

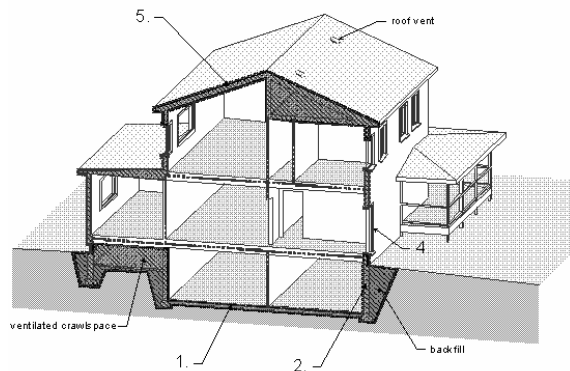
ARCH 673 – Building Science

Building Enclosures

The Building Enclosure

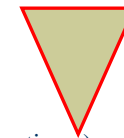
- ♦ The part of the building that physically **separates** the **interior** and **exterior** environments.
- ♦ Includes all of the parts that make up the wall, window, roof, floor, etc... from the innermost to the outermost layer.

Building Enclosure Components



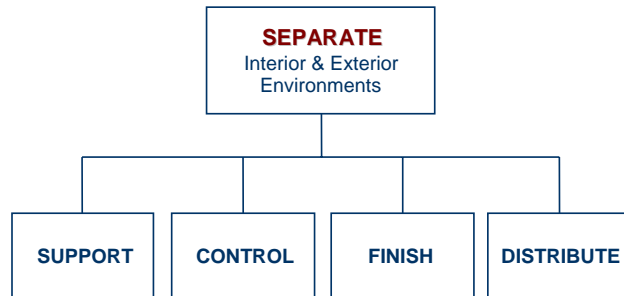
Building Enclosure

- ♦ Separates interior and exterior environment
- ♦ Passive environmental control
- ♦ Critical building component (*Seen from street, Vital Function, Physical Durability a common problem*)
- ♦ Basic **Building Enclosure** Functions
 - Support
 - Control
 - Finish
 - Distribute services (sometimes)

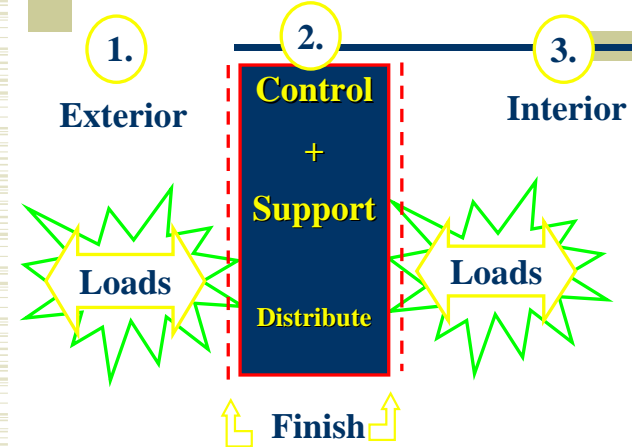


**Hierarchy
of
need**

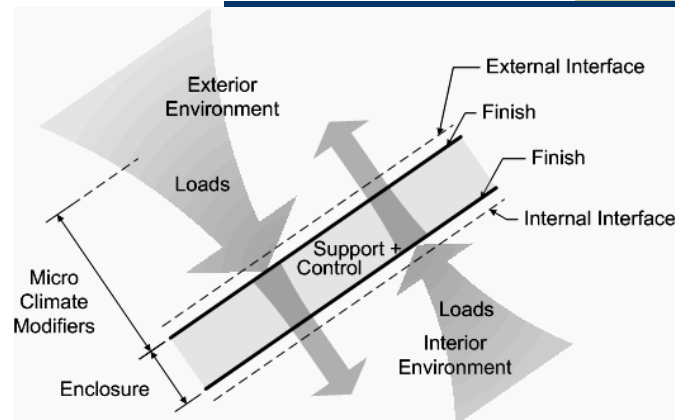
Building Enclosure Functions



Building Enclosure Functions



Building Enclosure Functions



Building Enclosure Functions

- ♦ Basic Functions
 - **Support**
 - Lateral (Wind Earthquake)
 - Gravity (dead, snow)
 - Rheological (temp, moisture)
 - Impact
 - Wear / Abrasion
 - Control
 - Finish
 - Distribute (sometimes)

Support - resist and transfer physical forces from inside and out

Building Enclosure Functions

♦ Basic Functions

- Support
- **Control**
- Finish
- Distribute (sometimes)

Heat
Air
Vapour
Rain
Sound
Fire
Insects
Access

Control - Mass and Energy Flows

Building Enclosure Functions

♦ Basic Functions

- Support
- Control
- **Finish**
- Distribute (sometimes)

Colour
Texture
Reflectance
Pattern
Speculance

Finish - interior and exterior surfaces for people

Building Enclosure Functions

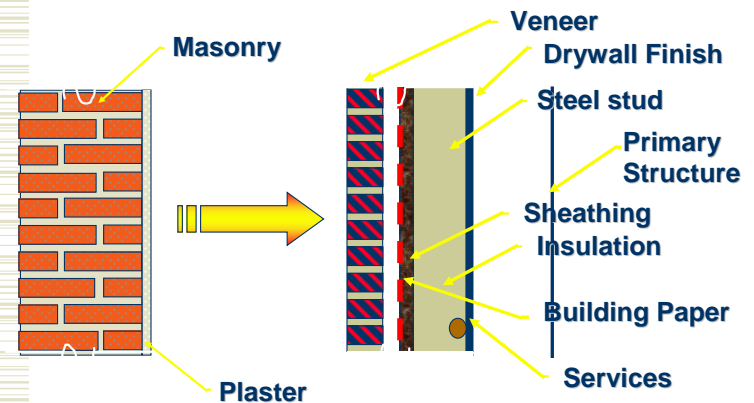
♦ Basic Functions

- Support
- Control
- Finish
- **Distribute (sometimes)**

Electricity
Communications
Plumbing
Air ducts
Gas lines
Roof drains

Distribute Services - a building function imposed on the enclosure

Building Enclosures: Change



“Virtual” Enclosures

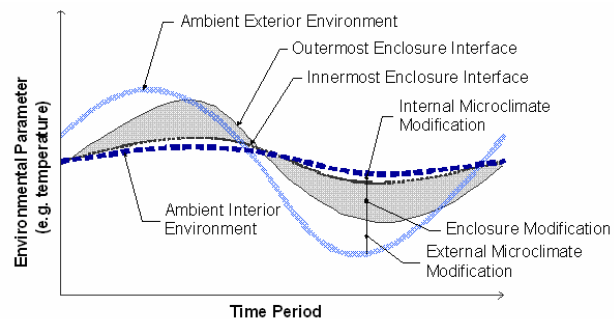
- ◆ Space can be formed by more than walls
- ◆ Climate can be modified by more than walls
- ◆ Multiple levels of control
 - climate
 - site
 - micro-climate
 - enclosure



Climate Modification

- ◆ Building & Site (overhangs, trees...)
 - Creates microclimate
- ◆ Building Enclosure (walls, windows, roof...)
 - Separates climates
 - Passive modification
- ◆ Building Environmental Systems (HVAC...)
 - Use energy to change climate
 - Active modification

Climate Modification



Website

- ◆ Review documents and details
- ◆ University of Waterloo

Building
Engineering
Group

www.civil.uwaterloo.ca/beg