

Structure/Envelope Masonry + Exterior Walls

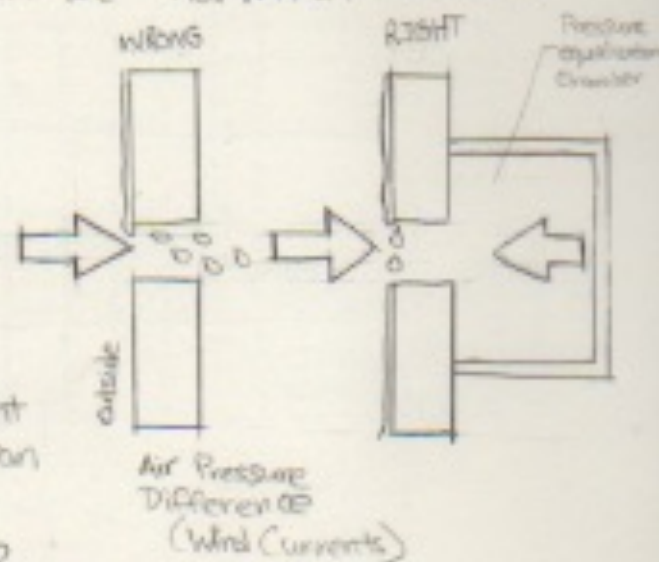
Design Requirements for The Exterior Wall

- Part of a building that defend (protect) the interior (Envelope) against invasion (water, wind, sunlight, heat and cold)
- The design merges art, science, and craft to solve difficult problems.
- * outermost layer of the exterior wall architects spend the most time to achieve their desired vision. *
- Keeping out environmental conditions (rain, snow, and ice) from entering the building.
- Smaller air leaks into buildings can be harmful because of wasted heat/cold conditioners.

Gravity
pulls water through a wall (inclined slope) rather than outside the building.



- 3 conditions must satisfied Simultaneously
1. Water is to be present at the outer face of the wall
 2. An opening must be present where water can move
 3. A force is necessary to move water through the opening.



Momentum
falling rain drops can lead water through a wall.



The Curtain Wall
built in 19th century
• The wall hangs like curtains and its thin

* Sustainability considerations for Exterior Wall System *

- Glass should be avoided in heated areas + provide views + daylighting
- Opaque areas must be well insulated
- Eliminating Thermal bridge for exterior wall
- Fresh air should be provided by ventilation system not only by air leakage through exterior wall

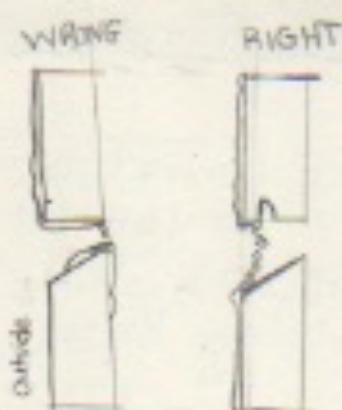
Exterior Wall easy to install *
Must have built in adjustment mechanisms

- Resist wind forces and controlling sounds (inside or outside)
- It's cladding must weather gracefully (to maintain visual quality)

Surface tension

Allows water to be drawn into the building.

- A simple drip on any underside surface to which water might adhere will eliminate the problem.



Conceptual approaches to making a wall watertight:

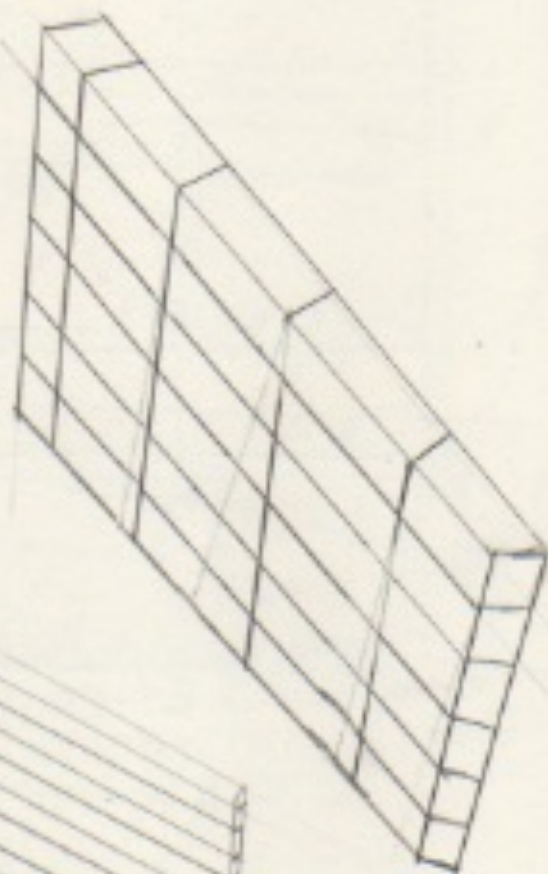
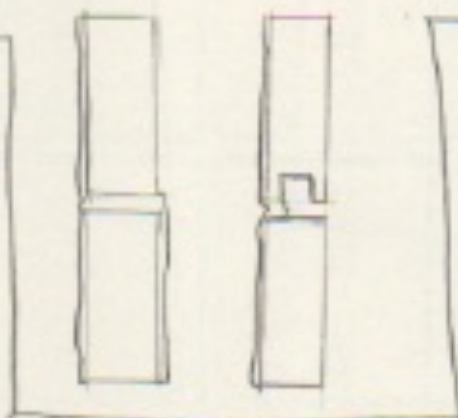
- Keeping water completely away from wall.
- Eliminate openings in a wall.

Capillary action

Tension effect that pulls water through any opening that can be bridged by a water drop.

Structural Frames

- ↳ Concrete frames
 - rigid frames
 - fire-resistant construction
 - qualify as noncombustible



Concrete and Masonry walls

- ↳ noncombustible
- ↳ strong in compression
- ↳ Both require reinforcing tensile stresses

→ Curtain walls.

structural steel or reinforce concrete frame