

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

Building Science

Adventures In Building Science

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What Is A Building?

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Environmental Separator

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- 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

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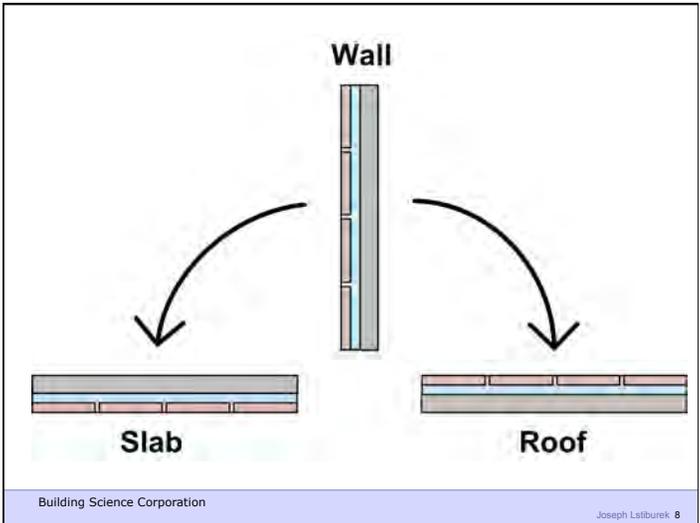
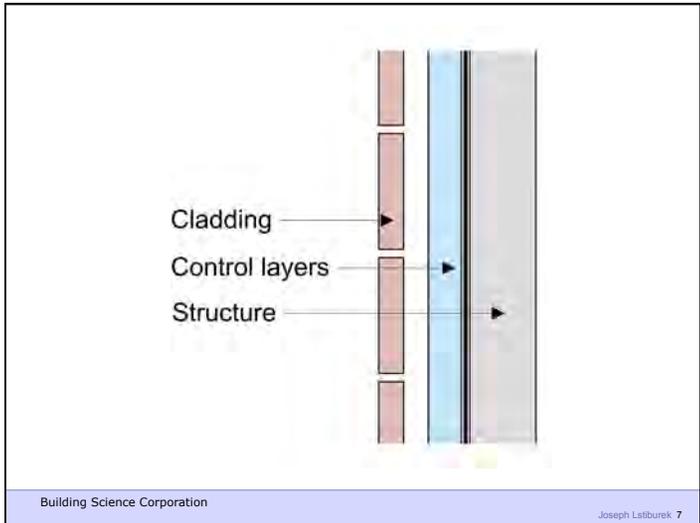
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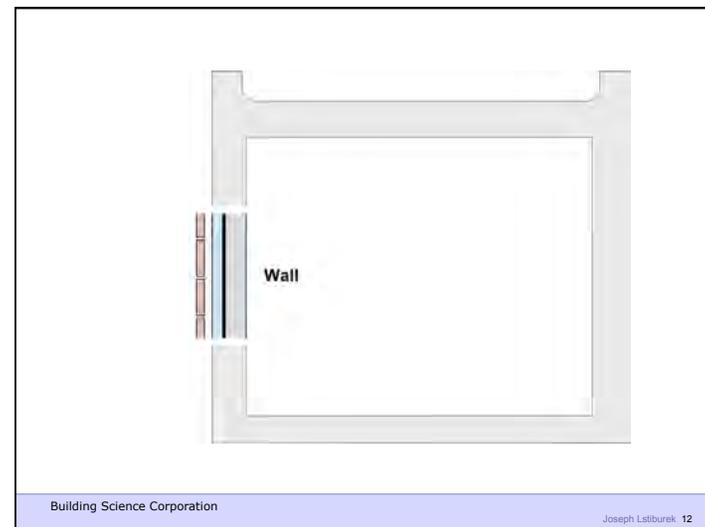
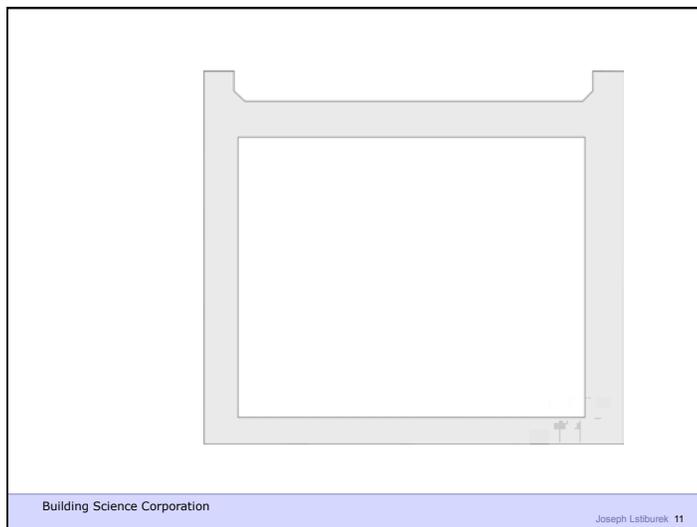
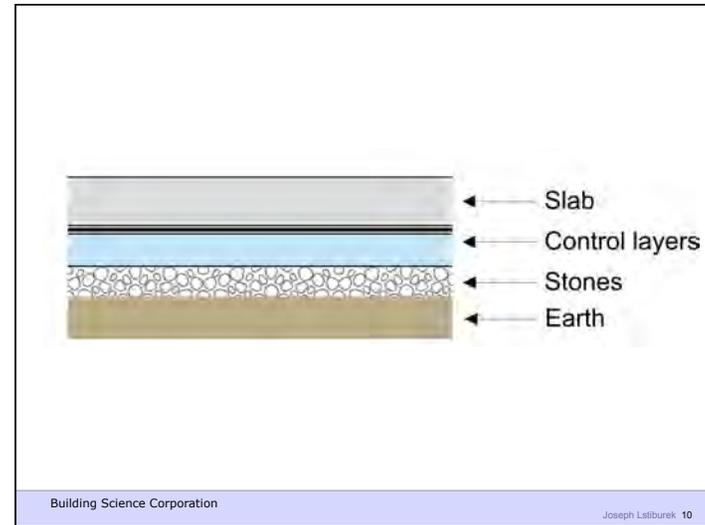
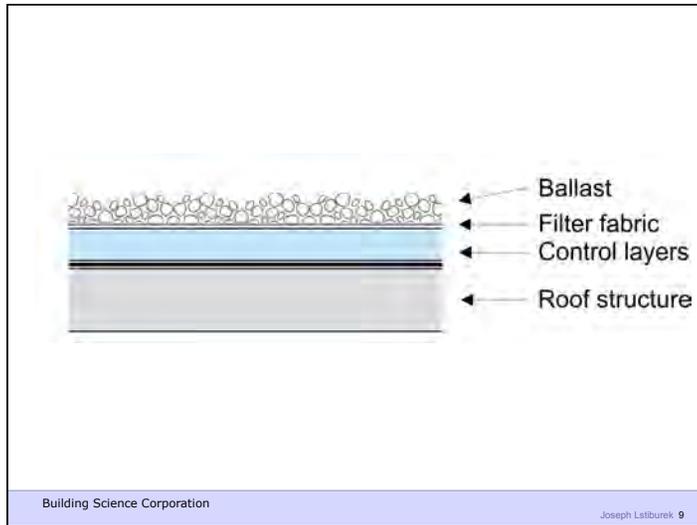
Heat Flow Is From Warm To Cold
Moisture Flow Is From Warm To Cold
Moisture Flow Is From More To Less
Air Flow Is From A Higher Pressure to a Lower Pressure
Gravity Acts Down

