

#### **Commercial Wall Systems**

If a building looks better under construction than it does when finished, then it's a failure. -Doug Coupland

#### **Commercial Wall Systems**

- Load Bearing Walls
  - Low Rise
  - Cast-in-Place Concrete
  - Tilt-up Concrete
  - Concrete Masonry Units
- Non-Load Bearing Walls
  Curtain Walls

#### **Comercial Wall Systems**

- Load Bearing Wall
  - Supports vertical loads other than its own weight
  - Often supports floors or roof above
- Non-Load Bearing
  - Supports only it own weight
  - Typically used as
    - Partition walls to separate interior spaces
    - Protection from the elements

#### Load Bearing Walls Common Construction Materials

# Low-rise commercial construction (three stories or less) may be similar to residential construction



#### Load Bearing Walls

Other common commercial wall materials

- Cast-in-Place concrete
- Tilt-up Concrete
- Concrete Masonry Units (CMU)

#### Concrete



#### Courtesy of TCA

### Concrete

#### Advantages

- Strength (especially in compression)
- Durable
- Fire Resistant
- Pest Resistant
- Rot/Rust Resistant
- Low Maintenance
- Energy Efficient Thermal mass stores heat energy



#### Concrete is mixed at a plant . . .



... and transported to the site of the pour.

#### Green Concrete?

#### LEED credits earned for

- Using materials extracted, harvested, or recovered within a 500 mile radius from the site
- Using recycled aggregate
- Improved energy efficiency by taking advantage of thermal mass of concrete
- Reduced VOCs using concrete compared to other construction materials
- Generating less construction waste than wood or steel



www.usgbc.org

#### **Cast-in-Place Concrete**

- Concrete walls are formed, reinforced, and poured in place.
- Concrete is reinforced with steel bars to improve tensile and bending strength.



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#### Cast-in-Place Concrete Typical Construction



Image Courtesy masonrysystems.org

Cast-in-Place Concrete Wall with Insulating Concrete Forms (ICF)

Concrete forms consist of insulating foam that stays in place as a permanent part of the wall assembly.





Courtesy TexAZ Commercial Properties





Courtesy Portland Cement Association



#### 155 N Wacker Chicago



Burj Dubai United Arab Emirates

## Tilt-up Concrete

Concrete wall sections (with reinforcing) are poured horizontally on site, tilted vertically, and then anchored.







### Tilt-up Concrete

- Can be formed into a variety of shapes and sizes
- Different surface treatments and form inserts can be used to create a wide variety of surface textures
- Relatively quick design and construction time







Form inserts give relief to the panels



Thin bricks are set in the form before the concrete is cast

#### Typical Tilt-up Concrete Wall Section











Boca Village Corporate Center Boca Raton, FL



All images courtesy Tilt-Up Concrete Association

## Concrete Masonry Units (CMU)

- Concrete is cast into hollow blocks that can be stacked and grouted to form walls.
- CMU load bearing walls are reinforced with steel bars to improve tensile and bending strength.



photo courtesy of constructionphotographs.com







Courtesy Masonry Systems.org

# IASONRY WALL XAMPLES



Isle of Palms Recreation Center, SC



Commercial building under construction



Tilt-up and CMU construction RS+K Advertising Madison, WI

### Non-Load Bearing Wall

- Supports only its own weight
- Typically used as
  - Partition walls to separate interior spaces
  - Protection from the elements
- Materials
  - Wood framing
  - Light gauge steel framing
  - Concrete masonry units
  - Curtain walls



photo courtesy of constructionphotographs.com



Courtesy Connie Bertucci



Courtesy TexAZ Commercial Properties

# **Curtain Walls**

- Non-load bearing wall attached to the exterior of a building
- Often composed of glass and metal
- Provides visual appeal, daylight, and protection from the elements



Courtesy Tilt-up Concrete Association



Courtesy Tilt-up Concrete Association



Wikipedia.com



Trump Tower

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  - Low Rise
  - Green Concrete?
  - Cast-in-Place Concrete
  - Tilt-up Concrete
  - Concrete Masonry Units
- Non-Load Bearing Walls
  - Curtain Walls

#### Image Sources

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