



Chapter Contents

Facility Accidents	340	Inspections and Maintenance	351
Injuries and Fatalities	340	Inspections	352
Illnesses.....	340	Maintenance	353
Design Considerations	341	Personal Behavior	353
Legal Requirements.....	341	Chapter Review	354
Facility Types	343	Discussion Questions	354
Safety Requirements	344		
Usability.....	349		
Gender Privacy	350		
Facility Protection.....	351		



FESHE Learning Outcomes

Occupational Safety and Health for Emergency Services

5. Describe the relevance for safety in the workplace including the importance of PPE.
10. Describe the responsibilities of individual responders, supervisors, safety officers, and incident commanders, safety program managers, safety committees and fire department managers as they relate to health and safety programs.

Facility Safety

Learning Objectives

After reading this chapter, students will be able to:

1. Identify causes for injuries, fatalities, and illness that may occur in the facility environment.
2. Identify the design considerations for fire service facilities.
3. Describe the inspection and maintenance schedules and tasks for fire service facilities.
4. Describe individual firefighter behaviors that encourage on-site safety.

Chapter 10

Facility Safety



Fire and emergency services facilities include fire stations, administrative offices, dispatch centers, apparatus repair garages, equipment warehouses, training classrooms, burn buildings, aviation hangers, and driving pads. Throughout North America, these facilities vary widely in age, size, and design (**Figure 10.1**). However, their goal should be the same: to provide a safe and healthy work and living environment.



Figure 10.1 Design and construction of fire department facilities must adhere to established building codes.

Design and usage are two key factors in facility safety. Safety features can be engineered into a facility during the initial construction or through updates and renovations. *Safety and Health Considerations for the Design of Fire and Emergency Medical Services Stations*, published by the USFA and FEMA, is a useful online resource for health and safety officers (HSOs) in the process of building or remodeling a fire department facility. In order to help reduce onsite accidents and injuries, this manual addresses design aspects of fire and EMS stations that pertain to the health and safety of their personnel.

However, facility safety also requires ongoing maintenance and a commitment to individual safety. The number of on-duty, non-fireground injuries has decreased over the past five years (NFPA, 2016) due, in part, to more fire departments incorporating safety and risk management into station planning, renovation, and design. Facilities in excellent condition benefit from cooperation on three levels:

- Governing agencies value the safety and health of their firefighters.
- Firefighters respect community property.
- Administration supports onsite safety and risk management.

This chapter discusses several safety design issues; addresses important components of station maintenance and inspection programs; and examines how the health and safety of any well-designed, maintained and inspected fire department facility also depends on the behavior of its occupants.

Facility Accidents

Safety and risk management are key elements in the successful planning, renovation, and design of safer environments for first responders. HSOs should conduct facility risk assessments, beginning with areas of highest perceived risk, to reduce or mitigate many onsite hazards. HSOs should also monitor accident, injury, and close call data for facility-related incidents and how to prevent them.

Injuries and Fatalities

According to the NFPA, there were over 62,000 firefighter injuries reported in the United States in 2016. Nearly 37,000 of those injuries were not sustained on the fireground and involve strain, sprain, or muscular pain. Although national data does not specify facility-related injuries and fatalities, individual departments continue to report onsite incidents and consider how best to prevent them. A reduction in the total number of on-duty, non-fireground injuries over the past five years suggests that safer design, maintenance, and usage of fire and emergency services facilities can make a positive difference.

Illnesses

Job-related illness may result from worksite exposure to patients, other emergency responders, or hazardous contaminants. If safety procedures are not followed, illnesses can spread from the fireground or medical response to the facility environment. Other illnesses are directly related to unsafe practices in the facility environment. For example:

- **Respiratory viruses from colds and the flu** — Germs pass through direct physical contact, by touching surfaces where they have accumulated, or by breathing the airborne particles emitted by sneezing.
- **Bacterial infections from biological contaminants** — Molds and mildew can cause bacterial infections when they are inhaled, due to poorly maintained HVAC systems.
- **Allergies** — Airborne dust, pollen, mold, mildew, and certain foods can cause unpleasant or dangerous immune system reactions.

- **Food poisoning** —Disease-causing microbes, pathogens, harmful toxins and chemicals can contaminate food that is spoiled or improperly cooked. Contaminated plates, silverware, cutting boards, countertops and other surfaces can also spread foodborne illnesses.
- **Cancer** — Poorly insulated stations, doors, and windows can allow carcinogens to enter station living spaces. Proper disposal of chemical-protective clothing and cleaning of personal protective equipment (PPE) is essential to keep the facility free of cancer-causing agents and other occupational health hazards.

