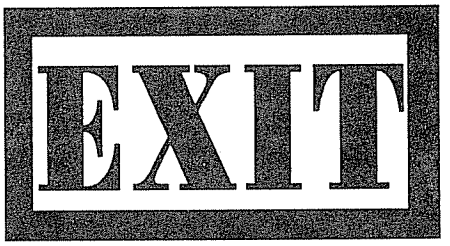
MEANS OF EGRESS
SUBPART E



This subpart deals with a subject which has been familiar to all of us since our early childhood days. Who does not remember the fire drills at school, with the primary classes trying for an orderliness award, and the older students welcoming a break in the routine? In school, or elsewhere, a sight so familiar that we hardly take note of it is represented by the exit sign. We see them in stores, factories, theaters, office buildings, hotels, apartment buildings, practically everywhere. Yet we rarely notice them until we look for them.

This subpart is about ensuring that when people need to have a safe and efficient means of leaving a building or facility under emergency circumstances, that means will be there and they will have minimal problems finding it and using it.

Egress: As defined by Webster: "A place or means of going out."

During this lesson you will learn the general requirements imposed by 29 CFR 1910 for providing means of egress from buildings. Subpart E contains definitions of terms related to the topic, general requirements which are fundamental to safe and efficient egress from facilities, and detailed requirements to ensure that the qualitative and quantitative factors are properly covered.

In addition, there are brief sections on the requirements for exit markings and

signs. The latter are covered more completely in Subpart L.

Throughout this discussion and in most materials devoted to the subject of emergency egress and exits, the emphasis will appear to be on escaping from fires. While this is certainly a primary reason for emergency egress from a building, it is not the only reason. Additional hazards which must be considered include:

- Explosion
- Earthquake
- Smoke (without fire)
- Toxic vapors
- Bomb threat
- Storms (tornado, hurricane, etc.)
- Flash floods
- Nuclear radiation exposure
- Actions or threatened actions of terrorist groups, mentally ill persons, or political radicals
- Other reasons

Each of these hazards to the occupants of a building can occur singly or in combination with others. Depending on the hazard, the people involved, the characteristics of the building, and the quality of the means of egress provided, each hazard can be compounded by:

- Panic and confusion
- Poor visibility
- Lack of information; misinformation

These compounding factors frequently cause more injuries and fatalities than the hazard itself. Providing the proper means of egress can enable persons to

successfully escape from the primary hazard.

The entire Subpart E is promulgated from NFPA 101-1970, Life Safety Code. This is prepared, maintained, and published by the National Fire Protection Association, headquartered in Quincy, Massachusetts.

Since this code is used as the basis for most local fire codes, it is written for general applicability. Keep in mind that your concern is its application primarily for the protection of employees, not the preservation of facilities.

The Life Safety Code, formerly the Building Exits Code, originated from work performed by the Committee on Safety to Life, The National Fire Protection Association, in 1913. At first, the committee devoted its attention to a study of the notable fires involving loss of life. That led to the preparation of standards for the construction of stairways and fire escapes, for fire drills in various occupancies, and for the construction and arrangement of exit facilities for factories, schools, etc. These form the basis of the present code.

In 1921, the committee was enlarged to provide a comprehensive guide to exits and related features of life safety from fire in all classes of occupancy. This guide was to be known as the Building Exits Code.

The Coconut Grove night club fire in Boston in 1942, where 492 lives were lost, focused national attention upon the importance of adequate exits and related fire safety features. Public attention to exit matters was further stimulated by the series of hotel fires in 1946. The Building Exits code thereafter was used to an increasing extent for legal regulatory purposes. The code however, was not in suitable form for adoption into law and the entire code was edited to limit the body of the text to requirements suitable for mandatory application. This involved adding provisions to the code of many features which had not been previously covered in order to produce a complete document.

In 1966, the code title was changed from "Building Exits Code" to "The Code for Safety to Life from Fire in Buildings and Structures," known as the "Life Safety Code."

The requirements in Subpart E are general and do not deal specifically with specialized facilities or out of the ordinary uses of the facilities. One major paragraph of Subpart E has been "reserved" for future standards which deal with specific occupancies, the hazards particularly associated with them, and the provisions for necessary means of egress.

DEFINITIONS - 1910.35

Means of Egress: A means of egress is a continuous and unobstructed way of exit travel from any point in a building or structure to a public way and consists of three separate and distinct parts: the way of exit access; the exit; and the way of exit discharge.

