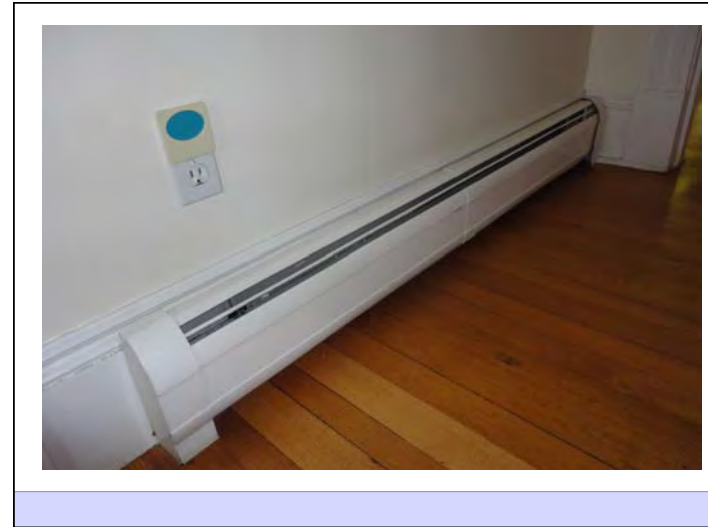


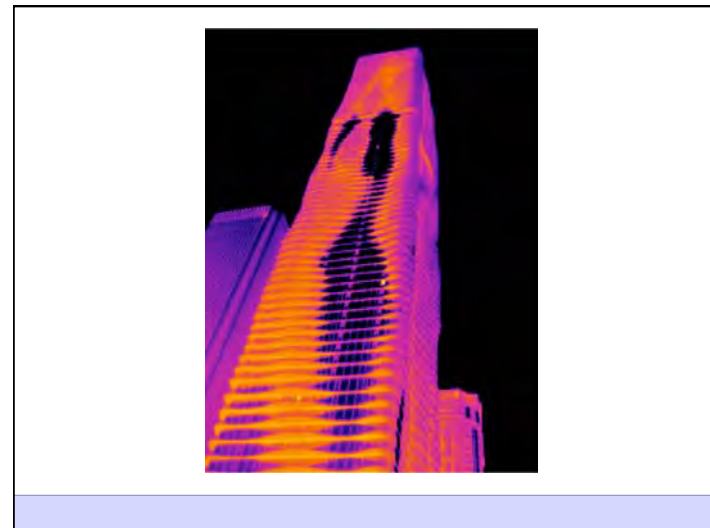
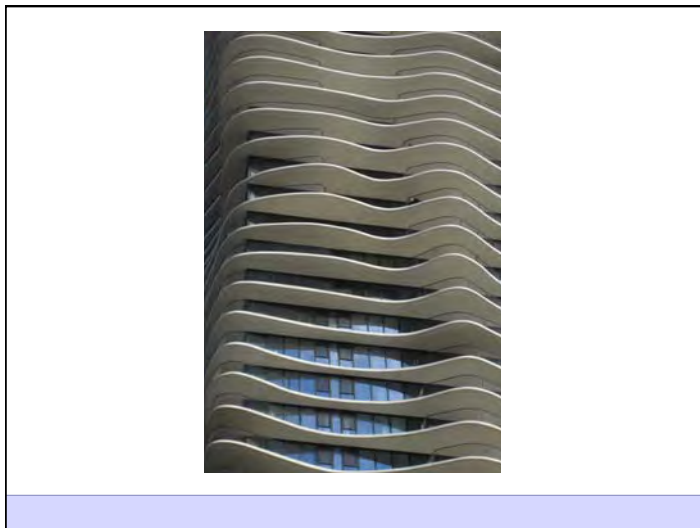
Joseph Lstiburek, Ph.D., P.Eng, ASHRAE Fellow

