
***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

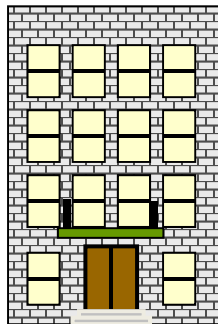
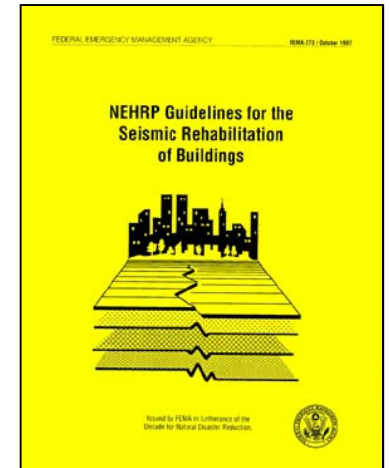
Communication Paradigm

- Public perception of expected performance
- Engineer's perception of expected performance

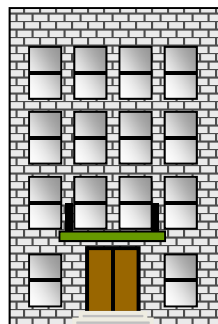


Background Context

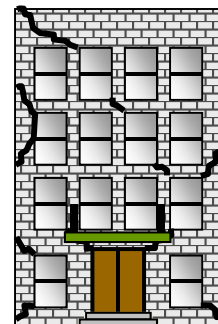
- Present-generation assessment
 - FEMA 273 *NEHRP Guidelines for Seismic Rehabilitation of Buildings* (1997)



