

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

## Building Science

North American Wood Window and  
Door Symposium

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Life is Tough Enough As it Is...

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

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Don't Do Stupid Things

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## What is a Building?

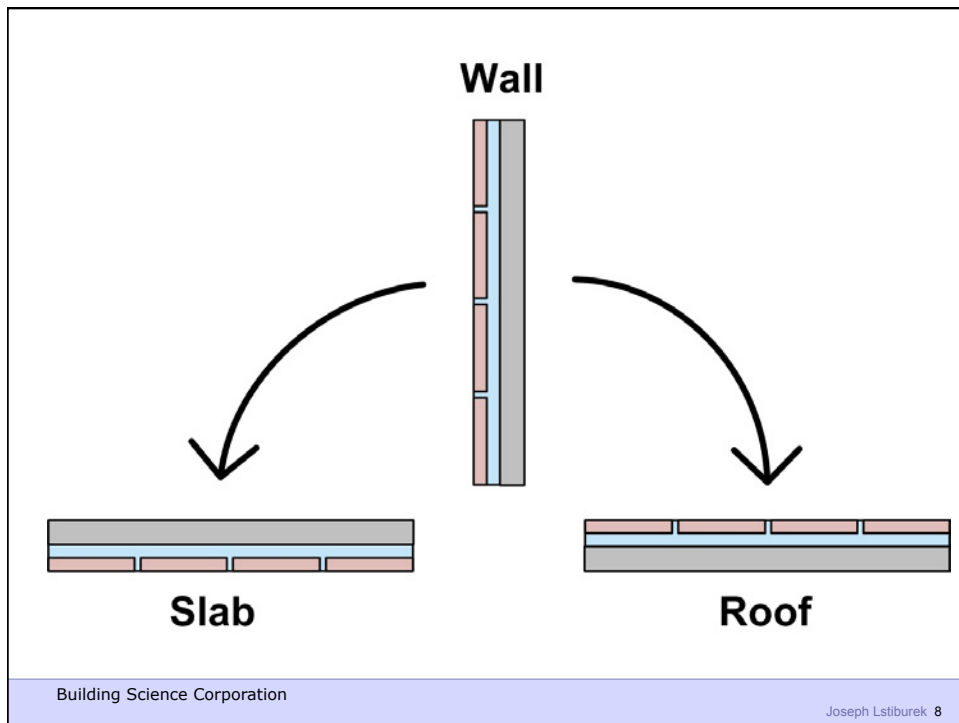
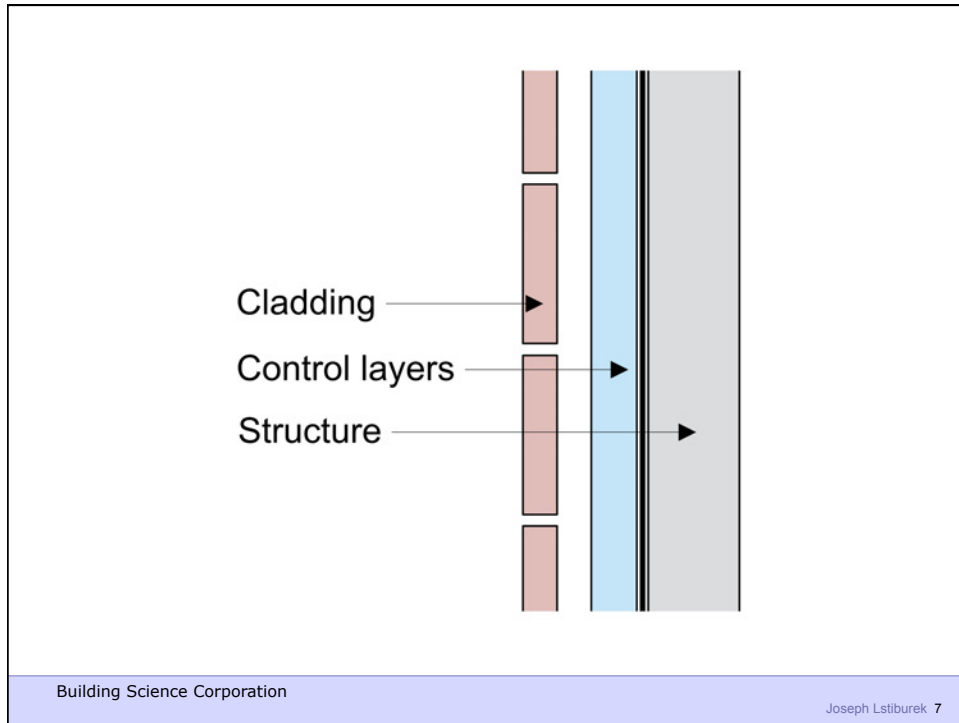
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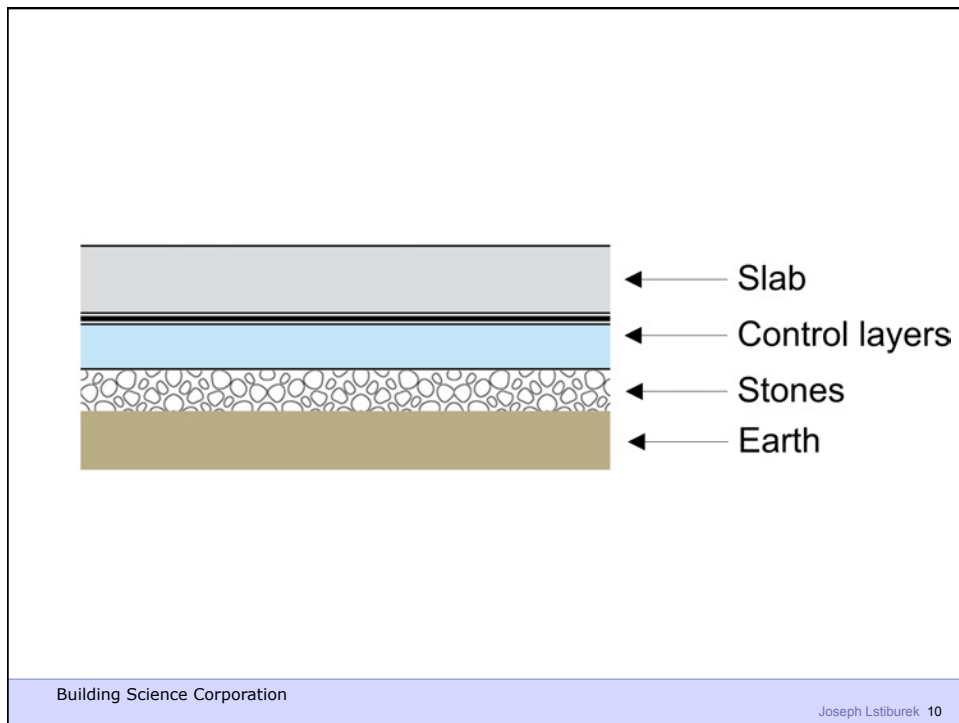
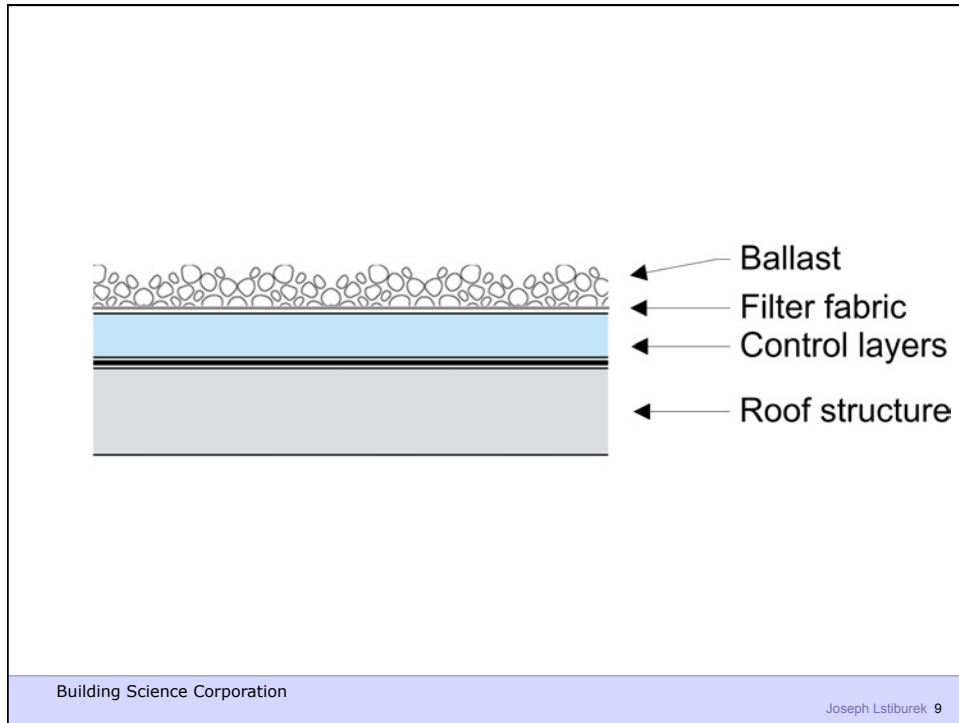
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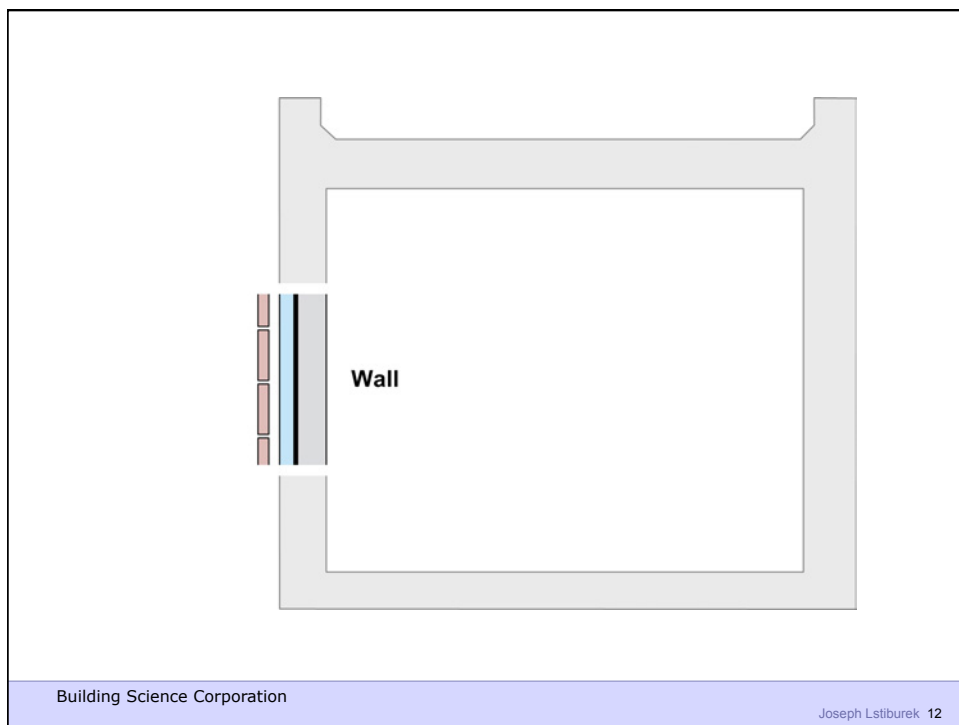
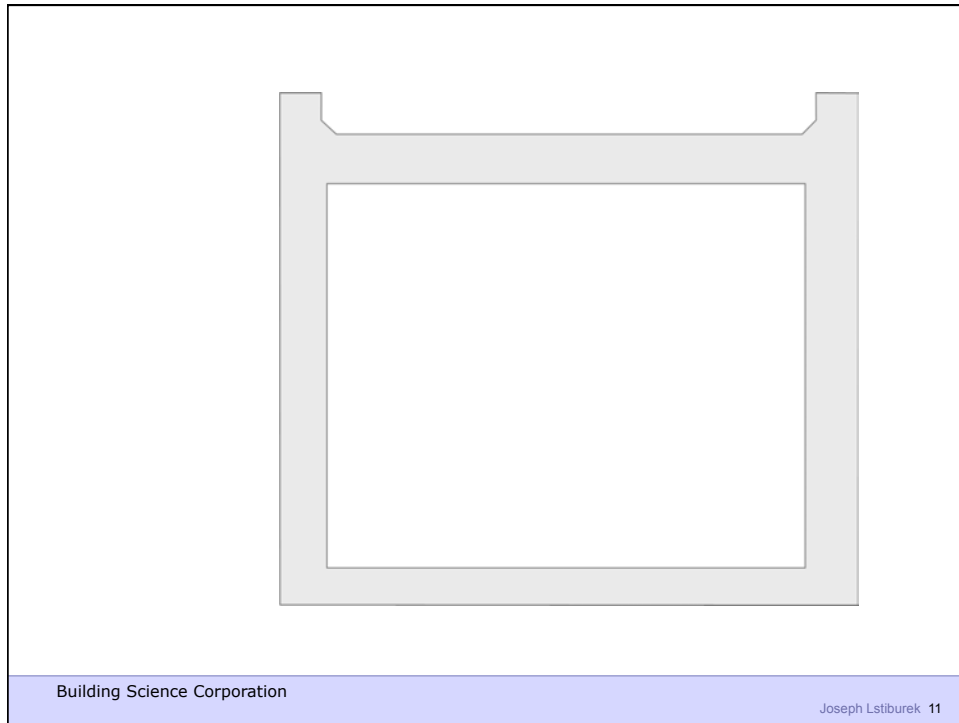
Water Control Layer  
Air Control Layer  
Vapor Control Layer  
Thermal Control Layer

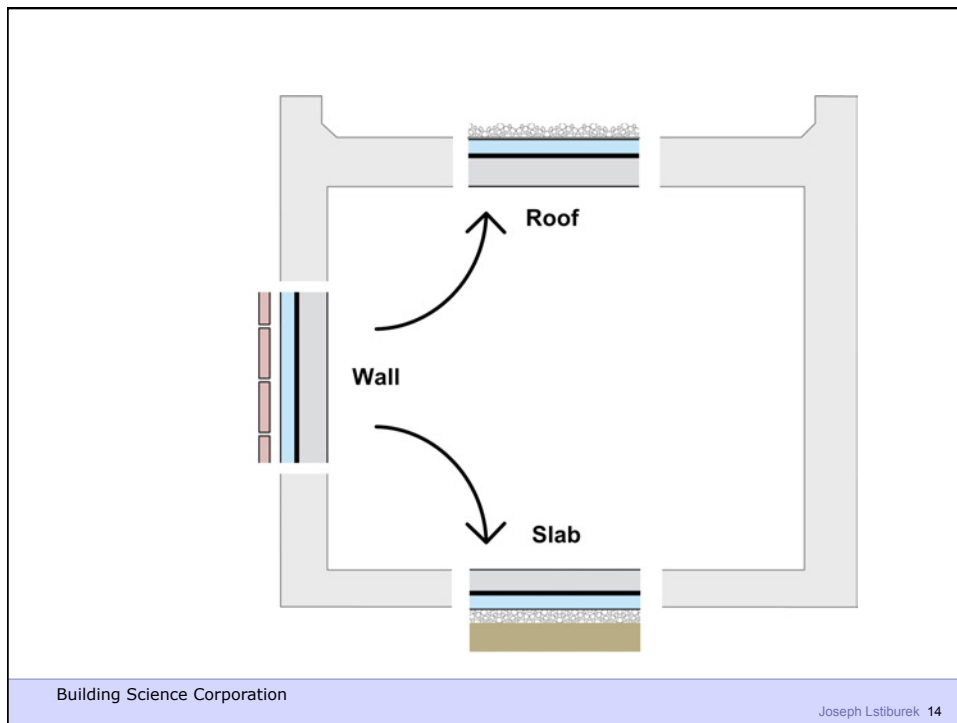
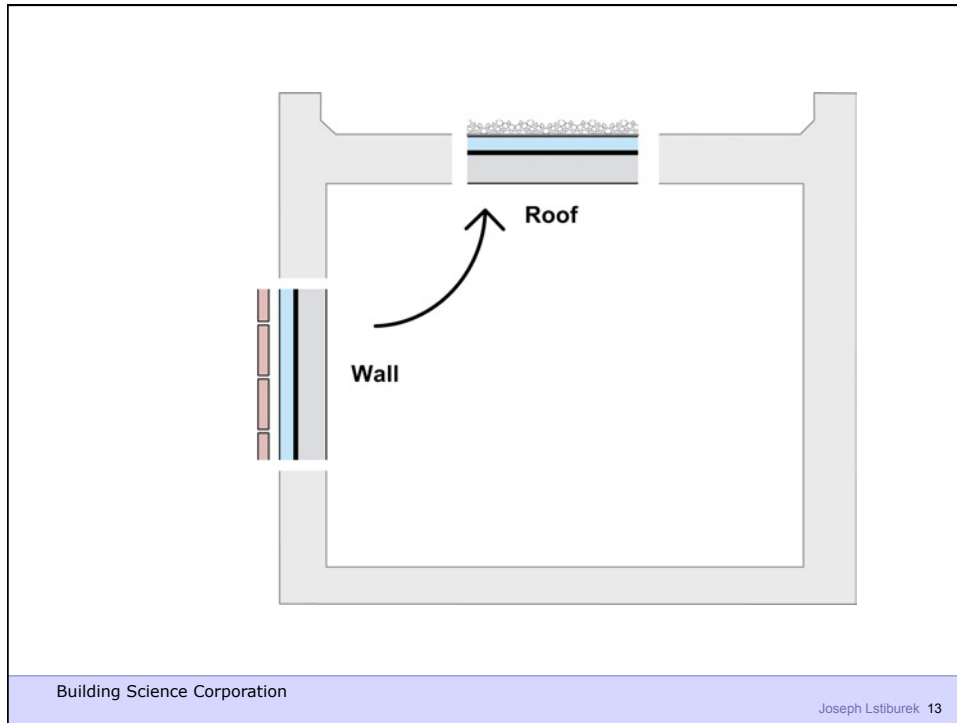
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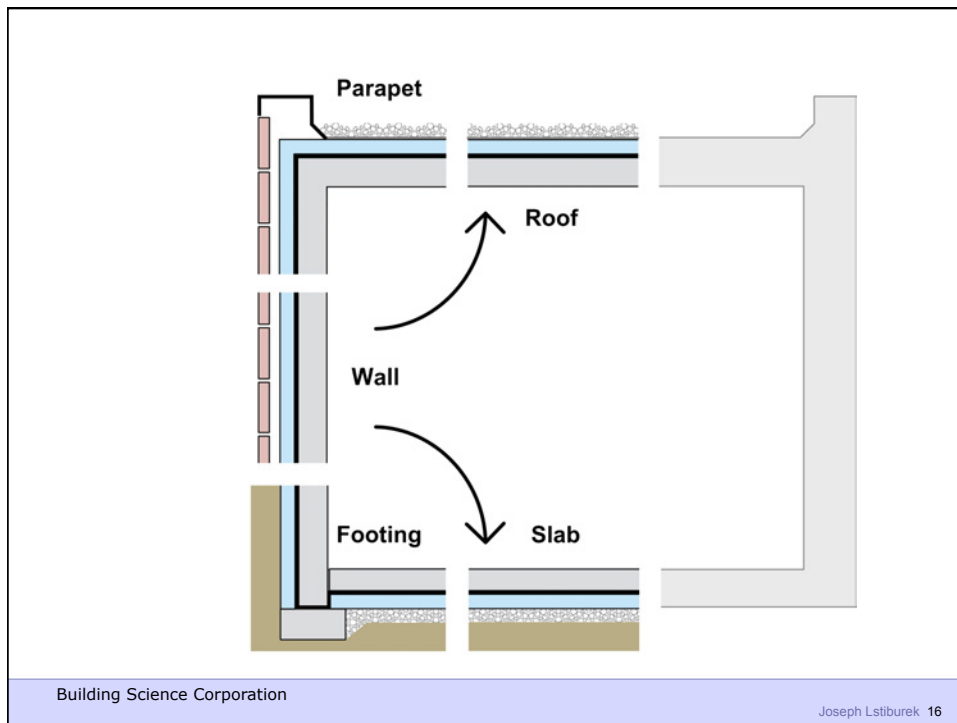
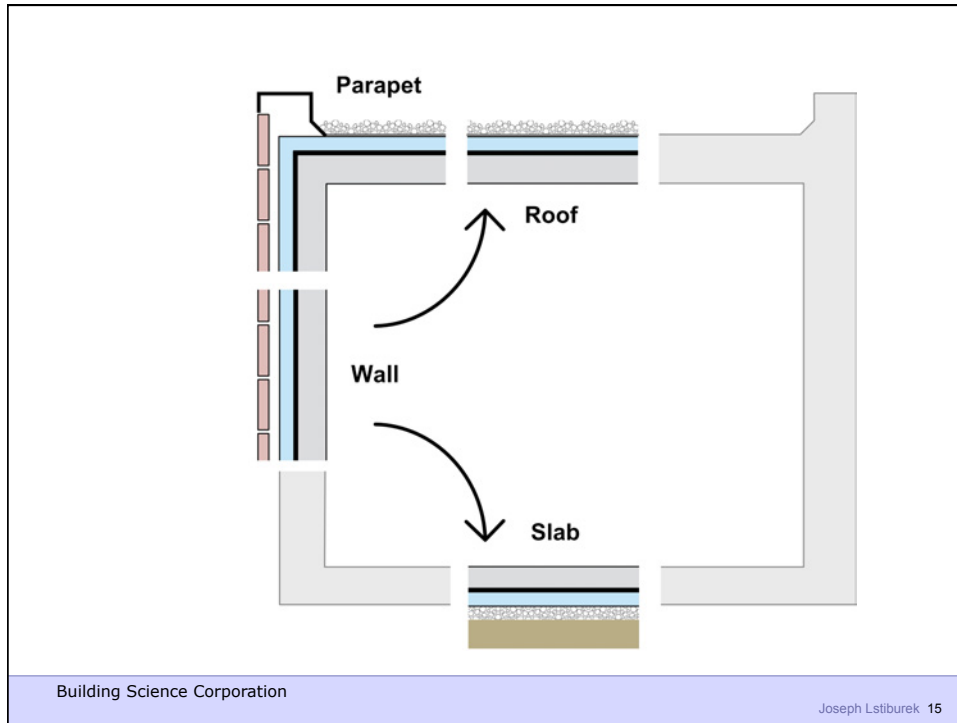
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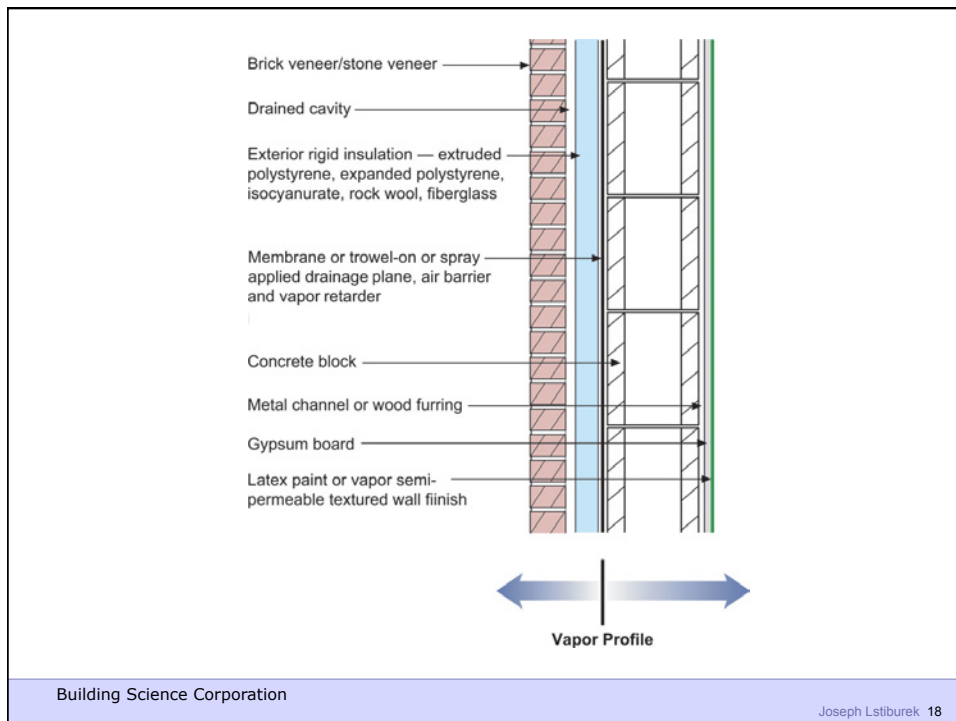
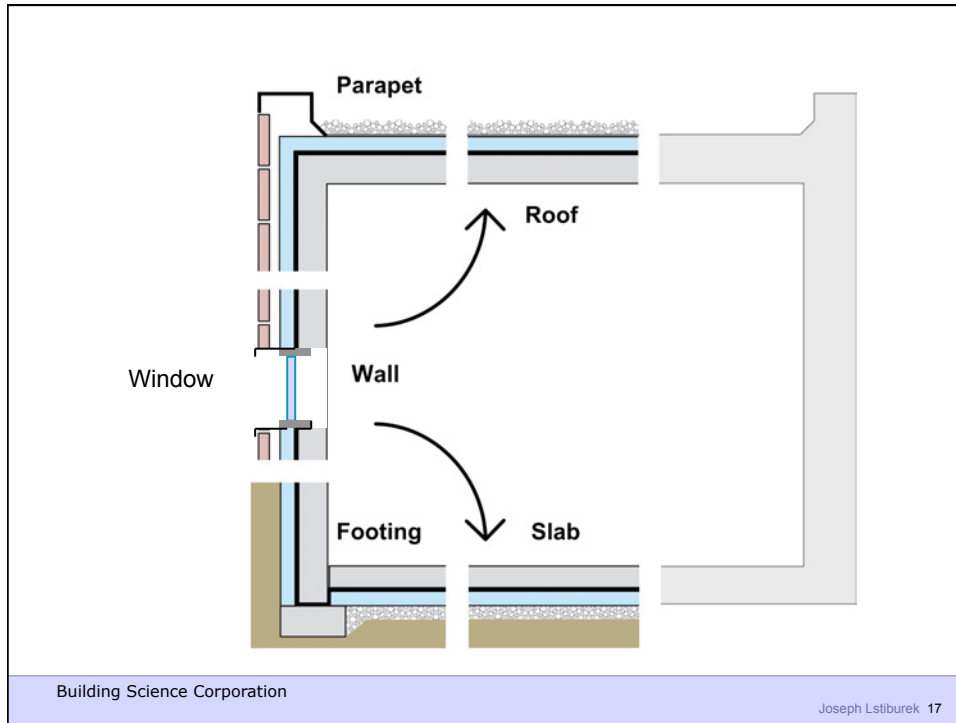


