A Risk Communication Game-Changer: The U.S. Resiliency Council (USRC) Building Rating System

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Agenda

- Background Context
- U.S. Resiliency Council (USRC)
- Current Draft Rating System
- Challenges that are being overcome
Communication Paradigm

- Public perception of expected performance
- Engineer’s perception of expected performance
Background Context

- Present-generation assessment
Implementation Problems

- Stakeholders did not fully understand the ramifications of performance objectives
- Discrete performance levels did not translate well into financial decision-making
- EQ hazard levels (500/2500 years) were difficult to explain
Next-Generation Assessment

- FEMA P-58 Seismic Performance Assessment
- Probable consequences and explicit consideration of uncertainty
  - Casualties
  - Repair costs
  - Repair time
  - Unsafe placarding
Stakeholder Interaction

  – Owners, developers, lenders, insurers, institutions, corporations, building officials, civic managers, and design professionals
Workshop Findings

- What did we learn?
  - Probability concepts are not well understood by most stakeholders

- In spite of our best efforts…
  - Something was lost in the translation from present to next-generation metrics
  - We have new communication challenges to solve
Need for a Rating System

- National imperative
  - NEHRP Workshop on Meeting the Challenges of Existing Buildings (ATC 71, 2008)
  - Prioritized Research for Reducing the Seismic Hazards of Existing Buildings (ATC-73, 2007)
  - Grand Challenges in Earthquake Engineering Research, A Community Workshop Report (National Academies, 2011)

- If only people could be made more aware, they would make better decisions
Need for a Rating System

- A rating system would:
  - Communicate performance to broad-based, non-technical audiences
  - Address new and existing buildings in a consistent context
  - Correct popular misconceptions about expected performance
  - Provide a context for public policy decisions and market forces to encourage and reward better performing designs
Why Now?

- **Technology**
  - FEMA P-58 provides a methodology for quantitative assessment

- **Vision**
  - SEAONC completed their Earthquake Performance Rating System (EPRS)

- **Demand**
  - City of LA Mayor’s initiative to identify and mitigate seismic risk in LA
The U.S. Resiliency Council (USRC) Building Rating System

- Be the administrative vehicle for implementation
- Promote and implement a rating system
- Educate the public about hazards associated with buildings
- Credential engineers and others to perform ratings
- Review ratings for conformance to the technical methodologies
The U.S. Resiliency Council (USRC) Building Rating System

Current USRC Structure – 501(c)3 non-profit

- Technical Advisory Board
  - Engineers
    - Professional Organizations
- Board of Directors
- Stakeholders Advisory Board
  - Owners
    - Lenders
    - Insurers
    - Tenants
    - Electeds
    - Regulators
    - Contractors
    - Engineers
- Executive Director
- Auditors
- Accredited Professionals
- Users of Ratings
Challenges

A rating system must:

- Be technically rigorous, but easily understood
- Communicate complex engineering ideas, but in a sound-bite fashion
- Be reliable and repeatable, but easy (and inexpensive) to implement
- Provide a realistic assessment of potential risk, but not be overconservative
- Represent consensus opinion from broad-based engineers, but also engage stakeholders
Ideas for Communication

The U.S. Resiliency Council (USRC) Building Rating System
USRC Rating System

- 3 dimensions
# Rating System - Safety

<table>
<thead>
<tr>
<th>Safety Rating</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>******</td>
<td>Serious injuries very unlikely and blocking of exit paths unlikely</td>
<td>Expected performance results in conditions very unlikely to cause serious injuries or to keep people from exiting the building.</td>
</tr>
<tr>
<td>****</td>
<td>Serious injuries unlikely</td>
<td>Expected performance results in conditions that are unlikely to cause serious injuries.</td>
</tr>
<tr>
<td>***</td>
<td>Loss of life unlikely</td>
<td>Expected performance results in conditions that are unlikely to cause loss of life. Potential exists for injuries as a result of falling objects in and around the building.</td>
</tr>
<tr>
<td>**</td>
<td>Loss of life likely in isolated locations</td>
<td>Expected performance results in partial collapse or falling objects which have a potential to cause loss of life at some locations within or around the building.</td>
</tr>
<tr>
<td>*</td>
<td>Loss of life likely throughout the building</td>
<td>Expected performance results in building collapse which has a high potential for deaths of people who are in or around the building.</td>
</tr>
</tbody>
</table>
# Rating System – Repair Cost