Design Considerations

This section looks at the legal requirements for facility design and construction, including those addressed in NFPA 5000, *Building Construction and Safety Code*®. It also reviews the types of facilities normally operated by fire and emergency services organizations.

Legal Requirements

Building, electrical, mechanical, and plumbing codes are developed by professionals as industry standards. They give architects, engineers, contractors, and others in construction a way to adhere to criteria. The model codes and standards must be adopted by the authority having jurisdiction (AHJ) before they can be enforced. National codes evolve, so AHJs must regularly update them.

Amendments to the code are developed locally and put in place with national codes. Once adopted by the AHJ, the local adoptions and national building code become the design standard for all construction and renovations. All employers are subject to Occupational Safety and Health Administration (OSHA) state or federal regulations when planning, building, and inhabiting work sites.

Agencies contemplating construction or remodeling should also seek legal advice. The AHJ for building construction may not be the agency that will occupy the building. A municipality, county, or even state may have legal jurisdiction over the construction of the facility. In some cases, local or regional planning boards must authorize the location and even the appearance of fire facilities.

Local and state codes frequently refer to other standards, such as NFPA 70E, *Standard for Electrical Safety in the Workplace*®, NFPA 101, *Life Safety Code*®, or NFPA 13R, *Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies*. The AHJ (and/or occupying agency) may determine that additional safety requirements should be included in the building. For example, some agencies protect their facilities with automatic sprinkler systems, even if these systems are not required by local building codes.

Fire codes may also be adopted by the AHJ to ensure that structures built under the jurisdictional building code are used safely. Fire codes establish guidelines for safe behaviors and are intended to prevent or mitigate the effects of fires. These codes are generally enforced by the local fire department.

NFPA 1500, *Standard on Fire Department Occupational Safety, Health, and Wellness Program*, lists safety standards for fire facilities in Chapter 9. It requires all fire departments to comply with all legally applicable health, safety, building and fire code requirements. The federal government has regulations for the safe use of facilities where personnel are employed. These

are contained in the U.S. Code of Federal Regulations and enforced by OSHA or similar state agencies. Most states, Puerto Rico, and the U.S. Virgin Islands have OSHA-compliant programs modeled on national regulations.

Another federal regulation that applies to the design of fire and emergency services facilities is the Americans with Disabilities Act of 1990 (ADA). The 2010 ADA Standards for Accessible Design, published by the U.S. Department of Justice, set minimum requirements for government, public, and commercial facilities to be readily accessible to and usable by individuals with disabilities (**Figure 10.2 a and b**).



Figure 10.2 a and a The Americans with Disabilities Act requires that government facilities be easily accessible to people with disabilities.

Structures and nonpublic areas may be exempted if the local authority can demonstrate that access is not necessary.

OSHA regulations require the use of signs and symbols to define specific hazards that can harm workers or the public. In particular, these regulations apply to facilities that store or use hazardous materials. NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, presents a system of symbols that are required to indicate the presence of hazardous materials and their flammability, health, stability, and reactivity hazards. Safety Data Sheets (SDS) must be maintained for each chemical that is used or stored on a property. Finally, all chemical containers must be properly labeled in accordance with OSHA regulations.

Other required signage includes the following:

- Warnings about wearing hearing and eye protection
- Warnings about electrical power equipment
- Prohibiting smoking or providing designated smoking areas
- Warnings about slick areas (**Figure 10.3**)

Facility Types

Safety requirements, whether or not they are mandated, exist for each type of emergency facility. Fire stations may include space designed and designated for the following health and safety functions:

- **Station facilities** — Structures intended to house emergency response apparatus, like land-based and marine (fireboat) stations, which may include personnel living quarters. Marine stations require special attention to mitigate water hazards, especially to station visitors. Newer station designs include integrated training props for firefighters and areas for community groups to meet. Community rooms must comply with ADA standards.
- **Apparatus and equipment maintenance facilities** — Structures designed for the repair and maintenance of apparatus, vehicles, tools, and equipment.
- **Training facilities** — Structures intended for training personnel. These facilities include classrooms, offices, smoke buildings, and live burn buildings or props (**Figure 10.4**). If they are located adjacent to a station, care should be taken to assure that station operations do not introduce additional hazards to training operations or vice versa. Many new fire stations are designed to incorporate training facilities. This combined location increases efficiency by reducing staff downtime, cutting costs, and keeping firefighters in their first-due response areas.



