

IDENTIFICATION

TOPIC TITLE: Exit Routes, Emergency Action Plans, Fire Prevention Plans, and Fire Protection

MINIMUM TIME: 1 Hour

OBJECTIVES

Terminal Objective:

Given current OSHA general industry standards regarding emergency planning, the student will be able to recognize effective evacuation, including fire prevention strategies to protect themselves from hazardous situations.

Enabling Objectives:

1. Recognize benefits of an Emergency Action Plan.
2. Identify elements of a Fire Prevention Plan.
3. Identify conditions under which evacuation actions may be necessary in an emergency situation.
4. Identify conditions under which shelter-in-place may be necessary in an emergency situation.
5. Identify characteristics of an effective emergency escape route.
6. Recognize the five types of fire extinguishers, including the types of fires they can extinguish.
7. Review requirements for proper maintenance of portable fire extinguishers.

INSTRUCTOR MATERIALS AND RESOURCES

- PowerPoint Presentation: *Exit Routes, Emergency Action Plans, Fire Prevention Plans, and Fire Protection*
- Knowledge Check Answer Key: *Exit Routes, Emergency Action Plans, Fire Prevention Plans, and Fire Protection*

STUDENT MATERIALS

- OSHA Fact Sheet: *Emergency Exit Routes*
- OSHA Fact Sheet: *Fire Safety in the Workplace*
- Knowledge Check: *Exit Routes, Emergency Action Plans, Fire Prevention Plans, and Fire Protection*

TEACHING PROCEDURES ---Preparation, Presentation, Application, Evaluation

Anticipatory Set (Focus Attention/Gain Interest)

Estimated Time: ?? hours

Key Points	Methods
<p>Approximately 145 fatalities per year are the result of fires and explosions (3% of total fatalities). There has been a long and tragic history of workplace fatalities related to fires and explosions. In addition to fires and explosions, other incidents in the workplace may require emergency actions to protect employees.</p> <p>OSHA requires employers to inform and train employees on what to do in an emergency, what the employees responsibilities are in regards to fire prevention and the defined employee scope and approved employee methods of dealing with fires in the workplace.</p>	<p>http://www.bls.gov/iif/oshwc/cfoi/cfch0013.pdf</p> <p>PPT slides #1 - #4</p>

Presentation (Instruction)

Estimated Time: ?? hours

Key Points	Methods
<p>I. Emergency Action Plan (EAP)</p> <p>A. Benefits of an EAP</p> <ol style="list-style-type: none">1. Written documentation to facilitate/organize actions during an emergency2. Can result in fewer/less severe injuries, less structural damage, and reduced confusion <p>B. Elements of Plan</p> <ol style="list-style-type: none">1. Purpose of EAP<ol style="list-style-type: none">a. Describes actions to be taken to ensure safetyb. Uses floor plans/maps to show emergency evacuation routesc. Tells employees what actions to taked. Covers reasonably expected emergencies2. Required elements of plan<ol style="list-style-type: none">a. Means of reportingb. Evacuation procedures and emergency escape routesc. Procedures for critical operations	<p>PPT slides #5 - #10</p> <p>https://www.osha.gov/SLTC/etools/evacuation/min_requirements.html</p>

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| <ul style="list-style-type: none">d. Accounting of employeese. Rescue and medical dutiesf. Contact personsg. Recommended elements<ul style="list-style-type: none">i. Description of alarm systemii. Site of alternative communications centeriii. Secure on- or off-site storage of documents <p>3. Training employees on EAP</p> <ul style="list-style-type: none">a. Review plan with each employee when:<ul style="list-style-type: none">i. Plan is initially developedii. Initial assignment of employee to jobiii. Changes are made to plan or employee actions or responsibilitiesb. Annual retraining with drillsc. Education and training should cover:<ul style="list-style-type: none">i. Types of emergencies and courses of actionii. Functions and elements of EAPiii. Special hazards in the workplaceiv. Fire hazards and fire prevention pland. General training should also address:<ul style="list-style-type: none">i. Individual roles and responsibilitiesii. Threats, hazards, and protective actionsiii. Notification, warning, and communications proceduresiv. Means for locating family members in emergencyv. Emergency response proceduresvi. Evacuation, shelter, and accounting proceduresvii. Location and use of common emergency equipmentviii. Emergency shutdown procedures <p>C. Examples of procedures for elements of EAP</p> <ul style="list-style-type: none">1. Method of reporting an emergency<ul style="list-style-type: none">a. 911b. Onsite resources | |
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2. Instructions for exit
 - a. Pull alarm
 - b. Use nearest staircase; do not use elevator
 - c. Designate rally points
 - d. Accounting of employees
3. Instructions for limited mobility
 - a. Proceed to nearest stairwell or area of refuge
 - b. Designate a buddy