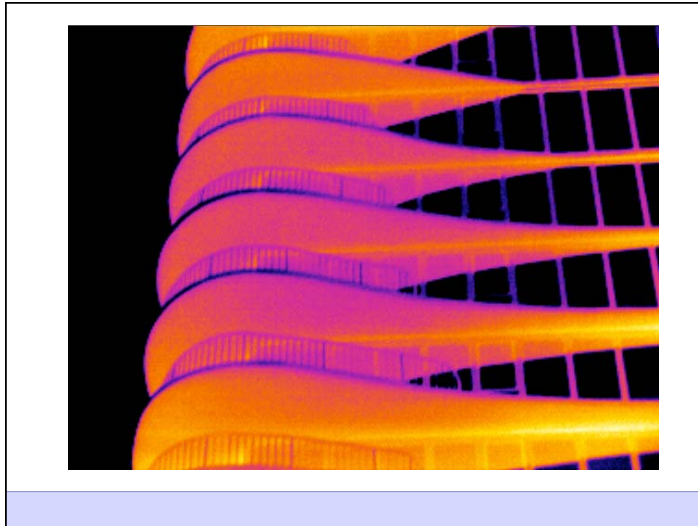
# Building Science

Adventures In Building Science

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Life is Tough Enough As it Is...

Life is Tough Enough As it Is...  
It's Harder When You Are Stupid

Don't Do Stupid Things

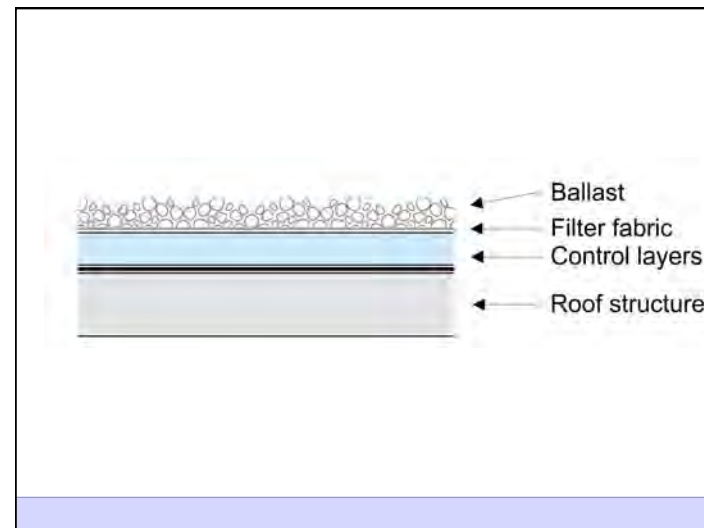
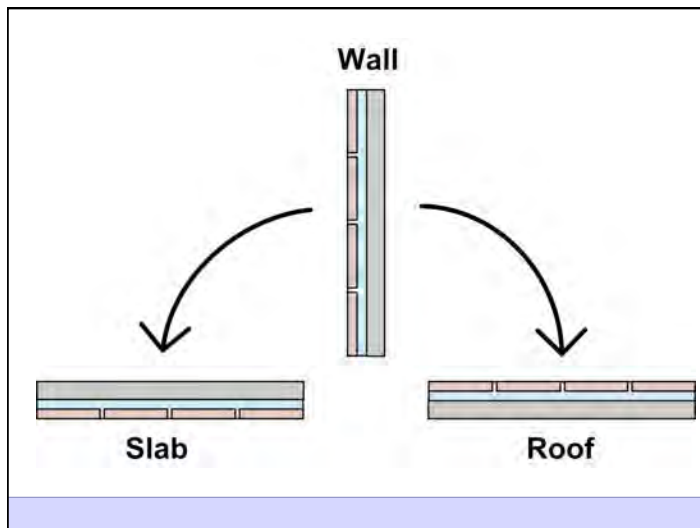
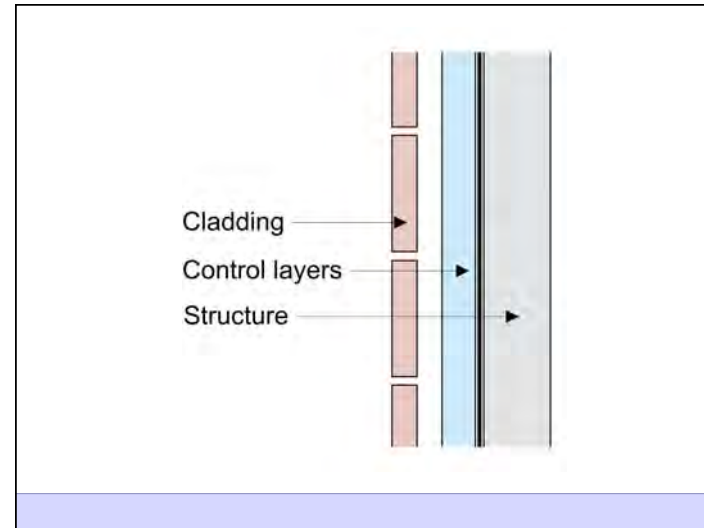
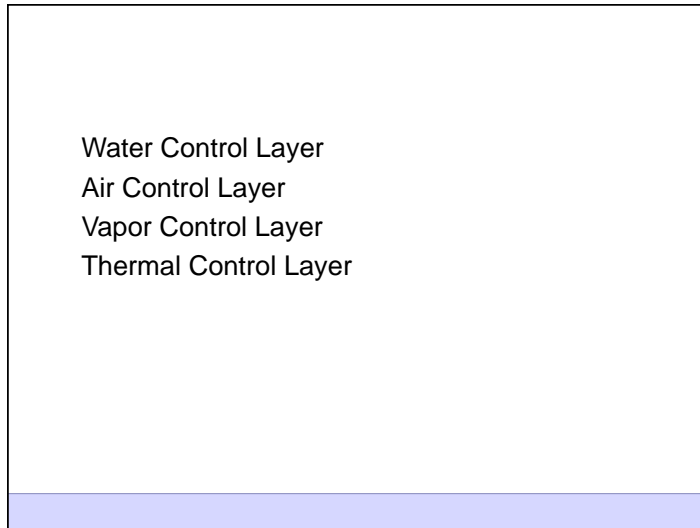
## What Is A Building?