Figure 10.3 If there are slick areas in a station, a caution sign should be posted.



Figure 10.4 Some fire stations have on-site or nearby training facilities like this burn building.

- **Administrative facilities** — Structures that contain offices intended to house administrative and staff personnel.
- **Storage facilities** — Structures designed to provide logistical support to the organization.
- **Communications centers** — Structures that house telephone, radio, and other communications equipment, including emergency dispatch for the organization.

- **Aviation facilities** —Structures located on airport property that provide hangar, maintenance and storage space for helicopters and/or fixed-wing aircraft used in wildland fire fighting. If connected to a station or located adjacent to a station, aircraft operations must not expose station personnel to hazardous conditions, and safe aircraft operations must not be compromised by station operations.

Safety Requirements

Each of these facilities will have safety requirements specific to the activities that occur in them. They will also share many of the requirements listed in the following sections:



Figure 10.5 Apparatus exhaust capture systems reduce air pollution in apparatus bays.

Indoor Air Quality

The sick building syndrome describes a situation in which occupants of a building experience acute health or comfort-related effects that seem linked to the amount of time spent in that building. The HSO is responsible for establishing the types of inspections performed at each facility. An inspection should be performed at least annually to comply with NFPA 1500, 9.1. Monthly inspections help to promptly identify and correct more immediate safety and health hazards.

Air quality requirements may include:

- Separating office and living quarter HVAC systems from apparatus and turnout storage HVAC systems
- Designing living quarter HVAC systems to be at higher pressures than apparatus bays
- Using an exhaust capture and filtration system (**Figure 10.5**) for apparatus bays
- Prohibiting smoking in all facilities
- Providing ventilation hoods in areas that may produce toxic or flammable vapors
- Installing passive ventilation systems in apparatus bays
- Installing carbon monoxide detectors in sleeping and living areas of all existing and new fire department facilities
- Installing windows that open to allow ventilation
- Incorporating a climate controlled area for medical supplies, drugs, and other medications

Decontamination and Cleaning

NFPA 1500, Chapter 9, requires that fire departments provide facilities for disinfecting, cleaning, and storage in accordance with NFPA 1581, *Standard on Fire Department Infection Control Program*. OSHA, local health departments, and fire departments may require additional space and procedures for reducing or eliminating work-related illnesses. These safety measures include:

- Installing a stainless-steel lined decontamination area
- Installing a designated area and separate laundry equipment for cleaning and drying PPE

- Requiring and issuing individual sets of bed linens to each occupant
- Installing emergency decontamination showers and eyewash stands
- Storing PPE away from living quarters
- Storing PPE in a separate room off the apparatus bay with a motion detector on the light so it turns off automatically
- Cleaning PPE or medical equipment away from kitchen and bathroom sinks
- Providing labeled medical waste containers
- Providing stainless steel sinks and countertops in kitchens (**Figure 10.6**)
- Installing antibacterial hand pump stations throughout the facility
- Enforcing proper hygiene in kitchen and bath areas
- Installing an apparatus bay drain system to capture and filter contaminated water and fluids

Fire Protection

Depending on the local building code, fire protection systems may be required in fire and emergency services facilities. NFPA 101, *Life Safety Code*®, addresses life safety from fire in both new and existing structures. It can be used in conjunction with a building code or alone in jurisdictions that have no building code in place. Fire protection systems include:

- Automatic and manual detection and alarm systems
- Kitchen ventilation hood fire suppression systems
- Kitchen stoves and ovens with automatic shutoffs
- Automatic sprinkler systems for the entire facility
- Paint booth fire suppression systems
- Fire extinguishers (**Figure 10.7**)
- Fire separation barrier between apparatus bay and office or living quarters
- Automatic fuel shutoff valve on cooking appliances (engaged whenever the station is dispatched)

If older fire stations are not protected by an approved, supervised automatic sprinkler system, they must have approved smoke detectors in every sleeping room. When a smoke detector is activated, a general evacuation alarm sounds throughout the building.

