

***Technical Principles and Practices of Fire Prevention***

***Module  
Educational***

**MODULE  
OBJECTIVES**

*The students will be able to:*

- *Classify occupancies as educational facilities and identify the subclasses.*
- *Identify and classify the major hazards found in educational occupancies.*
- *Given various examples of potential hazards in educational facilities, describe the hazard and suggest proper methods for solving the problem.*
- *Given a list of conditions found in educational occupancies, determine code requirements using the local code.*

## INSPECTING EDUCATIONAL FACILITIES

Webster's Dictionary describes educational occupancies as buildings that house "the action or process of education or being educated." An educational occupancy is one that serves to further education. In general, building codes define educational facilities as all structures, other than those occupied for business training or vocational training, which accommodate more than five persons for educational purposes through the twelfth grade. This is simple enough, but the simplicity disappears very quickly when one considers the following. A room or space occupied for educational purposes by fewer than 50 persons, 5 years of age or more, and which is accessory to another use group, shall be classified as a part of the main group. Day care facilities provide care for more than 5 persons, more than 2.5 years of age for fewer than 24 hours per day. Structures occupied for business training or vocational training shall be classified in the same use group. These definitions will vary slightly with each model building code. This is why you need to refer to your code.

### **NFPA 101, *Life Safety Code* Definition**

According to the National Fire Protection Association (NFPA 101, *Life Safety Code*), educational occupancies include all buildings or portions of buildings used for educational purposes through the twelfth grade by 6 or more persons for 4 or more hours per day, or more than 12 hours per week. Beyond twelfth grade (colleges and universities), the facility usually is treated as a business. Educational occupancies also include day care facilities of any occupant load. Other occupancies associated with educational institutions shall be in accordance with the appropriate parts of NFPA 101. In cases where instruction is incidental to some other occupancy, the section of NFPA 101 governing such other occupancy shall apply.

### **Major Differences Among the Model Codes**

Codes vary in specific requirements, based on some of the following considerations:

- number of occupants;
- age of the occupants;
- whether the occupancy is used full time or part time; and
- staffing requirements (for evacuation purposes).

How the model codes deal with multiple use or mixed occupancies also varies with the code. Requirements for assembly occupancies, business

occupancies and mercantile occupancies also may be considerations in a multiple-use educational occupancy. Nothing can replace being familiar with the local code.

## **EXAMPLES OF EDUCATIONAL FACILITIES**

Academies, kindergartens, nursery schools, and schools are examples of educational facilities, but a "Sunday" church/religious school is not classified as an educational facility since it is used only one day per week. If the religious school is used as a school during the week, then it is classified as an educational facility.

Day care facilities have their own classification. The codes for day care facilities may refer to sections of the educational occupancy code. Again you have to know your own code.

## **HAZARDS IN EDUCATIONAL FACILITIES**

Common problems in educational occupancies include hazards associated with electrical, housekeeping, heating, cooking, and building maintenance functions. In addition, there may be hazards associated with smoking and the use of matches. All of the common sources of ignition are potential hazards in educational facilities: open flames, heaters, friction, electricity, chemical action, smoking, and arson. We will examine two major facilities: storage and operations.

### **Storage Issues**

Educational occupancies may use and store some flammable liquids, compressed gases, chemicals, and biological materials. All of these can be hazardous if they are not located in a separate area, with no less than a one-hour fire-resistance rating, with self-closing or smoke-activated doors, and with an automatic extinguishing system.

### **Functional/Operational Concerns**

Educational occupancies contain boiler rooms and furnace rooms, and possibly laundries, maintenance, wood, metal, or paint shops, and janitors' closets. In each of these functional areas, there are operational concerns. Separations in these areas generally should have a one-hour fire-resistance rating. The area should have self-closing or smoke-activated doors, and

contain an automatic extinguishing system. In these areas, general housekeeping needs to be of the highest order.

