

Course Learning Outcomes for Unit III

Upon completion of this unit, students should be able to:

1. Recommend appropriate fire protection systems for protecting life and property.
 - 1.1 Describe written plans, procedures, and work practices for fire detection and alarm systems.

5. Examine emerging technologies related to fire protection.
 - 5.1 Explain the function of a fire alarm control unit.

6. Evaluate design specifications for fire alarm systems.
 - 6.1 Categorize the types of audible notification appliances.
 - 6.2 Discuss the three types of specialty signals.

Course/Unit Learning Outcomes	Learning Activity
1.1	Unit III Lesson Chapter 2 Report: <i>How to Plan for Workplace Emergencies and Evacuations</i> Unit III Course Project
5.1	Unit III Lesson Chapter 2 Unit III Course Project
6.1	Unit III Lesson Chapter 2 Unit III Course Project
6.2	Unit III Lesson Chapter 2 Unit III Course Project

Reading Assignment

Chapter 2: Fire Detection and Alarm Systems

In order to access the following resource, click the link below.

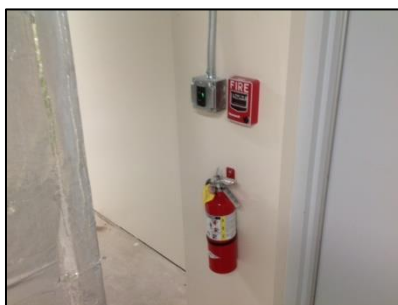
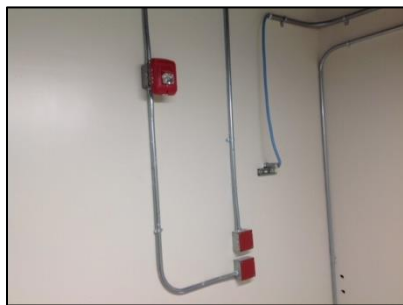
Occupational Safety and Health Administration. (2001). *How to plan for workplace emergencies and evacuations* (OSHA Publication No. 3088). Retrieved from <https://www.osha.gov/Publications/osha3088.pdf>

Unit Lesson

In the previous lesson, we learned that the components of fire protection, detection, and suppression are critical to ensure life safety and the protection of property. In addition, we learned the myth of pulling a manual fire alarm and activating the entire sprinkler system was found to be false. The fire alarm notification system is tied to the manual pull station, and pulling the alarm will initiate a signal notifying the monitoring company as to the type and location of the alarm. There are a variety of simple and complex fire alarm systems, and the optimal performance detection is the first defense against the spread of fire.

According to Brakhage, Abrams, and Fortney (2016), fire alarm detection systems range from simple in nature to advanced detection systems with microprocessor-based software. Fire detection and fire alarm systems utilize fire alarm control units (FACU) that receive the signal from the initiating device, whether it is a smoke, heat, light, or gas detection or even water flow. FACUs monitor and control the devices and transmit a signal to a fire alarm monitoring company where the fire department is notified of the location and type of alarm. In addition, upon activation, the FACU initiates an audible alarm to evacuate the structure. The National Fire Protection Association (NFPA) 72 outlines the notification requirements for fire alarm appliances.

What notification signaling appliance alerts occupants in a timely manner? Is it bells, buzzers, horns, speakers, strobe, or lights? What is the reliability of notification signaling appliances? Notification signaling appliances provide audible, visual, and textual signals. According to Gagnon (2008), of the different types of notification signaling appliances, a three-pulse temporal pattern allows individuals to recognize the alarm signal in a timely manner. Whether bells, buzzers, or horns, if it is a constant alarm sounding, it becomes ambient sound or white noise. The constant alarm is similar to a car alarm where many have become numb to the sound and, in many cases, not even respond to the sounding alarm even when there is an emergency. It happens so often that it has become a nuisance alarm to many believing it to be a false activation. Gagnon (2008) suggested that alarms are ignored because of the failure to recognize the sound, because it is a nuisance alarm, or because one cannot hear the alarm. As a result of numerous false alarms in some facilities, many have been conditioned to the sound.



