

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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A Building is an Environmental Separator

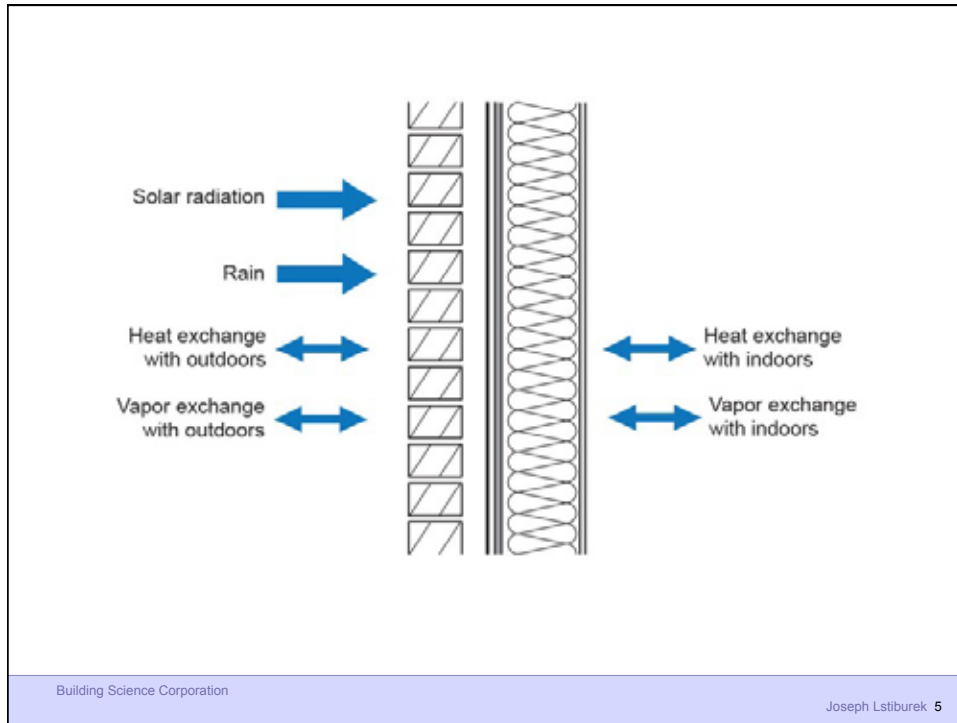
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- Control heat flow
- Control airflow
- Control water vapor flow
- Control rain
- Control ground water
- Control light and solar radiation
- Control noise and vibrations
- Control contaminants, environmental hazards and odors
- Control insects, rodents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

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

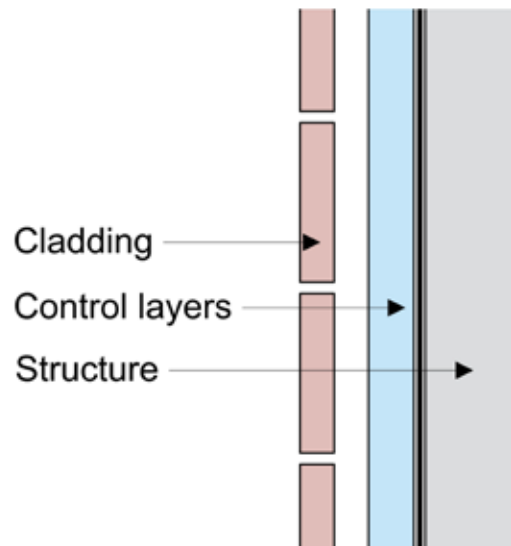
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Perfect Wall

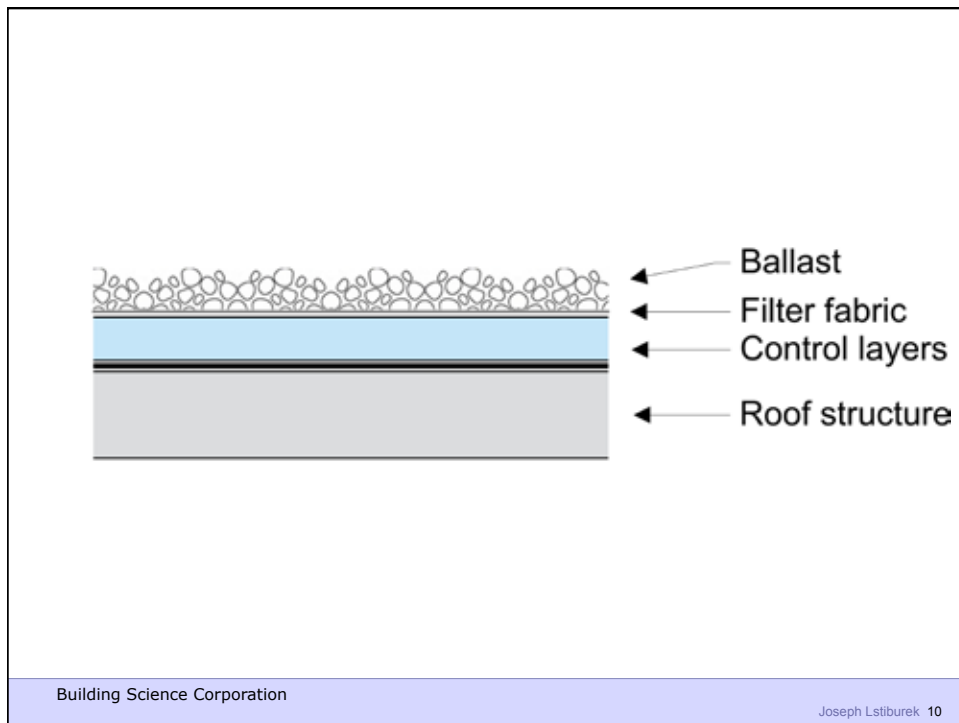
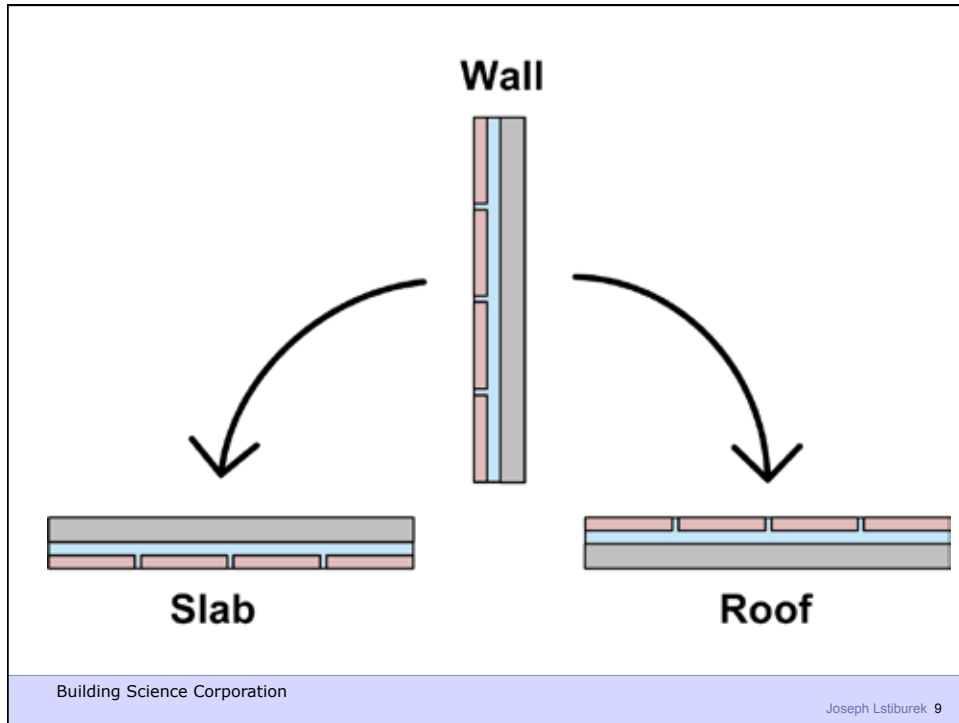
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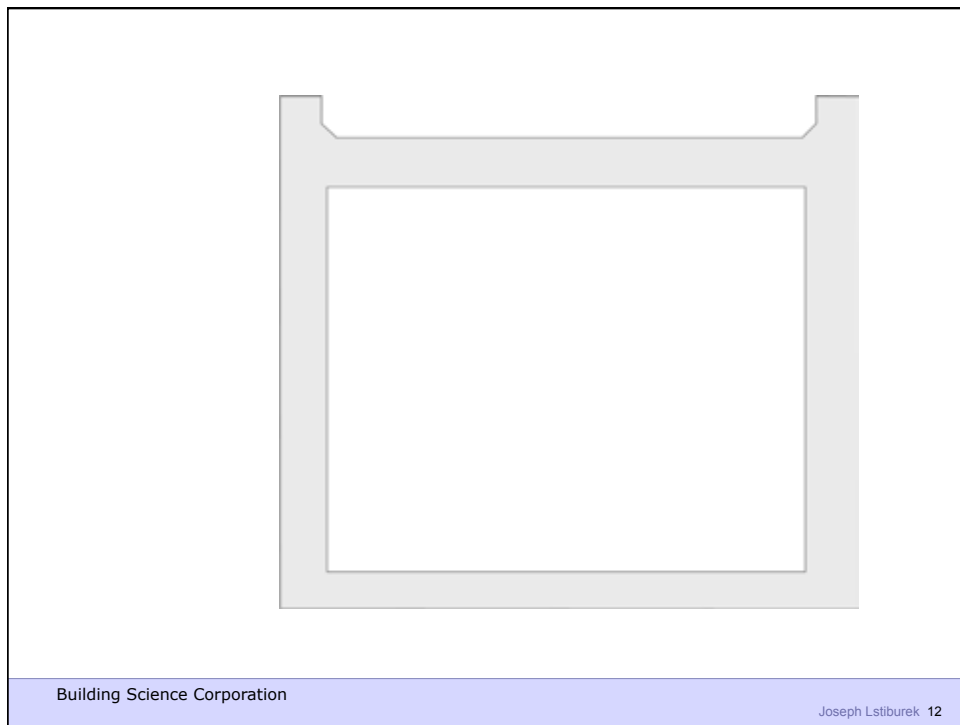
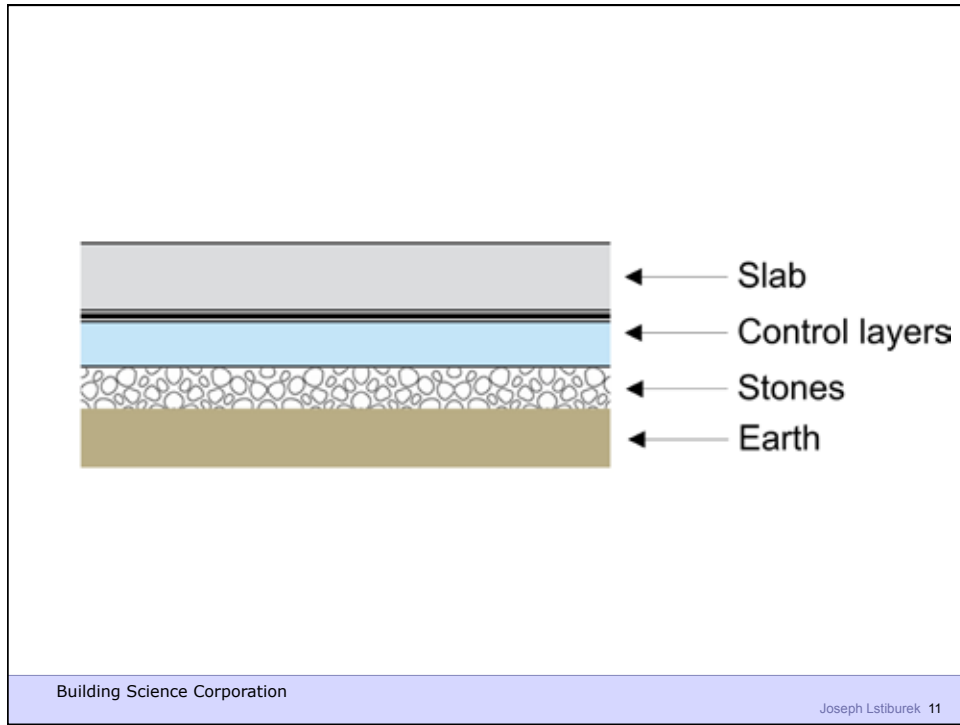
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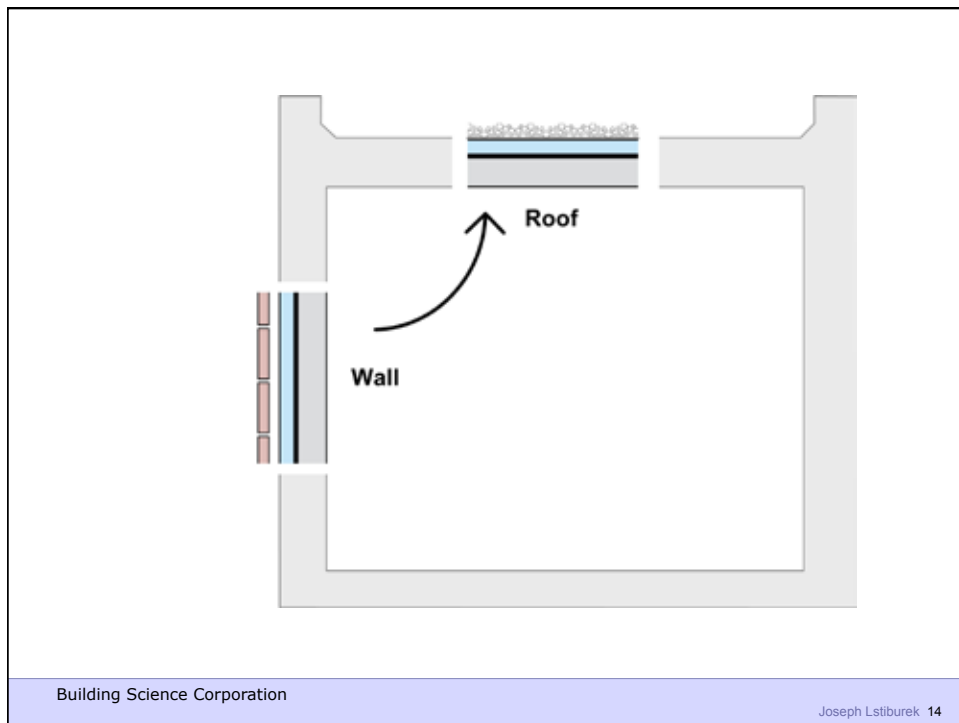
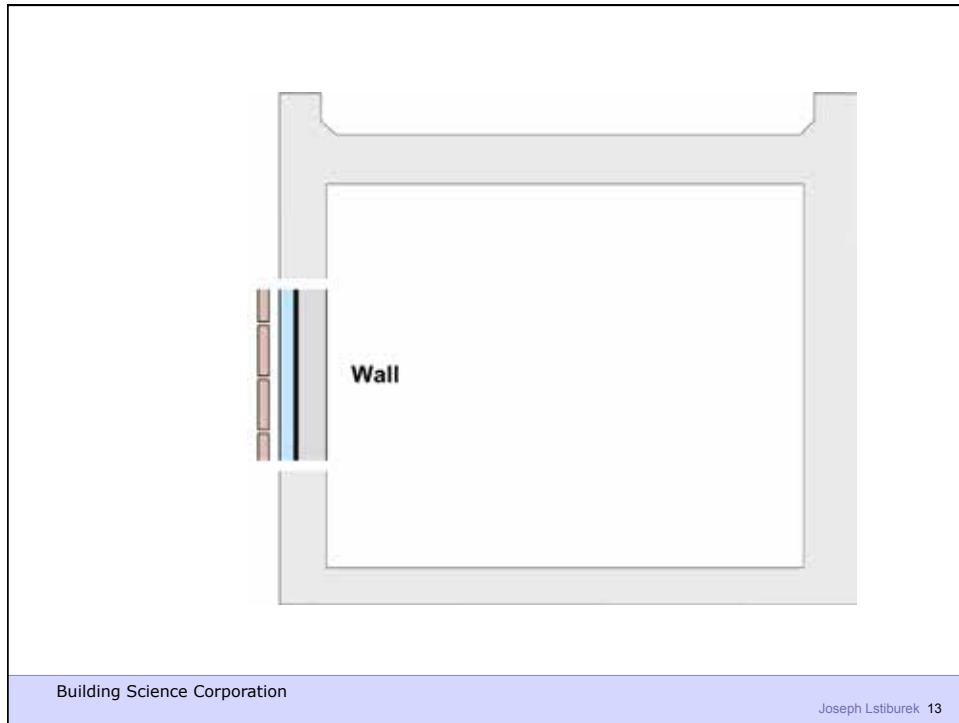