When a cooking grease hazard exists, kitchen facilities need to be treated as a commercial cooking area with portable fire extinguishers and fixed fire protection systems for the cooking/venting equipment.

Vocational and arts and craft areas may contain excessive combustible materials and flammable spray booths that will require special protection requirements.

### **Interior Finish and Decorative Materials**

Interior finishes in educational occupancies should be Class A (Type 1) in exits and enclosed stairways and Class B or C (Type 2 and Type 3) in other areas. Draperies, curtains, other furnishings, and decorations should be treated with flame-retardant finishes. Materials on walls such as displayed artwork should not cover more than 20 percent of the corridor wall areas.

Seasonal decorations are common in educational occupancies. During holidays such as Halloween, Thanksgiving, and Christmas, or during a theatrical production, there may be decorations that create additional fire hazards. These seasonal hazards should be given the same consideration as those in public assemblies. When an area in an educational occupancy is used for a show or for dances, it becomes a place of assembly for inspection purposes.

## **LIFE SAFETY ISSUES**

### **Occupant Load**

The occupant load limits in educational occupancies vary according to the use. In classroom areas, it is 1 person for every 20 square feet. In a shop, laboratory, or vocational area, there may be 1 person for every 50 square feet. Larger areas such as lecture rooms, gymnasiums, or cafeterias are treated as places of assembly where limits depend on available exit width and minimum aisle width. Some codes require that the occupant loads be posted.

## **Means of Egress**

Corridors should lead directly to exits or to other corridors, and should be enclosed by 1-hour fire-rated walls with 20-minute fire-rated doors. Corridors should be at least 6 feet wide and doors must swing 180 degrees or be recessed so they do not obstruct this width. Exit doors used by 100 people or more should have panic hardware. All exit doors must be kept unlocked during school sessions to allow egress from the building without the use of a key. There are several different types of security locks now available for exit doors. Make sure that these type of devices do not delay the quick and safe exiting from the school.

Every floor should have two exits. If a room has a capacity of 50 or more, there should be at least 2 means of egress, as remote from each other as practical. Dead ends should not exceed 20 feet. Travel distance to an exit should conform with the adopted building or fire code. As an example, NFPA *Life Safety Code* requires an exit to be within 150 feet travel distance, and 200 feet if the building is protected by an automatic sprinkler system.

Emergency lighting should illuminate the exit path at all points from the beginning to the end of the means of egress, and should be tested.

Some codes may require either an outside window for rescue or an exit door from each classroom, if the building is not protected with an automatic sprinkler system.

Remember that some of your schools may be old and may not comply with these conditions because they were existing when the codes were adopted.

## **Fire Protection**

Fire alarm systems shall be present and operational. The inspector should look at the testing and maintenance log/report and check each pull station. It is important to check the control panel to determine if the system is operational, if the trouble light is functioning, and if the supervisory signal and backup power are operational.

Automatic sprinkler systems, if present, must activate the fire alarm system. Again, the inspector should review the records.

A detection system is not necessarily required. Check your local laws, codes, and ordinances.

## **Evacuation**

The major purpose of an evacuation plan is the safe, orderly removal or evacuation of students from the building. In preschool, kindergarten, and first grade, the students should not be located below the first floor of exit discharge. Second graders must not be more than one story above the floor of exit discharge. Educational occupancies must have an evacuation plan, posted evacuation routes, and conduct regular drills.

The inspector needs to review logs and records kept at the school to determine whether or not drills have occurred. Be sure to check exit paths and distances in restricted areas such as locker rooms, and check security and occupant load in the gym.

## **Day Care Considerations**

There is a different definition of day care facilities under educational occupancies based upon age and number of occupants (students). Staff-to-student ratio also plays a role. There are minimum requirements for the location of the care facilities within the building based on construction type and height of the building.