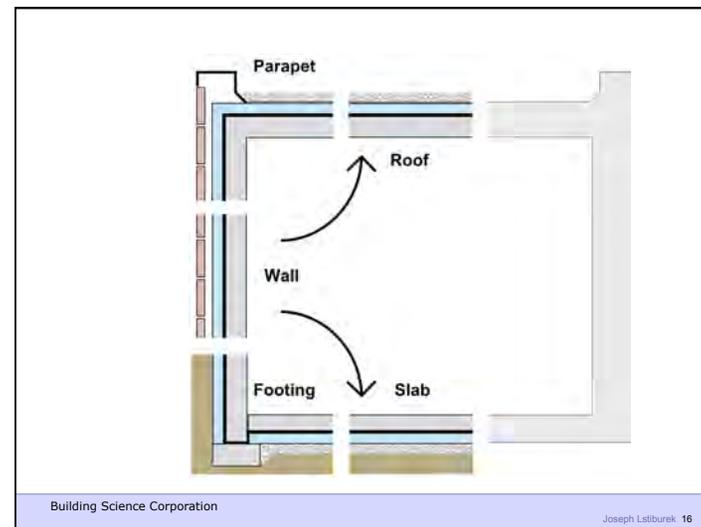
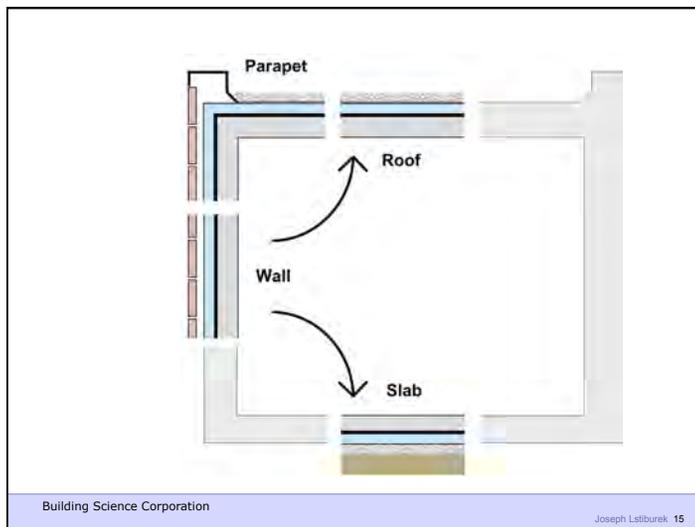
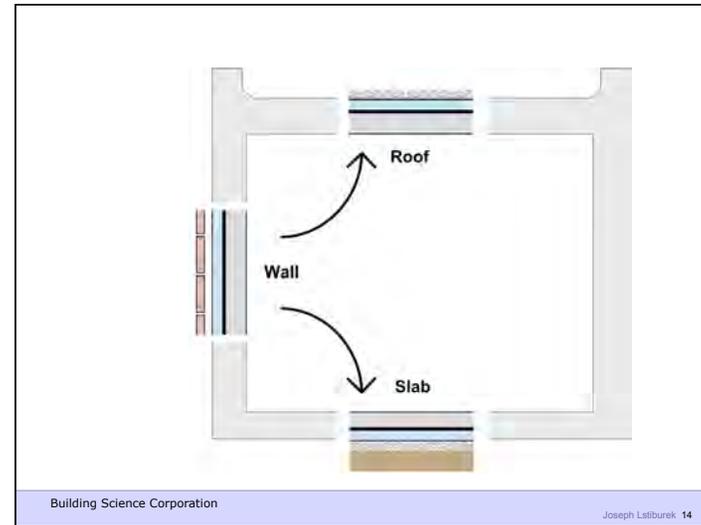
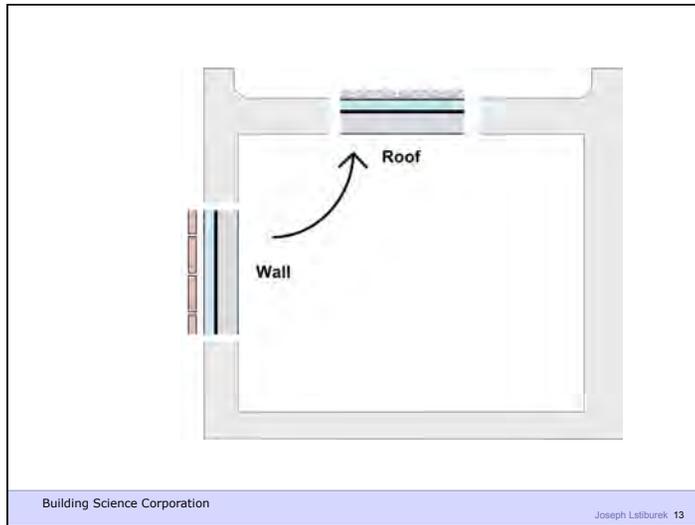
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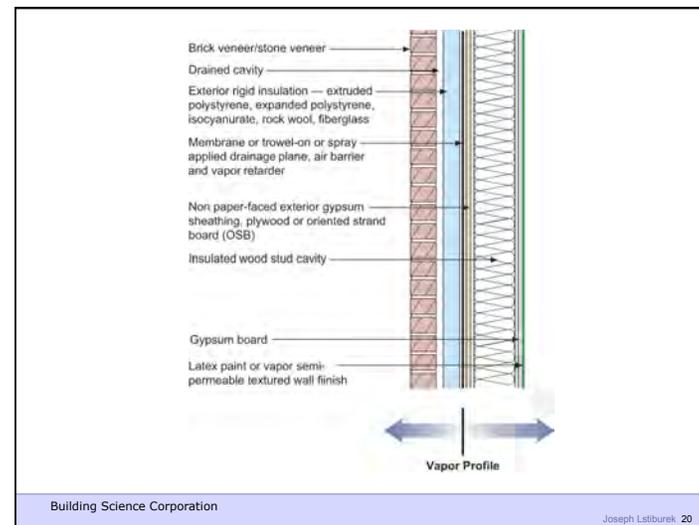
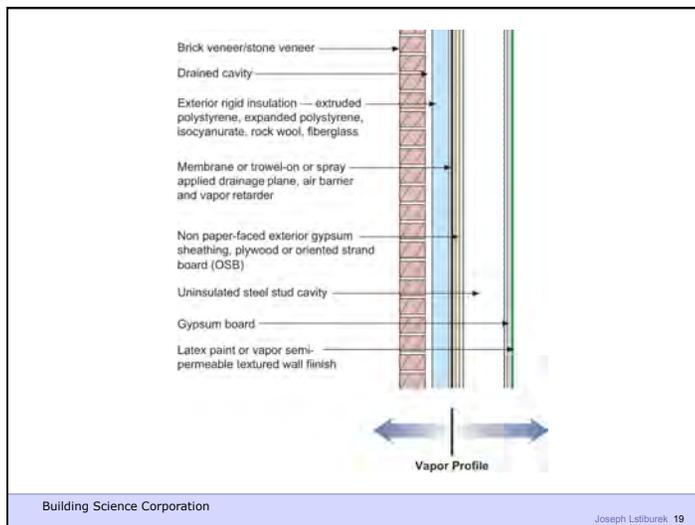
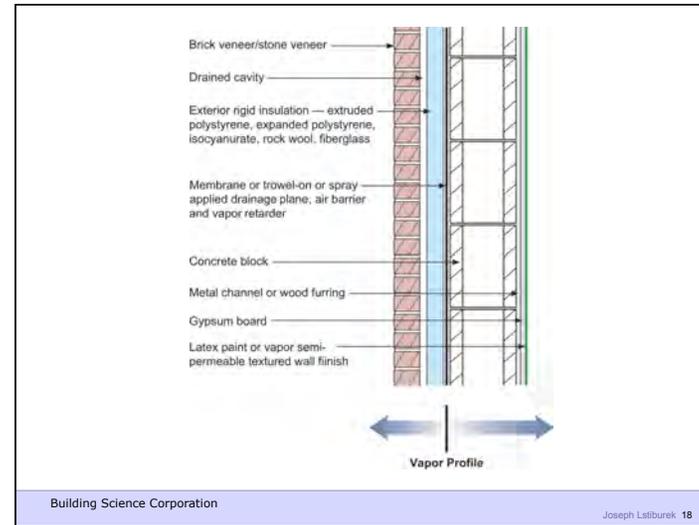
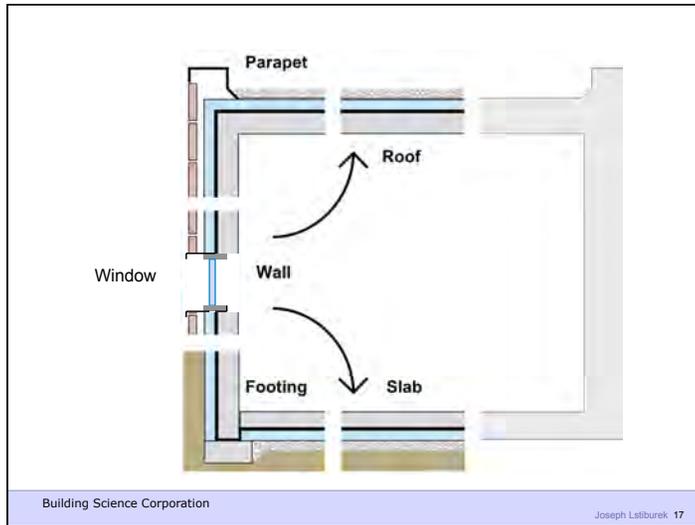
Water Control Layer
Air Control Layer
Vapor Control Layer
Thermal Control Layer

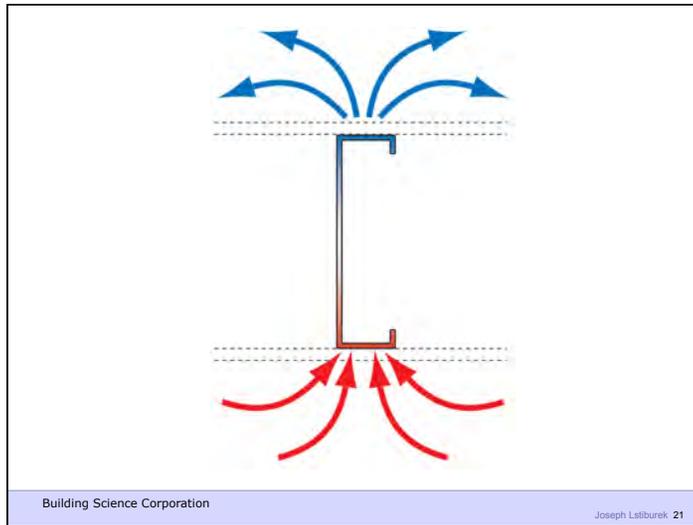
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Commercial Enclosure: Simple Layers

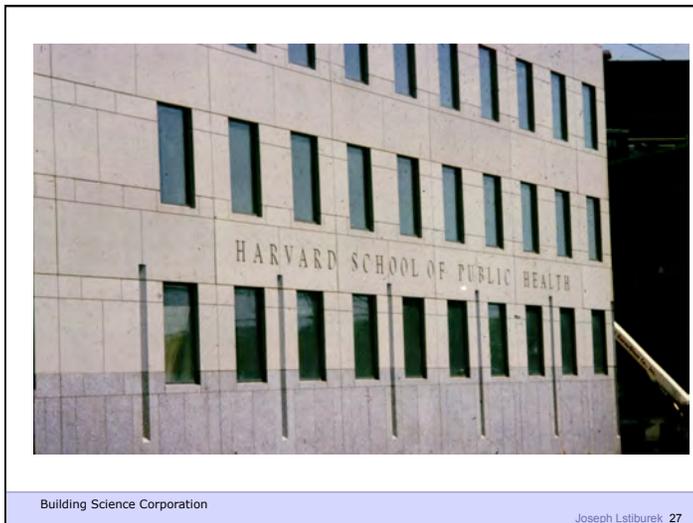
- Structure
- Rain/Air/Vapor
- Insulation
- Finish

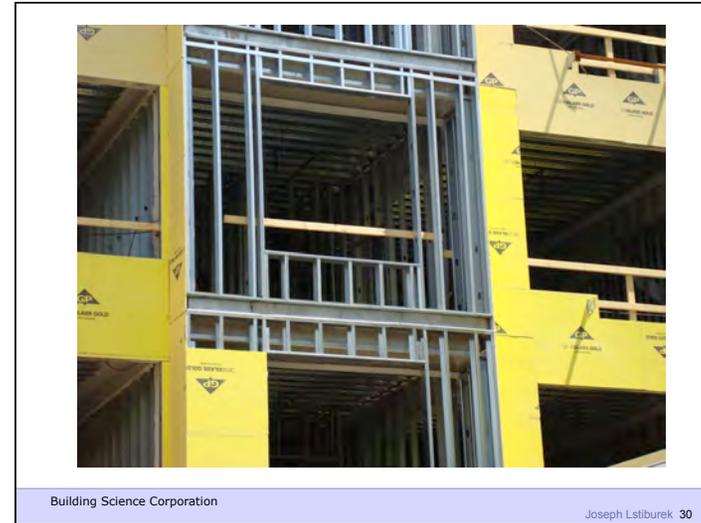
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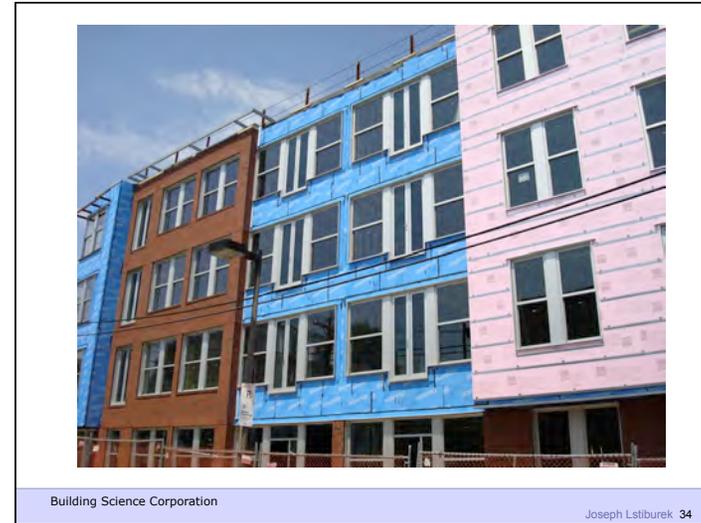
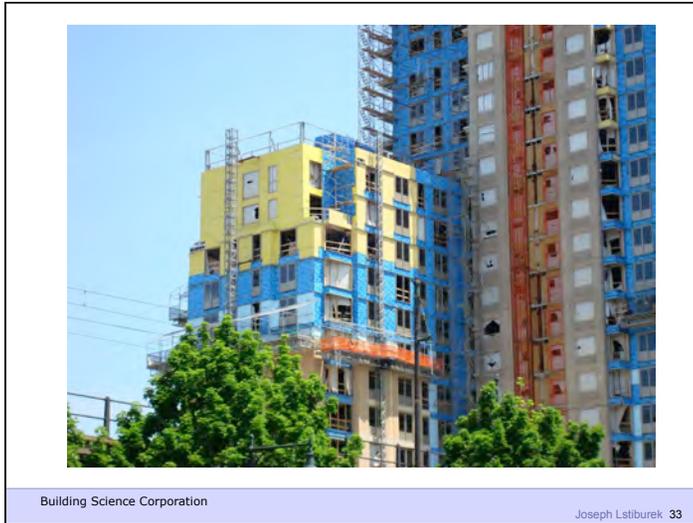
Enclosure Design: Details

