

Effective Evacuation Planning and Preparation for Facilities

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Introduction

This session will provide participants with essential information on preparing for and conducting facility evacuations. The session will cover the development of plans and procedures. Preparation is more than just documents, it must include training, building systems, and other items to ensure effectiveness.

Learning Outcomes:

- Identify types of evacuations.
- List the events that may require an evacuation.
- Identify building systems that may contribute to the effectiveness of evacuations.
- Identify critical planning components.
- Identify preparedness issues relative to evacuations.
- Identify key procedures that should be in place in your facility.
- Identify training needs and practices that will improve evacuation performance.

Role of evacuations

Evacuations are one of three primary approaches to protecting building occupants during and emergency. The other two are rapid control of the emergency and defending occupants in place. This presentation will focus exclusively on evacuation issues.

Types of evacuations

Moving people out of harms way during an emergency can take several forms. Use of these strategies may overlap in that an initial decision to use one of these options may be changed later

to another of the options. There may also be limitations which control which options are viable for any particular facility. The options are:

- Total evacuation
- Staged evacuation
- Partial evacuation
- Vertical relocation
- Horizontal relocation

Total evacuation involves notifying and moving all occupants as soon as the emergency is discovered. Unless features of the facility prevent this option from being the best option this is the approach we should use. This is the simplest evacuation to manage and has the least potential for leaving people in a dangerous environment. This may be the only option available to you if your facility does not have a programmable fire alarm or the protection and construction required to support the other options.

The other options all require a programmable fire alarm system, ideally with an evacuation communication capability. They also require a structure that is properly constructed with necessary fire separations. The structure should also be protected by a properly designed, installed and maintained fire sprinkler system.

Staged evacuations begin with the intent to evacuate the entire facility but unlike the total evacuation option they get there gradually. Typically the evacuation will begin with the floor where the fire is located and will include one or two floors above and below. Your local fire department will have an opinion on how many floors to include in the initial evacuation and you should check with them. Occupants from these areas move to outside the building. After this first group is on the way out of the building other occupants above the fire floor are evacuated. The last group to evacuate is those occupying areas of the building below the initial evacuation area.

Partial evacuations are intended to move only those occupants that are immediately threatened by the emergency event. A partial evacuation is designed like the initial phase of the staged evacuation. They can easily be expanded into a staged evacuation if conditions require it.

Vertical relocations may be used in high-rise buildings. Their primary advantage is that occupants are not required to make a long walk down stair towers. Typically the fire floor and one or two above and below are evacuated. The occupants are brought down a few floors and then held on that floor at least temporarily while the fire detection is investigated. This can be a more difficult to manage evacuation approach than most of the other options. It can also cause significant delays if the conditions worsen and you have to move on to a full evacuation. The floors that received the evacuated occupants from higher in the building now have many more occupants than their exit capacity was intended for so getting these people back into the stairs and moving out of the building can take more time than is ideal.

Horizontal relocations involve moving occupants to the opposite side of a rated fire wall away from the fire on the same floor. This option is heavily dependent on having the appropriate initial construction. This approach is often used in health care occupancies and other areas where moving people on the stairs may be difficult.

Events that may require evacuations

You should begin an emergency plan development process with a threat assessment and risk evaluation.

Threat assessments are often started by conducting a brainstorming session among key personnel within your organization. You should attempt to identify all the events that may require you to take protective actions concerning your building occupants.

Some of the key personnel you should involve in this process include: safety leadership, top management, human resources, maintenance management, facilities management, production management, and employee representatives. The actual group at the table should be relatively small but you should seek broad input from throughout the organization.

This should be a long list for the average organization. There will be potentially hundreds of individual items. Categorizing this list may help make it more manageable. One division should be technological or man-made versus natural threats. Part of the benefit of this division is that all of the technological threats should have a prevention aspect associated with them. You can't not have a hurricane but you can minimize the risk of having a fire. The source of the threat can be another division, internal versus external. Internal issues you have control over, external issues such as a chemical release at a neighboring industry are not things you can directly control. Another division that may be useful in some environments is intentional versus inadvertent threats.

You now have a large list of categorized threats. Unless you have an unlimited budget and more than 24 hours per day this list will need to be prioritized. This is the process of risk evaluation. In its simplest form this should compare the probability that the threat will occur with the severity of the impact if it does. Those threats that are both likely to occur and will create serious consequences if they do should be addressed first.

The prioritized list should be circulated among managers that were not part of the group that developed it. This provides a review that can be used to improve the list.

Threat assessment and risk evaluation form the foundation of any effective planning and preparation process.

This threat assessment and risk evaluation should be repeated at least annually to update your process and ensure that your plans and preparations cover your needs.

Building systems that may contribute to the effectiveness of evacuations

Many building features and systems may contribute to the effectiveness of evacuations. Fire suppression systems such as automatic sprinklers have an excellent and well desired reputation

for minimizing the risk to building occupants. They provide early warning of the fire and take action to contain and control the fire.

Detection and alarm systems also contribute to life safety by warning occupants early in the development of a fire. Even though alarm systems take no direct action upon the fire the additional time provided by the early notification can save lives.

The egress systems and components must always be ready to ensure that building occupants have a safe path out of the building.

Compartmentation is intended to slow the progress of the fire through the structure. The features and construction elements must be maintained as designed. Smoke management systems may be in place in some facilities to contribute to the time provided occupants to safely evacuate. Other features or systems may exist in your facility.

