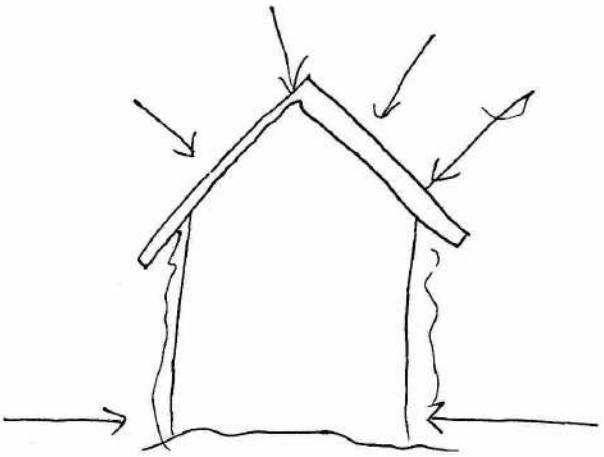
6. Structure / Envelope: Masonry + Exterior Walls

Allen and Iano p 783–807, Chiy 5.02-5.03, p 7.22-7.25, p 7.39-7.50
p 12.06-12.07, p12.10, p 5.14-5.27

- protection
- against invasion by water, wind, sunlight, heat and cold

Design Requirements for the exterior wall

- separate indoor environment of a building
- control sunlight, indoor temperature



keep water out

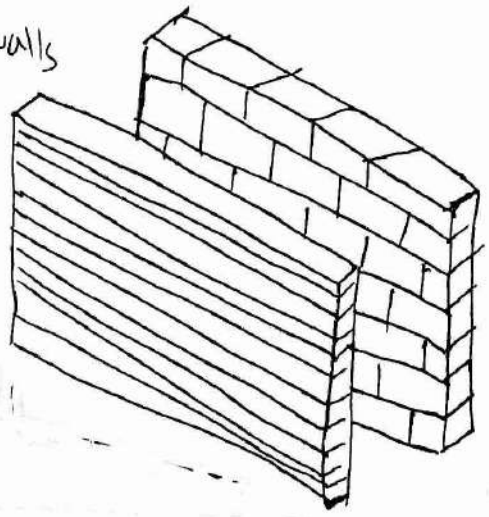
- prevent entry of rain, snow, and ice
- primary function of exterior wall

Main use of Exterior wall

1. keep water out
2. Prevent air leakage
3. Control light
4. Control Radiation of heat
5. Control conduction of heat
6. Control Sound

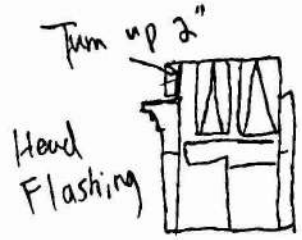
Wall Systems

- Concrete and Masonry Bearing walls
  - rely on mass on load carrying capability
  - require reinforcing to handle tensile stresses