II. Fire Prevention Plan (FPP)

A. Fire Prevention Plan requirements

1. Must be in writing, kept in the workplace, and available to employees for review
2. Employer must inform employees of fire hazards to which they are exposed upon initial job assignment and review with each employee applicable parts of the FPP necessary for self-protection
3. Minimum requirements for FPP
 - a. List of major fire hazards, proper handling and storage of hazardous materials, ignition sources and their control, and type of fire protection equipment needed for control of major hazards
 - b. Procedure to control flammable and combustible waste materials
 - c. Procedures for maintenance of safeguards on heat-producing equipment
 - d. Name or job title of persons responsible for
 - i. Maintaining equipment to prevent or control ignition sources or fires
 - ii. Control of fuel source hazards

B. Preventing fire hazards

1. Understanding fires
 - a. Very rapid chemical reaction between oxygen and a combustible material
 - b. Results in release of heat, light, flames, and smoke

PPT slides #11 - #17

<https://www.osha.gov/SLTC/etools/evacuation/fire.html>

- c. Four elements required for fire to exist
 - i. Enough oxygen to sustain combustion
 - ii. Enough heat to raise the material to its ignition temperature
 - iii. Some sort of fuel or combustible material
 - iv. The chemical reaction that is fire
- d. Ignition sources – open flames, smoking, static electricity, hotwork, hot surfaces, electrical and mechanical sparks, lightning
- C. Tasks that require fire protection and examples of hazards
 - 1. Hotwork – welding, cutting, brazing; 30-minute fire watch
 - 2. Dispensing flammables and combustibles: gasoline, diesel, or natural gas
 - 3. Flammable wastes: solvent waste, oily rags, and flammable liquids
- D. Handling of flammable hazards
 - 1. Only use approved metal safety containers or the original manufacturer's containers for storage
 - 2. Practice good housekeeping – clean up spills immediately and dispose of cleanup rags properly
 - 3. Keep containers closed when not in use
 - 4. Store away from exits or passageways
 - 5. Keep away from ignition sources
- E. Fire protection equipment
 - 1. PPE needed for evacuation
 - a. Eye and face protection
 - b. Head protection
 - c. Foot protection
 - d. Respiratory protection
 - e. Body protection
 - f. Special body protection for abnormal environmental conditions such as extreme heat
 - g. Special equipment or warning devices for hazards associated with the workplace