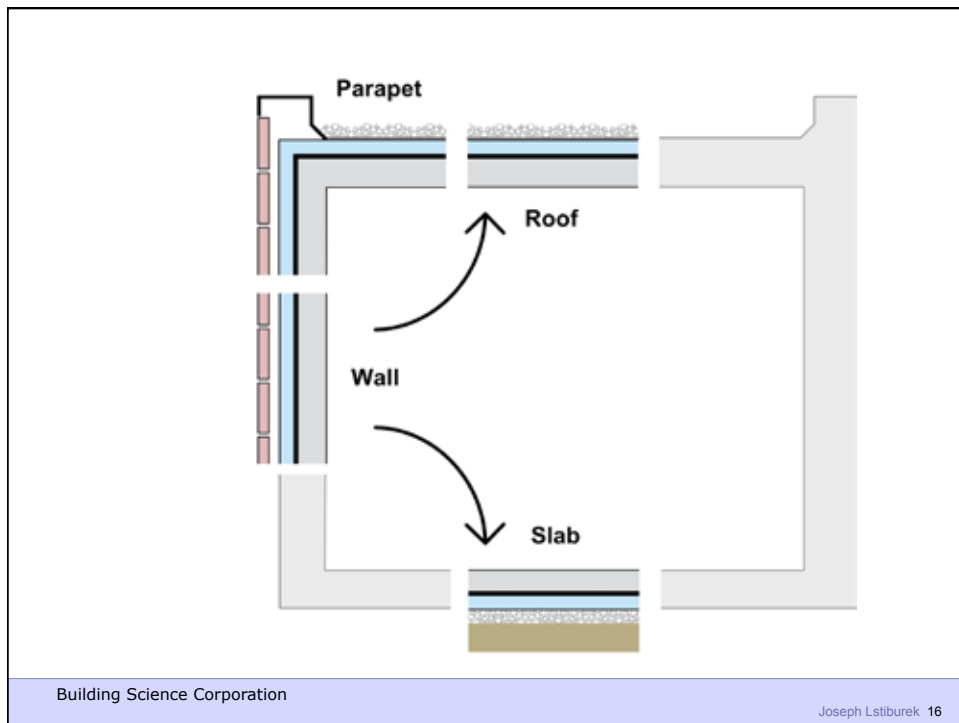
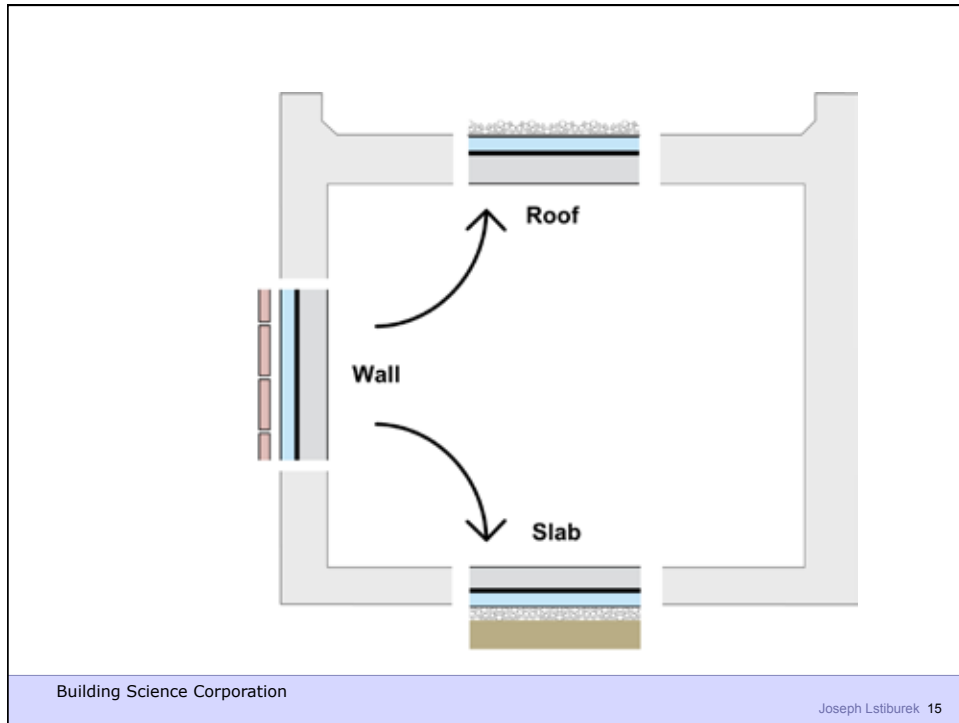
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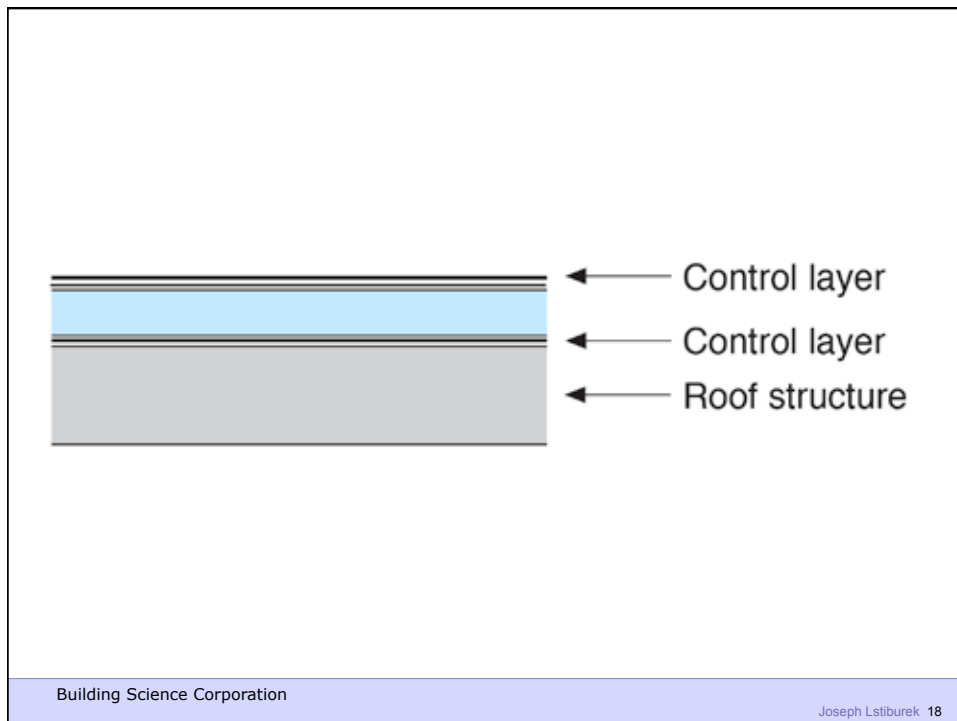
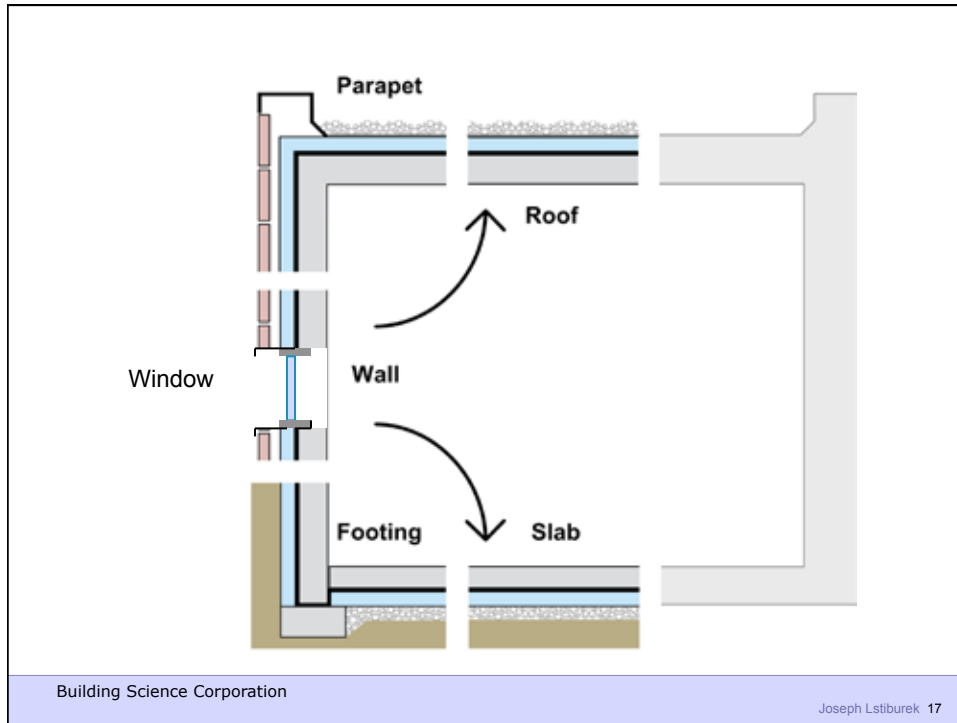
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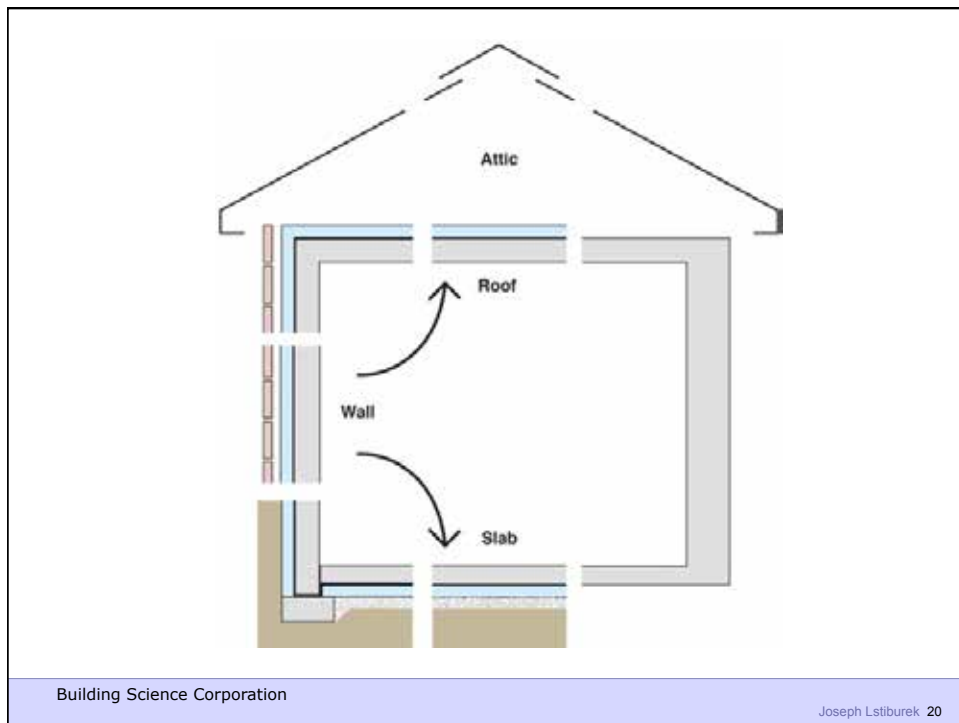
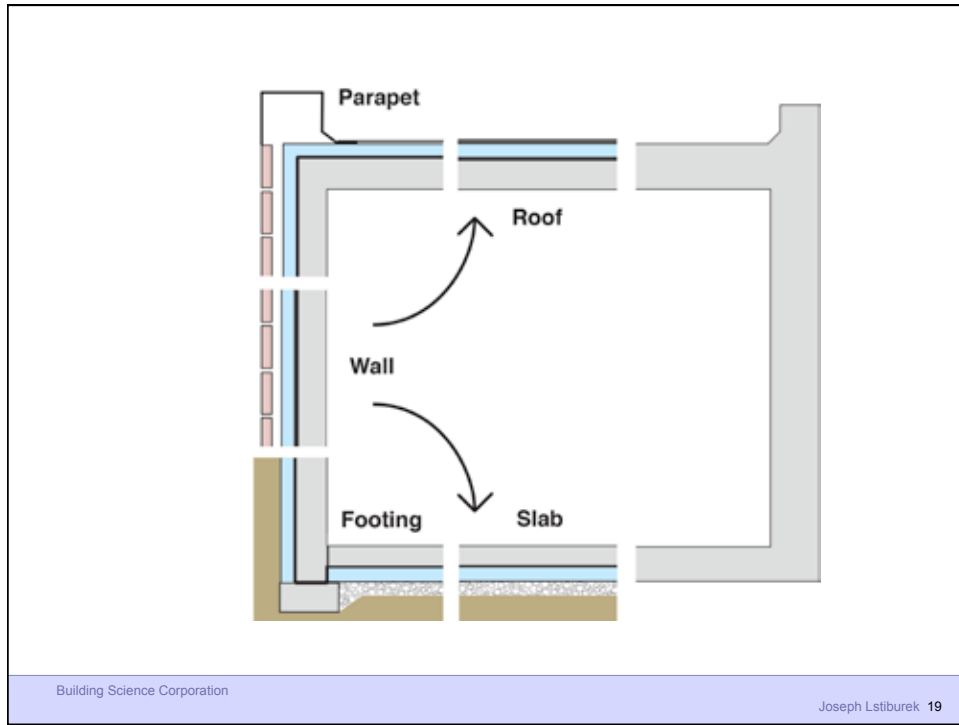


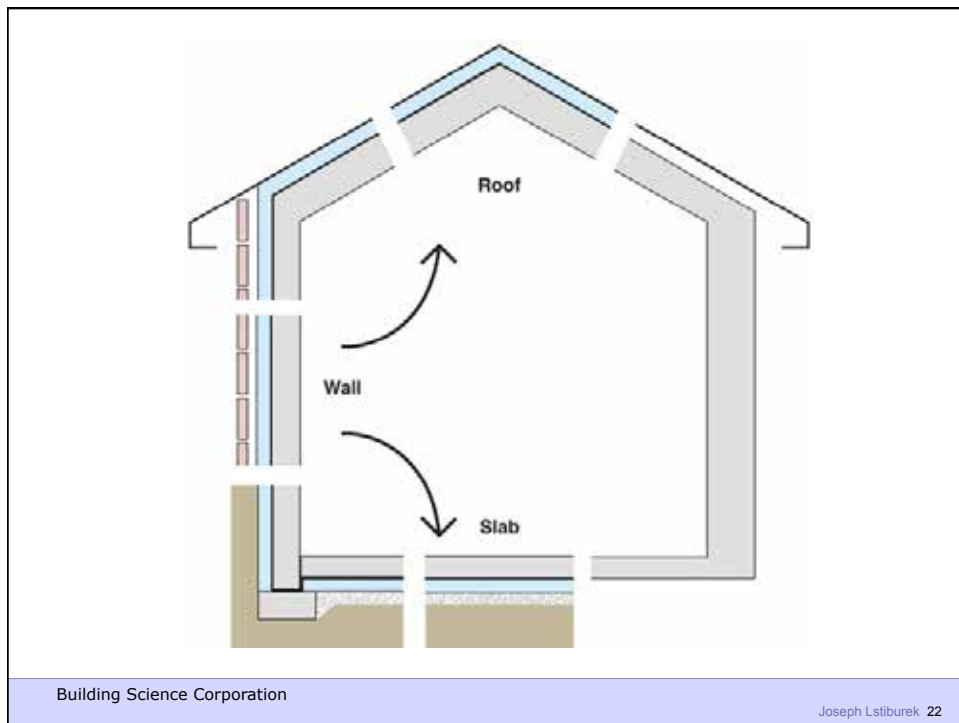
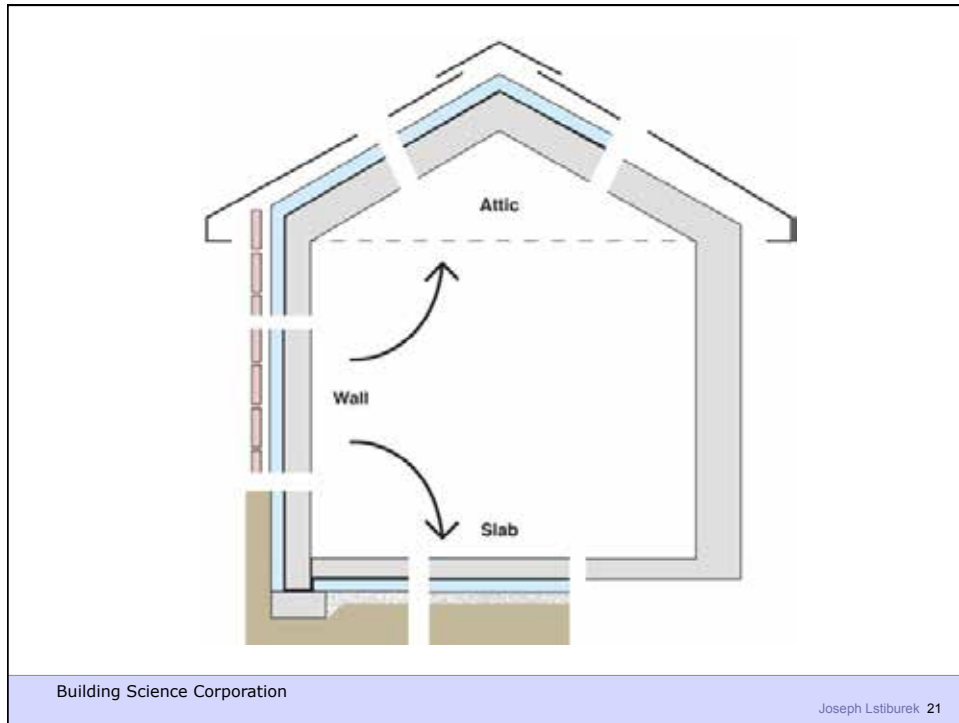


