IT9 – Diaphragm Issues

Update November 30, 2016
# Voting Members

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<th>Institution/Company</th>
<th>Location</th>
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<td>Ron La Plante</td>
<td>California Division of the State Architect</td>
<td>San Diego, CA</td>
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(1) *Ben Schafer is primary contact and voting member for steel industry research projects. Matt Eatherton or Jerome Hajjar may attend meetings in Ben's place.*
# Corresponding Members

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<thead>
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<td>Andre Filiatrault</td>
<td>SUNY University at Buffalo</td>
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<td>Patrick Bodwell</td>
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<td>Scott Schiff</td>
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<td>Steve Hobbs</td>
<td>Vulcraft</td>
<td>Tremonton, UT</td>
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<td>Tom Xia</td>
<td>DCI Engineers</td>
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<td>Walt Schultz</td>
<td>Nucor</td>
<td>Norfolk, NE</td>
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Topics

• Topic 1 - Rigid Wall/ Flexible Diaphragm: Determine next steps required to progress the rigid wall - flexible diaphragm seismic design methodology of the FEMA P-1026 guideline document to a Part 1 proposal ready for incorporation into ASCE 7. This will include consideration of technical gaps as well as mandatory language. If possible with IT resources, begin next steps.(road maps)

• Topic 2 - Determine next steps required to fully develop and document the methodology for deriving Rs diaphragm design force reduction factors for the alternative provisions for diaphragm seismic design developed by PUC last cycle. If possible with IT resources, begin next steps.(more likely Part III document, )

• Overlay - Incorporate available steel deck diaphragm information into the two items listed above
Topic 1 - RWFD

• Current focus is wood methodology based on FEMA P-1026
• With eye towards incorporation of steel methodology when it becomes available
**Topic 1 - RWFD**

Completed:

- Identify issues to be resolved prior to Part 1 proposal
  (15 topics identified)
- Identify priority issues and assign topic leaders
  (7 topics high priority, leaders assigned)
  (3 topics to be addressed if possible, leaders assigned)
  (5 topics set aside)
- Identify building configurations for which guidance on applicability and design approach is needed
  (John Lawson powerpoint)
Topic 1 - RWFD

In Progress:

• Develop design guidance for configurations of concern based on presentation by John Lawson

• Provide feedback to steel research team


**Topic 1 - RWFD**

Next steps:

- Progress on identified issues, with reports at monthly web meetings
- Start drafting Part 1 language

Target:

- First draft of Part 1 language and issues identified for input at May IT9 meeting, next PUC meeting

Collaboration:

- ATC-135 project has been created with a small group funded to provide detailed input on steel research that will be basis of steel RWFD methodology.
- ATC-135 project sits between IT9 and steel research team, but information and comments shared across all groups
**Topic 2 – Diaphragm Alternate Design Method**

In Progress:

- Provide background to members on basis of alternate design method and approaches used to date to develop $R_s$
- Review other pertinent R-factor related background

Next steps:

- Establish conceptual basis for future development of $R_s$ factors
- Identify work needed to progress conceptual basis into documented methodology
Steel Research Collaboration

- Two (plus) projects ongoing and of interest:
  1. SDII – Steel Diaphragm Innovation Initiative (Eatherton, Hajjar, Easterling, Sabelli)
     Advance the seismic performance of steel floor and roof diaphragms utilized in steel buildings through:
     - better understanding of diaphragm-structure interaction,
     - new design approaches, and
     - new three-dimensional modeling tools that provided enhanced capabilities to designers utilizing steel diaphragms in their building systems.
     SDII primarily focuses on the seismic design of diaphragms commonly used in steel mid-rise buildings.
Steel Research Collaboration

• Two (plus) projects ongoing and of interest:

2. RWFD: Advancing Seismic Provisions for Steel Diaphragms in Rigid Wall-Flexible Diaphragm (RWFD) Buildings, with NBM Technologies, Inc. (Meimand, Torabian, Eatherton, and Schafer)

Objective:
Validate alternative provisions for conventionally designed steel diaphragms in RWFD buildings.

Scope:
Small-scale testing and related efforts to develop an accurate and validated building scale model for dynamic analysis of steel diaphragms in typical RWFD buildings.
Steel Research Collaboration

• Key research persons included in IT9 – Ben Schafer, Matt Eatherton, Jerome Hajjar

• Will continue to have steel research team present updates to IT9 and will provide IT9 comments to research team, ATC
IT9 Meetings

1. September 12 & 13, 2016 In-person
2. November 18 web meeting

PLANNED
1. December Web Meeting – Week of December 12
2. (Focus on Topic 2, brief report on Topic 1)
3. January Web Meeting – TBD
4. (Focus on Topic 1)
5. February Web Meeting – TBD
6. March Web meeting – TBD
7. April Web Meeting – TBD
8. May In-person Meeting – Week of May 1 or May 8
End