CHAPTER

3

General Precautions Against Fire

The general safety requirements in the IFC were developed to control a wide variety of fire safety concerns that may not need additional clarification or the level of detail that might be found in other chapters.

Chapter 3 covers combustible waste materials (such as wood, paper and plastics), general storage, common fire hazards and sources of ignition. Ignition sources include mechanical, chemical, electrical or optical energy. The chapter also addresses topics such as fire safety issues related to vacant premises, fueled equipment, 3D printing, mobile food-preparation vehicles, storage of lithium-ion and lithium metal batteries, and recharging of powered micromobility devices powered by lithium-ion or lithium metal batteries. Vacant premises can be a major fire hazard to communities because if they are not adequately secured they may be used for criminal activity or as illegal and substandard housing. "Fueled equipment" includes motorcycles, mopeds, lawn care equipment and portable cooking equipment. Fueled equipment can be found in a variety of buildings and work sites, and represents another fire hazard because of the fuels used

and the common indoor use of the equipment. While not a structure or building, mobile food-preparation vehicles contain inherent fire and life safety hazards, such as cooking and storage of compressed or liquefied gases. Chapter 3 also contains requirements addressing hazards to firefighters and firefighting operations.

COMBUSTIBLE MATERIALS

Combustible materials are natural or synthetic materials that can be ignited and support combustion. Combustible materials in the context of IFC Chapter 3 are not combustible metals or flammable solids—these materials are classified as hazardous materials and are regulated by other provisions in the fire code. Materials regulated by IFC Chapter 3 generally are organic materials such as sawn wood, dimensional lumber, wastepaper or cardboard and baled cotton or paper. Synthetic materials may include plastics, fabrics or composite materials. Combustible materials are always solids and will have varying sizes and densities. The smaller the surface area of a combustible material and the lighter its density, the more easily it is ignited. The orientation of the combustible material, the strength of the ignition source and other variables can influence the ignitability of combustible materials.

The fire code recognizes that combustible materials are an important part of businesses and industries. The combustible material requirements in IFC Chapter 3 address the orderly storage of these materials, locating the materials away from ignition sources and, if the storage is indoors, separating the combustible materials from means of egress components and concealed spaces where they could accelerate the rate at which an unwanted fire grows and spreads. Orderly storage can slow the rate of fire spread, which benefits firefighters in the event the materials are ignited (Figure 3-1). [Ref. 315]

FIGURE 3-1 Retail displays are considered storage, and all storage must be maintained in orderly fashion and separated from ignition sources. [Ref 315.3]

While it is not within the scope of this chapter, fire code officials should understand that storage of many combustible materials over 12 feet in height inside of buildings introduces the potential for a fire that will exhibit a much faster growth

FIGURE 3-2 The IFC requires separation of outdoor dumpsters from buildings to limit the likelihood of the dumpster igniting an exposure building.

Code Essentials

The IFC requirements for combustible materials depend on whether the material is used as a component or product or if it is waste material.

Combustible material must be stored in an orderly manner, away from ignition sources and in locations that do not disrupt the means of egress.

Combustible waste must be located in approved waste receptacles. The IFC has specific requirements for dumpsters located indoors and outdoors. ●

rate when compared to the same materials stored at or near the floor level. Such storage can be found in many warehouses and mercantile occupancies and is required to comply with the requirements in IFC Chapter 32. Chapter 14 in this book introduces the reader to the hazards of high-piled combustible storage.

Combustible Waste

When combustible materials become "waste," the IFC takes a more aggressive approach: the materials must be removed and disposed of in a controlled manner. For combustible waste containers larger than 40 gallons, the IFC requires that the waste containers be noncombustible or plastic containers formulated from chemicals that result in a low heat release if ignited [Ref. 304.3]. When materials are placed in bulk trash receptacles (dumpsters), the fire code requires the dumpsters be located at least 5 feet from combustible construction, wall openings and combustible roof eaves (Figure 3-2). Because of property limitations, dumpsters are sometimes placed inside of buildings. In such instances, the room housing the dumpster is required to be protected by an automatic sprinkler system. Sprinkler protection is not required when the dumpster is located in a building constructed of noncombustible, fire-resistive materials and used exclusively for dumpster or trash container storage. [Ref. 304.3.4]

Valet Trash Collection

Valet trash collection is a service that is becoming more common. Valet trash collection is a service that removes trash or recycling materials placed outside of dwelling units or sleeping units. This service is sometimes offered in apartment buildings or condominiums. The occupant places their trash outside their front door on a specific day and the valet service will collect the trash and recycling. This is offered as a convenience to the occupants so they do not need to haul their waste to the trash chute or the dumpster.