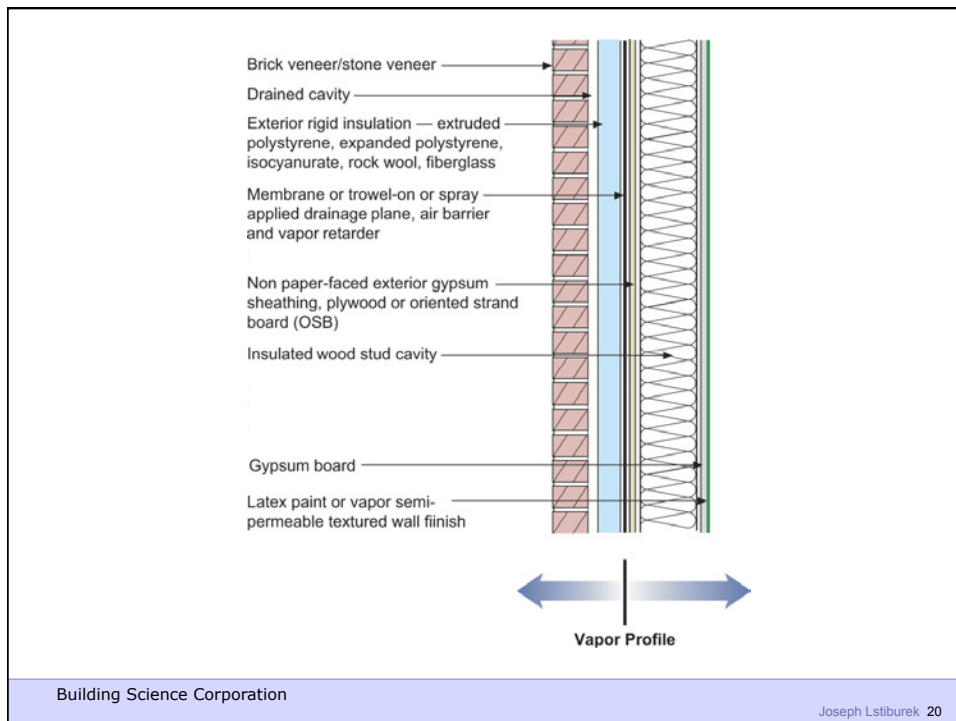
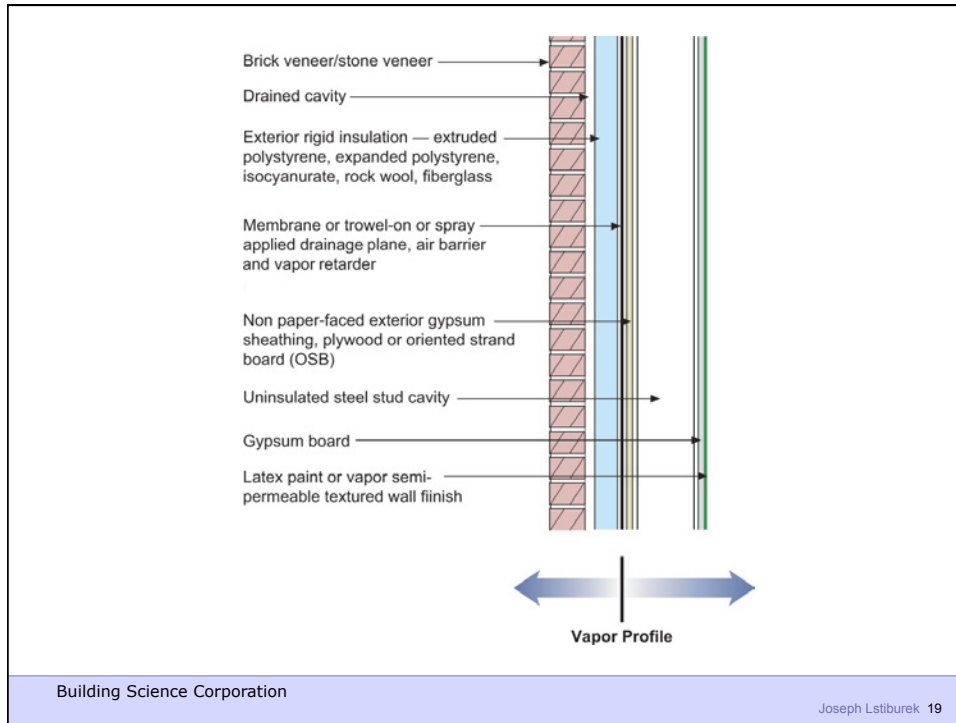


