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CODE CORNER

ABOUT CODE CORNER

CCFS would like to remind you to check with your local "Authority Having Jurisdiction (AHJ)" for questions and opinions concerning your local Fire and Building Codes. The information contained in this article is supplied as a courtesy by the International Code Council (ICC) and is based on the International Fire and Building Codes and their respective commentaries. Your local codes or ordinances may vary.

CHAPTER 4

Emergency Planning and Preparedness

Part 3 of 4

About the 2012 Edition ... CCFS will be publishing sections of the 2012 IFC for your review and comparison. Please note that CCFS is not suggesting you adopt this new regulation. Any regulations used in your state/organization should be in accordance with the recommendations set forth by your local Building Regulations Organization and State Fire Marshal's Office.

SECTION 405 EMERGENCY EVACUATION DRILLS

405.1 General. Emergency evacuation drills complying with the provisions of this section shall be conducted at least annually in the occupancies listed in Section 404.2 or when required by the *fire code official*. Drills shall be designed in cooperation with the local authorities.

▫ *The fire safety and evacuation plans required by Section 404 are critical components of life safety strategies in high-density occupancies and extraordinary buildings, such as high-rise buildings. Many times such plans are developed with the best of intentions and available expertise, but fail to adequately consider certain site- or area-specific conditions. Just as emergency operations and hazardous material response plans require operational drills to verify their continued viability and effectiveness, so too do evacuation plans require periodic implementation to gauge effectiveness in achieving their objectives. Since not all of the occupancies that are required to prepare and maintain fire safety and evacuation plans by Section 404.2 are re-*

quired to conduct drills by Table 405.2, this section requires at least an annual drill to exercise the required plan. An additional benefit of an annual drill is the enhanced recognition by occupants, particularly in the case of a high-rise structure, of the possibility of selected-floor evacuation. Given the generally heightened awareness following the events of September 11, 2001, building occupants understandably exhibit a greater reluctance to remain inside a building in the event of an emergency. A complete building evacuation may be unnecessary in a large number of cases and may actually work counter to effective fire-ground operations if uncontrolled. An annual drill in these instances would serve to reinforce the local jurisdiction's preferences regarding evacuation, as well as provide a verification tool that the plan, as developed, is functional and presents opportunities for critique and improvement. The use of an annual drill could also easily be incorporated with certain additional training to satisfy the requirements for training in Section 406 as well.

405.2 Frequency. Required emergency evacuation drills shall be held at the intervals specified in Table

405.2 or more frequently where necessary to familiarize all occupants with the drill procedure.

▫ *To utilize fire drills and the lessons that they teach to the best of their advantage, drills should be conducted on a regular basis to familiarize both staff and residents with the evacuation plan. The element of surprise is not necessarily of significant benefit in those occupancies where residents may be prone to maladaptive behavior. Drills should be designed and practiced to reinforce relocation or evacuation behaviors as adaptive planned responses to stressful and potentially dangerous situations. Drills should be scheduled so that all staff members on all shifts have an opportunity to participate in them. Practice makes perfect, and when it comes to effective egress, there is no substitute for fire drills at regular intervals so that all occupants are familiar with the plan's details and their particular responsibilities in implementing them. Truly effective drills test the plan by varying conditions and force occupants to adapt. Many conditions can conspire to affect available safe egress time, and drills should incorporate some allowance for unanticipated conditions, such as delayed detection, rapid fire growth, reduced staffing or poor weather conditions, as may be appropriate for the occupancy. Discovering deficiencies in the evacuation plan should be encouraged, and every opportunity should be taken to improve the plans.*

405.3 Leadership. Responsibility for the planning and conduct of drills shall be assigned to competent persons designated to exercise leadership.

▫ *This section requires a focal point in the planning and execution of evacuation drills. Having a single point of contact streamlines the process and provides a necessary leadership role.*

405.4 Time. Drills shall be held at unexpected times and under varying conditions to simulate the unusual conditions that occur in case of fire.

▫ *If fire and emergency drills are a routine planned occurrence, they will not simulate actual reaction to an emergency but will provide an inaccurate and most likely optimistic outcome; therefore, the drills need to occur at random.*

405.5 Record keeping. Records shall be maintained of

required emergency evacuation drills and include the following information:

1. Identity of the person conducting the drill.
2. Date and time of the drill.
3. Notification method used.
4. Staff members on duty and participating.
5. Number of occupants evacuated.
6. Special conditions simulated.
7. Problems encountered.
8. Weather conditions when occupants were evacuated.
9. Time required to accomplish complete evacuation.