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

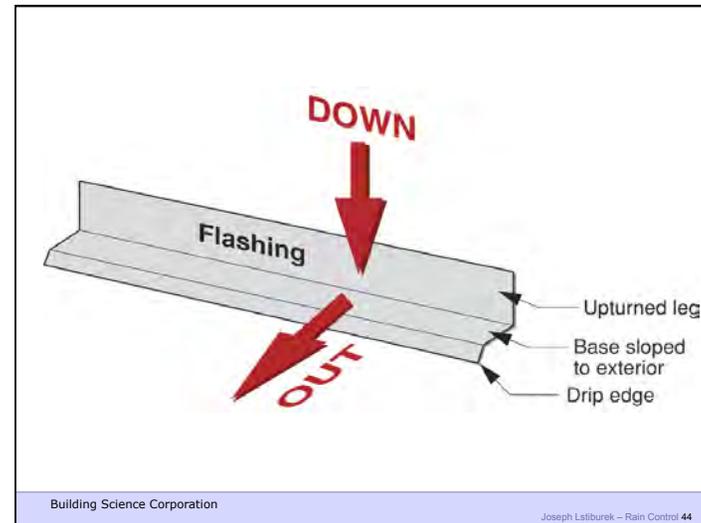
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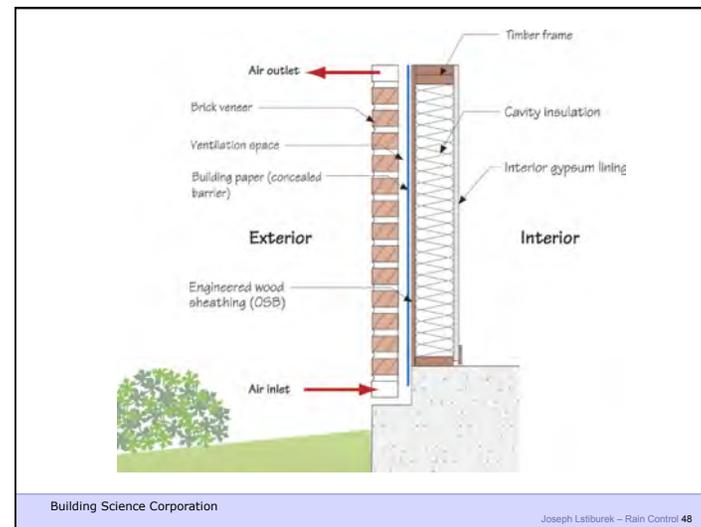
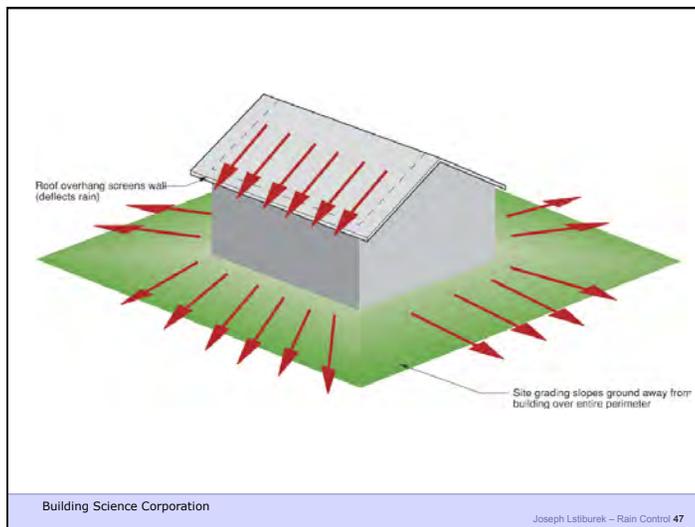
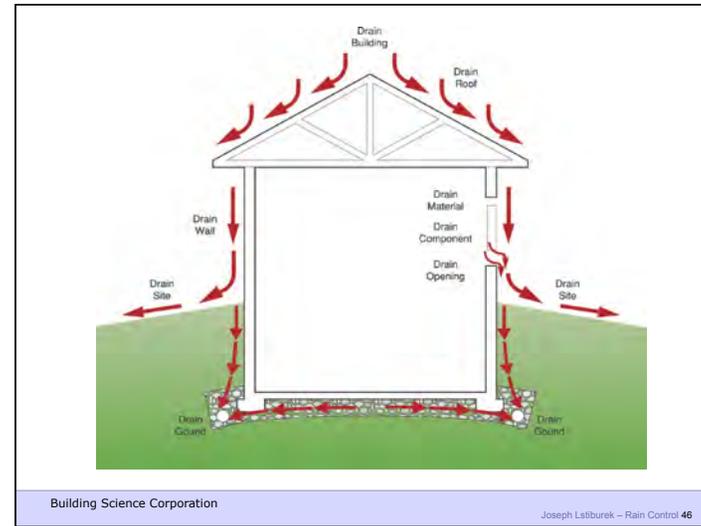
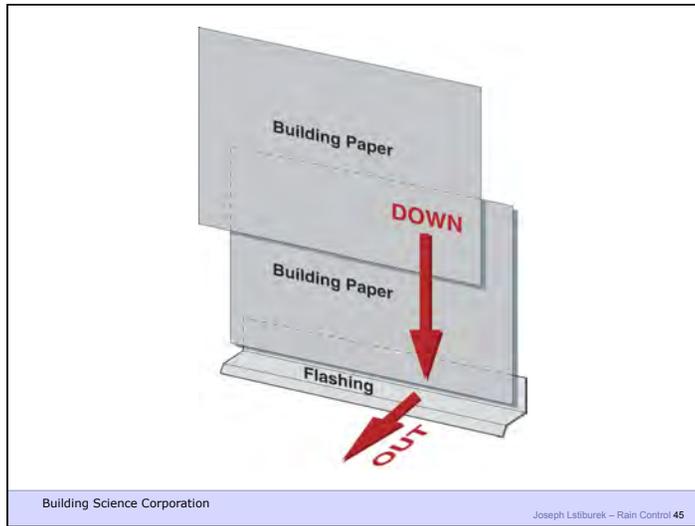


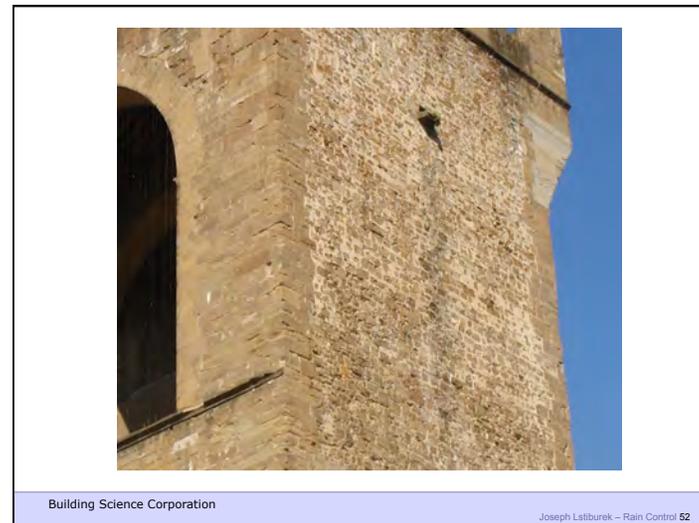
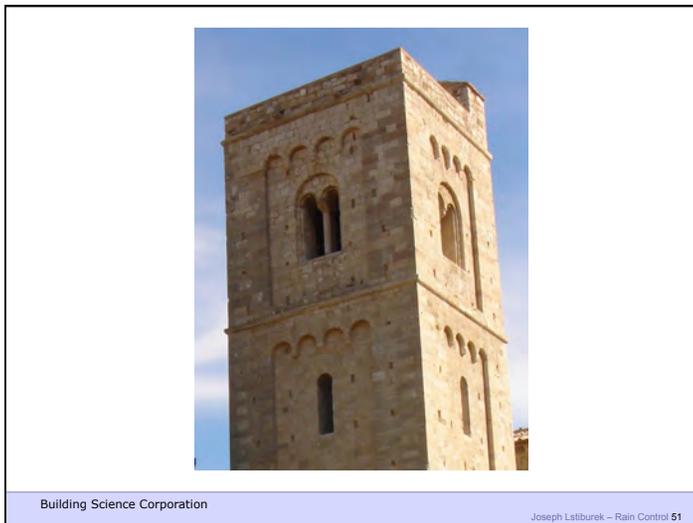
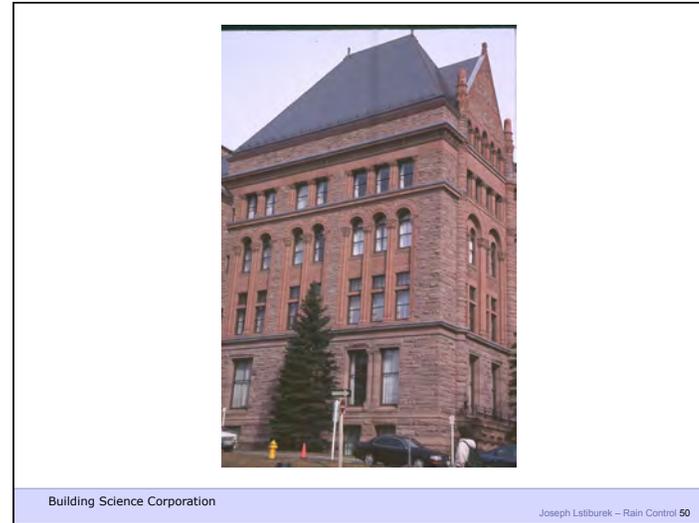
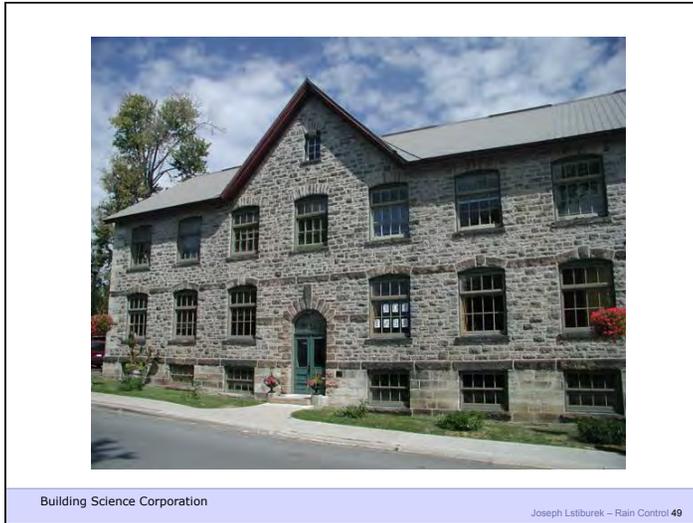