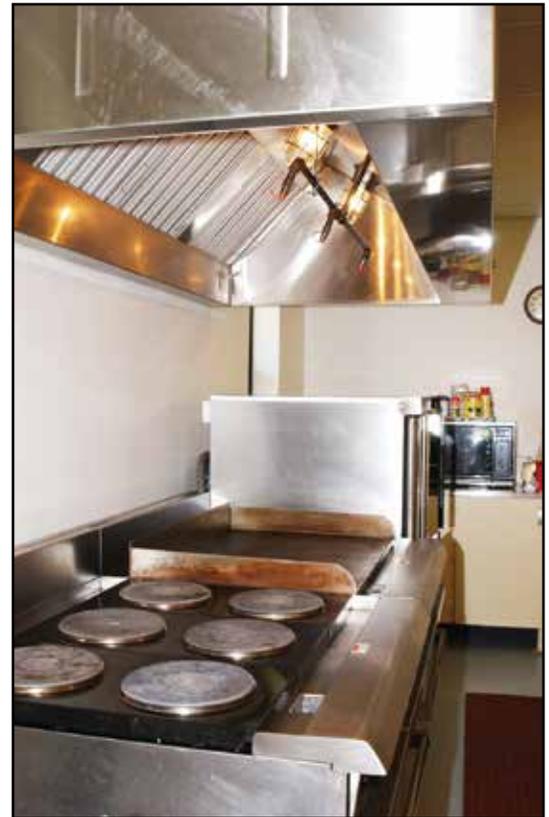


Figure 10.6 Stainless steel appliances and countertops are designed for easy cleaning and to prevent the growth of bacteria.



Figure 10.7 Fire extinguishers may be required in emergency services facilities.

Hazardous Materials

Hazardous materials found at fire and emergency services facilities often include flammable/combustible liquids, compressed/liquefied gases, and corrosives. Most are stored in small quantities and used for cleaning and maintenance. OSHA and local fire codes regulate the use and storage of these materials. Safety requirements for hazardous materials include:

- Maintaining a SDS book on-site
- Labeling all containers
- Constructing a flammable/combustible storage room or using an approved storage cabinet
- Storing hazardous materials in approved containers
- Providing the proper PPE for use with hazardous materials
- Providing containment systems for hazardous materials

Ergonomic Concerns

Ergonomics is the scientific study of people and their working conditions. It is concerned with designing and arranging things that people use in the workplace in order to improve efficiency, effectiveness, comfort, and safety. Ergonomics can be applied to fire and emergency services facilities by:

- Designing office workstations that relieve stress to backs, arms, and wrists
- Locating tools and equipment within easy reach
- Providing mechanical assistance for lifting heavy objects, such as cylinders in ambulances and ARFF apparatus



Figure 10.8 Emergency exit lighting serves as one component of an overall lighting strategy.

Lighting

Proper lighting reduces eyestrain and associated headaches. It is critical to prevent injuries and to complete work safely. General room illumination is established by building codes and OSHA, depending on the type of occupancy and work area. There are a number of lighting needs to consider in the design of a fire and emergency services facility:

- Installation and location of exit and emergency lighting (**Figure 10.8**)
- Installation of auxiliary lighting powered by batteries or generator
- Installation of suitable lighting in each room or work area
- Connection of lights to emergency alert systems in fire stations
- Installation of traffic warning and control lights
- Installation of accessible work (drop) lights in apparatus and shop areas
- Installation of exterior security lighting around the building perimeter and parking areas

Floor Surfaces

Floors in fire and emergency services facilities should provide a nonslip walking surface, reduce noise levels, and reduce physical strain on legs, back, and lower body. Options include vinyl, carpet, and ceramic tile.

A popular choice for floors of apparatus bays is smooth-troweled concrete with a sealant. In apparatus bays, walkways and backing guideline stripes should be designated by striping or a contrasting color. Floor drains should be located where apparatus are parked, and the surface under a truck should slope directly toward the drain to prevent liquids from pooling on the floor and creating a slipping hazard. Maintenance pits should be avoided when possible. If necessary, they need to be gated and secured.

Floors in physical fitness areas should be covered with rubber or vinyl tiles that absorb impact and moisture. The floor area should be large enough for exercise areas that are free from equipment. Sound-suppressing carpet or tiles reduce noise in office, living, and sleeping areas. Kitchen and bathroom areas should be covered with ceramic tile or similar easy-to-clean surfaces. Tile and grout must be sealed to prevent staining.

