FEMA P-1000: A SCHOOL SAFETY GUIDE FOR NATURAL HAZARDS

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ABSTRACT

FEMA P-1000, Safer, Stronger, Smarter: A Guide to Improving School Natural Hazard Safety provides up-to-date, authoritative information and guidance that schools can use to develop a comprehensive strategy for addressing natural hazards. The Guide presents information and guidance on: (1) identifying natural hazards that could potentially impact a school; (2) making new and existing school buildings safer for children and staff, and more resistant to damage during natural disasters; (3) planning and preparing for effective and successful response during a natural disaster; (4) recovering after a natural disaster as quickly and robustly as possible, and being better prepared for future events; and (5) engaging the whole community in the entire process in order to improve school and community disaster resilience.

FEMA P-1000 aims to equip school safety advocates and stakeholders with the information, tools, and resources they need to promote safer schools in their communities. It also aims to empower and support decision-makers by providing actionable advice. Providing this guidance is particularly relevant in the United States where many decisions pertaining to school safety (e.g., design and construction) are controlled at the local or state level, and therefore having informed local advocates is critical to ensuring school natural hazard safety.

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Background

Many school buildings are highly vulnerable to significant damage or collapse in an earthquake or other natural disasters. Past events have clearly demonstrated the devastating effects of school damage and destruction. Even students who survive a school building collapse can suffer...
long-term negative effects from school closure and other secondary stressors associated with a disaster; their education might be delayed causing their future to be completely derailed.

Despite the critical role that schools play in people’s lives, many obstacles exist in attempting to improve school safety from natural hazards. These include competing public needs and demands, scarce resources, and lack of understanding of risks from natural hazards. Yet, there is hope. Many successful school safety efforts have been initiated by informed and dedicated advocates. In recognition of this need for action, in 2014 the U.S. Federal Emergency Management Agency (FEMA) funded an effort led by the Applied Technology Council (ATC) to develop a guide to serve as a tool for school safety advocates. Under this effort, two major tasks were conducted to inform the development of the guide as follows: (1) a literature review of over 250 existing relevant resources with the principal goal of identifying gaps and challenges; and (2) focus group sessions with representatives of the intended audience to understand their needs and solicit their feedback.

The resulting FEMA P-1000, *Safer, Stronger, Smarter: A Guide to Improving School Natural Hazard Safety* [1] provides up-to-date, authoritative information and guidance that schools can use to develop a comprehensive strategy for addressing natural hazards. The Guide presents information and guidance on: (1) identifying natural hazards that could potentially impact a school; (2) making new and existing school buildings safer for children and staff, and more resistant to damage during natural disasters; (3) planning and preparing for effective and successful response during a natural disaster; (4) recovering after a natural disaster as quickly and robustly as possible, and being better prepared for future events; and (5) engaging the whole community in the entire process in order to improve school and community disaster resilience. It provides hazard-specific guidance for earthquakes, floods, hurricanes, tornadoes, tsunamis, high winds, and some brief guidance specific to snow storms, volcanic eruptions, and wildfires. The guidance is focused on K-12 public schools, but most of the guidance is also applicable to private schools and other levels of education. The topics covered by FEMA P-1000 are illustrated in Fig. 1, with hazard-specific guidance provided in the Supplements.

FEMA P-1000 is intended to be used by administrators, facilities managers, emergency managers, emergency planning committees, and teachers and staff at K-12 schools. It can also be valuable for state officials, district administrators, school boards, teacher union leaders, and others that play a role in providing safe and disaster-resistant schools for all. Parents, caregivers, and students can also use FEMA P-1000 to learn about ways to advocate for safe schools in their communities.

FEMA P-1000 also highlights new developments and successful efforts related to school natural hazard safety. These include raising awareness of the successful efforts to develop earthquake assessment and retrofit programs for hazardous unreinforced masonry buildings in several U.S. states, showcasing the new tsunami vertical evacuation school building in Washington State, and highlighting the new 2015 *International Building Code* [2] requirement for tornado safe rooms to be incorporated into new school buildings that have a certain level of occupancy and are within the highest tornado design wind speed zone.
Identifying Relevant Natural Hazards

