



Inspecting Buildings after Natural Disasters

James "Scott" Groenier, Project Leader

The recent hurricanes in the United States and the earthquake in Pakistan show the need for rapid structural safety assessments of buildings after natural disasters. After a disaster, public officials who regulate building safety need to determine the damage to buildings and let the public know whether the buildings are safe. These assessments are difficult, particularly because building department employees also may be victims of the disaster and may be overwhelmed with the workload.

for an immediate response by structural engineers who perform the structural assessments after a major disaster. The plan would help States assemble teams of structural engineers ready to respond safely and efficiently to a structural disaster. The *SEERPlan Manual* was completed in 2003 (figure 1). The manual can be ordered from the NCSEA for \$25 plus shipping. An order form is available at <http://www.ncsea.com/downloads/seerplanorder.pdf>.

Where to Find Information about Assessments

Recently, the National Council of Structural Engineers Associations (NCSEA) developed a manual and training package for these assessments. The manual outlines a comprehensive *SEERPlan Manual: Structural Engineers Emergency Response Plan*. The primary focus of the plan is to develop a framework

Highlights...

- Structural engineers need to be prepared to make rapid safety assessments of buildings after natural disasters.
- Manuals and guidelines published by the National Council of Structural Engineers Associations and the Applied Technology Council can help structural engineers prepare themselves for these assessments.

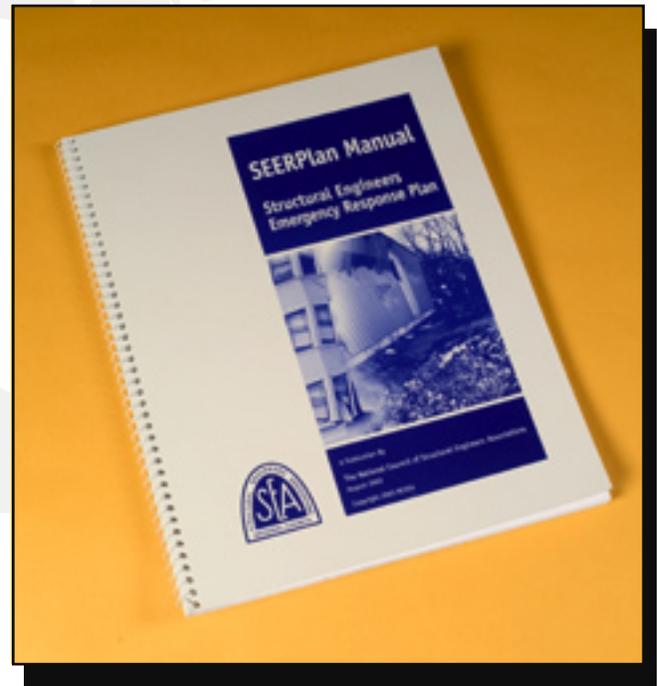


Figure 1—The *SEERPlan Manual: Structural Engineers Emergency Response Plan* was developed for structural engineers who need to perform structural assessments after natural disasters.

In the late 1990s, the Applied Technology Council (ATC) developed and published *Post-Earthquake Safety Evaluation of Buildings* (ATC-20). The ATC recently published guidelines on safety evaluations of buildings after windstorms and floods



(ATC-45) patterned after the widely used standard ATC-20. The ATC-20 and ATC-45 reports and field manuals can be ordered on the Web at <http://www.atcouncil.org/Merchant2/merchant.mv?Screen=PLST>.

The ATC standards provide systematic procedures for conducting building safety evaluations after natural disasters and are the technical guidelines throughout the United States. After an ATC-20/45 safety evaluation, a building will be posted with a red (unsafe), yellow (restricted use), or green (inspected) placard that will let the building's tenants, owner, and the general public know of the building's relative safety. The NCSEA has organized member associations in 39 States to provide volunteer engineers who can perform building safety assessments after natural disasters. This program is called the *SEERProgram*.

According to the NCSEA, the ATC-20/45 guidelines (figure 2) and the SEERProgram provide:

- A clear public communication tool for identifying a building's safety and risk.
- A systematic method and documented procedure for building safety evaluations after disasters.
- A standardized building safety placard system.
- Highly trained volunteers who can serve as building safety assessment engineers after a natural disaster.
- A cadre of highly trained engineers to provide specialized training to local building officials and inspectors on the ATC-20/45 building safety evaluation protocol.



Figure 2—The Applied Technology Council has published a procedures manual and two field manuals on safety evaluations of buildings after earthquakes, windstorms, and floods.

Other organizations also are publishing information to help during structural assessments after natural disasters. APA—The Engineered Wood Association published the *Customer Service Tip, Assessing Water Damage after a Flood*, with information about the serviceability of wooden structural panels after a flood. The publication may be downloaded free after registration at http://www.apawood.org/level_b.cfm?content=pub_main. Search for Form X501.

Preparing for Natural Disasters

The Federal Emergency Management Agency has many publications on design and construction guidance for natural disasters such as hurricanes, earthquakes, floods, and tornadoes. Electronic versions of the publications are available at: <http://www.fema.gov/library/prepandprev.shtm>.

Another source of information for flood-resistant design for new buildings is the American Society of Civil Engineers' standard ASCE/SEI 24-05, which can be ordered at: <http://www.pubs.asce.org/books2.html>.

Conclusions

Many resources are available to help structural engineers assess damages after a natural disaster. Structural engineers should become familiar with these resources so they will be prepared when a natural disaster strikes.

Sources of Information

American Society of Civil Engineers

1801 Alexander Bell Dr.
Reston, VA 20191
Phone: 800-548-ASCE (2723)
Web site: <http://www.asce.org>

APA-The Engineered Wood Association

7011 South 19th
Tacoma, WA 98466
Phone: 253-565-6600
Fax: 253-565-7265
Web site: <http://www.apawood.org/>

Applied Technology Council

201 Redwood Shores Parkway, Suite 240
Redwood City, CA 94065
Phone: 650-595-1542
Fax: 650-593-2320
Web site: <http://www.atccouncil.org/>

Federal Emergency Management Agency

500 C Street SW.
Washington, DC 20472
Phone: 800-621-FEMA
Web site: <http://www.fema.gov/>

National Council of Structural Engineers Associations

645 North Michigan Ave., Suite 540
Chicago, IL 60611
Phone: 312-649-4600
Fax: 312-649-5840
Web site: <http://www.ncsea.com/>

About the Author

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tation and with an engineering consulting firm before joining the Forest Service in 1992. He worked as the east zone structural engineer for the Eastern Region and as a civil engineer for the Ashley and Tongass National Forests before coming to MTDC.

Library Card

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Identifies sources of manuals and training materials structural engineers can use for safety assessments of buildings after natural disasters.

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For additional information about inspecting buildings after hurricanes and earthquakes, contact James “Scott”

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Electronic copies of MTDC’s documents are available on the Internet at <http://www.fs.fed.us/eng/t-d.php>.

Forest Service and Bureau of Land Management employees can search a more complete collection of MTDC’s documents, videos, and CDs on their internal computer network at <http://fsweb.mtdc.wo.fs.fed.us/search>.



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