A means of egress comprises the vertical and horizontal ways of travel and shall include intervening room spaces, doorways, hallways, corridors, passageways, balconies, ramps, stairs, enclosures, lobbies, escalators, horizontal exits, courts, and yards.

Note: The word "way" in Subpart E is used to mean a route or path rather than a method.

Exit Access: Exit access is that portion of a means of egress which leads to an entrance to an exit.

Exit: Exit is that portion of a means of egress which is separated from all other spaces of the building or structure by construction or equipment as required in this subpart to provide a protected way of travel to the exit discharge.

Exit Discharge: Exit discharge is that portion of a means of egress between the termination of an exit and a public way.

High-hazard Contents: High-hazard contents shall be classified as those which are liable to burn with extreme rapidity or from which poisonous fumes or explosions are to be feared in the event of fire.

Emergency Action Plan: Means a plan for a workplace, or parts thereof, describing what procedures the employer and employees must take to ensure

employee safety from fire or other emergencies.

Emergency Escape Route: The route that employees are directed to follow in the event they are required to evacuate the workplace or seek a designated refuge area.

GENERAL REQUIREMENTS - 1910.36

Application

This subpart contains general fundamental requirements essential to providing a safe means of egress from fire and like emergencies.

The requirements in Subpart E are minimum requirements. The standards do not prohibit better construction, more exits, or safer conditions that these minimums set forth.

These requirements are not intended to apply to exits from vehicles, vessels, or other mobile structures.

Fundamental Requirements

This subparagraph contains requirements that apply to all buildings, new or old, which are intended for human occupancy. They may be summarized as follows:

- Shall have exits sufficient for prompt and convenient escape of occupants in emergency.
- The design of exits and other safeguards shall be such that reliance for safety to life will not depend solely on any single safeguard.
- Building structures shall not cause danger to occupants during period necessary for escape.
- There shall be no locks or devices to prevent emergency egress except in specialized facilities, such as mental, penal, or corrective institutions where attendants are on duty.

- Means of egress shall be clearly visible and understandable to occupants who are physically and mentally capable to know the direction of escape.

- Any doorway or passageway not constituting an exit or way to reach an exit, but of such a character that it may be mistaken for an exit, shall be clearly marked "Not an Exit."

- Adequate and reliable illumination shall be provided for all exit facilities in every building or structure equipped for artificial illumination.

- When a fire may not itself provide adequate warning to occupants, fire alarm facilities shall be provided where necessary to warn occupants of existence of fire.

- Provisions for emergency egress shall not cause hazard under normal occupancy conditions.

These fundamental requirements are described more fully, as they apply to specific conditions and circumstances, in a later section of this lesson.

Employee Protection During Construction and Repair

Buildings are normally not occupied during construction or during major renovation phases. When construction or repair activity is in progress, for whatever purpose, the occupants of the building shall be protected to the same extent as if construction or repair were complete.

The activity shall not create any additional danger or handicap egress beyond the normally permissible conditions of the building. When these requirements

cannot be met, the building or affected portion thereof shall not be occupied.

Maintenance

Every required exit, way of approach thereto, and way of travel from the exit into the street or open space shall be continuously maintained free of all obstructions or impediments to full instant use in the case of fire or other emergency.

Every automatic sprinkler system, fire detection and alarm system, exit lighting, fire door, and other item or equipment, where provided, shall be continuously in proper operating condition.

MEANS OF EGRESS, GENERAL - 1910.37

This section is devoted to the "components" of the means of egress.

Permissible Exit Components

An exit shall consist only of the approved components. Exit components shall be constructed as an integral part of the building or shall be permanently affixed thereto. For instance, if a door to an exit or to a way of exit access is not of the side-hinged, swinging type, it is not approved.

Although wording here refers to "exit components," it is applied to all components of the means of egress. Note that an ordinary outside fire escape, so familiar on older buildings, is not recognized as a safe means of egress in new building construction.

Protective Enclosure of Exits

The measure of fire resistance is the fire resistance rating. That is the time in hours that materials or assemblies have withstood a fire as established by tests.

When an exit is protected by separation from other parts of the building, the separating construction shall meet the following requirements.

