
Continuing Education For the Fire Fighter



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Building Construction

Module 1

Chapter 4



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LEARNING OBJECTIVES

Describe the impact of fire on common building materials.

List the main types of occupancy classifications.

Explain the impact of fire on construction classifications.



ALABAMA FIRE COLLEGE

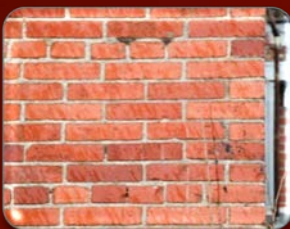
A WIDE VARIETY OF BUILDING MATERIALS ARE USED IN CONSTRUCTION.



All react differently to heat
of fire



Knowing reaction can help



Courtesy of Ron Moore and
McKinney (TX) FD



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WOOD IS THE MOST COMMON MATERIAL USED IN NORTH AMERICA.

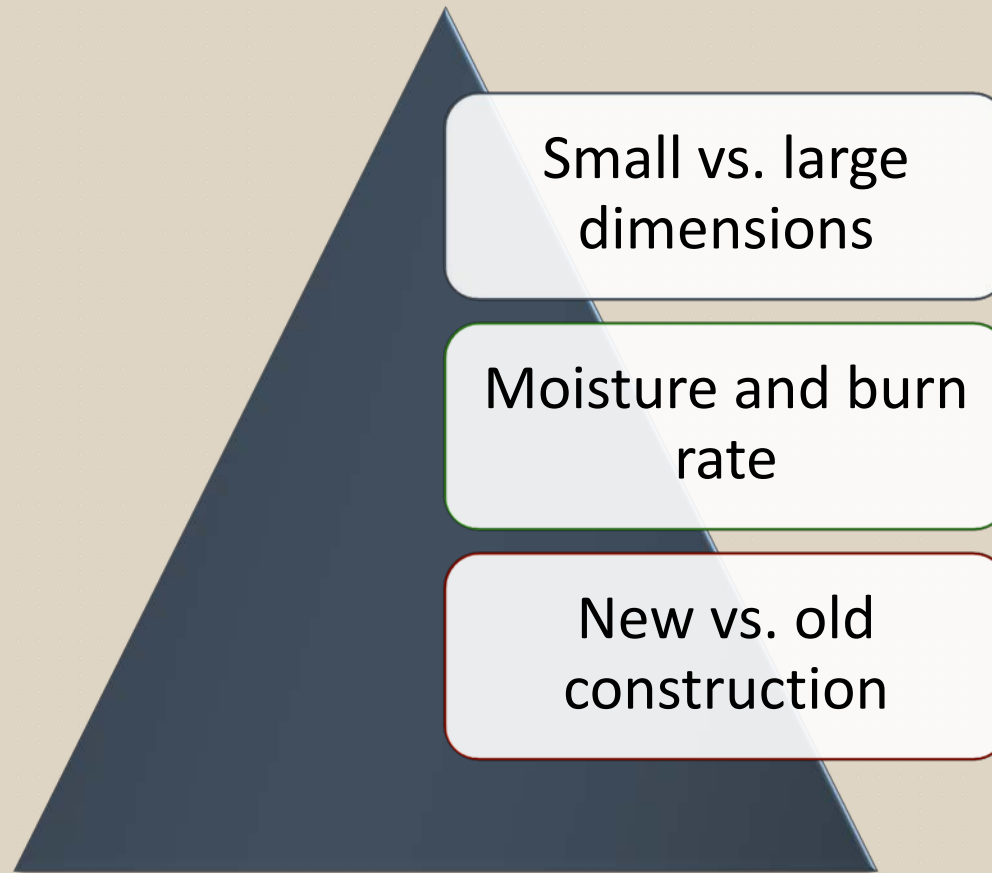


Also main
component in
structural
assemblies



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THE SIZE AND MOISTURE CONTENT OF WOOD AFFECTS HOW IT REACTS TO FIRE.



EACH TYPE OF MASONRY SHOWS SIGNS OF DETERIORATION IN DIFFERENT WAYS.



Brick



Stone

*Courtesy of Ron Moore and
McKinney (TX) FD*



Concrete/
Concrete Block



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THE EFFECT OF HEAT ON METAL DEPENDS ON THE TYPE AND EXPOSURE.

Cast Iron



Wrought Iron



THE EFFECT OF HEAT ON METAL DEPENDS ON THE TYPE AND EXPOSURE.

