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

Building Seismic Safety Council

PUC Meeting

Embassy Suites Waterfront, 150 Anza Blvd, Burlingame, CA
August 15, 2018, 8:30 am – 5:00 pm, August 16, 2018, 8:00 am – 5:00 pm

Participants

Provisions Update Committee
David Bonneville, Degenkolb Engineers (Chair), August 15 & 16
Pete Carrato, Bechtel Corporation, (Absent)
Kelly Cobeen, Wiss Janney Elstner, August 15 & 16
C.B. Crouse, AECOM, August 15 & 16
Dan Dolan, Washington State University, (Absent)
Anindya Dutta, Simpson Gumpertz & Heger, August 15 & 16
S.K. Ghosh, S.K. Ghosh Associates, August 15 & 16
John Gillengerten, Consulting Engineer, August 15 & 16
Ron Hamburger, Simpson Gumpertz & Heger, August 15
Jim Harris, James Harris & Associates, August 15 & 16
William Holmes, Rutherford & Chekene, August 15
John Hooper, Magnusson Klemencic Associates, August 15 & 16
Gyimah Kasali, Rutherford & Chekene, August 15 & 16
Charles Kircher, Charles Kircher & Associates, August 15
Philip Line, American Wood Council, (Called in August 16)
Bret Lizundia, Rutherford & Chekene, August 15 & 16
Jim Malley, Degenkolb Engineers, August 15 & 16
Bonnie Manley, American Iron and Steel Institute, August 15 & 16
Robert Pekelnicky, Degenkolb Engineers, (Absent)
Rafael Sabelli, Walter P. Moore, August 15 & 16
John Silva, Hilti, August 15 & 16
Greg Soules, CB&I, August 15 & 16
Jonathan Stewart, University of California Los Angeles, August 15 & 16

BSSC Members and Associates
Sandy Hohener, Degenkolb Engineers (IT 2 Chair), August 15
Stephen Harris, Simpson Gumpertz & Heger Inc.(IT 7 Chair) , August 16
Jason Collins, PCS Structural Solutions, Corresponding member, (Absent)
Julie Furr, Rimkus, P17 member, (Absent)
Leigh Arber, AISC, (Absent)
Jon-Paul Cardin, AISI, August 15

Larry Kruth, AISC, (Absent)
Jon Heintz, ATC, August 15 & 16
Philip Caldwell, SE, August 15 & 16 (Called in)
Jennifer Goupil, ASCE/SEI, August 15 (Called in)
Michel Bruneau, University of Buffalo, (Absent)
Amit Varma, Purdue University, August 16 (Called in)
Ben Schafer, Johns Hopkins University, (Absent)
Bahram Zarin-Afsar, BSSC Board, August 15 & 16
Zia Zafir, Kleinfelder, P17 advisory committee, August 15
Kristijan Kolozvari, UCLA, August 16

USGS
Nicolas Luco, August 15
Sanaz Rezaeian, August 15

FEMA /NIBS
Mai Tong, FEMA, August 15 & 16
Michael Mahoney, FEMA, August 15 & 16
Bob Hanson, FEMA, August 15 & 16
Philip Schneider, NIBS/BSSC, August 15 & 16
Jiqiu Yuan, NIBS/BSSC, FEMA, (Absent)

GUESTS
Mike Gannon, AISC, August 15 & 16
Emily Gugliermo, Martin/Martin, August 15
James Bela, Oreq, August 15

1. Call to order, David Bonneville

David Bonneville opened the meeting at 8:33 a.m. with member introductions, a reading of the anti-trust statement, and a review of the agenda (Attachment 1).

