Community Resilience Panel:
Buildings & Facilities Standing Committee Meeting

MEETING DATE: September 21 - 22, 2016
TIME: 1:30 PM MST (9/21) to 9:30 AM MST (9/22)
LOCATION: Fort Collins Marriott, Fort Collins, CO
ISSUE DATE: November 3, 2016

ATTENDEES:

Attendee	Affiliation
Don Scott (Chair)	PCS Structural Solutions
Rachel Minnery (Vice Chair)	American Institute of Architects
David Vaughn (Secretary)	Clemson University
Rachel Bannon-Godfrey	RNL Design
Lindsay Brugger	American Institute of Architects
Stephen Clawson	Facility Engineering Associates P.C.
Navid Attary	Colorado State University
Carol Considine	Old Dominion University
William Coulbourne	Coulbourne Consulting
Derya Deniz	Colorado State University - NIST COE
Gary Ehrlich	NAHB
Rosemarie Grant	State Farm
Rakesh Gupta	Oregon State University
Michael Olen	City of Milwaukee
Jon Heintz	ATC
Robert Pekelnicky	Degenkolb Engineers
Long Phan	NIST Engineering Laboratory
Chris Poland	Chris D Poland Consulting Engineer
Jay Raskin	Oregon Seismic Safety Policy Advisory Committee
Adrienne Sheldon	AECOM
Jason Smart	AWC
Bryan Soukup	The International Code Council
Ed Thomas	Natural Hazards Mitigation Association
Peter Vickery	Applied Research Associates
Greg Wheeler	City of Thornton
Michael Widdekin	The Zurich Services Corporation
Don Scott (Chair)	PCS Structural Solutions
Rachel Minnery (Vice Chair)	American Institute of Architects

DISTRIBUTION: Attendees and Buildings & Facilities Standing Committee
NOTES BY: David Vaughn, Clemson University

1. Welcome and Introductions

Don Scott (Chair) opened the session by welcoming all participants. He reviewed the work performed by the Scenario Teams and asked that each committee member to briefly introduce themselves and provide their affiliation.

1. Scenario Teams

Don Scott (Chair) reviewed the agenda:

A. Finish studies
B. Develop report out presentation, to include:
    1. Identify areas of deficiencies in codes and standards that prevent making buildings and facilities more resilient.
    2. Identify policies that need revision or make recommendations for implementation of new policies.
    3. Share best practices and applications aligned with the Guide.
    4. Identify the most critical interdependency for your community.

The teams broke up, met in different rooms, and worked on the tasks outlined above. After meeting for 1 hour and 40 minutes, each team received 5 minutes to report their findings, as summarized below:

Buildings & Facilities Scenario Teams Goal #1

Identify areas of deficiencies in codes and standards that prevent making buildings and facilities more resilient.

- Current standards do not fully define the design loading conditions that need to be considered for resilient design of buildings & facilities:
    - Tornadoes are not considered in typical building design.
    - Long-duration earthquakes are not considered. Also, aftershocks are not considered.
    - Storm water inundation in Zone C Flood areas is not published. Flood map MRIs are not consistent with other hazards. Base flood elevation is not a resilient assumption.
    - Wildfire is not typically considered/adopted.
- We need to provide an upgrade threshold trigger for existing buildings within the building code. Risk-based upgrade requirements need to be further developed.
- Standards need to consider functionality in development of their provisions.
- Design standards need to move to more performance-based provisions.
- Climate change needs to be considered in future editions of the design standards

Buildings & Facilities Scenario Team Goal #2

Identify policies that need revision or make recommendations for implementation of new policies.

- Building Officials/Special Inspectors need to be more involved in the overall design requirements and construction inspection process.
- Critical facilities should be subject to higher review and design standards.
- Participate in the code development land-use ordinance processes to ensure policies support and enhance resiliency
- Set standards for rebuilding/upgrades to current code, Stafford Act 323, for critical facilities

- Training & communication:
  - For local governments, with federal support, in addition to improved access to recovery planning tools
  - Local building officials are the messenger and not the instigator of increased regulations that are causing resentment in the community.
  - There is a need for increased communication with the general public on expected performance, how to achieve resilient performance, the risks associated with non-compliance, and risk management techniques.
- Hazard warning systems require national standardization.

Buildings & Facilities Scenario Team Goals #3 and 4

Share best practices and applications aligned with the Guide.

- We need practical tools and webinars (solutions) to help the small communities implement the guidelines, along with more examples and guides.
- In addition there should be more resilience sessions at professional events AIA, ASHE, NFPA, ASCE, NAHB, etc.
- We must look at communities that have gone through disasters and apply learned lessons:
  - Moore, OK was rebuilt with individual shelters dispersed throughout.

Identify the most critical interdependency for your community.