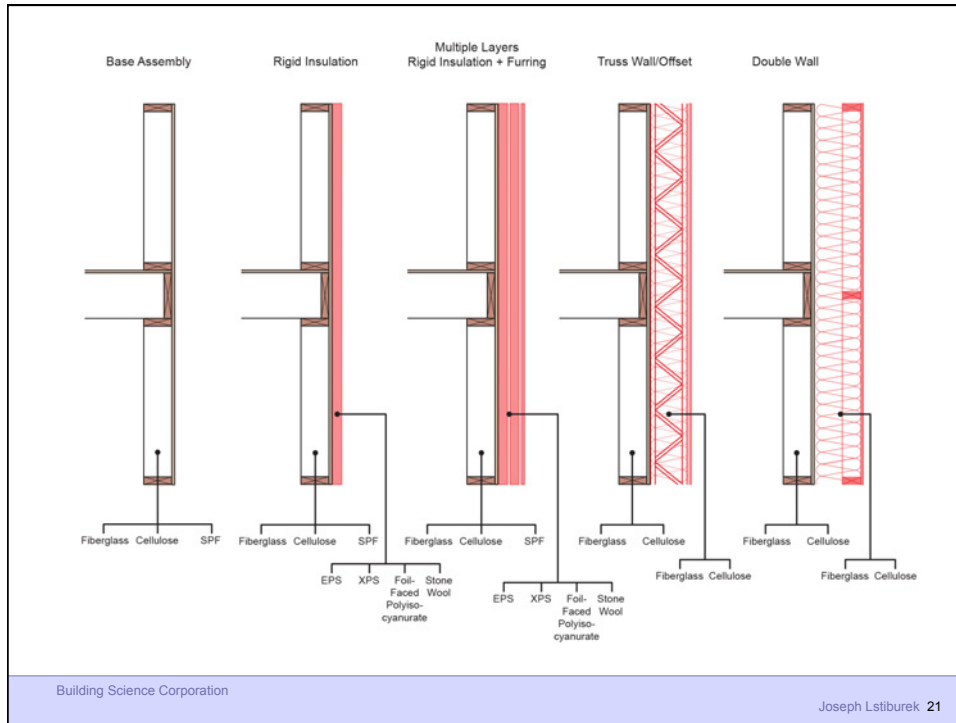










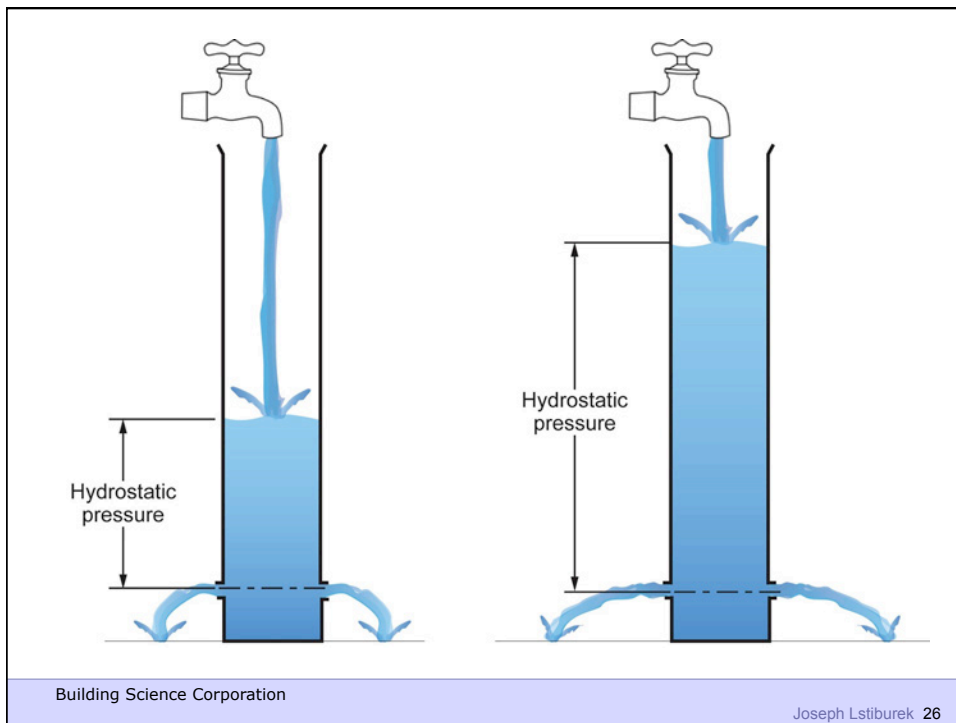






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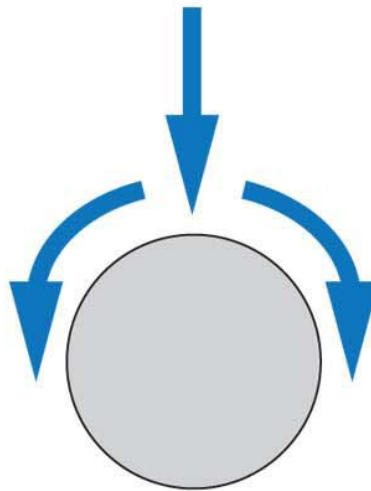
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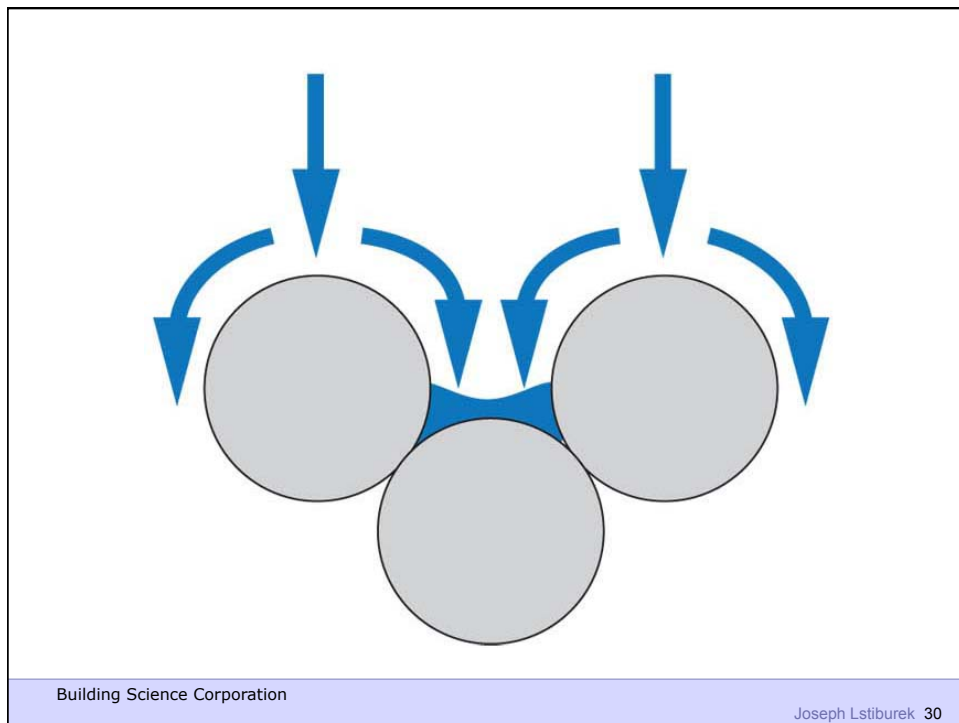
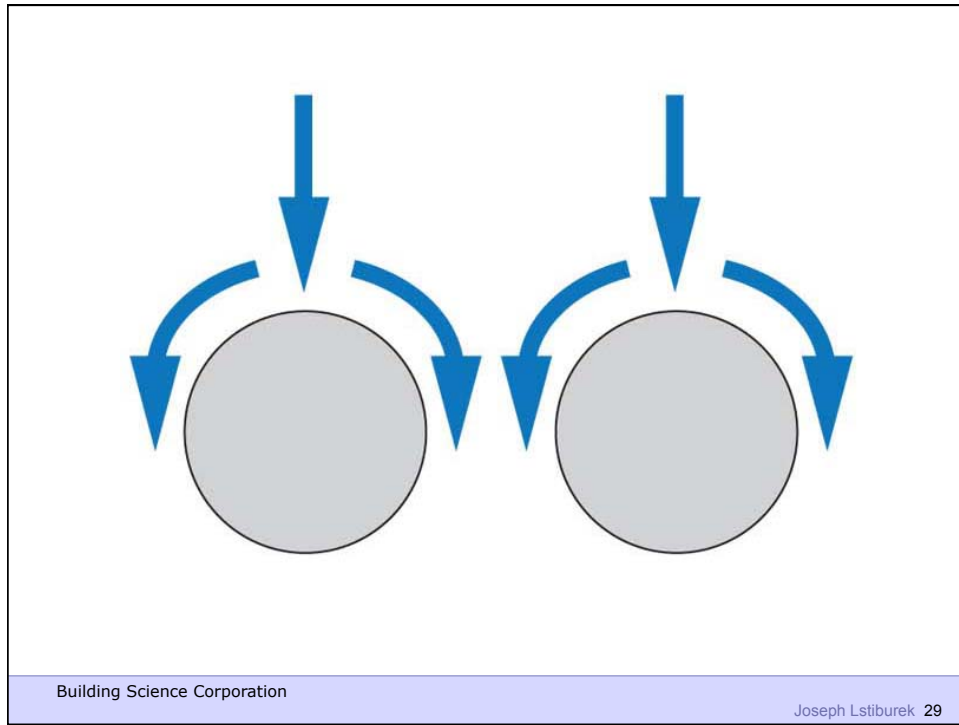
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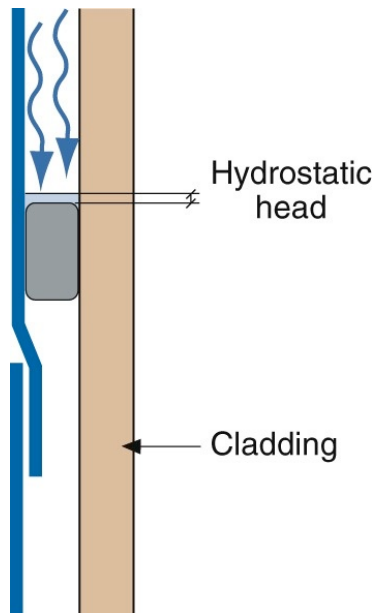
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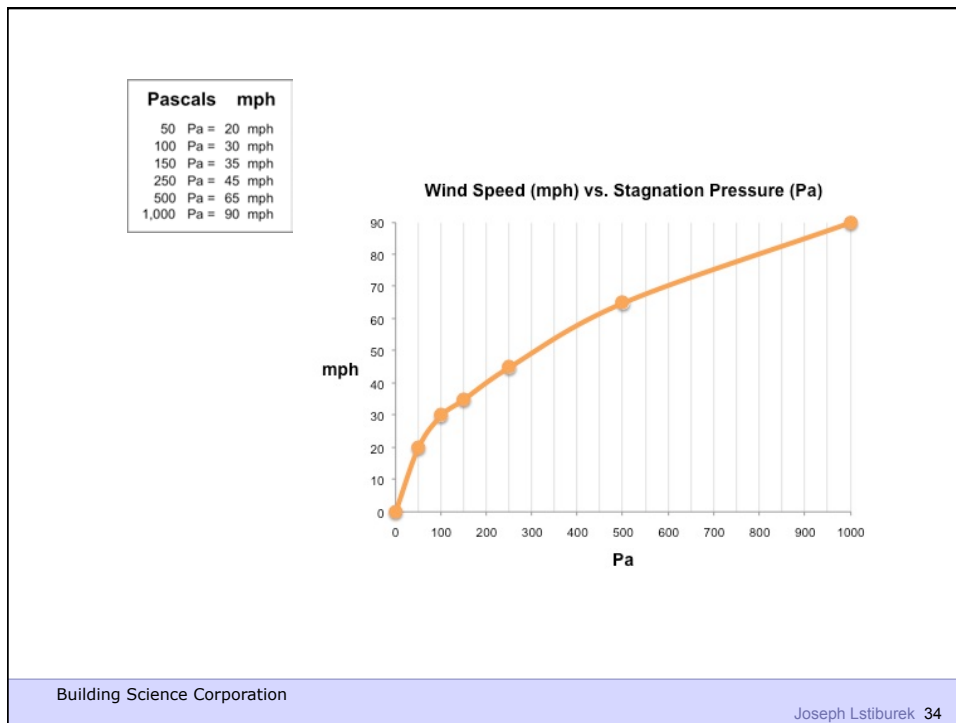
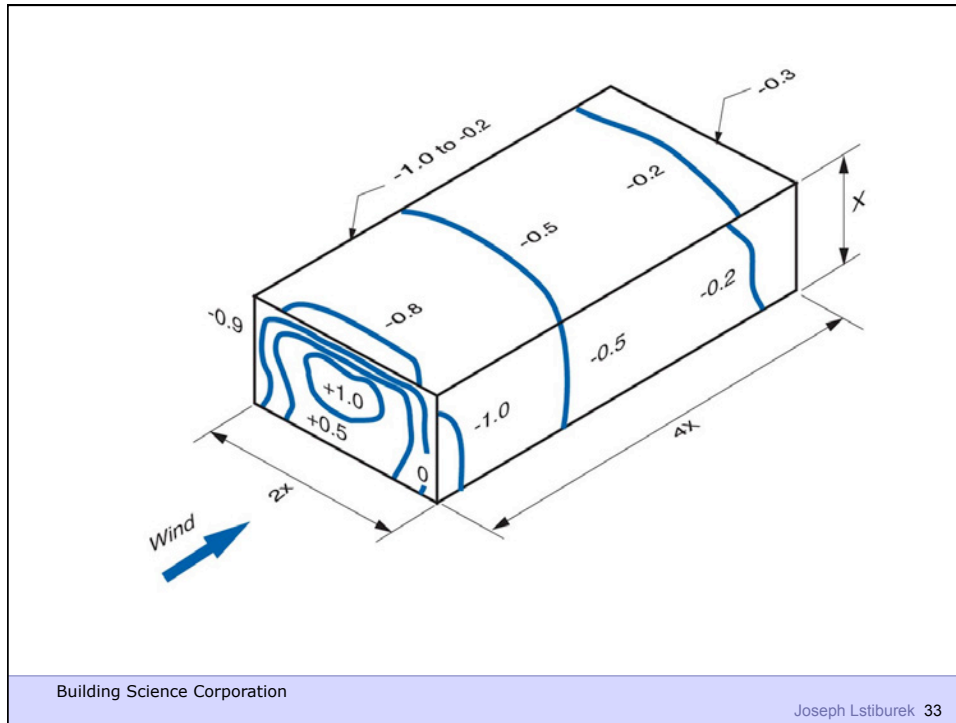
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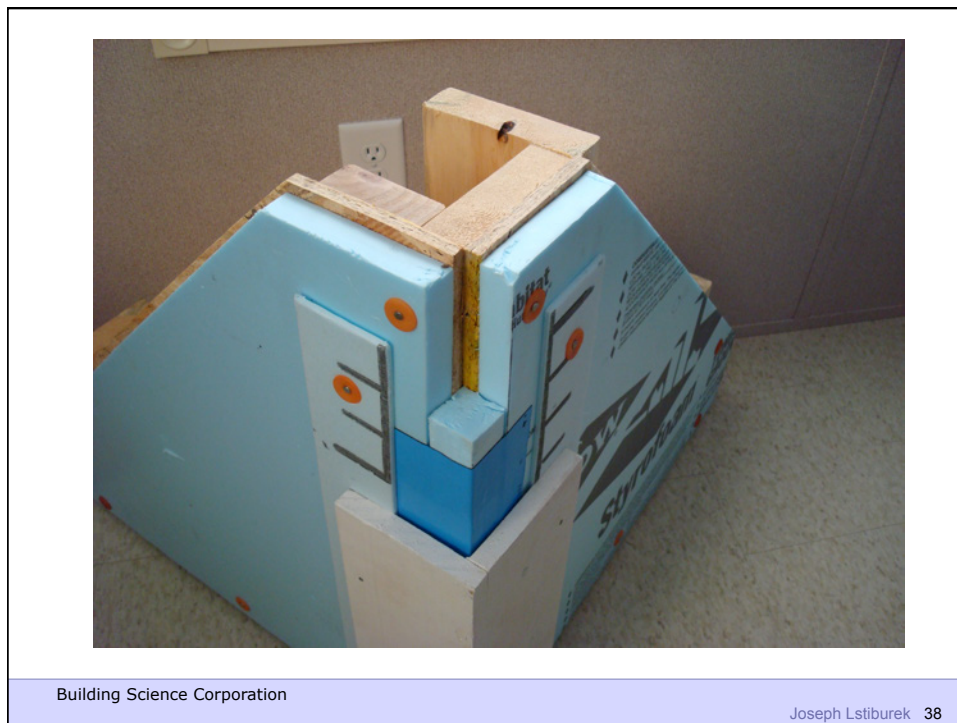
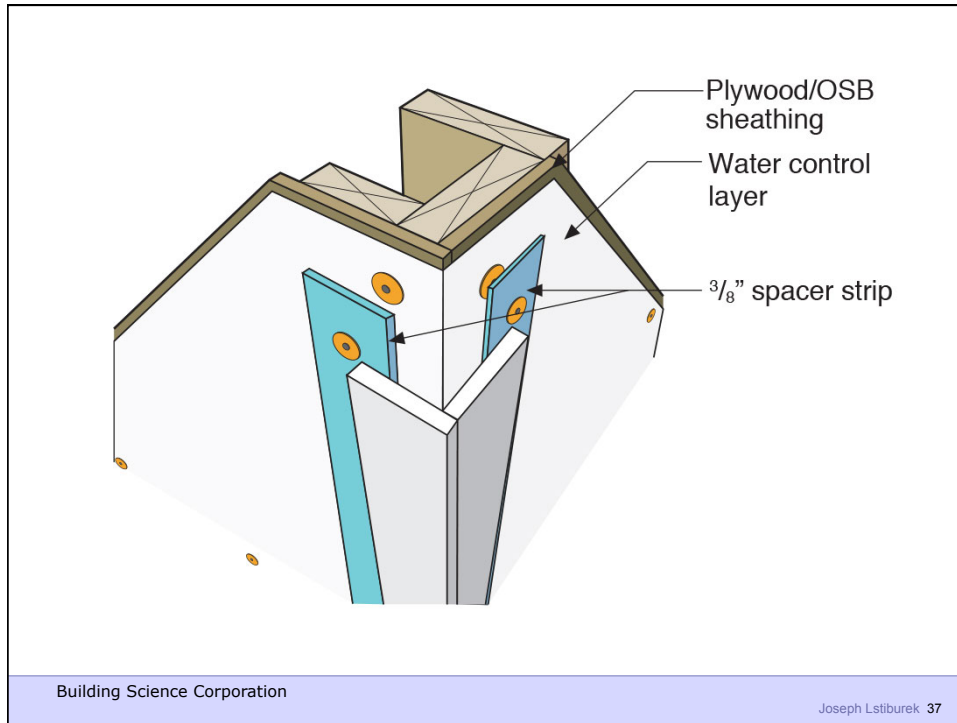




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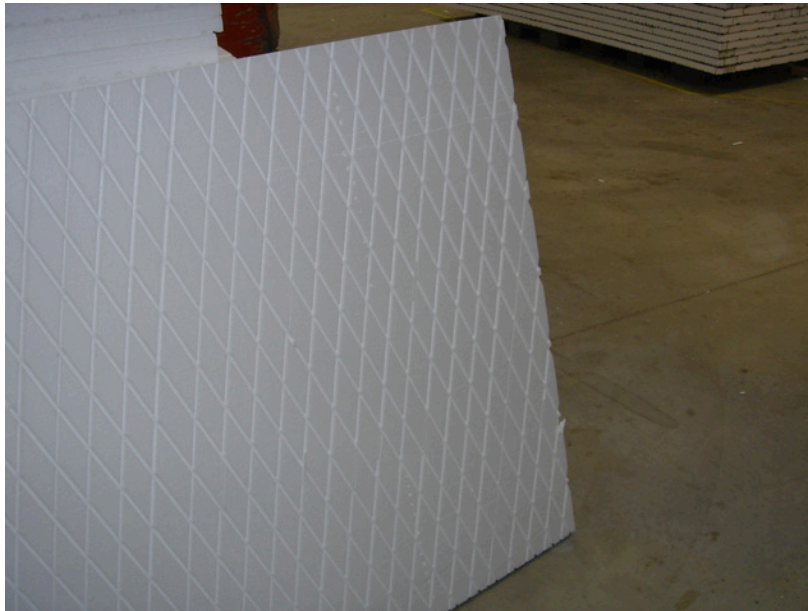
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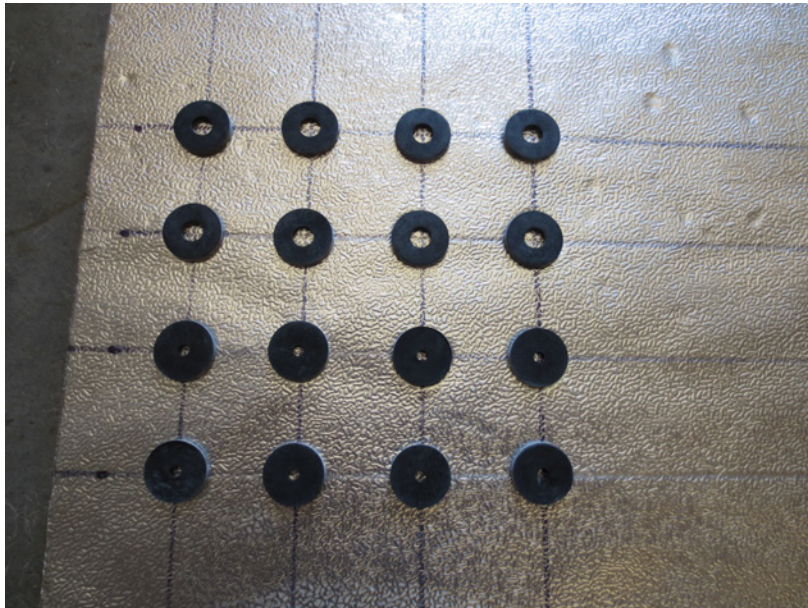
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# Rain Screen

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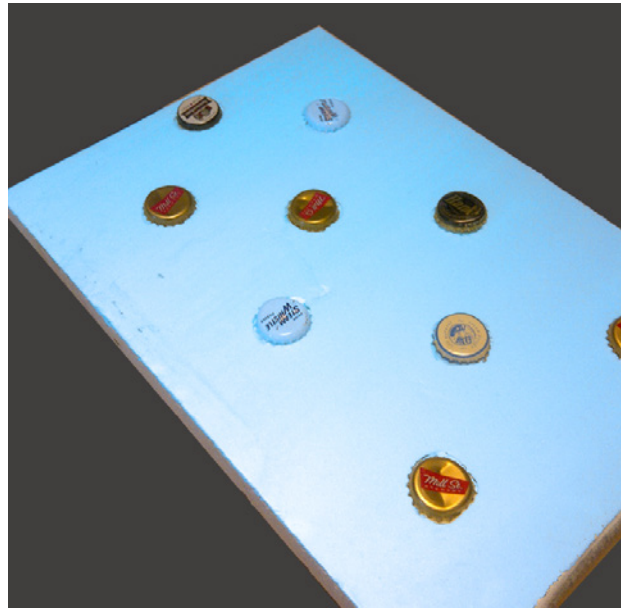
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# Beer Screen?