The first key step is for readers to identify which types of hazards could potentially impact their school(s). To help guide this, FEMA P-1000 provides basic information on the natural hazards listed in Fig. 1 and in particular covers: (1) a brief description of the hazard, (2) where the hazard occurs; (3) the hazard’s frequency of occurrence; (4) available warning time; (5) expected hazard duration; and (6) typical follow-on hazards. This information is intended to help readers identify relevant hazards, as well as understand some of the basic hazard characteristics that are important to consider while developing preparedness and mitigation plans. For example, understanding potential follow-on hazards is critical to creating an effective response plan that ensures the safety of school children and staff. The process for determining relevant hazards is summarized in a checklist from FEMA P-1000 in Fig. 2.
1. Take the following steps to determine whether your school has a reasonable chance of experiencing each of the hazards below:

   □ **Earthquakes**: Is your school in a moderate Region of Seismicity or higher per Figure 2-1? If so, read the *Earthquake Supplement.*

   □ **Floods**: Is your school located behind a levee, in a storm surge inundation area, or in Flood Zone A, V, B, C, or X? Does your school have a history of flooding? If any of these are true, read the *Flood Supplement* and the *Flood Maps Appendix.*

   □ **Hurricanes**: Is your school in the shaded region in Figure 2-2 or in Hawaii or a U.S. territory in the Caribbean or South Pacific? If so, read the *Hurricane Supplement.*

   □ **Tornadoes**: Is your school within the tornado-prone region as defined in Figure 2-3? If so, read the *Tornado Supplement.*

   □ **Tsunamis**: Is your school within a high or very high tsunami hazard level per Table 2-2? If so, read the *Tsunami Supplement.*

   □ **High Winds**: All areas in the United States are susceptible to high winds, notably straight-line and down-slope winds. If you are not already reading the *Hurricane Supplement,* you should read the *High Winds Supplement.*

   □ **Other Hazards**: If you think your school is located in an area that is prone to snow storms, volcanic eruptions, or wildfires, read the *Other Hazards Supplement.*

2. Incorporate risk management steps for the relevant hazards in your school’s hazard safety strategy.

Figure 2. Checklist from FEMA P-1000 guiding users through a process to determine which natural hazards are relevant to their school. Figures and tables referenced in the checklist pertain to those found in Chapter 2 of FEMA P-1000.

**General Guidance on School Building Safety, Response Planning, and Recovery Considerations**

FEMA P-1000 provides general guidance for natural hazards relevant to the following topics: school building safety, response planning, and recovery considerations. Guidance on these topics are provided as chapters in FEMA P-1000; highlights of this guidance are as follows.

**Making School Buildings Safer**

This guidance focuses on key aspects and considerations necessary to ensure the safety of both existing and new school buildings. The guidance highlights that for schools threatened by hazards with little or no warning, such as earthquakes, building assessments and evaluations should be prioritized. The *Guide* describes the level of safety typically provided by building codes (life safety), as much of the general public incorrectly assumes that the government requires all school buildings to be safe and minimally damaged during a natural hazard.

FEMA P-1000 also covers the importance of designating *adequate* existing buildings as
shelters. Most existing schools have not been constructed as a “designated” shelter according to the building code and therefore may not have adequate performance to serve as a shelter. FEMA P-1000 also highlights important considerations for new schools that might serve as emergency shelters or recovery centers, including requirements for more stringent seismic design, as well as other considerations, such as the need for emergency generators and storage rooms for supplies.

Specific guidance on funding sources, such as the federal Pre-Disaster Mitigation (PDM) grant program, as well as concrete examples of how other communities have funded their efforts involving school building safety are provided. This guidance was particularly important given that funding was the most commonly-cited challenge in the literature review.

The *Earthquake Supplement* provides additional guidance specific to earthquakes, such as identifying the most vulnerable building types (e.g., older or pre-code buildings, and URM buildings), developing strategies for retrofit (e.g., partial or incremental retrofit), and implementing nonstructural risk reduction measures.