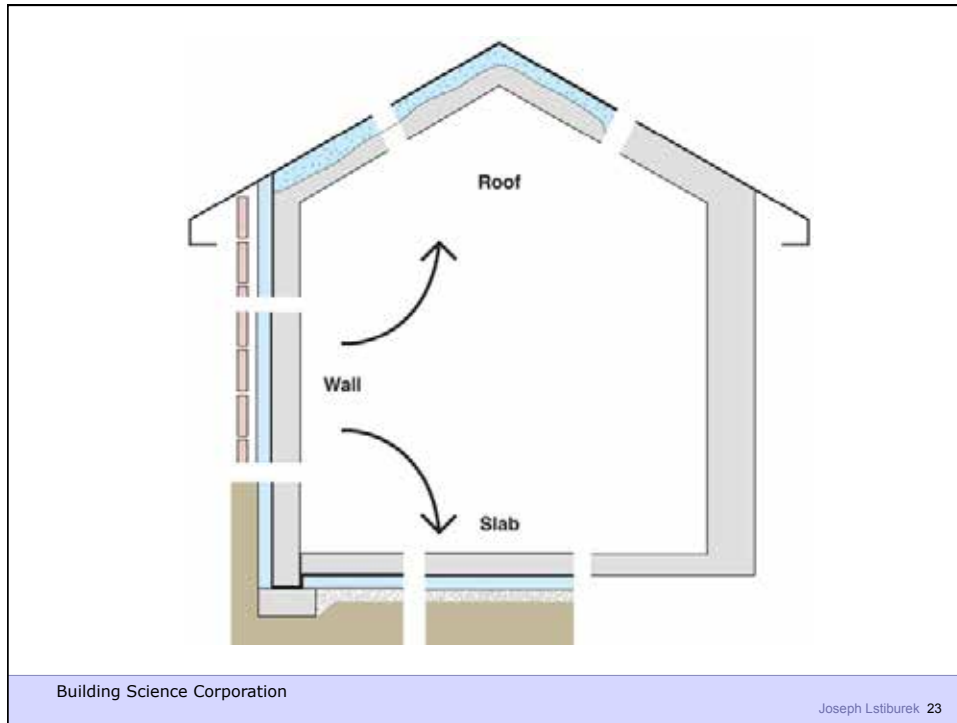




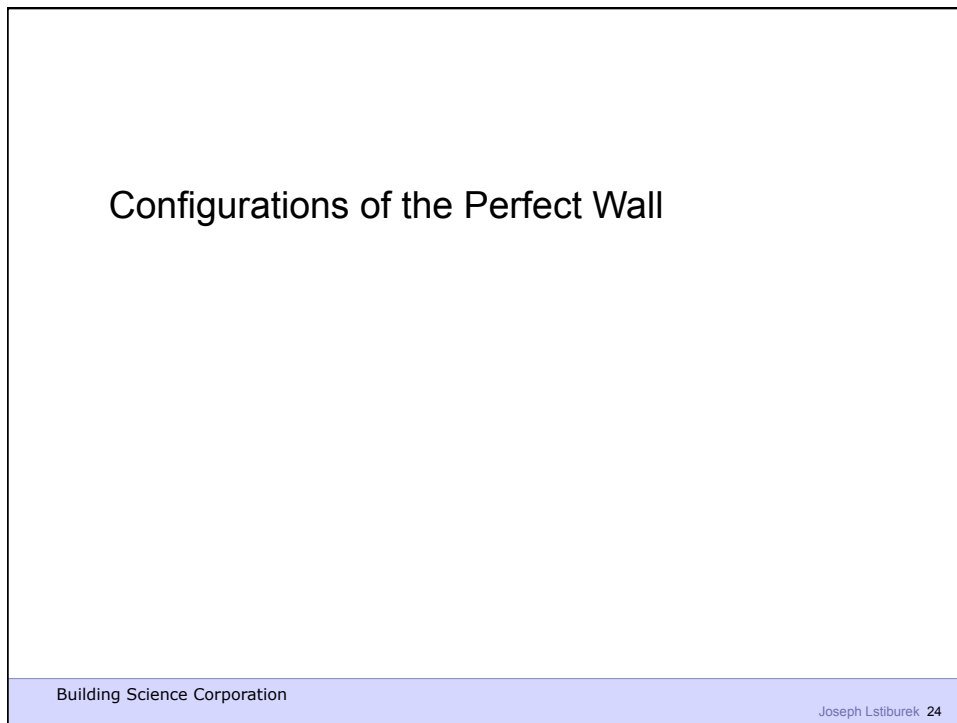


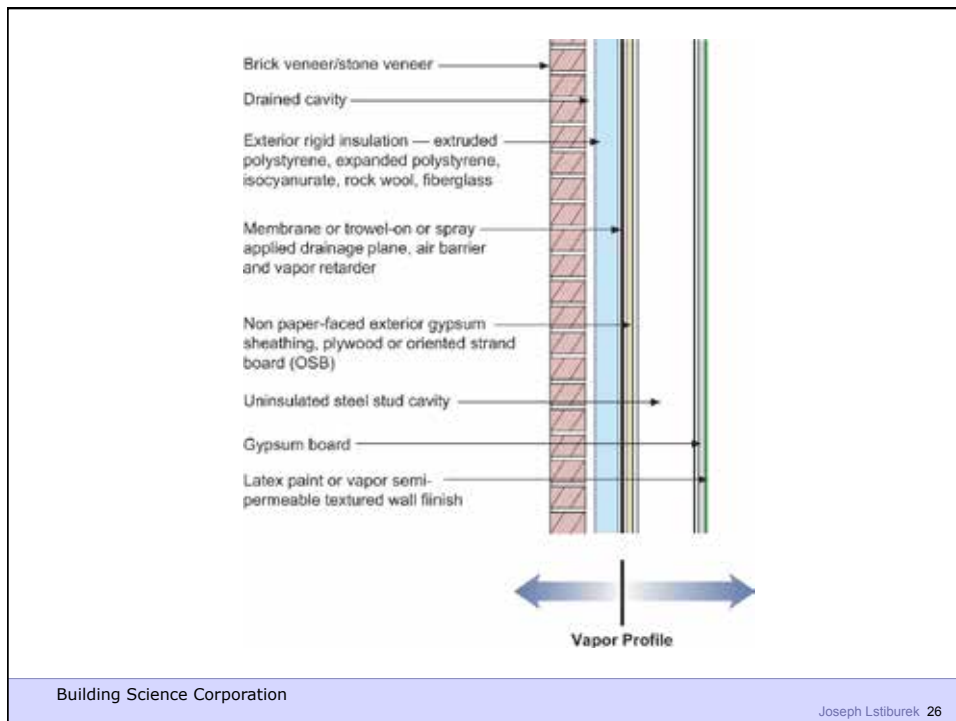
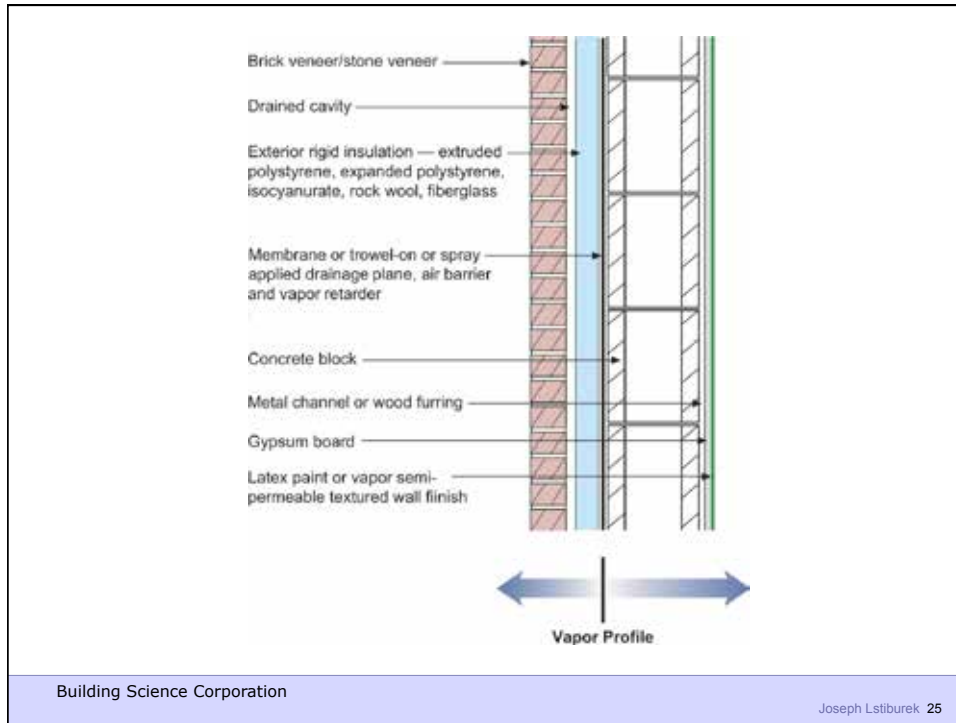