- Three stories or less - one hour fire resistance
- Four or more stories - two hour fire resistance
- Openings protected by approved self-closing fire doors.
- Openings in exit enclosures shall be limited to those necessary for access to the enclosure from normally occupied spaces and for egress from the enclosure.

What this requirement means, essentially, is that the exit must survive and provide protection long enough to be used by the occupants of a building.

Width and Capacity of Means of Egress

The capacity in number of persons per unit of exit width for approved components of means of egress shall be as follows:

- Level Egress Components (including Class A ramps): 100 persons/unit
- Inclined Egress Components (including Class B ramps): 60 persons/unit

A Class A ramp is one which has a slope no greater than 1 3/16 inches in a 12-inch length, a width at least 44 inches, and no limit on the maximum height between landings. A Class B ramp is one which has a slope of 1 3/16 to 2 inches in a 12-inch length, a width of 30 to 44 inches, and a maximum height between landings of 12 feet.

Means of egress shall be measured in units of exit width of 22 inches. Fractions of a unit shall not be counted, except that 12 inches added to one or more full units shall be counted as one-half a unit of exit width.

Units of exit width shall be measured in the clear at the narrowest point of the means of egress except that:

- Handrails may project no more than 5 inches;
- Stair stringers may project no more than 1½ inches.

An exit or exit access door swinging into an aisle or passageway shall not restrict the effective width at any point during its swing to less than the specified minimum widths.

Egress Capacity and Occupant Load

When capacity has been determined for each means of egress, the projected occupant load for the means of egress must be calculated.

- Capacity of means of egress shall be sufficient for occupant load of any space served.
- Occupant load is the maximum number of persons that may be in a space at any time.
- Capacity of the exits at a floor can be based on individual floor occupant loads (not additive).
- Exit capacity must not decrease in direction of exit travel.

For additional information concerning egress capacity and occupancy load refer to the National Fire Protection Association (NFPA) which has specific requirements for individual occupancies.

Arrangements of Exits

When multiple exits are required for a floor, at least two of the exits shall be separated from each other as far as possible to minimize chances of more than one being blocked.

Access to Exits

The basic requirements include:

- Exits must be readily accessible at all times.

- Doors from a room to an exit or way of exit access shall be of the side-hinged, swinging type and must swing with exit travel when the room is occupied by more than 50 persons or used for a high hazard occupancy.

- Access to an exit shall not be through a bathroom or other room subject to locking, except where the exit serves only that room.

- Access to exits shall be clearly recognizable.

- Exit doors shall not be disguised, covered, concealed, or decorated in such a way as to confuse their purpose.

- Mirrors must not be placed on or near exit doors.

- Routes of exit access shall never be toward a high hazard location, unless effectively shielded.

- Minimum width of any way of exit access is 28 inches.

Exterior Routes of Exit Access

Under certain conditions it is permissible to plan an exterior route as a way of exit access from one interior part of a building to another or to an exterior exit. Such routes may include flat roof tops, enclosed courtyards, balconies, etc.

Specific requirements for exterior access routes include:

- Smooth, solid, level floors.

- Guard rails on open sides above ground level.

- Covered by roof if snow or ice could accumulate.
- Permanent, reasonably straight route of travel.
- No obstruction to use of exterior access route.
- No dead ends longer than 20 feet.

Normally, when we think of an "exit" we visualize a door or doorway, through which one can pass from the inside to the outside. As used in this subpart, an exit can be such a doorway, and it can also be an interior stairwell or anteroom, or as we have already seen, it can be an exterior "fire escape."

An exit is that portion of a means of egress which is separated from all other spaces by means of a door or balcony, etc., to provide a protected way of travel to the exit discharge.

Discharge from Exits

The requirements for exit discharge are:

- Discharge directly to the street, or to yard, court, or other open space leading to the street.
- The discharge area, including the street, shall be large enough to accommodate all who leave the building from the exit.
- Stairs and other exits shall be so arranged as to make clear the direction of egress to the street. Exit stairs that continue beyond the floor of discharge shall be interrupted at the floor of discharge by partitions, doors, or other effective means.

Headroom

Means of egress shall have a minimum ceiling height of 7 feet, 6 inches and any projection from the ceiling (lights, etc.) shall be at least 6 feet, 8 inches from the floor.

Changes in Elevation

Where a means of egress is not substantially level, such differences in elevation shall be negotiated by stairs or ramps.