Combustible material storage in the egress path is generally prohibited in the code, however, specific provisions for valet trash collection In Appendix O regulate this operation. Section 304.1.1 states that valet trash collection is only allowed where it is specifically approved by the fire code official. [Ref. 304.1.1]

Appendix O provides criteria for the valet trash collection operation in Group R-2 occupancies. Appendix O is only applicable when

the appendix has been specifically adopted in the enabling ordinance. If Appendix O is adopted, valet trash collection is still only permitted where approved by the fire code official. [Ref. 101.2.1, 304.1.1]

The containers placed outside the door for valet trash collection cannot exceed 2 cubic feet, they must be noncombustible or have a low heat release and they must have a lid. The valet trash containers cannot obstruct the required egress width and cannot be placed in stairways. [Ref. O103, O104]

Outdoor Pallet Storage

Transportation of products on pallets is a common occurrence in many different businesses. Whether the product is shipped off-site, or simply relocated within the facility, pallets are a useful tool providing quick access and mobility. A pallet adds a moderate fire load to the product it is carrying. When a pallet is not being used, it is considered an idle pallet. When idle pallets are stacked, the fire load and accompanying hazard increase dramatically. This occurs because each piece of wood in a wooden pallet is able to burn on all sides, and the typical construction of a pallet allows adequate air to reach all surfaces of the wood. So rather than burning from the outside in, like a stack of 2 by 4's, each side of piece of wood can be burning at the same time (Figure 3-3). [Ref. 315.7.5]

There are two sections in the code that regulate pallet storage. Section 315 regulates pallet storage incidental to the main operation

FIGURE 3-3 Incidental storage of idle pallets is regulated in Section 315.7.

FIGURE 3-4 Pallet yard fires generate a tremendous amount of heat. *(Getty Images)*