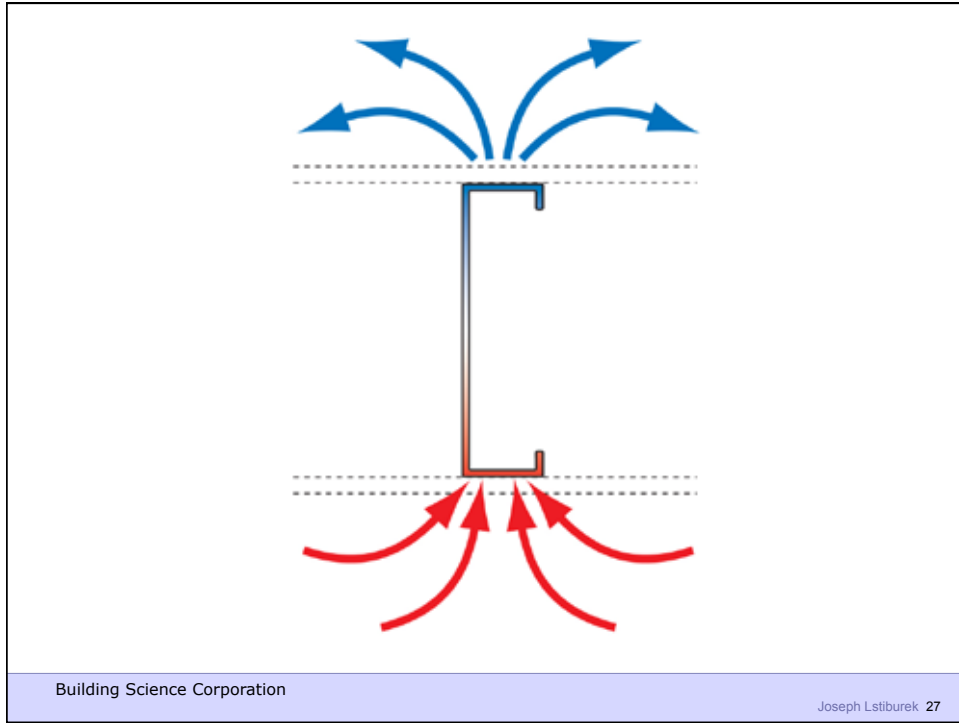


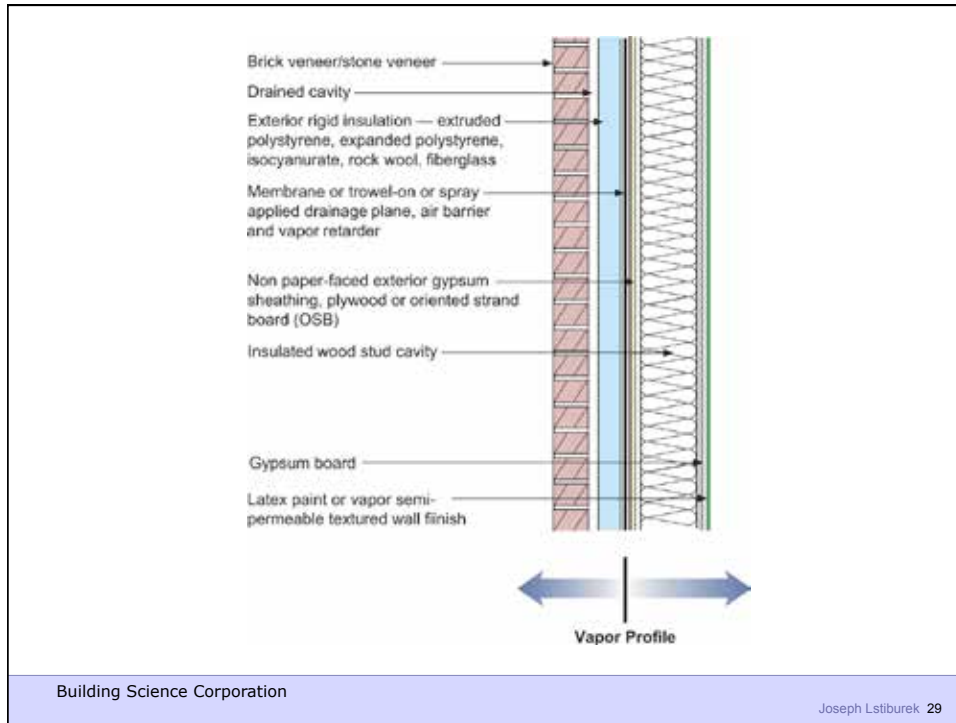


Configurations of the Perfect Wall





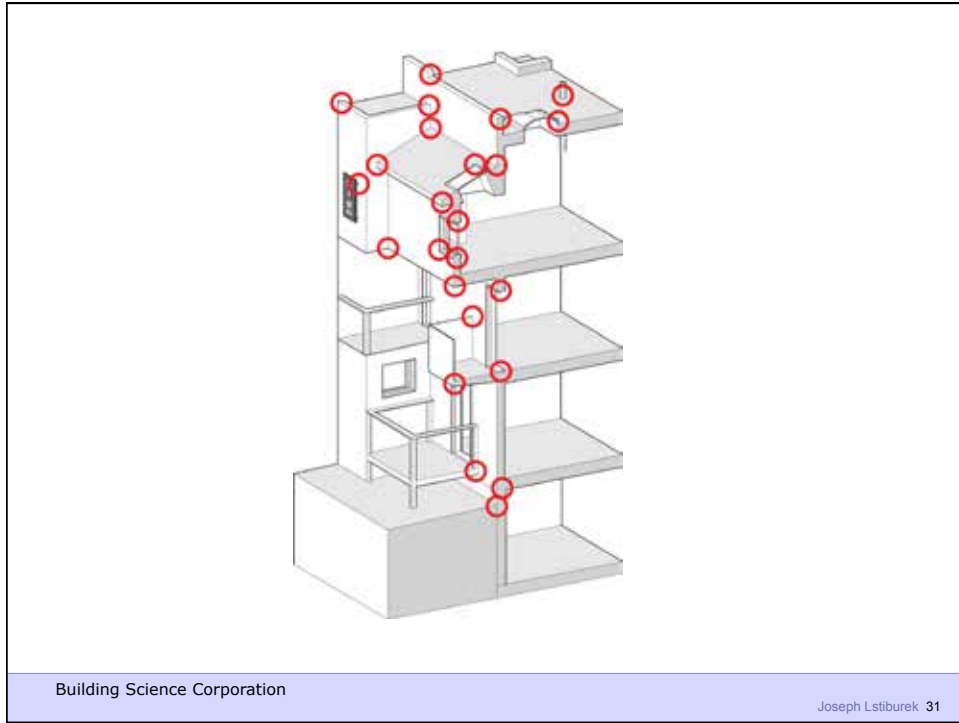




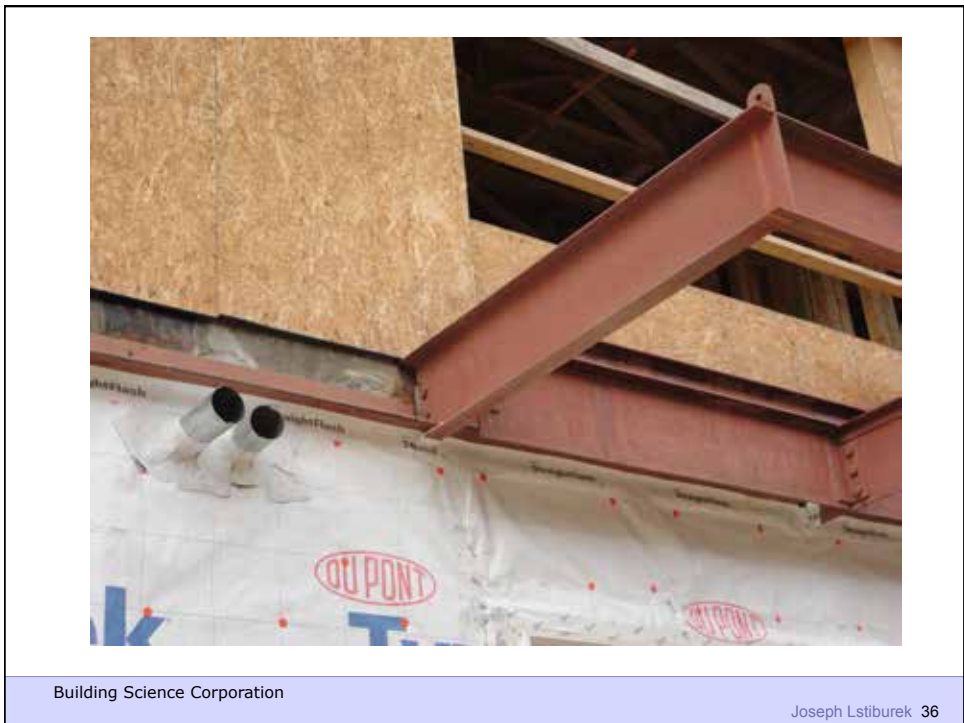
Commercial Enclosure: Simple Layers



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













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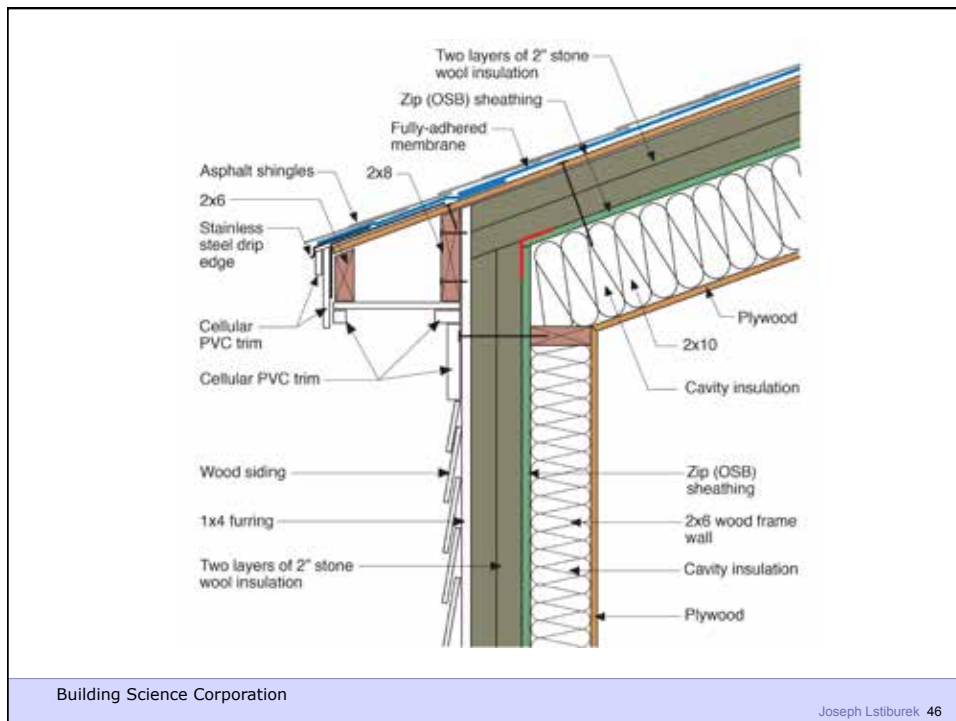
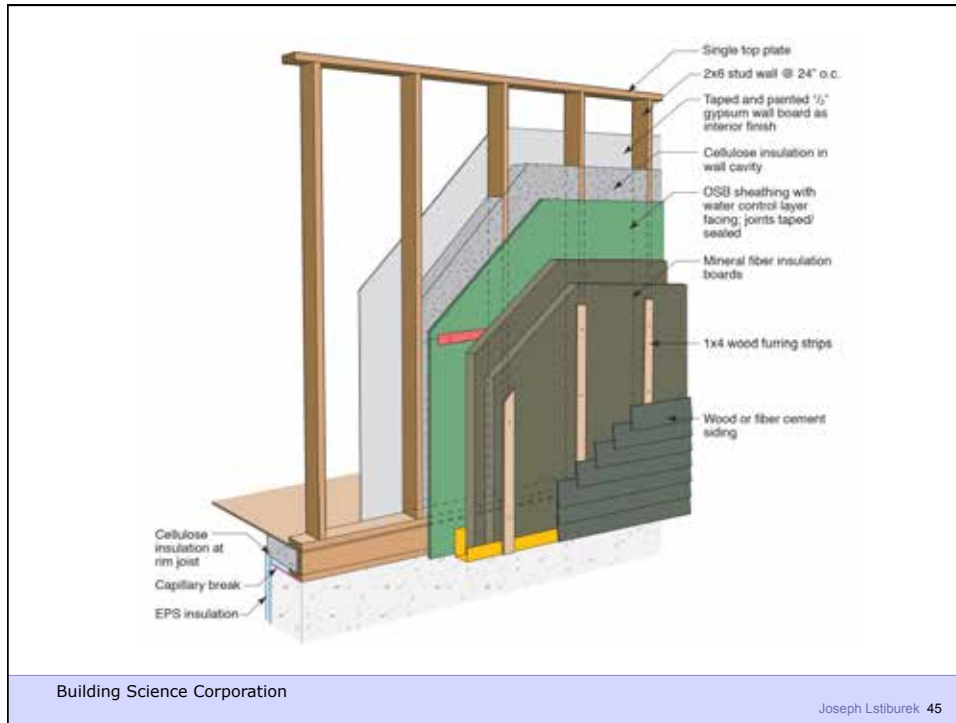
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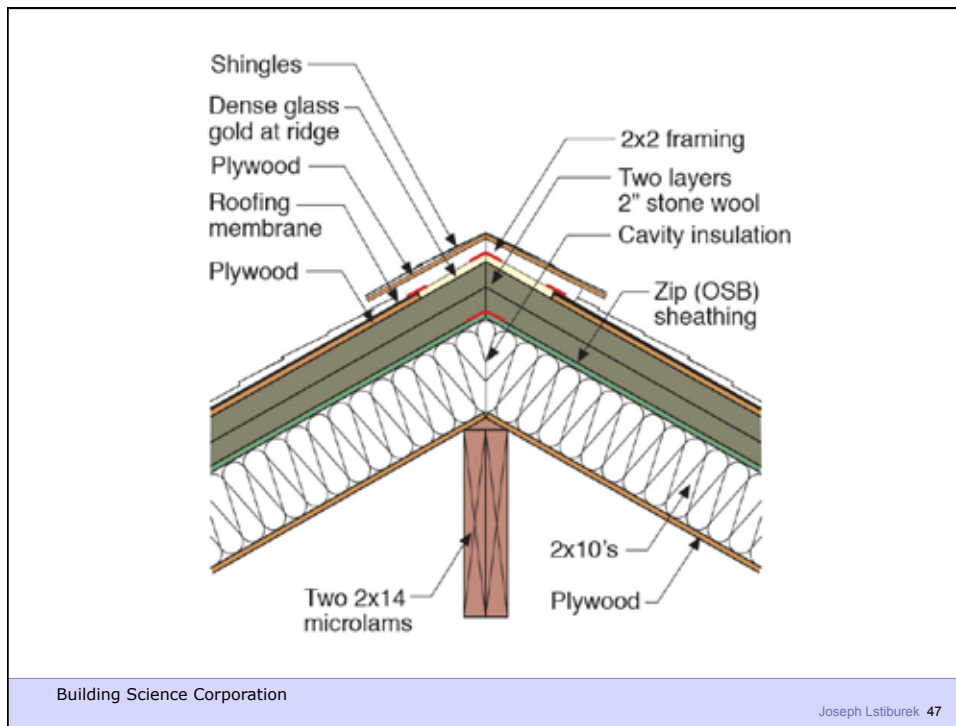
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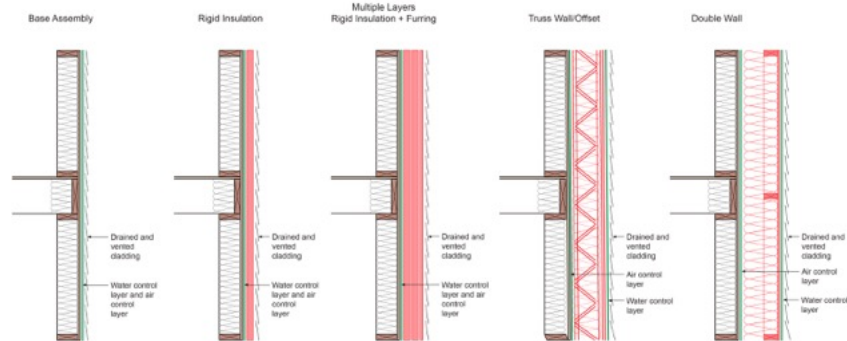
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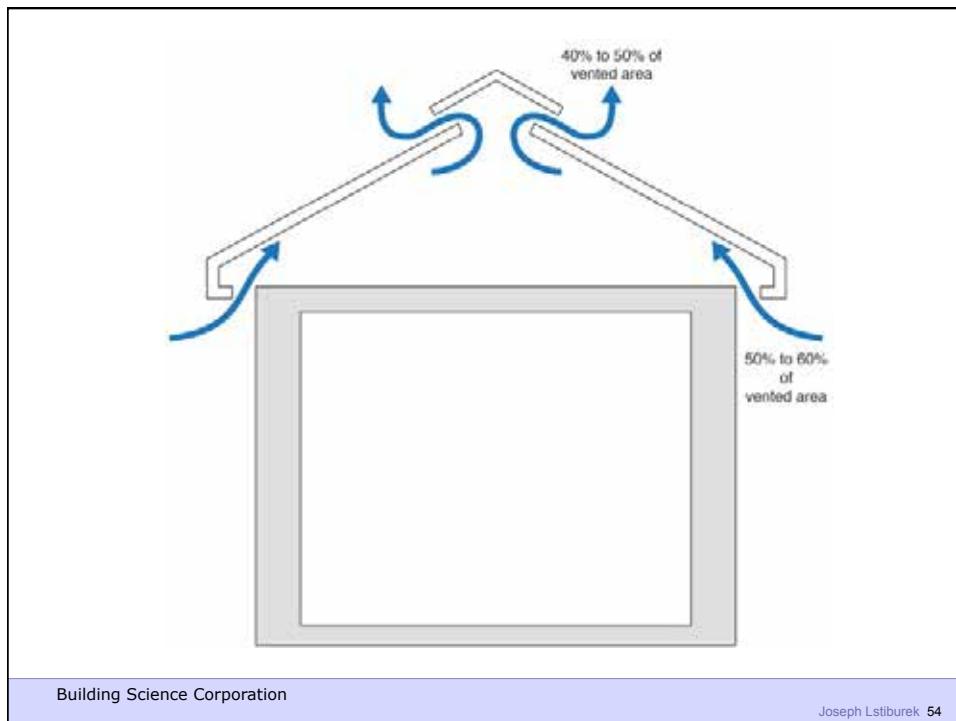
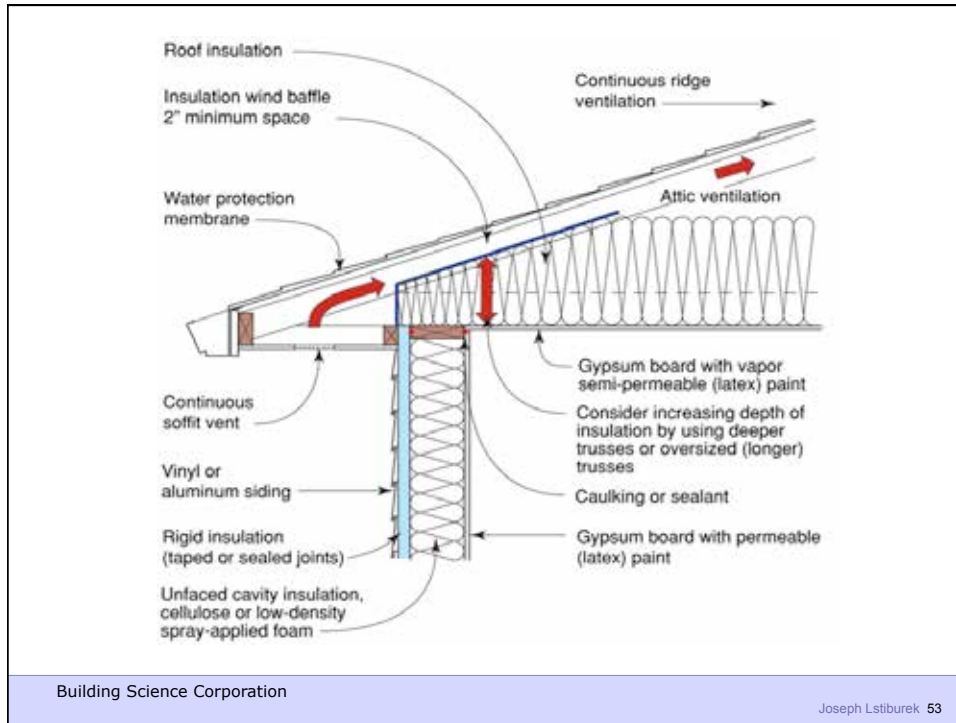
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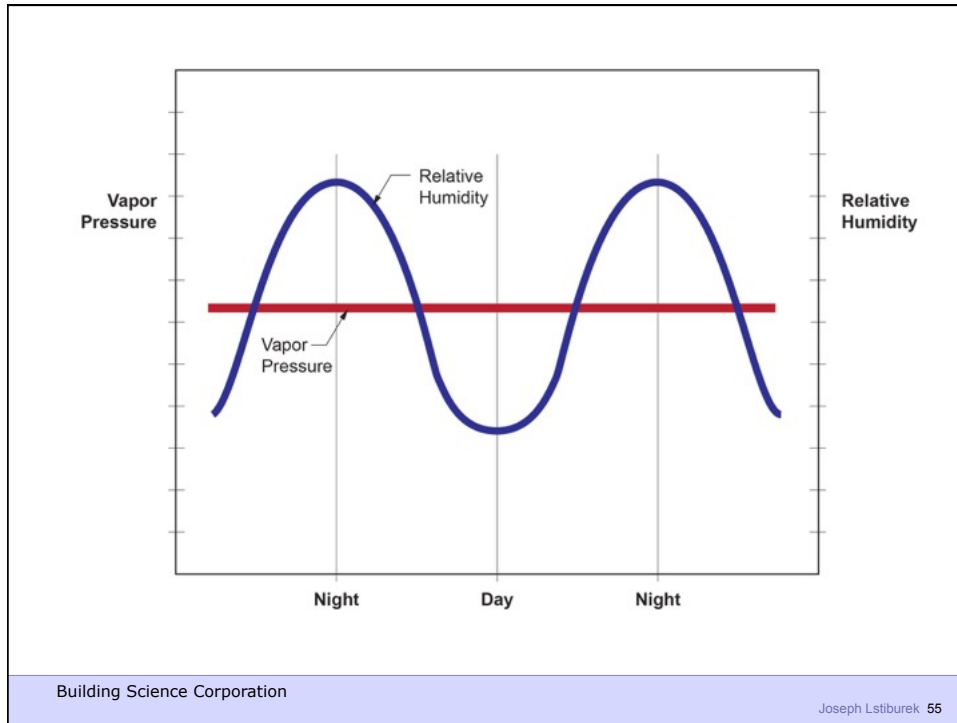
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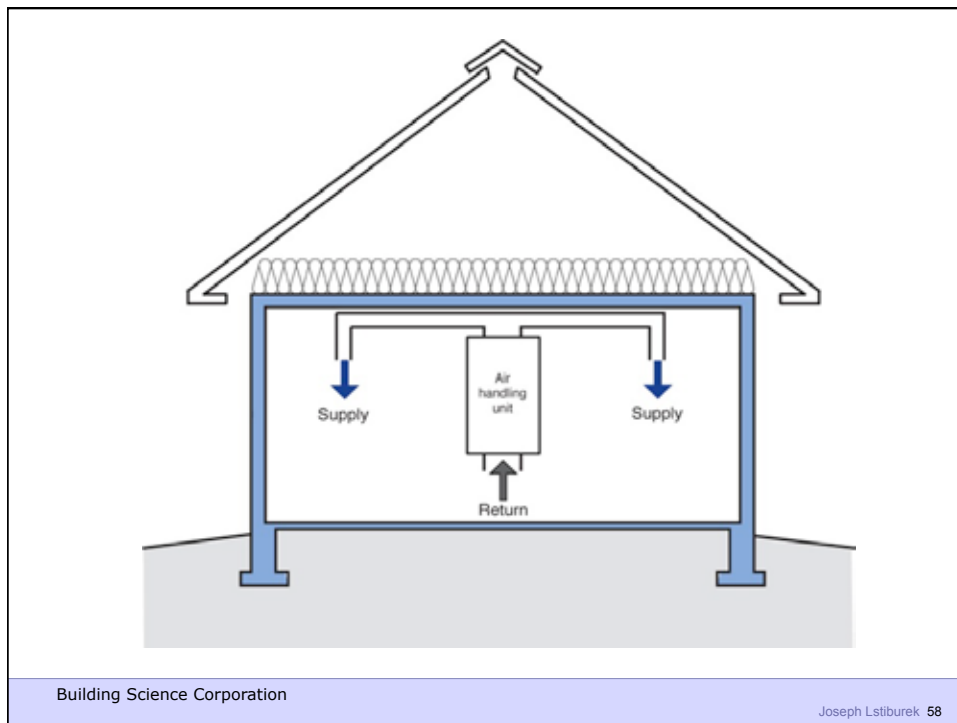
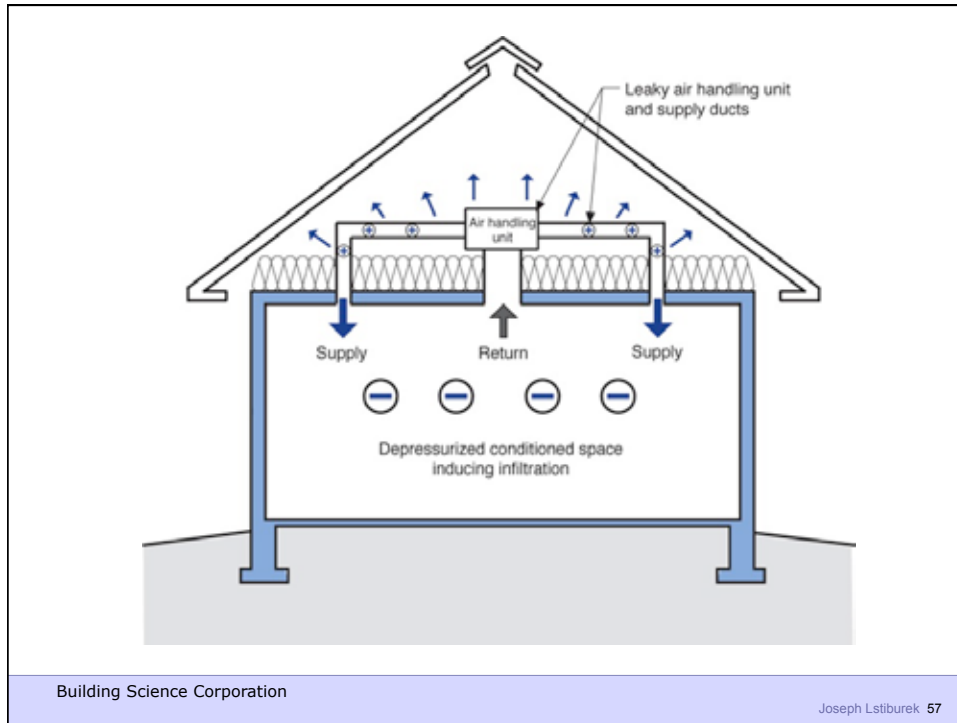


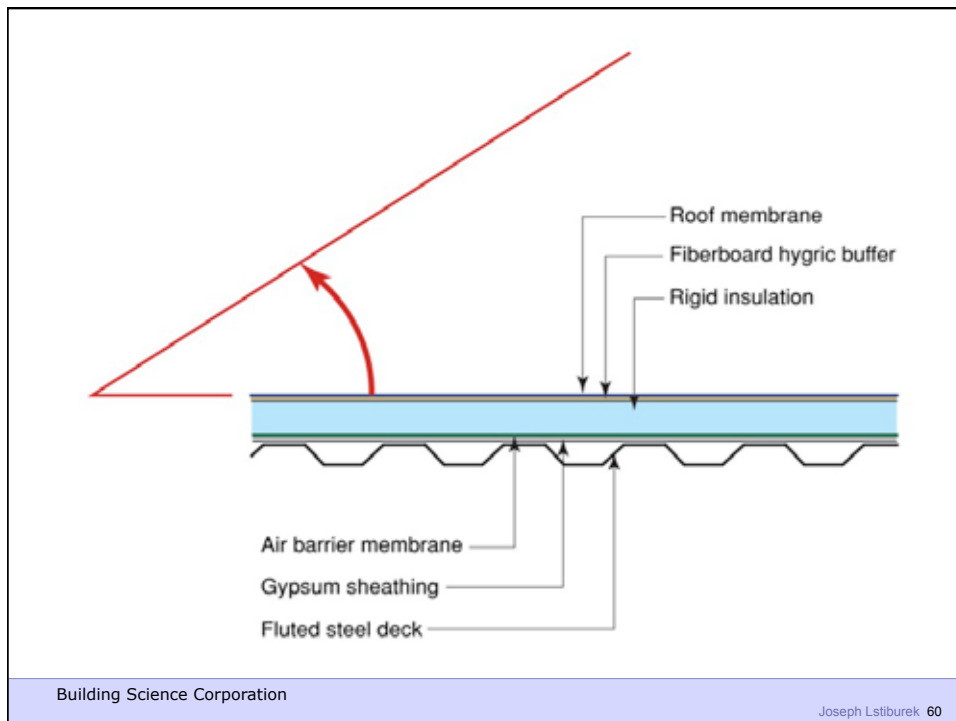
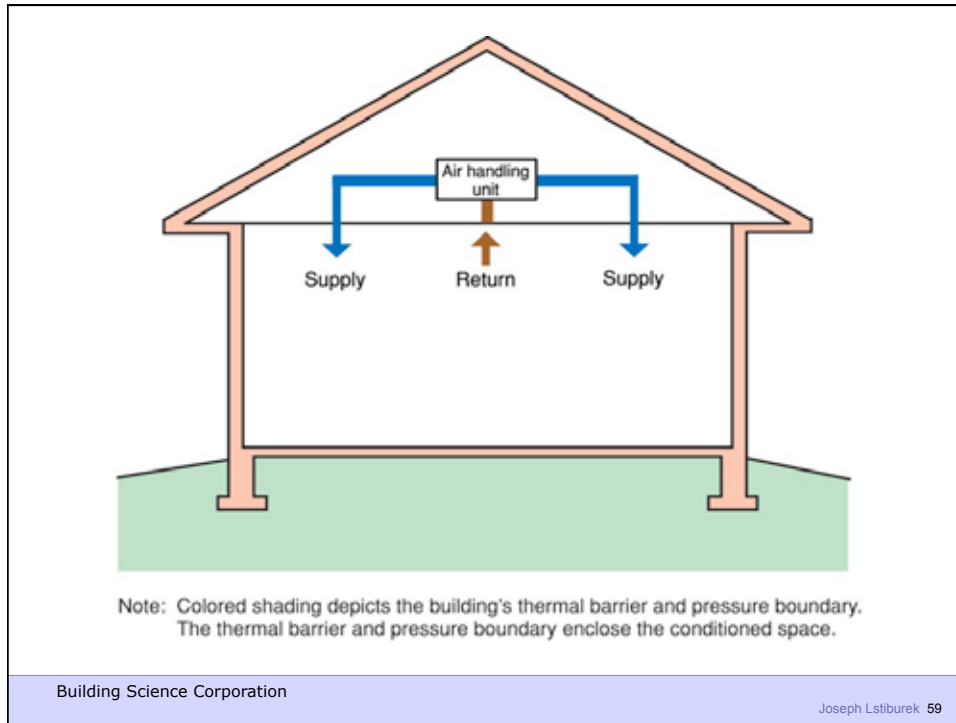
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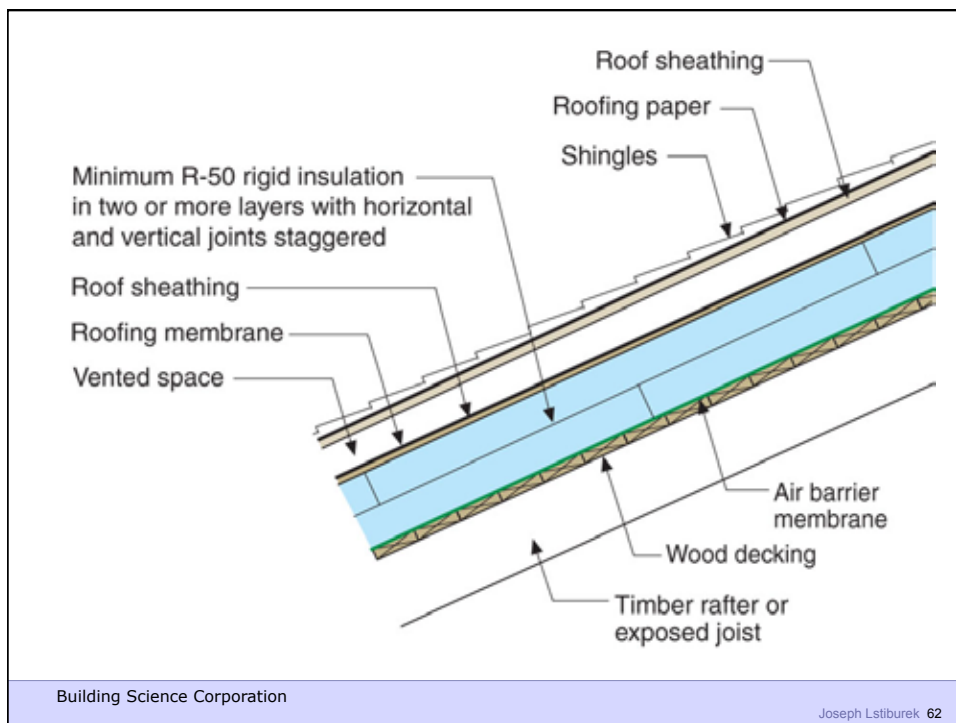
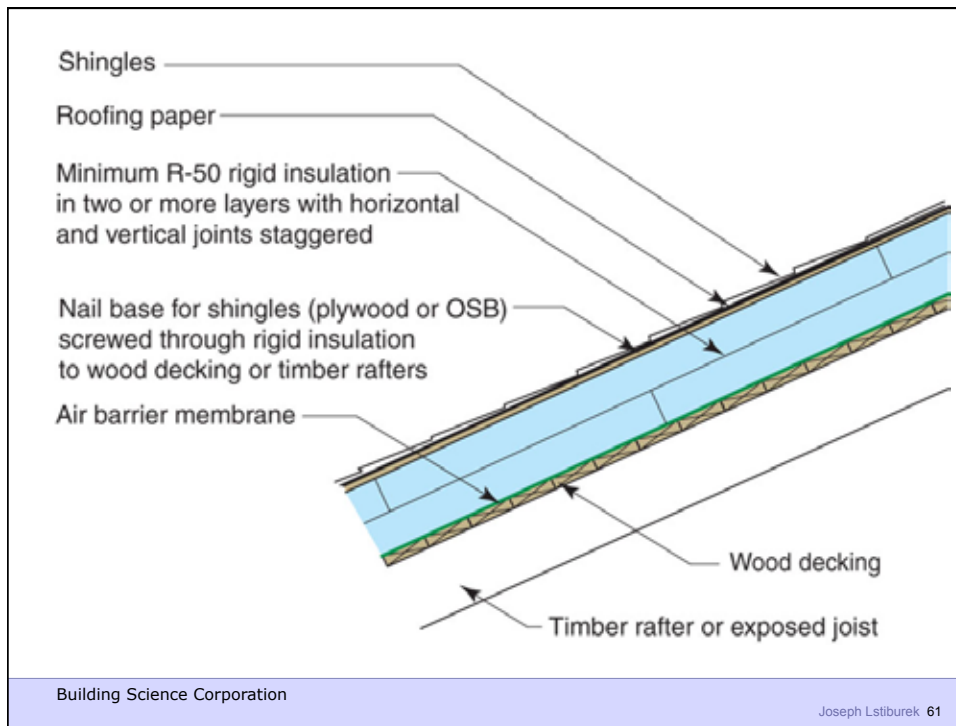
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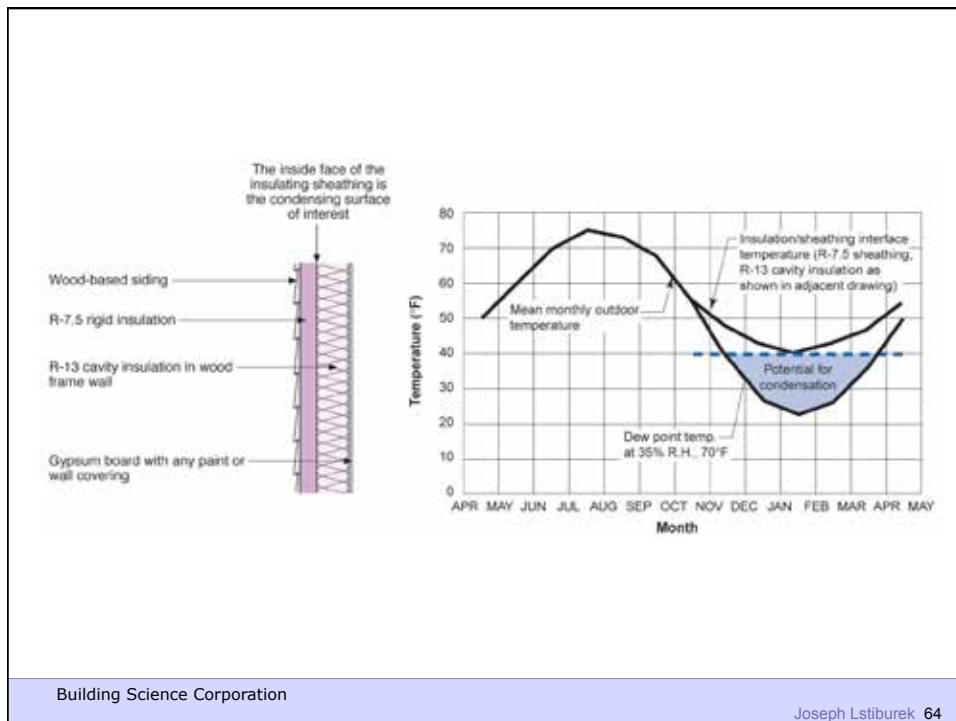
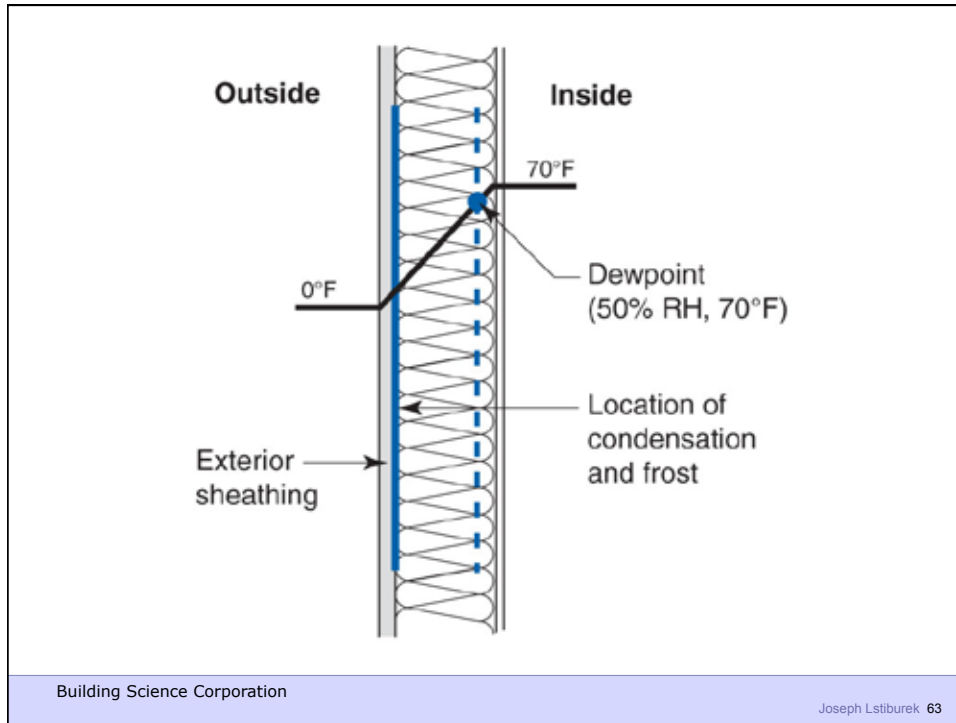