Stress Reduction

Heart attacks continue to be the leading cause of death among firefighters on duty. Repeated exposure to loud alarm systems contribute to on-duty stress. Startling alarms and bright lights, especially those that awake sleeping firefighters, can cause heart rates to soar. Alert tone technology and illumination methods can counteract and reduce stress. Additional ways to minimize stressors include:

- Testing for noise levels in all facilities
- Installing noise-reduction materials on floors, walls, and ceilings
- Installing an alert system that uses colored lights to illuminate rooms and an audio alert that gradually increases in volume from soft to loud

General Requirements

Many safety requirements do not fit a specific category; they include the following:

- **Roadway access** — Station driveways should be long enough to accommodate the longest apparatus housed there (**Figure 10.9**). This distance should provide ample time for the driver/operator to assess the traffic, activate warning devices, and prepare to enter the roadway. It should also provide time for oncoming traffic to see the apparatus and stop. Traffic control lights and audio warning devices linked to the alert system should be installed to warn motorists. Station driveways should be visible in both directions of traffic flow.
- **Medical equipment** — Emergency equipment for use by facility occupants must be located where it is easily accessible. Medical equipment includes first aid kits, defibrillators, and oxygen inhalators (**Figure 10.10, p. 348**). Equipment and a direct source of communication should be available to citizens who meet in community rooms that are connected to fire stations.



Figure 10.9 A station driveway should be long enough to accommodate the longest apparatus in a fire station. Courtesy of Chris Mickall/District Chief, New Orleans (LA) FD Photo Unit



Figure 10.10 Defibrillators and other emergency medical equipment must be accessible in all facilities.

- **Evacuation plans** — All facilities, especially those open to the public, must develop evacuation plans and post them along travel routes. Structures designed for shelter-in-place protection during a weather emergency should designate the safe area on their plan.
- **Slide poles** — Slide poles have been used for more than a century to move firefighters from upper stories to the apparatus bay of multistory stations. Unfortunately, use of these poles has resulted in foot, ankle, and leg injuries. Firefighters have also died from falls through the opening on the upper floor. Slide poles in older facilities must be equipped with required safety accessories, including a cushioned mat at the base of the pole, a removable covering for the hole, and a guardrail with retractable gate around the hole and pole. In some states, no new installations of slide poles are permitted.
- **Security** — An ever-increasing safety concern is security for public facilities. Vandalism of unattended facilities, theft, and violence toward fire and emergency services personnel have led to increased security measures that include:
 - Locking stations when they are unattended
 - Providing security card swipe doors to all exterior and apparatus bay entrances
 - Requiring visitors to use a single point of access and requiring they be escorted while on the property
 - Requiring vendor preapproval through internal governmental security departments
 - Installing bulletproof glass in exterior doors and windows
 - Installing security fences and gates around parking areas
 - Installing burglar alarms and panic alarms for staff working in offices
 - Installing external security bars or grills on windows and doors
 - Hiring personnel to provide security
 - Providing a secure, locked cabinet or closet for controlled drugs or medical supplies
 - Installing video surveillance camera systems
- **Storage** — Injuries from falling objects are common. Items stored on mezzanines, lofts, or high-storage shelving can be dropped or fall on their own. The following modifications can prevent injuries related to storage locations and practices:
 - Require that all vertical file cabinets with three or more drawers have a file interlock mechanism that prevents opening more than one drawer at a time.
 - Place a lip on the open edge of storage shelves, and a retaining wire or bar at six-inch intervals along the edge of elevated storage areas, to keep items from falling.

- Secure all compressed gas cylinders to a back wall to prevent them from toppling over.
- Require a wall or guard rail at least 42 inches (1.1 m) high on all mezzanine storage areas.

Usability

When designing a facility or renovating one, usability is another important consideration. Usability, or user-centered design, means that the structure meets the goals, mental models, tasks, and requirements of its occupants. Usage of fire and emergency services facilities has changed drastically over the past 50 years. New services have been added and personnel requirements have changed. Usability issues include the following:

- Life expectancy of structure
- Station height
- Drive-through versus back-in station
- Gender privacy
- Auxiliary power
- Physical fitness equipment
- Public accommodations

Life Expectancy of Structure

Fire and emergency services facilities are usually built to last at least 50 years (**Figure 10.11**). However, because of the high cost of replacing stations, a building may stay in service for more than a century.

Extending the life of an old building can pose serious problems. It can be difficult to predict the demographics of the service area, and to anticipate changes in services and personnel. As land use surrounding a station changes, apparatus and personnel needs must be reanalyzed along with the utilization of stations. Fire agencies that once assumed responsibility for ambulance service no longer meet the requirements for that role. Facilities in other agencies may lack proper accommodations for women. It is also possible that station designs of today will not be able to accommodate larger apparatus or crew sizes in the future. Advances in technology may make current station designs obsolete.

