0.08g or -38%), amplification in Long Beach (0.04 g or 19%), amplification in Seattle (0.08 g or 37%), and deamplification in SF (-0.09g or -37%), etc.
    - Two options from the USGS April 2018 workshop: use local models inside of the four basins; or use local models only for the deepest portion of the basin ( $Z_{2.5} > 3\text{km}$ ).
    - P17 members won't comment on science that USGS chooses, but suggest documenting it as clear as possible, so that engineers conducting a site specific analysis know what is included.
  - Source/Fault characterization (minor).  
Resources for further information can be found in an 11NCEE Conference Paper on "Preliminary 2018 National Seismic Hazard Maps for the United States" and March 7-8 USGS workshop presentations.

## 7. Project 17 update, Ron Hamburger (Attachment 5)

- Acceptable Risk: This work group has recommended retaining current risk basis for maps with 1% 50yr and deterministic cap in near fault regions
- Deterministic Caps:
  - Deterministic limits are still needed.
  - Two options: retain current deterministic limits concept, with a new definition of characteristic earthquake; or, adopt varied risk-targeted deterministic caps. The concept of varied risk-targeted deterministic caps was presented at a January 2018 P17 web meeting and followed by a P17 ballot. The ballot failed with 5 “yes” votes, 1 “yes with reservations,” and 8 “no” votes. In a separate discussion during the PUC meeting, Jon Steward asked if the PUC will support developing a Part 3 paper for varied risk-targeted deterministic caps. In general, the PUC supports the effort. Jon will have a draft Part 3 proposal in the latter part of 2018. The Part 3 proposal will go through PUC and MO ballots.
  - CB’s group’s ongoing effort on deterministic caps:
    - Option 1: deaggregate the hazard at the  $MCE_R$  return period years and determine the “characteristic” event as the magnitude for the dominant event.
    - Option 2: Perform PSHA, but where ground motion exceeds a deterministic floor, limit hazard to epsilon =1 values (1 sigma).
  - The P17 Committee will try to ballot the deterministic caps proposals before the August PUC meeting and put forward a PUC proposal.
- Yo-Yo effect:
  - The P17 Committee looked at ways of smoothing ground motion changes within code editions including reducing significant figures, using weighted averages, etc. Generally the committee agrees that minor (+/- 15%) changes in ground motions values are annoying but not generally problematic, and it’s important to stabilized SDC’s.
  - Stabilizing SDC’s proposals:
    - Proposal overview: Use separate SDC maps to indicate the designation of design categories. There will be two maps including Risk Category I,II, III map and Risk Category IV map; the maps will be tied to ground motion values and to default site class; the PUC will use judgment on whether to move SDC boundaries or not.
    - Downsides of SDC proposal: some structures will be too conservatively designed; there will be lots of work for future PUC’s.
    - The P17 passed going forward with the proposal in straw poll 7-2.
    - The SDCs stabilization proposal will be balloted by the P17 Committee, then move to the PUC.
    - SDC consolidation is being investigated under PUC IT 1 (see the note under IT 1).

- Multi-period spectra
  - Multi period spectra proposals were presented to P17 in a January 2018 P17 web meeting, and followed by a P17 ballot to move the proposals to the PUC for finalization and approval. The ballot passed with 12 “yes” votes, 1 “yes with reservations,” and 0 “no.”
  - To implement the multi-period proposals, the USGS requires approved Ground Motion Prediction Equations (GMPEs) that directly incorporate site class parameters and are able to generate spectral response parameters over the range of periods indicated. Presently, the USGS has such GMPEs only for those portions of the Western U.S. where subduction hazards are negligible. USGS anticipates that the NGA East and NGA Subduction GMPEs will be approved for use within a time frame that will permit them for implementation in the proposals for the continental United States. Even with approval of these GMPEs, the USGS will require direction on how to generate the mapped spectral parameters in those locations where the available GMPEs are not directly applicable. FEMA potentially will fund the effort to develop this direction in a time manner, which will be ideally completed in a study before the end of this year, so that the multi-period proposal and the developed methodology can be balloted by the PUC in early 2019 (or late 2018).