▫ *Documenting the frequency and efficiency of emergency evacuation drills not only aids the fire code official in verifying that drills complying with these provisions have been performed but may also help administrators identify trends in emergency evacuation drill performance. Accurate records help life safety planners determine the adequacy of their plans. Identifying issues such as problems encountered and weather conditions helps to further determine which elements create the largest delays and why.*

**TABLE 405.2
FIRE AND EVACUATION DRILL
FREQUENCY AND PARTICIPATION**

GROUP OR OCCUPANCY	FREQUENCY	PARTICIPATION
Group A	Quarterly	Employees
Group B ^c	Annually	Employees
Group E	Monthly ^a	All occupants
Group F	Annually	Employees
Group I	Quarterly on each shift	Employees ^b
Group R-1	Quarterly on each shift	Employees
Group R-2 ^d	Four annually	All occupants
Group R-4	Quarterly on each shift	Employees ^b
High-rise buildings	Annually	Employees

- a. The frequency shall be allowed to be modified in accordance with Section 408.3.2.
- b. Fire and evacuation drills in residential care assisted living facilities shall include complete evacuation of the premises in accordance with Section 408.10.5. Where occupants receive habilitation or rehabilitation training, fire prevention and fire safety practices shall be included as part of the training program.
- c. Group B buildings having an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.
- d. Applicable to Group R-2 college and university buildings in accordance with Section 408.3.

□ *Table 405.2 provides varying evacuation drill frequencies based on building occupancy. The table also prescribes who should be involved in these drills. The level of participation is based on the type of occupancy or, in the case of high-rises, building characteristics. It is unreasonable, for example, to expect that in a Group A occupancy or facility, such as a hospital or correctional facility, it would be necessary to require the general public to participate in an evacuation drill. It is potentially dangerous to involve anyone but the employees in such drills.*

The overall strategy for these occupancies is to provide a package of relevant information to occupants before an emergency and to have the staff facilitate and direct occupants during an emergency. The necessary participants in the drills are related to the overall emergency strategies for those buildings. Note that Group E, I-1 assisted living facilities, R-2 college and university buildings and R-4 occupancies are the only occupancies requiring that everyone be involved. This is related to the fact that occupants are generally able to evacuate. In the case of educational occupancies, drills serve as a learning tool for children to carry through their lives. Schools have generally stressed these drills because of large losses in fires, such as in 1958 at Our Lady of Angels School in Chicago, Illinois. In terms of Group I-1 and R-4 facilities, the occupants generally are able to evacuate with some assistance. In Group R-2 college and university buildings, the occupants are usually able-bodied and it is in their best interest to be familiar with the egress routes. More discussion on Group E, I-1, R-2 college and university buildings and R-4 occupancies is found in Section 408.

405.6 Notification. Where required by the *fire code official*, prior notification of emergency evacuation drills shall be given to the *fire code official*.

□ *In some cases, the fire code official will want prior notification of evacuation drills because he or she may need to prepare for such an event. This section provides the fire code official with the authority to require such notification.*

405.7 Initiation. Where a fire alarm system is provided, emergency evacuation drills shall be initiated by activating the fire alarm system.

□ *To simulate conditions normally experienced during an emergency, the emergency notification procedures, which would include a fire alarm system in many cases, must be used.*

405.8 Accountability. As building occupants arrive at the assembly point, efforts shall be made to determine if all occupants have been successfully evacuated or have been accounted for.

□ *This requirement is key to the success of evacuation plans. If a method is not available to account for the occupants once evacuation or relocation is complete, search and rescue activities will be more difficult for the emergency responders. Also, it would be difficult to measure the success of the plan.*

405.9 Recall and reentry. An electrically or mechanically operated signal used to recall occupants after an evacuation shall be separate and distinct from the signal used to initiate the evacuation. The recall signal initiation means shall be manually operated and under the control of the person in charge of the premises or the official in charge of the incident. No one shall reenter the premises until authorized to do so by the official in charge.

□ *This section is primarily aimed at the concern that the occupants will be confused if similar signals are used to notify them of an alarm and also for reentry. This confusion has the consequences of slowing or even halting evacuation during an actual emergency. Additionally, to make sure that occupants do not go back into the building prematurely, any reentry signal must be operated manually to avoid a situation where it automatically sounds. Finally, this section specifically*

prohibits reentry until authorization is provided by the official in charge at the scene.

SECTION 406 EMPLOYEE TRAINING AND RESPONSE PROCEDURES

406.1 General. Employees in the occupancies listed in Section 404.2 shall be trained in the fire emergency procedures described in their fire evacuation and fire safety plans. Training shall be based on these plans and as described in Section 404.3.