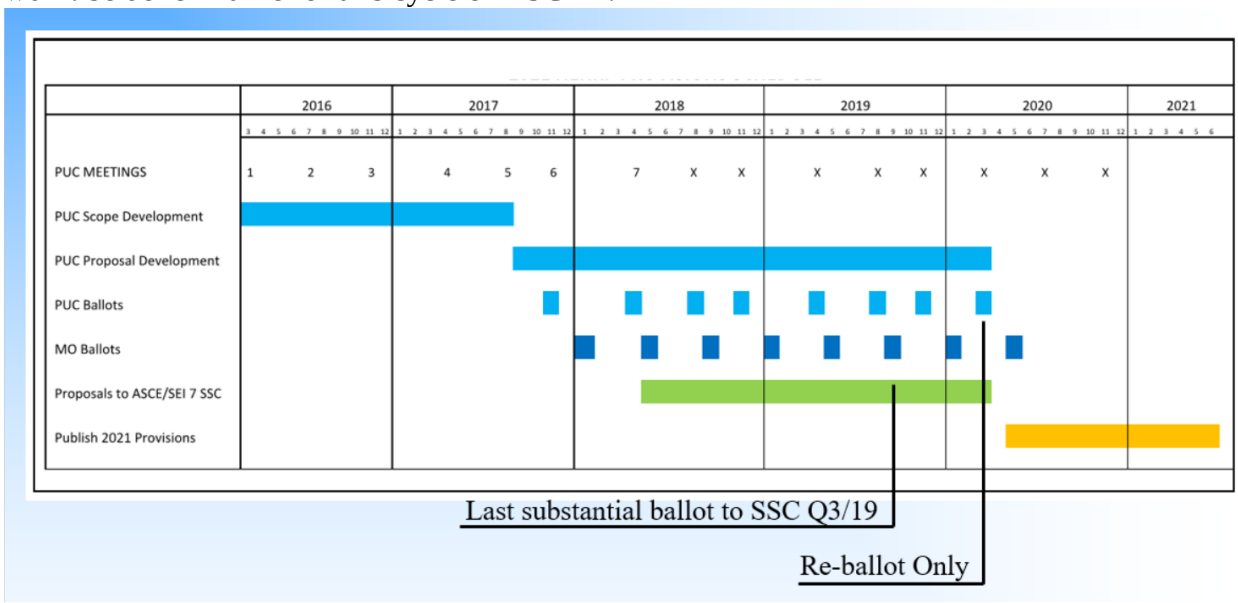
David announced that after lunch we will not have two more presentations by IT-01, since Bob Pekelnicky will not be here due to his wife having had a baby on Sunday.

2. Approval of Last PUC Meeting Minutes, David Bonneville

The minutes were approved unanimously (17 approved, 0 against or abstained). The meeting minutes and attachments are posted on the BSSC website.
https://www.nibs.org/?page=bssc_PUC

3. 2020 Cycle Schedule Review, Future PUC Meetings, David Bonneville

David noted that the committee should have substantive technical ballots by April 2019. Anything of major substance by this time next year needs to be moving to an ASCE 7 subcommittee. For proposals that are not submitted until August, if they don't succeed, they won't be done in time for this cycle of ASCE 7.



4. FEMA/BSSC Update, Mai Tong

Mai congratulated the members of the PUC on a very successful year and stated that FEMA is continuing to support the PUC and a new issue team to continue the Project 17 work in the next fiscal year.

5. ASCE 7 SSC Update, John Hooper (Attachment #2)

- Six proposals have been presented for ASCE 7-16 Supplement No. 1. The two proposals by Charlie Kircher are very important for the ASCE 7-16 document, but are not important for PUC moving forward with the multi-period spectrum work.
- Proposal on the Chapter 6 to update the load combinations for force controlled actions did not pass and will be pushed into Supplement No. 2.
- Two proposals on foundation clarifications have been passed and will be in Supplement No. 1.
- The proposal about revised language in Chapter 15 for storage racks have been passed and will be Supplement No. 1.

Motion [Jim Harris]

I suggest that we adopt these Supplement No. 1 changes as written here on the screen (slide 5 of the presentation)

Second [Charlie Kircher]
Discussion:

The supplement is currently out for public comment and will be finalized and published by December 15. A few of the PUC members stated that they would like see the full proposals before a formal ballot.

Motion withdrawn [Jim Harris]

6. USGS National Seismic Hazard Model, Nicolas Luco & Sanaz Rezaeian (Attachment #3)

Progress on the 2018 hazard maps was updated, which are being proposed for adoption into the 2020 Provisions (IBC 2024).

- This 2018 NSHM should be finalized by December 2018, and next update will be in 2020 (including subduction GMPEs and simulations)
- Update on what is included in 2018 NSHM: NGS-East (GMPE model, site amplification model, new standard deviation); re-weighting and basin effects for WUS; and seismicity catalog.
- Site amplification factors (F_{760}, F_{linear}, $F_{nonlinear}$): Jonathan Stewart explained why and how the NGA's were created and how the amplification factors were determined and used to map to other site classes since all the models were for a single default site class.
- There was discussion regarding the lack of smoothness in the central and eastern response spectrum vs. the smoothness of the west. Sanaz explained that USGS has improved this where they could but it's a published model so they can't do much more to smooth it out.
- Basin effects:
    - USGS didn't directly address basin effects in the past. Below 1- second period the basin effect term has minimal impact, but at longer periods it has a larger effect.
    - For LA, SEA, SF and Salt Lake, USGS has models of the actual basin depth. The 2018 NSHM will insert those data into WUS2 rather than using the default values (USGS doesn't have data elsewhere).
    - It is the deepest parts of basins where there is the most amplification from the data and the models, so only in the deepest parts of the basins will data be included.
    - The variation in amplification also changes depending on site class.
    - Discussion related to multi-spectra values and explicit basin depth data: USGS is changing the term in the GMPE with the explicit value instead of the implicit value where they have these deep basins
    - USGS has maps that show the deeper than default basin depths and will share these with the PUC

- USGS is shooting for the Dec. 2018 meeting to have some final versions of these maps that include basin effects.