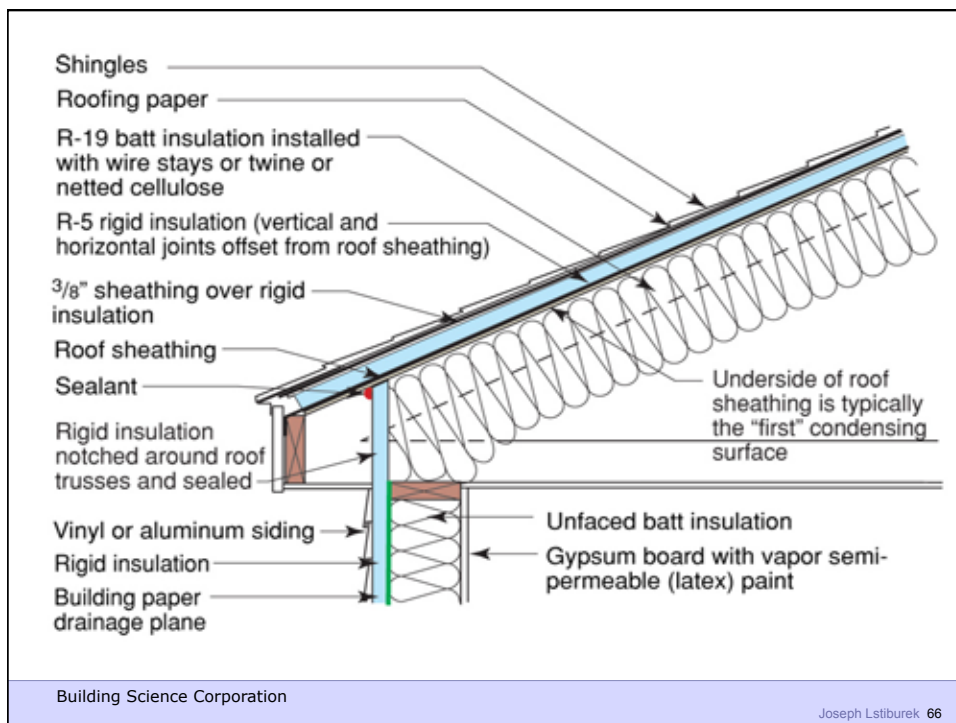
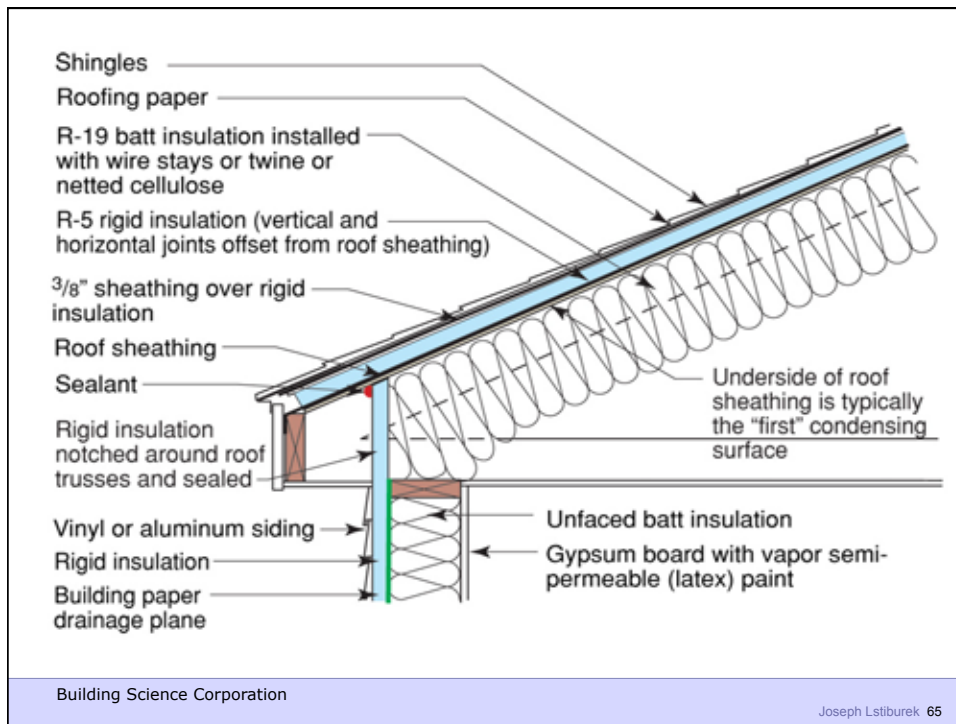


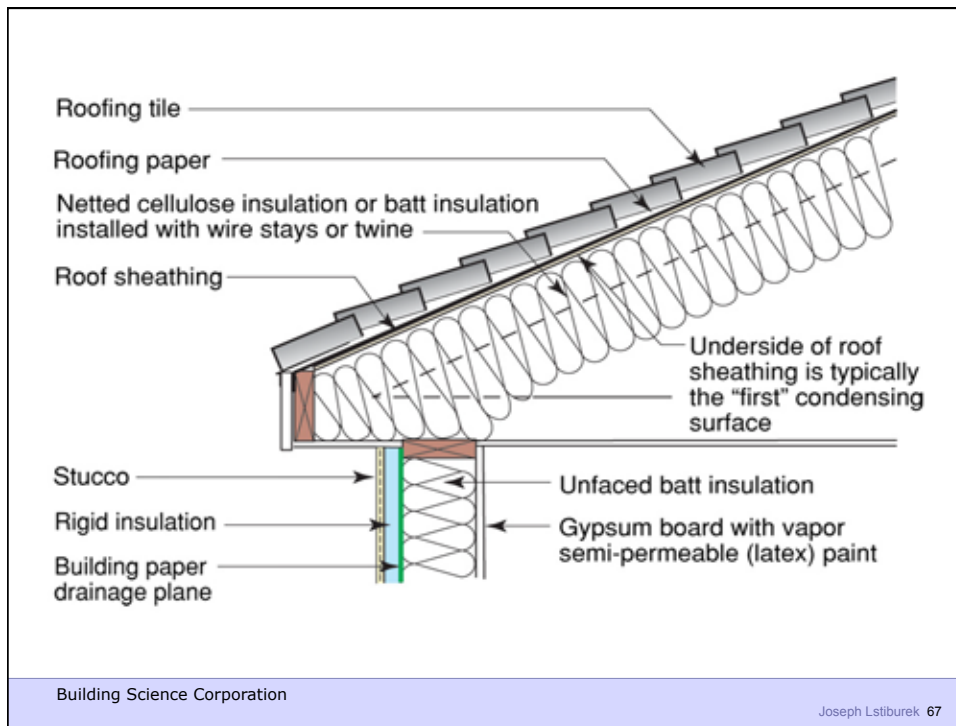














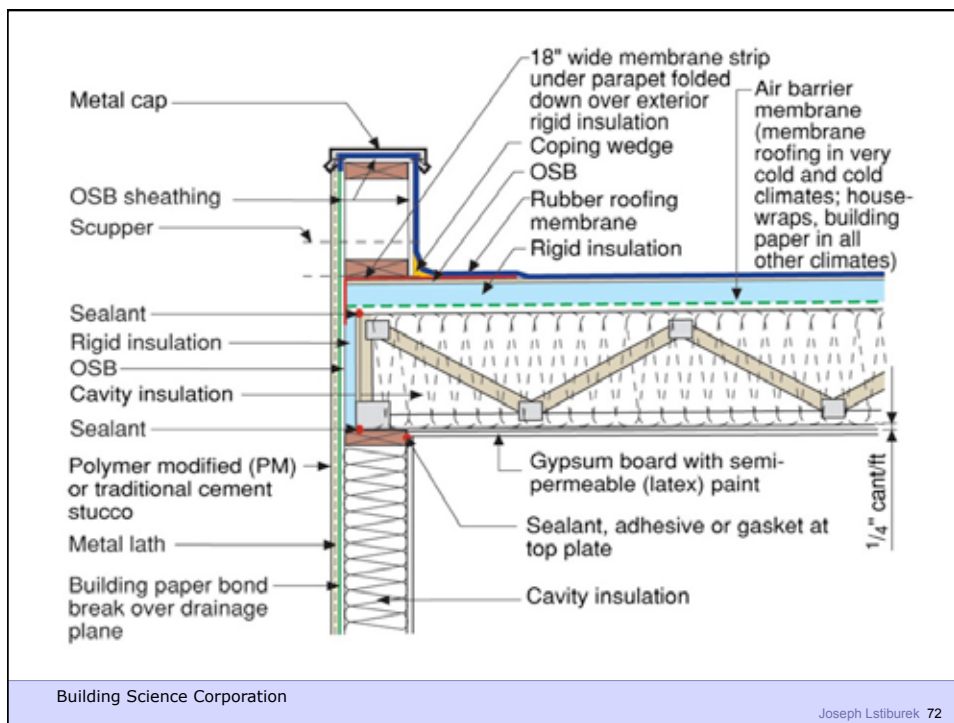
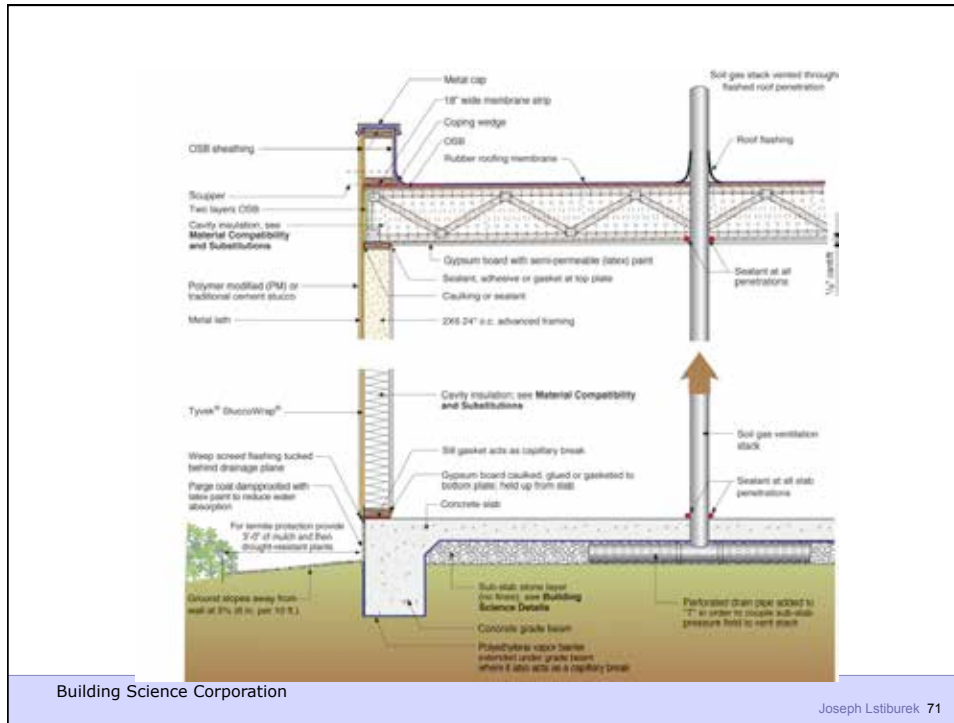
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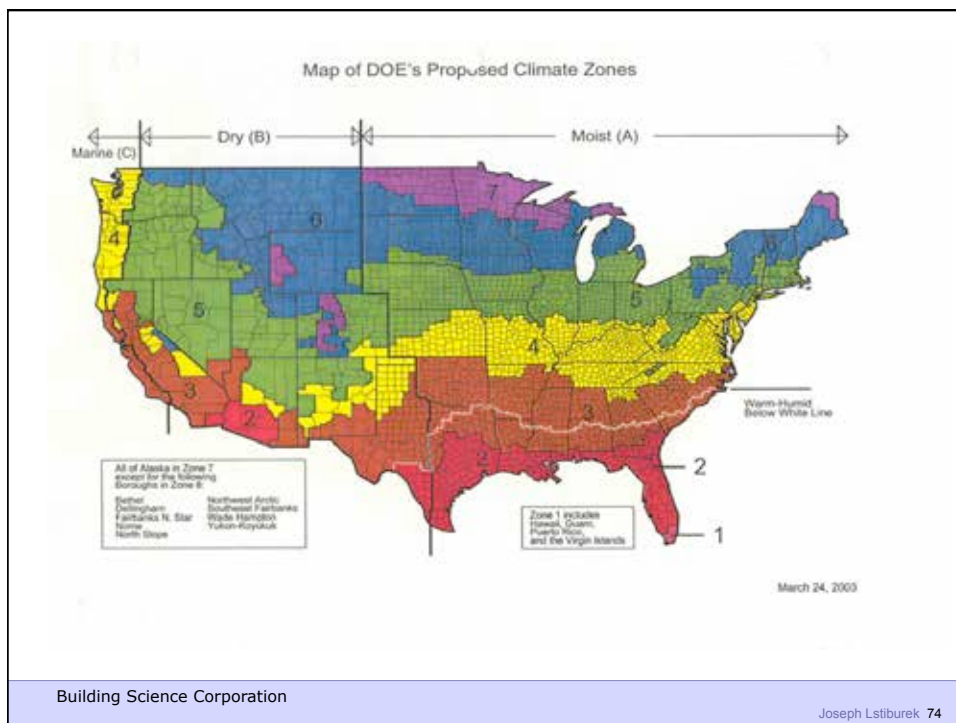
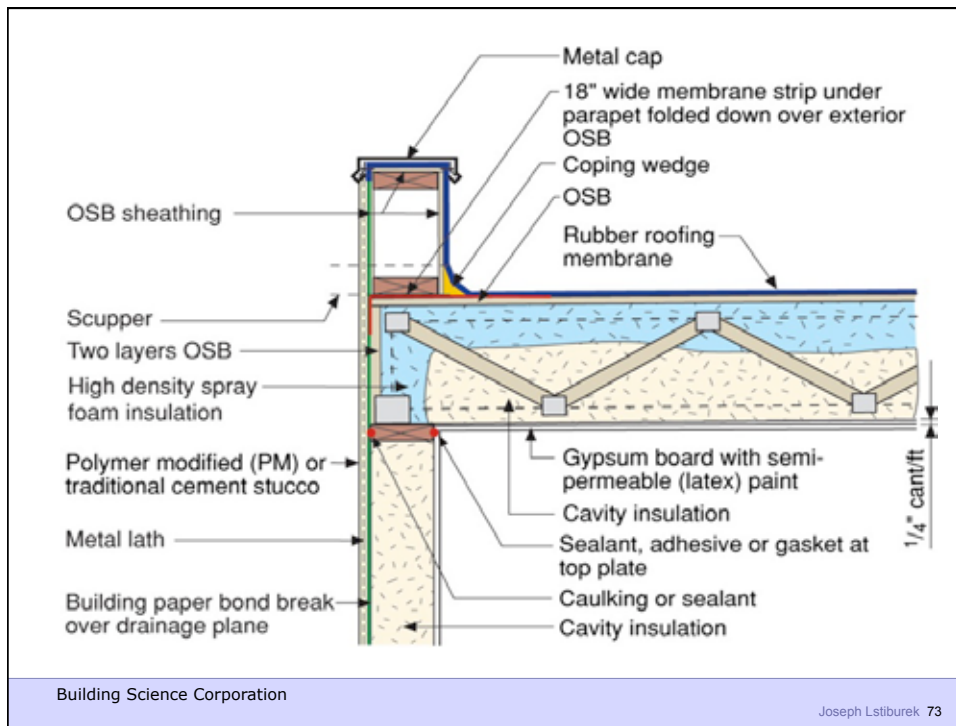
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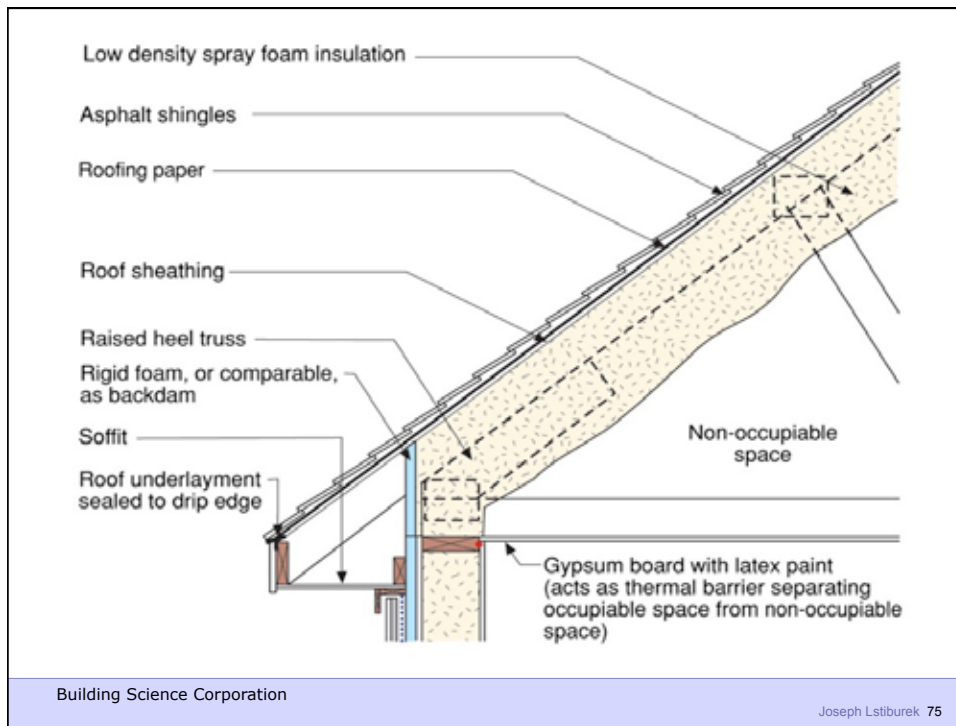