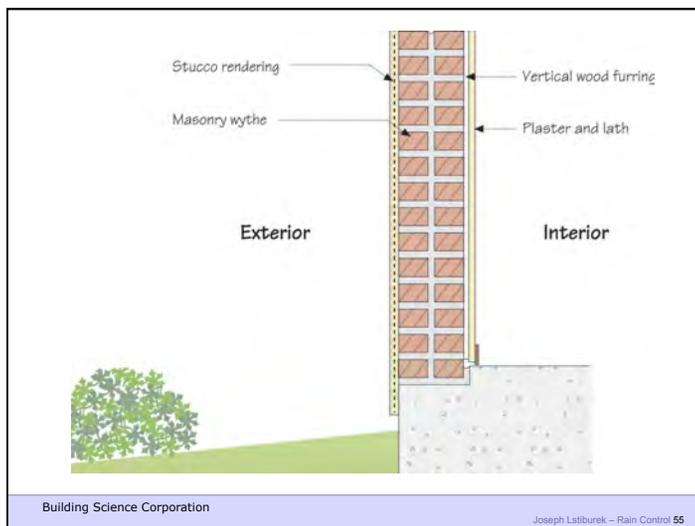
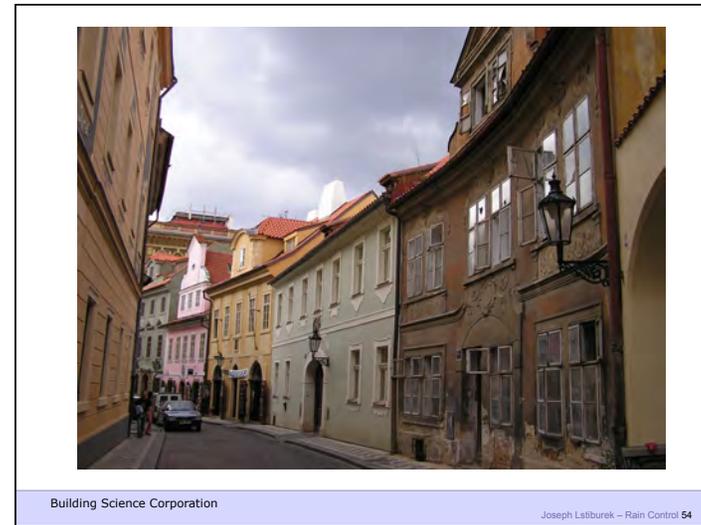


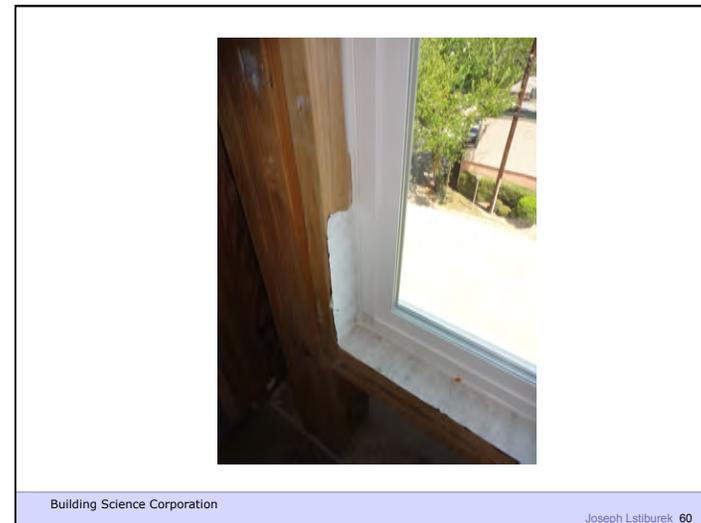
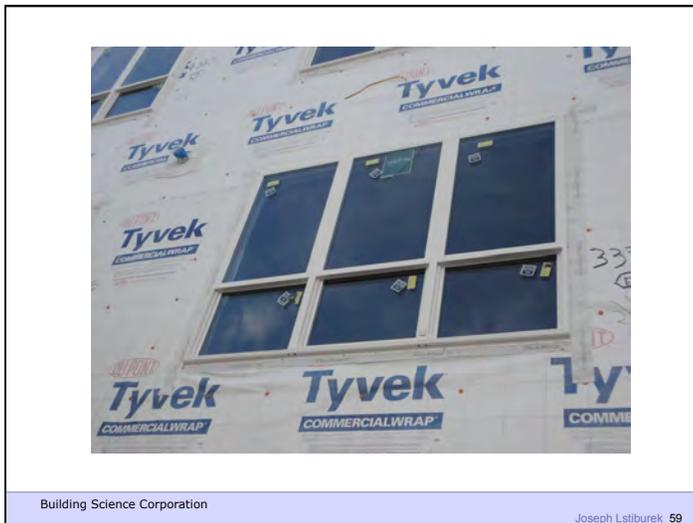


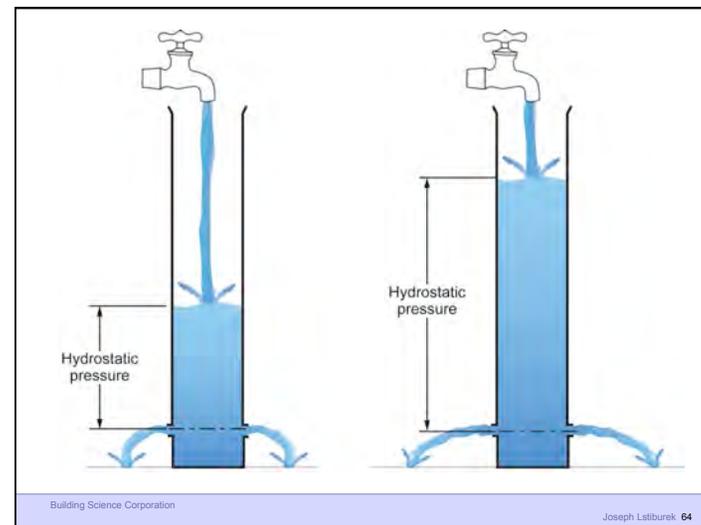
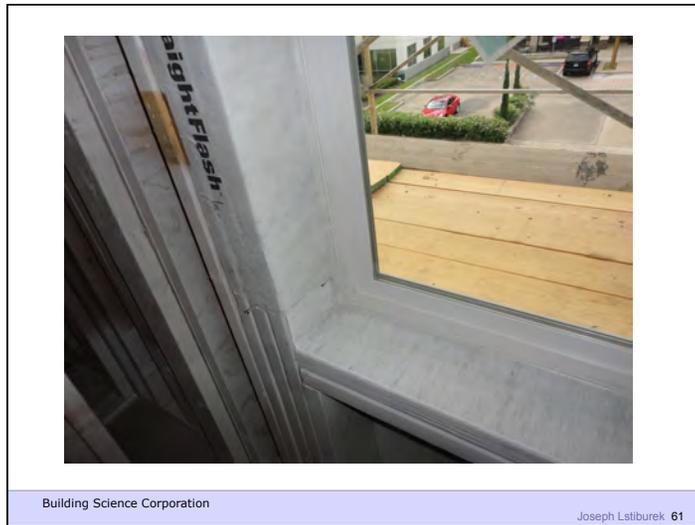


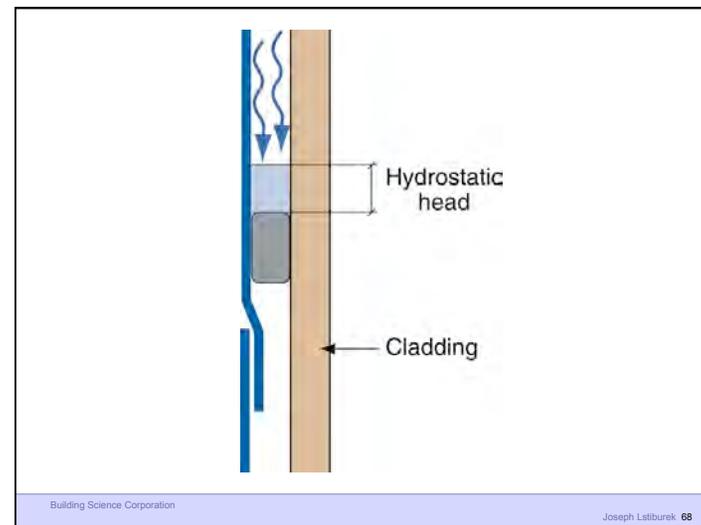
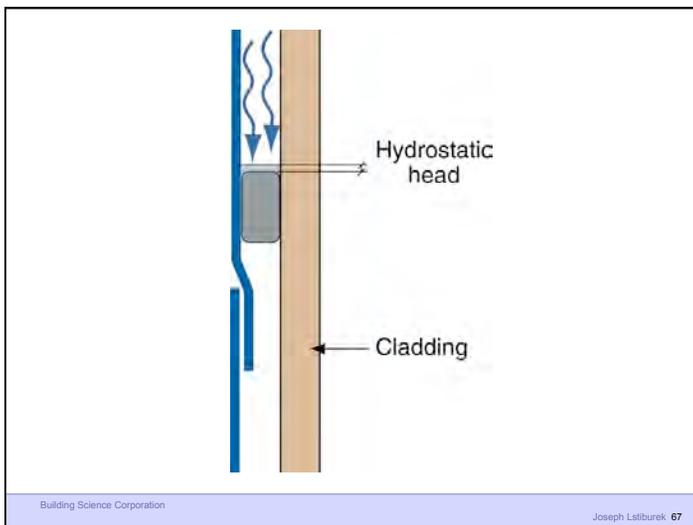
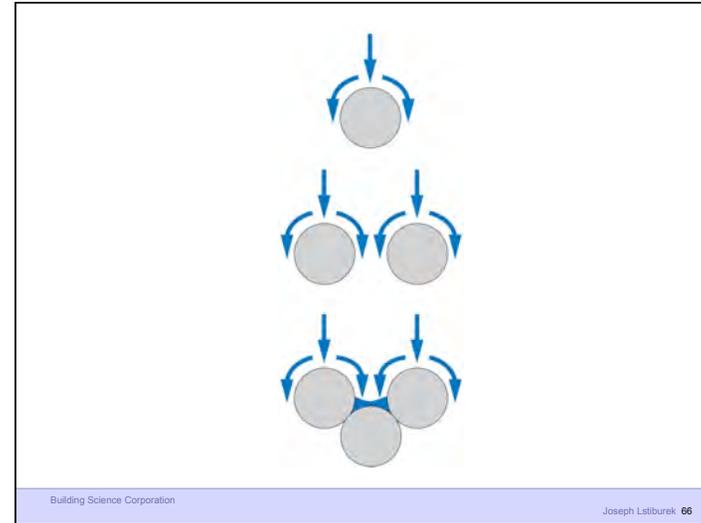
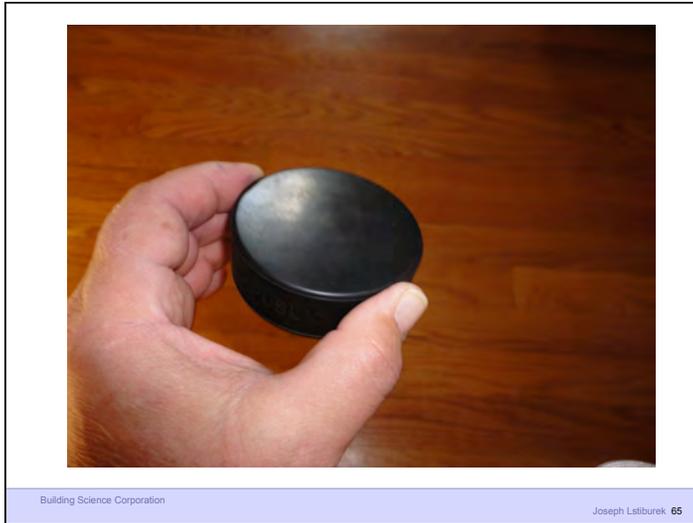