In areas where rapid growth is expected, some departments set up temporary stations consisting of manufactured homes and large metal sheds. Care must be taken that these temporary facilities do not compromise personnel safety.

Station Height

Most fire stations constructed in recent years have been single-story facilities. Departments look at predicted population growth and purchase parcels of land sufficient to accommodate single-story facilities.

Drive-Through vs. Back-In Station

There is less opportunity for an accident in a drive-through station, but it takes a considerably larger lot and budget (**Figure 10.12, p. 350**). Without a corner lot and side street, a driveway must be built to connect the street to the rear



Figure 10.11 In many parts of the country, fire stations are more than 50 years old.



Figure 10.12 Fire stations with drive-through bays all but eliminate the possibility of accidents that occur when apparatus are backed into stations.

apron. This driveway permits a driver to reach the rear apron by making only right turns and provides the best view of potential obstructions. A driveway is also needed on the left to serve as an alarm bypass or a staging area.

The lot size requirement is smaller for back-in stations, and experience is essential for safe backing procedures. Rear- and side-view cameras, floor paint, and lighting can assist drivers in safely backing fire apparatus. Driver experience, communication, and situational awareness are also essential to preventing backing accidents.

Gender Privacy

One of the most significant changes in station design is the growing need for gender-specific, gender-neutral, or gender-friendly facilities. As more women enter the fire service, departments either retrofit facilities or design facilities to meet the increased need for privacy in living quarters. Areas that have the most need for privacy are sleeping areas, locker and changing areas, restrooms, and showers. In addition to increasing privacy and improving sleep quality, the change from dormitory sleeping arrangements to private cubicles or private rooms may also reduce exposure to illnesses, such as colds and flu.

Auxiliary Power

Because modern fire and emergency services facilities depend on electricity to power more equipment than in the past, high-capacity auxiliary generators are essential. Today's generators operate with natural gas, propane gas, or diesel fuel, and they can provide power for an entire facility. This increased capacity ensures that firefighters will have uninterrupted power in case of an outage. It may also convert the station into a place of refuge for displaced citizens. Periodic testing evaluates how well a station reacts to a power disruption and which internal equipment or systems continue to function.

Solar power is also becoming a viable source of energy for daily facility use. It can reduce the size of backup power sources, thus reducing overall costs.

Physical Fitness Equipment

Because cardiac arrest is the leading cause of firefighter fatalities on the job, fire department administrations and labor organizations are increasing their requirements for participation in physical fitness programs. To accommodate these programs, designs for new facilities include space for physical fitness equipment and floor areas for core workouts.

To address safety needs, physical fitness areas should be large enough to allow personnel to perform exercises; to access each piece of equipment; and to provide a clear passage through the room. Floor coverings should be easy to clean, soundproof, and cushioned. The space should be well-illuminated and offer exterior air ventilation when weather permits. Large windows to interior high traffic areas enable coworkers to see who is exercising.

Public Accommodations

Unless they are privately owned, fire and emergency services facilities are public property. As governments attempt to cut net expenses, non-emergency-related activities have started to take place in facilities. Administrative facilities, training centers, and, in particular, fire stations are increasingly being opened for public use. Nongovernmental organizations have also collaborated with fire and emergency services organizations to provide services through these facilities. Uses include the following:

- **Community use** — Community meeting rooms or areas are added to a facility for voting, public meetings, health examinations or vaccinations, CPR classes, and other civic events. If possible, this area should have its own access and public restrooms.
- **Place of refuge** — During emergencies or natural disasters, fire stations and other facilities are used as places of refuge. They offer accessibility and space; auxiliary power and sanitary facilities; and sufficient storage space to hold emergency supplies. When fire stations are used in this manner, firefighters should have secure storage for their own belongings and separate living quarters to shower and dress.
- **Safe Place** — The Safe Place program provides access to help for youth in need. Its yellow and black sign outside a fire station or other facility designates the site as a place where victims of abuse, lost children, and those in danger can seek assistance (**Figure 10.13**). Station personnel are trained to assist victims and refer them to the proper authorities. Those authorities go to the Safe Haven site to talk with the youth and determine if he or she needs professional help.