## 8. Multi-period spectra proposals, Charlie Kircher (Attachment 6)

### Chapter 11 (section 11.4)

- $S_{MS}$  and  $S_{M1}$  will include site effects (no more site coefficient tables).
- Revise to incorporate site specific multi-period  $MCE_R$  and design response spectra but retain the two-period definition.
- Revise site-specific ground motion procedures (section 11.4.7) to be the same as those in ASCE 7-10.
- For the default site class envelope, Site Class DE is included in the proposal since it is not a rare case, but including DE might be too conservative for project initiation evaluation. However, it is suggested to remove DE from default and add terms stating that default site class can be used when certain thresholds are met.
- Section 11.4.4: no objection to the proposed change.
- Will maintain the  $T_L$  map.
- The PUC discussed the trigger for site specific analysis for isolated structures and structures with damping systems of 0.6 and replacing  $S_1$  with  $S_{M1}$ . One suggestion is to delete  $S_1$  requirement for all isolated structures. This will require coordinating the effort of Chapters 12 (Sandy’s Group) and 17 (Bret’s Group).
- The Table 11.9-1 values of vertical coefficient might require input from the PUC.

### Chapter 20 (Table 20.3-1)

- Revise definitions/criteria to include new site classes at boundaries.

- A geotech support group for revisions to Chapter 20 (site classes, table 20.3-1) will include Gyimah Kasali, Zia Zafir, CB Crouse, and Jon Stewart. Gyimah will coordinate the effort.

Chapter 21 (sections 21.2.2. and figures 21.2-1 and section 21.3)

- Delete method 1 (based on risk coefficients) as generally agreed by the PUC.
- Section 21.2.2: Revise the deterministic  $MCE_R$  floor, and wait for CB's work group's deterministic caps proposal.
- Section 21.2.3 Exception: There is a need to state that Class F is excepted in the commentary (USGS does not have Class F anyway).
- Section 21.3: Revise the 80% lower-bound limit to be based on the multi-period design spectrum (USGS values). The PUC discussed how the lower bound limit can be 100% of design value (67% of  $MCE_R$ ), or 90% of design value (60% of  $MCE_R$ ), or 80% of design value (50% of  $MCE_R$ ).  
In a show-of- hands vote: nine voted yes in favor of 50% (all periods), and eight voted yes in favor of 60% (opposing votes were not requested).

The PUC agreed to add an exception that if the site specific is lower than the USGS value, it may be allowed if it is peer reviewed.

- The PUC discussed deleting the deterministic PGA based on geomean of PGA, solely on the probabilistic hazard.  
In a show-of- hands vote in favor of limiting PGA with the deterministic as limiting spectra acceleration with deterministic, 14 voted in favor.

Chapter 22

- Provide mapped values of  $S_{MS}$  and  $S_{MI}$  (equivalent  $S_{DS}$  and  $S_{DI}$ ) for “default site” conditions only. All mapped parameters/site conditions will be provided via a web-based application.  
In a show-of--hands vote to include one set of map (based on default site) in the Provisions, 16 voted in favor.  
In a show-of-hands vote to include no maps in the Provisions 4 voted in favor.

In general, PUC agrees to move forward

Schedule wise, multi-period spectra proposals (in a package with the methodology to develop multi-period spectra for areas without GMPEs) will probably be balloted in November, 2018.

## 9. IT1: Seismic performance Objectives, Bob Pekelnicky (Attachment 7)

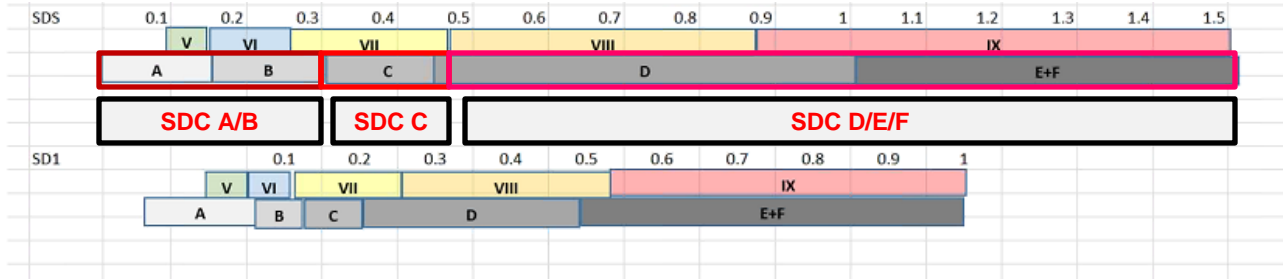
### Topic 1: Seismic Design Category Consolidation