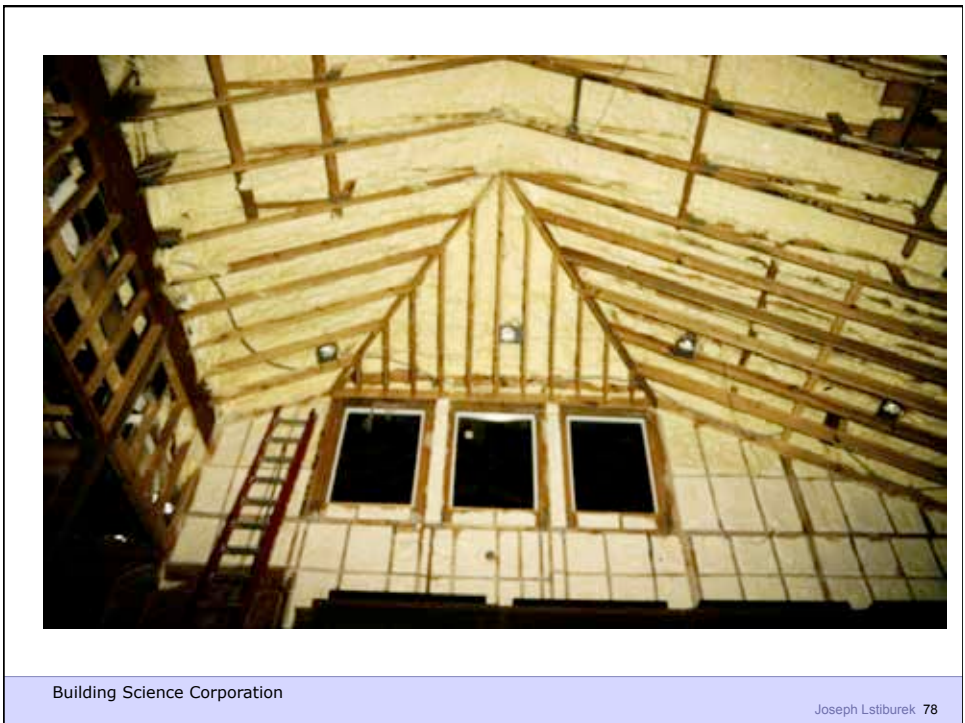
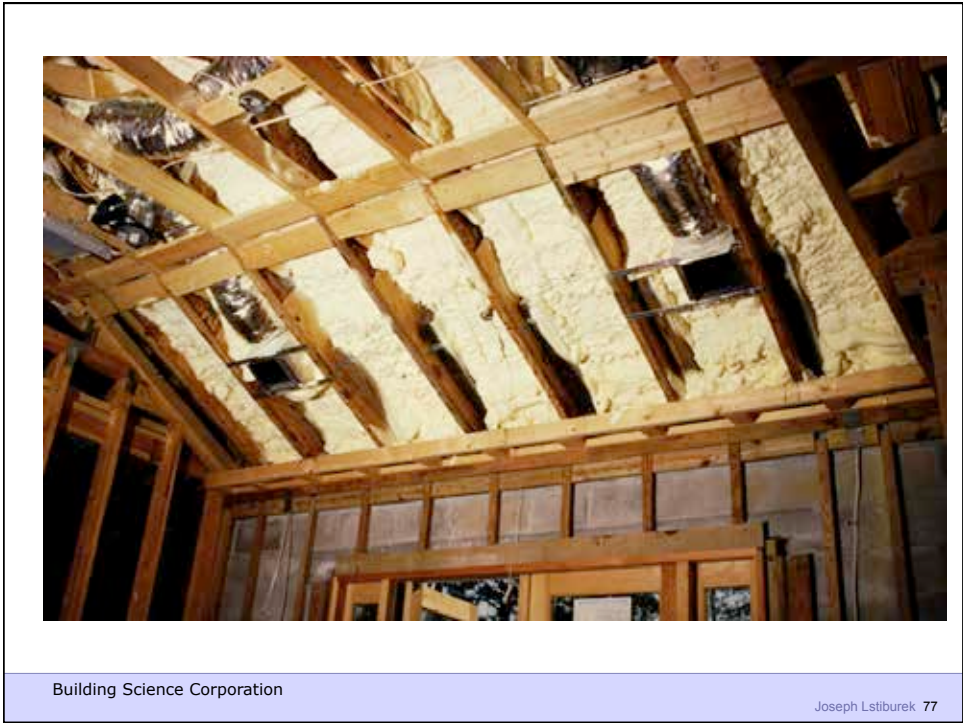
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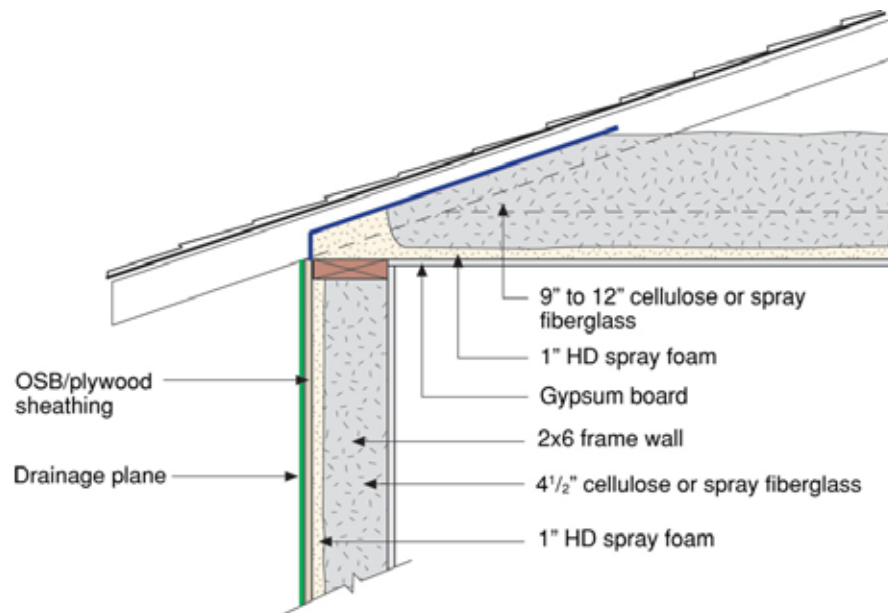






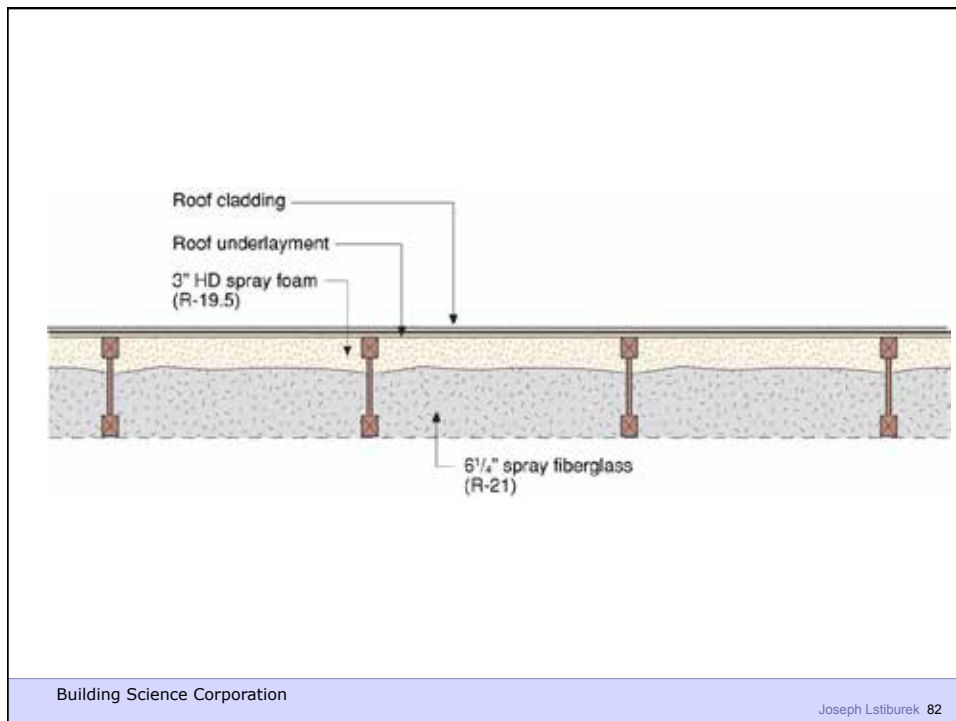
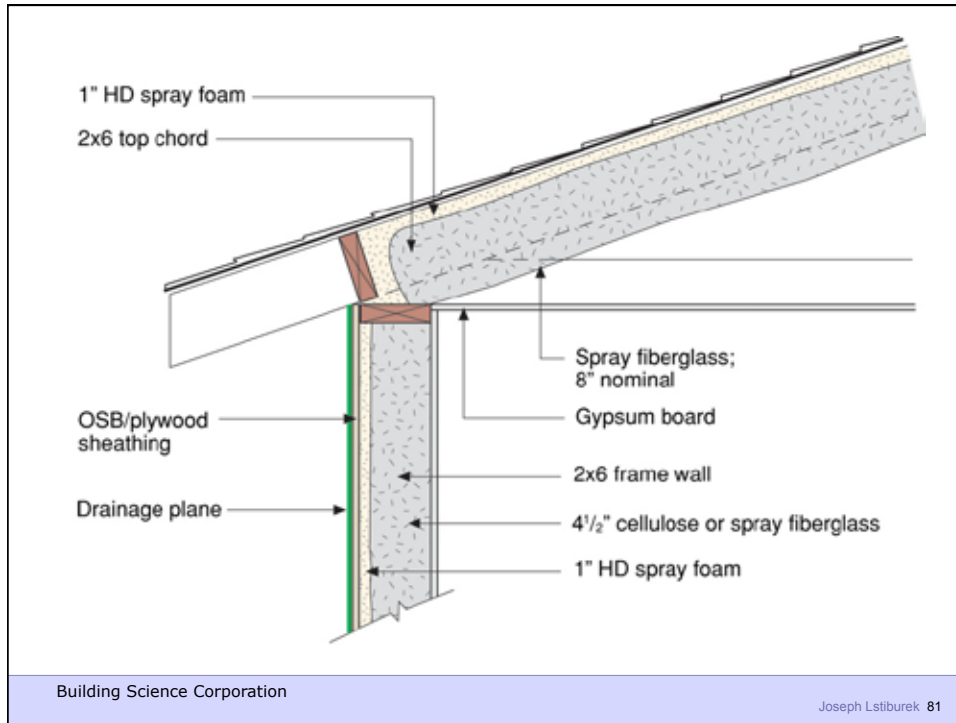
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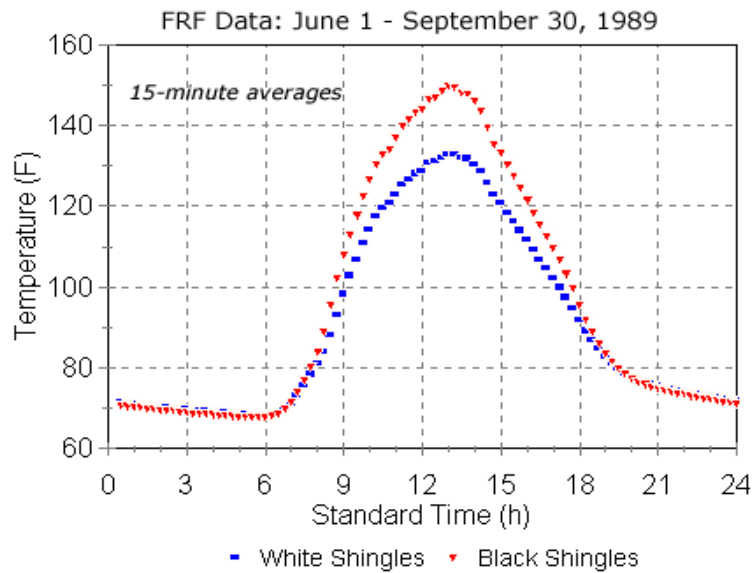
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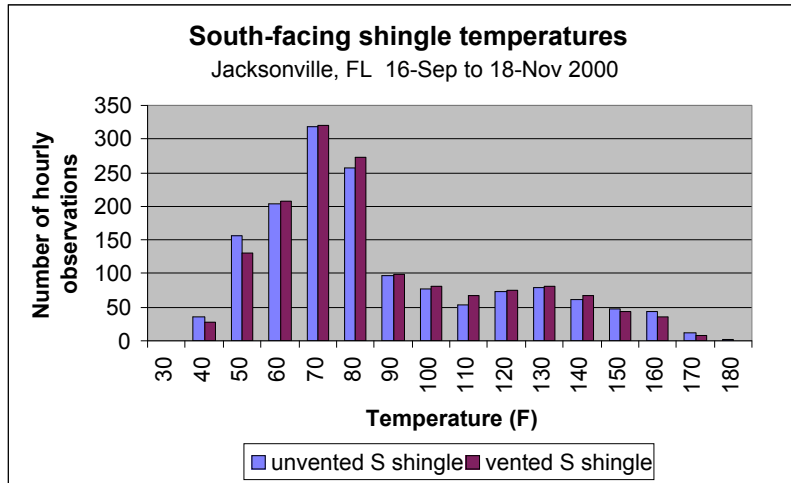
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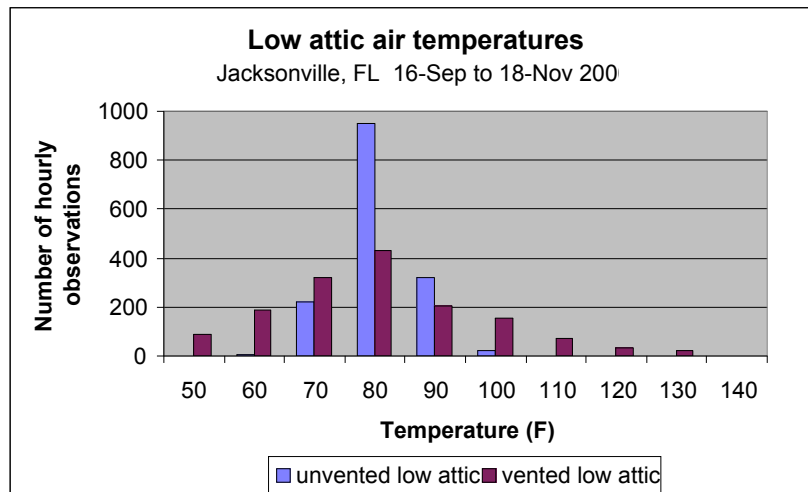
Vented vs. unvented shingle temperatures



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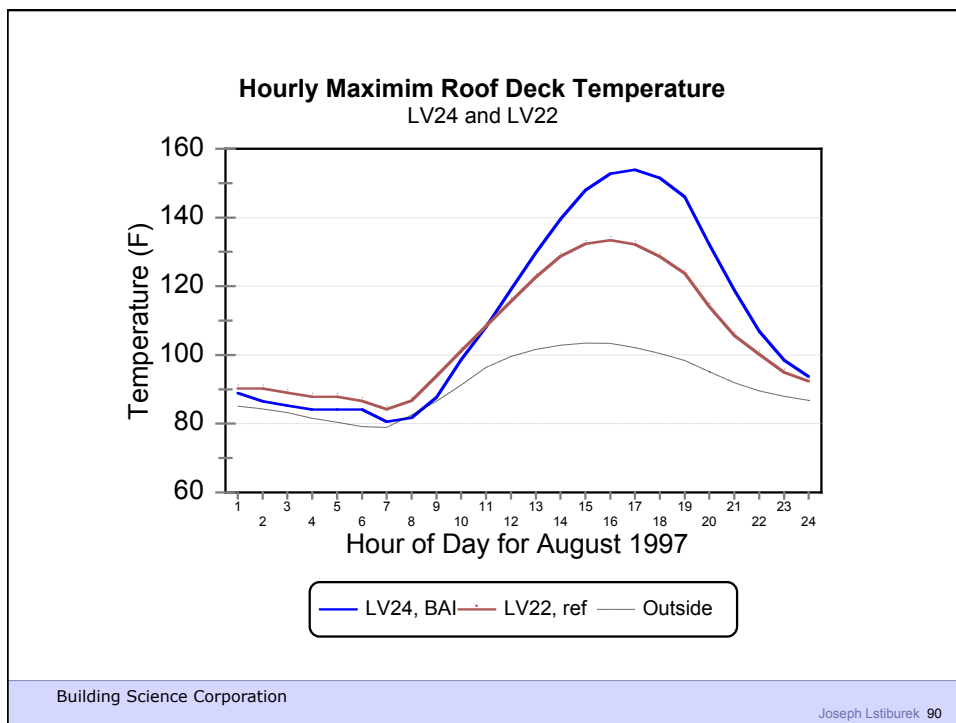
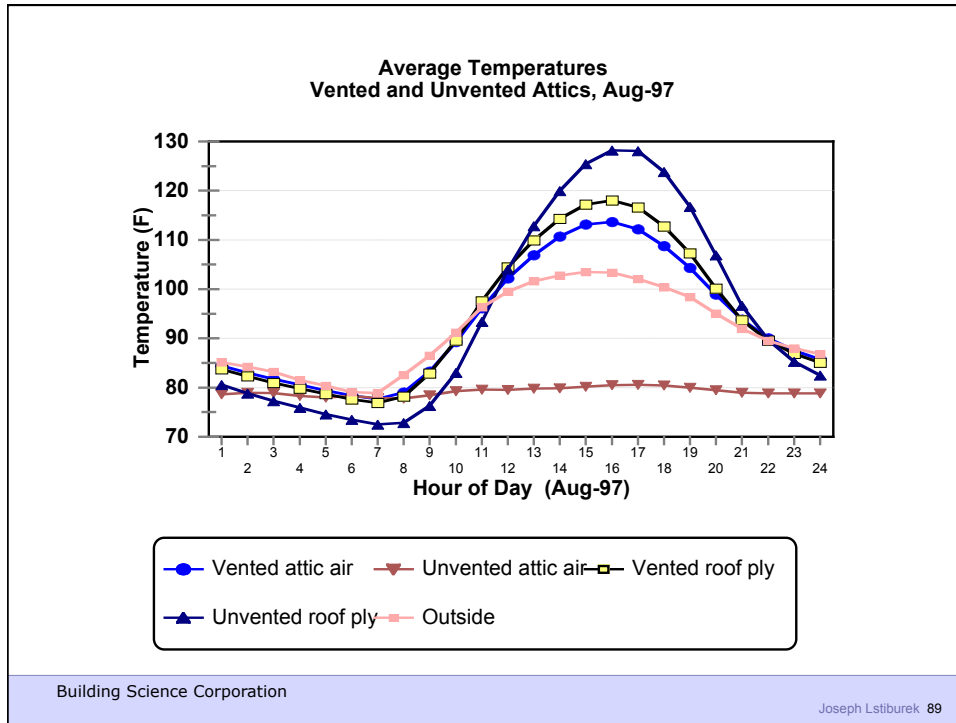
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Vented vs. unvented attic air temperatures