https://www.osha.gov/SLTC/etools/evacuation/high_hazard.html#special

<p>III. Conditions under which evacuation actions may be necessary in an emergency situation</p> <p>A. Type of Emergency</p> <ol style="list-style-type: none">1. Man-made: fires, explosions, toxic material releases, radiological/biological incidents, civil disturbances, workplace violence2. Natural: floods, earthquakes, hurricanes, tornadoes <p>B. Factors affecting decision to evacuate/shelter-in-place</p> <ol style="list-style-type: none">1. Type/extent of emergency2. Location of emergency within or outside the workplace3. Type of building in which the workplace is located4. Shutting down critical operations5. Fire emergencies – fight or flee?<ol style="list-style-type: none">a. Options for evacuation<ol style="list-style-type: none">i. Option 1: Total evacuationii. Option 2: Designated employees are authorized to fight fire; all other evacuateiii. Option 3: All employees are authorized to fight fireiv. Option 4: Extinguishers are provided, but are not intended for employee useb. Performing a risk assessment<ol style="list-style-type: none">i. Is the fire too big?ii. Is the air safe to breathe?iii. Is the environment too hot or smoky?iv. Is there a safe evacuation path? <p>C. Evacuation maps</p> <ol style="list-style-type: none">1. Floor diagrams that designate exit route assignments2. Should include locations of:<ol style="list-style-type: none">a. Exits<ol style="list-style-type: none">i. To, thru, and awayii. Minimum of two – primary and secondary exitsb. Assembly/refuge areas	<p>PPT slides #18 - #23</p> <p>https://www.osha.gov/SLTC/etools/evacuation/evac.html</p>
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<ul style="list-style-type: none">c. Current location on map; "You are here"d. Equipment needed in an emergency – fire extinguishers, first aid kits, spill kits <p>D. Planning evacuation actions</p> <ul style="list-style-type: none">1. Alerting employees to evacuate2. Accounting for who has exited3. Informing employees regarding actions after emergency – all clear, safe to re-enter, remain at assembly point, clear to leave workplace <p>IV. Conditions under which shelter-in-place may be necessary in an emergency situation</p> <p>A. Incidents that may require shelter-in-place</p> <ul style="list-style-type: none">1. Release of chemical, biological, or radiological contaminants2. Severe weather, such as tornadoes<ul style="list-style-type: none">a. Watch – high possibility that weather emergency will occur; pay attention for updates/changes and be ready to take actionb. Warning – a weather emergency is already happening, or will happen soon; take immediate action3. Other situations occurring outside the workplace (building lockdowns)<ul style="list-style-type: none">a. Civil disturbancesb. Criminal suspect in area <p>B. Shelter-in-place</p> <ul style="list-style-type: none">1. Means taking refuge in interior room(s) with no/few windows2. Local authorities often issue shelter-in-place advice via television or radio3. Procedures are specific to worksite, such as:<ul style="list-style-type: none">a. Close businessb. Provide for safety of customers, clients, or visitors in the building; authorities want everyone to act; do not drive or walk outdoors	<p>PPT slides #24 - #26</p> <p>https://www.osha.gov/SLTC/etools/evacuation/shelterinplace.html</p>
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<ul style="list-style-type: none">c. Call emergency contacts (except with imminent threat); turn on answering systemsd. Explosion dangers: close window shades, blinds, or curtainse. Gather essential disaster suppliesf. Select rooms with hard-wired telephonesg. Tape plastic sheeting to prevent contaminationh. Document/report who is in roomi. Get further instructions until safe or ordered to evacuate (radio, tv, internet) <p>C. Planning shelter-in-place actions</p> <ul style="list-style-type: none">1. Alerting employees to take shelter2. Accounting for everyone in refuge3. Keeping employees informed <p>V. Characteristics of an effective emergency escape route</p> <p>A. Exit routes</p> <ul style="list-style-type: none">1. Continuous and unobstructed path of exit travel from any place in workplace to safety2. Consists of three parts<ul style="list-style-type: none">a. Exit accessb. Exitc. Exit discharge3. Should be:<ul style="list-style-type: none">a. Clearly markedb. Well-litc. Wide enough to accommodate the number of personnel evacuatingd. Unobstructed and clear of debris at all timese. Unlikely to expose any additional hazards <p>B. Basic exit route requirements</p> <ul style="list-style-type: none">1. Permanent2. Separated by fire-resistant materials	<p>PPT slides #27 - #30</p> <p>https://www.osha.gov/SLTC/etools/evacuation/egress_construction.html</p>
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3. Limited openings to an exit; protected by self-closing fire door
 4. Adequate number of exit routes
 5. Discharge leading directly to outside or to a place with access to outside
 6. Exit door must be unlocked from inside and side-hinged
 7. Exit route capacity must be adequate
 8. Meet minimum height (7' 6") and width (28")
 9. Outdoor exit routes permitted; guardrails if fall hazard exists
- C. Clear communication of 3 elements of escape route
1. Exit access pathway
 2. Nearest exits from all points of building
 3. Pathway away from building structure to rally point/area of refuge
- D. Review elements of a good evacuation floor plan
1. Designated primary and secondary exits
 2. No emergency exits in restrooms
 3. Exit away from rooms with hazardous materials
 4. No emergency exits into narrow passages
 5. Exit signs indicating the nearest emergency exit
 6. Designated assembly area
 7. No use of elevators to reach emergency exit
 8. Exits with wheelchair access
 9. Employee's current location ("You are here")