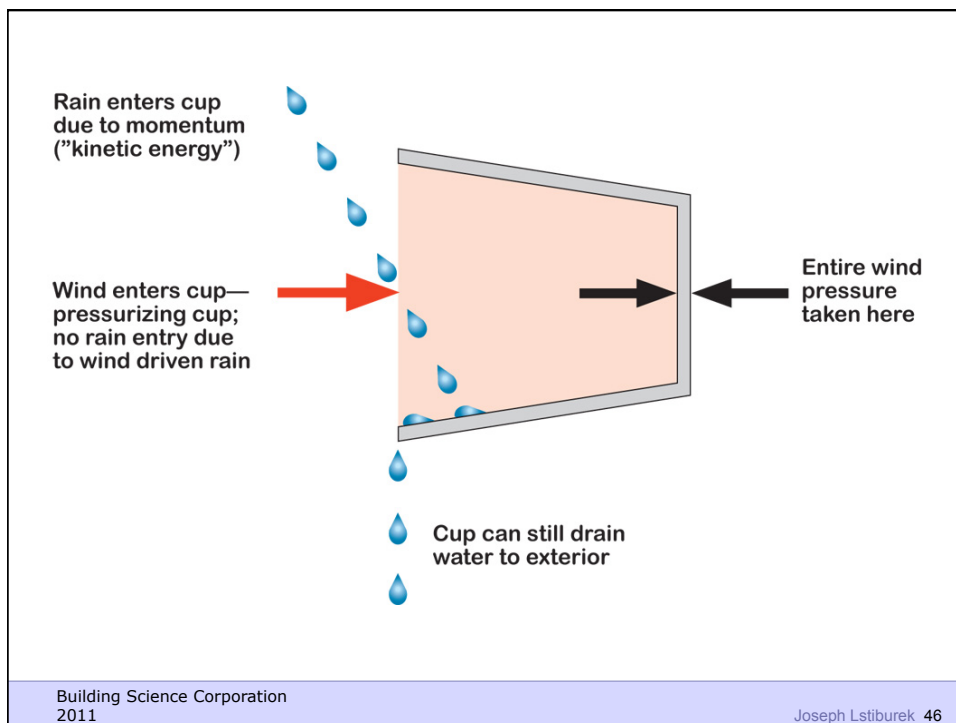
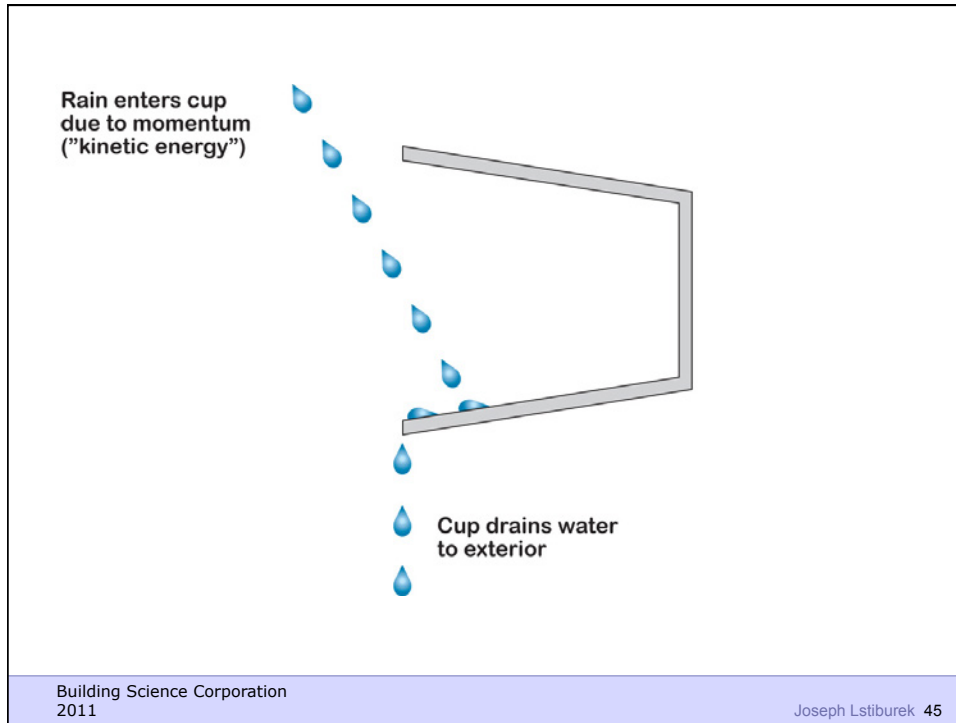
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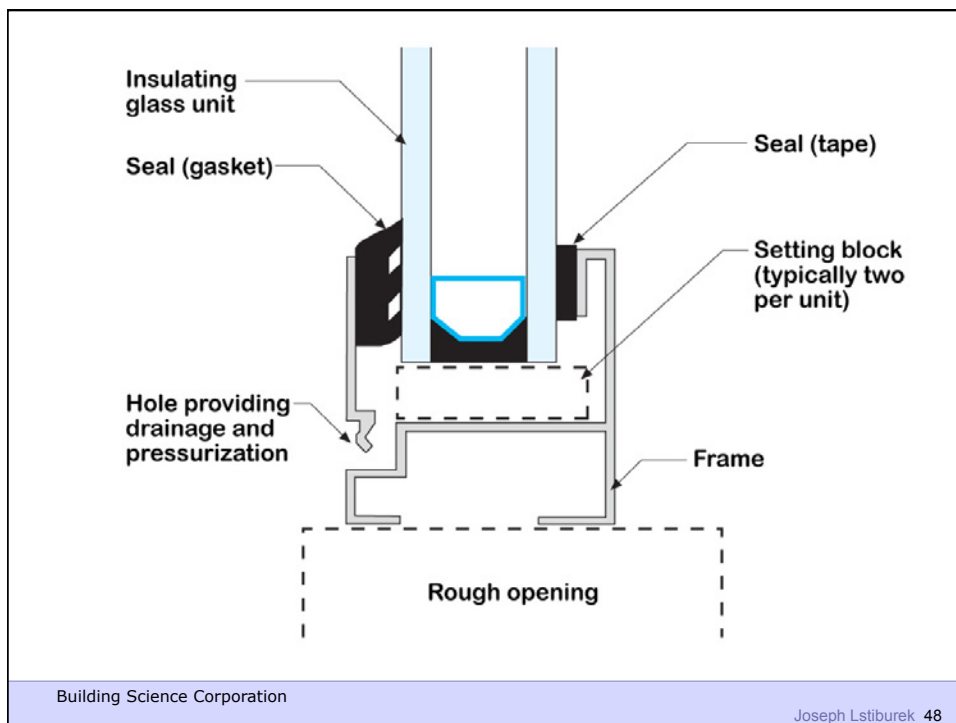
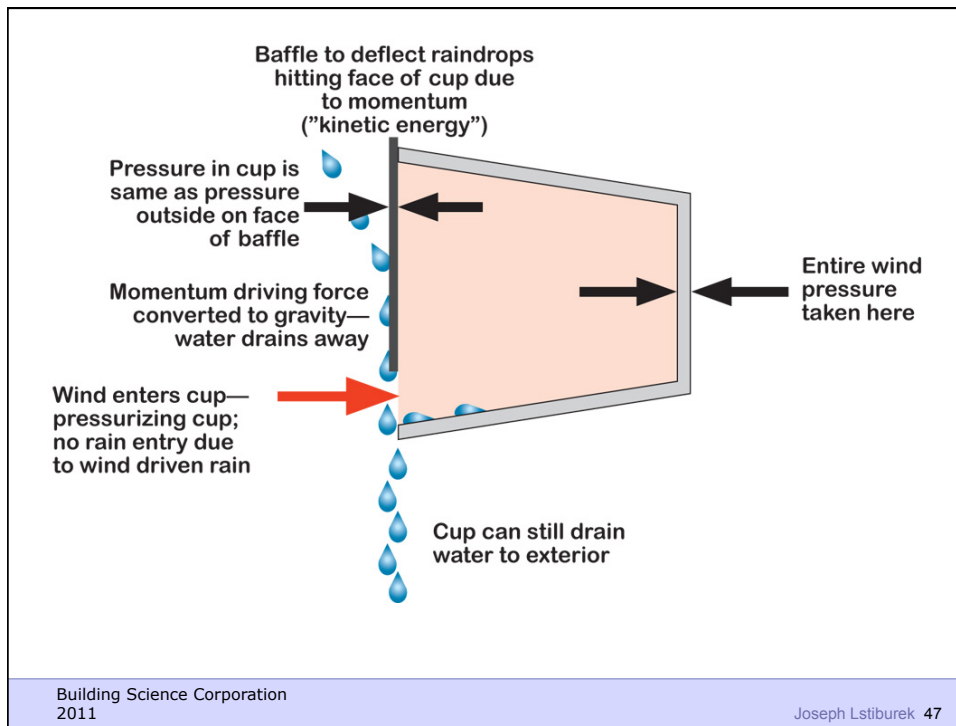
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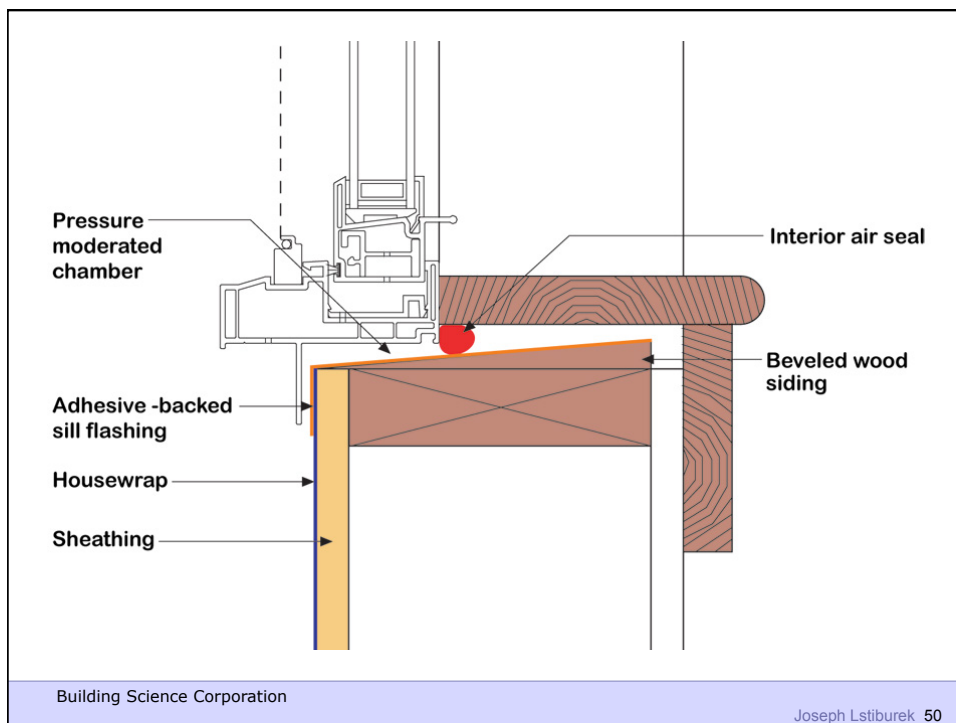
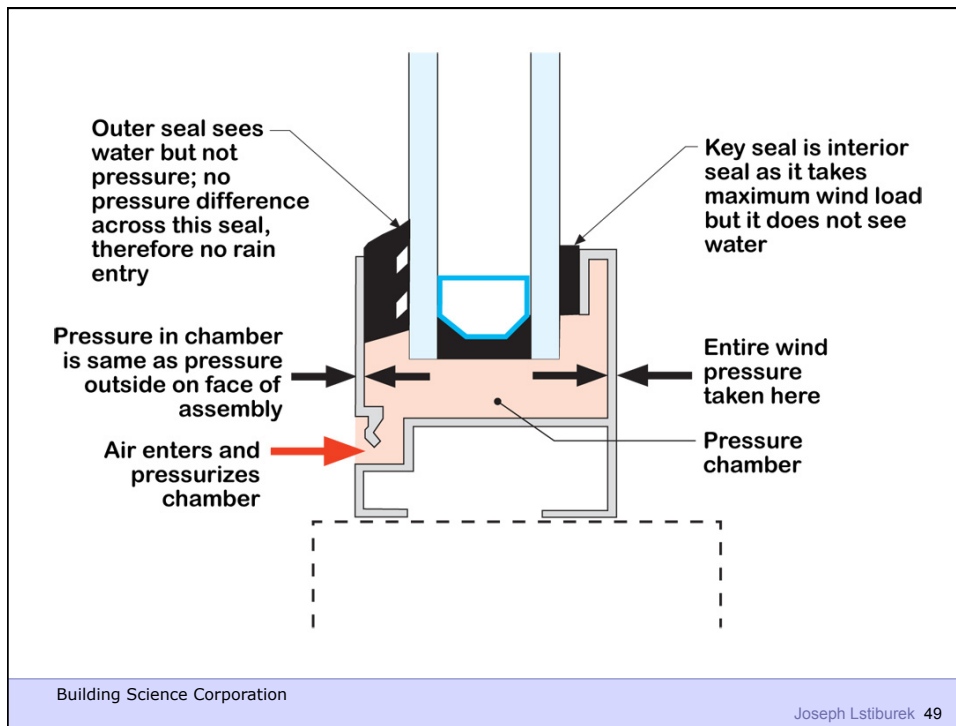
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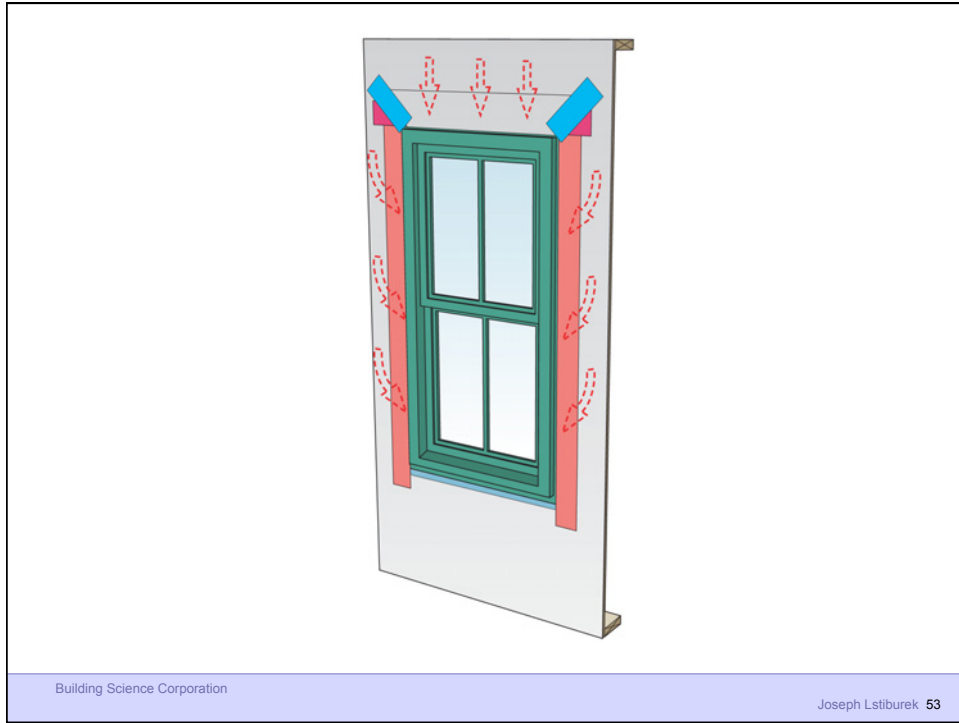
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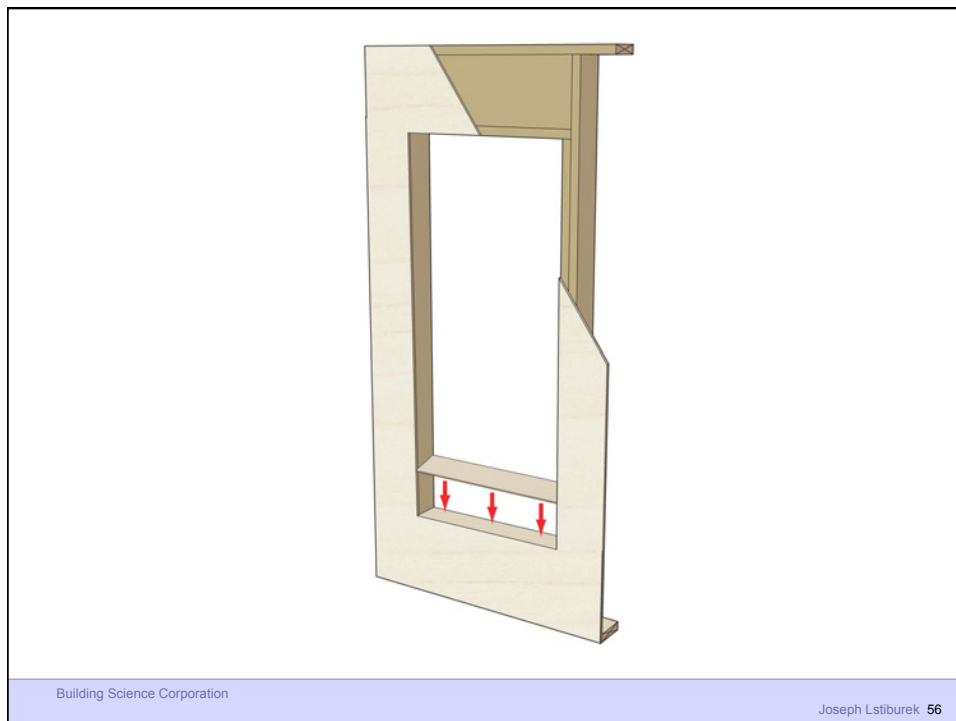
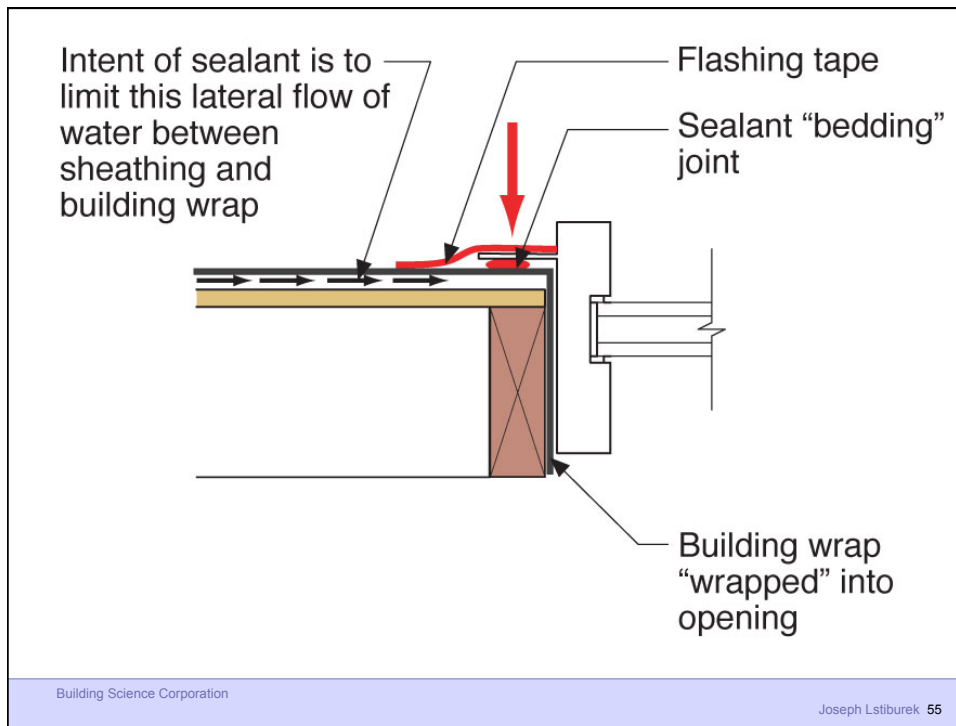
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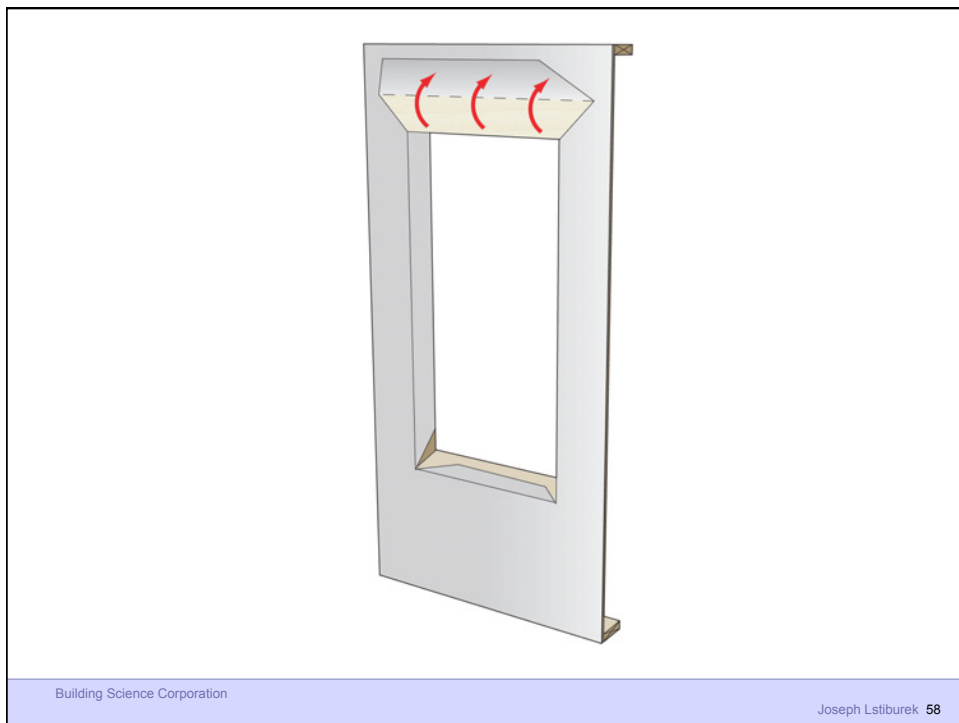
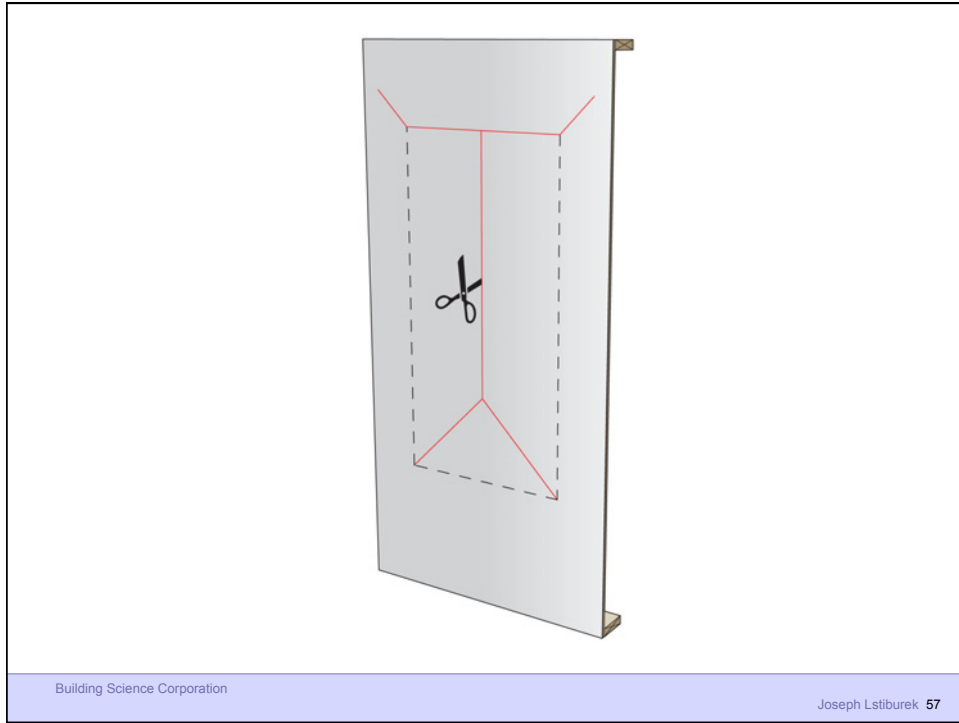


