

Elements of Disaster Resilience

Contributed by the Knowledge Resources staff

March 2008

The AIA collects and disseminates Best Practices as a service to AIA members without endorsement or recommendation. Appropriate use of the information provided is the responsibility of the reader.

SUMMARY

The AIA Center for Building Science and Performance Knowledge Community hosted a symposium on disaster resilience on March 1, 2008. Laurie Johnson, an urban planner and expert in the field of disaster response and preparedness, presented “Recommendations for Disaster-Resilient Communities and Buildings.” Her presentation on some recent disasters and earthquake response preparation in California was framed by a theoretical discussion of disaster resilience.

A CLEAR DEFINITION OF DISASTER

The term “disaster” is often defined as “an event, concentrated in time and space, in which society...undergoes severe danger and incurs...losses to its members and physical appurtenances...” (Fritz, 1961). Johnson observed that this definition is problematic. Disasters are not isolated events, concentrated in time and space, but happen again and again. Physical losses may be an essential element of a disaster, but these occurrences are more complex than physical loss, with cultural, economic, social, and institutional ramifications.

A NEW FOCUS: RESILIENCE

Once the definition of disaster has been clarified, the dialogue surrounding disaster restoration can change. The focus is expanded beyond the physical to address all elements of society that are affected. This new type of restoration effort requires resilience—the ability to bounce back after physical stress.

Johnson cited the writings of Michel Bruneau and the books “The Resilient City” by Vale and Campanella and “Collapse” by Jared Diamond in her discussion of resilience. Bruneau is known for his work on multihazard engineering with the Multidisciplinary Center for Earthquake Engineering Research (MCEER) at the University of Buffalo. He identifies resilience using four properties referred to as the four Rs:

- **Robustness**—The inherent strength or resistance in a system that allows it to withstand external demands without degradation or loss of functionality
- **Redundancy**—System properties that allow for alternate options, choices, and substitutions under stress
- **Resourcefulness**—The capacity to mobilize needed resources and services in emergencies
- **Rapidity**—The speed with which disruption can be overcome and safety, services, and financial stability restored

Efforts to rebuild and revitalize New Orleans after Hurricane Katrina reflect attention to the four Rs. Planners, citizens, business owners, and public officials are preparing for future disasters and working to make New Orleans a more resilient city. Details about lessons learned in their planning and restoration efforts can be found at “Lessons Learned: Urban Planning in New Orleans.”

EARTHQUAKE MITIGATION PLANNING

For the 100th anniversary of the 1906 earthquake, San Francisco planners are taking a proactive approach to the needs of the city in relation to the four Rs. Considering New Orleans, which is now grappling with planning and flood mitigation in the aftermath of devastation, the city of San Francisco is working to get ahead of the curve.

Strategies for Earthquake Mitigation

The San Francisco Planning and Urban Research Association (SPUR) and the Earthquake Engineering Research Institute (EERI) are collaborating to prepare San Francisco’s built environment, institutions, and citizens for future seismic activity. The top 10 actions for earthquake professionals recommended by SPUR, divided into three categories, are these:

Develop a Culture of Preparedness

1. Know your seismic risk.
2. Prepare to be self-sufficient for 72 hours.
3. Plan to care for vulnerable populations.
4. Prepare to respond, and run practice exercises often.

Invest in Reducing Losses

5. Secure collapse hazard buildings.
6. Retrofit essential facilities for earthquake resistance.
7. Retrofit vulnerable infrastructure.

Ensure Resiliency in Recovery

8. Plan for displaced households.
9. Plan for financing to cover the cost of reconstruction.
10. Develop a government plan to fund reconstruction.

How to Prepare

SPUR defines the concept of resilience after a seismic event as the ability of the city to

- Contain the effects of earthquakes.
- Carry out recovery activities in ways that minimize social disruption.
- Rebuild in ways that mitigate the effects of future earthquakes.

SPUR has also mapped a timeline for disaster response that defines time-sensitive actions at all points during the response and recovery effort. Disaster response has three phases: the initial response, ongoing social needs, and long-term recovery.

Looking Forward: What Needs to Be in Place

For San Francisco, the next step is to develop policies to help achieve resiliency. Policies that create:

- Needed transparency and flexibility in new building codes
- A balance of requirements for existing buildings
- Lifelines on the grassroots level based on new national standards and incentives

Bruneau has four recommendations to achieve community resilience:

- Public awareness. Citizens need to be educated and aware of risks.
- Planning. This should occur up front and happen at the grassroots level.
- Leadership. Proactive leadership is vital; leaders cannot assume the next disaster will occur after their term of office has ended.
- Resource allocation. A sustained federal and state funding commitment is essential.

ABOUT THE PRESENTER

Laurie Johnson has more than 17 years of professional experience in catastrophe-related consulting, management, and research. She has written extensively about the economics of catastrophes, land use and risk, and disaster recovery and reconstruction.

RESOURCES

More Best Practices

The following AIA Best Practices provide additional information related to this topic:

- 11.09.02 The AIA's 10 Principles for Livable Communities
- 11.09.06 Lessons Learned: Urban Planning in New Orleans
- 11.07.02 Advantages of Raised-Floor Foundations in Floodplains

For More Information on This Topic

See also the sidebar “Record Keeping to Create a Legacy” by Tawny Ryan Nelb (pp. 447–48) in the topic on “Retaining and Archiving Records” in *The Architect's Handbook of Professional Practice*, 14th edition. *The Handbook* can be ordered from the AIA Bookstore by calling 800-242-3837 (option 4) or by sending an e-mail to bookstore@aia.org.



Feedback

The AIA welcomes member feedback on Best Practice articles. To provide feedback on this article, please contact bestpractices@aia.org.

Key Terms

- Events
- Disasters and failures
- Master planning

This Best Practice was produced in collaboration with the AIA's Knowledge Communities; for more information, please go to www.aia.org.