



National Institute of
BUILDING SCIENCES
*An Authoritative Source of Innovative Solutions
for the Built Environment*

Building Seismic Safety Council

FEMA-NIBS BSSC PROVISIONS UPDATE COMMITTEE

Burlingame, CA

April 12-13, 2017

Summary Minutes

Participants

Provisions Update Committee

David Bonneville, Degenkolb Engineers (Chair), April 12 &13
Pete Carrato, Bechtel Corporation, April 12 &13
Kelly Cobeen, Wiss Janney Elstner, April 12 &13
C.B. Crouse, AECOM, April 12 &13
Dan Dolan, Washington State University, April 12 &13
Anindya Dutta, Simpson Gumpertz & Heger, April 13
S.K. Ghosh, S.K. Ghosh Associates, April 13
John Gillengerten, Consulting Engineer, April 12 &13
Ron Hamburger, Simpson Gumpertz & Heger, April 12 &13
Jim Harris, James Harris & Associates, April 12 &13
William Holmes, Rutherford & Chekene, April 12 &13
John Hooper, Magnusson Klemencic Associates, April 12 &13
Gyimah Kasali, Rutherford & Chekene, April 12 &13
Charles Kircher, Charles Kircher & Associates, April 12 &13
Philip Line, American Wood Council, April 12 &13
Bret Lizundia, Rutherford & Chekene, April 12 &13
Jim Malley, Degenkolb Engineers, April 12 &13
Bonnie Manley, American Iron and Steel Institute, April 12 &13
Robert Pekelnicky, Degenkolb Engineers, April 13
Rafael Sabelli, Walter P. Moore, April 12
John Silva, Hilti, April 13
Greg Soules, CB&I, April 12 &13
Jonathan Stewart, University of California Los Angeles, April 12 &13

BSSC Members and Associates

Sandy Hohener, Degenkolb Engineers (IT 2 Chair), April 12 &13
Stephen Harris, Simpson Gumpertz & Heger Inc.(IT 7 Chair) , April 13
Jason Collins, PCS Structural Solutions, April 12 &13

John Heintz, Applied Technology Council, April 12 &13
Charlie Cater, AISC, BSSC Board, April 12
Lawrence Kruth, AISC, April 12 &13
Jon-Paul Cardin, AISI, April 12 &13
Victor Azzi, RMI April 12
Philip Caldwell, SE April 12
Jon Siu, City of Seattle, Washington, April 12
Ben Enfield, City of Seattle, Washington, April 12
Julie Furr, CSA, April 12
Jennifer Goupil, ASCE/SEI, April 12 &13
Jim Bela, April 12 &13

USGS

Nicolas Luco, April 12

NIST

Steven McCabe, April 12 &13
Siamak Sattar, April 12 &13

FEMA /NIBS

Mai Tong, FEMA, April 12 &13
Michael Mahoney, FEMA, April 12 &13
Robert Hanson, University of Michigan, April 12 &13
Andrew Herseth, April 13
Jim Sealy, BSSC Board, April 12 &13
Philip Schneider, NIBS/BSSC, April 12 &13
JQ Yuan, NIBS/BSSC, April 12 &13

1. CALL TO ORDER.

David Bonneville opened the meeting at 1:30 p.m. with member introductions, a reading of the anti-trust statement, and a review of the agenda (see [Attachment No. 1](#)).

Mai Tong, the FEMA Project Officer, welcomed everyone.

2. 2020 Cycle Schedule Review and BSSC updates

David reviewed the 2020 cycle schedule and ballot procedures ([Attachment No. 2](#)) and suggested that proposals should be submitted no later than the end of 2018, especially for sophisticated proposals, to give enough time for the ballot process and inclusion in the 2020 Provisions.

JQ Yuan updated the BSSC activities (also in [Attachment No. 2](#)). BSSC will have a series of six webinars covering the NEHRP materials chapters, a joint BSSC-SEAOC half-day session at the 2017 SEAOC Convention, and a session at the NCSEA Summit in October, 2017. The BSSC website is being constantly updated with the PUC and ITs membership and meeting minutes.

Webinars and future meeting schedules will be announced on the BSSC website. Philip Schneider updated the committee on the Chapter 24 publication, which will include an update of Chapter 24 to ASCE 7-16 and publication of “Seismic Design Manual for SDC B” possibly by NCSEA/ICC. BSSC will work with the PUC to have the updated Chapter 24 submitted as a proposal and balloted after September 2017 for potential inclusion in the 2020 NEHRP Provisions.