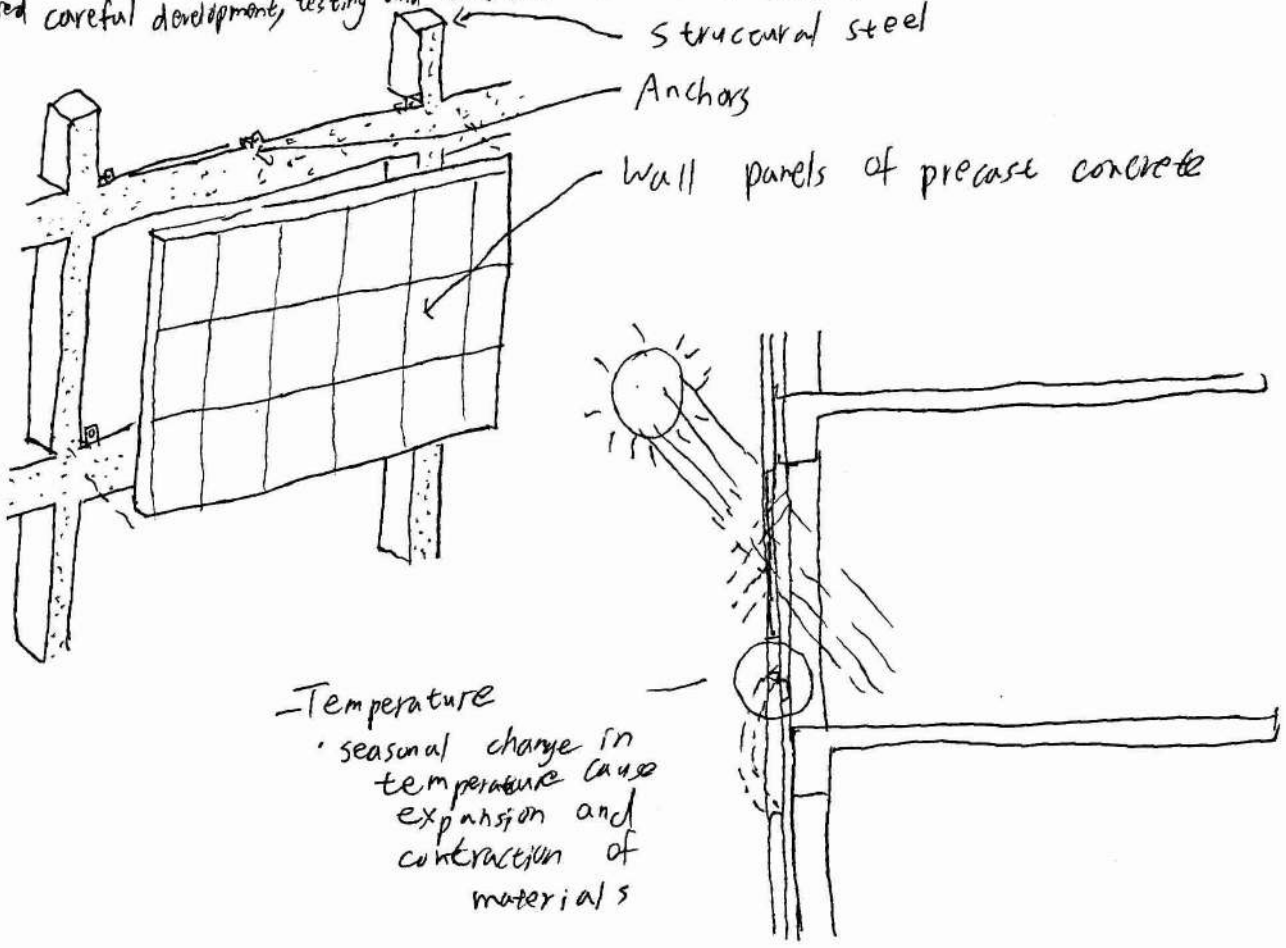
Wall Flashing

- collect moisture that may penetrate a wall



Curtain Walls

- exterior wall supported by steel or concrete structural frame
- required careful development, testing and erection



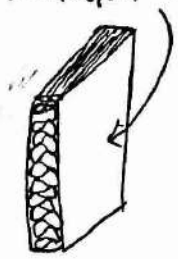
- Temperature
  - seasonal change in temperature cause expansion and contraction of materials

Thermal Insulation

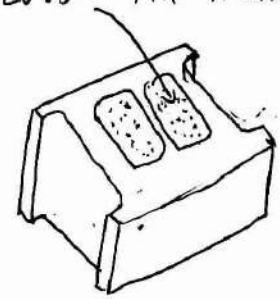
- control the flow or transfer heat through exterior assemblies of a building
- reduce amount of energy required by heating and cooling equipment to maintain conditions for human comfort in building

Insulating Materials

- Batt insulation contains insulation of glass or mineral wool 16" or 24"