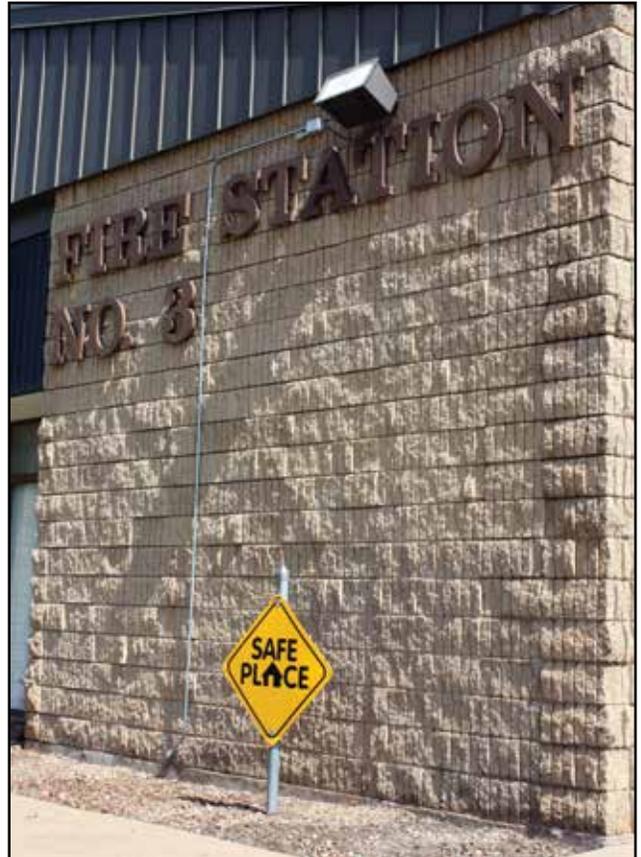


Figure 10.13 A Safe Place sign at a fire station means the site provides immediate help for youth in need.

Facility Protection

Facilities in regions that experience tornadoes, hurricanes, earthquakes, or other catastrophic natural disasters must be designed to protect their occupants from these hazards. Some areas may also need structural protection from potential terrorist attacks. Safe rooms and storm shelters may be added to structures. Video surveillance of all exterior entrances ensures that firefighters know who is on the other side of a door before they open it. Bollards can be installed to protect fixed objects around the facility, such as fuel pumps.

Inspections and Maintenance

Facilities must be inspected and maintained regularly to prevent deterioration. The responsibility for both of these duties may be spread through the fire and emergency services organization or shared with another department of local/state government. Administrators, supervisors, and individual firefighters all participate in inspection and maintenance procedures.



Figure 10.14 Station inspections are generally performed on a weekly or monthly basis by personnel assigned to the facility.

Inspections

Performed properly, inspections ensure a safe and healthy work environment. According to NFPA 1500, 9.3., each fire department “shall have an established system to maintain all facilities and to provide prompt correction of any safety or health hazard or code violation.”

The least formal and most frequent inspection is one that every member of the organization can perform. In a career or combination organization, a shift change is the first opportunity for facility inspection. Immediately following the formal change of command or during station cleaning, personnel informally inspect the condition of the facility and note any maintenance needs. Through the chain of command, repairs are made or reported to the proper authority.

During their shift, personnel repair or report any needs they have noted. As a form of preventive maintenance, they make small repairs before urgent problems develop. In a volunteer organization, this type of inspection may occur whenever the unit holds mandatory training or work sessions.

A more formal inspection is usually performed weekly by the company or chief officer (**Figure 10.14**). These inspections may coincide with a thorough cleaning of the facility. This level of cleaning and inspection allows an officer to note more significant maintenance needs, such as painting, caulking, and replacing filters. Monthly inspections are generally performed by a district/battalion chief. The thoroughness of these inspections is similar to the weekly inspection. Monthly inspections may result in more detailed repairs or alterations and require greater expenditures or budget requests.

Finally, the HSO and/or a fire prevention officer performs an annual inspection. It ensures compliance with health and safety policies and with fire and life safety codes. The focus of the annual inspections is on the condition of the facility and on the safe behavior of its occupants. The HSO may inspect air quality, noise levels, tool guards, chemical storage, oil buildup on floors, and door seals throughout the facility.

The HSO should test the air quality in the building annually, or when the need arises, to reduce the potential for illness from germs or excessive levels of carbon monoxide. Testing equipment samples the air and determines the parts per million of contaminants, such as dust or pollen. Inspection results may recommend cleaning air ducts or replacing filters. Apparatus room contamination should also be tested to determine if apparatus exhaust systems need to be installed.