- For most locations transportation was the 'critical interdependency.'
  - Moore & Palm Beach are bedroom communities and thus loss of critical services (healthcare, etc.) were their critical interdependency.
- Each community valued LOCATION over other considerations.

Buildings & Facilities Comm. Question #1

- ***What first steps has the committee taken with the goal of providing products that support the six-steps in the NIST Community Resilience Planning Guide?***
  - The committee reviewed the Guide process with the Scenario Team activity.
    - The committee still needs to review final data to determine products that need to be developed from this activity
  - Started to look at guides to help communities to understand their building inventory in regards to resiliency
  - Training or communications of resiliency goal guides need to be developed for building owners. We have not started, but we recommend the Fellows work on this task.

Building & Facilities Comm. Question #2

- ***What are the gaps the standing committee identified as potential areas to contribute additional products to support communities in becoming more resilient?***
  - The standing committee found that most small communities do have disaster plans, but very few have recovery plans.
    - Many smaller communities need to develop their plans on a more regional basis because they do not have the resources to develop their own.
    - Guides for starting a regional team need to be developed.
  - Performance-based design standards for all hazards that provide disaster risk reduction are necessary.
  - We need to incorporate climate change into the standards.

- Design standards need to include 'return to function' considerations for the design of buildings.

Building & Facilities Comm. Question #3

- ***How is your committee planning to address the gaps? (i.e., What products are already being developed? What will be developed? What are your next steps?)***
  - Outside resources are currently being determined for review.
    - We must review these outside resources for inclusion on the RKB.
    - We must also review outside resources to determine where the gaps are. This will take a huge effort.
  - Outside committees are currently being compiled for association and interaction with our committee.
    - We must interact with the other associations to develop standards to support resilience

2. Introduction of Thursday Activity

Don Scott (Chair) welcomed the committee members back and handed the discussion over to Rachel Minnery.

Rachel Minnery (Vice Chair) reminded the committee members of the Group Activity and immediately ask that each of the members to break-up into the groups of their choosing. The groups met for 1 hour and 30 minutes and then reported out their findings, which was followed by a 10-minute Q&A session. Findings are summarized in the attached report out slides and some of the discussion points that will require additional discussion are as follows:

INVENTORY: Codes, standards, guidance, or initiatives published, or are in-process, in your respective sectors?

- NIST Community Resilience Planning Guide
- ANSI
- Homeland Security Panel standards
- ULI Report
- OARS
- RELi checklist
- ASTM committee E06, resilience standards for buildings
- Passive House
- NFPA 1616, mass evacuation and sheltering (NFPA 1600 series & NIST)
- IBHS Fortified

Group A - Vulnerability: Criticality, Assessments, Surge Capacity

1. Propose a methodology to determine the criticality of a facility
   a. Ready.gov – Risk Assessment (Business): https://www.ready.gov/risk-assessment
   b. Kaiser Model for healthcare: http://cchealth.org/ems/pdf/Kaiser-HVA-Tool-and-Instructions.pdf
   c. FEMA 543 and 577
2. Develop standards for Vulnerability Assessment. Consider surge capacity for emergency use.
   a. United Nations - Community Vulnerability Assessment Tool (CVAT)

b. FEMA – Hazard Identification and Risk Assessment: https://www.fema.gov/hazard-identification-and-risk-assessment
c. FEMA – Protecting Our Communities: http://www.fema.gov/protecting-our-communities
d. NIBS/ FEMA Multi Hazard Risk Assessment (Hazus): http://www.fema.gov/multi-hazard-models
e. TISP – Attached Word document with references
f. NHMA A Living Mosaic: http://nhma.info/wp-content/uploads/2016/04/A_Living_Mosaic_FINAL.pdf
g. Community based vulnerability assessment: http://www.mdcinc.org/sites/default/files/resources/Community%20Based%20Vulnerability%20Assessment.pdf
h. FEMA 452: https://www.fema.gov/fema-452-risk-assessment-how-guide-mitigate-potential-terrorist-attacks-against-buildings
i. Walter Peacock, Texas A&M: http://hrrc.arch.tamu.edu/publications/research%20reports/
j. IUNC Review of Vulnerability Assessment models: https://portals.iucn.org/library/efiles/documents/2011-068.pdf
k. Texas A& M Surge studies and models for hospitals: http://bush.tamu.edu/psaa/capstones/projects/2009/NationalPreparednessDeliverableII.pdf
l. OCHA – Surge Capacity: http://www.unocha.org/what-we-do/coordination-tools/surge-capacity/overview
m. IFRC Vulnerability and Capacity Assessment Tool: http://www.ifrc.org/Global/Publications/disasters/vca/Vca_en.pdf