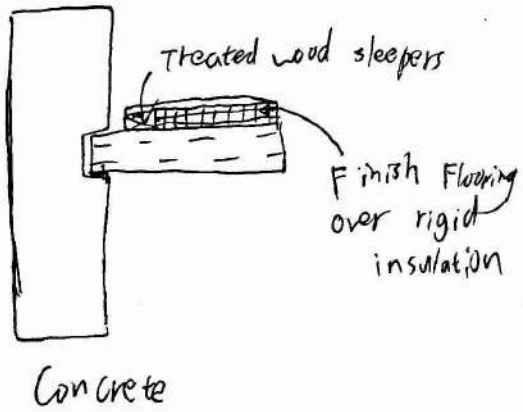


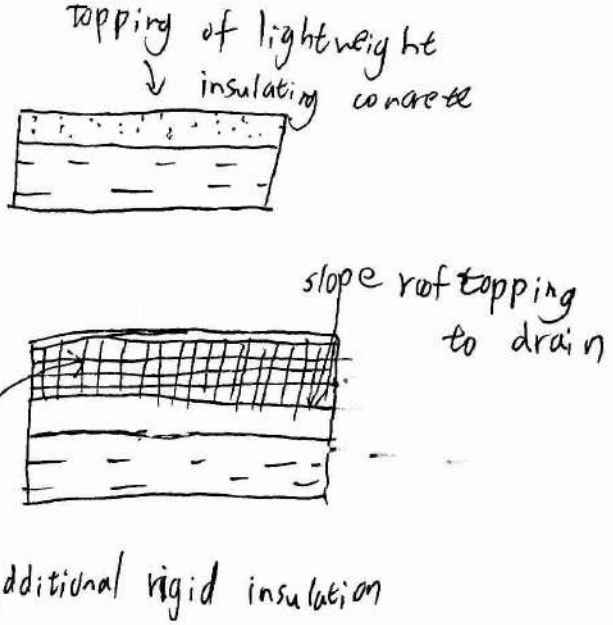
- Loose-fill insulation consists of foamed plactic, polyurethane



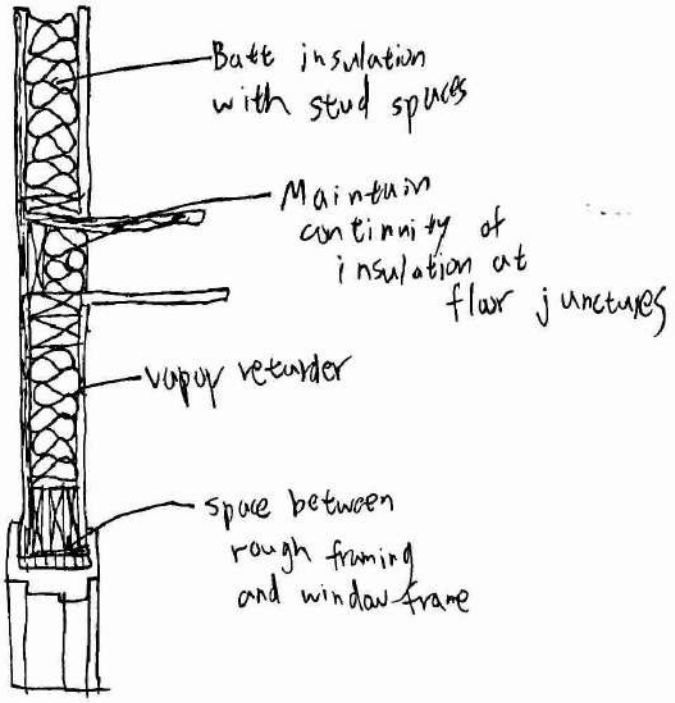
Form	Material
Batt or blanket	Fiberglass Rockwool
Rigid board	cellular glass polystyrene, extruded, polyisocyanurate polyurethane, expand, perlite, expanded
Foamed in place	polyurethane
Loose fill	Cellulose perlite vermiculite
Cast	Insulating concrete