Courtesy of Ron Moore and McKinney (TX) FD



STEEL

- Used for structural support
- Lengthens when heated
- Failure at near or above 1,000°F (538°C)
- Keys to keep in mind when firefighting



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THE EFFECT OF HEAT ON METAL DEPENDS ON THE TYPE AND EXPOSURE.

Aluminum

- Many uses
- Affected by heat more rapidly than steel

Tin

- Used for ceiling tiles, roofs

Copper

- Found in wiring, pipes, gutters, decorative elements

Lead

- Found in pipes, flashing, stained or leaded glass windows



REINFORCED CONCRETE TYPICALLY PERFORMS WELL UNDER FIRE CONDITIONS.



Courtesy of Ron Moore and McKinney (TX) FD

Fortified with rebar

- Loses strength through spalling



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GYPSUM HAS EXCELLENT HEAT-RESISTANT AND FIRE-RETARDANT PROPERTIES.



Known as drywall, Sheetrock®



High water content



Breaks down gradually under fire conditions



THE PROCESS OF LATH AND PLASTER CAN PRESENT UNIQUE CHALLENGES DURING AN INCIDENT.



May be replaced with wire mesh

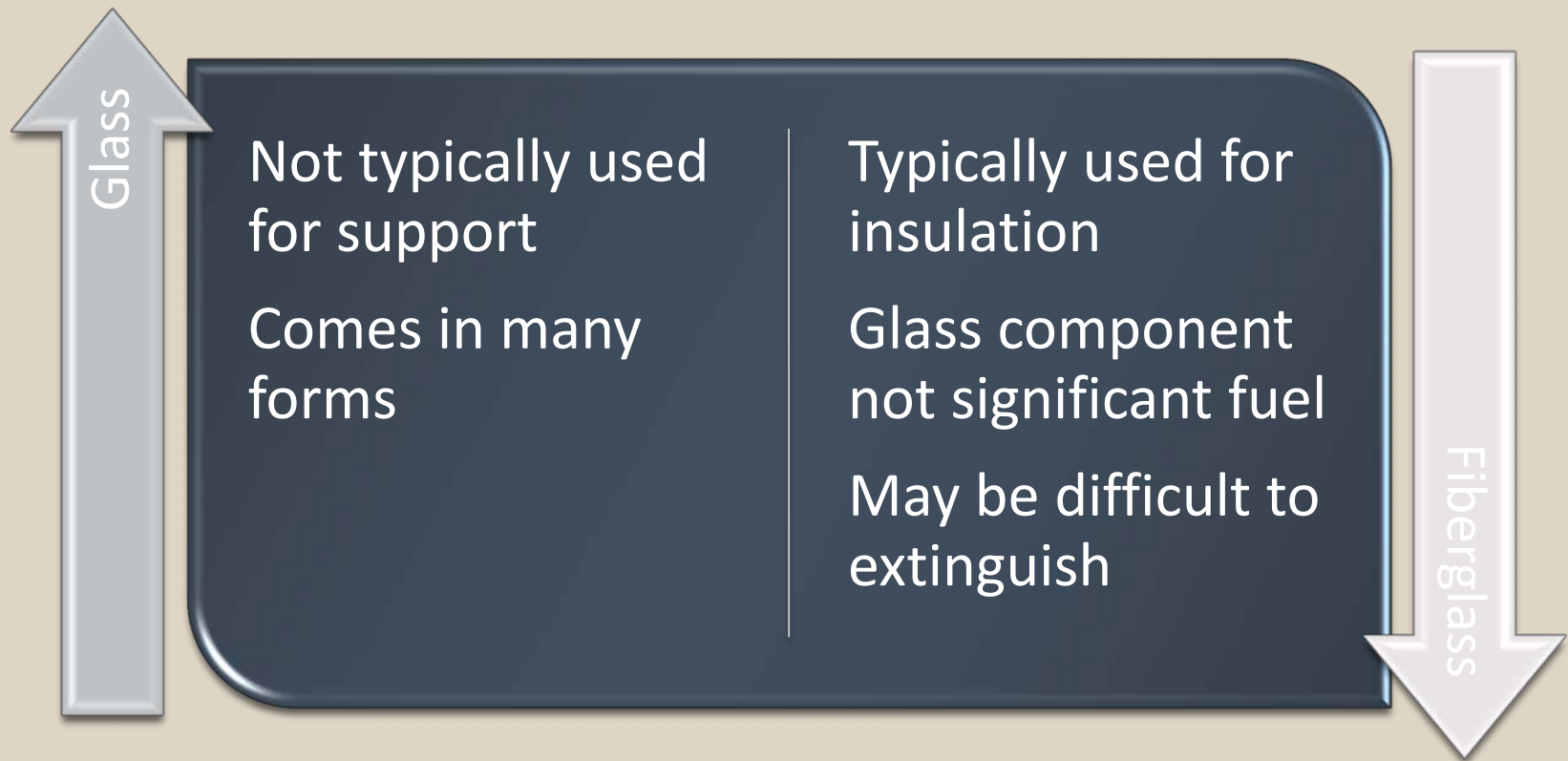
Can be difficult to penetrate

Can conceal fire in cavity

May add fuel



BOTH GLASS AND FIBERGLASS REACT TO HEAT IN DIFFERENT WAYS.



PLASTIC TYPICALLY MELTS AND CONTRIBUTES TO THE CONTENT LOAD DURING AN INCIDENT.