Examples of fire alarm notification system

In addition, fire alarm system activation should not impact other zones being evacuated within the same structure and must be separated by a 2-hour rated wall, and the cabling that carries the notification signal must be rated for 2 hours (Gagnon, 2008).

Points to Ponder Scenario

At 1:17 p.m., the fire alarm monitoring company received a report of a water flow alarm at 44614 Mays Street West. The FACU-initiating devices did not sense the presence of the products of combustion and smoke conditions through the multi-criteria devices throughout the warehouse. The only notification received was the signal for a water flow-initiating device in the warehouse. A few minutes later, the monitoring company received notification of a pull station activation in the warehouse near the loading docks. The monitoring company notified the City of Washington Fire Department, and a first-alarm assignment was dispatched. The first company arrived shortly thereafter and reported seeing the dense black smoke issuing from the roof area of the City of Washington Distribution Warehouse. Workers stated that after pulling the manual pull stations, there was no audible alarm notification. Those in the office area and other parts of the warehouse were unaware of the fire and were not evacuated until the fire department arrived. After investigating, it was found that the alarm notification system on the older part of the warehouse and office was a pre-signal service with an integral delay, and someone in the office concerned about another false alarm cleared the notification. However, the sprinkler system and manual pull station were tied to a newer FACU and sent a signal to the monitoring company. The audible notification of the fire alarm pull station and the water flow detection-initiating device were wired into the pre-signal system, and when the system was silenced, the audible notification did not sound. The pre-signal was allowed by the previous business because they had written plans, procedures, and work practices concerning fire and evacuation as well as a trained fire brigade for a quick response until the fire department could arrive.

Why was there only a water flow alarm and not a smoke or heat detection alarm in the scenario? Why was there a pre-signal system in the warehouse? What is a pre-signal system? Gagnon (2008) described a *pre-signal system* as a fire alarm system that sends a signal to a control room, front desk, or security workstation. The signal has a delay, and someone must manually activate a public alarm. Pre-signal systems are undesirable in many locations and must be approved by the authority having jurisdiction before installation. Most pre-signal systems have 24-hour supervision.

Written Plans, Procedures, and Work Practices

Is it important to have written plans, procedures, work practices, or even an emergency action plan with the advanced fire detection and fire alarms that we have today? Are these a thing of the past when systems were simple? Should workplace emergency be identified in advance? How do you protect employees and visitors in the workplace? Written plans, procedures, and work practices are needed in any organization, no matter how large or small they may be. Written plans and procedures point out unforeseen hazards or emergencies to the organization, employees, or even the public. These written plans and procedures identify multiple hazards or emergencies ranging from natural events to manmade. Even the Occupational Safety and Health Administration (OSHA, 2001) suggests that these events were unforeseen threats and listed them as "floods, hurricanes, tornadoes, fires, toxic gas releases, chemical spills, radiological accidents, explosions, and workplace violence resulting in bodily harm and trauma" (p. 1). The best time to prepare for an event is before it happens, and the emergency action plan must be comprehensive and deal with specific hazards found in the workplace. Not all workplaces are the same, and each workplace has its unique hazards. Every emergency action plan consists of the following components:

- a way to report fires and other emergencies;
- strategies and processes for evacuation;
- emergency procedures for escape and assigned routes, such as maps of floor plans and designated safe areas;
- contact information of individuals inside and outside the company who know the details of the duties and responsibilities of individuals during the emergency plan;
- measures for employees who stay to perform or shut down crucial company operations or maintain services that cannot be shut down for every emergency alarm; and
- rescue and medical responsibilities for workers (OSHA, 2001).

Without clear and concise written plans, procedures, and work practices during an emergency, confusion and chaos can result in injury, damage to property, and possibly death. These written documents need to identify someone who will be the incident commander or person in charge who can follow procedures using some type of command structure. Someone needs to be familiar with the procedure who can determine if the written plan needs to be activated; evacuate personnel; know the exact location and any known hazards present to communicate to emergency medical services, fire services, or both; and terminate plant operations when needed.