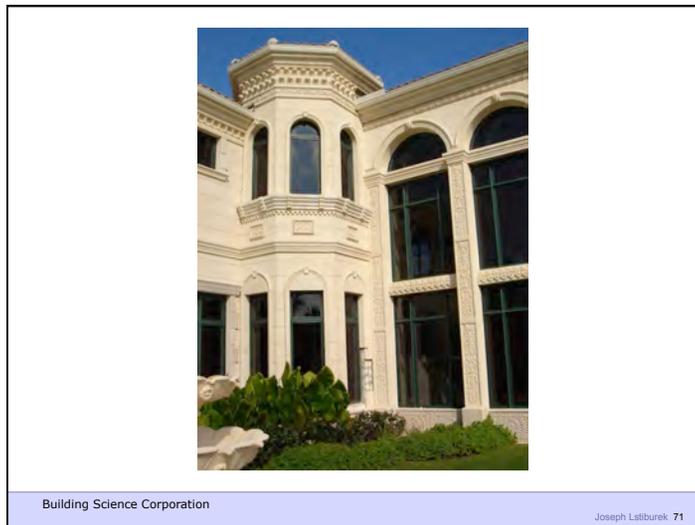
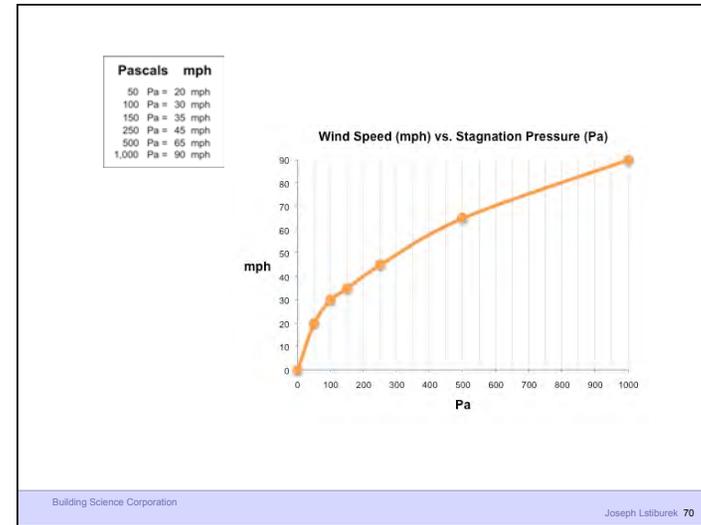
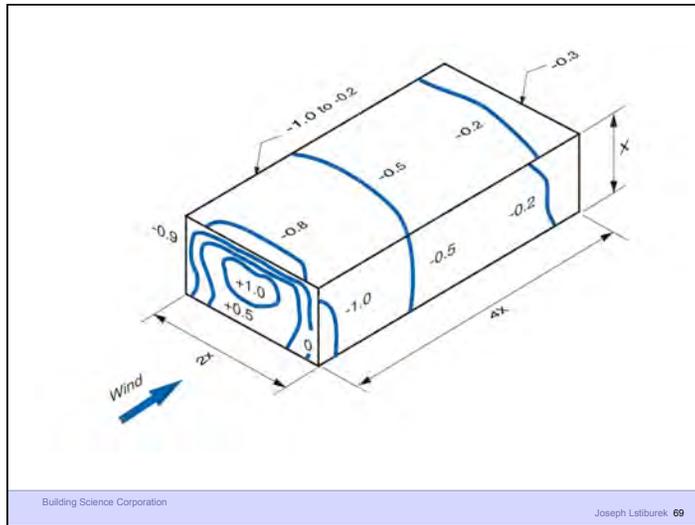




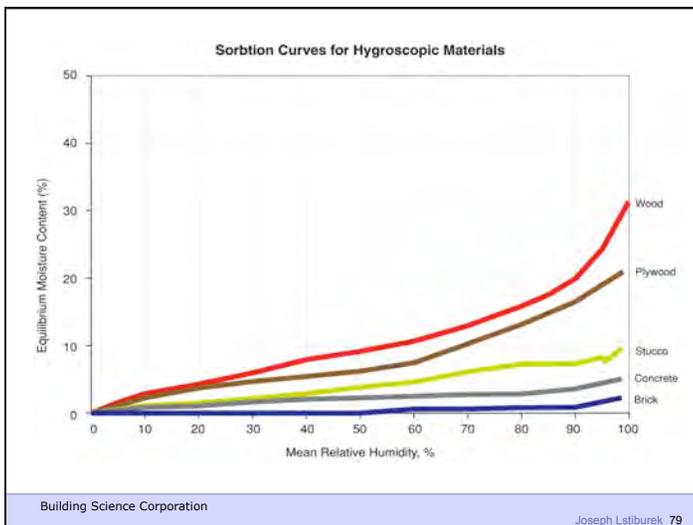
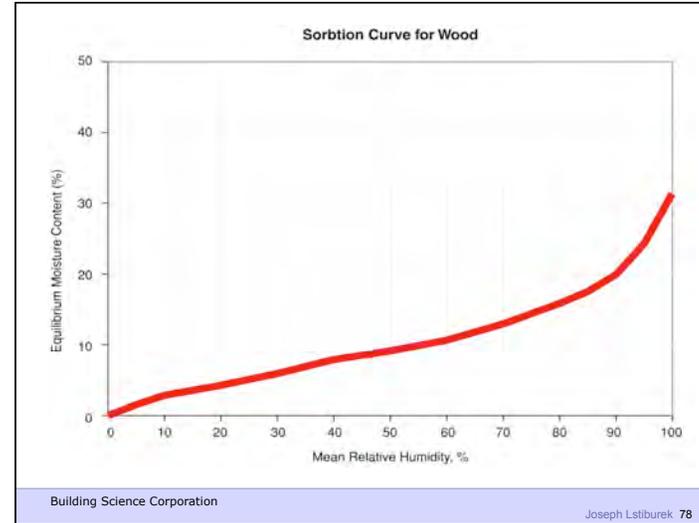
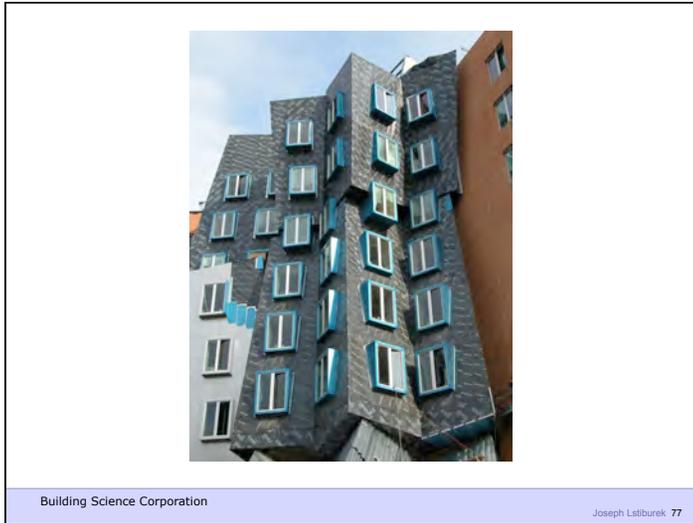


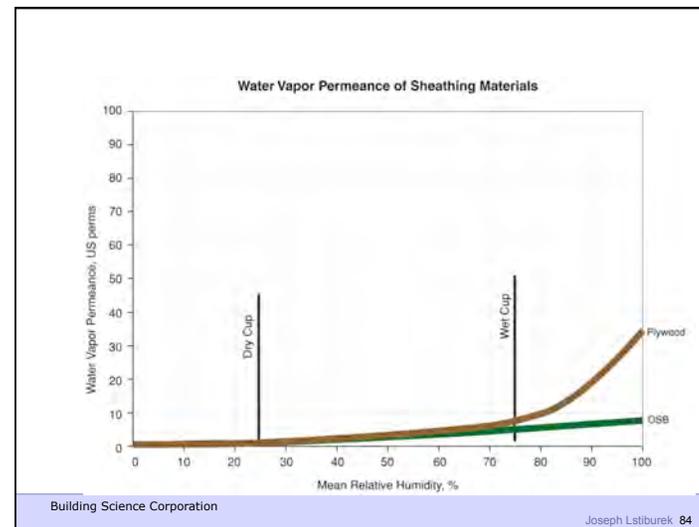
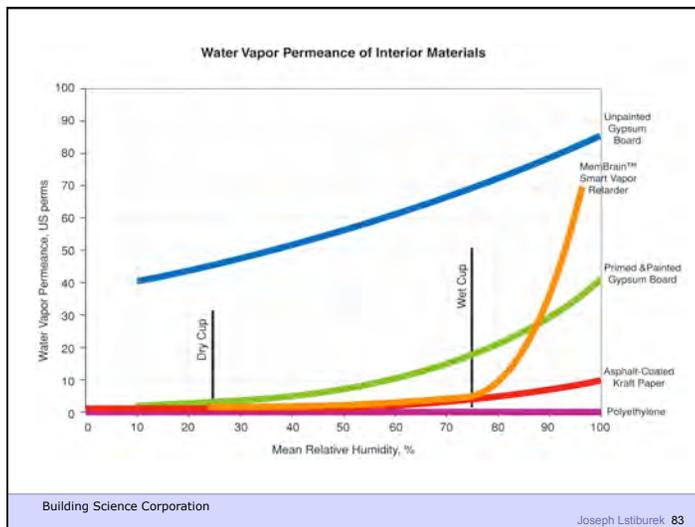
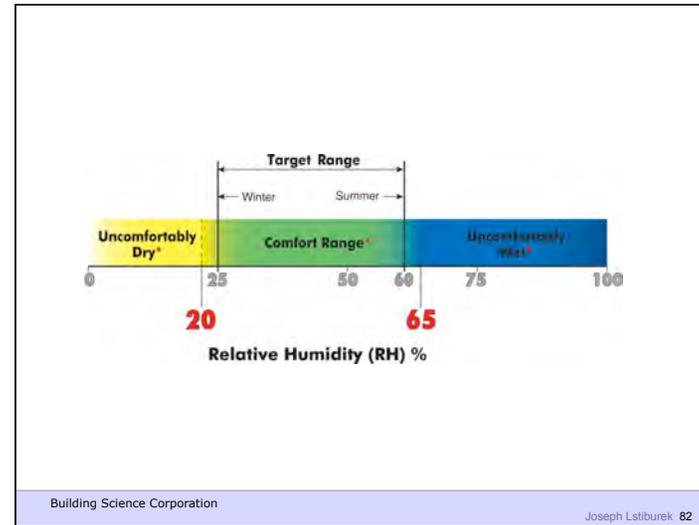
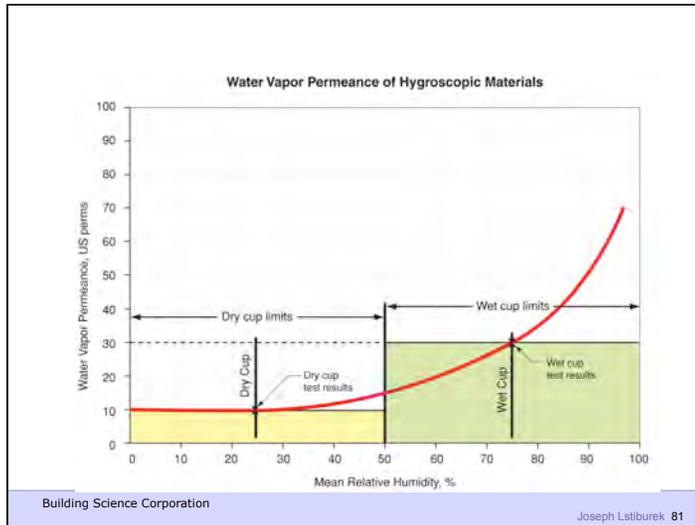