- The group originally discussed consolidating SDCs from 6 to 4 - A, B/C, D, and E, and the latest recommendation from the last IT 1 in-person meeting was to consolidate to three SDCs - A (MMI VI), B/C (MMI VII), and D/E/F (MMI VIII).
- IT 1 had general consensus that there should not be different SDCs for structural and non-structural
- Proposed Boundaries:  
SDC A,  $S_{DS} < 0.15$  g,  $S_{D1} < 0.05$  g (presently 0.167, 0.067), “A” shrinks  
SDC BC,  $S_{DS} < 0.5$  g,  $S_{D1} < 0.25$  g (presently 0.5, 0.2), “BC” grows at lower end  
SDC DEF,  $S_{DS} > 0.5$ g,  $S_{D1} > 0.25$ g (presently 0.5, 0.2), “D” grows to encompass “E&F”
  - Discussion for new SDC BC
    - Ordinary concrete frames are not permitted (currently allowed for SDC B)
    - Adopt height limits based on SDC C.
    - Plain masonry is not permitted. It is suggested to contact masonry industry early about this.
  - SDC DEF: in general, loosen E/F requirement to D, and add a prohibition for extreme weak story irregularity to D.
- **Show-of- hands votes:**
  - Support consolidating SDC (structural only) from 6 to 3:  
in favor 10, oppose:3: abstain 6
  - Vote on supporting the originally proposed SDC boundaries:  
SDC A, MMI VI and lower,  $S_{DS} < 0.15$  g,  $S_{D1} < 0.05$  g  
SDC BC, VI < MMI < VIII,  $S_{DS} < 0.5$  g,  $S_{D1} < 0.25$  g  
SDC DEF, MMI VIII and higher,  $S_{DS} > 0.5$ g,  $S_{D1} > 0.25$ g  
In-favor: 9, oppose: 6, abstain 2
  - Support for excluding ordinary concrete frame in SDC BC:  
In-favor: 8, oppose: not asked, abstain: not asked



- Support for modified SDC boundaries: Combine A/B and the boundary of A/B will be lower end of MMI VII, and move the C/D boundary to catch the MMI VII and VIII transition (see figure below).

In favor: 15, oppose: not asked, abstain: not asked



- Allow non-structural align with structural boundary (three categories).

In-favor: 13, oppose (prefer decouple): 3, abstain: 0.

- The PUC has general support for the non-structural SDC concept as following: based on a modified SDC boundary, AB - no seismic requirement, C - something that potentially kills people, and DEF - design for seismic.

## Topic 2: Reliability of Structural and Non-Structural Components for Safety

- The performance objective of the ordinary noncritical component or anchorage at  $MCE_R$  is included in ASCE 7-16, but not in Provisions. Options to modify the table or to delete it were discussed by PUC members.

Risk Category <sup>1</sup>	Failure That Could Result In Individual Lives	
	Given DE Shaking	Given $MCE_R$ Shaking
I	** —	** —
II	10%	25%
III	5%	15%
IV	2.5%	10%

### **Topic 3: Function of Risk Category IV buildings:**

The current Provisions for Risk Category IV buildings is to “avoid loss of function in critical facilities.”

In a straw poll asking if IT 1 should continue its efforts to provide quantitative requirements for Risk Category IV building for the PUC’s future consideration:

In-favor: 13, oppose (support leave it qualitative): 2.

Bob presented data showing that a 10% of probability of loss of function for RC IV in a design earth quake might be acceptable. IT 1 needs to define what is loss of function.

### **Topic 4: Egress**

There will be potential changes to the Provisions based on the ATC 120 study.