Insulating Roof and Floors



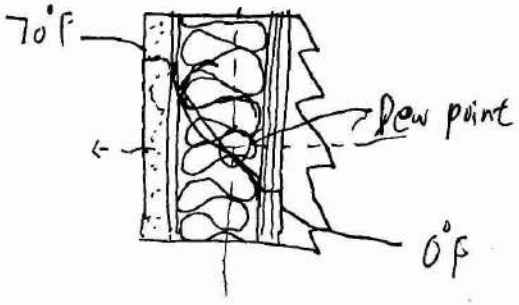


Insulating walls

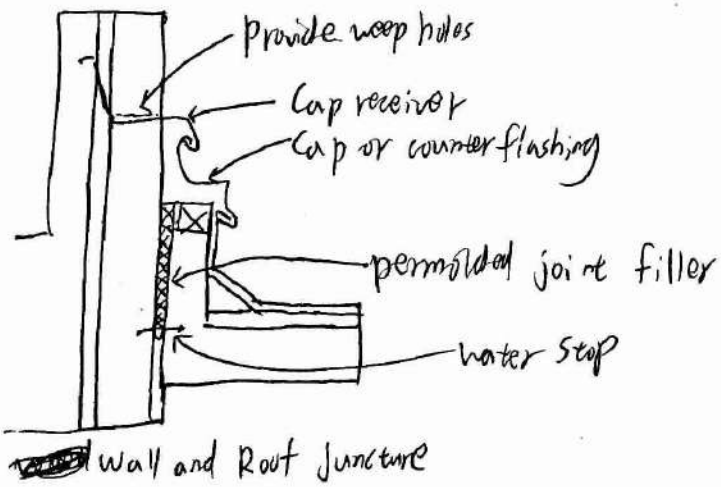


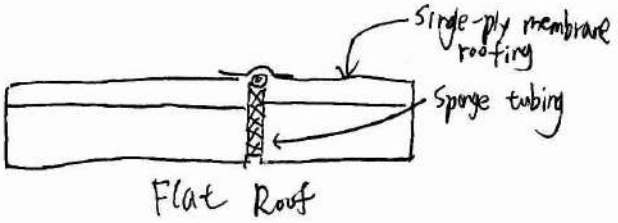
Moisture Control

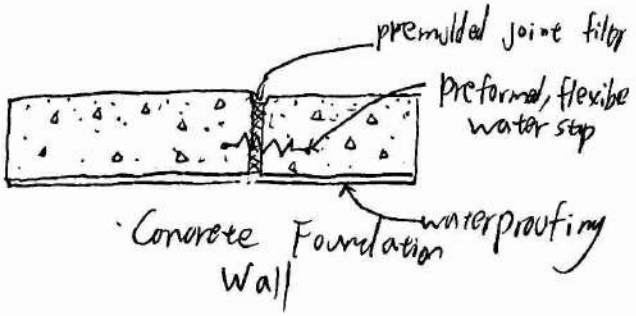
- wall require a vapor retarder to prevent water vapor from Condesing insulation
- hold and reaches dew point temperature



Movement Joints







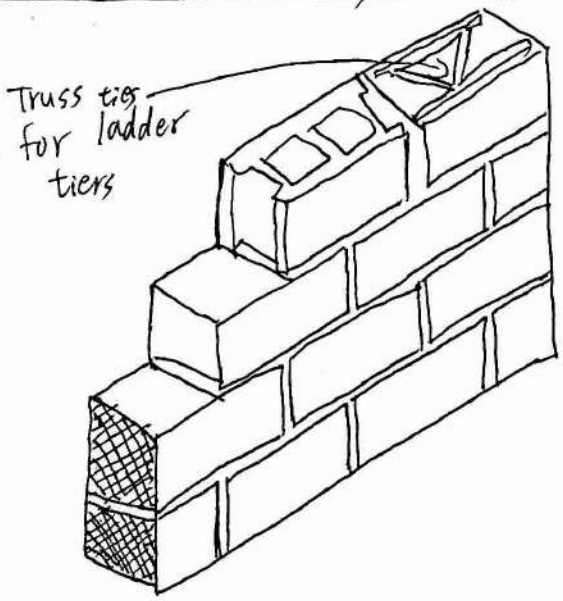
- Joint creates complete break
- weatherstop in form of elastic joint sealant

Masonry Walls

- fire-resistant
- solid walls
  - unreinforced or reinforced
  - parallel sets to support steel mud or concrete
- exterior masonry walls able to control heat flow and weather-resistant

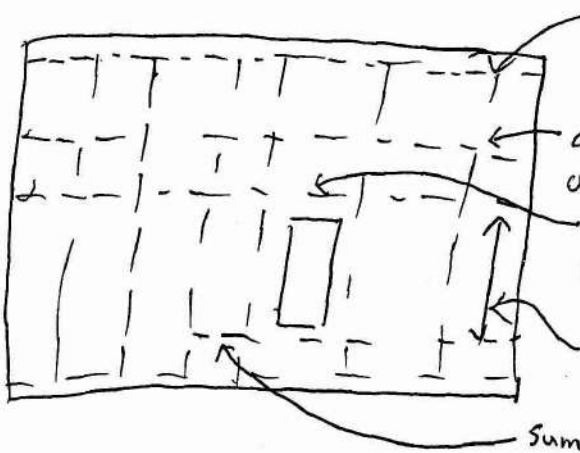
← 8" minimum thickness for
- Masonry bearing wall
- Masonry shear walls
- Masonry parapets

Unreinforced Masonry walls



Reinforced Masonry Walls

General Requirements



Sum of vertical and horizontal reinforcement at 0.002 x gross cross-sectional area of the wall

Masonry Column & Pilasters