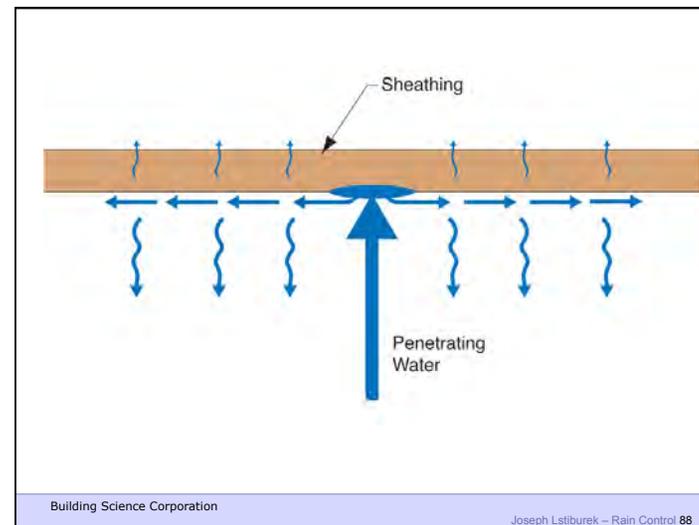
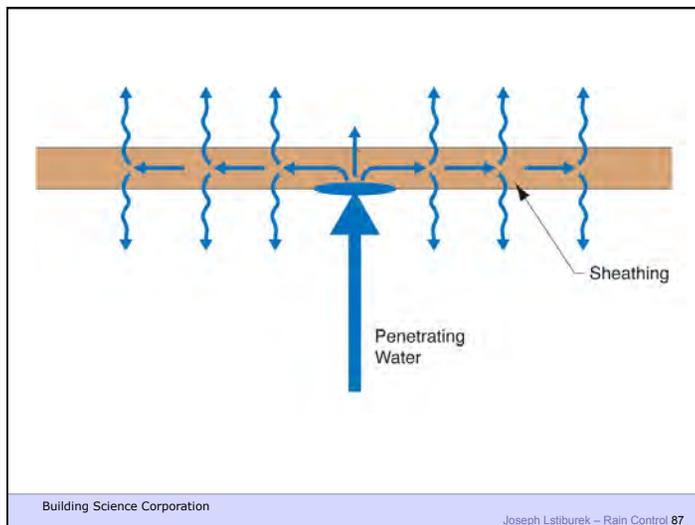
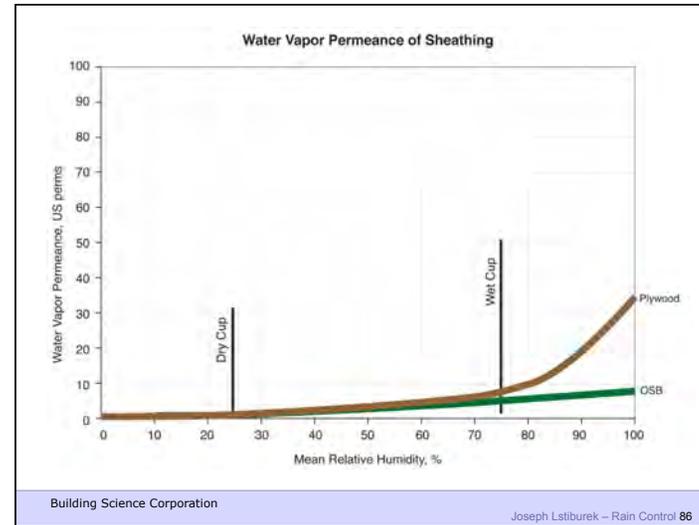
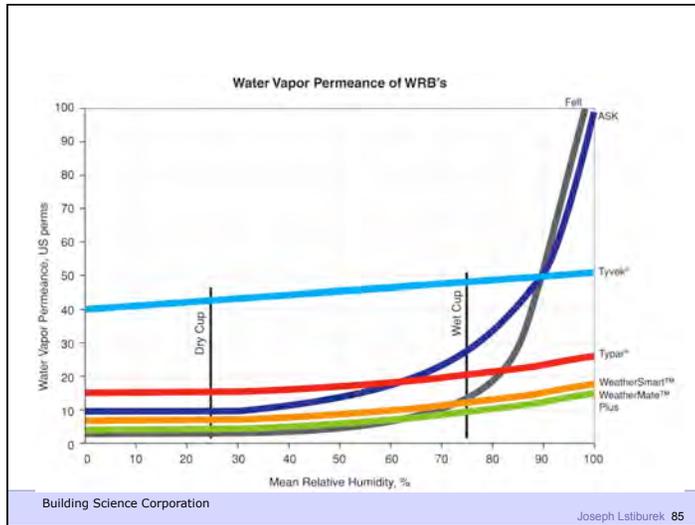


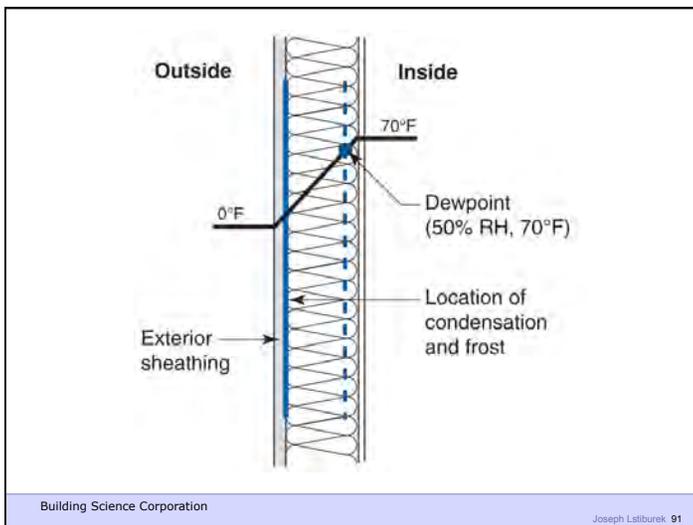
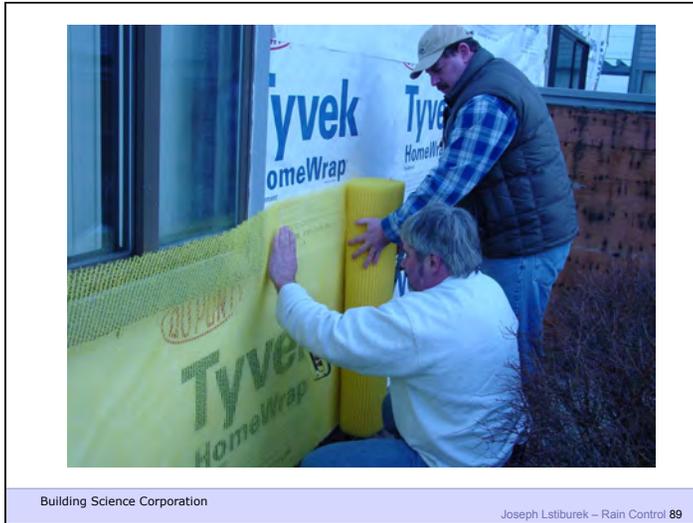


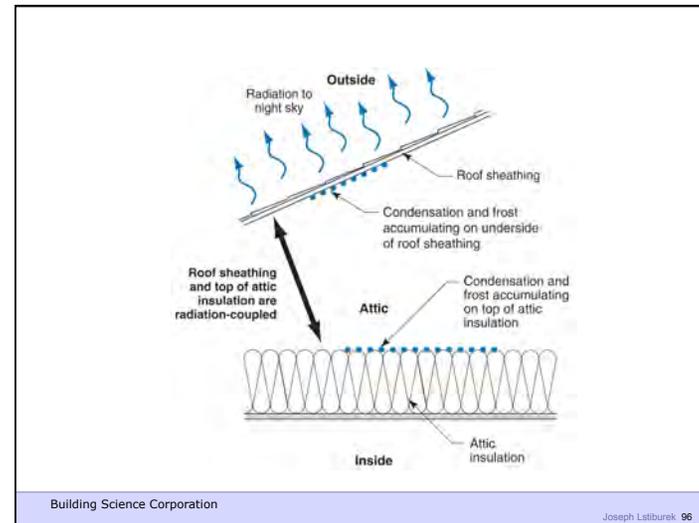
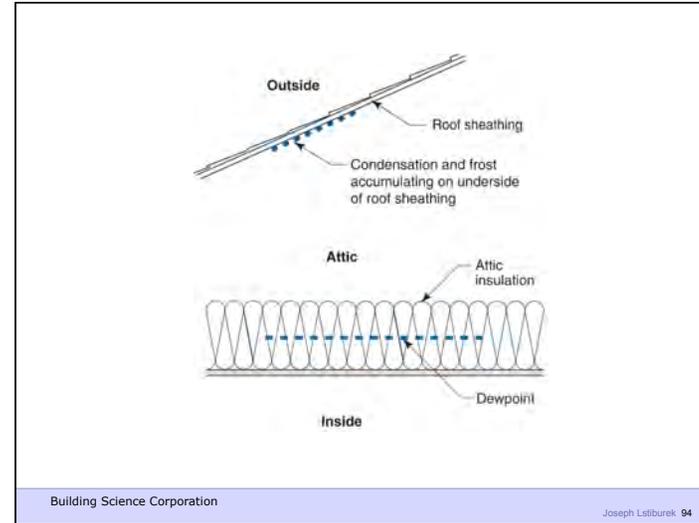
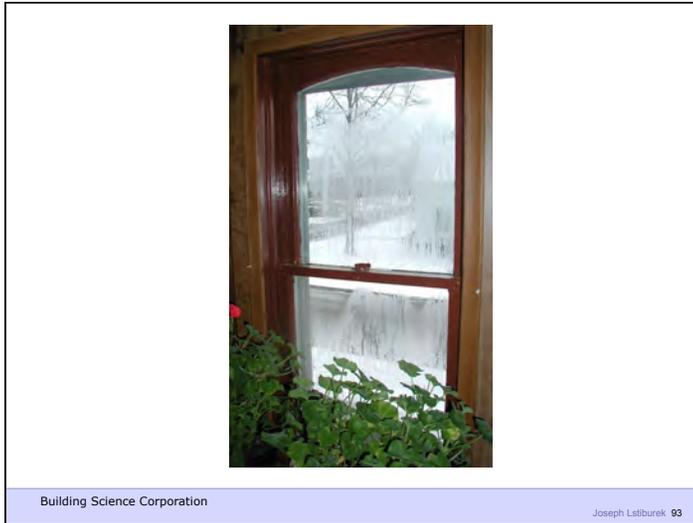