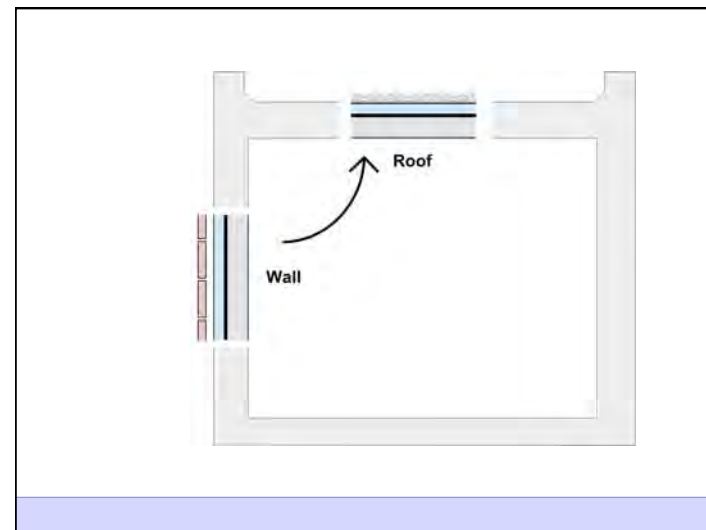
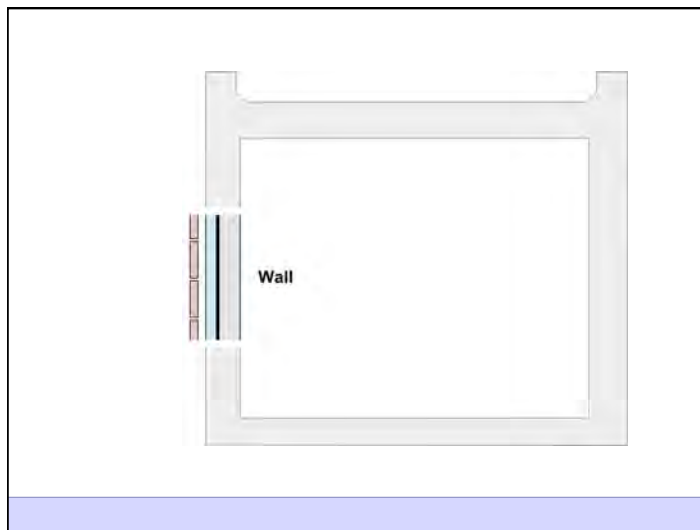
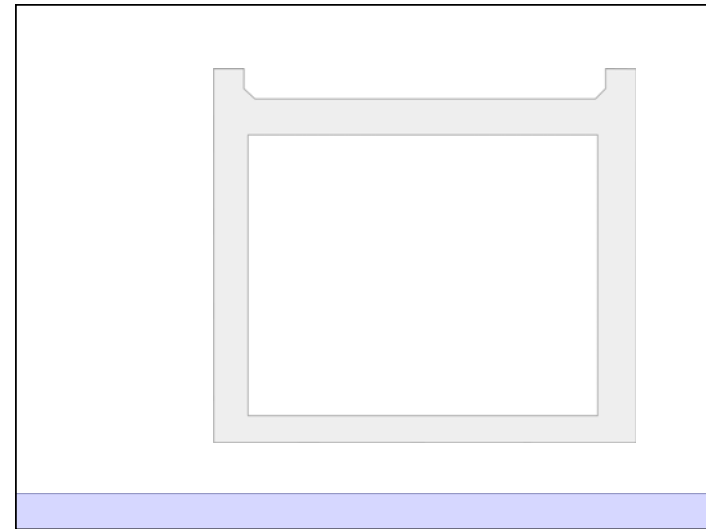
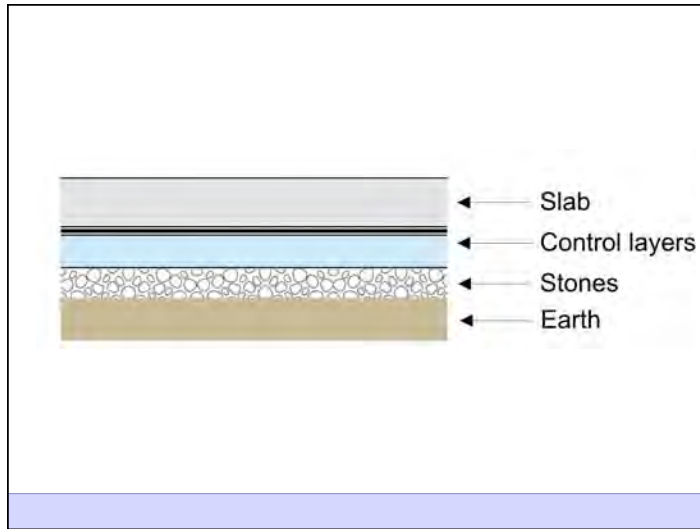
It is an environmental separator