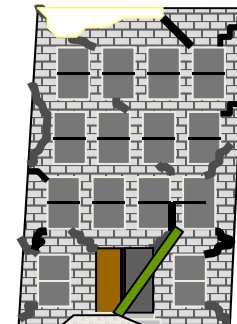
Operational



*Immediate
Occupancy*

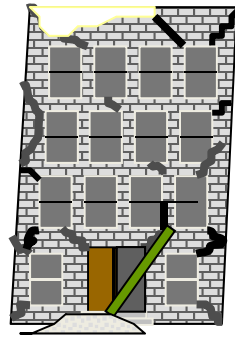


*Life
Safety*

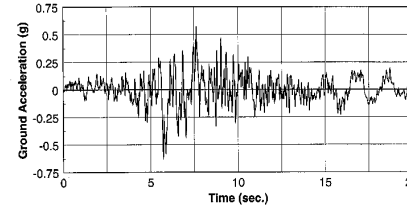


*Collapse
Prevention*

Implementation Problems



*Collapse
Prevention*

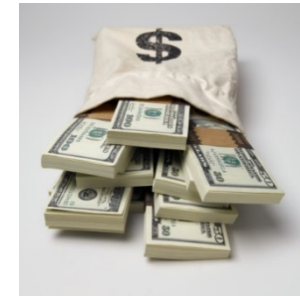


Ground
Motion

- 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

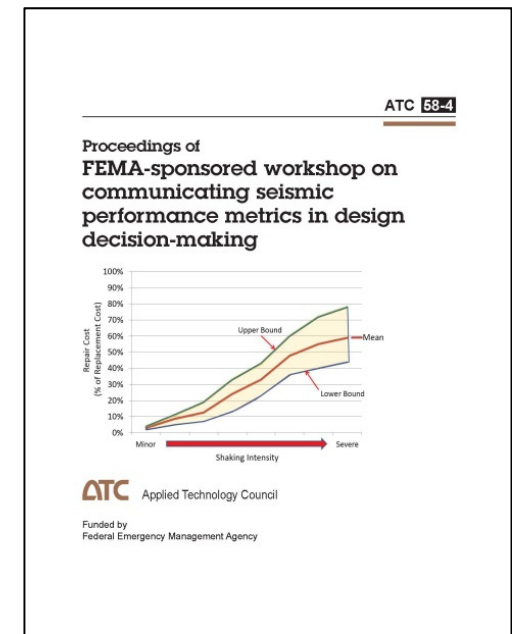


Task Name	Duration	Start	End
1. Develop Project Schedule	100 days	01/01/2012	03/01/2012
2. 2012 Phase 1 Strategic Plan	100 days	01/01/2012	03/01/2012
3. 2012 Phase 2 Strategic Plan	100 days	03/01/2012	05/01/2012
4. 2012 Phase 3 Strategic Plan	100 days	05/01/2012	07/01/2012
5. 2012 Phase 4 Strategic Plan	100 days	07/01/2012	09/01/2012
6. 2012 Phase 5 Strategic Plan	100 days	09/01/2012	11/01/2012
7. 2012 Phase 6 Strategic Plan	100 days	11/01/2012	01/01/2013
8. 2012 Phase 7 Strategic Plan	100 days	01/01/2013	03/01/2013
9. 2012 Phase 8 Strategic Plan	100 days	03/01/2013	05/01/2013
10. 2012 Phase 9 Strategic Plan	100 days	05/01/2013	07/01/2013
11. 2012 Phase 10 Strategic Plan	100 days	07/01/2013	09/01/2013
12. 2012 Phase 11 Strategic Plan	100 days	09/01/2013	11/01/2013
13. 2012 Phase 12 Strategic Plan	100 days	11/01/2013	01/01/2014
14. 2012 Phase 13 Strategic Plan	100 days	01/01/2014	03/01/2014
15. 2012 Phase 14 Strategic Plan	100 days	03/01/2014	05/01/2014
16. 2012 Phase 15 Strategic Plan	100 days	05/01/2014	07/01/2014
17. 2012 Phase 16 Strategic Plan	100 days	07/01/2014	09/01/2014
18. 2012 Phase 17 Strategic Plan	100 days	09/01/2014	11/01/2014
19. 2012 Phase 18 Strategic Plan	100 days	11/01/2014	01/01/2015
20. 2012 Phase 19 Strategic Plan	100 days	01/01/2015	03/01/2015
21. 2012 Phase 20 Strategic Plan	100 days	03/01/2015	05/01/2015
22. 2012 Phase 21 Strategic Plan	100 days	05/01/2015	07/01/2015
23. 2012 Phase 22 Strategic Plan	100 days	07/01/2015	09/01/2015
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25. 2012 Phase 24 Strategic Plan	100 days	11/01/2015	01/01/2016
26. 2012 Phase 25 Strategic Plan	100 days	01/01/2016	03/01/2016
27. 2012 Phase 26 Strategic Plan	100 days	03/01/2016	05/01/2016
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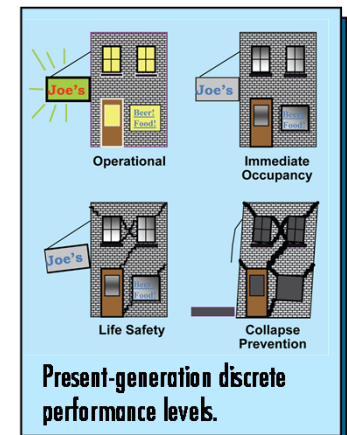
Stakeholder Interaction

- Workshop on Communicating Seismic Performance Metrics in Design Decision-Making (2013)
 - 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

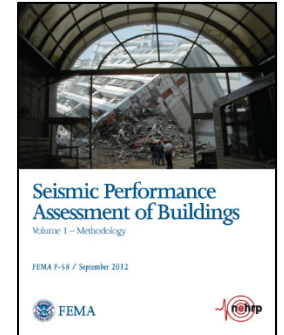
- National imperative
 - NEHRP Workshop on Meeting the Challenges of Existing Buildings (ATC 71, 2008)
 - Prioritized Research for Reducing the Seismic Hazards of Existing Buildings (ATC-73, 2007)
 - Grand Challenges in Earthquake Engineering Research, A Community Workshop Report (National Academies,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