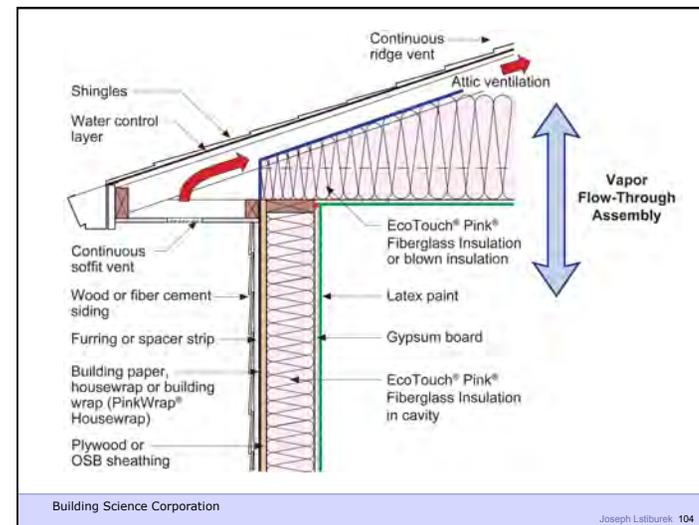
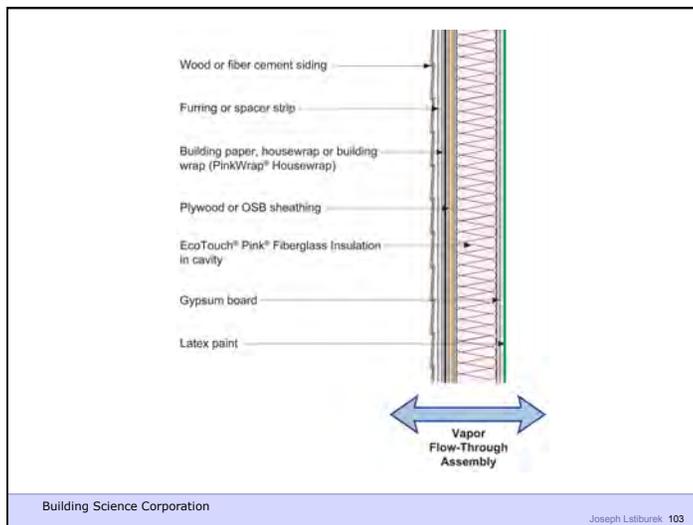
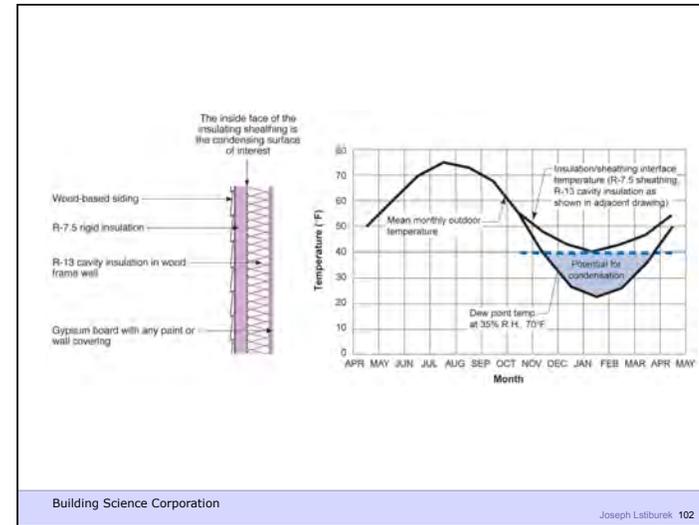
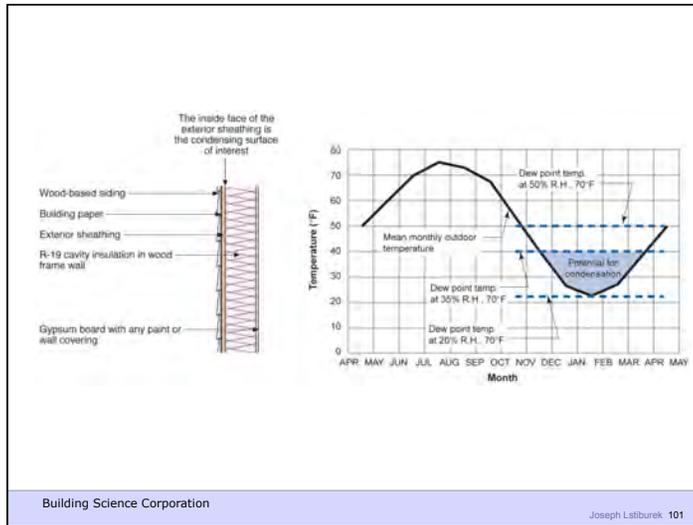


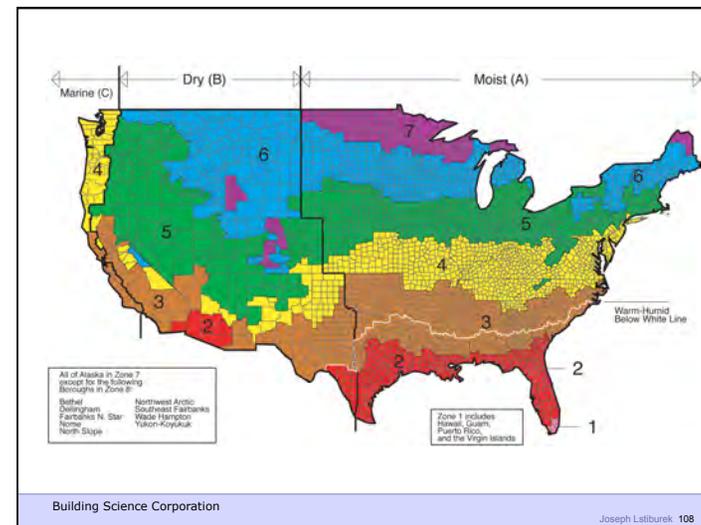
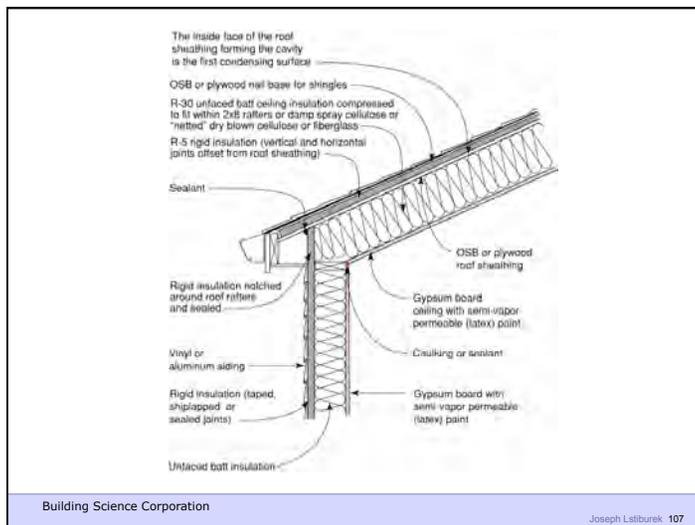
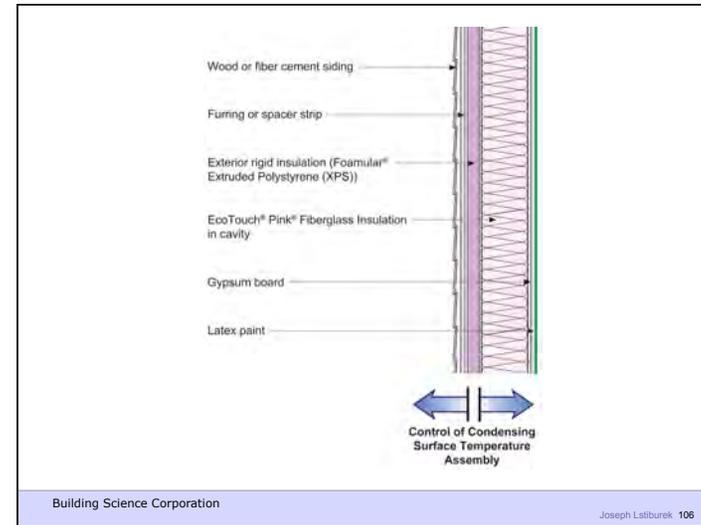
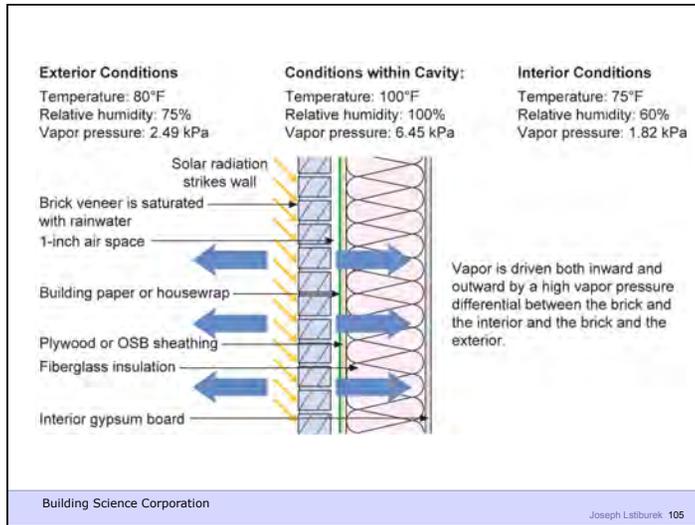