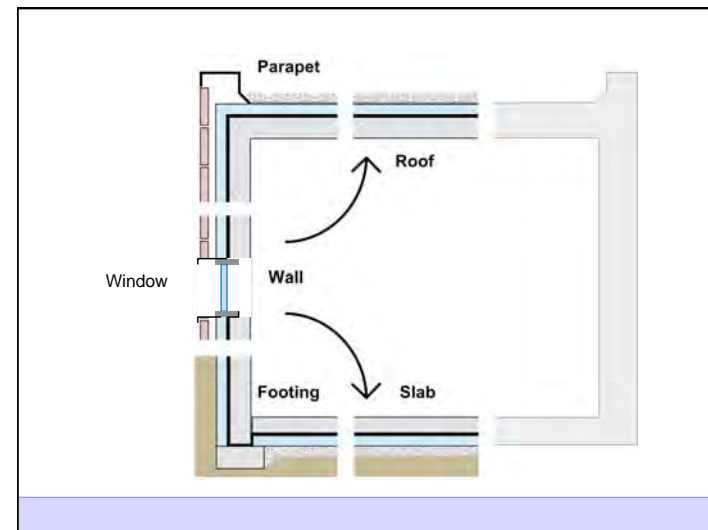
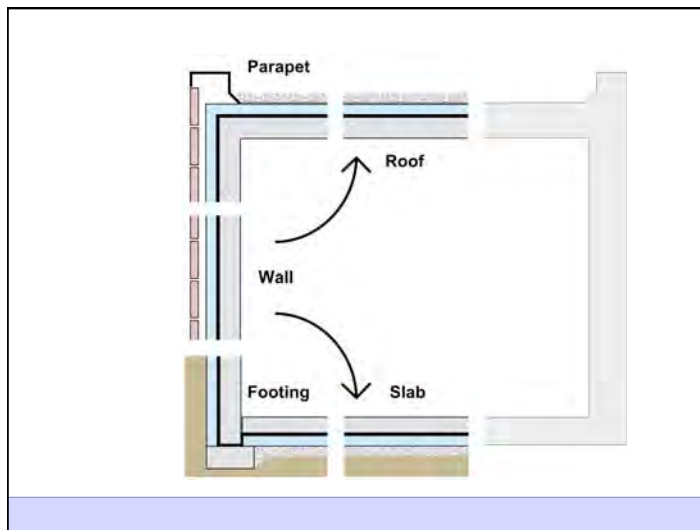
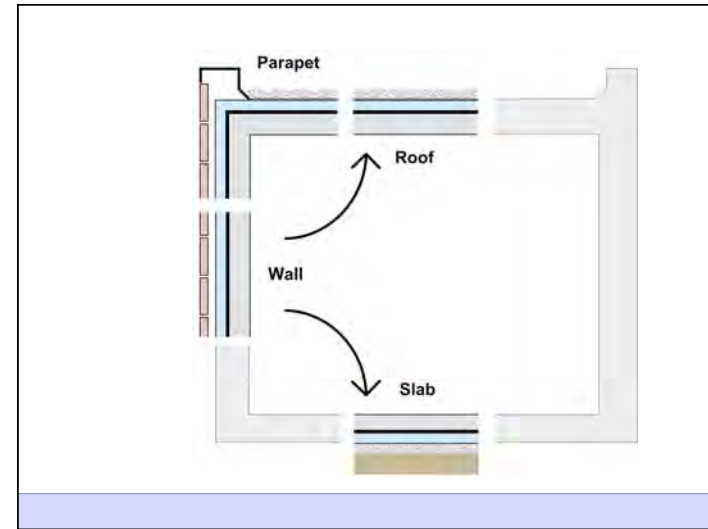
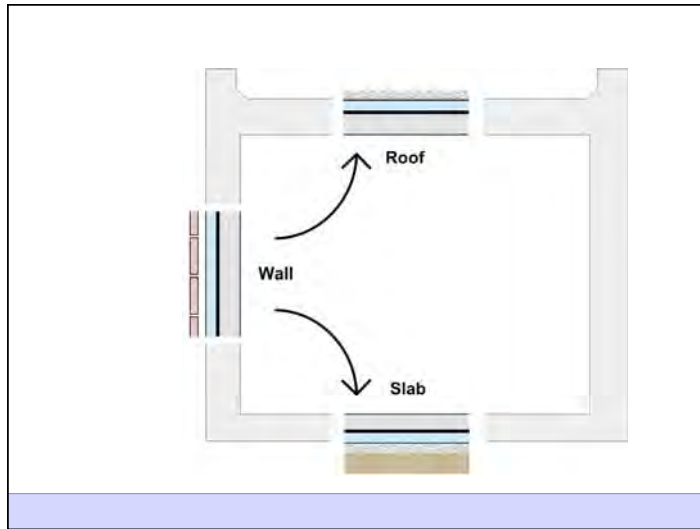
At the most basic level a building provides shelter - shelter from the elements as well as from other dangers. Its' function is to separate the inside from the outside as required by the local environment and the wishes of its occupants. A building creates an interior environment that is different from the exterior environment – it is an environmental separator. This interior environment should be controllable by the occupants in a manner that meets their needs.