Exterior uses

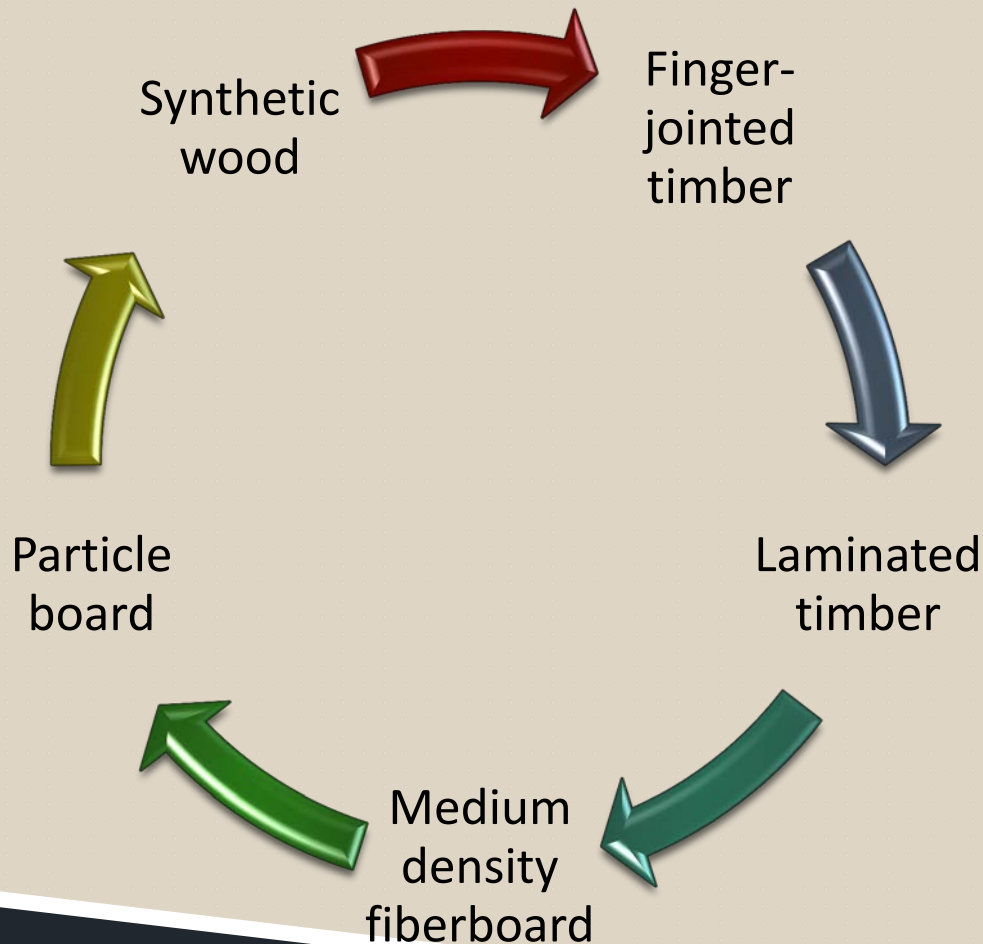
Water, sewer pipes

Decorative use

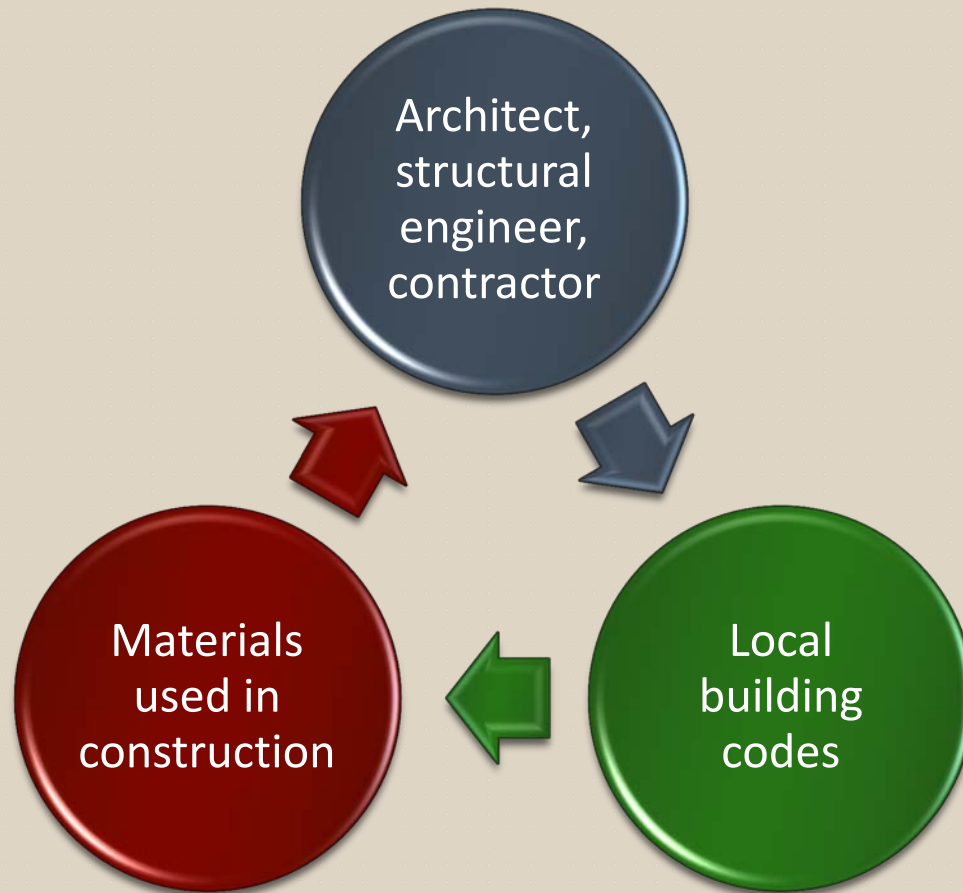


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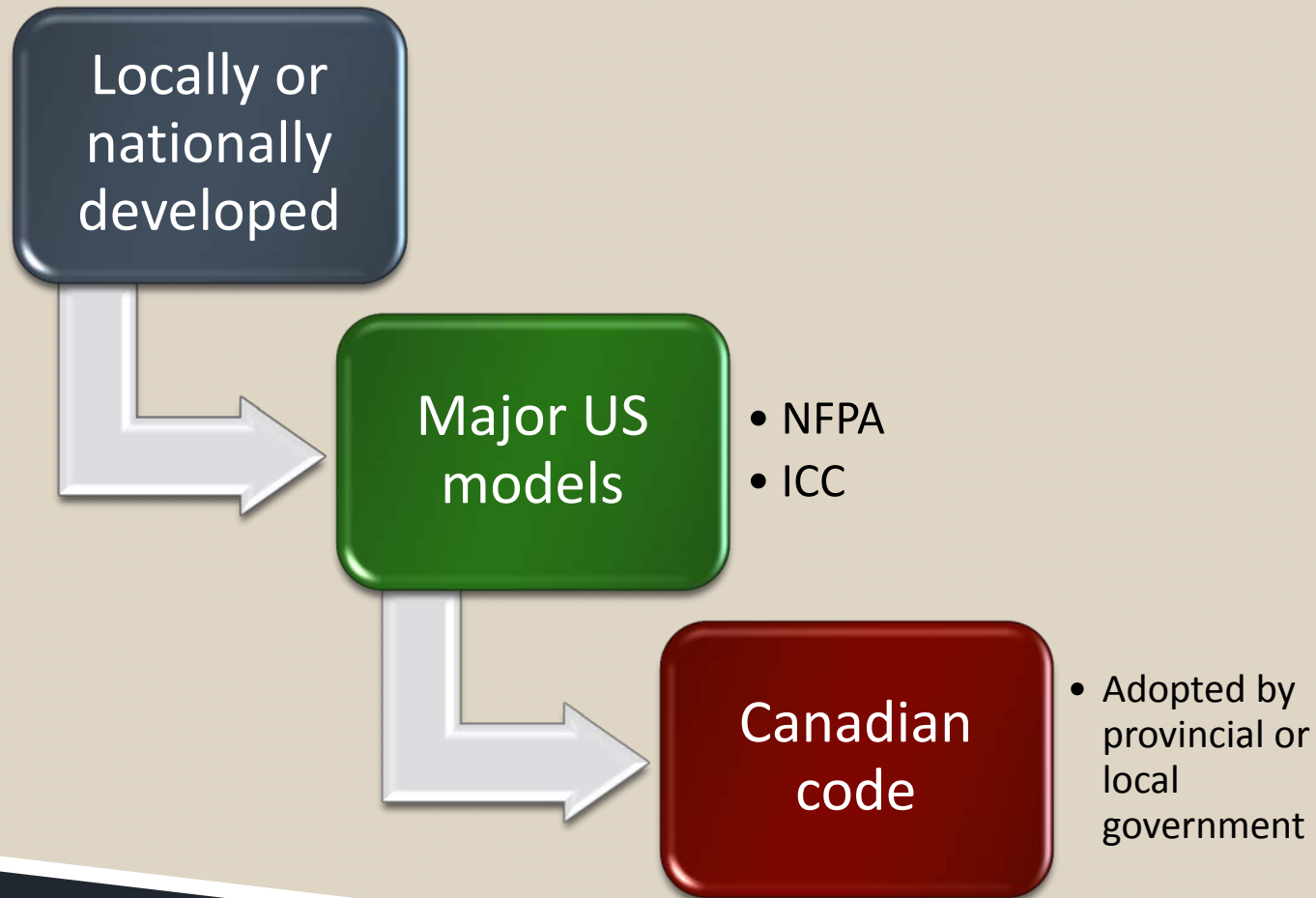
COMPOSITE MATERIALS ARE MADE BY COMBINING TWO OR MORE DISTINCTLY DIFFERENT MATERIALS.



CONSTRUCTION CLASSIFICATION TYPE IS DETERMINED BY SEVERAL FACTORS.



BUILDING CODES ARE ADOPTED AND SOMETIMES MODIFIED TO MEET LOCAL REQUIREMENTS.



SOME BUILDINGS MAY BE EXEMPT FROM FOLLOWING LOCAL CODES AND RENOVATIONS CAN ALSO CHANGE STRUCTURES.

May be exempt

- Manufactured homes
- Federal- or State-owned buildings