## **10. IT2 Seismic Force Resisting Systems, Sandy Hohener (Attachment 8)**

- ATC 123 Mass Irregularity update: The PUC had concerns about the ATC 123 process of eliminating mass irregularity (300% mass irregularity is too small and ATC 123 only studied moment frames). A study by Sabelli et al. found that with mass irregularity, Equivalent Lateral Force (ELF) analysis is generally conservative on story shear and overturning moment compared to Modal Response Spectra Analysis (MRSa). Clarification/restriction is should be provided for some cases, such as nonbuilding structures with a heavy boiler system in upper floor, or large screens hanging in a stadium building).
- ATC 123 Torsion update:
  - Analysis on pulse ground motions were conducted and demonstrated a similar trend to far field motions.
  - IT2 will develop a proposals to add a trigger that “when more than 75% of the story lateral strength is provided on one side of the center of mass” and add a 100%-30% orthodontic load combination and change some of the redundancy factor requirements.

The PUC generally supported moving forward for the mass irregularity and torsion proposals. It is preferred to have the ATC 123 draft report (not necessary 100% final report) before voting on the proposals.

- **Resolution on Proposal #6 re-ballot on C<sub>d</sub>=R for Building Separation.**

- Sandy's motion to find Peter Carrato and Ron Hamburger's negative votes Non Preservative (NP), 2<sup>nd</sup> by David Bonneville: in favor 11, oppose: 6, abstain: 1. The motion failed (need 2/3 to pass).

David cited the PUC Procedures regarding adjudication of PUC ballots: *Each proposal proponent or IT shall categorize the ballot comments received on the proposal as indicated above and shall present the categorization to the PUC with recommendations as follows:*

- For comments categorized as "Persuasive," the proposal proponent or IT may recommend to the PUC either that the proposal be substantively revised to respond to the comment and subsequently reballoted or that the issues raised by the comment require further study during the next update.*
- For comments categorized as "Nonpersuasive" or "Nonresponsive," the proposal proponent or IT will explain the reasoning behind that decision.*
- For comments categorized as "Editorial," the proposal proponent or IT will identify the specific changes to be made.*
- Substantive technical changes that are conceptually simple may be approved based on a vote of the PUC. Revisions that are complex shall be re-balloted.]*

Noting that the negatives expressed by Carrato and Hamburger do not completely overlap (Pete's contains language related to Chapter 15) the PUC agreed to vote on resolution of the two negative votes separately. The committee agreed that this is "conceptually simple" per BSSC ballot procedure and moved forward for separate votes.

- Rafel Sabelli's motion to find Ron Hamburger's negative vote NP for the reason stated by Sandy (in the ballot system), 2<sup>nd</sup> by SK: in-favor 11, oppose: 5, abstain 2. The motion passed.
- Greg Soule's motion that IT 6 will have a separate proposal on Equation 15.5-1 and find Peter Carrato's negative vote NP, 2<sup>nd</sup> by Kelly Cobeen. In Favor: 11, oppose: 6, abstain: 1. The motion failed.

Since the second motion did not pass, that negative is not resolved and the proposal will be withdrawn.

Kelly's Group [Kelly Cobeen (lead), Sandy Hohener, Bob Pekelnicky, John Gillengerten, John Hooper] will look broadly at the scope of work involved in a comprehensive change involving C<sub>d</sub>=R, and report back to the PUC at the next meeting.

- **Resolution on Proposal #6 re-ballot on C<sub>d</sub>=R for Deformation Compatibility.**

- Bret Lizundia's motion to find Peter Carrato's negative vote NP, 2<sup>nd</sup> by Dan Dolan. In-favor 11, oppose: 2, abstain: 5. The motion passed.

- Kelly Cobeen's motion to find Ron Hamburger's negative vote NP, 2<sup>nd</sup> by Dan Dolan. In-favor 11, oppose: 3, abstain: 4. The motion passed.
- Bonnie Manley's negative vote was considered nonresponsive.
- John Silva's negative vote was withdrawn.
- Kelly Cobeen's yes with reservation vote was considered editorial and the proposal will be revised.
- Bob Pekelnicky yes with reservation vote was considered technically simple and the proposal will be revised.

The PUC accepted the proposal. It can be moved to Member Organization (MO) ballot with the concurrence of the BSSC Board of Direction.

- C<sub>d</sub> = R Study, Charlie Kircher (Attachment 9)
  - Kelly's group will work with Charlie and report back to the PUC regarding the need and scope of this effort and on its inclusion in Part 1 or Part 3.