Maintenance and Workmanship

One of the most frequently cited violations in Subpart E is the requirement that means of egress be continuously maintained free of all obstructions or impediments to full instant use in the case of fire or other emergencies.

Any exit alarms or devices installed to restrict the improper use of an exit shall not, even in cases of failure, prevent the emergency use of such exit.

Doors, stairs, ramps, passageways, signs, and all other components of means of egress shall be of substantial, reliable construction and shall be built and/or installed in a workmanlike manner.

Furnishings and Decorations

No furnishings or decorations shall be permitted which obscure or obstruct the means of egress. This is particularly likely to occur during holiday seasons.

No furnishings or decorations of an explosive or highly flammable character are permitted.

Fire Protection Provisions

Although Subpart E is devoted to the provisions for ensuring that personnel can egress from a building under emergency conditions, it also contains several provisions for preventing or reducing risk of such an emergency. Detailed requirements for fire protection are in Subpart L. Subpart E requires that where protection - such as automatic sprinklers, and fire retardant paints - are required and/or installed, they shall be regularly inspected or tested, maintained, and replenished or renewed as necessary to keep them in good operating condition.

Exit Markings

Exit markings fall into two categories:

- Signs or markings which clearly identify an exit, or the way to an exit.
- Signs or markings which clearly identify doors or areas which are <u>not</u> means of egress.

The requirements are:

1. Every <u>exit</u> shall be marked by a clearly visible sign with the word EXIT in plainly legible letters at least 6 inches high and with at least a ¾" stroke width.

2. When the way to an exit is not readily apparent, signs or markings similar to exit signs shall be provided which also provide directional information. Where arrows are used, they shall be obvious as to the direction of the exit.

3. Doors, passageways, and stairways which are not means of egress shall be clearly marked "NOT AN EXIT" or with other labeling to show their true

character, if they may be confused with access to exits.

4. Exit signs shall be illuminated either by internal or external means by a "reliable" light source giving a value of not less than 5 foot-candles on the illuminated surface.

5. Exit signs and exit access signs must be configured and located so as to be readily visible. Other building appurtenances, such as furnishings, decorations, or equipment, are not permitted to obscure or detract from the attention value of the exit sign.

EMPLOYEE EMERGENCY PLANS AND FIRE PREVENTION PLANS - 1910.38

This section applies to all emergency action plans and fire prevention plans required by a particular OSHA standard.

Emergency Action Plan

Elements

The emergency action plan must be in writing; except for employers with 10 or fewer employees, where the plan may be communicated orally to employees. The plan must include, at a minimum, the following elements:

1. Escape procedures and escape route assignments;
2. Critical operations shutdown procedure;
3. Procedure to account for all personnel;
4. Rescue and medical duties assignment;
5. Means of reporting fires and emergencies; and
6. Identification of responsible persons for further information.

The emergency action plan should address all potential emergencies that can be expected in the workplace. It may be helpful to perform a hazard audit to determine potentially toxic materials and unsafe conditions. For information on chemicals, the manufacturer or supplier can be contacted to obtain Material Safety Data Sheets. These forms describe the hazards that a chemical may present, list precautions to take when handling, storing, or using the substance,

and outline emergency and first-aid procedures.

The employer should list in detail the procedures to be taken by those employees who must remain behind to care for essential plant operations until their evacuation becomes absolutely necessary. This may include monitoring plant power supplies, water supplies, and other essential services that cannot be shut down for every emergency alarm.

For emergency evacuation, the use of floor plans or workplace maps that clearly show the emergency escape routes and safe or refuge areas should be included in the plan. All employees must be told what actions they are to take in the emergency situations that may occur in the workplace.

Alarm System

Employers shall establish an employee alarm system which complies with 1910.165. Alarms should be audible or seen by all people in the plant and should have an auxiliary power supply in the event electricity is affected. The alarm should be distinctive and recognizable as a signal to evacuate the work area or perform actions designated under the emergency action plan.

Evacuation

The employer shall establish in the emergency action plan the types of evacuation to be used in emergency circumstances. At the time of an emergency, employees should know what type of evacuation is necessary and what their role is in carrying out the plan. In some cases where the emergency is very grave, total and immediate evacuation of all employees is necessary. In other emergencies, a partial evacuation of nonessential employees with a delayed evacuation of others may be necessary for continued plant operation. In some cases, only those employees in the immediate area of the fire may be expected to evacuate or move to a safe area such as when a local application fire suppression system discharge employee alarm is sounded. Employees must be

sure that they know what is expected of them in all such emergency possibilities which have been planned in order to provide assurance of their safety from fire or other emergency.