7. Project 17 Report, Ron Hamburger (Attachment #4)

Project 17 has been meeting since 2016 and will wrap up in September 2018. P17 will publish a final report on the work that has been conducted and pass it to a new Mapping Issue Team under PUC to bring forward the Project 17 proposals to the PUC.

- The Project Goals
  - Explore a means of stabilizing the fluctuating design triggered by periodic updates to the map (yo-yo effect).
  - Complete work on the spectral shape adjustment (multi period spectra) initiated in prior cycle.
  - Deterministic ground motions will be updated following the demise of the "characteristic earthquake magnitude".

- A proposal is expected for deterministic caps, and the general procedure is described as below:
  - Compute Risk Targeted Ground Motion (RTGM)
  - If RTGM exceeds "Deterministic Lower Limit" (150% of 1994 UBC adjusted for site class)
    - At RTGM return period, deaggregate the hazard
    - From deaggregation, obtain deterministic scenarios that could result in RTGM
    - Adjust each deterministic scenario to 84th percentile ground motion
    - Use the largest 84th percentile ground motion among deterministic scenarios with relative likelihood >=x%
  - This proposal will achieve the following (which is suggested to be included in the final proposal):
    - Significantly reduces subjectivity in the process
    - Still achieves 84th percentile ground motion
    - Since 1997 we have not had a need to design for ground motions that were more than 1 sigma above the median and this is perpetuating that decision
- Yo-Yo Effect:
  - The team looked at ways of smoothing the ground motion changes with code editions such as a weighted average to dampen the changes etc.
  - Ultimately the team decided that modest changes (under 15%) were not problematic unless they switch you from one design category to another.
  - The recommendation of project 17 is to develop a SDC map (like the old zone maps) except the map won't set the force levels, just the detailing rules and limitations. The maps will be tied to a default site class (which was a major

point of contention). Overall, there would be overdesigning (over-detailing) in some cases, but it was beneficial to achieve uniformity of practice in a region.
    - If a boundary line runs through the middle of a major city that may need to be adjusted.
    - These maps will be closely reviewed upon USGS value updates, where lines may need to be changed to keep regions consistent.
    - Default site class is C or D whichever gives the larger SDC.
    - There will also be multiple risk category maps for these SDC's just like the wind maps.
    - Discussions. This will have a high economic impact – a large change - that the committee should try to assess in some manner. The issue is that some buildings will be detailed more conservatively than necessary, but this will foster a more uniform built environment since building inspectors will be reviewing the same detailing. Maybe being a bit conservative is ok because as we know even just a 1% change can push you from one category to the next which can be a mess. Stability and simplicity or precision and accuracy, this is the debate Project 17 has been having for over a year. What carried the vote was stability and simplicity. The assumption is that this will come forward as a proposal out of issue team 1.

- Spectral Shape Adjustment: Multi-point Spectrum
    - The typical two domain spectral shape doesn't work well on softer sites.
    - This will be covered now by the multi-period spectrum work.
    - Project 17 has passed recommendations to the PUC for implementation.

- Continuation of the P17 work

    - What remains to be transitioned will move to the new Mapping Issue Team 10 within the PUC. The charge will be to develop the design maps. The seismic design category map will be under Issue Team 1.
    - C.B. Crouse will be leading this Issue Team 10. Ron Hamburger, John Hooper, Charlie Kircher, Jonathan Stewart, Jim Harris and Bill Holmes will also be on the committee as well as Nico Luco and Sanaz Razaeian.
    - This work will not be broadened to include existing buildings.

- The Project 17 committee will develop final project report by September 30, 2018

8. Proposal No. 19: IT-1-1 SDC Consolidation, Ron Hamburger [will be RE-BALLOTED]

The proposal is to consolidate the number of SDC's from 6 to 3 (A, B, C, D, E and F to Low, Moderate, and High)

- Low is A
- Moderate is B and C
- High is D, E and F

It was cleared at the meeting that this proposal does not address non-structural items and there will be a parallel proposal to addresses non-structural, which is intended to be brought forward.

Discussions:

- There are concerns about ACI 318 detailing provisions tied to SDC's since they are on different schedules. It is suggested to insert something that says when referencing materials that use SDC's that the ASCE 7 standard applies**.**

- Regarding Cobeen's comments on table 12.6-1, correction will be made (use word "or" instead of "and").

- It is agreed to eliminate the E_v term in the moderate seismic design category.

- The over strength factors will stay for the moderate design category.

- There are comments that the current practice has three levels of detailing: special, intermediate and ordinary. Design for D, E, F are special, C is minimal to intermediate, and B is minimal to ordinary. Putting D, E, F together is good, but imposing detailing requirements for category C on category B may lack justification.