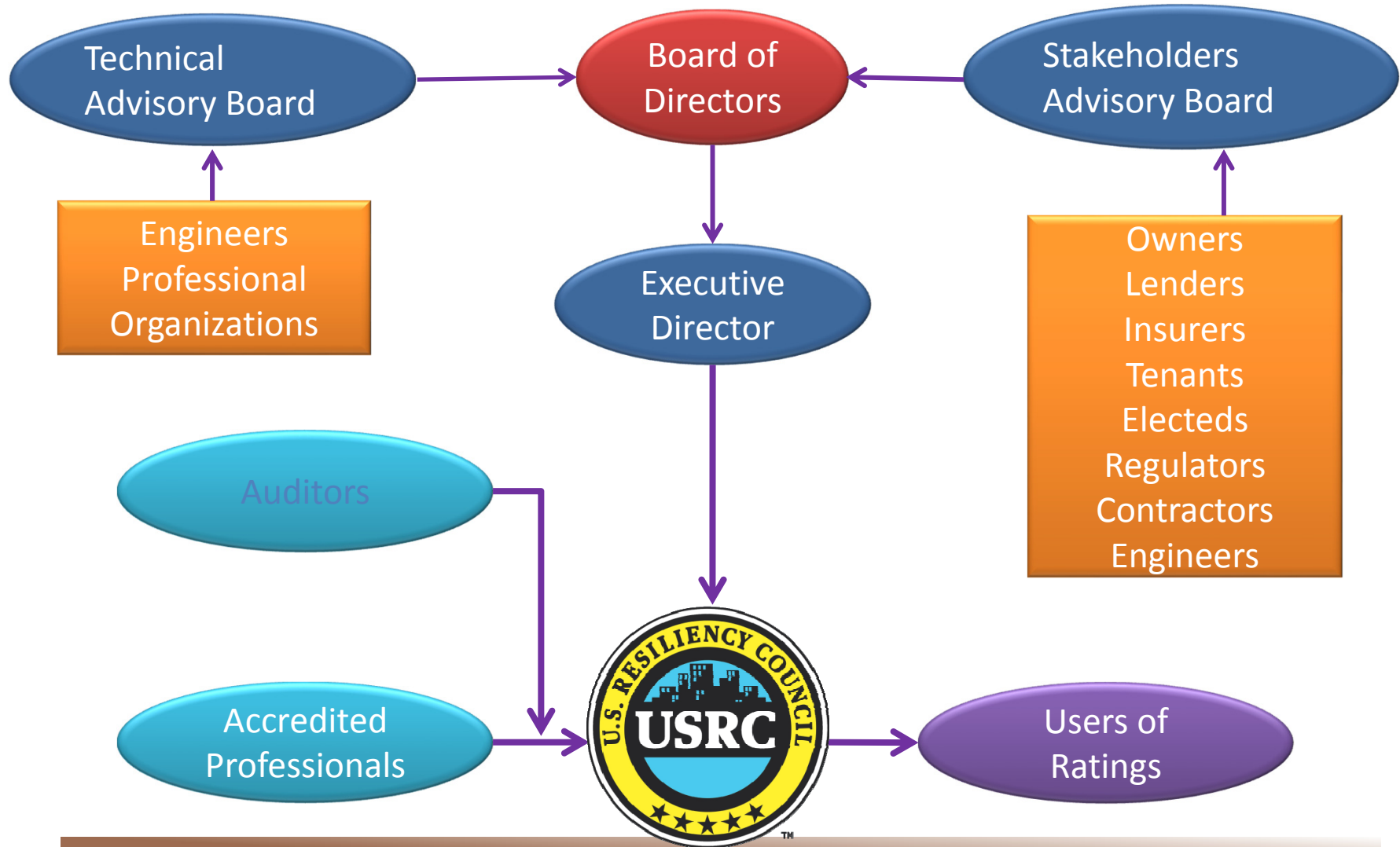


U.S. Resiliency Council (USRC)