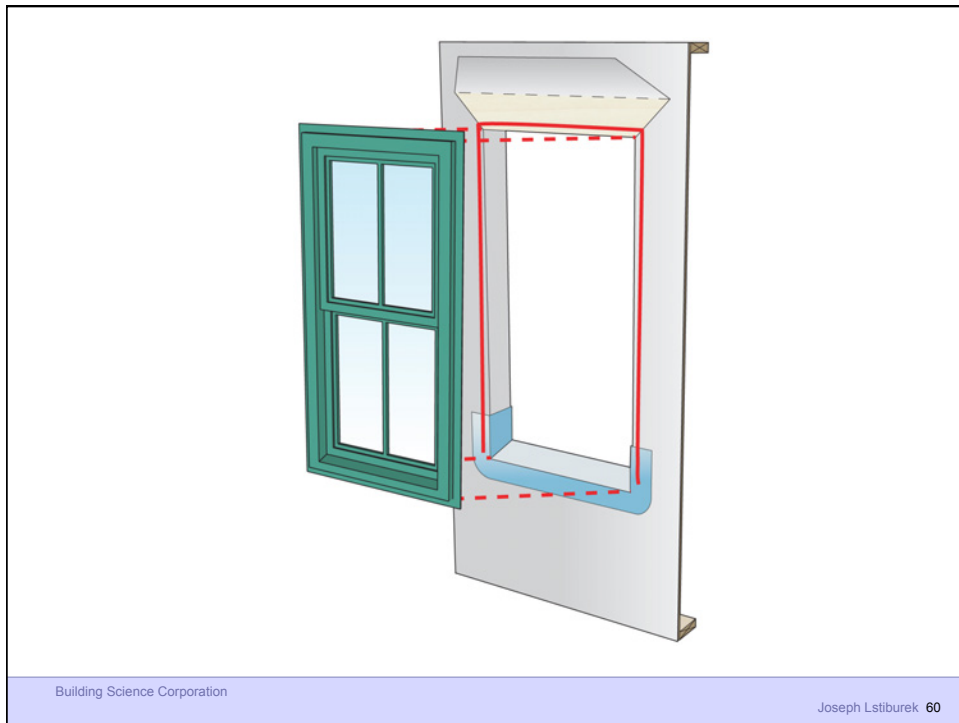
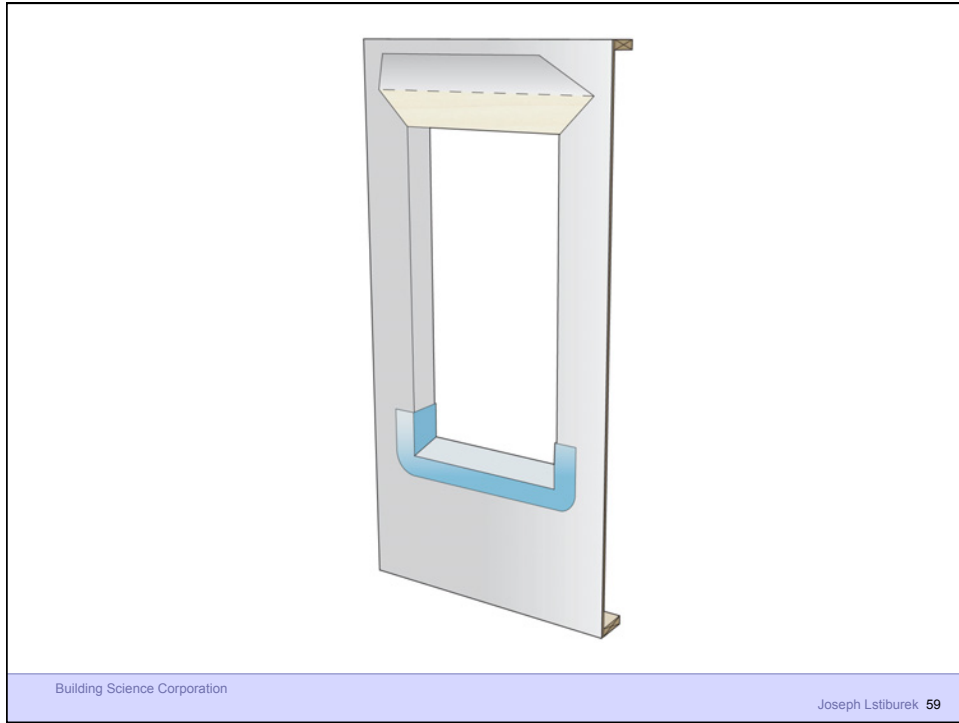
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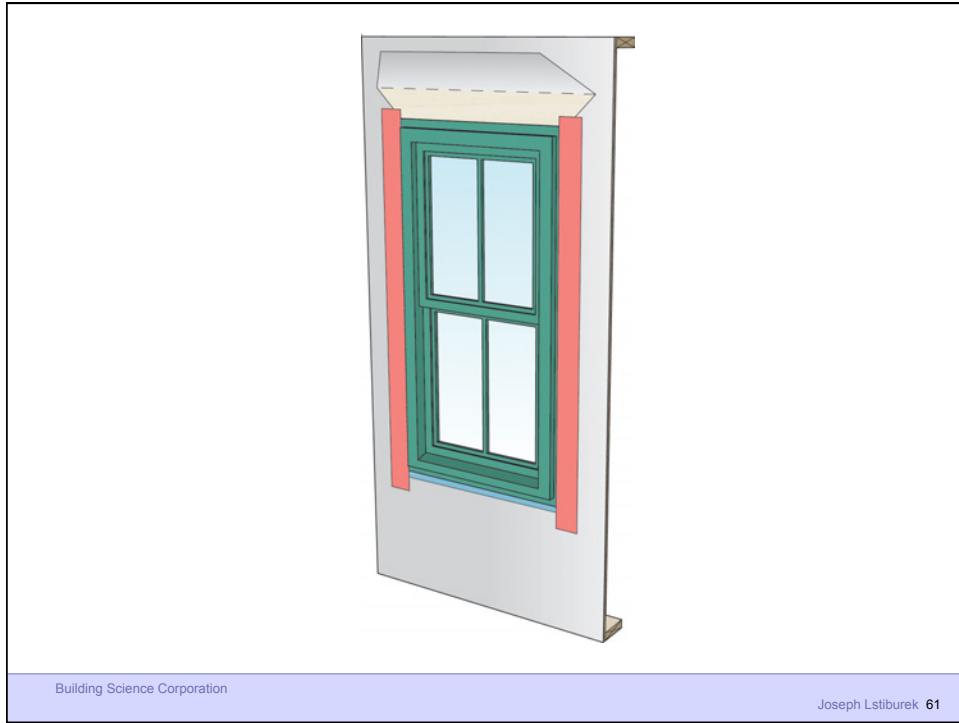
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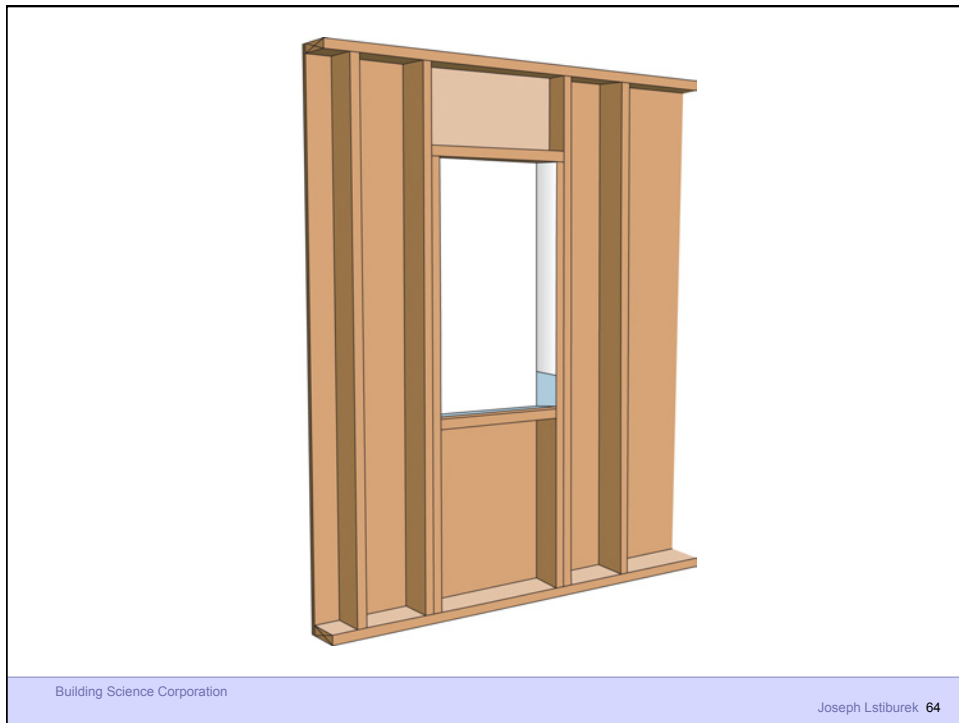
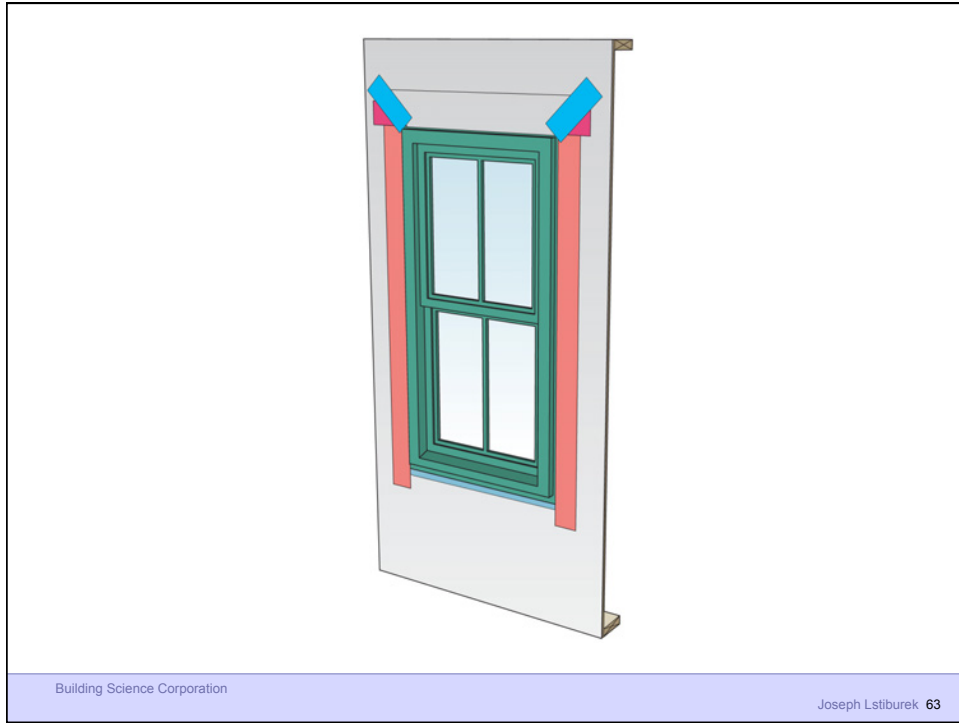




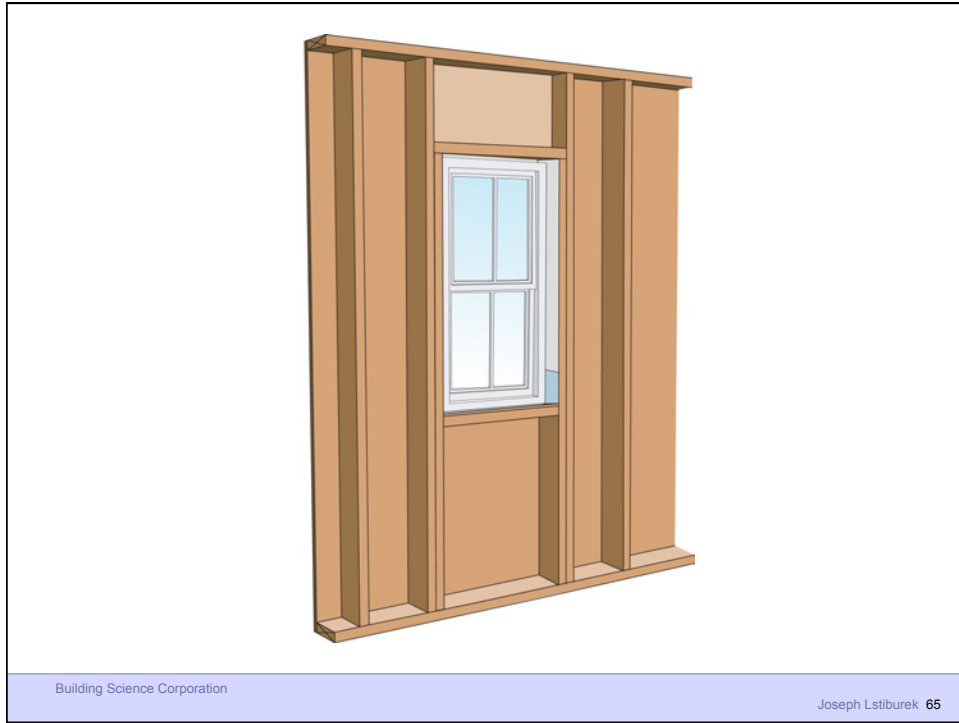














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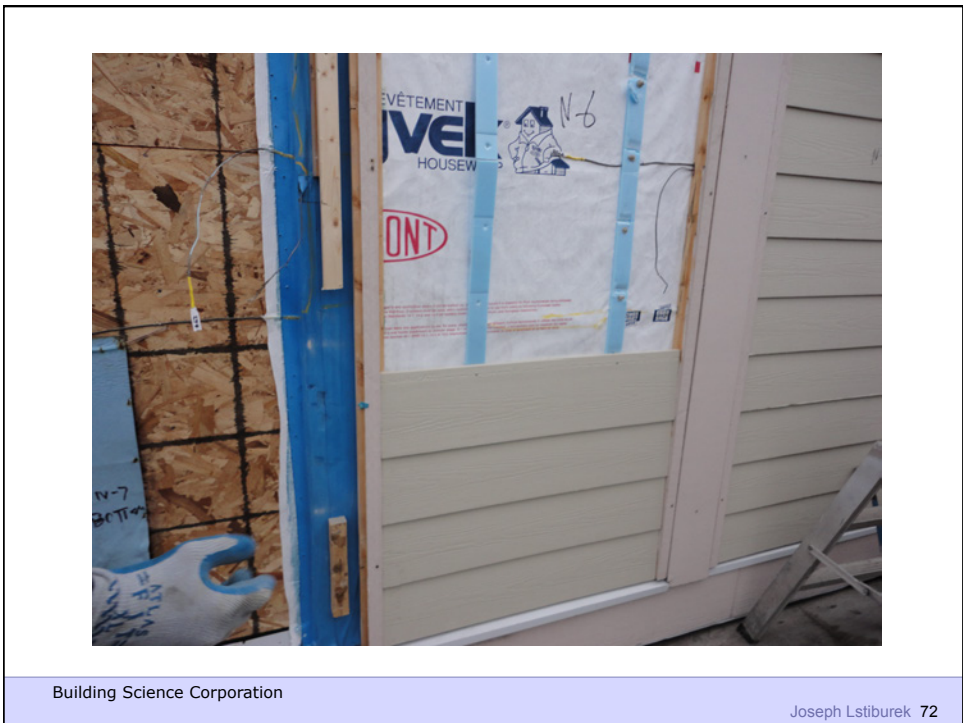
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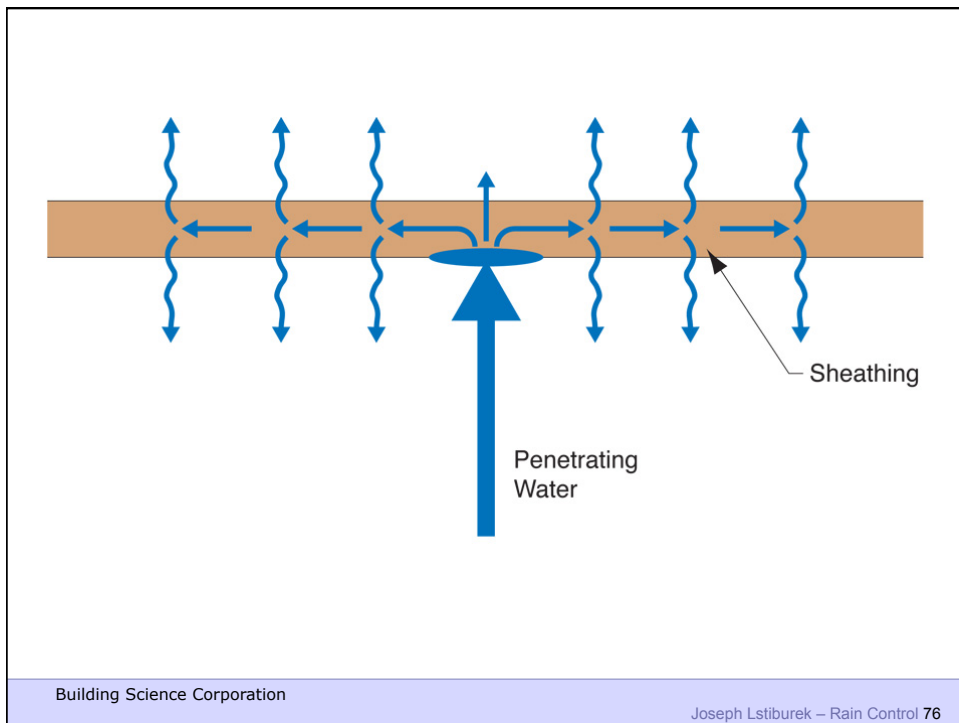


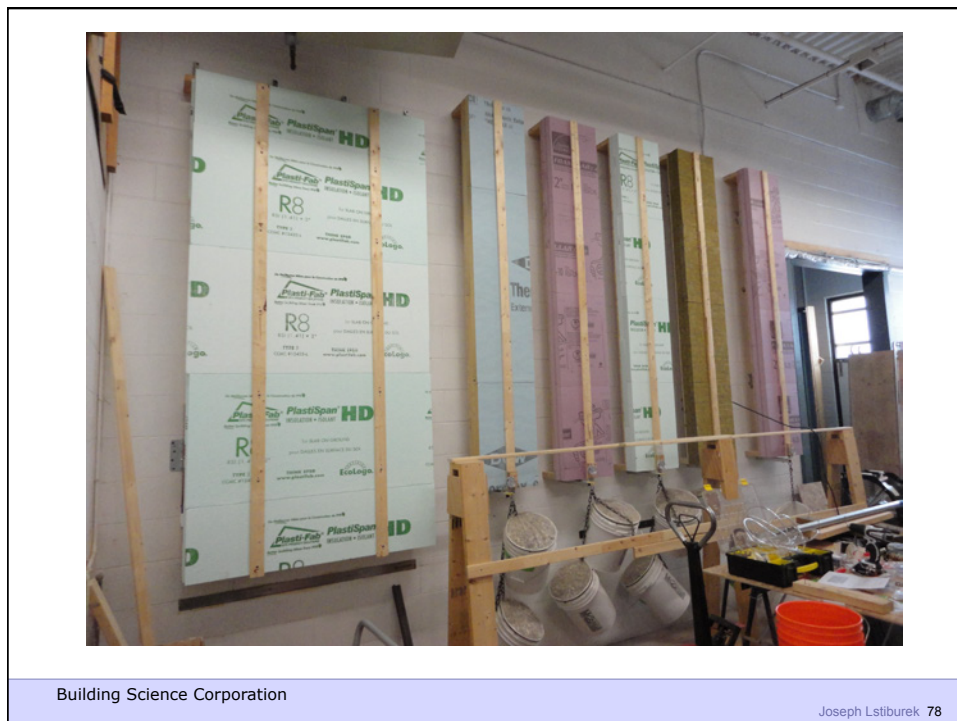
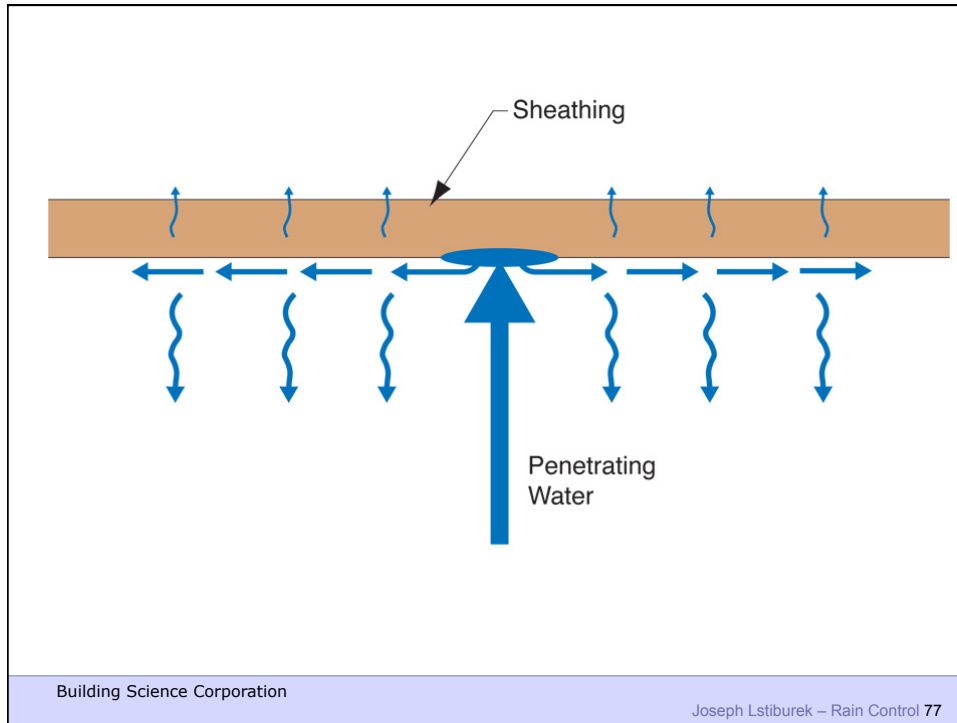
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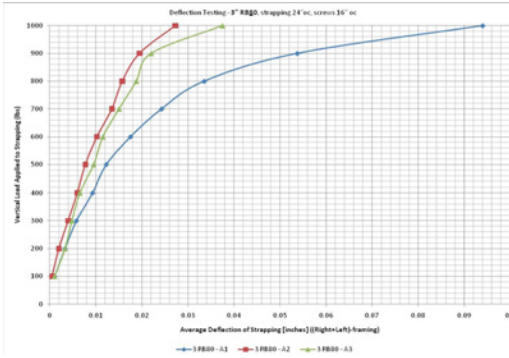


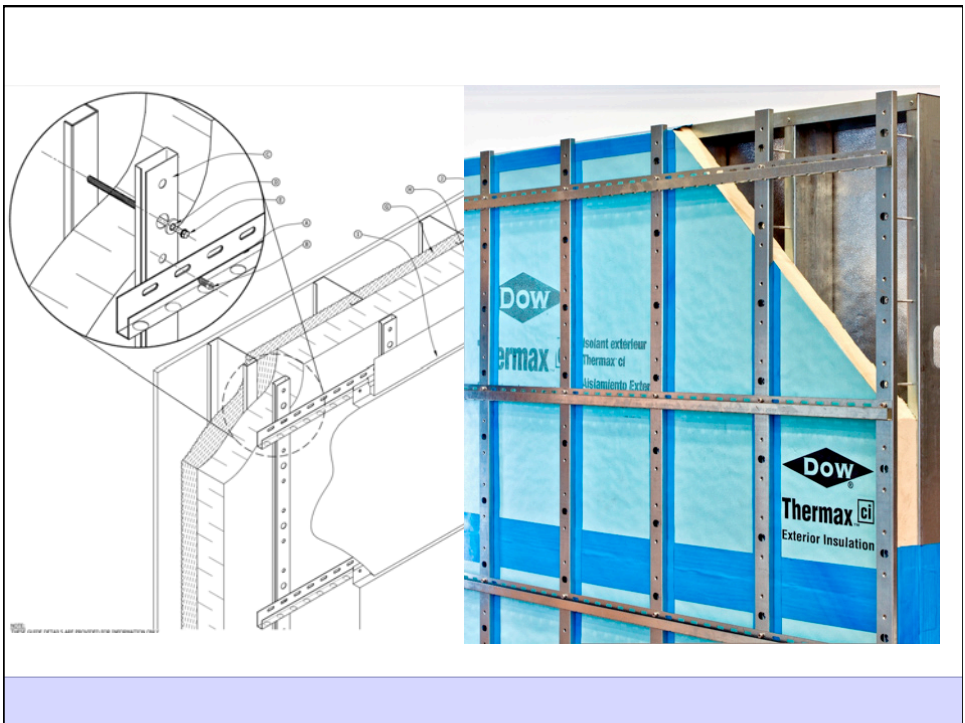
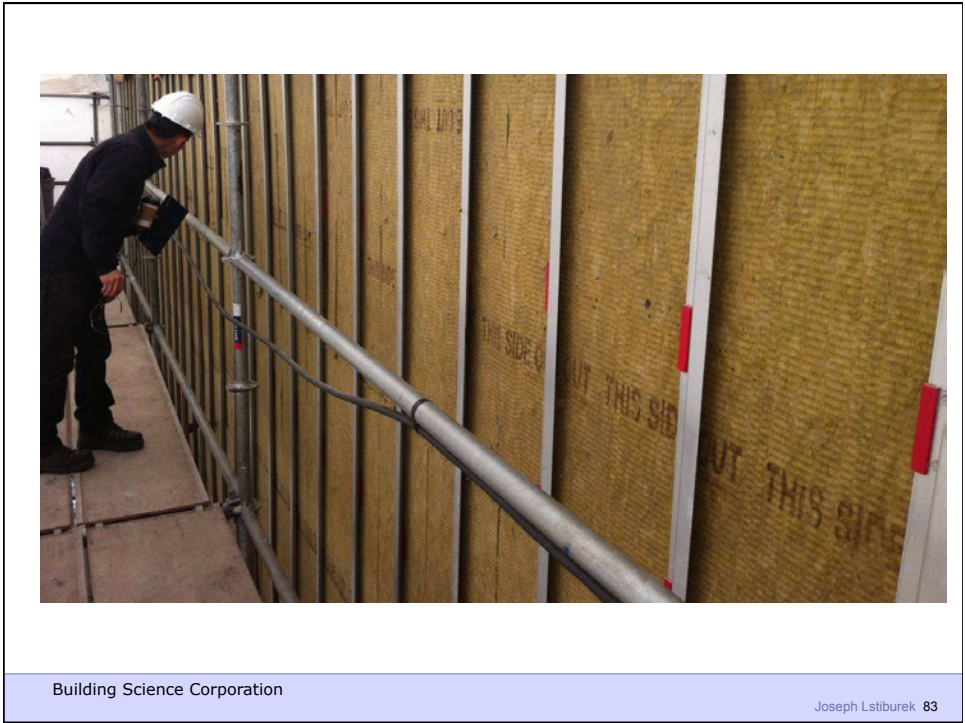