3. ASCE 7-16

BSSC should have ASCE7-16 in PDF (with commentary, without supplement) in early May. The PUC will review ASCE 7-16 and will ballot it. Ron Hamburger motioned to ballot ASCE 7-16 with commentary, with a second by Pete Carrato.

Vote: Yes19, No 0, Not Vote 0.

4. Project 17 _ Ron Hamburger (Attachment No. 3)

Four key work areas for Project 17 are:

- Update site class definitions and soil factors to better account for ground motions associated with the use of modern GMPEs. Once issues are resolved IT1 will write a proposal.
- Re-evaluate risk basis for maps. The resolution from the workshop is to maintain risk targeted motions with deterministic caps, but evaluate the risk target with additional data for alternative return periods to see if adequate safety is obtained (especially in the east).
- Provide stability in mapped values. The resolution from P17 is to go to a separate SDC map, computed for a “conservative” default site class in each region, and eliminate the ability to adjust SDC based on site class (allow adjusting of the level of ground motion, but not detailing) .

Straw vote from the PUC: favor 11, oppose 8.

Side study for PUC IT1: (1) the number of SDCs, (2) the things SDCs determine, (3) the triggering ground motion levels for each.

Ron Hamburger suggested proceeding with direction indicated by the straw vote.

- For deterministic Caps, the work will be based on deaggregation of hazard at 2500 years and identification of dominant factors including magnitude and distance, at each period. (The Work group might also look at an alternative period). The work group may also look at the potential of having a deterministic floor vs deterministic caps.

5. Issue Team Reports

5.1 IT9 Rigid-Wall Flexible Diaphragm (RWFD) Buildings, Chair: Kelly Cobeen (Attachment No. 4)

IT9 met in person on September 12 and 13, 2016 and followed with five web meetings in November and December of 2016 and January, February, and March of 2017. The current focus of the team is wood methodology based on FEMA P-1026 with a look forward to incorporating a steel methodology when it becomes available. Kelly presented updates on the following topics:

- Directions for transitioning to ASCE 7 (Topics 13 & 14 listed in Attachment 4),: (1) will be located in Chapter 12, (2) designated as alternate procedure, and (3) made as broadly applicable as possible (wood and steel deck).
- Rigid but light vertical systems (Topic 7): IT9 will determine whether P-1026 design methodology (developed based on heavier concrete tilt-up walls) is equally valid for light wall buildings.
- Plan configurations (Topic 4): IT9 will need to include non-rectangular, multi-span, and short-span diaphragms in the methodology, or identify research that is needed to develop or validate a methodology.
- Inclusion of diaphragm deflection in drift (bonus topic): PUC suggest IT 9 develop recommendations for this topic.
- Steel research collaboration: ongoing.

5.2 IT7 Soil-Foundation Interface, Chair: Stephen Harris (Attachment No. 5)

- Consider eliminating conservative KSSI limits for NLR (to make them less restrained) and use the originally proposed 50% limit.
- Consider revising BSA & Embedment to eliminate 0.75. The issue team will re-produce the radiation damping equations instead of referring it to in other documents,
- See if a rocking structure should be treated differently from a fixed base structure. Ongoing effort.
- Soil pressure on basement walls: check if the traditional way is appropriate. Ongoing effort.

5.3 IT6 Nonbuilding Structures, Chair: Peter Carrato (Attachment No. 6)

- IT6 drafted a proposal on Corrugated Steel Liquid Storage Tanks (in risk category III and IV), which has been circulated within the IT for comments and finalized by Greg Soules. IT6 will have a detailed proposal along with more illustrations at the next PUC meeting.
- Might overlap with IT5 work. IT6 will try to establish a trigger mechanism to determine when to include distributed systems in the structural analysis.
- For tee head pipe supports, IT6 might work with IT5, but has already drafted a proposal format, for discussion within the issue team.
- Fiberglass cooling towers will be addressed in Chapter 15, which currently only addresses steel, concrete, and timber cooling towers. Jim Harris volunteered to be a

corresponding member for this effort. IT6 might have a proposal ready at next PUC meeting.

- Large concrete machine foundation: in progress
- Cast-in anchor bolts: in progress.

5.4 IT5 Nonstructural Components, Chair: John Gillengerten (Attachment No. 7)

IT5 held a kick-off meeting on March 23, 2017. In the meeting, the team reviewed the status of the ATC-120 study, provided feedback to the ATC 120 team, identified and prioritized issues that should be addressed in the 2020 Provisions, and developed a preliminary action plan.

John updated PUC on the ATC-120 project, which includes three working groups: WG1 – Assessment of current nonstructural design provisions; WG2 – Performance expectations for nonstructural components; and, WG3 – Evaluation of ASCE 7 nonstructural design equations and alternative philosophies for nonstructural design.