  The reason to put B and C together is due to the probability of different ground motions experiencing different MMI effects. The cutoffs for B relates to MMI VII shaking for MCE_R which is why the proposal went this way with category B. Straw vote on consolidating A and B instead of B and C and leave C alone:

  Vote 1:
  - Some consolidation in A B C (14 favor)

  Vote 2:
  - Option1: Combine D E F, combine B and C together, leave A alone (9 favor)
  - Option 2: Combine D E F, leave C alone, combine A and B (5 favor)

- There will be two proposals, the first just combining D E F, leave A B C alone, and the other is combining D E F with some consolidation in B C, and A.

- The comment that the table was wrong was substantive so the proposal is withdrawn and will be re-balloted.

9. Multi Period Spectra: Development of MPRS shapes for non WUS sites, Charles Kircher

- Four draft proposals were brought forward to this committee at the April 2018 meeting and they've been updated at this time
- The main changes are in chapter 20, a table only used by geotechnical engineers: adding three new site classes to the table. There are three different ways to getting to a site class currently
- The geotechnical engineers have decided they just need to define site class by Vs30 and don't need the other two methods. Needs the PUC's ok on this so the whole proposal isn't bogged down by this point
- There was discussion about whether to divide this proposal in order to separate these issues and if so at what level, ASCE or PUC?
- Plan is to develop a proposal in parallel by Gyimah Kasali for the chapter 20 table (Geotechnical shear wave velocity)

10. Multi Period Spectra: Comparison of MPRS for the 34 WUS and CEUS sites, Sanaz Rezaeian (Attachment #5)

Reviewed the current procedure for derivation of design ground motion and new proposed procedures

- The new procedure will be based on 22 periods and 8 site classes (use Vs30 as direct input into GMPEs to get hazard curves).
- Showed the comparison of site design values based on ASCE 7-10 vs the multi period response spectra (MPRS) values, ASCE 7-16/MPRS, and the new proposed procedure/MPRS.
- Not planning to update the regions outside the contiguous US
- Developing a method of creating these shapes for areas where USGS only has Ss and S1 values. The methodology will be part of the proposals.
- This is very amplitude dependent and we're planning to use the WUS equations for the unknown sites rather than the CEUS
- LA example, Site class DE: Showing MPRS, ASCE 7-10 and 7-16, and S_{ms} and S_{m1} from
- Central and eastern US examples:
    - Memphis and Charleston SC: The peak is occurring at much shorter periods, less than 0.2s, so our models (90% max between 0.2 and 5s) are underestimating; it also over estimates at longer periods.
    - Do we care about this since the peak is occurring at 0.1s periods and less and therefore doesn't affect most buildings?
    - Discussion on either set the peak at 90% of the peak no matter where it occurs, or use 0.1s period value as the minimum, or stay with 0.2s as lowest period. (does it matter to high mode analysis, to nonstructural design).
      Recommendation from PUC: don't see the reason to make change and state with 0.2s as lowest period.
- Update on the Response Spectrum Shape Factors (RSSF).

11. IT-2: C_d = R Study, Kelly Cobeen (Attachment #6)

- This task group brought forth two proposals previously: one about deformation compatibility which passed (barely), and one on building separations which failed
- This is a progress report discussing the work done so far around drift limits
- Task 1
    - List seismic provisions in ASCE 7-16 that incorporate seismic drift
    - Describe intent of provisions and history of provisions
    - Describe in concept any required realignment of designer calculation of estimated drift
    - Describe in concept any required realignment of permitted drift
    - Develop recommendations for items for which the task group has adequate information. Where applicabl,e identify any further information or studies that are required.
- Task 2
    - Solicit design example problems with available design drift calculations
    - Solicit numerical study data on estimated drifts
    - Review alignment between numerical study and example problem estimation of drift
- From initial results from ATC 116 it looks like we are not underestimating drift in ASCE 7-16. This is a comparison of a non-linear time history analysis or full scale shake table testing for full buildings compared with the code equation calculation
- Some building data show that the design drifts are close or slightly un-conservative compared to the non-linear modeling in some cases
- There is some discrepancy in the data (roof drift, story drift).
- There was a discussion about the distribution of drift along the height of a building with different types of lateral systems, how they tend to vary and how this affects this group's analysis

DISCUSSION

- MCE is more appropriate for structural considerations. The code should continue to have very simplified procedures for estimating drift. It shouldn't have different calculations for different stories, but could still have a Cd times elastic design drift
- The code should continue to have different requirements for different considerations; for example a bridge connecting two buildings vs cladding
- IT 2 put forth a series of proposals, one was to make Cd=R for calculating separations. PUC decided we wouldn't decide specific times to change the factor, but study a comprehensive change. That question is within the scope of this study
- There was a discussion about whether there should be a small change in this cycle just for steel moment frames only, since there doesn't appear to be an issue with other structures drift calculations. There appeared to agreement that it should be studied holistically.