Written plans, procedures, and work practices are aimed at minimizing the causes of fire and prevent injury and the loss of life to employees and visitors through written guidelines. These guidelines should identify potential fire hazards as well as address the proper storage and handling of combustible or hazardous materials. In addition, they should identify persons or positions responsible for the housekeeping procedures and the segregation and separation of combustible materials. The written plans should address training of employees for any hazards that they may be exposed to during their daily activities.

Conclusion

Fire detection and fire alarm systems are the first defense against the spread of fire through detection, whether by simple or complex systems. Fire detection and fire alarm systems utilize FACUs to receive the activation signal from the initiating device and transmit a signal to the monitoring company in order to reduce fire damage or the loss of life. Systems have transitioned from bells, buzzers, or horns to a more complex electronic alerting system that does not blend into the background. In addition to an audible notification to save lives and reduce damage, written plans, procedures, and work practices are needed to ensure the risk of fire has been reduced or eliminated as much as possible.

References

- Brakhage, C., Abrams, A., & Fortney, J. (Eds.). (2016). *Fire protection, detection, and suppression systems* (5th ed.). Stillwater, OK: Fire Protection Publications.
- Gagnon, R. M. (2008). *Design of special hazard and fire alarm systems* (2nd ed.). Albany, NY: Delmar Learning.
- Occupational Safety and Health Administration. (2001). *How to plan for workplace emergencies and evacuations* (OSHA Publication No. 3088). Retrieved from <https://www.osha.gov/Publications/osh3088.pdf>

Suggested Reading

In order to access the following resources, click the links below.

You are encouraged to read about how you can create a written program for your facility to reduce hazards, establish safety rules, and enforce procedures to ensure employee and visitor safety. The article below discusses the importance of having a written program that addresses work-related injuries and workplace safety.

- Caccavale, S. (2002, July). How to create your facility's written program. *Safety Management*, 472, 1, 3, 6–7. Retrieved from <https://libraryresources.columbiasouthern.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=6964598&site=ehost-live&scope=site>

Although the document below was written about a concrete plant emergency plan, it covers the three parts needed for written safety plans: emergency action plan; fire prevention plan; and spill prevention plan for environmental spills of oils, fuels, and chemicals.

- Eckhardt, B. (1998, February). Written emergency plans-part I. *Concrete Products*, 101(2), 12–17. Retrieved from <https://libraryresources.columbiasouthern.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=317432&site=ehost-live&scope=site>

The video below discusses the importance of pre-signal alarms.

- S.E.R. Safety. (2016, November 12). *System test 19: LED & pre-signal!* [Video file]. Retrieved from <https://www.youtube.com/watch?v=yGuifXK86bE>

Click [here](#) for a copy of the video transcript.

Learning Activities (Nongraded)

Nongraded Learning Activities are provided to aid students in their course of study. You do not have to submit them. If you have questions, contact your instructor for further guidance and information.

Reflect on the concepts you have learned during your readings. What do you understand completely? What did not quite make sense? The purpose of this assignment is to provide you with the opportunity to reflect on the material you have read and to expand on it. If you are unclear about a concept, either review it in the textbook or ask your professor. Can you apply what you have learned to your career? How?

This is not a summary. A reflection paper is an opportunity for you to express your thoughts about the material you are studying by writing about it. Reflection writing is a great way to study because it gives you a chance to process what you have learned and increases your ability to remember it.

Use the following guidelines as you reflect on the course material.

- List and compare the different types of manually operated fire alarm devices.
- What are the types of audible notification appliances for fire alarm systems?
- Explain the effectiveness of audible notification appliances given ambient sound or white noise.

Write at least two pages, using APA style writing. This is a nongraded activity, so you do not have to submit it. If you have any difficulties with the unit content, contact your instructor for additional explanation and discussion.