Critical components of planning

Planning for emergencies is a continuous effort. Plans must be reviewed, updated and improved. You will never actually be completely finished with this process.

The process began with the threat assessment and risk evaluation.

The next step is to collect and review information about your facility, the identified threats and your resources.

Developing an outline of the plan comes next. A well developed outline will ease the writing process. Effort expended on this phase will pay dividend later. Once a draft outline has been developed circulate it among key personnel in your organization for review and comment. Try to catch gaps in coverage and sequence issues now before you start writing the plan.

Next is writing. Please remember useful, brief, simple, and accurate. If your outline was completed as recommended the writing should flow from the outline. Allow soak time between writing plan segments and reviewing them. Also have at least a few of the other key personnel in your organization review the plan.

Supporting documents are added next. These are all the items of information that may be useful but don't or shouldn't have a place in the main body of the plan. Examples include: building diagrams, hazardous materials lists, MSDS, personnel lists, telephone number lists, resource lists, etc. These should be organized in an easy to use format either at the back of the plan binder or in a separate binder.

Another review of the plan should be completed after the supporting documents have been added.

Testing the plan is the next step. If this is an entirely new effort the initial tests should be table top exercises with key personnel. Next conduct full scale testing of the plan. Usually testing will identify areas for improvement. If the items needing improved are relatively minor you do not

need to repeat the testing process. If major improvements were necessary than the plan should be tested again.

Implementation is the final step in the process. This includes distribution of the plan and training of personnel. Few people need the entire plan. Portions of the plan should be distributed based upon the role of the individual.

Characteristics of an effective plan

A few characteristics are common to all effective plans.

First and most important of these essential items is that the plan is useful. This should go without saying but too often it is not even seriously considered as part of the planning process. Useful means useful to the intended audience. The intended audience is your most recently hired night shift supervisor, at three in the morning, looking at the plan you have written spread out on the hood of someone's car, by flashlight, while your facility burns down over his shoulder. If the plan is not useful to this person within a minute or two they will close the binder and do the best they can on their own. Which is probably a good thing, they'll do better with their common sense than they probably would have done using a bad plan.

We too often write plans for regulators, corporate auditors, insurance inspectors, or others who will not have to actually use the plan during an emergency. These audiences are frequently falsely impressed by bulk rather than substance, by volume rather than conciseness.

Closely tied to useful is brief. Most effective plans are brief. People that are in the midst of a high stress event like having their workplace on fire need to be able to find guidance quickly. Short words formed into short sentences work best. Bullet points not paragraphs. As professionals in the field we sometimes tend to want to give every piece of advice we think might possibly be useful in the plans we develop. The extra advice often harms more than it helps though by obscuring the most critical information among the nice to know or rarely needed.

Simple is a close ally of brief. Complexity often works against effectiveness. Figure out the simplest way to accomplish the task and include that in your plan.

The last of this short list of essential characteristics is accurate. The advice you give in your plan must be tested for accuracy. People must trust that if the plan is followed the outcome will be more positive than if we had done nothing. Accurate advice is critical.

Preparedness issues relative to evacuations.

Preparedness supports your ability to effectively implement plans. It involves ensuring that appropriate resources are available and ready for use at all times. Preparedness issues will vary significantly from one facility to another. The types of threats you may face will prompt much of what needs to be done in this area. For example, the issues in an office building will not be as substantial as the concerns in a chemical plant.

One item all facilities should have is a “Go” bag. This bag should be located near the main entrance to the building. A backup should be maintained near another exit from the building. These will need to be stored in secure locations as I’m going to recommend that you have items in the bags that you will not want to lose. The contents will vary but should at a minimum include: a copy of the emergency plan, keys to all doors and other locked items in the entire building, floor plans, MSDS for your most dangerous chemicals, fire protection systems information, and potentially many other items.

Key procedures that should be in place in your facility

The extent of procedures required by any particular facility will vary significantly. There are a few basic items that every organization should cover.

Every member of your organization should know how to report emergencies both internally and to public response organizations. They must also know the role in evacuating the building.

Someone in your organization should be designated to meet the fire department at a predetermined location and provide a liaison with them for the duration of the emergency.

If you have installed fire protection systems a designated individual should confirm that water control valves are open on the system and if you have a fire pump that it is either running or ready to so.

You may designate individuals on each floor of your building to act as evacuation assistants to help ensure that others are leaving the building and direct people to the stairs and away from elevators.

One or more people may be assigned the role of accounting for people after they exit the building.

Training needs and practices that will improve evacuation performance

Training is critical to the effective implementation of your plans and preparations. Personnel must be provided with training and practice evacuation opportunities or they can not be expected to perform as needed during an emergency.

Every person in your organization needs training on evacuation and emergency procedures. They do not all need the same training though. This is where our training often becomes ineffective. Training must be aimed at meeting the needs of the specific audience based upon their anticipated role during an emergency.

Your average employee with no special role during emergencies needs to know how to report and emergency and how to get out of the building. If the employee is supposed to meet the fire department at the front of the building and act as liaison then they must have training for that role.

The people who may make announcements on your evacuation communications system need training to fulfill that role.

Practice is another critical piece of preparedness. If you want your organizations response to an emergency to be effective it must be practiced.

Realistic simulations of varying types of emergencies prepare your building occupants better than any training program alone could.