- 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



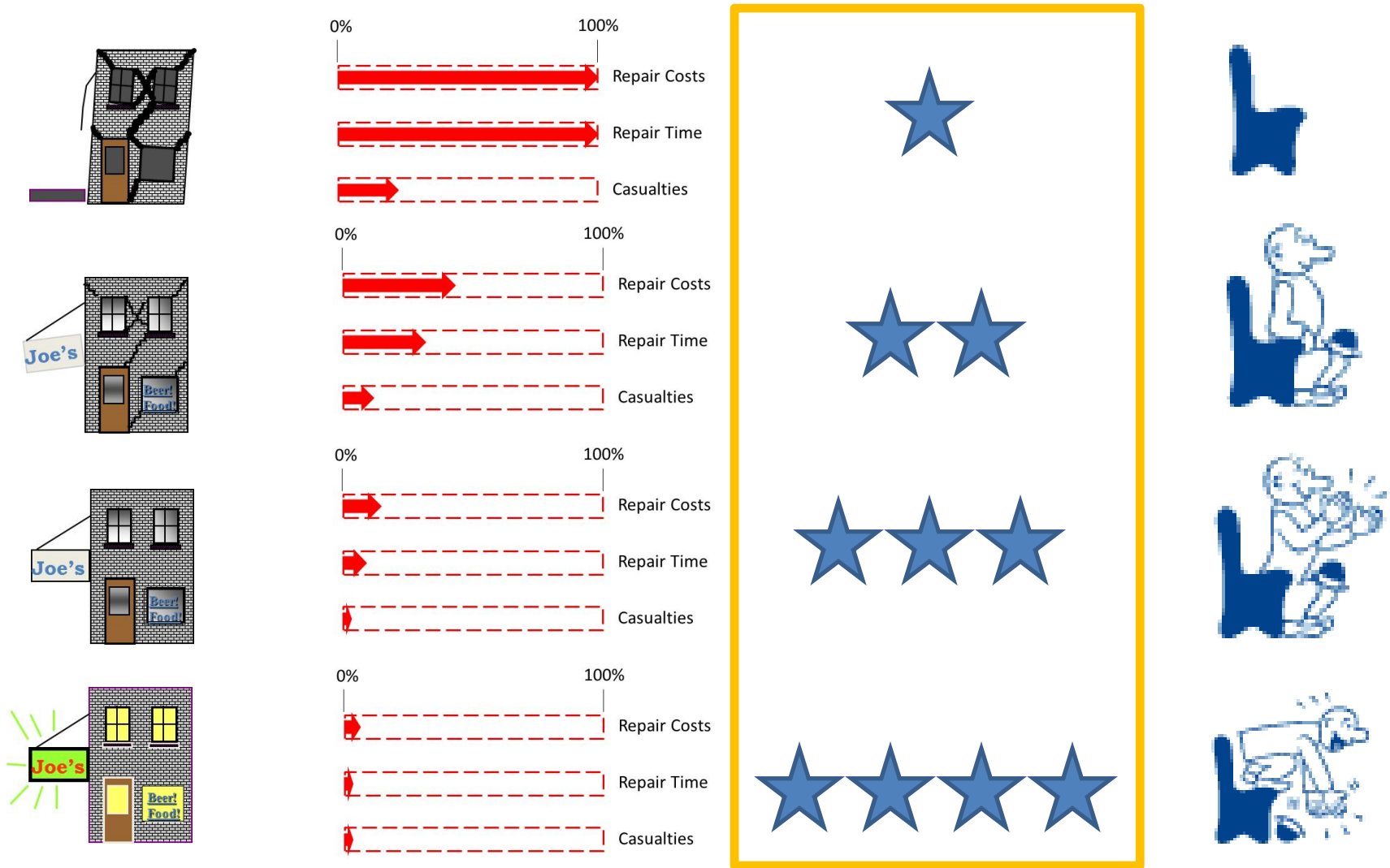
Current USRC Structure – 501(c)3 non-profit



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



USRC Rating System

- 3 dimensions



Rating System - Safety

Safety Rating	
*****	Serious injuries very unlikely and blocking of exit paths unlikely Expected performance results in conditions very unlikely to cause serious injuries or to keep people from exiting the building.
****	Serious injuries unlikely Expected performance results in conditions that are unlikely to cause serious injuries.
***	Loss of life unlikely 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.
**	Loss of life likely in isolated locations 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.
*	Loss of life likely throughout the building Expected performance results in building collapse which has a high potential for deaths of people who are in or around the building.

Rating System – Repair Cost

Repair Cost Rating	
*****	Minimal Damage Repair Cost likely less than 5% of building replacement cost
****	Moderate Damage Repair Cost likely less than 10% of building replacement cost.
***	Significant Damage Repair Cost likely less than 20% of building replacement cost.
**	Substantial but Repairable Damage Repair Cost likely less than 50% of building replacement cost.
*	Substantial Damage Repair Cost likely greater than 50% of building replacement cost.
NE	Not Evaluated Repair Cost has not been evaluated.

