

## Lesson Overview

A school Emergency Operations Plan must address all potential significant hazards, be they natural, technological, or humanmade. Your planning team members can help you conduct this assessment.

This lesson presents information on hazard assessment. By the end of this lesson, you will be able to:

- Describe the types of hazards that must be considered when developing an Emergency Operations Plan.
  - Explain the distinction between structural and nonstructural hazards.
  - Explain how to conduct a “walkaround” assessment to identify potential hazards.
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## Addressing All Hazards

As you begin the planning process, you need to think about the potential hazards your school faces.

For example, depending on your school’s location, type of construction, and age, certain hazards—such as tornadoes, floods, snow or ice storms, or fires—may be obvious possibilities.

Other difficult hazards have become almost “ordinary” for schools to face these days, including such situations as:

- Bomb threats.
  - Child snatching by noncustodial parents.
  - Drugs and weapons on campus.
  - Environmental toxins.
  - Student or faculty injury caused by students or intruders.
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## What Hazards Are Possible?

A school Emergency Operations Plan must equip personnel to deal with any possible crisis. In order to ensure that such a Plan will work in all situations, you must consider all potential hazards. Determining the likelihood of specific incidents is a refinement that happens at the end of the hazard identification process.

Your local Emergency Manager will be a valuable resource in identifying the various hazards to address. Also, newspapers and other historical records contain valuable sources of past hazards.

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## Types of Hazards

In developing your Emergency Operations Plan, work from the “big picture” to the small details to identify:

- Community hazards.
- Neighborhood hazards.
- Structural and nonstructural hazards.

The screens that follow will provide more detail on each hazard type.

## Community Hazards

Community hazards might include:

- Weather-related hazards.
- Crime-related hazards (if crime is a problem in the surrounding community).
- Commercial/industrial facility hazards (if such facilities are near the school).
- Transportation corridor hazards (if the school is near a busy road or highway).

Sometimes cascading events occur when one hazardous event triggers another. For example, a hazardous materials spill might lead to an explosion, fire, and/or escape of toxic fumes. Such situations compound the danger and the complexity of the emergency response. The potential cascading scenarios should be considered as part of the hazard identification process.

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## Factors Exacerbating Community Hazards

Hazardous events in the community can affect:

- The school, either directly or indirectly.
- The time it takes for responders to begin providing assistance.

If the community has a volunteer fire department, a school may need to allow additional time in planning for emergency response, for the volunteers to respond.

Risk may increase during specific times of the day (for example, rush hour) or times of the year (for example, spring flood season, hurricane season, winter storm season, tourist seasons).

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## Neighborhood Hazards

Elements in the immediate area of a school building may pose specific hazards. Consider these neighborhood features:

- Trees or brush near the building may present a fire or wind hazard.
  - Overgrown shrubbery may provide cover for people who do not belong on school property.
  - A gas station near the school could present potential fire, explosion, and HazMat dangers.
  - A fast food restaurant across a busy street from a school may cause students to run into traffic, or may draw strangers who present hazards to the school.
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**Structural and Nonstructural Hazards**

When identifying hazards that relate to the school building, both structural and nonstructural elements of the school come into play.

- **Structural Hazards:** These hazards include the building, roof, and other structures.
  - **Nonstructural Hazards:** These hazards include unanchored or poorly anchored equipment and furnishings, furniture blocking egress, improper storage, and laboratory and cleaning chemicals.
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**Structural Hazards**

Most school buildings, by virtue of their age and/or design, present some sort of structural hazard. During the planning process, school and community officials determine whether structural issues are significant.

The recent proliferation of modular or “portable” classrooms on school grounds also presents certain types of hazards. Such units are particularly susceptible to damage from wind and other natural phenomena.

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**Structural Hazard: Unreinforced Masonry**

Many schools are built using unreinforced masonry, which means that exterior walls are constructed of brick and/or block with no steel or underlying reinforcement.

Unreinforced masonry collapses easily in an earthquake or as a result of extremely high winds or flying debris.

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**Example: Unreinforced Masonry School Catastrophe**

The photo at right illustrates the risk posed by unreinforced masonry construction.

This school in Newburgh, NY, was struck by a Force 5 downburst. (A Force 5 downburst equals a Level 5 tornado.)

In this collapse, 9 students were killed and 15 injured. A lawsuit against the district based on the building design is pending.

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**Structural Hazard: Improperly Supported Roofs**

The flat roofs on many schools are highly susceptible to wind damage, especially in gymnasiums, cafeterias, auditoriums, and other areas that have broad spans of unsupported roof.

Heavy snow accumulations on roofs with insufficient support can cause roof collapse.

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### **Examining Schools for Structural Hazards**

If there is concern about a school's structural integrity, it may be necessary to consult with experts who can help determine a building's vulnerability to structural problems.

Particular experts who may be helpful include:

- Structural engineers, who specialize in structural integrity and design of protective measures.
  - Architects, who specialize in building design and construction.
  - Soil engineers, who specialize in types of soils and potential soil instabilities that can affect structures.
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### **Nonstructural Hazards**

Nonstructural hazards are present in every school building, and may present significant risk to health and safety.

Nonstructural elements include any items installed after the supporting structure of the school is complete. Sometimes these elements are hazards in their own right; others can become hazards if a particular natural, technological, or humanmade emergency occurs.