#### **11. IT3 Modal Response Spectrum, Anninda Dutta (Attachment 10)**

- Review the study of a 20-story of moment frame building and the effect of mass irregularity and torsion irregularity
- Suggest striking out the  $T < 3.5T_s$  limit in ASCE Table 12.6-1. Ron will reach out to Anil Chopra, who originally suggested the  $3.5T_s$  limit in the 97 cycle.
- For regular buildings, allow ELF without any limitations. The PUC suggested moving forward with a proposal.
- Looking ahead, the IT will start assessing data from Moment Frame and Braced Frame studies and complete stiffness and torsional irregularity studies, which will be summarized in a white paper. IT3 will also work with IT2 on revising the trigger for MRSA based on the recommendations in ATC 123.

#### **12. IT4 Shear Wall Design, SK Ghosh (Attachment 11)**

The goal of IT4 is to propose modifications to ASCE 7-16 table 12.2-1, adding line items on Bearing Wall Systems, Building Frame Systems, and Dual Systems featuring Ductile Reinforced Concrete Coupled Walls. The group is planning to have ballot proposals by December, 2018.

- Ductile shear wall and ductile coupling beam already exist in ACI 318 (ACI 318 18.10.2 through 18.10.7), but not ductile coupled shear wall.
- ACI 318H tried to define coupled shear wall based on energy dissipation. A definition based on aspect ratio (between 2 and 5) failed within ACI 318H.

- New definition with added details passed within ACI 318H and will be balloted by the ACI 318 main committee.
- Kelly provided an update on the P695 study of coupled concrete shear wall.
- SK provided an update on shear amplification factor.

IT4 is planning to have ductile couple shear wall proposals in October 2018 (Ballot #5) to be balloted before the PUC December meeting.

AISC updates on Coupled Steel Plate Composite Shear Wall System were provided by Michel Bruneau and Amit Varma (Attachment 12):

- For failure mode, it was suggested to use the drift ratio (probably 5%) for cutoff point.
- Over strength factor has not been considered by the research team yet.
- PUC proposals: detailing in Chapter 14 (refer to AISC 341) and R factor in Chapter 12. If detailing requirements are to be included in AISC 341, the timing for having AISC 341-22 included in ASCE 7-22 may be an issue. The detailing requirements might go to Chapter 14 of the NEHRP Provisions directly.
- Next step: IT4 will report research results at the PUC December meeting.

### **13. IT5: Nonstructural Components, John Gillengerten (Attachment 13)**

- IT5/6 held a joint meeting that focused on coordination of nonbuilding structures and nonstructural components design criteria with emphasis on penthouses, supports for nonstructural components, and size limits for items that could be in either Chapter 13 or Chapter 15.
- John provided an overview of the potential penthouses proposal. The penthouse design will remain in Chapter 13. The current proposal has the weight limit based on the weight of penthouse to total building weight (25%). One suggestion from the PUC is to relate it to the weight of the building level where the penthouse is located.
- Component support proposals:
  - Design of support for nonstructural components in five categories: integral with components, skid-mounted, simple supporting structures, discrete bracing, and platform systems.
  - Displacements of nonstructural components, mostly distribution systems.
- Scoping group proposals:
  - A draft proposal on revisions to extend the Chapter 13 scope to nonstructural components and their supports and attachments.
  - Draft definitions for temporary and movable components.
  - Limitations on use of nonductile materials.

- Lateral force group:
  - A work group is working on introducing the revised force equation (from ATC 120) into the NEHRP Provisions.
- Update on 25% Mass Ratio Rules of Sections 13.1.1 and 15.3, Greg Soules (Attachment 14)
  - A work group will develop a proposal to correct mass ratio trigger to from 0.25 to 0.2.
  - Commentary will be expanded to describe source of rule and assumptions made in original analysis.
  - Chapter13 and Chapter15 rules will be standalone and not apply to distributed systems.

#### **14. IT6: Nonbuilding Structures, Pete Carrato**

- IT6 had a joint meeting with IT 5 which focused on coordination of nonbuilding structures and nonstructural components design criteria. [See notes under IT5].
- Proposal No.10 on T-Supports was withdrawn by Peter. The main pushback within IT6 relates to on the definition of the T support.