Here are some special considerations:

- Children should be able to operate door latches and locks.
- Hazardous storage should be in a separate area and not accessible to children.
- Wastebaskets and containers should be of noncombustible material.
- All electrical receptacles should have protective coverings.
- Automatic smoke detectors and alarms usually are required.

## **INSPECTION CONSIDERATIONS**

A complete "walk around" of the exterior of the building and a "walk through" of the interior of the building are essential to identify potential hazards. Review records, including the evacuation plan. Check records and logs regarding the sprinkler system, alarm system, detection system, fire drills, and staff training.



## Activity ED.1

### Identify Educational Occupancies

#### Purpose

To identify educational occupancies in your home areas.

#### Directions

1. Individually, generate a list of educational occupancies in your home area.
2. As a large group, identify the common types of educational occupancies, the activities they host, and the ages of the people involved.



## Activity ED.2

### Hazards in Educational Occupancies

#### Purpose

To identify fire and life safety hazards in educational occupancies.

#### Directions

1. You will work in small groups.
2. Your group will choose two educational occupancies from the list generated in Activity ED.1.
3. Develop a list of hazards you would expect to find in these educational occupancies.
4. Select a spokesperson to report the group's list.



### Activity ED.3

### Hazard Correction

#### Purpose

Given a list of potential hazards in educational occupancies, describe the hazards and suggest proper methods for solving the problems.

#### Directions

1. Review this list and note any deficiencies you discover.
  - a. Fire-rated doors are held open by a wooden wedge on the floor.  

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  - b. Set of doors with panic hardware is chain locked, and the building is occupied.  

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  - c. Broken fire alarm pull station.  

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  - d. Supply room has shelving, and the top shelf's items are within four inches of the ceiling.  
Sprinklered:  

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  - e. Doors to interior enclosed stairwell are tied open with elastic cord.  

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2. Look up the suspected deficiency in your code and develop solutions. List the problem, the solution, and the code reference.
3. Be prepared to discuss your solutions.

## Activity ED.4

### Report Writing

#### Purpose

To formulate code-based findings from an inspection into a properly formatted report document.

#### Directions

1. Working individually and using the code applicable to your jurisdiction, review the inspection scenario.
2. Complete the attached inspection report form or an inspection report form from your jurisdiction, citing the hazards identified in the scenario.
3. Write a report on the occupancy. Be sure to cite specific code references.
4. You have 60 minutes for this activity. You will turn in all completed forms to the instructor.

#### Scenario

On Friday, April 15, 1996, my supervisor, John D. Smith, assigned me to inspect the Central Public Elementary School. This inspection was to be completed by Thursday, April 21, 1996.

On Friday, April 15, 1996, 1038 hours, I contacted the Central Public Elementary School by telephone and spoke with the principal, Ms. Jones. We arranged for my inspection on Monday, April 18, 1996, 0930 hours.

I reviewed the previous file of the Central Public Elementary School on the afternoon of Friday, April 15, 1996. I noted the address as:

Central Public Elementary School  
456 Education Lane  
Amsterdam, CA 29815

I also noted that the school was rather small, with 16 classrooms, a small cafeteria/multipurpose room, library, and administrative area. The only major concern during the last inspection was that the janitors' closet and the mechanical room were not sprinklered. This inspection was conducted on September 22, 1993.

Upon arrival at the above-noted address, I met with the school janitor, Mr. Sam Johnson. Jones, the principal, was busy with a special meeting at the local board of education office regarding recent fire inspections of the system's schools. Mr. Johnson is present Monday through Friday, approximately 0630 to 1600 hours. He is on call for the facility during other hours. He can be reached at the school's number, 303-484-3333 or his pager, 303-484-4444. He has been the janitor with this school since it was opened in 1984, and he was present during the last inspection. While with Mr. Johnson, I learned that the school drill/evacuation log indicated that the last drill was conducted on April 12, 1996. They have conducted a total of four drills for this school year. The evacuation plan was available; it had been reviewed by all employees. The alarm system maintenance log/report indicated that the system was last inspected by Mr. Johnson on April 2, 1996. It was last tested on April 12, 1996. Not all janitors' closets were sprinklered.