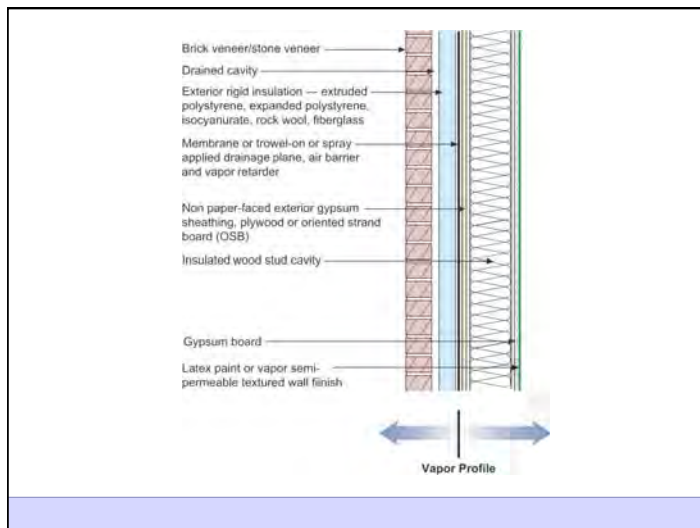
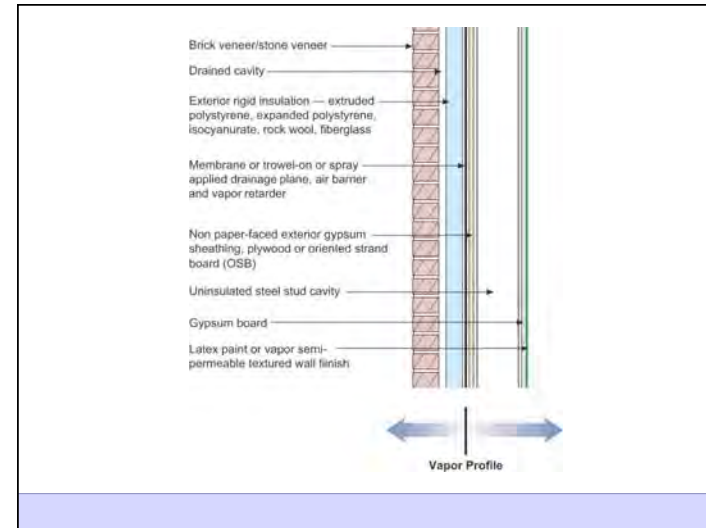
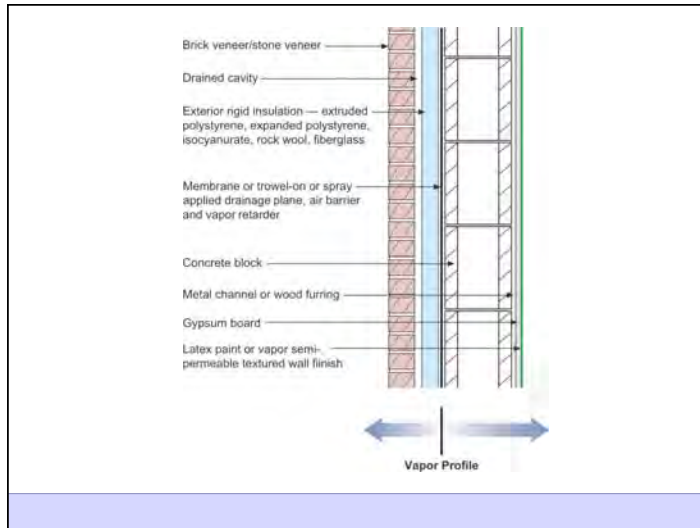
- Control heat flow
- Control airflow
- Control water vapor flow
- Control rain
- Control ground water
- Control light and solar radiation
- Control noise and vibrations
- Control contaminants, environmental hazards and odors
- Control insects, rodents and vermin
- Control fire
- Provide strength and rigidity
- Be durable
- Be aesthetically pleasing
- Be economical