https://www.osha.gov/SLTC/etools/evacuation/floorplan_demo.html

PPT slides #31 - #42

VI. Extinguishing fires

A. Methods of fire protection

1. Fixed extinguishing systems
2. Fire brigade
3. Fire extinguishers

<ul style="list-style-type: none">B. Portable fire extinguisher training and education<ul style="list-style-type: none">1. Required for employees authorized to use fire extinguishers2. General principles of fire extinguisher use3. Hazards of incipient stage fire fighting4. Operation of equipment – instruction and practice5. Required upon initial employment/assignment and at least annually thereafterC. Classes of fire – based on substances fueling fire<ul style="list-style-type: none">1. Class A – ordinary combustibles2. Class B – flammable liquids and gases3. Class C – energized electrical equipment4. Class D – combustible metals5. Class K – cooking oils and greases (kitchen)D. Fire extinguishers<ul style="list-style-type: none">1. How they work – recall fire triangle (requirements for a fire to exist)<ul style="list-style-type: none">a. Remove heatb. Displace/remove oxygenc. Stop chemical reaction2. Parts and label<ul style="list-style-type: none">a. Safety pinb. Handlec. Nozzled. Canistere. Pressure gauge (depending on type)f. Label<ul style="list-style-type: none">i. Letters – represent type of fire for which extinguisher has been approvedii. Rating – water equivalent and/or area it can extinguish	<p>29 CFR 1910.157(g)</p> <p>https://www.osha.gov/pls/oshweb/owadisp.show_document?p_table=STANDARDS&p_id=9811</p>
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3. Extinguisher types

- a. Water or air-pressurized water (APW)
 - i. Designed for Class A fires only
 - ii. Large, silver container, 2-3 ft. tall, weighing about 25 lbs. when full
 - iii. Filled 2/3 with ordinary water, then pressurized with air; detergents may be added to produce foam
 - iv. Works by cooling the surface of the fuel – removes heat
 - v. Never use on flammable fires or electrical fires
- b. Carbon dioxide (CO₂)
 - i. Designed for Class B and Class C fires only
 - ii. Red cylinders, ranging from 5 – 100 lbs. or larger, with a hard horn (located at the end of the flexible hose) and no pressure gauge
 - iii. Filled with CO₂ under extreme pressure
 - iv. Displaces oxygen; dry ice pieces also have a cooling effect
 - v. Never use in a confined space without proper respiratory protection; not recommended for Class A fires
- c. Dry chemical (Multi-purpose)
 - i. May be used on Class A, Class B, and/or Class C fires (check label)
 - ii. Red cylinders, ranging in size from 5 – 20 lbs.
 - iii. Fire-retardant powder is the extinguishing agent and is propelled by a compressed, non-flammable gas
 - iv. Separates fuel from oxygen; powder also interrupts the chemical reaction
- d. Class K – dry and wet chemical extinguishers
 - i. Designed for kitchen fires
 - ii. Only intended to be used after activation of built-in hood suppression system

https://www.osha.gov/SLTC/etools/evacuation/portable_about.html#water

- iii. Filled with electrically conductive extinguishing agents; use only after electrical power to appliance has been shut off
- iv. Potassium bicarbonate may be used in dry types; wet chemical extinguishers spray a fine mist
- 4. Using a fire extinguisher
 - a. Steps to follow:
 - i. Sound alarm; call fire department
 - ii. Identify safe evacuation path
 - iii. Select appropriate fire extinguisher
 - iv. Discharge extinguisher using P.A.S.S technique
 - v. Back away once fire is extinguished in case of flame-up
 - vi. Evacuate immediately if:
 - Extinguisher is empty and fire is not out
 - Fire progresses beyond incipient stage
 - b. P.A.S.S technique
 - i. **Pull** the pin
 - ii. **Aim** nozzle (horn or hose) at base of fire
 - iii. **Squeeze** the handle to release extinguishing agent
 - iv. **Sweep** from side to side at base of fire until it is out
 - v. Watch area for re-ignition; repeat steps 2 – 4 if necessary; when in doubt, evacuate immediately

VII. Maintenance of portable fire extinguishers

A. Elements of inspection

- 1. Inspect bottle, handle, hose and gauge to make sure they are in proper working order
- 2. Inspect inspection tag and bottle for
 - a. Month and Year put in service current (annual)
 - b. Monthly visual inspections completed (monthly)
 - c. Extinguisher product still free flowing inside bottle (turn upside down and / or shake)

PPT slide #43

10-hour General Industry Outreach

Application (How students apply what they learn)

Estimated Time: ?? hours

Key Points

Methods

Have participants describe the issues with the numbered elements shown in the exit route illustrations on slides.