<table>
<thead>
<tr>
<th>Repair Cost Rating</th>
<th>Description</th>
<th>Repair Cost Likely Consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td>*****</td>
<td>Minimal Damage</td>
<td>Repair Cost likely less than 5% of building replacement cost.</td>
</tr>
<tr>
<td>****</td>
<td>Moderate Damage</td>
<td>Repair Cost likely less than 10% of building replacement cost.</td>
</tr>
<tr>
<td>***</td>
<td>Significant Damage</td>
<td>Repair Cost likely less than 20% of building replacement cost.</td>
</tr>
<tr>
<td>**</td>
<td>Substantial but Repairable Damage</td>
<td>Repair Cost likely less than 50% of building replacement cost.</td>
</tr>
<tr>
<td>*</td>
<td>Substantial Damage</td>
<td>Repair Cost likely greater than 50% of building replacement cost.</td>
</tr>
<tr>
<td>NE</td>
<td>Not Evaluated</td>
<td>Repair Cost has not been evaluated.</td>
</tr>
</tbody>
</table>
# Rating System – Function

<table>
<thead>
<tr>
<th>Time to Regain Basic Function Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*****</td>
<td><strong>Within days</strong>&lt;br&gt;Excluding external factors, the expected performance will very likely result in people being able to quickly re-enter and resume use of the building from immediately to a few days.</td>
</tr>
<tr>
<td>****</td>
<td><strong>Within weeks</strong>&lt;br&gt;Excluding external factors the expected performance may result in delay of minimum operational use for at least a week.</td>
</tr>
<tr>
<td>***</td>
<td><strong>Within months</strong>&lt;br&gt;Excluding external factors the expected performance may result in delay of minimum operational use for at least one month.</td>
</tr>
<tr>
<td>**</td>
<td><strong>More than 6 months</strong>&lt;br&gt;Expected performance may result in delay of minimum operational use for at least six months.</td>
</tr>
<tr>
<td>*</td>
<td><strong>More than one year</strong>&lt;br&gt;Expected performance may result in delay of minimum operational use for at least one year or more.</td>
</tr>
<tr>
<td>NE</td>
<td><strong>Not Evaluated</strong>&lt;br&gt;Time to regain basic function has not been evaluated.</td>
</tr>
</tbody>
</table>
Calibration of USRC Rating Definitions
The U.S. Resiliency Council (USRC) Building Rating System

USRC Ratings Process

1. **Owner Wants a Rating**
   - Owner hires a USRC Credentialed Engineer

2. **Credentialed Engineer**
   - Performs evaluation. Sends USRC prelim. rating with fee TBD

3. **USRC**
   - Organizes Audit and Issues Verified Rating
   - Tracks and Issues Professional Rating. USRC also organizes random audit of 1 in X projects

4. **Anyone can check with USRC**
   - on Validity of Rater and Rating – no details revealed

5. **Engineer**
   - May use Appeal Process if they believe Rating is better than methodology provides, Costs TBD
Conclusions

- There are additional technical, legal, organizational, and financial challenges to solve
- The USRC provides a vehicle to implement a system in a credible, and equitable way, which can avoid the pitfalls of the current PML system
Conclusions (cont’d)

- Performance-based design serves only a subset of the population
- It has failed to capture the attention of the public, and performance is a secondary concern in building procurement decisions
- A rating system will speak to the population as a whole, and will change the game in risk communication
Thank you!