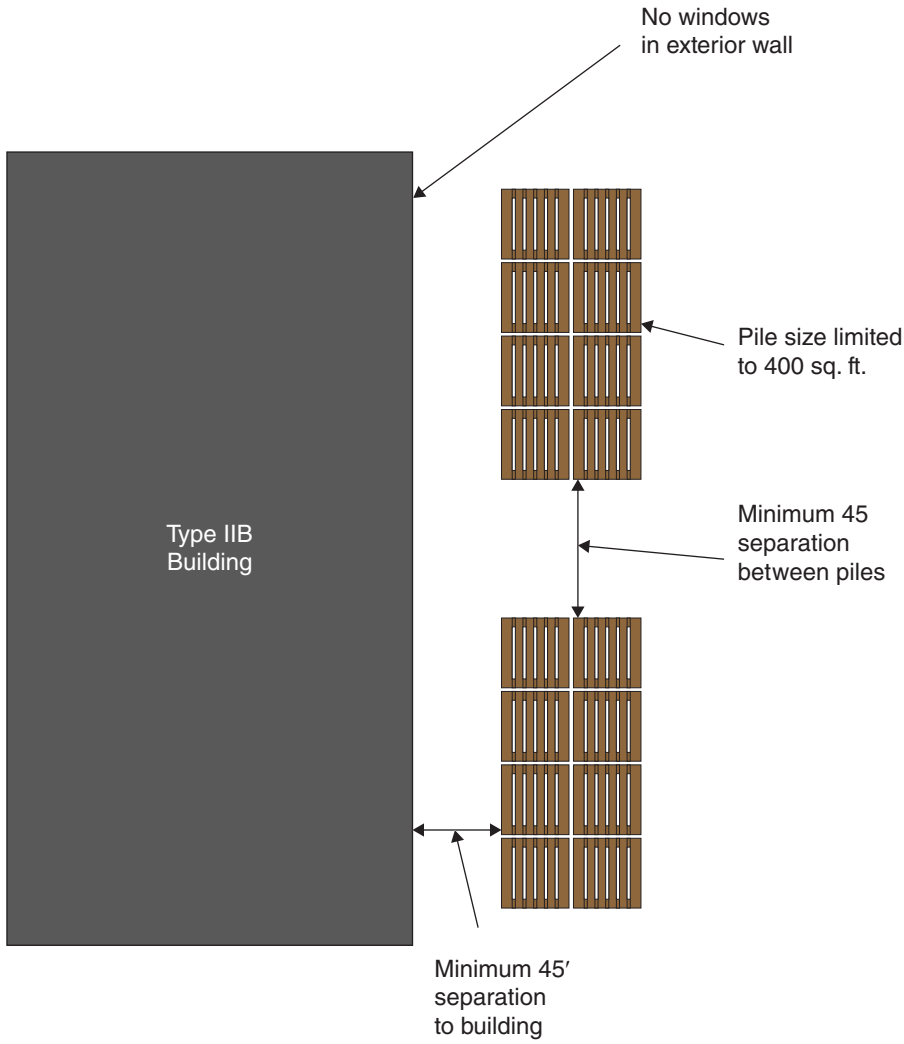

FIGURE 3-5 These outdoor pallet storage piles are separated from the building based on piles of more than 200 pallets. Note: if there were any windows in the exterior building wall, the separation distance would change from 20 feet to 90 feet.

of the facility. Section 2810 regulates the outdoor storage of pallets at pallet manufacturing and pallet recycling facilities.

Outdoor storage of pallets is specifically regulated because a fire in the pallet storage area creates an enormous amount of heat and can easily impact any exposures (Figure 3-4). The separation of pallet piles from buildings, property lines and other pallet piles is contingent on the type of pallet and the construction of the building (Figure 3-5). Pallets of wood and plastic pallets that are labeled in accordance with UL 2335, *Fire Tests of Storage Pallets,* or FM 4996, *Approval Standard for Classification of Pallets and Other Material Handling Products as Equivalent to Wood Pallets,* are all treated as a group with regard to spacing and pile size requirements. Plastic pallets not in compliance with either standard are treated as a separate

group since the heat release rate is considerably higher than wood pallets. [Ref. Tables 315.7.6(1) through 315.7.6(4)]

IGNITION SOURCES

Controls for ignition sources are dictated in several chapters of the IFC, including specific requirements for electrical equipment and hot work involving brazing, oxygen-acetylene cutting and welding. IFC Chapter 3 contains general requirements to address separating uses and activities involving potential sources of open flames from combustible materials. The provisions require adequate separation between open flames and combustible materials, open-flame warning devices such as road flares and negligent burning of combustible vegetation and materials. Cooking, decoration, theatrical or construction activities are regulated elsewhere in Chapter 3. [Ref. 305]

An open-ended requirement for the control of ignition sources and unwanted fires is included in IFC Section 305.5. This section states that when situations, uses or processes have repeatedly caused fires, the cause of the fire must be mitigated. This section can be used to address systems or situations that are not specifically regulated in the code, but are creating an unsafe situation resulting in repeat fires. There are no specific requirements to address the hazard other than the requirement to modify the situation to prevent further fires. [Ref. 305.5]

OPEN FLAMES

The IFC allows the use of open flames for theatrical performances, food preparation, religious ceremonies, decoration and paint removal. The IFC also prohibits the use of open flames in wildfire risk areas without a permit, or in sleeping units of Group R-2 dormitories. Cooking with charcoal or open flame devices on combustible balconies of Group R-1 and R-2 occupancies is prohibited unless the buildings are protected by an automatic sprinkler system. Under very limited conditions, open flames are permitted in assembly (Group A) occupancies. The IFC requires an operational permit for using open flames in assembly areas, dining areas of restaurants and drinking establishments. [Ref. 105.5.36, 308.1.5, 308.4.1]