ATC-120 will wrap up this summer, and IT5 will become more active. The first set of proposals from IT5 will probably include a major re-write of ASCE 7 Chapter 13 for clarification.

5.5 IT4 Shear Wall Design, Chair: S.K. Ghosh (Attachment No. 8)

SK updated the committee on the following topics:

- Coupled shear wall systems where it is possible to include higher response modification factors.
- Tall buildings in the 400-ft height range.
- Masonry shear wall with a focus on partially grouted shear walls, and a plan to develop recommended improved detailing requirements for adoption into the TMS 402 Standard.
- Steel plate shear walls with a plan to characterize behavior and performance of SPSW-WC system, and develop design guidelines that enable adoption of SPSW-WC configuration.
- Wood shear walls with a plan to develop Part 3 white paper.
- Hybrid shear walls - no urgent topic in this area that needs IT4's attention.
- Concrete shear wall coupled shear walls: IT4 needs to define coupled shear wall systems, which will come from ACI 318. PUC comments: If coupled concrete shear walls are to gain acceptance by ASCE 7 in the R-factor table, a P695 study might be needed. John Wallace, who is seeking funding for \$30,000 for a 9 month study has developed a draft proposal that might need review panel/feedback from the PUC. Ron Hamburger, Steve McCabe, Charlie Kircher, and Anindya Dutta volunteered to review the proposal.
- Concrete shear walls will include shear design of special shear walls.

SK mentioned that IT4 may develop the following resource papers on:

- (1) Comparing steel and concrete shear walls.
- (2) Comparing coupling system of steel and concrete shear walls.
- (3) Rocking systems in general, including timber shear walls as a white paper.

5.6 IT3 Modification of Existing Modal Response Spectrum Method, Chair: Anindya Dutta (Attachment No. 9)

- For a moment frame study, review a paper presented in 16th WCEE by Sanchez et al. The next step is to study 20-story building.
- Modify MRSA to better target a probability of collapse of 1% in 50 years. The PUC commented that this is a great topic but may not be evaluated due to limited resources.

5.7 IT2 Seismic-Force Resisting Systems and Design Coefficients, Chair: Sandy Hohener (Attachment No. 10)

- Height limit is not a Part I proposal effort. IT2 will plan to write a white paper.
- For bearing wall definition IT2 drafted a proposal with mainly an editorial change. Ron Hamburger commented this might not need to be considered by PUC.
- For bearing wall R factor IT2 will work with IT 4.
- Directional combination: More data for tall buildings from John Hooper was included and IT2 will review more studies. IT2 may modify Section 12.5.4 and have uniform requirements for all seismic design categories.
- $R=C_d$ proposal: this will also change allowable drift limit. The PUC commented that it should consider the net effect of adding the changes together. What is the total impact to the industry? IT2 should proceed with the proposal and coordinate it with IT1 to consider performance objectives.

5.8 IT1 Seismic Performance Objectives, Chair: Bob Pekelnicky (Attachment No. 11)

- For seismic design category the topics being considered are: (1) numbers of SDC, (2) SDC boundaries, (3) stabilizing SDCs, (4) should building period, site class, and risk category affect SDC? (5) should structural and nonstructural have separate categories? The work group will proceed to how the SDCs change if decoupling site class from SDC. The work is expected to finish in the next few months.
- Provide two performance levels for nonstructural components, based on $I=1$ and $I=1.5$. Hopefully the IT will have a white paper before next PUC meeting, so IT5 may begin writing rules.
- Function performance: (1) what is design level for MCE_R vs $2/3 MCE_R$. (2) what are function goals for different risk categories. Members of the PUC commented that most power plants are in risk category III and the team may need to get inputs. Peter Carrato will be the contact and involved IT1.
- For resilience and recovery: should new building design standards require higher performance to balance out the existing buildings that are going to perform poorly? IT1 is reviewing papers to determine if a Part 3 white paper is appropriate.
- IT1 will look at the results from ATC 58-2 which assesses the performance of code designed buildings.

6. New Business

Jim Malley brought up that we need a clear and firm guideline to evaluate many new and innovation seismic systems. As a peer-reviewed effort, Jim envisions the guideline being included in the building code. The PUC agreed to start the effort with a study group, then may be an issue team. Jim Malley, Dan Dolan, and John Hopper volunteered to start the study group and have a report at next PUC meeting.

7. Other topics

Each IT chair was asked to submit a one-page summary of an updated IT work scope.

8. Adjourn

The meeting adjourned at 12:30 pm.

Future PUC meetings: August 29 and 30, 2017 and November 29 and 30, 2017.