□ In most cases, the success of an evacuation and fire safety plan hinges on the appropriate reactions of the building occupants. The main activity that building occupants must undertake is removing themselves from the hazards. In some cases, fire safety and evacuation plans involve additional actions by the employees of the facility. For instance, in the case of hospitals, the nurses and other hospital staff must relocate patients; therefore, specific training is required for those activities.

Additionally, employees must be trained based on the specific fire safety and fire evacuation plans.

406.2 Frequency. Employees shall receive training in the contents of fire safety and evacuation plans and their duties as part of new employee orientation and at least annually thereafter. Records shall be kept and made available to the fire code official upon request.

□ This section requires that employee training occur during new employee indoctrination and annually thereafter. A record of this training must be provided to the fire code official when requested. This section provides a minimum criterion for the training frequency for all occupancies addressed by Chapter 4. Section 408 may require more restrictive training frequencies.

406.3 Employee training program. Employees shall be trained in fire prevention, evacuation and fire safety in accordance with Sections 406.3.1 through 406.3.4.

□ This is a general section that requires all employees to be trained in fire prevention, evacuation and fire safety in accordance with the subsections that follow. These provisions are primarily intended as a mechanism to ensure that training occurs and not as a requirement for

establishing training criteria.

406.3.1 Fire prevention training. Employees shall be apprised of the fire hazards of the materials and processes to which they are exposed. Each employee shall be instructed in the proper procedures for preventing fires in the conduct of their assigned duties.

□ If a fire can be prevented, evacuation and relocation of the occupants will also be avoided. Employees must be made aware of the potential hazards related to their particular area of the facility and what can be done to avoid a hazardous situation. Having specific procedures increases the likelihood that proper fire prevention techniques will be followed. Generally, people tend to be unaware of many hazards unless they are alerted to them. An example is the use of space heaters.

406.3.2 Evacuation training. Employees shall be familiarized with the fire alarm and evacuation signals, their assigned duties in the event of an alarm or emergency, evacuation routes, areas of refuge, exterior assembly areas and procedures for evacuation.

□ In the event that an emergency does occur, the employees must be prepared to assist in the evacuation or relocation of occupants. This training will vary widely from one occupancy type to another. In a high-rise building only some of the occupants will be evacuated at a time, whereas a school will evacuate all occupants at once. This section requires that the training occurs.

406.3.3 Emergency lockdown training. Where a facility has a lockdown plan, employees shall be trained on their assigned duties and procedures in the event of an emergency lockdown.

□ If a facility goes to the trouble of creating a lockdown plan, it stands to reason that it would want its staff to be versed in the plan's contents. Training should be scheduled so that all staff members on all shifts or occupants, as applicable, have an opportunity to participate. Practice makes perfect, and when it comes to effective lockdowns, there is no substitute for training at regular intervals so that all staff and occupants are familiar with the plan's details and their particular responsibilities in implementing it. Drills should be scheduled to test the plan by varying conditions and forcing occupants to adapt, respond instinctively to emergencies without panicking and allow the staff to identify weaknesses in

the preparations. Many conditions can conspire to affect lockdown success and drills should incorporate some allowance for unanticipated conditions as may be appropriate for the occupancy. Discovering deficiencies in the plan should be encouraged, and every opportunity should be taken to improve the plans (see also commentary, Section 404.3.3.2).

406.3.4 Fire safety training. Employees assigned fire-fighting duties shall be trained to know the locations and proper use of portable fire extinguishers or other manual fire-fighting equipment and the protective clothing or equipment required for its safe and proper use.

▫ Any time employees are to take specific action during a fire event, proper training is required. This section holds the building owner or operator responsible for making sure the training occurs.

SECTION 407 HAZARD COMMUNICATION

407.1 General. The provisions of Sections 407.2 through 407.7 shall be applicable where hazardous materials subject to permits under Section 5001.5 are located on the premises or where required by the fire code official.

▫ This section is specific to buildings and facilities that contain hazardous materials over the permitted amounts listed in Section 105.6. Knowledge related to which hazardous materials are on site is critical in several ways. First, it assists emergency responders in knowing what to expect when responding to a scene. Second, it provides emergency responders with an idea of incidents that may occur at a building or facility. Lastly, it provides a better understanding to the occupants of the potential hazards present and how to avoid emergencies.

Facilities that store, use or handle hazardous materials on a large scale generally depend heavily on the actions of the employees to prevent or minimize hazardous materials incidents. Therefore, the occupants play a strong role in the overall protection of the building. These types of requirements would, in the past, have been found only within the hazardous materials section of the code. These provisions have also been located within this chapter because of the nature of the information. These requirements are aimed at preparing both the occupants and the emergency responders. Hazardous materials pre-

sent a wide range of problems because of the significant variation of properties and reactions; therefore, a reference to these requirements has been included in Chapter 4. These specific provisions are found in Section 5001.