Heat Flow Is From Warm To Cold  
Moisture Flow Is From Warm To Cold  
Moisture Flow Is From More To Less  
Air Flow Is From A Higher Pressure to a  
Lower Pressure  
Gravity Acts Down










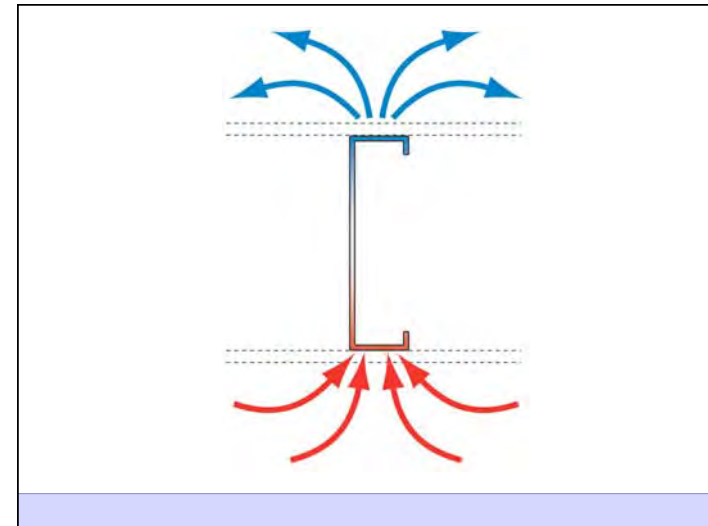
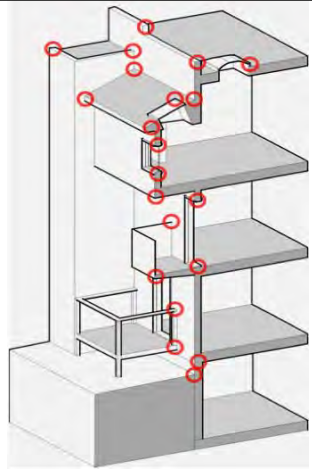
### Commercial Enclosure: Simple Layers