Group B - Awareness & Risk disclosure, Returns on Investment

1. List code development milestones, to provide a base level of structural performance.
   a. Expand definition of critical facility to reflect local dependencies
2. Do you recommend evaluation and monitoring of existing buildings? If so, at what intervals?
   a. Yearly spotting by AHJ, detailed investigation if needed
   b. Challenge: qualified inspectors
   c. Milwaukie: Every 5 years, bldgs higher than 4 stories evaluated (façade primarily)
   d. Critical facilities should be evaluated more often, could tie to yearly fire inspections
   e. Need resource that provides template/matrix of what to look for during “resilience” inspection (given local hazard risk
   f. Spot for structural AND nonstructural damage as nonstructural most often prevents habitation post-disaster
   g. Build off from existing inspection methods and frequency (ie. bridges and railroads already regularly inspected)
3. Recommend methodologies to communicate and disclose hazard risks. When and to whom should they be communicated? (point of sale, when hazard mitigation plans are updated, etc.)
   a. Post most recent and next inspection dates (similar to elevator) for public awareness (would also need some wider public education to build understanding)
   b. In CA – must disclose if downstream of dam
   c. Expand homeowner inspections to evaluate hazard risk and building performance

d. Public awareness campaigns geared towards homeowner associations
e. Multiple methods of communication (social media, local churches, tap into existing community networks etc)
f. Need for education on effective home maintenance
g. Partner with insurance companies for public awareness campaign around risk awareness and value of mitigating that risk
h. Education on code benefits and limitations to city level. Understand what code developments mean, why they're important

Group C - Aligning performance characteristics

1. Performance Standards: what specific design criteria needs to be unified? State common performance goals for building components; trace them back to their source to document interdependencies. (buildings cannot be recovered without the functionality of other infrastructure systems)
   a. Consider social and economic needs of the community. Expected performance will vary depending on the function and use of the building. Highest level would be expected to perform, without disruption, through the design event and its aftermath; intermediate level would allow for use of critical functions during repairs; lowest level would simply ensure life-safety during the design event. These performance goals should be applied to every aspect of design. An example of design criteria that need to be unified are means of egress (need to be designed considering all applicable hazards). Systems that must be designed to the applicable performance level: structure, ventilation, water, light, building envelope.
2. Identify specific resources for each scale and segment of the building industry (civil, structural, architectural, etc.
   a. ASCE 7
   b. ASCE 41 for seismic (and the potential future equivalent for wind)
   c. PBD standards for fire design
   d. I-codes (including International PBD code)
3. Recommend top priorities for research required to inform resilience practice and policy, such as investigating unintended consequences vs. public health, and completing cost-benefit analysis of building resilience
   a. Establish design parameters (e.g., seismic, fire, etc.) for new and emerging construction types
   b. Improved characterization of loading that each building type will be subjected to in design events (including tornadoes and tsunamis)

Group D - Defining resilience: code performance, "above code", incorporating climate data

1. Recommend protocol for incorporating climate data projections into base code design.
   a. Establish design parameters (e.g., seismic, fire, etc.) for new and emerging construction types
   b. Improved characterization of loading that each building type will be subjected to in design events (including tornadoes and tsunamis)
2. Define a resilience standard (return to function). Is the standard based upon a building service life assumption? Include criteria and information on return (ROI) periods

a. Return to function is based on many factors and may need to be evaluated using a matrix, factors include:
   i. Time (no loss of service (hospitals), 24 hours, 48 hours, 96 hours)
   ii. Type of building
   iii. Owner requirements
   iv. Reliance on external infrastructure
   v. Community values (housing, employees, etc.)
b. Return on Investment is based on owner values. A rating system for building resilience can help owners make informed decisions. Criteria for consideration includes:
   i. Identification of hazards
   ii. Risk profile of hazards
   iii. Risk tolerance
   iv. Value proposition

Group E - Community, Land Use, Building Departments

1. Optimize FEMA's existing community rating systems for other hazards, climate and applications
2. Create recommendations for building and planning department competencies and processes. Be sure to include building industry professionals in a participatory process
3. Recommend general land use opportunities that implement resilience strategies and promote community service redundancies.

After each of the Teams reported there was a 10-minute Q&A session and the following points were discussed, which should be addressed as part of future planning activities:

A. As part of the movement towards Community Resilience the following should be considered:
   a. Disaster Risk Reduction
   b. Social aspects such as crime
   c. Along with natural disasters we should be considering human caused events
B. Rating Systems have been very affective in that past when they reward good conduct and we need to find ways to expand the influence by:
   a. Rewarding the proper use of building codes and land use practices
   b. We need to develop a "Standard of Care" document that will describe what can be done to create a resilient community.

4. Next Panel Meetings

The Standing Committee will meet monthly on conference calls to advance the projects.

5. Adjournment

There was no other business and the meeting adjourned at approximately 9:30 pm MST.