The weather on Monday, April 18, 1996, 0930 hours was rainy with high humidity (68°F).

The facility itself is basically concrete block with brick veneer consisting of the central area and two classroom corridors or wings. Total classrooms are 16, 8 on each wing. The school houses one each of grades one through six, one kindergarten that houses two different groups daily, and one room that is used as the music, art, and special activity center. The central area contains the administrative area, the cafeteria, the library, and the mechanical room/janitors' closet. There are two additional janitors' closets, one in each classroom wing. The classrooms each measure 30' x 30'. The total student population is 281. The largest class holds 37 students. An alarm system is present, and smoke/heat detectors appear to be present. The facility is not sprinklered. The school uses the local municipal water system.

The inspection was fairly easy to conduct as the school is all one level and easily accessible. I first inspected the central area and then each of the classroom wings. The central corridor appeared to have over 80 percent of its wall covered with posters and seasonal decorations. Two of the exit doors from the cafeteria were chain locked. The fire-rated doors to the classroom corridors were chocked open. Classroom corridor 1 had a fire extinguisher that indicated discharged. Classroom corridor 1 janitors' closet was very sloppy, with spilled cleaner fluids.

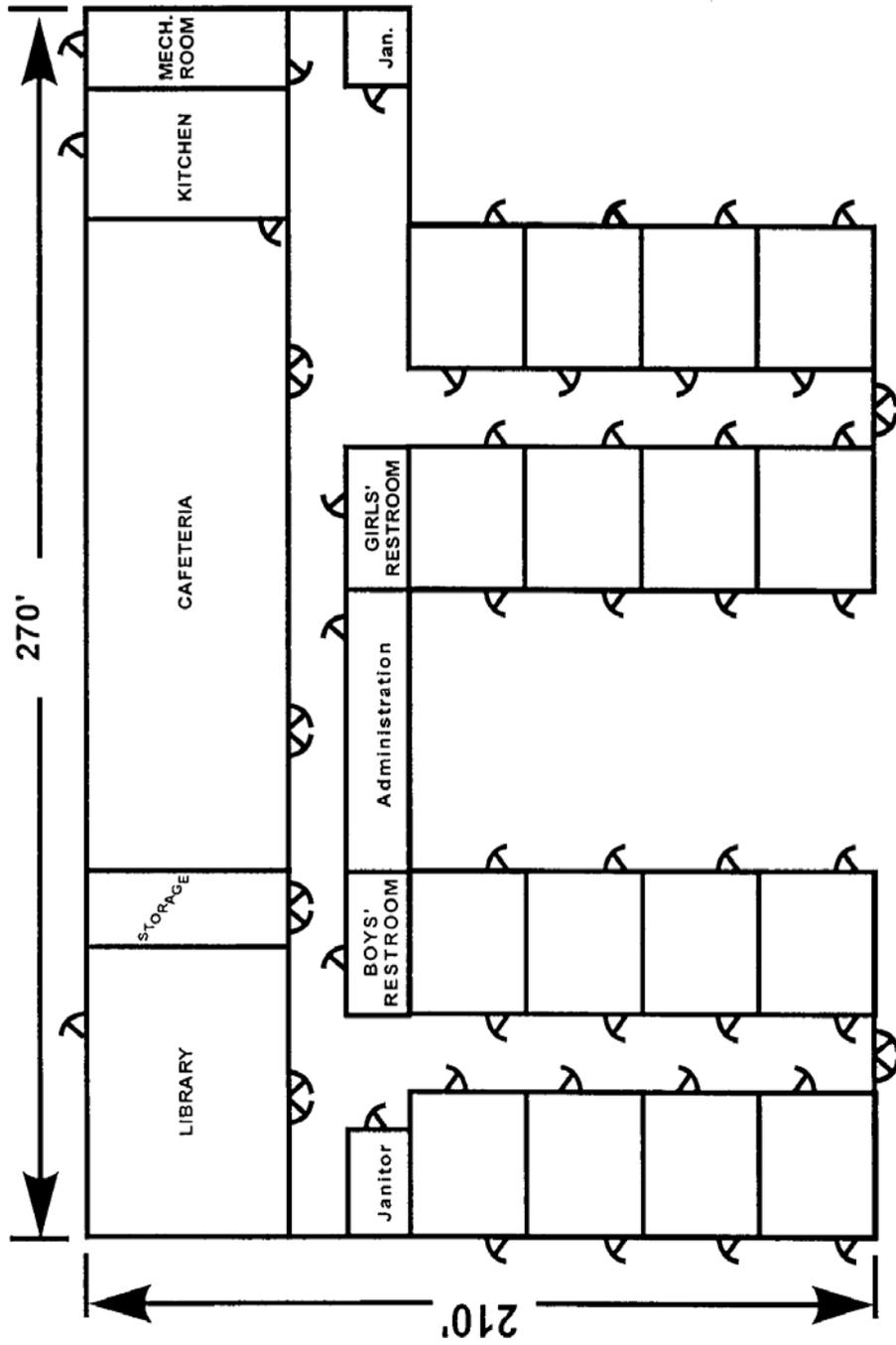
In the kitchen, I found that the fire protection hood system was last inspected on April 2, 1995; the system appeared to be charged and functional. The filters were a little dirty. An illuminated exit sign in the kitchen was out. One alarm pull station outside the cafeteria appeared to be damaged.