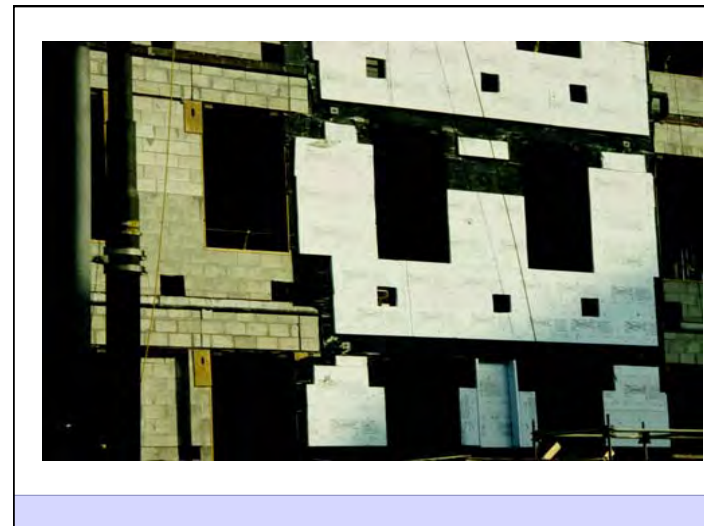
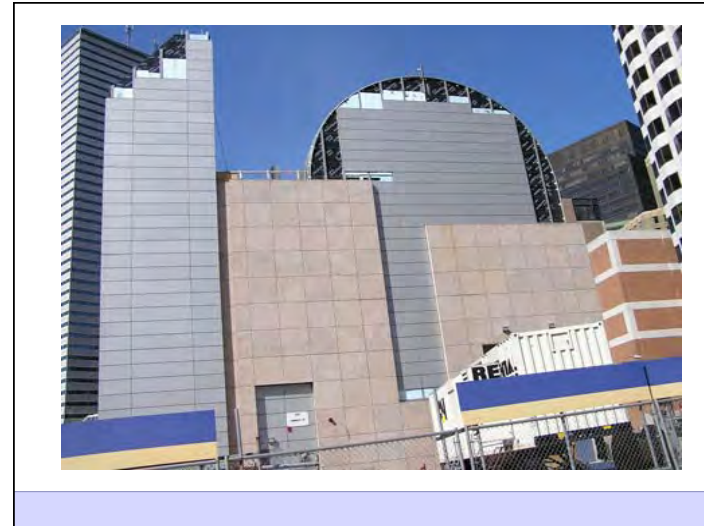
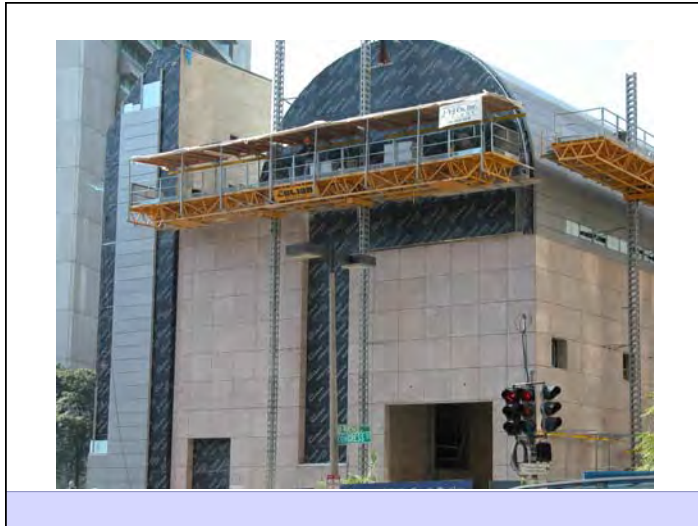
- Structure
- Rain/Air/Vapor
- Insulation
- Finish