PPT slides #44 - #45

Follow elements of a typical evacuation plan or have them make their own. Demonstrate the monthly inspection of a fire extinguisher. Match up the proper class of fire extinguisher to the type of fire that it is most effective on

Evaluation/Summary

Estimated Time: ?? hours

Key Points

Methods

Knowledge Check: *Exit Routes, Emergency Action Plans, Fire Prevention Plans, and Fire Protection*

PPT slides #46 - #54

References

OSHA Standard

General Industry ([29 CFR 1910](#))

- [1910 Subpart E](#), Means of egress
 - [1910.35](#), Compliance with alternate exit-route codes
 - [1910.36](#), Design and construction requirements for exit routes
 - [1910.37](#), Maintenance, safeguards, and operational features for exit routes
 - [1910.38](#), Emergency action plans
 - [1910.39](#), Fire prevention plans
- [1910 Subpart L](#), Fire protection
 - [1910.155](#), Scope, application and definitions applicable to this subpart
 - [1910.156](#), Fire brigades
 - [1910.157](#), Portable fire extinguishers
 - [1910.158](#), Standpipe and hose systems
 - [1910.159](#), Automatic sprinkler systems
 - [1910.160](#), Fixed extinguishing systems, general
 - [1910.161](#), Fixed extinguishing systems, dry chemical
 - [1910.162](#), Fixed extinguishing systems, gaseous agent
 - [1910.163](#), Fixed extinguishing systems, water spray and foam
 - [1910.164](#), Fire detection systems
 - [1910.165](#), Employee alarm systems
 - [Appendix A](#), Fire Protection
 - [Appendix B](#), National consensus standards
 - [Appendix C](#), Fire Protection references for further information
 - [Appendix D](#), Availability of publications incorporated by reference in section 1910.156 fire brigades
 - [Appendix E](#), Test methods for protective clothing

https://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=STANDARDS&p_toc_level=1&p_keyvalue=1910

Directives

- [Compliance Policy for Emergency Action Plans and Fire Prevention Plans](#). CPL 02-01-037 [CPL 2-1.037], (2002, July 9). Provides a consolidated compliance policy for the application of emergency action plans (EAPs) and fire prevention plans (FPPs), General Industry Standard for [29 CFR 1910.38](#).
- [1910.156\(e\)\(3\)\(ii\) Fire - Resistive Coat Requirements for Fire Brigades](#). STD 01-09-003 [STD 1-9.3], (1981, December 12). Recognizes a variation to the washing cycle requirements referenced in 29 CFR 1910.156(e)(3)(ii).
- [29 CFR 1910.157\(f\)\(2\),\(f\)\(2\)\(i\) and \(f\)\(4\) Hydrostatic Testing of Dry Chemical Cartridge Portable Fire Extinguishers](#). STD 01-09-002 [STD 1-9.2], (1981, August 5). Provides exceptions for hydrostatic testing and repairs.
- Search all available [directives](#).

OSHA Publications

- OSHA #3088 Booklet *Emergency Action Plans: How to Plan for Workplace Emergencies and Evacuation* (2001)
- OSHA #3335 Fact Sheet *Emergency Management: Planning & responding to Workplace Emergencies* (2004)
- OSHA Fact Sheet *Emergency Exit Routes* (2003)
- OSHA #3183 QuickCard™ *Emergency Exit Routes*
- OSHA #3256 Booklet *Fire Service Features and Fire Protection Systems* (2015)
- OSHA Fact Sheet *Fire Safety* (2002)

OSHA References/Resources

- Safety and Health Topics, *Emergency Preparedness*, no date
<https://www.osha.gov/SLTC/emergencypreparedness/index.html>
- Safety and Health Topics, *Fire Safety*, no date
<https://www.osha.gov/SLTC/etools/evacuation/sitemap.html>
- Evacuation Plans and procedures eTool, no date
<https://www.osha.gov/SLTC/etools/evacuation/eap.html>
- Evacuation Plans and procedures eTool, no date
https://www.osha.gov/SLTC/etools/evacuation/floorplan_demo.html