In the library, I observed that the door to the outside of the building had a manual toggle-type lock located approximately eight inches from the top. The toggle was locked. This door is not indicated on the floor plan map I found in our file.

I reviewed the above items with Mr. Johnson and advised him that a reinspection will take place on May 15, 1996.

Activity ED.4 (cont'd)

Floor Plan



Elementary School



FIRE-SAFETY SURVEY REPORT

FIRE PREVENTION... FOR YOUR SAFETY

Building \_\_\_\_\_ Owner/Mgr. \_\_\_\_\_
Address \_\_\_\_\_ Phone \_\_\_\_\_
\_\_\_\_\_ Type of Occupancy \_\_\_\_\_

[ ] New Occupant

The \_\_\_\_\_ Fire Department has conducted a fire safety survey of your property. The knowledge gained through this survey will enable the Fire Department to attack and extinguish fire that might occur in the building quickly and efficiently.

During this inspection, conditions affecting fire safety throughout the premises were also noted. It is requested that the items listed below be given your immediate attention in the interest of fire safety.

FIRE HAZARDS FOUND TO EXIST: [ ] NONE OBSERVED THIS INSPECTION

- [ ] Fire Extinguishers [ ] Housekeeping [ ] Flammable Liquids [ ] Electrical
[ ] Trash [ ] Utilities [ ] Fire Protection Equip. [ ] Fire Lanes
[ ] Exits [ ] Fire & Smoke Doors [ ] No Smoking Signs [ ] Other

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If at any time questions regarding fire safety arise, do not hesitate to contact the Fire Department at \_\_\_\_\_. For an emergency call \_\_\_\_\_. In case of fire in your building, call the FIRE EMERGENCY NUMBER.

\_\_\_\_\_ Property Representative \_\_\_\_\_ Reporting Officer \_\_\_\_\_ Date

Reinspection Due \_\_\_\_\_ Made By \_\_\_\_\_ Date \_\_\_\_\_ Notified FM # \_\_\_\_\_

WHITE - Owner/Manager FIRE HAZARDS CORRECTED # \_\_\_\_\_
YELLOW - Station File FIRE HAZARDS NOT CORRECTED # \_\_\_\_\_
PINK - Fire Marshal

10/75