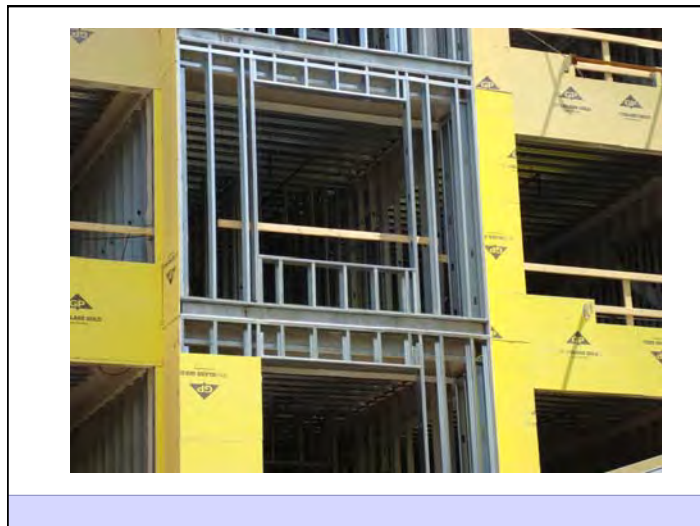
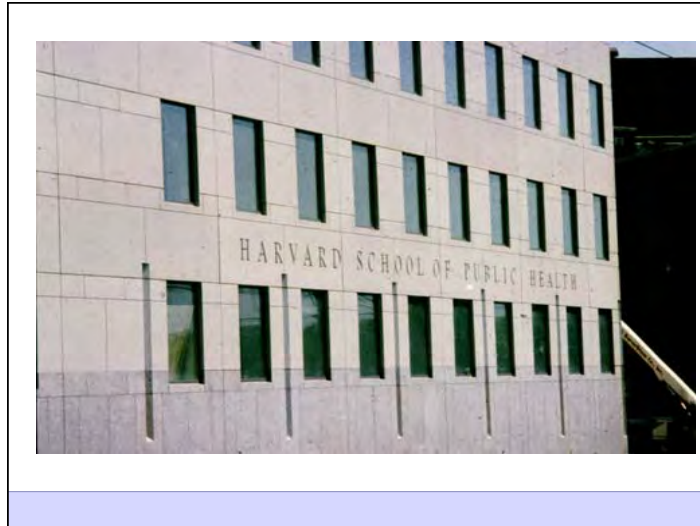


### Enclosure Design: Details

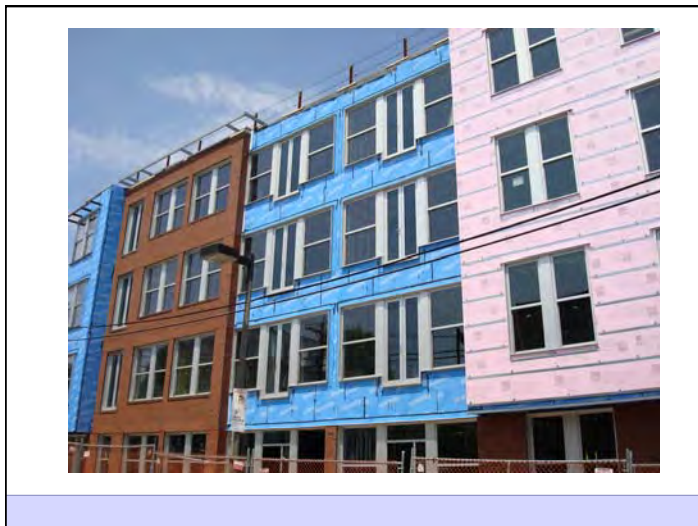
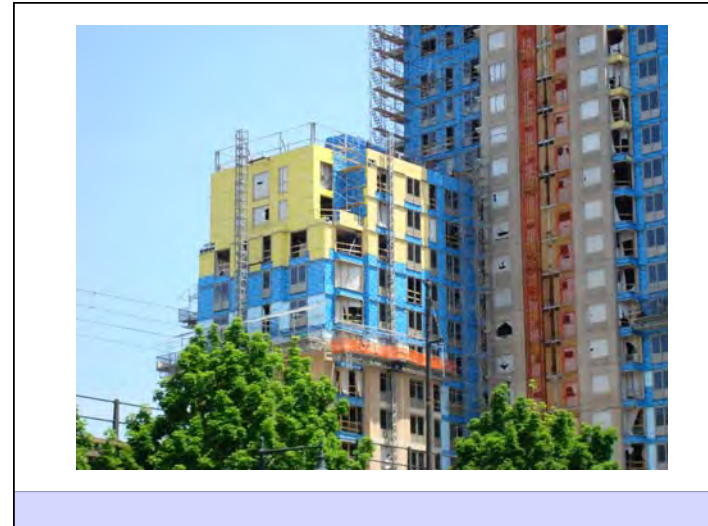
- Details demand the same approach as the enclosure.
- Scaled drawings required at 











Don't Do Stupid Things