- Kelly is to create a scope with data needed and information collected so far, and bring it back to the next meeting

12. IT-2-6: Proposal No. 12: Accidental Torsion, Sandy Hohener [PASSED and move to MO ballot]

- **C1: Pete Carrato**: There were added provisions in addition to the torsional irregularity ratio that had some strength provisions. Torsional response is more on the stiffness side than strength.

  Response: Yes the elastic response is dependent on stiffness and that's retained, but what's added is a strength requirement for there to be strength on both sides of the center of mass. So Sandy Hohener is finding that comment non-persuasive.

- **C2: Pete Carrato**: Now in the redundancy provision the ρ must be used only if there are irregularities in both directions not just one which is not appropriate.

  Response: Now that the 100%+30% is required in all these buildings this is basically the same as it was before so Sandy Hohener found this comment to be non persuasive.

- **C3: S.K. Ghosh**: I prefer one comprehensive code change, I don't think this should be pulled out as separate.

  Response: The only technical changes that are being balloted are this and the mass irregularity. Issue team 2 did not want to ballot them together in case one passes and the other doesn't.
  S.K. Ghosh withdraws this part of his comments.

- **C4: S.K. Ghosh**: Why limited to C-F not including SDC B as well.

  Response: No relevant, as that is not part of the proposed change
  S.K. Ghosh withdraws this part of his comments
- **C5: John Gillengerten**: Add something to the reason statement about the context about the original provisions.

  Response: Good suggestion, this has been added

- **C6**: Editorial change of "and" to "or"

- **C7: Bret Lizundia** (Editorial): Revise the language in the commentary. Jim Malley suggested a revised language. This was found editorially persuasive

- **C8: Jim Malley**: The added provision that you have to have lateral force elements on each side of the center of mass for certain irregularities does not specify how much strength is needed on each side.

  Response: The study considered as low as 12% of the story's strength, not as low as 1% so to address the comment we proposed adopting language in the redundancy provisions that at least two bays be located on each side of the center of mass. Sandy Hohener found this comment to be editorially persuasive.

- **C9: Bob Pekelnicky**: I believe 100% strength on one side should be added to an extreme torsional irregularity.

  Response: if you don't have two bays on each side you don't meet the criteria so this is found non-persuasive

- **C10: John Silva**: Withdraws comment

  Motion [David Bonneville]
  Motion to accept the changes to this proposal as editorial or simple in nature.
  Second [John Hooper]
  Approved (17)
  Opposed (0)
  Abstained (1)

13. IT-2-3: Proposal No. 5: Mass Irregularity_Rev1, Sandy Hohener [PASSED and move to MO ballot]

- **C1: Kelly Cobeen**: The table needs to be cleaned up (editorial)

  Response: Agreed it will be corrected in the standard.

- **C2: Kelly Cobeen**: Table 12.6-1 has a reference to irregularity that needs to be changed

  Response: It has been corrected.

- **C3: Kelly Cobeen**: Upper level drift issues not discussed.

  Response: We substantially increased the commentary to address this to reflect findings from ATC work.

- **C4: Kelly Cobeen**: Why were Moment Frames used in the study.

Response: This is also addressed in the commentary.

- **C5: John Gillengerten**: Commentary focused on only one study.

  Response: The commentary has been expanded to address both studies.

- **C6: Bret Lizundia**: Results and rationale needed in the commentary.

  Response: This has been added to the commentary.

- **C7**: Three people pointed out some grammar issues

  Response: It has been corrected

Motion [John Hooper]
Motion to approve this proposal with the discussed edits
Second [Greg Soules]
Favor (18)
Opposed (0)
Abstained (0)

14. Proposal No. 9: System Selection_Rev1, James Malley [will be RE-BALLOTED]

- Summary of the negative votes:
  - Two negative votes were concerned with the ability to define what is a non-conforming system and what the extrapolations would be
  - One negative note was regarding the limitations on risk category IV structures
  - One was about going away from using the tall building guidelines
- Found them all persuasive and will revise the proposal. Regarding the height limitation, the revised proposal will only allow height limit extensions for building designs directly going to ASCE Chapter 16, which covers 95% of what's done today by putting an exception on systems designated as NP
- Rafael Sabelli's editorial change was withdrawn, found to be ok if intended for new building systems
- There was a discussion about where in the code this should occur; within 12.2.1.1 or a in a new section 12.2.1.3, or in a footnote (no one liked this idea), or in Chapter 16.
- Discussion: There are systems designated as NP in the table that says you can do that for one story or light frames etc. It is suggested to refer to the footnotes for a few of those NP's, as someone might take those ordinary systems and extrapolate them up to extreme heights.

