

Building Construction

Workbook Activities

The following activities have been designed to help you. Your instructor may require you to complete some or all of these activities as a regular part of your fire fighter training program. You are encouraged to complete any activity your instructor does not assign to you, as a way to enhance your learning in the classroom.

Chapter Review

The following exercises provide an opportunity to refresh your knowledge of this chapter.

Matching

Match each of the terms in the left column to the appropriate definition in the right column.

- | | |
|-------------------------------|--|
| _____ 1. Combustibility | A. A natural material composed of calcium sulfate and water molecules |
| _____ 2. Thermal conductivity | B. Interior walls extending from the floor to the underside of the floor above |
| _____ 3. Fire window | C. Built-up unit of construction materials set in mortar |
| _____ 4. Fire barrier wall | D. Walls designed for structural support |
| _____ 5. Gypsum | E. The weight of the building contents |
| _____ 6. Occupancy | F. How a building is used |
| _____ 7. Live load | G. Describes how readily a material will conduct heat |
| _____ 8. Load-bearing walls | H. Used when a window is needed in a required fire-resistant wall |
| _____ 9. Spalling | I. Determines whether a material will burn |
| _____ 10. Masonry | J. Chipping or pitting of concrete or masonry surfaces |

Multiple Choice

Read each item carefully, and then select the best response.

- _____ 1. Thermoplastic materials melt and drip when exposed to high temperatures, some even as low as
- A. 100°F (37.8°C).
 - B. 250°F (121.1°C).
 - C. 500°F (260°C).
 - D. 650°F (343.3°C).

- _____ 2. What is another term for wood-frame construction?
- A. Type I
 - B. Type II
 - C. Type IV
 - D. Type V
- _____ 3. A steel bar joist is an example of a
- A. bowstring truss.
 - B. pitched chord truss.
 - C. parallel chord truss.
 - D. flat chord truss.
- _____ 4. When selecting materials for building construction, architects most often place a priority on
- A. price and ease of construction.
 - B. functionality and aesthetics.
 - C. availability of materials and price.
 - D. durability and maintenance expenses.
- _____ 5. How many layers will a typical built-up roof covering have?
- A. 3
 - B. 5
 - C. 7
 - D. 9
- _____ 6. Which of the following materials will expand at extremely high temperatures, conduct heat well, and lose its strength as the temperature increases?
- A. Steel
 - B. Concrete
 - C. Masonry
 - D. Gypsum
- _____ 7. Fire doors and fire windows are rated for a particular duration of
- A. heat resistance to controlled temperatures.
 - B. internal temperature compliance.
 - C. standard fire resistance.
 - D. fire resistance to a standard test fire.
- _____ 8. The weight of the building is called the
- A. live load.
 - B. total load.
 - C. dead load.
 - D. structural load.

- _____ 9. Which type of glass consists of a thin sheet of plastic between two sheets of glass?
- A. Tempered glass
 - B. Wired glass
 - C. Laminated glass
 - D. Glass blocks
- _____ 10. Walls that are constructed on the line between two properties and are shared by a building on each side of the line are called
- A. fire walls.
 - B. fire partitions.
 - C. curtain walls.
 - D. party walls.
- _____ 11. The exposed interior surfaces of a building are commonly referred to as the
- A. interior finish.
 - B. building surfaces.
 - C. structural surfaces.
 - D. structural finish.
- _____ 12. Which of the following is a commonly used building material?
- A. Steel
 - B. Concrete
 - C. Aluminum
 - D. All of the above
- _____ 13. Pitched, curved, and flat are types of
- A. awnings.
 - B. roofs.
 - C. stairways.
 - D. rafters.
- _____ 14. Which synthetic material is found in many products and may be transparent or opaque, stiff or flexible, and tough or brittle?
- A. Glass
 - B. Plastic
 - C. Aluminum
 - D. Copper
- _____ 15. Trusses are used extensively in support systems for
- A. both floors and roofs.
 - B. floors.
 - C. roofs.
 - D. roofs, with the exception of flat roofs.
- _____ 16. What term describes the length of time a building or building components can withstand a fire before igniting?
- A. Pyrolysis
 - B. Thermal resistance
 - C. Fire retardance
 - D. Fire resistance
- _____ 17. Lightweight and heavy timber construction are examples of
- A. Type I construction.
 - B. window frames.
 - C. wood floor structures.
 - D. roofs.