The designation of refuge or safe areas for evacuation should be determined and identified in the plan. In a building divided into fire zones by fire walls, the refuge area may still be within the same building but in a different zone from where the emergency occurs.

Exterior refuge or safe areas may include parking lots, open fields or streets which are located away from the site of the emergency and which provide sufficient space to accommodate the employees. Employees should be instructed to move away from the exit discharge doors of the building, and to avoid congregating close to the building where they may hamper emergency operations.

Training

Training is important to the effectiveness of an emergency plan.

1. Before implementing an emergency action plan, a sufficient number of persons must be trained to assist in the safe and orderly evacuation of employees. Training for each type of disaster response is necessary so that employees know what actions are required.

2. The employer shall review the plan with each employee covered by the plan at the following times:

    - Initially when the plan is developed,

    - Whenever the employee's responsibilities or designated actions under the plan change, and

- Whenever the plan is changed.

3. The employer shall review with each employee upon initial assignment those parts of the plan which the employee must know to protect themselves in the event of an emergency.

The employer should assure that an adequate number of employees are available at all times during working hours to act as evacuation wardens so that employees can be swiftly moved from the danger location to the safe areas. Generally, one warden for each twenty employees in the workplace should be able to provide adequate guidance and instruction at the time of a fire emergency. The employees selected or who volunteer to serve as wardens should be trained in the complete workplace layout and the various alternative escape routes from the workplace. All wardens and fellow employees should be made aware of handicapped employees who may need extra assistance, such as using the buddy system., and of hazardous areas to be avoided during emergencies. Before leaving, wardens should check rooms and other enclosed spaces in the workplace for employees who may be trapped or otherwise unable to evacuate the area.

After the desired degree of evacuation is completed, the wardens should be able to account for or otherwise verify that all employees are in the safe area.

Personal Protection

Effective personal protection is essential for any person who may be exposed to potentially hazardous substances. In emergency situations, employees may be exposed to a wide variety of hazardous circumstances. It is extremely important that employees be adequately protected in these situations.

Medical Assistance

In a major emergency, time is a critical factor in minimizing injuries. Most small

businesses do not have a formal medical program, but they are required to have the following medical and first-aid services:

1. In the absence of an infirmary, clinic, or hospital in close proximity to the workplace that can be used for the treatment of all injured employees, the employer must ensure that a person or persons are adequately trained to render first aid.

2. Where the eyes or body of any employee may be exposed to injurious corrosive materials, eye washes or suitable equipment for quick drenching and flushing must be provided in the work area for immediate emergency use. Employees must be trained to use the equipment.

3. The employer must ensure the ready availability of medical personnel for advice and consultation on matters of employee health. This does not mean that health care must be provided, but rather that, if health problems develop in the workplace, medical help will be available to resolve them.

Fire Prevention Plan

Elements

The following elements, at a minimum, shall be included in a fire prevention plan.

1. A list of all major work place hazards and their proper handling and storage procedures, potential ignition sources, and type of fire equipment or systems to control a fire involving them.

2. Names or job titles responsible for maintenance of equipment and

ignition prevention or control systems.

3. Job titles or persons responsible for control of fuel source hazards.

Housekeeping

Employer shall control accumulations of flammable and combustible waste materials and residues so that they do not contribute to a fire emergency. These procedures shall be included in the fire prevention plan.

Training

The employer shall apprise employees of the fire hazards of the materials and processes to which they are exposed.

Upon initial assignment, the employer shall review those parts of the fire prevention plan which each employee must know to protect themselves in the event of an emergency. The written plan shall be kept in the work place and available to the employee. The plan may be communicated orally in establishments with 10 or fewer employees.

Maintenance

Equipment and systems installed on heat producing equipment shall be maintained in order to prevent accidental ignition of combustible materials. These procedures shall be included in the written fire prevention plan.

SUMMARY

During this lesson, we have discussed the scope and philosophy of Subpart E, "Means of Egress," and presented both general and specific requirements for providing and marking access to exits, exits, and exit discharge for occupants of buildings. As we know from some of the tragedies which have occurred over the years, inadequate egress provisions are often responsible for more deaths and injuries than the original emergency.