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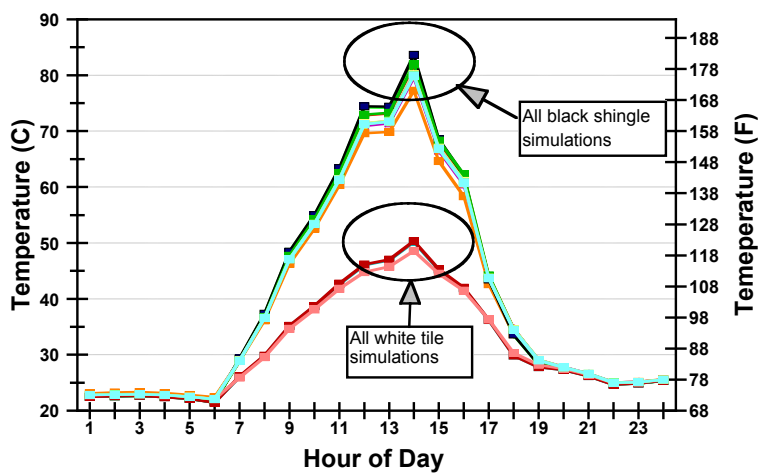


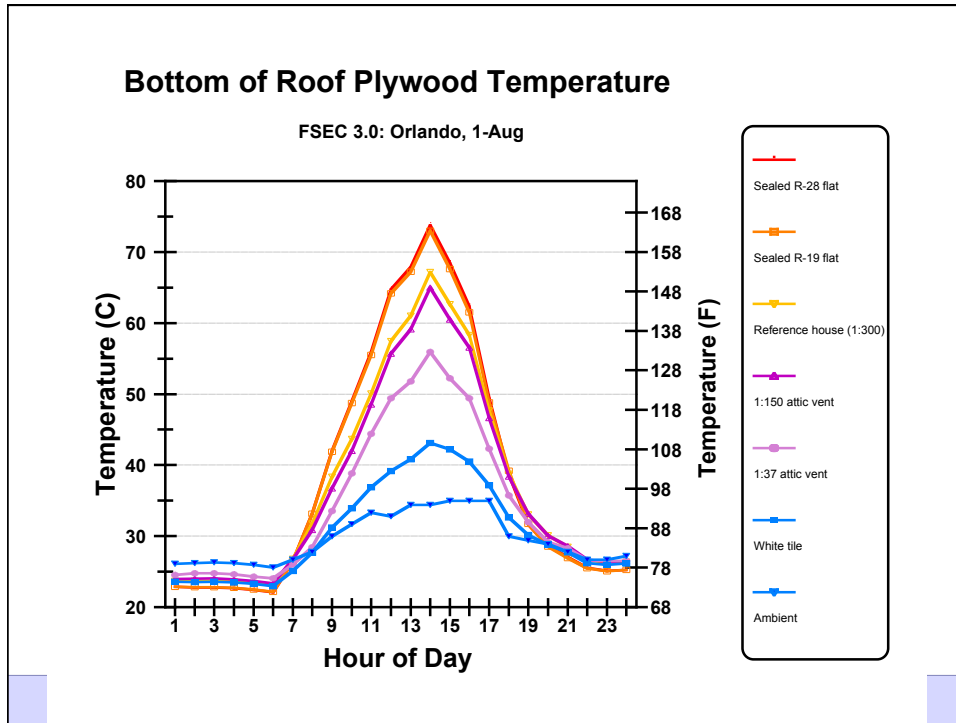
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Roof Shingle Temperature

FSEC 3.0: Orlando, 1-Aug







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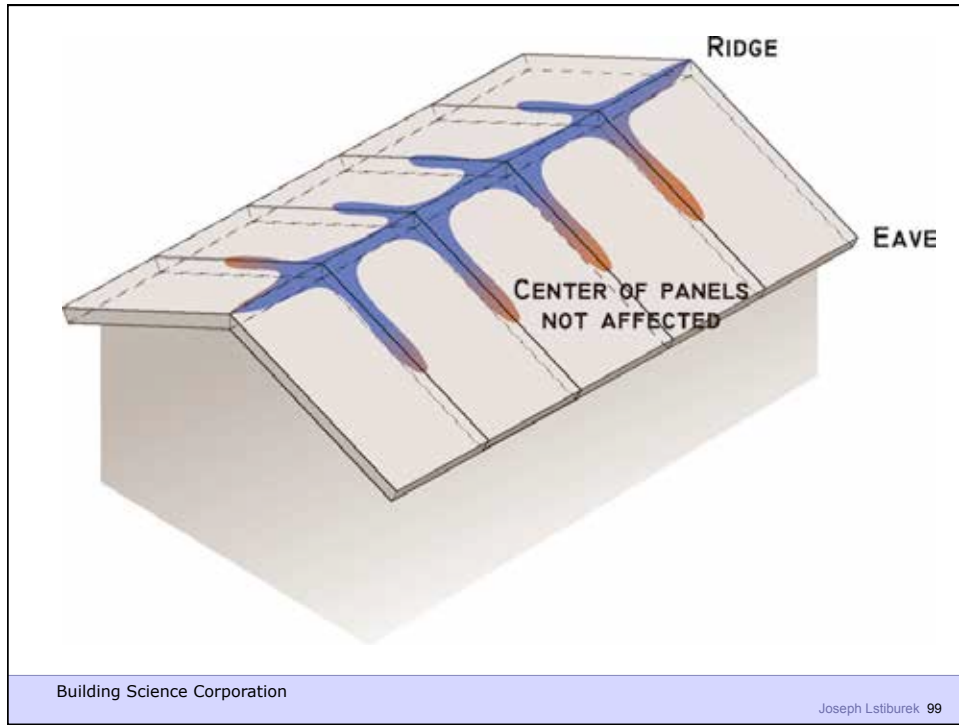
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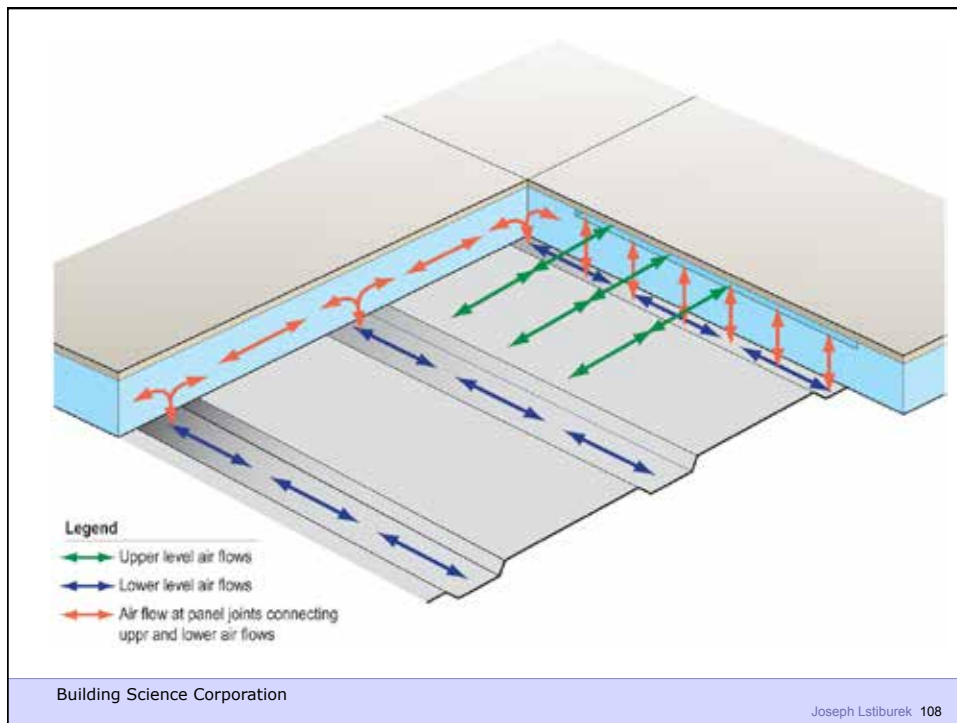
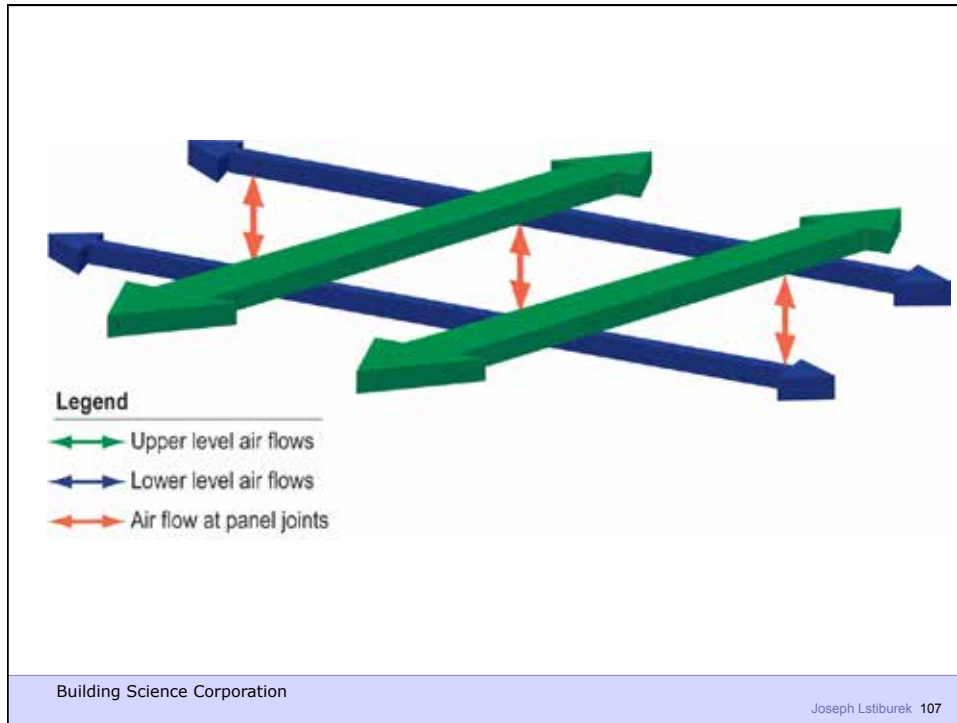
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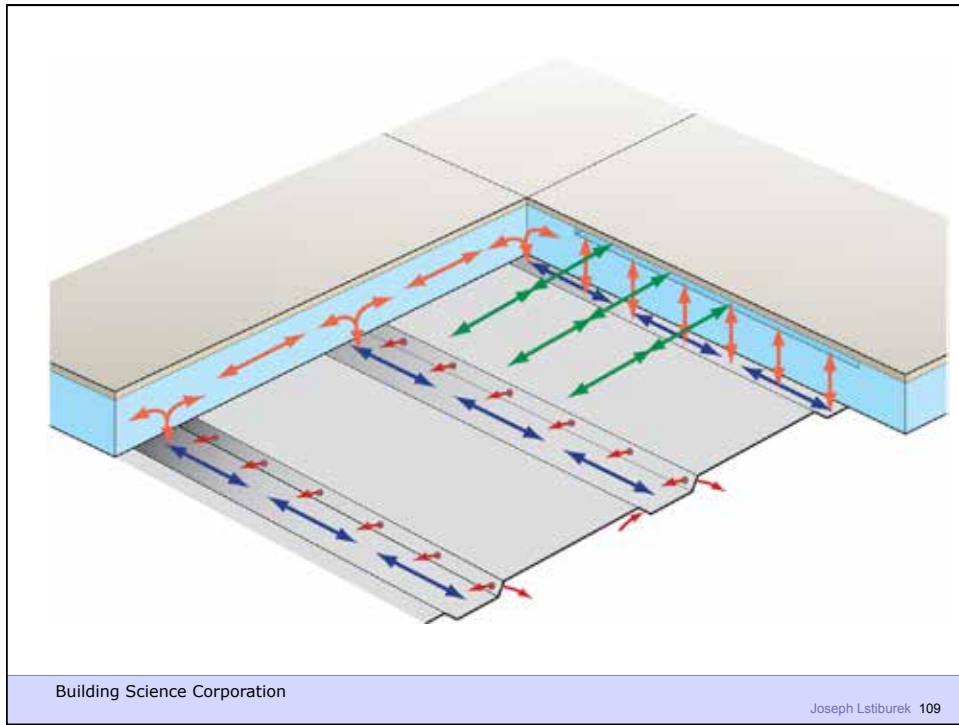
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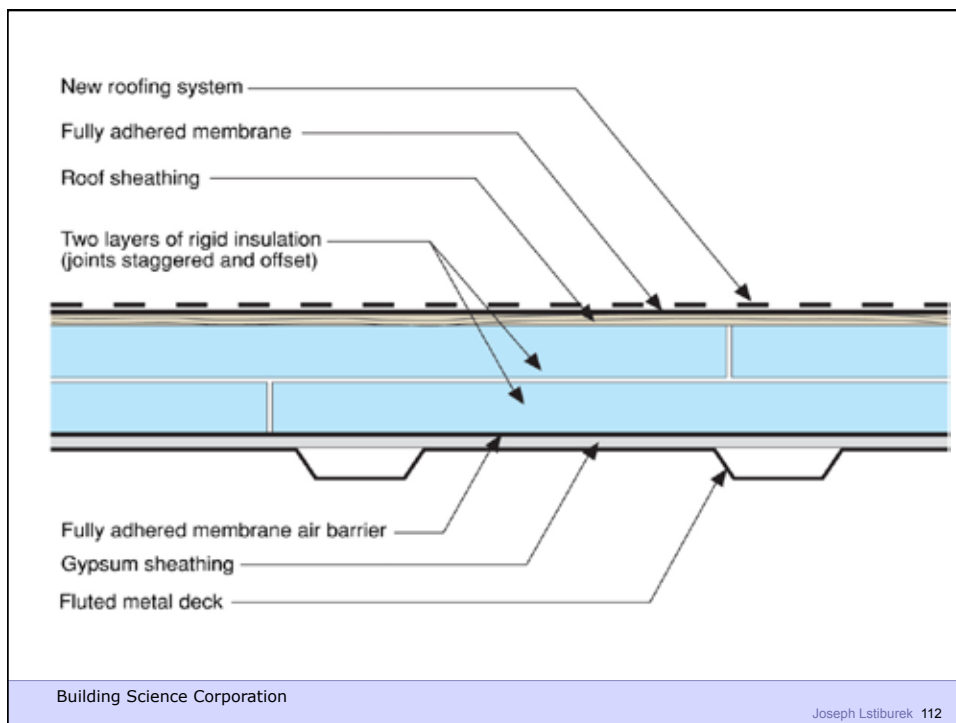
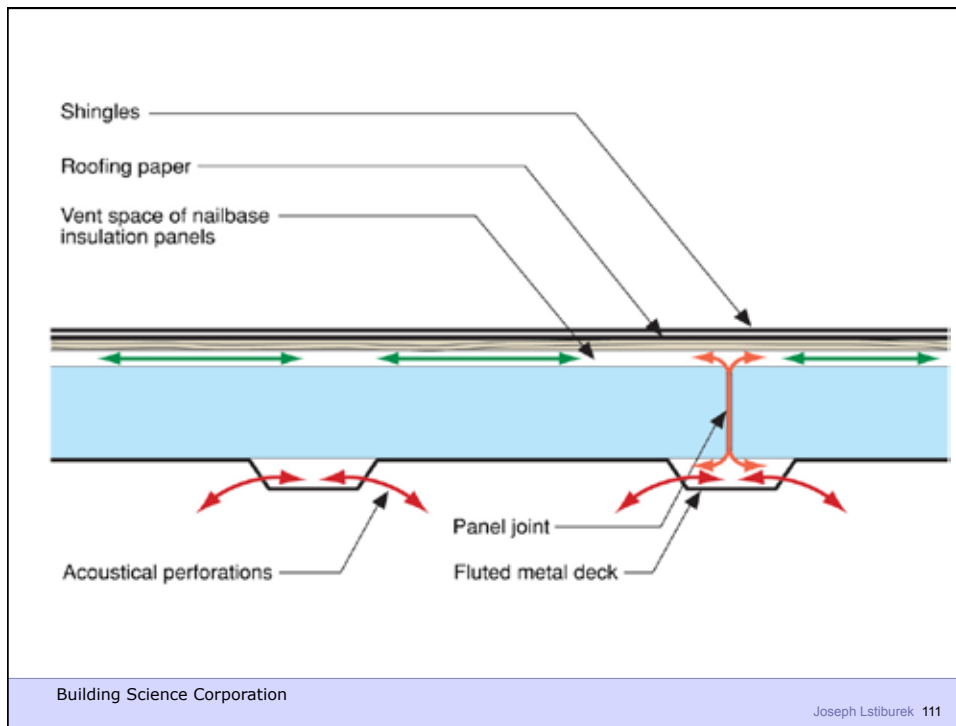


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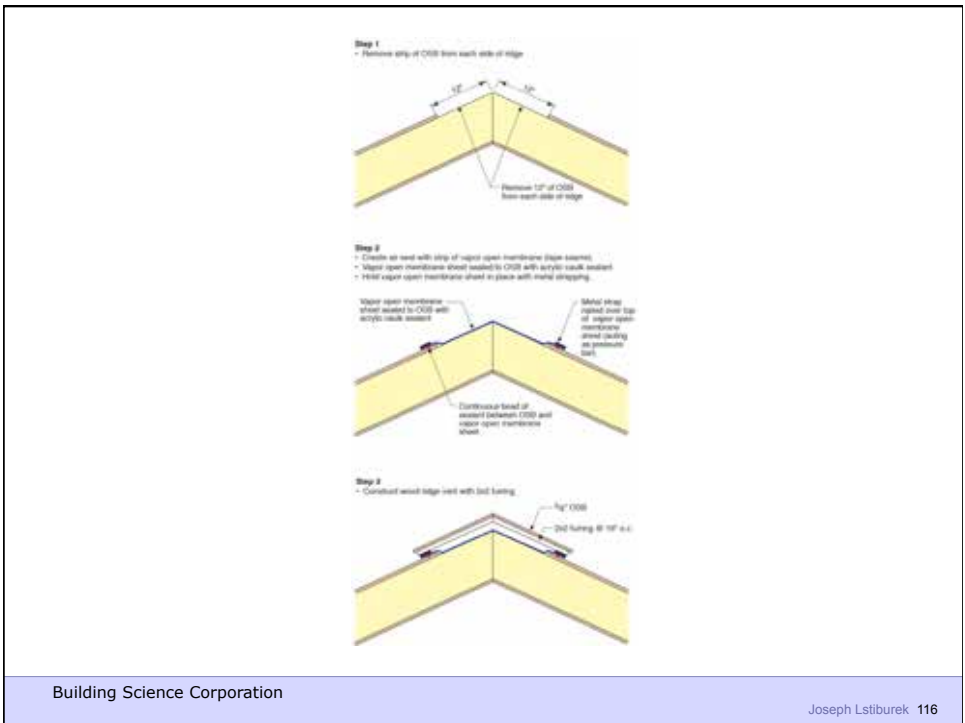
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Joseph Lstiburek 119