#### **15. IT7 Soil-Foundation Interface, Steve Harris**

Progress Report on Seismic Pressures on Retaining Walls, Jon Stewart (Attachment 15)

- John outlined a proposed (resource paper) approach:
  - External elements attached to wall, require SSI analysis, but existing procedures are sufficient.
  - Procedures were presented in a draft proposal on free-standing walls: kinematic approach.
- Feedback from the PUC:
  - Will USGS produce  $T_m$  and PGV parameters for the calculation? If not, it is suggested that PGV can be produced/correlated to other parameters.
  - PGV will depend on site class.
  - The procedure relies on S waves, but how about other waves? John responded that surface waves are not captured here, but are considered a secondary effect (low frequency, long wave length).
  - Will this apply to backfill on a slope? Response: Might use projected height, but should be a secondary effect.
- Path forward: The model is much developed and will move on in Part 3 papers. IT7 will develop example computations for various values of  $V_s$ , distance to source, and magnitude, and will compare some examples to M-O cases.

## 16. IT8 Base isolation and Energy Dissipation, Bret Lizundia

- With the major updates in last cycle, the IT8 only expects minor updates in this cycle and will address potential consistency issues between chapters.
- IT8 will review testing data that has been generated in the past few years.
- IT8 will look at requirements for production testing.
- Another topic suggested by the PUC: factor of safety against barrier failure.

## 17. IT9: Rigid Wall-Flexible Diaphragm, Kelly Cobeen (Attachment 16)

- For Rigid Wall/Flexible Diaphragm, IT9 is preparing two proposals,
  - Proposal #1: Alternative diaphragm design forces for one story structures with flexible diaphragms and rigid vertical elements.
    - The PUC discussed shear amplification factor 1.5 and step function.
    - The PUC discussed deflection calculation to be coordinated with other requirements in Chapter 12, like deflection limit and stability.
  - Proposal #2: Alternative diaphragm design provisions for one-story flexible diaphragm structures (two-stage analysis).

PUC agreed to move forward to ballot the two proposals in ballot #4 (June, 2018).

- **Update on Steel Diaphragm Innovation Initiative (SDII) (Attachment 17) and the CFS deck in RWFD Building projects, Ben Schafer (Attachment 18)**
  - The objective is to include steel deck diaphragms in the alternative design provisions (ASCE 7-16 Section 12.10.3), recommend  $R_s$  values (could depend on the connection system, mechanical vs weld), and develop a steel deck diaphragm proposal similar to the wood diaphragm proposal.
  - $R$  and  $R_s$  applied independently may not result in expected behaviors; a wall's ability to shield the diaphragm might be much greater than a diaphragm's ability to shield a wall.
  - Drift ratio at  $MCE_R$ , 3.7% over 400ft at median earthquake seems high. How is that compatible with gravity system (hangers)? This concurs with what is in current code (consistent with wood diaphragm), but needs to be considered and should not be a roadblock for the new methodology.
  - $R_s$  is probably more related to  $R_s/R$ . It does not seem to change the  $R_s$  value in the NEHRP Provisions Part 3.
  - A technical paper summarizing the effort is provided in attachment 19.

## 18. Proposal on Structural System Selection, Jim Malley

- Jim reviewed the ballot comments and the proposal was withdrawn and will be re-balloted before PUC August meeting.

- PUC Comments:
  - A defined system can go to Chapter 16; for nondefined systems, a FEMA P-695 study should be required.
  - Extend it to Risk Category IV structures. This will require more discussion within IT1.
  - Need a definition on “project specific”. Is multiple buildings in one project considered project specific?
  - Should not set a cap on R=8.
  - Suggest possibly putting the proposal in Chapter 17.

#### **19. Issue with one entry in Table 15.4-1, Bob Bachman (Attachment 20)**

Problem statement: For larger industrial structures (higher than 35 feet), some cost-conscious nonbuilding structure design engineers are using the less detailed OCBFs with  $R = 1.5$  and higher member and foundation forces rather than using a seismically detailed OCBFs per AISC 341 with  $R = 2.5$  because the connection forces are lower (e.g. 67 bolts rather than 80 bolts per connection). This was not intended. Bob suggested reducing the omega zero value, or reduce the R value.

The PUC agreed that IT6 (Pete, Greg, Rafael) will look into this issue.

#### **20. Future PUC meetings.**

- August 15-16, 2018 (August 14, 2018 P17C meeting).
- December 4-5, 2018

#### **21. Adjourn**