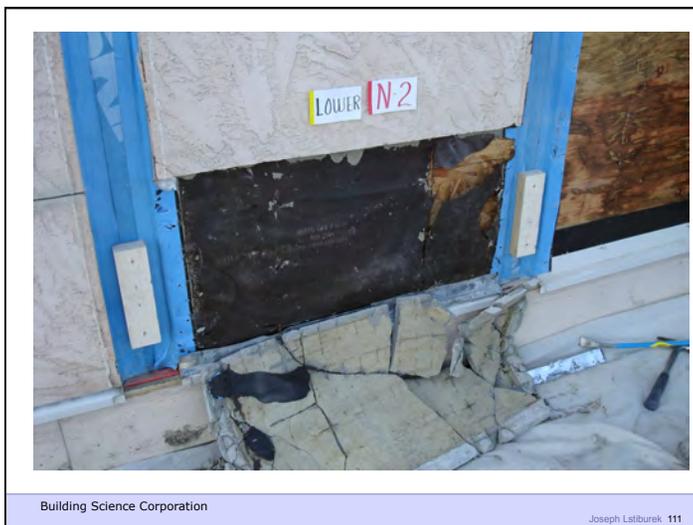
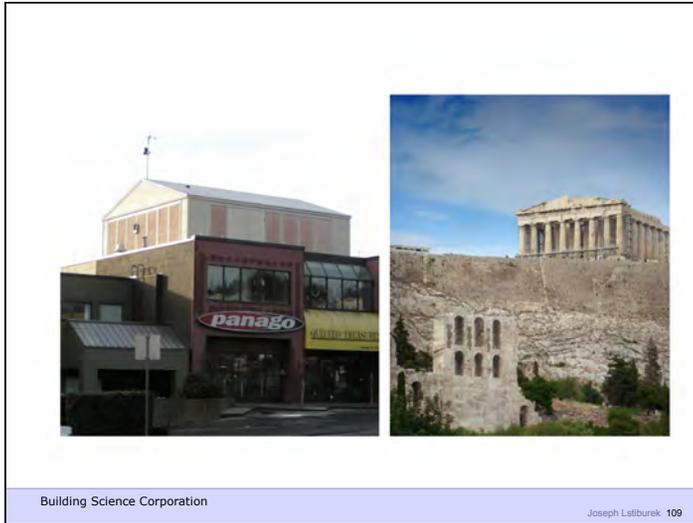




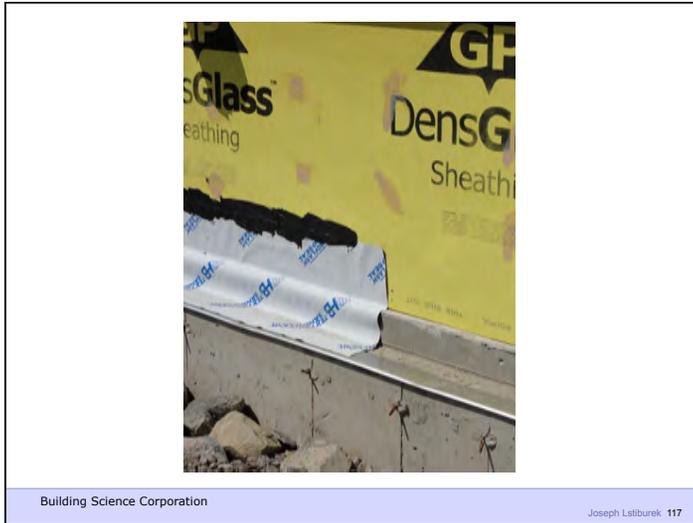


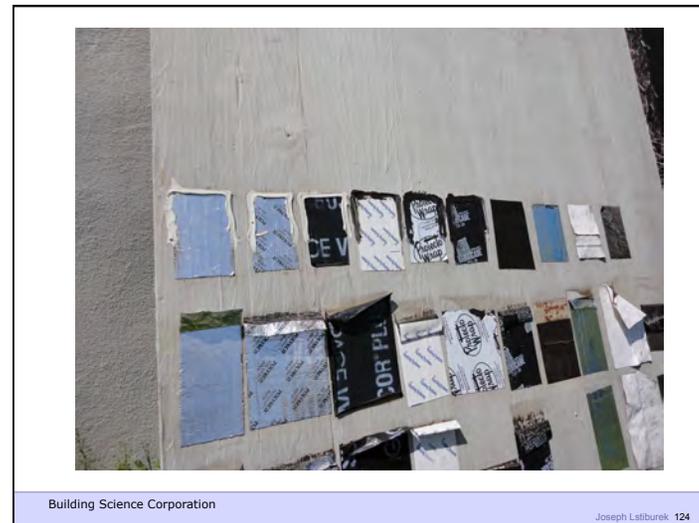
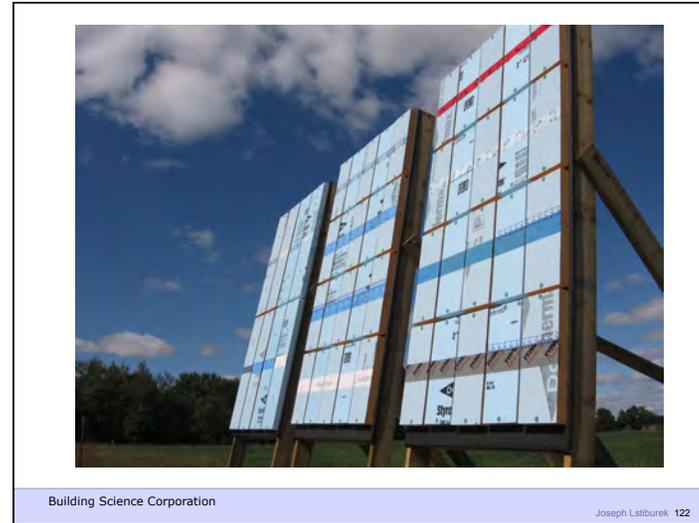


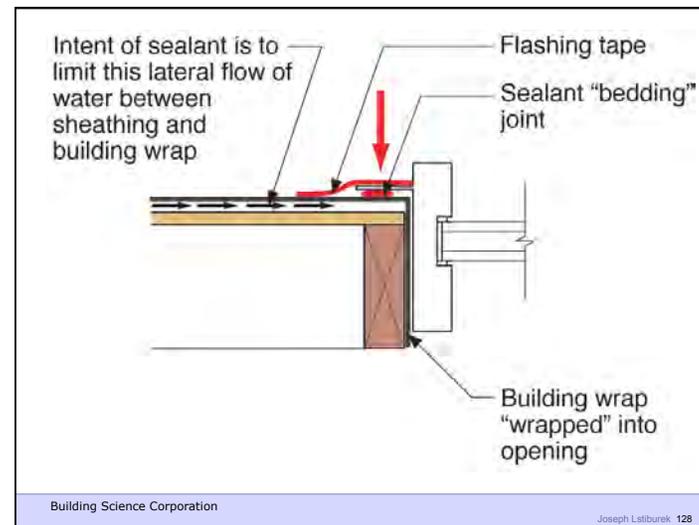


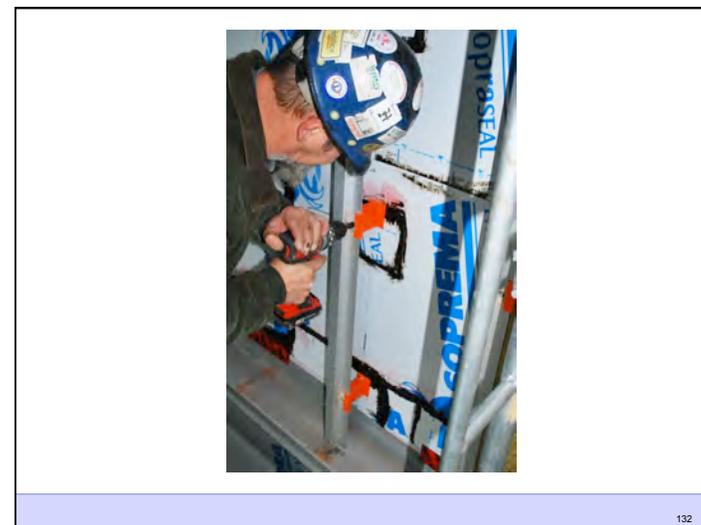
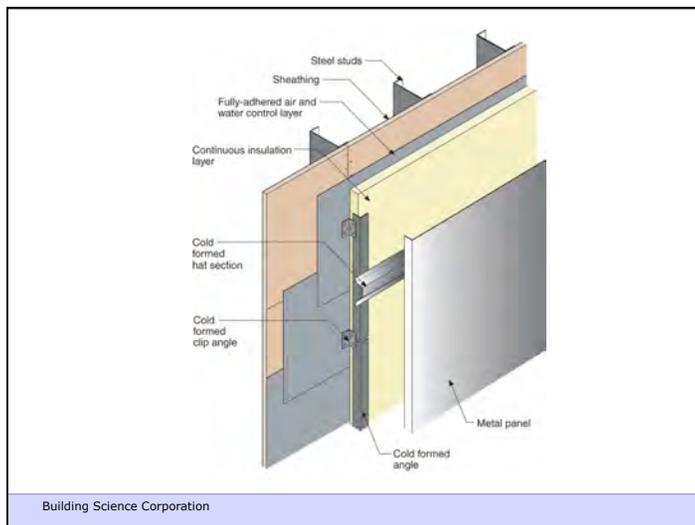
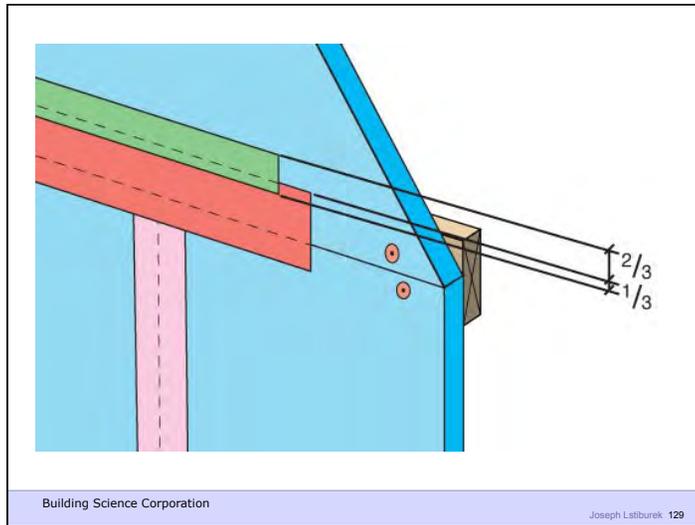








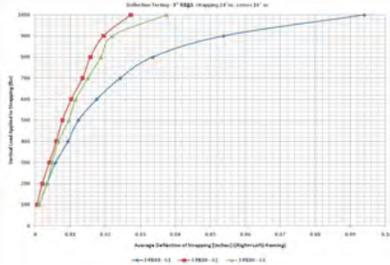






Rockwool

1x3 furring @ 24" o.c.
 #10 screws @ 16" o.c. vertically
 Result: 20 psf cladding weight
 with < 2/100" deflection



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