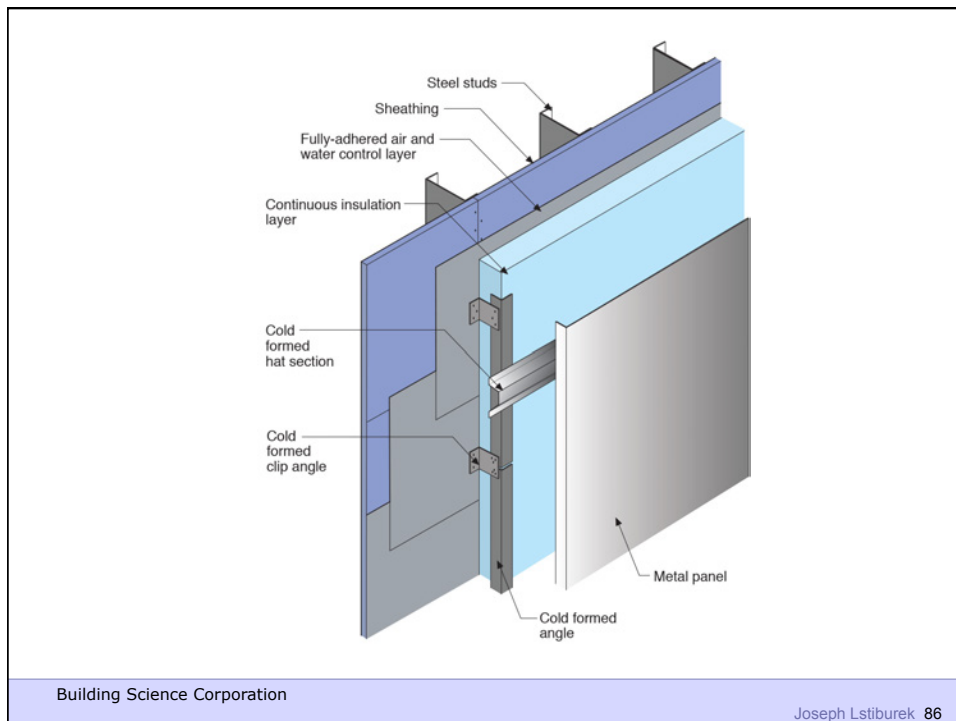
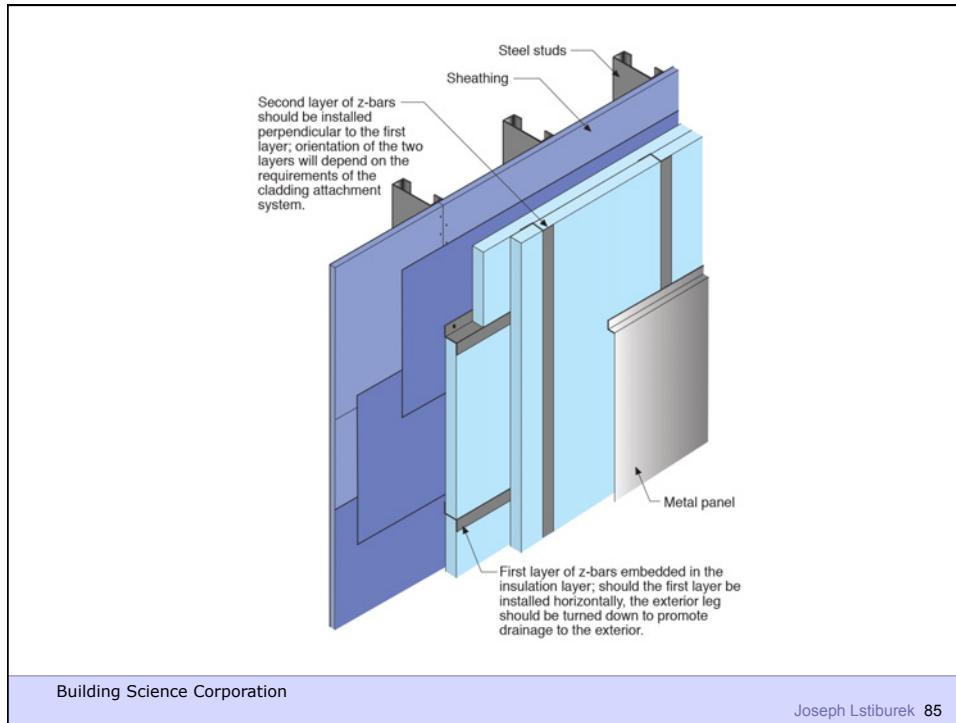


# Rockwool

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







## Housewraps are so 80's

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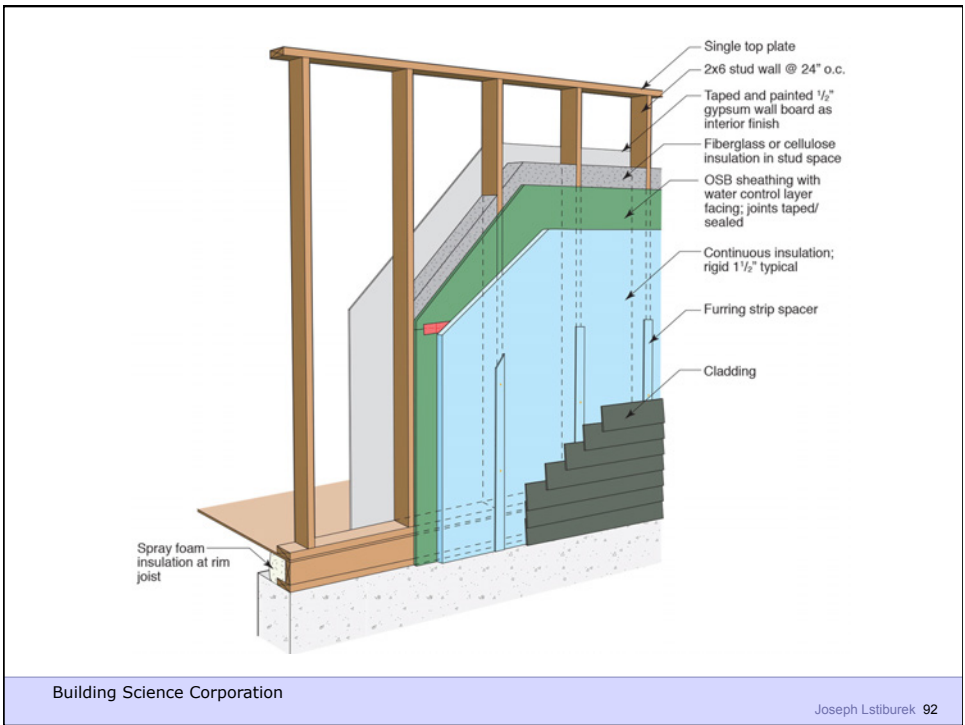
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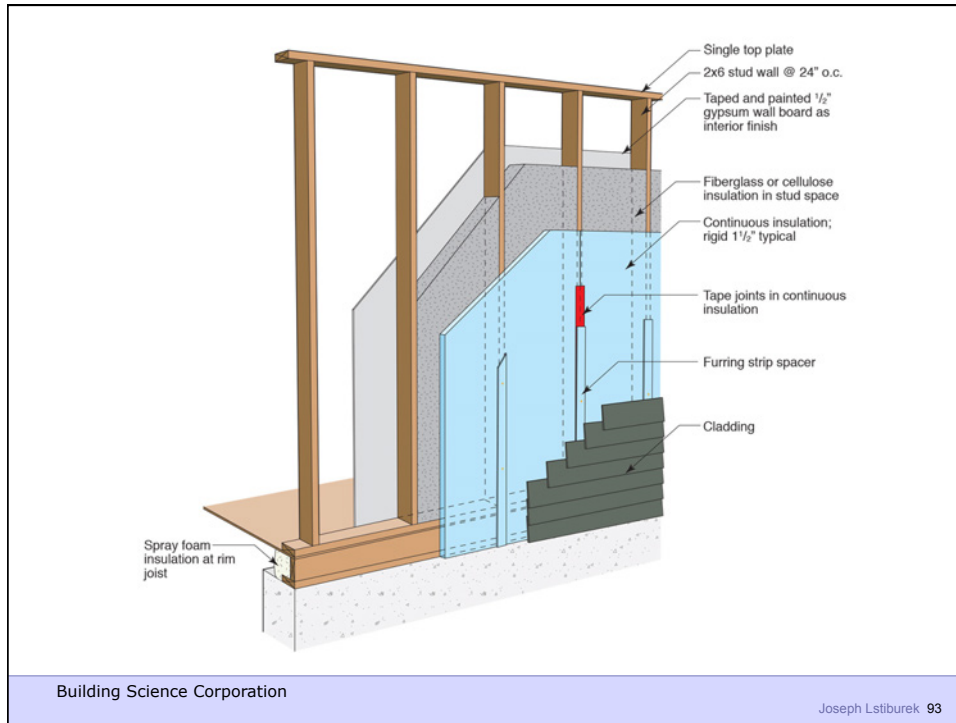


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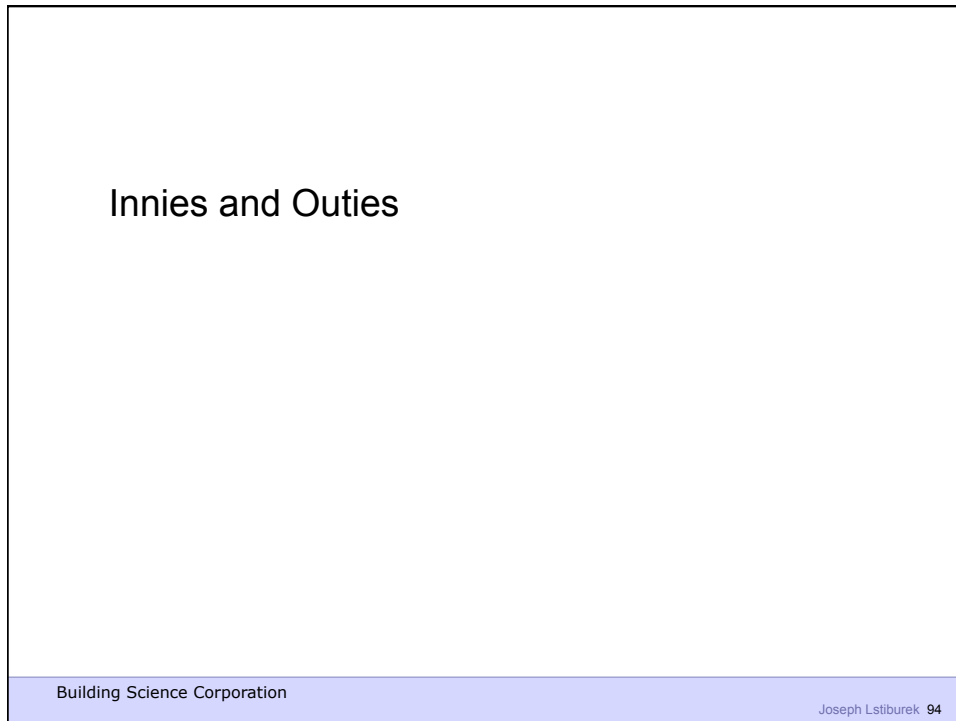
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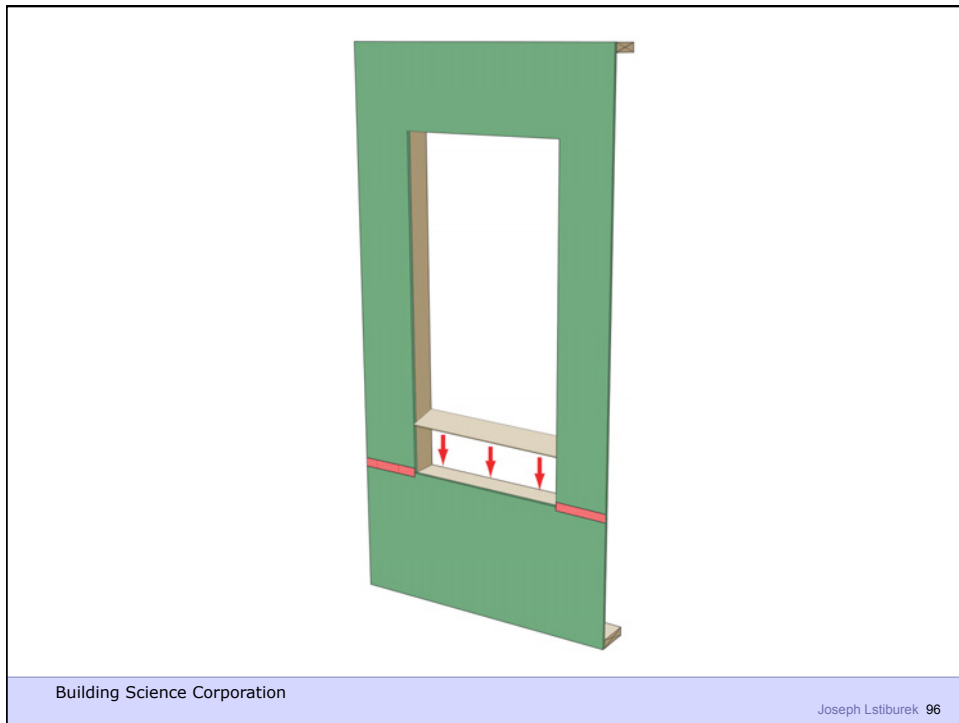
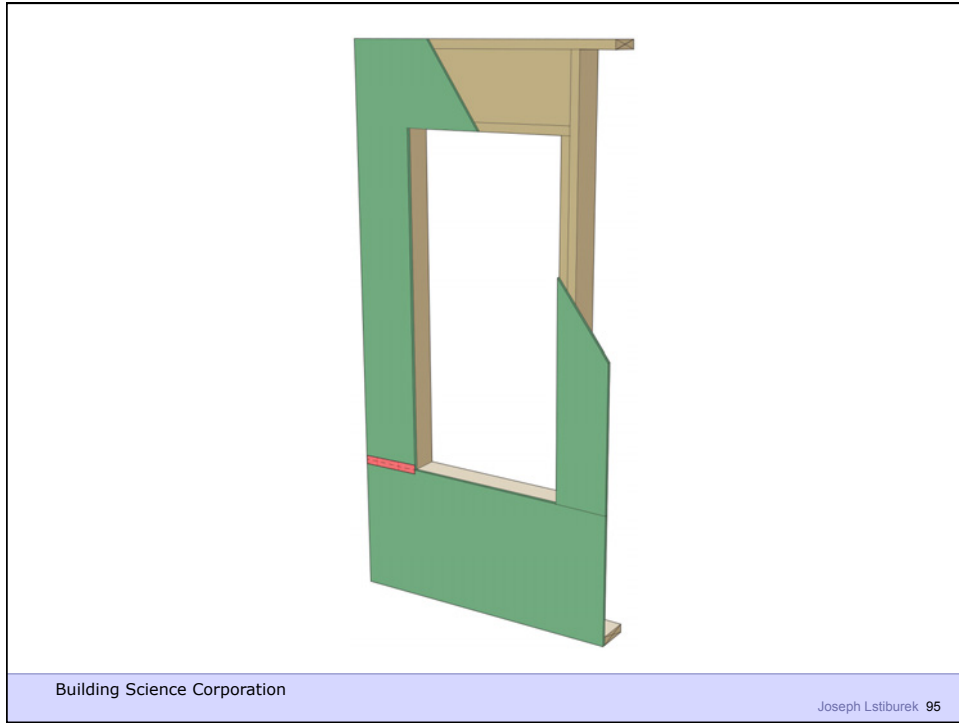




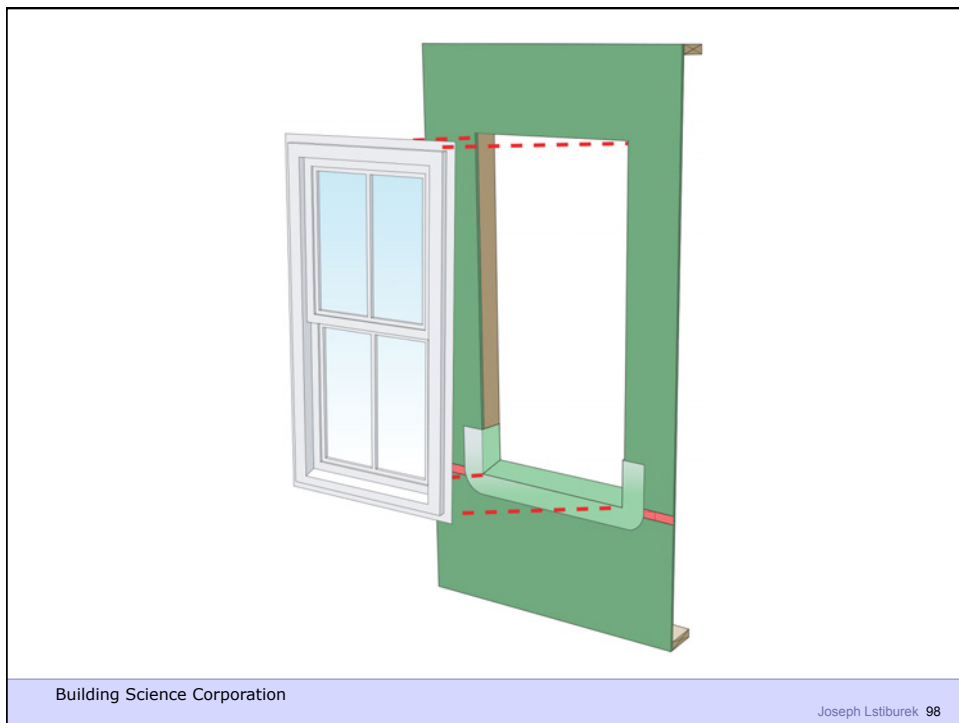
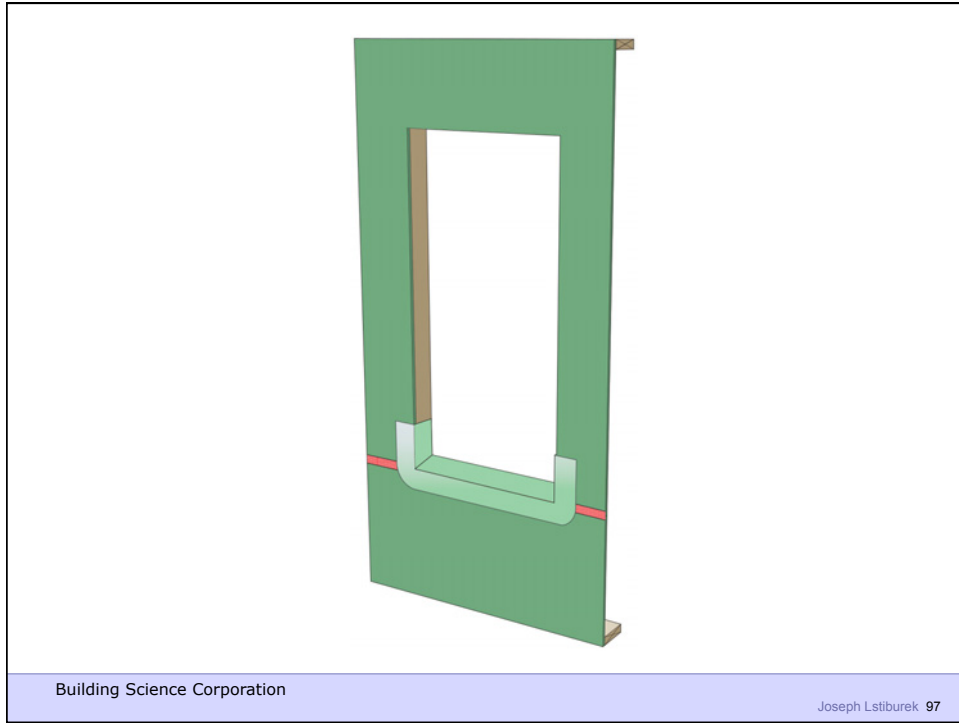