This section states that when subject to permit requirements, hazardous materials must also be addressed. This section has requirements for the submittal of Material Safety Data Sheets (MSDS); the labeling or marking of hazardous materials through placarding and related identification; training; the compilation, when required, of both HMIS and HMMP and finally, the submittal of a closure plan when a facility is being shut down.

407.2 Material Safety Data Sheets. Material Safety Data Sheets (MSDS) for all hazardous materials shall be either readily available on the premises as a paper copy, or where approved, shall be permitted to be readily retrievable by electronic access.

▫ MSDS provide critical information about individual chemicals and their related hazards. This section requires that these data sheets be readily available on the premises or, where equivalent access can be achieved, as approved by the fire code official, they may be retrievable by electronic means. This allows availability for review by both employees and emergency responders. An appropriate location may be the security room at a facility or perhaps the main office. These sheets can potentially play a role in the response to an emergency. For example, if a chemical is noted as being water reactive on the MSDS, depending on the level of water reactivity, applying water to that spill may not be an appropriate response.

407.3 Identification. Individual containers of hazardous materials, cartons or packages shall be marked or labeled in accordance with applicable federal regulations. Buildings, rooms and spaces containing hazardous materials shall be identified by hazard warning signs in accordance with Section 5003.5.

▫ This section requires two activities related to the identification of hazardous materials. First, chemicals must be specifically labeled. Second, rooms or areas where the materials are located must be specifically labeled. In this case, the code essentially requires placarding as defined in Section 5003.5, which references NFPA 704.

407.4 Training. Persons responsible for the operation of areas in which hazardous materials are stored, dispensed, handled or used shall be familiar with the chemical nature of the materials and the appropriate mitigating actions necessary in the event of a fire, leak or spill. Responsible persons shall be designated and trained to be liaison personnel for the fire department. These persons shall aid the fire department in preplanning emergency responses and identification of the locations where hazardous materials are located, and shall have access to Material Safety Data Sheets and be knowledgeable in the site emergency response procedures.

▫ *This section requires training specific to the hazards of the materials located and used at a particular building or facility. As noted, the actions taken will vary based on the hazards associated with the materials. Additionally, this section requires a specific group of persons to be designated as points of contact for the fire department. Having specific points of contact is critical because it eases planning and response procedures. These contacts also provide the fire department with specific persons who are more familiar with the hazards of the building or facility. The fire department is charged with responding to many different businesses within a community. Having specified contacts at facilities containing hazardous materials helps them prepare and respond.*

407.5 Hazardous Materials Inventory Statement. Where required by the *fire code official*, each application for a permit shall include a Hazardous Materials Inventory Statement (HMIS) in accordance with Section 5001.5.2.

▫ *An HMIS is further described in Chapter 50 but is essentially a document listing all the hazardous materials found on site. This documentation includes information such as the type of material, amount, specific hazards associated with the material and how it is used. All of this information can be very important for emergency planning and preparedness. An HMIS is required only if the *fire code official* specifically requires one. See Appendix H for further information on HMIS and HMMP preparation.*

407.6 Hazardous Materials Management Plan. Where required by the *fire code official*, each application for a permit shall include a Hazardous Materials Management Plan (HMMP) in accordance with Section 5001.5.1. The *fire code official* is authorized to accept a similar plan

required by other regulations.

▫ *As with the HMIS, an HMMP is required only when the *fire code official* specifically requires one. This document is somewhat different from the HMIS in that it is geared to the layout of the building and the location and use of the hazardous materials. This document provides a better understanding of how the facility operates. This information in turn provides more detailed information to the emergency responders. This plan will also include such information as the location of aisles; the type and location of emergency equipment available and location of specific shutoff valves and other operating equipment. The detailed requirements for HMMPs are located in Chapter 50. See Appendix H for further information on HMIS and HMMP preparation.*

407.7 Facility closure plans. The permit holder or applicant shall submit to the *fire code official* a facility closure plan in accordance with Section 5001.6.3 to terminate storage, dispensing, handling or use of hazardous materials.

▫ *It is important for emergency responders to be made aware of the closure of a plant that uses or stores hazardous materials. First, closure means a readjustment in their planning. Second, the extent of the closure must be communicated so that the emergency responders are made aware of hazards that may still be present. Any hazards that are still present may potentially be more dangerous, since the facility is now unattended; therefore, the building owner must develop a plan that is acceptable to the *fire code official*. In some cases, a facility will be only temporarily closed, which would mean maintaining a permit and continuing inspections.*