**Planning the Response**

Guidance regarding effective response planning was built upon the *Guide for Developing High-Quality School Emergency Operations Plans* [3], which provides the latest guidance on developing school emergency operation plans (EOPs) that is applicable to many hazards. The *School EOP Guide* was developed by the U.S. Department of Education in conjunction with other federal partners, including FEMA, and identifies the following guiding planning principles for developing a comprehensive EOP:

- Planning must be supported by leadership
- Planning uses assessment to customize plans to the building level
- Planning considers all threats and hazards
- Planning provides for the access and functional needs of the whole school community
- Planning considers all settings and all times
- Creating and revising a model EOP is done through a collaborative process

Specific guidance is provided on the recommended process to develop an EOP, and a sample EOP structure is provided using a traditional format [3]. Fig. 3 illustrates how the sample EOP is divided into a basic plan, functional annexes describing critical operation functions and courses of action to take, and threat- or hazard-specific annexes describing specific recommendations for response based on the hazard.
Planning the Recovery

The guidance concerning recovery focuses on: important aspects to consider while trying to get students and staff back into school buildings; considerations related to the health, safety, and well-being of students and staff during recovery; guidance on financing the recovery; and the importance of planning for the next event. In particular, the following are highlighted in the Guide:

- Documenting damage is important, especially in terms of receiving appropriate insurance or other reimbursement. Documentation should include photographs of damage, as well as documentation of time and materials spent on the response and recovery.
- For schools that need to conduct major repairs or demolish and rebuild one or more school buildings, this is an unparalleled opportunity to build back better.
- School leaders should make contingency plans that are adaptable in case they cannot reoccupy some or all of their buildings in a reasonable timeframe due to the need for retrofit or reconstruction.
- Because school buildings are often used as recovery shelters, school district leaders and staff should consider contingencies for continuing instruction during emergencies that
may require public use of their facilities.

- Re-establishing routine and addressing mental health issues are key drivers for recovery.

Guidance on financing the recovery includes examples of specific financial resources, such as the FEMA post-disaster Public Assistance (PA) Program and Hazard Mitigation Grant Program (HMGP).

**Engaging the Whole Community**

School disaster resilience is most effectively achieved when the community is engaged in the process to understand and reduce school risks, plan for emergencies, and recover from damaging events. FEMA P-1000 stresses the importance of engaging not only key stakeholders in the preparedness and mitigation planning for school natural hazard safety, but also the involvement of other key community stakeholders. These partners can include many different groups, including children and youth, design professionals, educational professionals, elected officials, emergency management professionals, labor bargaining units, local business and industry, local community organizations, local hospitals, local jurisdiction public agencies, media, and parents and caregivers. Key aspects of engaging the whole community include understanding and meeting the actual needs of the whole community, engaging and empowering all parts of the community, and strengthening what already works well in communities on a daily basis.

**Vignettes to Encourage Action**

Throughout FEMA P-1000, vignettes featuring examples of communities incorporating school safety measures in their communities or lessons learned from past events are provided to help ground the advice and guidance that is provided. An example of a vignette from FEMA P-1000 is illustrated in Fig. 4.
Parents as School Safety Champions

Much of Oregon is at high seismic risk, and some of the most vulnerable buildings in the state are schools. In response, Portland parents have mobilized to advocate for seismic improvements in schools. Parents at Sunnyside Environmental K-8 in Portland, for example, formed a “Rock and Roll Committee” to draw attention to seismic issues. The group began by researching the structural integrity of the school building, which was built in 1925. A rapid visual screening of schools by Oregon’s Department of Geology and Mineral Industries deemed Sunnyside as one of dozens of schools at “very high risk” of collapse in a strong earthquake. The Rock and Roll Committee hosted a dinner event to educate fellow parents and community members about the risks facing their school, and also to advance an agenda focused on preparedness and hazard mitigation. The work continues with support from the school’s Parent-Teacher-Student Association. (Manning, 2012)

Another informal group, Parents for Preparedness (P4P), connects Portland-area parents to share school-level initiatives and to learn from local preparedness and seismic safety experts. P4P members are encouraged to explore roles in advocacy on school safety at the local school board and in the state legislature.

Oregon parents helped to supply the political support that led state legislators to approve $175 million in state funding for school earthquake retrofit projects in 2015-2017. Oregon’s recent experience proves that individuals and informal groups can make a big difference in terms of awareness, school-level projects, and even the funding commitments needed to make schools safer.

Figure 4. Example vignette from FEMA P-1000.

Conclusions

FEMA P-1000 aims to equip school safety advocates and stakeholders with the information, tools, and resources they need to promote safer schools in their communities. It also aims to empower and support decision-makers by providing actionable advice. Providing this guidance is particularly relevant in the United States where many decisions pertaining to school safety (e.g., design and construction) is typically controlled at the local or state level, and therefore having informed local advocates and stakeholders is critical to ensuring school natural hazard safety.

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References