The HSO is also responsible for testing the noise level in the facility. Noise-testing instruments determine the level in decibels (dB). Facility noise originates from the HVAC system, kitchen range ventilation hood, auxiliary power

generator, power tools, and equipment. The greatest source of noise is the apparatus in the bay. Although a maximum allowable noise level in the cab of the apparatus is limited to 90 dB by federal law in the United States, the level outside the vehicle may be higher. If the noise level cannot be reduced, the department may require the use of hearing protection while the apparatus is running.

Inspection checklists or reports provide a record of tests, maintenance, and repairs. These records are generally maintained for the life of the facility, or for the minimum retention time prescribed by local policy. Inspections that result in maintenance requests must be forwarded to the appropriate authority. Maintenance requests should be tracked to ensure that work is completed in a timely fashion. Repairs related to health and safety should take priority. A sample facility inspection checklist form is located in **Appendix D**.

Maintenance

Like inspections, facility maintenance is the responsibility of many people and departments. In volunteer organizations, volunteers are responsible for most of the work. In large departments, maintenance work may be assigned to another department or to a private contractor.

Basic maintenance begins with continual cleaning and care of the facility. Cleaning is usually performed at the start of each work shift. Some facilities, such as administrative offices and training sites, are cleaned by private contractors during off-duty hours. Cleaning reduces germs in the air and on surfaces that can cause illnesses and allergic reactions. A thorough cleaning of all cooking and food-preparation areas prevents the growth of microbial germs. These surfaces may need to be tested periodically to ensure that they are properly disinfected.

While local policies may vary, minor maintenance is generally performed by the facility personnel. Replacing light bulbs or HVAC filters are part of this responsibility. Major maintenance and repairs are normally performed by the organization's supply or support division, the jurisdiction's public works department, or a private contractor. Painting, roof repairs, glass replacement, plumbing and electrical repairs, and training prop repairs fall into the category of major maintenance work. In many volunteer departments, trained members of the department also perform these tasks.

Emergency personnel normally perform ground maintenance, although a local parks department or a private contractor may also provide this service. Mowing the lawn, trimming shrubs and trees, and maintaining planting beds improve the appearance of the facility and reduce the potential for vermin to nest in weeds and tall grass. However, ground maintenance can also result in injury when personnel operate power tools and equipment.

Personal Behavior

Strategic design, regular inspection, and timely maintenance all contribute to safety and health in a fire and emergency services facility. However, the behavior of its occupants determines whether or not those conditions will last.



Figure 10.15 Personal protective equipment is kept in ventilated storage lockers in the apparatus bay.

Safe practices on the part of individual firefighters is initiated on common sense, good training, and adherence to safety policies and procedures. Common sense actions and best practices for on-site firefighters include:

- Avoid horseplay.
- Keep PPE in the apparatus bay, designated storage areas, and cleaning areas; away from living quarters (**Figure 10.15**).
- Keep structural turnout gear out of living quarters and personal vehicles.
- Use approved ladders for reaching high areas.
- Use mechanical aids or additional personnel to lift heavy objects.
- Wear approved PPE when operating power tools and equipment.
- Practice personal hygiene.
- Thoroughly clean all cooking and food-preparation surfaces.
- Report all facility maintenance needs immediately.
- Report any illnesses or injuries that may be caused or aggravated by the facility's condition or design.
- Use only approved cleaning and maintenance materials.
- Update and read the SDS for all cleaning and maintenance materials.
- Adhere to the safety policy and procedures manual.
- Use physical fitness equipment according to instructions.
- Adhere to the No Smoking policy.
- Practice good housekeeping in all facilities and work areas.

The HSO and the supervisor are primarily responsible for providing all safety-related training to firefighters. Firefighters are responsible for practicing the safety-related skills that are taught. Each firefighter is ultimately responsible for their safety in and around department facilities.

Chapter Review

1. How can unsafe practices in fire service facilities lead to illness?
2. What are the safety considerations for the different types of fire service facilities?
3. What are some reasons why fire service facilities are designed with facility or structural protection in mind?
4. How can the HSO, supervisors, and individual firefighters enhance the safety of fire service facilities?

Discussion Question

1. Why might regular and thorough inspections and maintenance of fire service facilities be as, if not more, important than inspections and maintenance of apparatus and PPE?