15. IT-5: Proposed Nonstructural Design Equations, Bret Lizundia (Attachment #7)

- This is a final presentation as ATC 120 is wrapping up the details on this work. The goal was to create an equation that met the following criteria:
  - Grounded in science: based on a comprehensive technical investigation of the parameters that significantly influence components response. Use instrumental records and archetype studies
  - Transparent: the form of the equation is easy to understand and directly related to the underlying basis
  - Not complicated: easy to use by practitioners
  - Addresses various situations:
    - Building type and height are not known
    - Building type and height are known but no other info
    - A building analysis is available
- All the different factors that affect component shaking are considered in the new equation, including PGA, PFA, PCA, building damping, building ductility, component period and building period resonance, inherent component damping, and source of ductility.
- The new equation:
  - Replaced the concept of a step function of rigid to flexible (a_p) with the likelihood of being in resonance with the building or not
  - There will be a parallel a_p & R_p set of tables
- ATC-120 Recommendations:
  - Develop code change proposal using report
  - Create an industry database on component damping, ductility and period of vibration
  - Study test results to quantify the component reserve strength margin
  - Augment archetype studies with low R-factor buildings
  - Augment archetype studies with more amplitude scaled response histories
  - Increase strong motion instrumentation of components and for more thoughtful vertical response (actually put instruments on components)
- Next Steps
  - PUC issue team 5 to review and consider adoption of the proposed equations
  - Issue team 5 will need to assign components to unlikely/likely in resonance and ductility categories and refine the tables to match what the likely source of ductility is
  - A code change proposal will then be written. The proposal should be balloted before April 2019 meeting. Preliminary draft to implement this and representative design coefficients will be presented at the December meeting

16. IT-5-1: Proposal No. 16, Scope of Nonstructural Provisions, John Gillengerten
[PASSED and move to MO ballot]

- Regarding David Bonneville's comment on importance factor that why is there no I factor in Chapter 13 and 15 for Risk Category III structures? Response (editorial persuasive): Nonstructural component forces are based on the post earthquake performance objectives desired for the component itself. For drift controlled components it is being taken into account, but there are shortcomings in the commentary. If there were get a description for Risk Category III structures, additional criteria for design of important nonstructural components could be developed. This was followed by discussion about Risk Category III buildings needing a more extensive definition, but that not being part of this proposal
- Regarding Jim Malley's comment on inconsistent language in a few places and a lack of clarity by what was meant by "outside of a structure". Response (Partially persuasive): The phrasing is slightly different in different sections on purpose. And an image to the commentary to show "outside the structure" will be added.
- Regarding Bob Pekelnicky's comment on term "permanently attached". It is clarified by Gillengenten that this term is only used for utility attachment, not for the equipment. Equipment attachment is dealt with elsewhere where the ability to remove it is acknowledged. It is not the intent that require people to get a permit to move every piece of equipment. Exceptions will be reviewed and may be added by the issue team.
- Regarding on comments that if non structural component is outside of a structure wouldn't that make it a separate component? Response**:** with the exception of a few exceptions, components outside the building are still considered a component. This is what we'll try to address in the joint proposal

17. IT-6: Nonbuilding Structures, Greg Soules (Attachment #8)

- New proposal being developed addressing Bob Bachman's concern on connection design for steel ordinary concentrically braced fames. A Canadian paper titled "Improved Canadian Seismic provisions for steel braced frames in heavy industrial structures" will be reviewed.
- A new proposal for stiffness effects of large bore piping predominantly in Chapter 15, but not ready at this time
- The common components between Chapter 13 and Chapter 15 are to be moved to Chapter 15 and will be removed from the tables in Chapter13. This applies to exterior as well as elements connected to the building
- Moved all small tanks and small vessels to Chapter 15 and is being balloted in ASCE 7 SSC.
- Will develop provisions for small cooling towers
- Penthouses: separate subsection under section 15.5. The plan is to limit the type of system that a penthouse can be constructed out of

18. IT-6-5: Proposal No. 15, Coupled Analysis Requirements, Greg Soules [PASSED to move to MO ballot]

- Discussion that the line in one of the figures appears to not be in agreement with the numbers stated. Addition wording may be provided (by Lizundia) in the commentary to explain that the research is representative.
- Changes will be in commentary and will be editorial in nature so will be sent to an MO ballot

19. IT-9: Rigid Wall-Flexible Diaphragm, Kelly Cobeen

The detailed comments and responses are recorded in the BSSC ballot portal. The proposal passed and will move to BSSC Member Organization (MO) ballot.