- _____ 18. Which type of building construction has two separate fire loads?
 - A. Type II
 - B. Type III
 - C. Type IV
 - D. Type V

- _____ 19. Which type of building construction provides the highest degree of safety and is usually made of reinforced concrete and protected steel-frame construction?
 - A. Type I
 - B. Type II
 - C. Type IV
 - D. Type V

- _____ 20. Buildings having masonry exterior walls, and interior walls, floors, and roofs made of wood, are considered to be
 - A. Type II construction.
 - B. Type III construction.
 - C. Type IV construction.
 - D. Type V construction.

Vocabulary

Define the following terms using the space provided.

1. Hybrid building:

2. Platform frame:

3. Balloon-frame construction:

4. Bowstring truss:

5. Thermoplastic materials:

6. Heavy timber construction:

Fill-In

Read each item carefully, and then complete the statement by filling in the missing word(s).

1. A building with a(n) _____ will have a distinctive curved roof.
2. When wood is exposed to high temperatures, its strength can be decreased through the process of _____.
3. Type _____ construction was commonly used to build mills in the 1800s.
4. A(n) _____ chord truss is typically used to support a sloping roof.
5. A(n) _____ helps prevent the spread of a fire from one side to the other side of the wall.
6. The term _____ refers to how a building is used.
7. Type _____ is the most fire-resistive category of building construction.
8. Fire severity in a Type II building is determined by the _____.
9. _____-frame construction is used for almost all modern wood-frame construction.
10. The weight of the building's contents is called _____.

True/False

If you believe the statement to be more true than false, write the letter "T" in the space provided. If you believe the statement to be more false than true, write the letter "F."

1. _____ The structural components and building contents in Type III and Type IV construction are considered noncombustible.
2. _____ Aluminum is more expensive than, and not as strong as, steel.
3. _____ The entire structure of a manufactured (mobile) home can be destroyed by fire within a few minutes.
4. _____ Trusses are used in support systems for both floors and roofs.

- 5. _____ Fire doors and fire windows are rated for a particular duration of fire resistance to a standard fire test.
- 6. _____ Most doors are constructed of aluminum.
- 7. _____ Concrete is one of the most commonly used building materials.
- 8. _____ Aluminum floors are common in fire-resistive construction.
- 9. _____ Type I building construction provides the highest degree of safety.
- 10. _____ The support systems for most flat roofs are constructed of aluminum.

Short Answer

Complete this section with short written answers using the space provided.

- 1. List the five factors that affect how fast wood ignites, burns, and decomposes.

- 2. Identify and briefly describe the five types of building construction.

- 3. What problems must be anticipated when considering the fire risks associated with a construction or demolition site?

- 4. List the four key factors that affect building materials under fire.

5. Briefly describe gusset plates and how they respond when heated.

6. List some of the building construction–related questions that should be asked during preincident planning.

Fire Alarms

The following real case scenarios will give you an opportunity to explore the concerns associated with building construction. Read each scenario, and then answer each question in detail.

1. Your ladder truck company is dispatched to a structure fire at a three-story Type III construction nursing home.

The fire is reported in the kitchen. You start to think about the contents and the building construction. What are your concerns?

2. It is 10:00 on Friday night when your engine is dispatched to a fire at a bowling alley. Upon arrival, you find a masonry building with a curved roof and the rear exterior wall leaning out. The fire has involved the office area in the rear of the building. How should you proceed?