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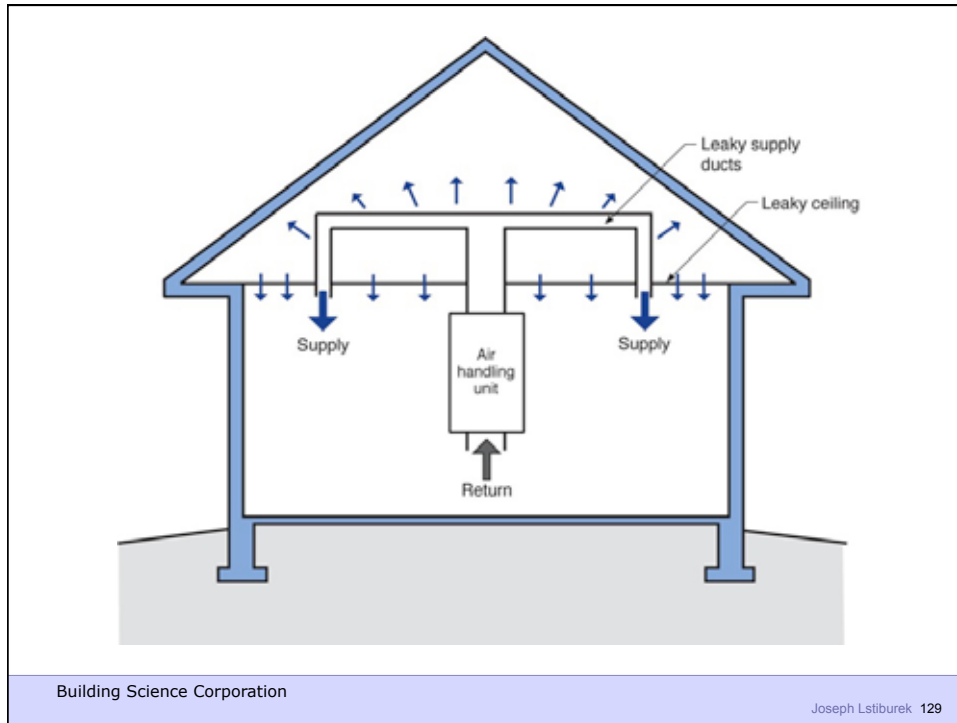
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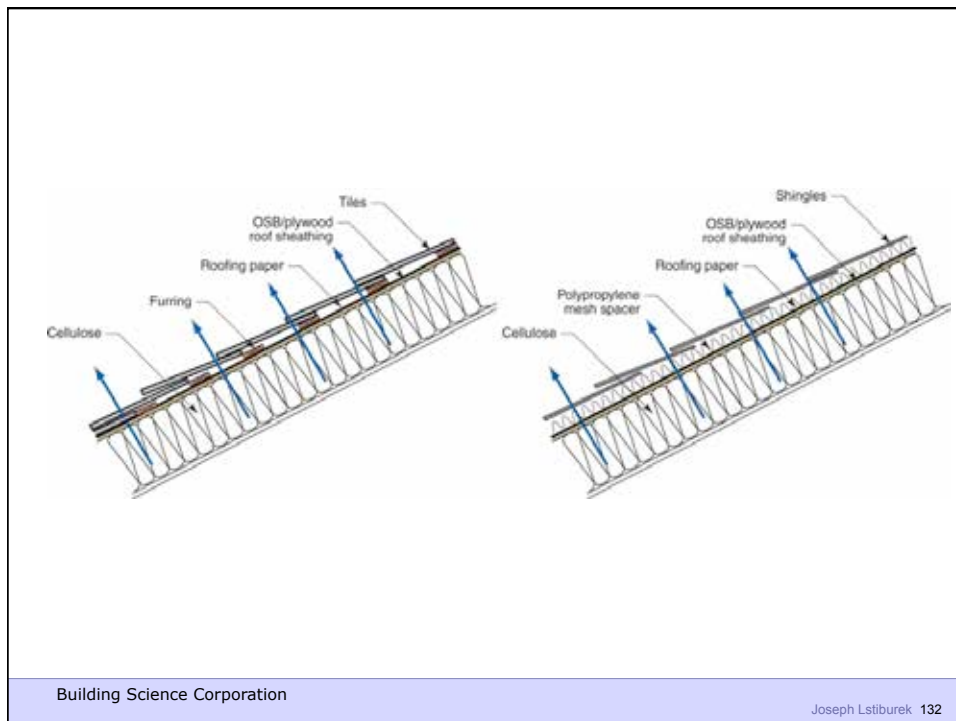
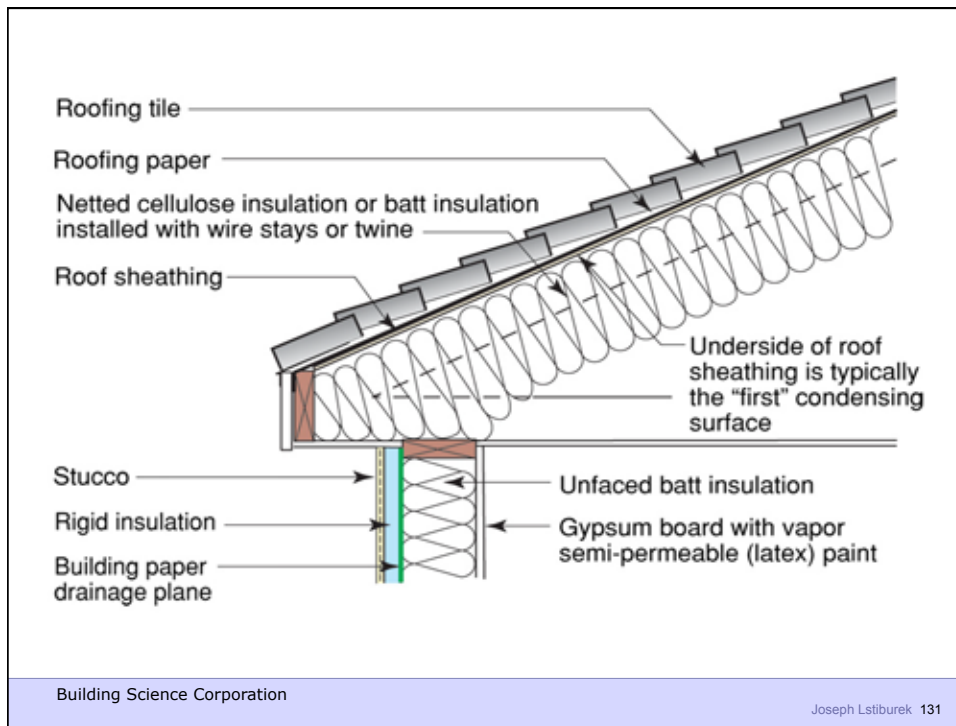
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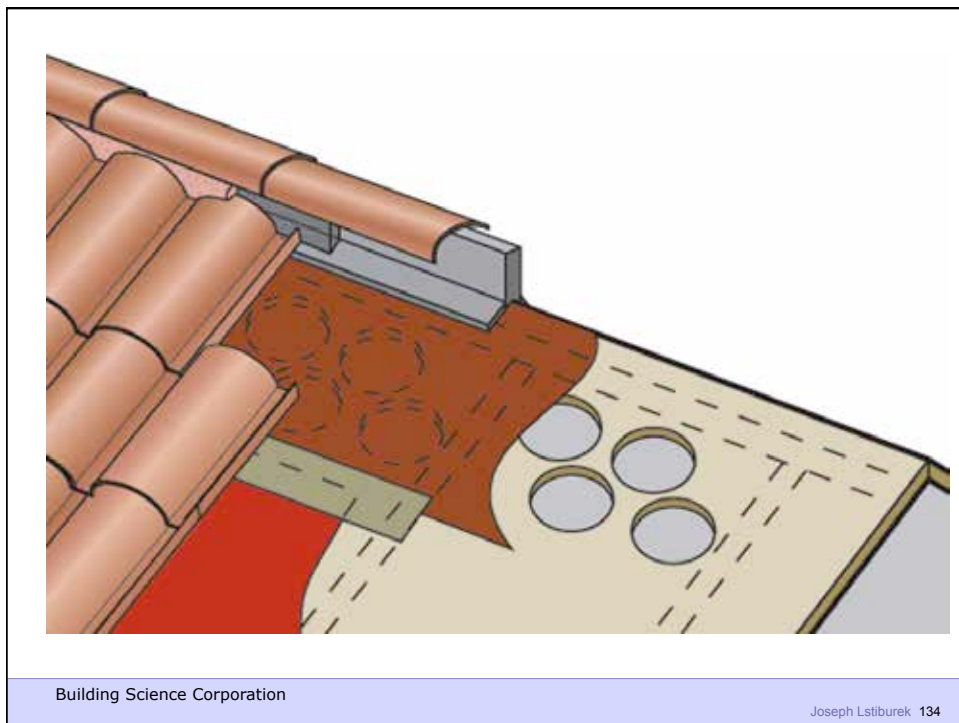
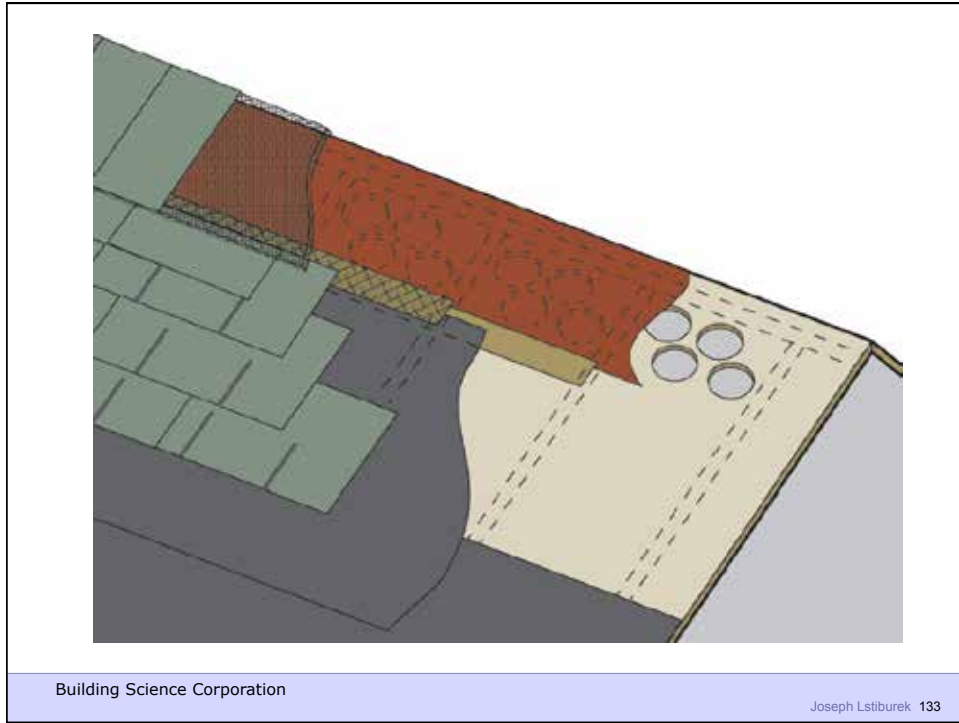


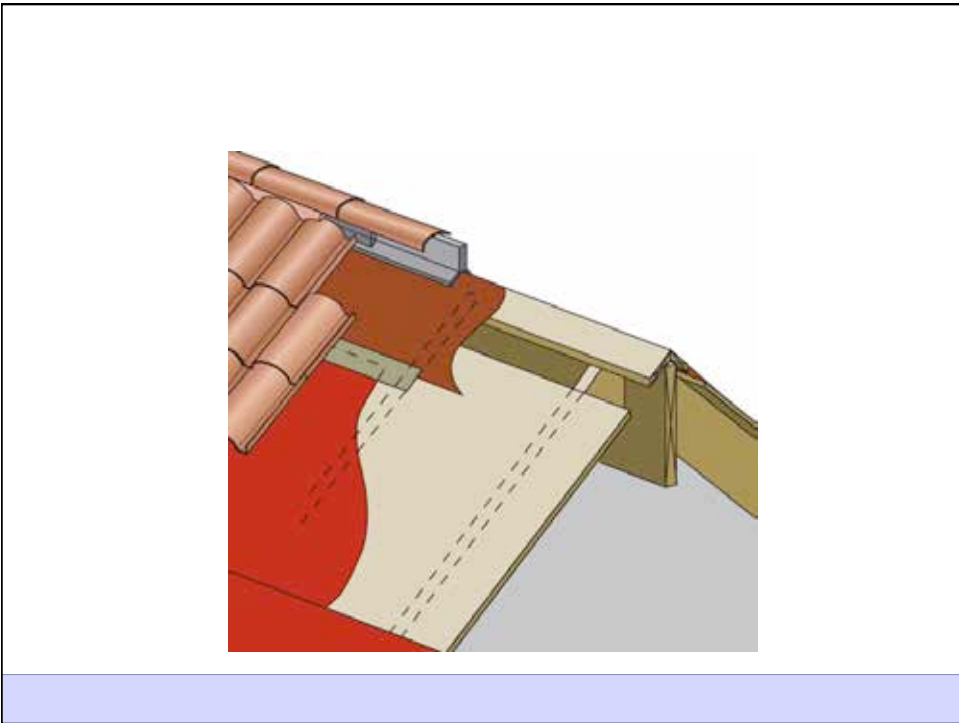
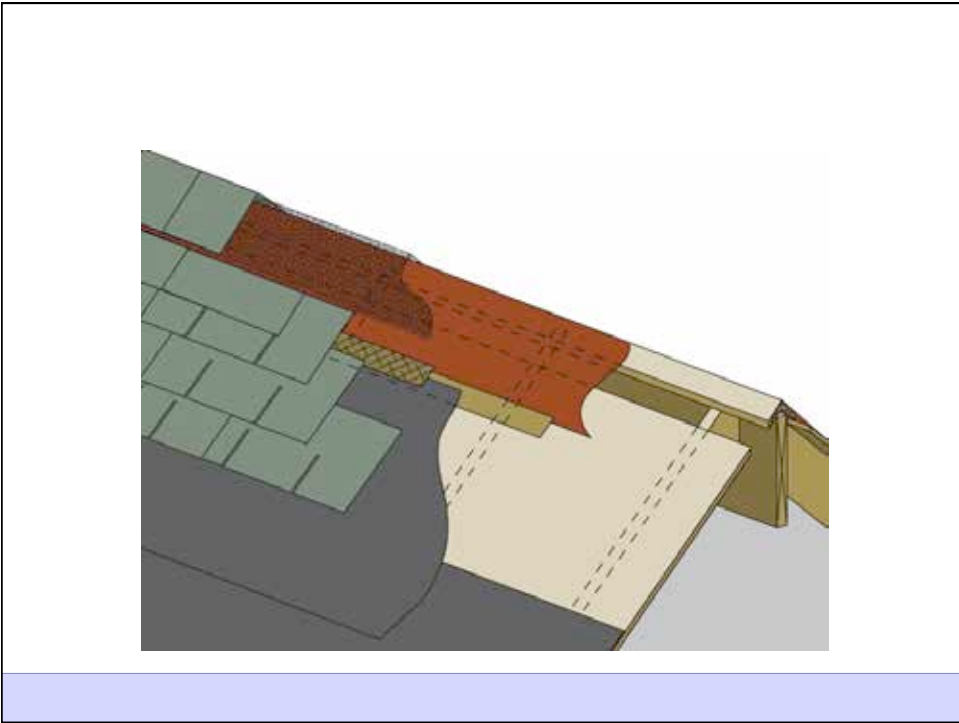
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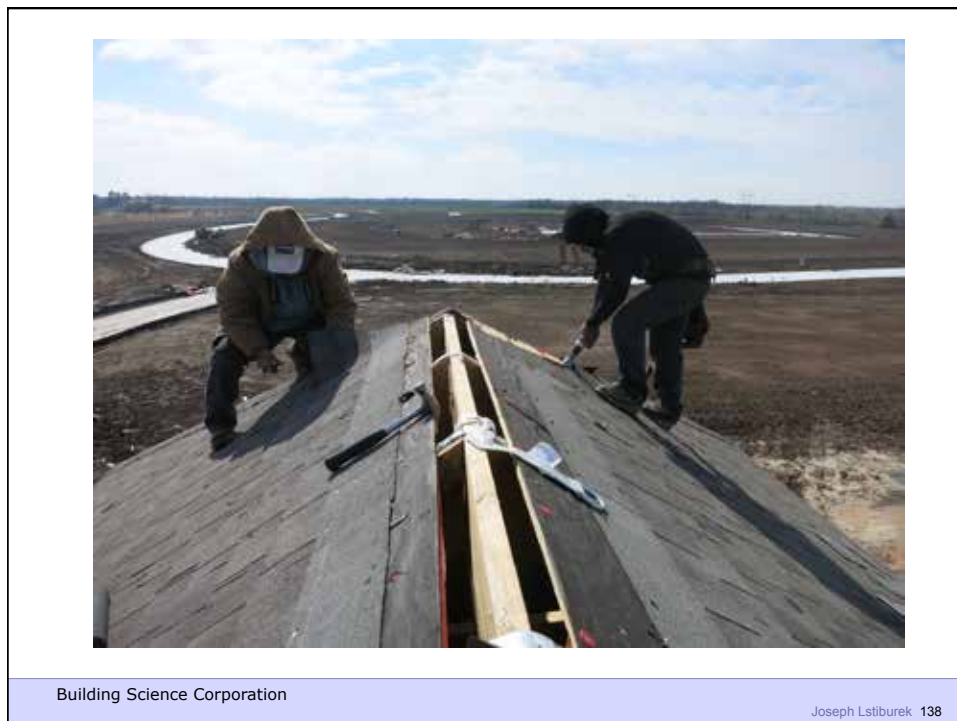
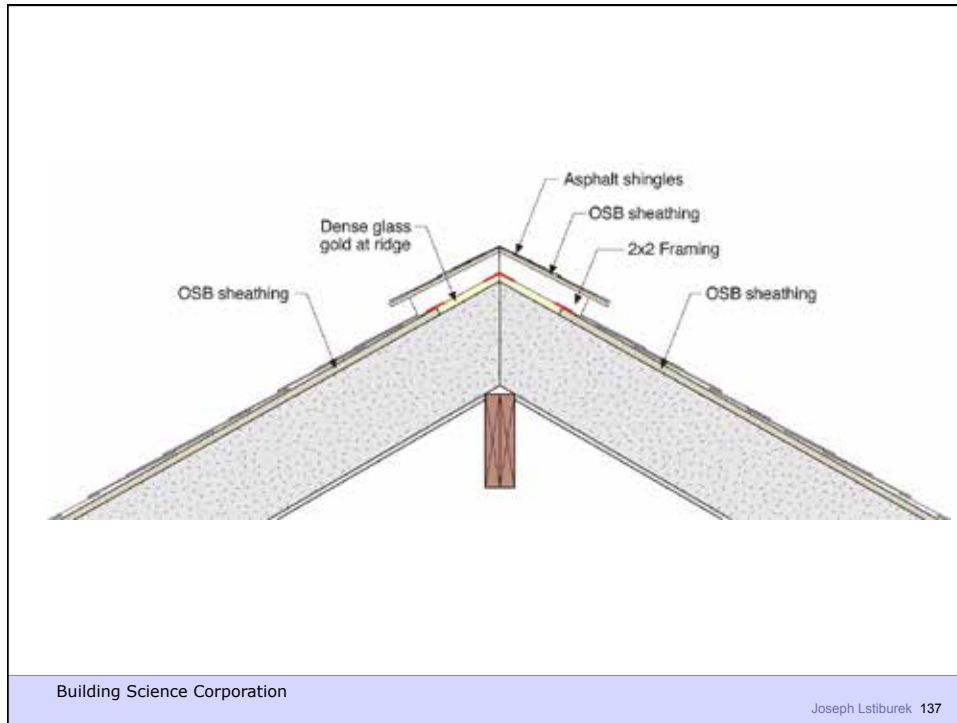
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