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### **How To Identify Potential Hazards**

To identify potential hazards, members of the emergency planning team should conduct a systematic "walkaround" of the school, both inside and outside. Carrying out a walkaround involves:

- Preparing for Hazard Identification
- Assessing School Grounds Hazards
- Assessing Building and Classroom Hazards
- Assessing Potential Evacuation Route Hazards
- Assessing Potential Neighborhood/Community Hazards

Additional information on each type of walkaround assessment is explained on the following screens.

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### **Preparing for Hazard Identification**

To prepare for identifying hazards in and around the school, obtain or draw a map of the school and school grounds. You can then use the map to:

- Note potential hazards and the location of utilities, emergency equipment, and supplies.
  - Provide a basis for establishing evacuation routes.
  - Identify a safe, open-air assembly area.
  - Develop procedures for conducting emergency response activities.
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**Assessing School Grounds Hazards**

Identifying the hazards that exist on school property will provide information useful for planning evacuation routes and assembly areas. In addition, a conscious look at existing hazards on school grounds can help pinpoint any hazards that can be easily mitigated.

Assessing hazards on school grounds includes inspecting:

- The school building itself.
  - Other structures on school property.
  - The playground and any athletic fields.
  - All remaining parts of the school grounds.
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**Assessing Building and Classroom Hazards**

A focused walkaround inside the school will help determine the scope of hazards throughout the building and in specific classrooms.

A number of the hazards discovered can be mitigated with little or no expense. As a followup, school administrators can then develop a plan and schedule to mitigate those existing hazards that can be resolved or reduced.

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**Assessing Potential Evacuation Route Hazards**

In order to develop procedures for a quick and orderly evacuation, it is important to assess the hazards that students and staff are likely to encounter en route to safe, open assembly areas.

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**Assessing Potential Neighborhood/Community Hazards**

Often there are hidden hazards near a school that should be addressed in any Emergency Operations Plan for that building. Such hazards would include underground utilities, high-voltage electrical lines, and dangerous chemicals and/or radioactive materials.

Finding the locations of these hazards may require some searching on the property and some checking with utility and other companies. The local Emergency Manager may also be a very useful resource in identifying such hazards.

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### Analyze the Hazards

After identifying potential hazards, school officials can begin to analyze the risks that each hazard presents.

The best way to analyze hazards is to assign a risk rating and prioritize the hazards according to whether each presents a high, medium, or low risk to the school. The risk rating should be based on both:

- The likelihood that the hazards will occur, and
- The potential for death, injury, or property damage if the hazard occurs.

All hazards with a risk priority rating of high or medium should be addressed in your school Emergency Operations Plan.

The next screen shows a useful worksheet that can help when you are analyzing risks.

### Hazard Analysis Worksheet

The example worksheet below shows one way to analyze each individual hazard identified at a school.

RISK INDEX WORKSHEET					
Hazard	Frequency	Magnitude	Warning	Severity	Risk Priority
<b>Tornado</b>	4 Highly likely	4 Catastrophic	④ Minimal	4 Catastrophic	<input checked="" type="checkbox"/> <b>High</b>
	③ Likely	3 Critical	3 6-12 hours	③ Critical	<input type="checkbox"/> Medium
	2 Possible	② Limited	2 12-24 hours	2 Limited	<input type="checkbox"/> Low
	1 Unlikely	1 Negligible	1 24+ hours	1 Negligible	
<b>HazMat Spill Outside School</b>	4 Highly likely	4 Catastrophic	④ Minimal	4 Catastrophic	<input type="checkbox"/> High
	3 Likely	3 Critical	3 6-12 hours	③ Critical	<input checked="" type="checkbox"/> <b>Medium</b>
	② Possible	② Limited	2 12-24 hours	2 Limited	<input type="checkbox"/> Low
	1 Unlikely	1 Negligible	1 24+ hours	1 Negligible	

**Web Resources**

- National Earthquake Information Center and World Data Center for Seismology  
<http://www.neic.cr.usgs.gov/>
  - Natural Hazards Research and Applications Information Center  
<http://www.colorado.edu/hazards>
  - The National Hazards Informer, Earthquake Hazard Newsletter  
<http://www.colorado.edu/hazards/informer>
  - State School Safety Centers [http://www.safetyzone.org/state\\_centers.html/](http://www.safetyzone.org/state_centers.html/)
  - USGS, Earthquake Hazards Program  
[http://neic.usgs.gov/neis/eqlists/USA/1964\\_03\\_28\\_pics.html](http://neic.usgs.gov/neis/eqlists/USA/1964_03_28_pics.html)
  - Surviving an Earthquake <http://advanceonline.com/Earthquake/home3.htm>
  - National Severe Storms Laboratory <http://www.nssl.noaa.gov>
  - Storm Prediction Center <http://www.nssl.noaa.gov>
  - National Weather Service <http://www.nws.noaa.gov>
  - University of Oklahoma's National Weather Center <http://nwc.ou.edu>
  - National Oceanographic and Atmospheric Administration (NOAA) <http://www.noaa.gov>
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**Summary**

This lesson presented guidance on the types of team members to include in your planning process.

Remember that an effective Emergency Operations Plan results when all stakeholders are asked to contribute.

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