20. IT-9-1: Proposal No. 13, Alternative Diaphragm Design, Kelly Cobeen [PASSED and move to MO ballot]

- Regarding Ron Hamburger's Comment about the changes made to Chapter 12 of the ASCE 7 list of items where ρ can be 1.0. Response (non persuasive): there are a lot of buildings with large span diaphragms and brace frames with a ρ of 1.3 so it will be left in this list and that is the clear intent. A line item to that list with commentary will be added.
- Regarding John Hooper's comment on lower bound on diaphragm forces. The team checked the data and confirmed that there is no lower bound.
- Regarding Philip Line's comments on unclear language around PAF's and steel ledgers, the proponent found it editorially persuasive and updated it.
- Regarding Philip Line's comments on language that requires reduced nailing zones. Response: P695 took a look at what it does if you don't reduce the nailing and the response was positive. So we don't believe it's necessary to require this and we discuss it in the commentary, but we found this non persuasive to mandate this in the code.
- Regarding Bret Lizundia's comment that wood diaphragms with stiff toppings is not well defined. Response: Editorially persuasive and tried to respond to this as best we could.
- Regarding Jon Silva's comments on initial statement. It makes no sense to say it's un-conservative and we'll give you an alternate. It creates a situation where the designer is required to do it two ways possibly. It is suggested to make is necessary in the cases that it is applicable. Response: It's very complicated in terms of the archetype buildings that use it. The team is not prepared to tell people right now that they can't use the standard provisions.

  The team will modify the language issue in the reason statement for the first part of comment (not planning to weigh in on the current procedure, but only make a statement about the new procedure). The second part of the comments was withdrawn.

21. IT-9-2: Proposal No. 14, Two Stage Analysis, Kelly Cobeen [PASSED and move to MO ballot]

- Regarding Ron Hamburger's comment that the procedure is confusing with the 1.5 amplification factor, commentary will be updated to make it more clear.
- Regarding Ron Hamburger's comment that the reduction in forces is not enough to justify the complication. Response: Industry people involved felt this was very important to be able to make this differentiation. It was found to be important to the primary users.
  Motion [Kelly Cobeen]
  Motion to consider Ron Hamburger's second comment non persuasive
  Second [S.K. Ghosh]
  Approved (10)
  Opposed (0)
  Abstained (4)

- Bret Lizundia withdraws his comment

- John Silva withdraws his comment

- **Motion [Kelly Cobeen]**
  Motion to accept these two proposals as they've been modified
  Second [S.K. Ghosh]
  Approved (15)
  Opposed (0)
  Abstained (0)

  Another example has been provided to the proposal as a supplemental document for additional clarity.

22. Proposal No. 11_RS-1, Drift Limit, Rafael Sabelli [RE-BALLOT]

- Proposal is about the drift of buildings with very flexible diaphragms and the consequences of defining the drift and deformation compatibility
- **C1: David Bonneville (No)**: We cannot explicitly tie particular failures to excessive drifts in the diaphragm and if we can't we are causing a lot more work for the engineer.

Response: Valid point however looking at building performance as a whole, we have seen excessive drift causing loss of life so I don't' think this is a stretch so if we want to address this we have to deal with the actual drift, not just the center of mass drift.

There was Discussion about the current code requirements for deformation compatibility checks compared with the new requirements for one-story buildings.

David Bonneville withdraws his comment.

- **C2: Kelly Cobeen (No):** Drifts are complicated and they accomplish three things for us. I think you are instituting a very significant change to building practice and this will affect a lot of the building industry. I think it's been done without substantive technical support.

  Response: I believe typical practice is to look at displacement of every element. I don't believe the intent is to carve out an exception for flexible diaphragms, but I think that this won't effect the big box stores that you're referencing and I think this is necessary to preserve life safety

  There was discussion on how much we are changing current practice by doing this. The discussion also talked about how non-structural components are intended to deal with these deflections. There was concern about this will force many buildings to be designed stiffer to meet the 2.5% drift requirements, which will be a major change to building design. Rafael Sabelli believes that then the drift limits should be updated, but we shouldn't ignore the actual drift

- **John Gillengerten**: I think we should fix the proposal, but don't throw it out. Let's make it a little less atomic on practice. I think getting engineers to design for what the drift actually is a wonderful idea, but having to design the building to have drift limited by the diaphragm is maybe not what we really intended

Motion [Rafael Sabelli]
Motion find Kelly non-persuasive on her comment
Second [John Silva]

Discussion:
John Silva: I think we need to fix this proposal and then we need a whole other proposal to deal with the drift limit issue
Jim Harris: I think Kelly is persuasive, we need to fix this proposal, but then deal with the drift limits
John Hooper: I'd rather deal with it holistically

Approved (2)

Opposed (12)
Abstained (2)

- **C3**: **S.K. Ghosh**: had a number of editorial comments

- **C4A: Ron Hamburger (No):** Deflections of diaphragms may not be a safety concern, things such as glazing may be able to take large deflections out of plane Response A: Big box stores are exempted from drift limits if the elements can handle the displacements and because buildings are not all rectangles, large deflections can result in in place loading of things like glazing that aren't designed for such large deflections.

