Part I: Masonry in Architecture

• Structural Morphology

i. Load Bearing

ii. Non-load Bearing

Images:

Institute of Chemistry, IIT
Mies van der Rohe, 1945

Library and Administrative Building, IIT
Mies van der Rohe, 1944

House
Mies van der Rohe,
Wall Section, 1934
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Image by MIT OCW.
Part II: Masonry Systems and Architecture

- Principles of masonry construction
- Construction
- Loading and deformation
Overview

• Water Penetration Resistance
  – Wall Systems
  – Flashing and Weep holes
  – Coatings

• Differential Movement
  – Cracking
  – Movement Joints
Part II: Masonry Systems and Architecture

Problems related to water penetration

- Water entry into interior
- Efflorescence
- Spalling
- Corrosion
- Reduced insulating capacity
- Staining / Mold / Mildew
Keys to Providing Water Penetration Resistance

- Quality Materials
- Good Construction
- Proper detailing
- Maintenance
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Three Basic Wall Types

- Drainage Wall
- Barrier Wall
- Single Wythe Wall
Drainage Wall
Drainage Wall

- Water travels down back side of outer wythe, collected on flashing, and channeled to exterior through weep holes

- Examples:
  - Cavity walls
  - Masonry veneer walls
  - Rain screen walls
Drainage Walls Requirements

- 2 to 4 ½ inch clear cavity
- Flashing and weep holes to channel out excessive water
Rain Screen Wall

- Equalizes pressure within cavity
- Vents at top and bottom of wall or panel
- Flashing and weep holes
- Compartmentalized
- Allows for ventilation and evaporation
Barrier Wall

• Collar joint between wythes acts a barrier to moisture along with the thickness of the wall

• Examples
  – Brick and Block Composite Wall
Barrier Wall

- Voids allow water penetration
- Must be filled solid with mortar or grout
Single Wythe Walls

• Masonry units with coating or integral water repellent
• Mortar with integral water repellent
• Through-wall flashing
• Weep Holes
• Vents
“A nominal four-inch wythe of brick masonry, no matter how well built, by whom, or of what, never stopped a wind driven rain.”
Air Space Requirements

• 2” minimum to be effective
Air Space

- Clear and free
Flashing Details

- Locations
- Placement
Flashing Locations

- base of wall
- sills
- heads of windows
- at shelf angles
- copings
- lower wall/ higher roof intersection
- other discontinuities in air space
Good Flashing Detail
Poor Detail
Drip Edge
SS Drip Edge