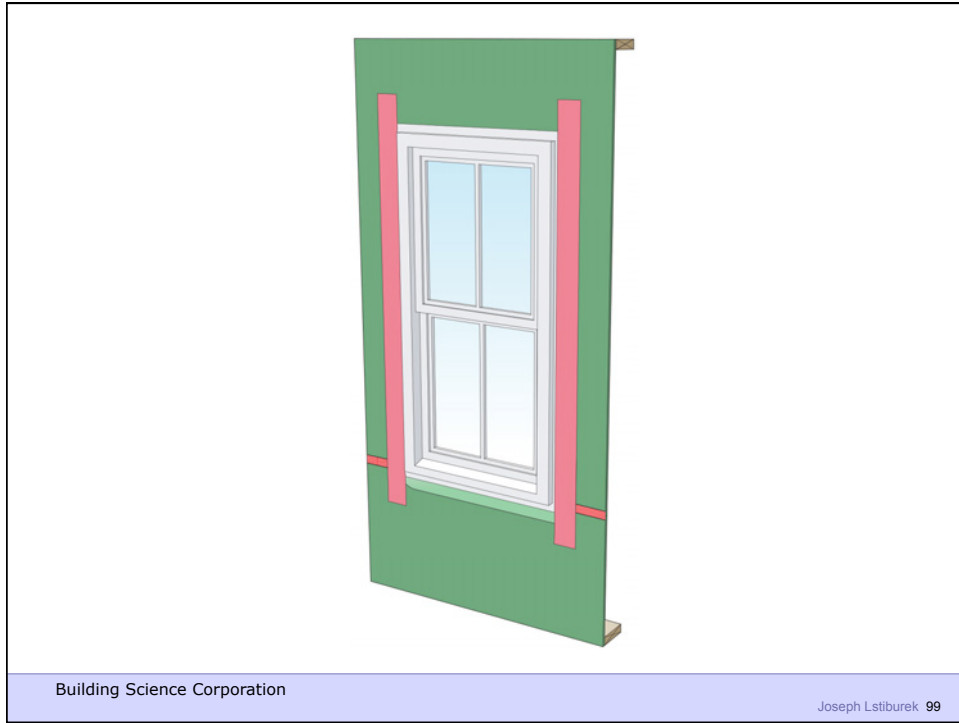
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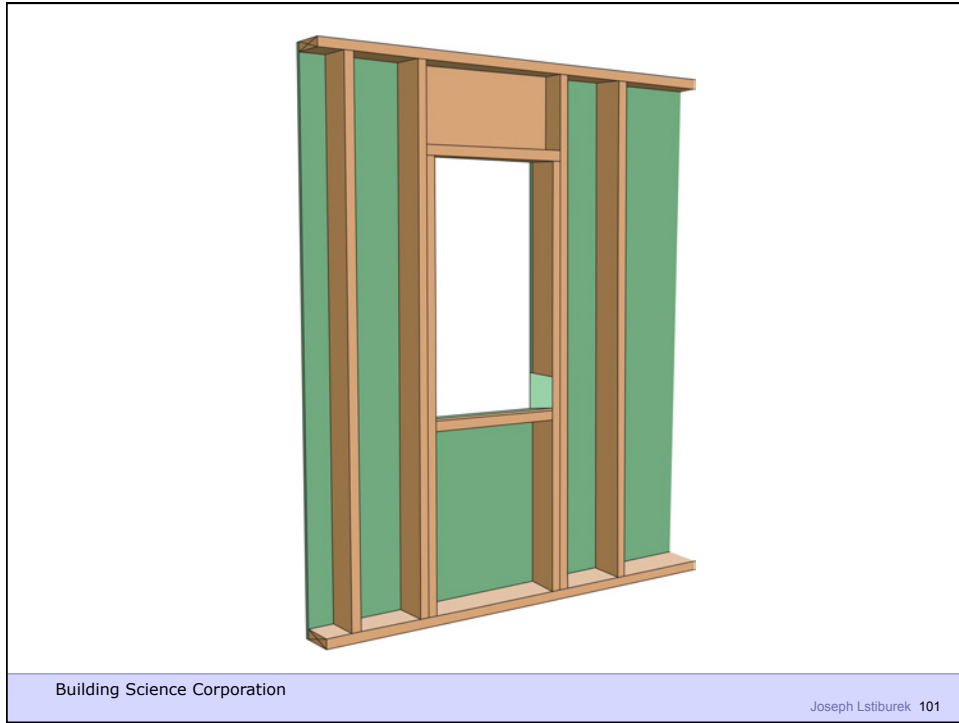


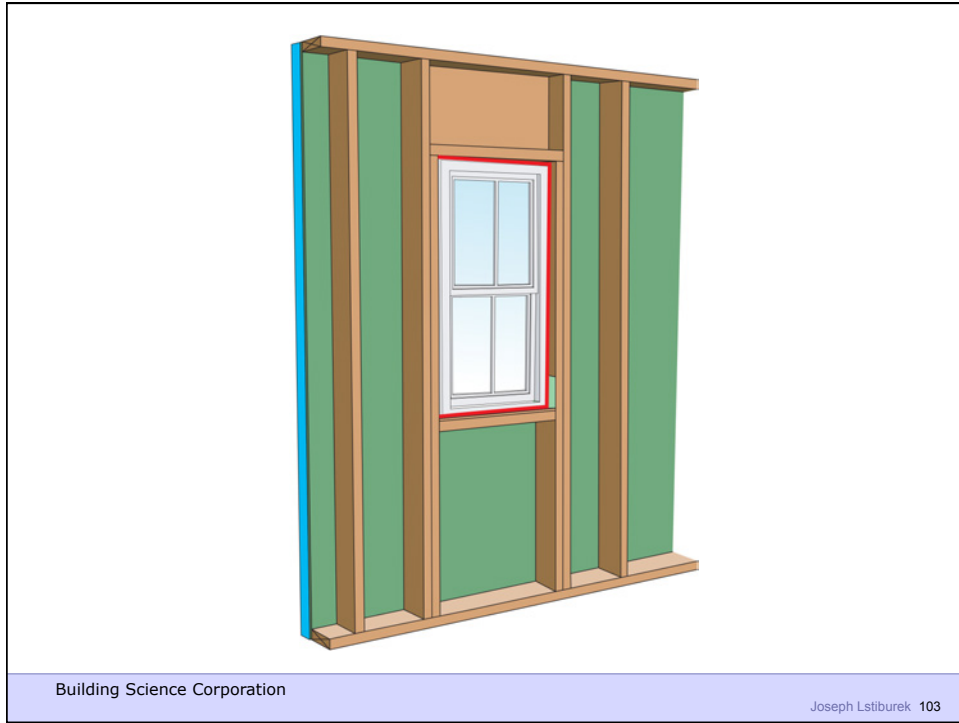








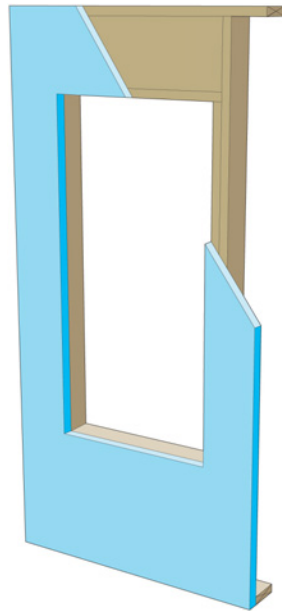




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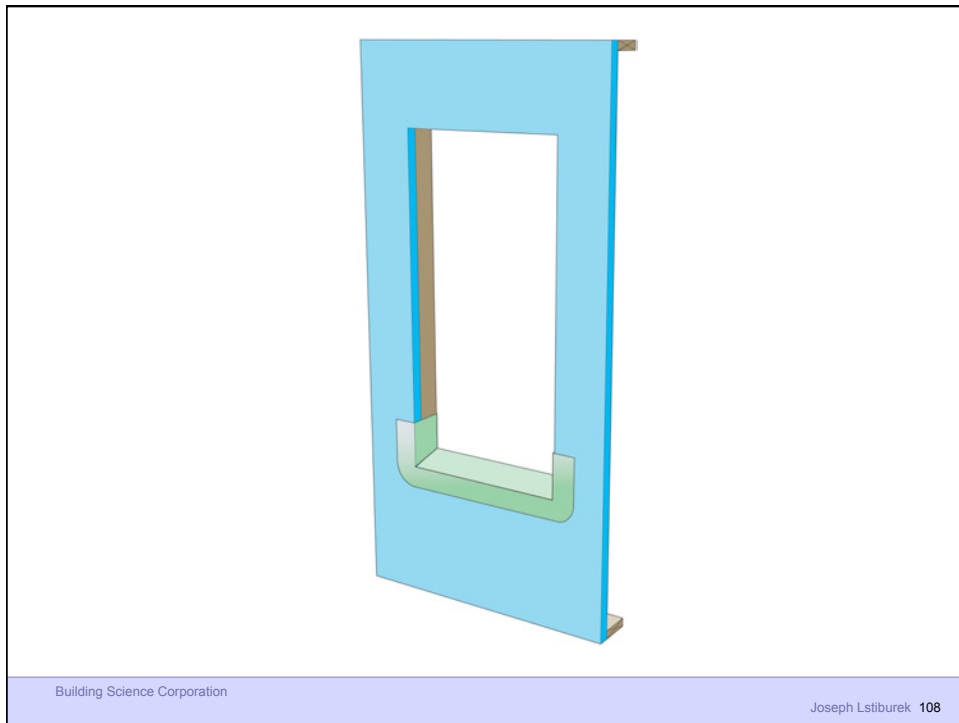
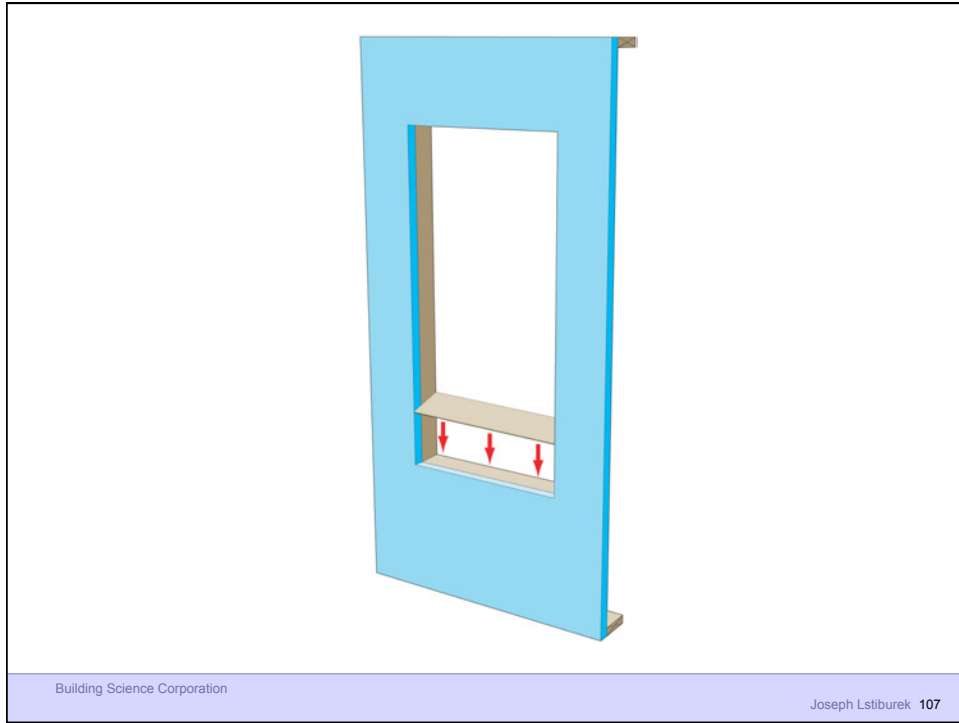
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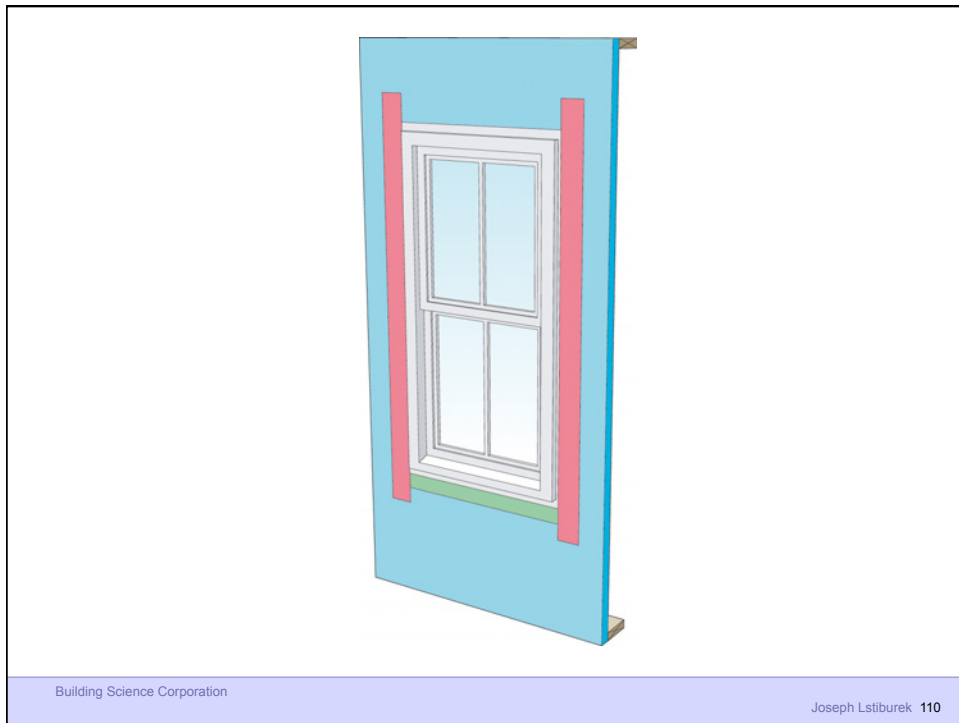
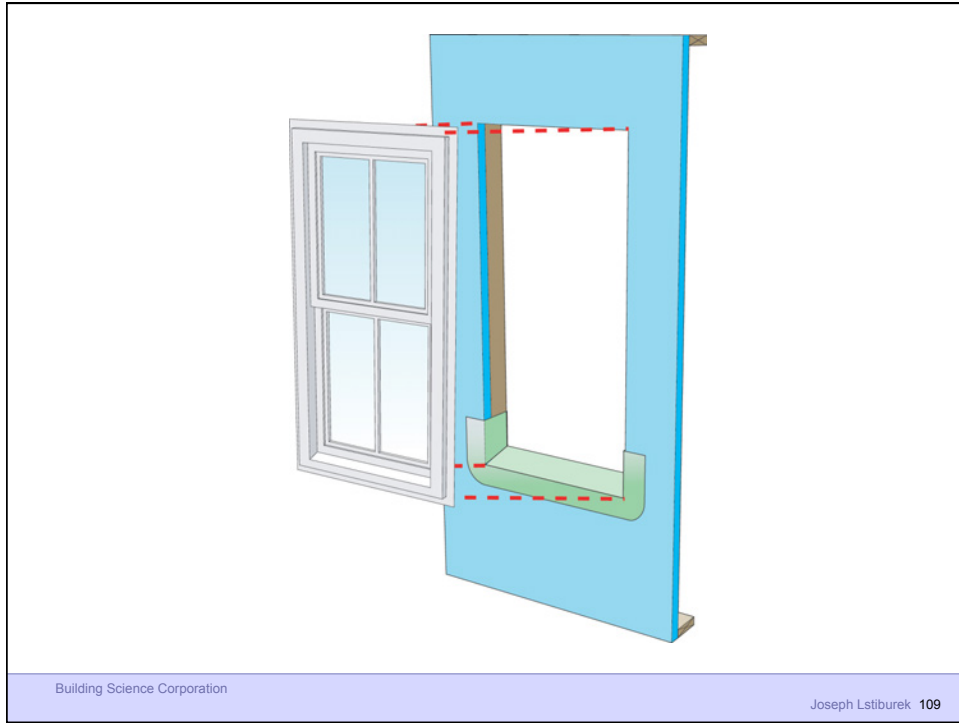
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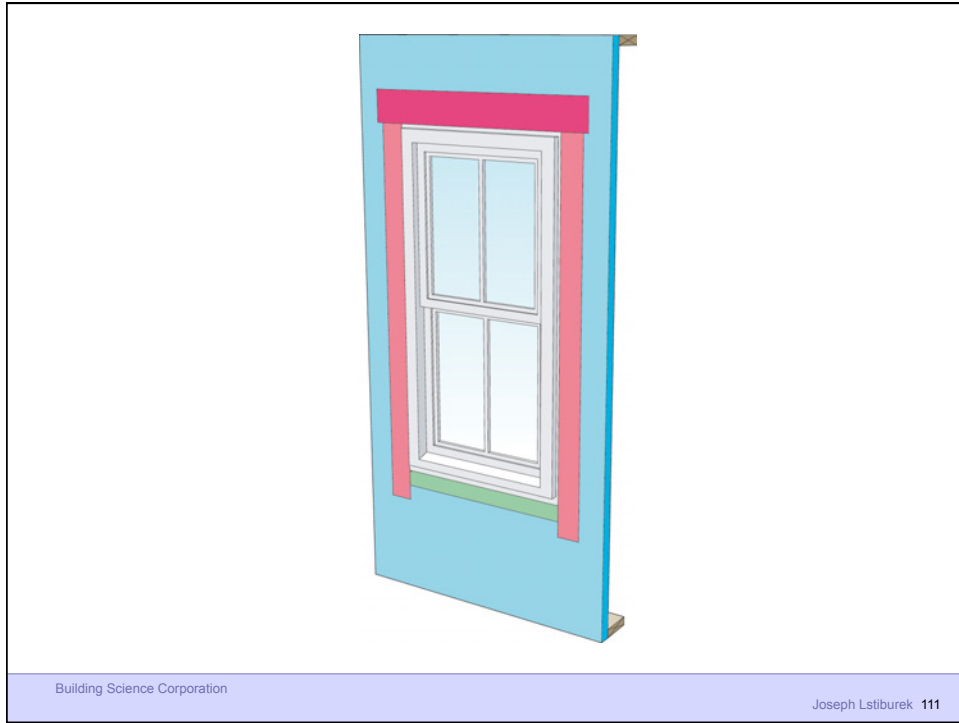