Motion [Rafael Sabelli]
Motion to find Ron Hamburger's first point non persuasive
Second [David Bonneville]
Approved (14)
Opposed (1)
Abstained (1)

Comment Ron Hamburger: Could make performance of big box structures worse if design is increased, the building will get stiffer and increase the loads on the structure.

Motion [Rafael Sabelli]
Motion to find Ron Hamburger's second point non persuasive
Second [John Silva]
Approved (15)
Opposed (0)
Abstained (1)

Motion [Rafael Sabelli]
Motion to find Ron Hamburger's third point non persuasive
Second [John Silva]
Approved (15)
Opposed (1)
Abstained (0)

- **C5: Jim Harris**: Addressing drift at the edges is incorrect, it's not the edges that drift the most

  Response: That was in the existing language so in the revised provision I struck that phrase "along any edged of the structure"
  Jim Harris is ok with this

- **C6: Phil Line**: Questioned why the proposal addresses semi rigid and flexible diaphragms, why not include everything?

  Response: It would simplify the proposal a lot if we did but we would then be changing the current code which I'm not opposed to, but should be a different proposal. I'm finding this non persuasive

  C7: Bret Lizundia: Section 12.12.2 about diaphragm deformation is confusing

  Response: I agree that I'm intending to supersede this section so I'll revise the language to supersede this section where necessary and update the commentary

  Bret Lizundia accepts this revision but feels there may be some longer term clean up that is needed in these sections

- **C8: John Silva**: Editorial changes
  Response: These have been picked up

- **Discussion about next steps:**

  Revise and reballot.

23. IT-4: Shear Wall Design, S.K. Ghosh, (Attachment #9)

- IT 3 will propose modifications to ASCE 7 Table 12.2-1 adding line items on bearing wall systems, building frame systems, and dual systems featuring ductile reinforced concrete coupled walls.
- Target ballot for April 2019
- IT-4 update on Composite Steel Plate Shear Walls with Coupling study, Amit Varma, (Attachment #10)

  - Next steps: present the preliminary results to Issue Team 4 on the Sept. 5 and 6, 2018 meeting and collect their comments, present to the PUC in December 2018, and ballot in the PUC for April 2019

- IT-4 update on Ductile Couple Reinforced Concrete Shear Walls, Kristijan Kolozvari, (Attachment #11)

  - This will be balloted in April 2019

24. IT-3: Modal Response Spectrum, Anindya Dutta

- IT3 did a torsionally irregular building study using the 8 story CSW building modeled by ATC 123 and studied 3 cases moving the locations of the walls. The modeling of the irregular buildings is complete and the team will compare the drift data at the building corners in RSA and ELF and then create a position paper of analytical findings.

- **IT-3 Proposal by Bob Hanson on RSA Base Shear Scaling**

  - Bob outlined a proposed new approach for reducing the base shear value in MRSA analysis that he believes would be more accurate. This will need more data to substantiate the numbers and where it's going.
  - The PUC wants to see the impact of this on practice. IT 3 will come back to the PUC with some comparative systems before we proceed with the proposal

25. IT-7: Foundation Rocking, Steve Harris (Attachment #12)

- Presentation about rocking effects and the results of some examples. Concluding thoughts:
  - For any building, the effective rocking reduction at maximum safe soil pressure can be computed for each wall and foundation
  - The lowest reduction factor in each direction could be used for the design of all elements, including diaphragms, collectors, etc.
  - The loads reduced in this manner can be considered as $E_{m.}$
  - Most effective in light buildings.

- Seeks input from PUC to see if the study should go further

- Discussions:
  - Displacement expectations? The team will run some analysis and look at this.
  - So far the team only looked at individual walls. It is suggested to apply it to a building as a whole and how much it might rear up
  - There are other types of resisting systems like a basement wall that could be significant.
  - Have you looked at higher modes?
  - Get in touch with ATC 140, Roy Lobo & Bruce Cutter as they are working on this

26. Pile Down Drag, C.B. Crouse

- Subcommittee is proposing an exception to allow other procedures to be allowed to calculate the down drag and induced settlement for piles. The method being proposed is primarily the neutral plane method which is apparently being used by a number of geotechnical engineers and allowed in the Canadian building code.
- It was suggested to handling this directly at the ASCE 7 subcommittee.

27. Adjourn and Future Meetings and Ballots

	Proposal to BSSC, no later than	Post in BSSC Ballot system	PUC Ballot	Proponent Response	PUC discussion
Ballot #3	2/18/2018	Within 3 days	3 weeks	3 weeks	April 4-5, 2018
Ballot #4	6/27/2018	Within 3 days	3 weeks	3 weeks	August 15-16, 2018
Ballot #5	**10/15/2018**	**Within 3 days**	**3 weeks**	**3 weeks**	**December 4-5, 2018**
Ballot #6	**2/22/2019**	**Within 3 days**	**4 weeks**	**3 weeks**	**April 16-18, 2019**