Rating System – Function

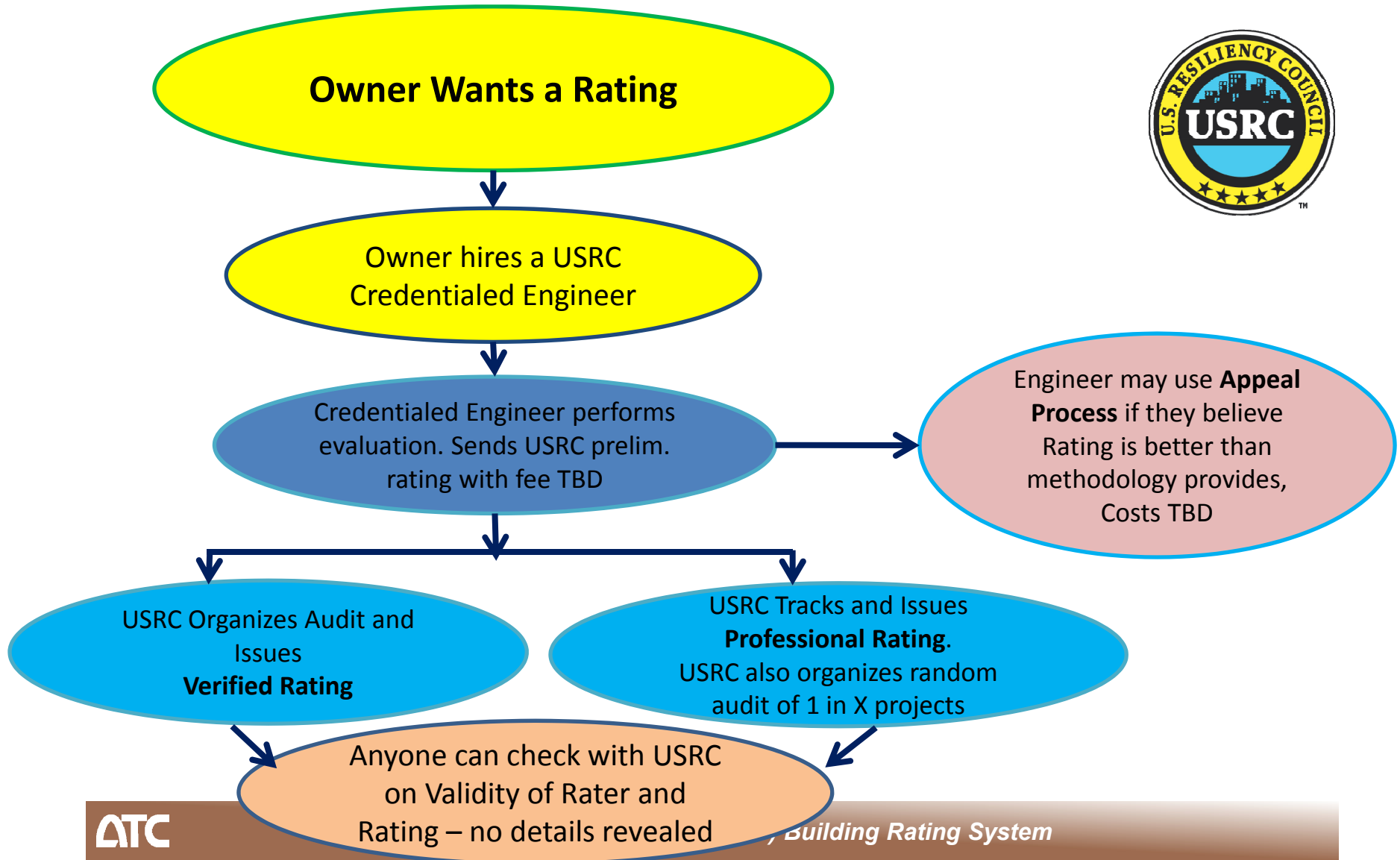
Time to Regain Basic Function Rating

*****	Within days 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.
****	Within weeks Excluding external factors the expected performance may result in delay of minimum operational use for at least a week.
***	Within months Excluding external factors the expected performance may result in delay of minimum operational use for at least one month.
**	More than 6 months Expected performance may result in delay of minimum operational use for at least six months.
*	More than one year Expected performance may result in delay of minimum operational use for at least one year or more.
NE	Not Evaluated Time to regain basic function has not been evaluated.

Calibration of USRC Rating Definitions



USRC Ratings Process



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!