Renovations

- Contain more than one construction method
- May improve fire safety
- May create potential hazards



THE IBC® AND NFPA® CLASSIFY FIVE TYPES OF CONSTRUCTION.



Type I



Type II

Courtesy of Ron Moore and McKinney (TX) FD



ALABAMA FIRE COLLEGE

THE IBC® AND NFPA® CLASSIFY FIVE TYPES OF CONSTRUCTION.



Type III



ALABAMA FIRE COLLEGE

THE IBC® AND NFPA® CLASSIFY FIVE TYPES OF CONSTRUCTION.



Type IV



Type V



MANUFACTURED HOMES ARE NOT REQUIRED TO CONFORM TO MODEL BUILDING CODES.



OCCUPANCY CLASSIFICATIONS ARE DEFINED BY BUILDING AND LIFE SAFETY CODES.



Single-use

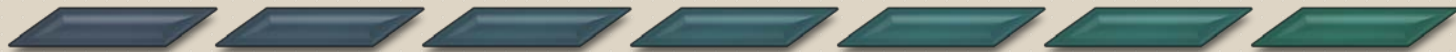


Separated use



SUMMARY

Your safety when fighting fire depends on your ability to know how the building will contribute to and even control the spread of fire.



You must also understand the effect fire and heat have on structural components and materials to be able to anticipate results.



Knowing and understanding building construction is as vital as your knowledge and understanding of fire behavior.



You must be familiar with the types of construction in your community or response area, be aware of changes to existing structures, and follow trends in building construction.