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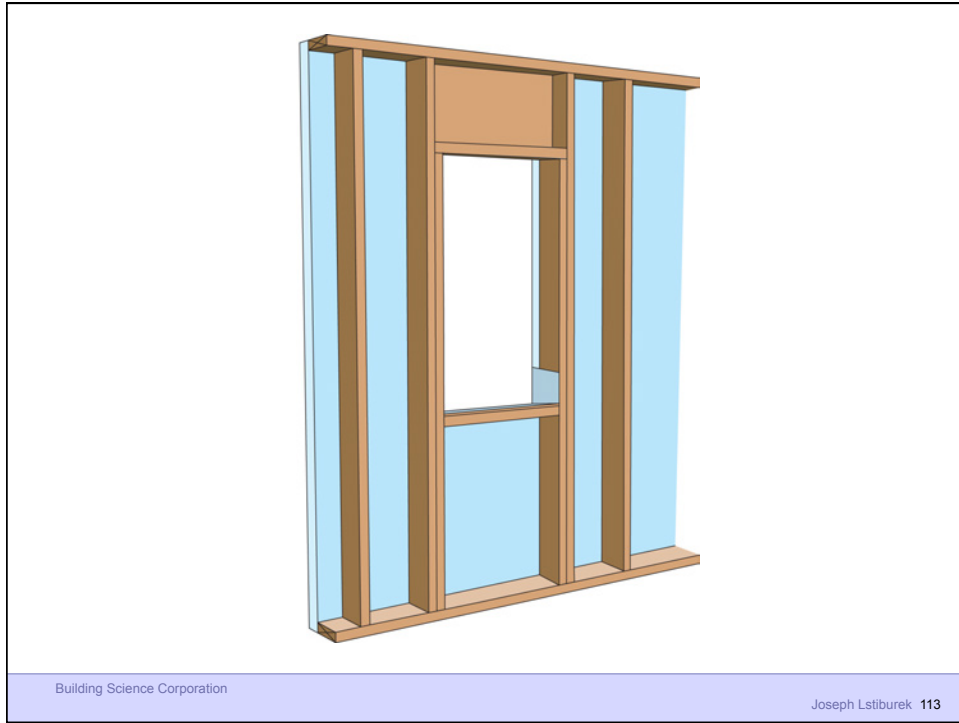
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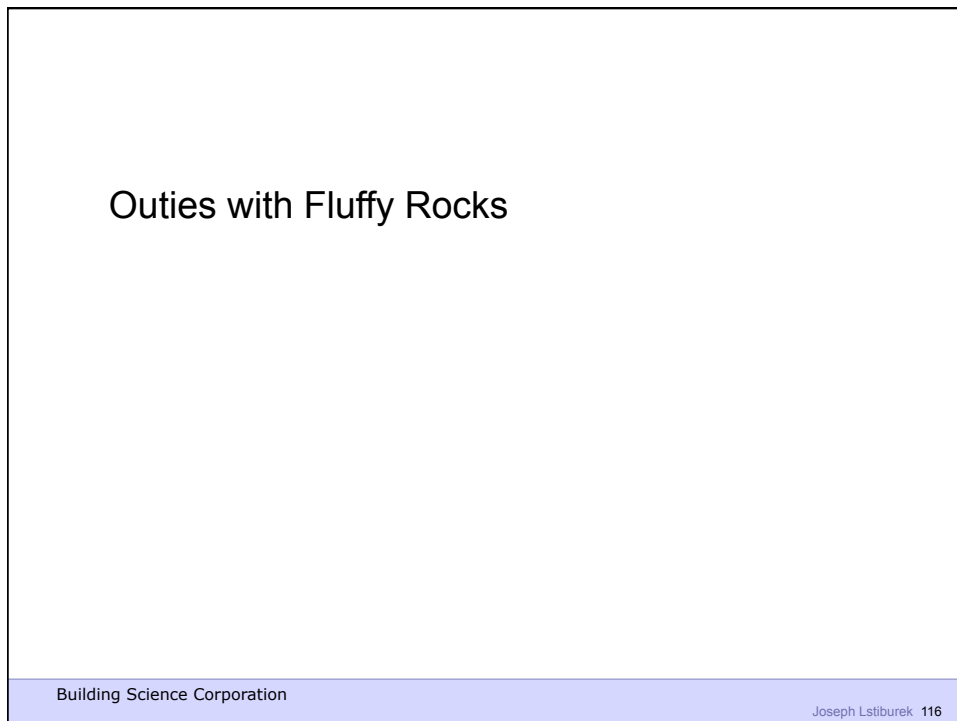


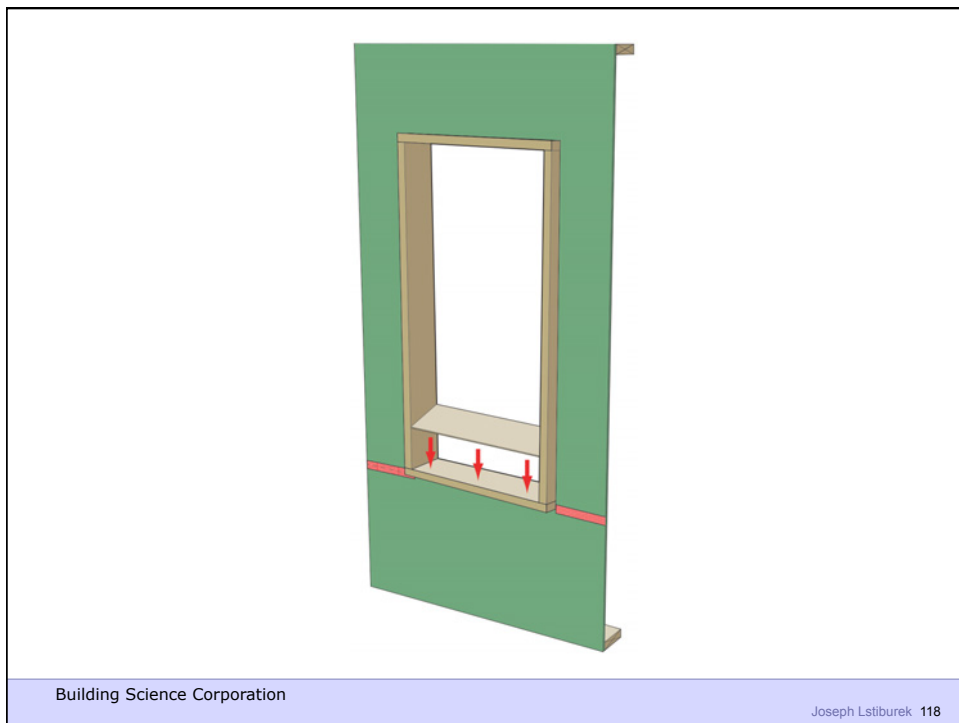
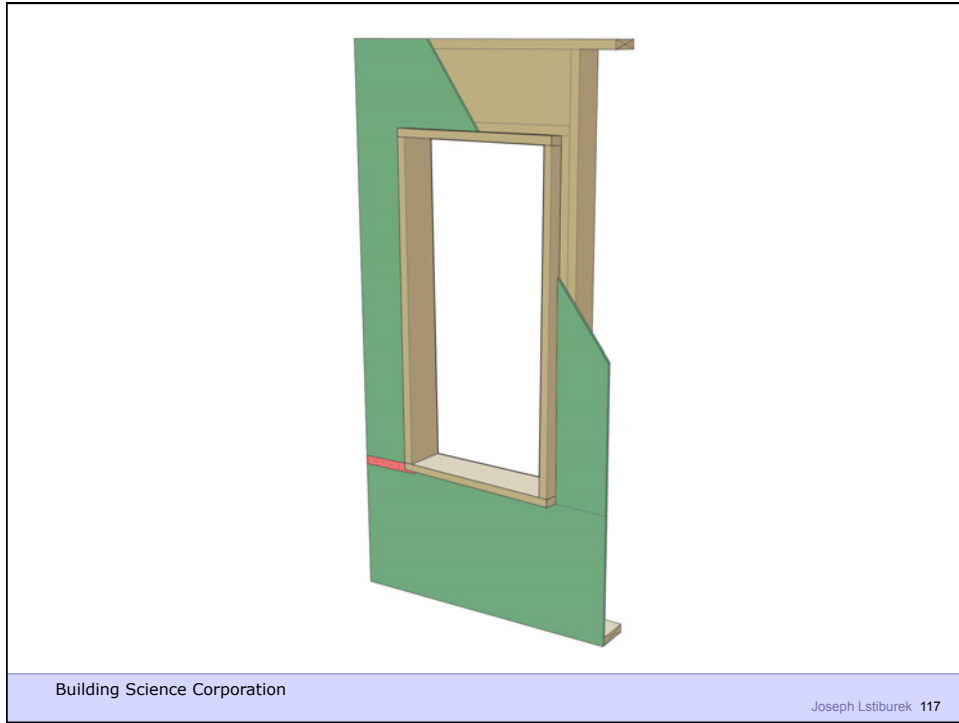


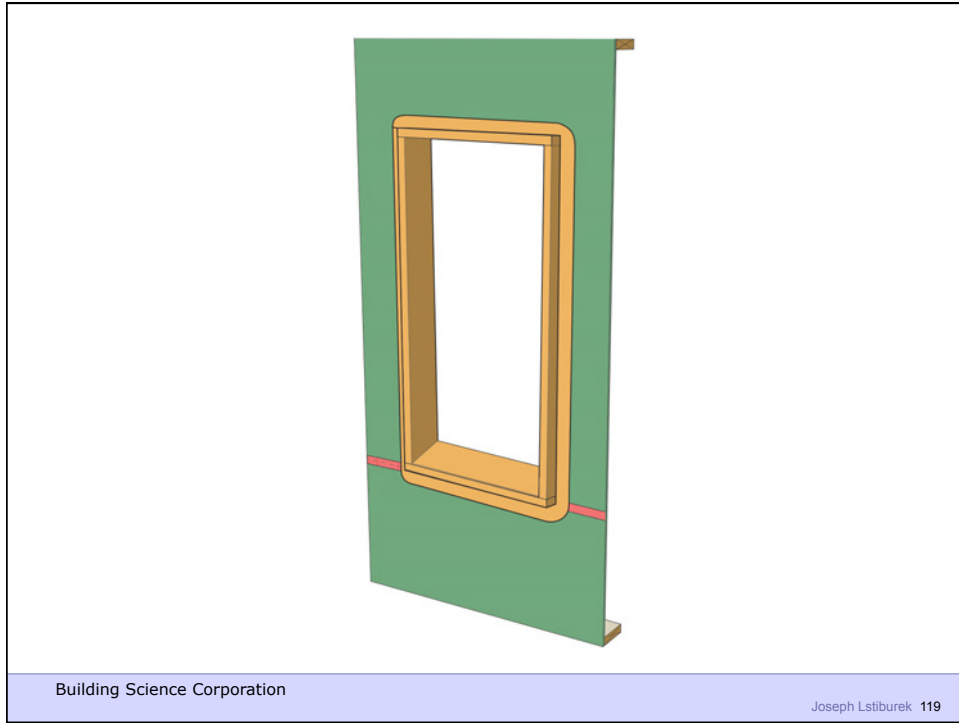


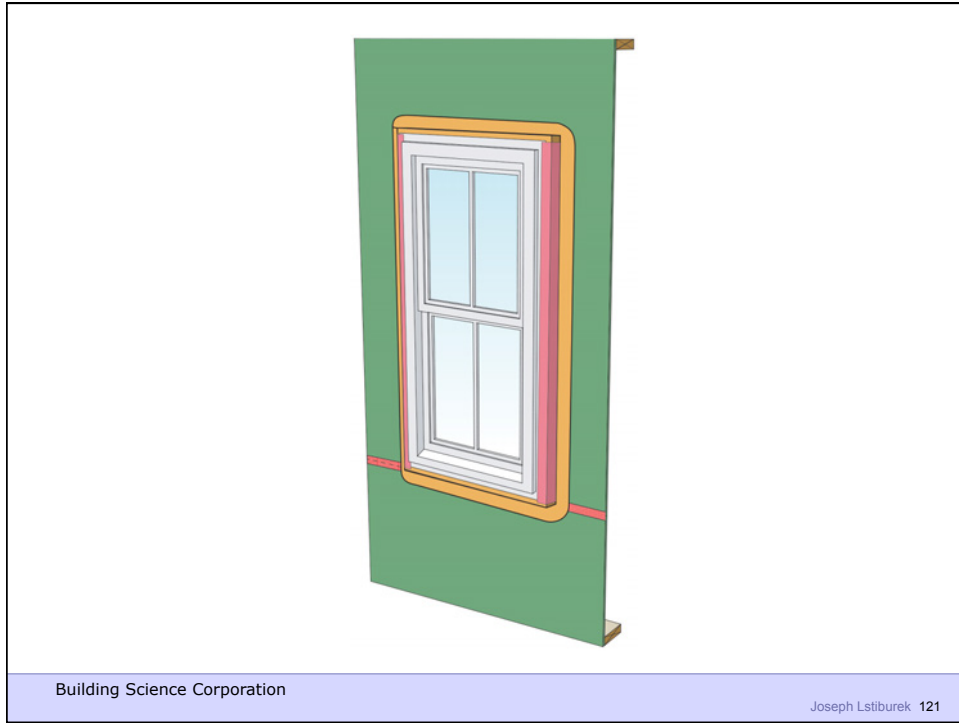


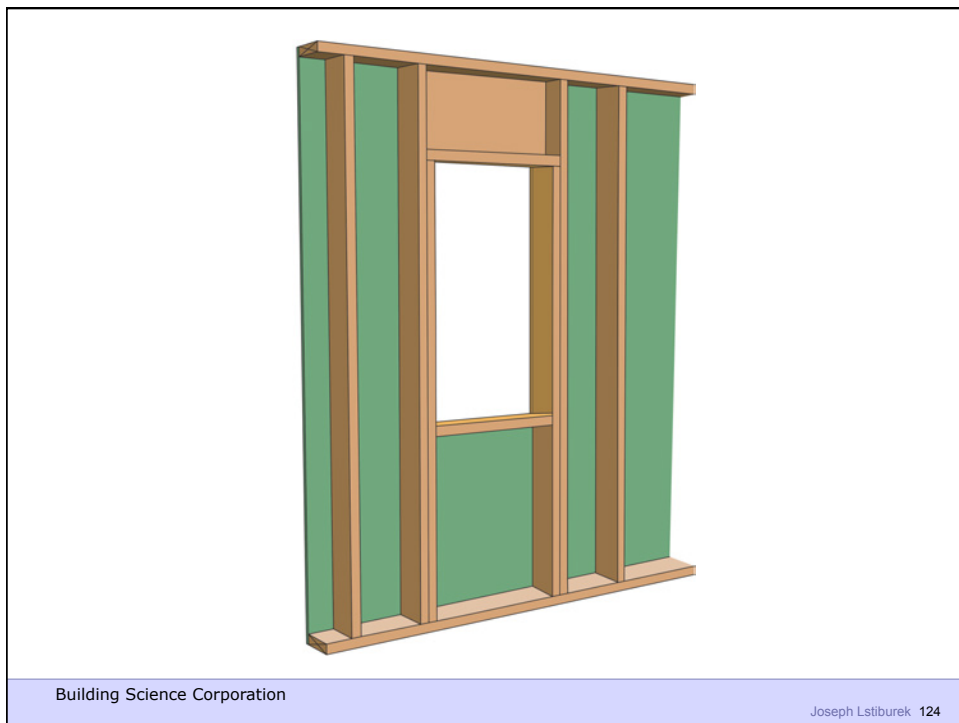
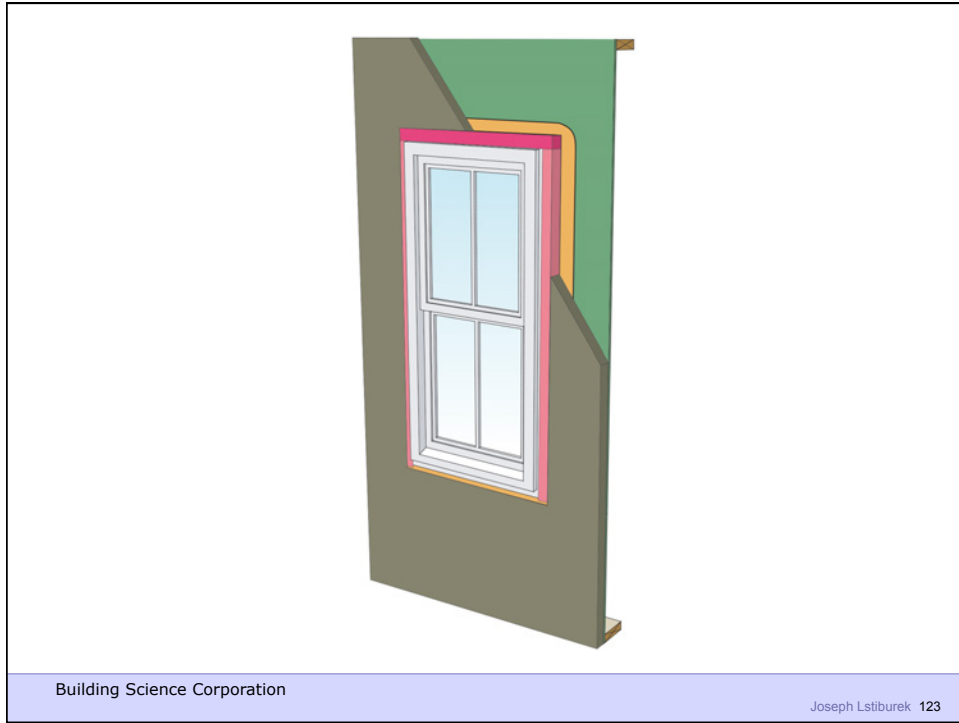
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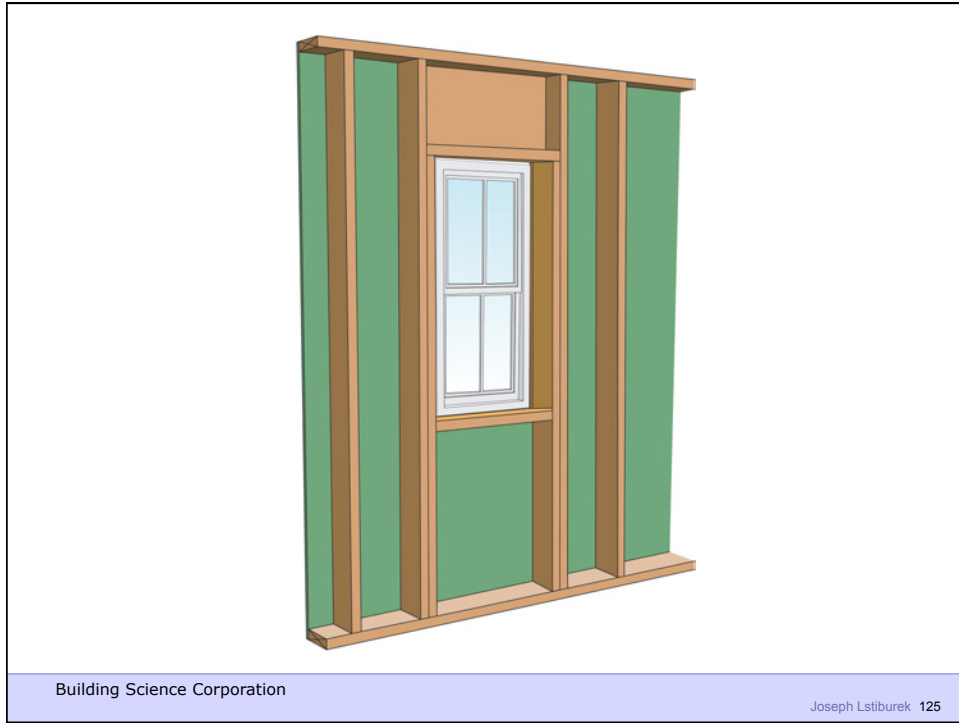








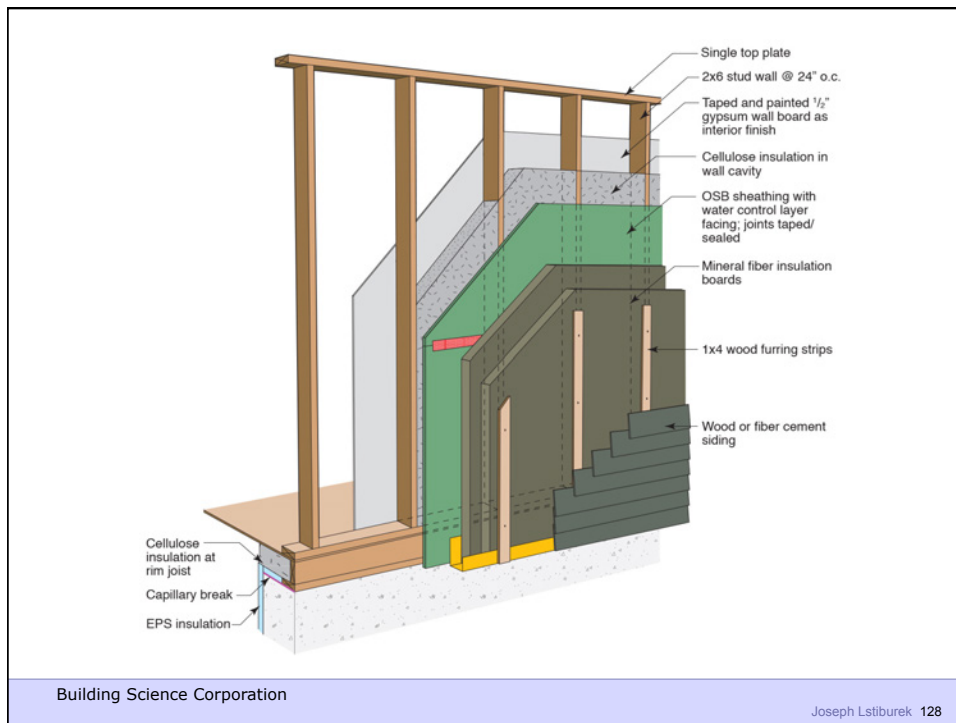




# Way Out There Outies

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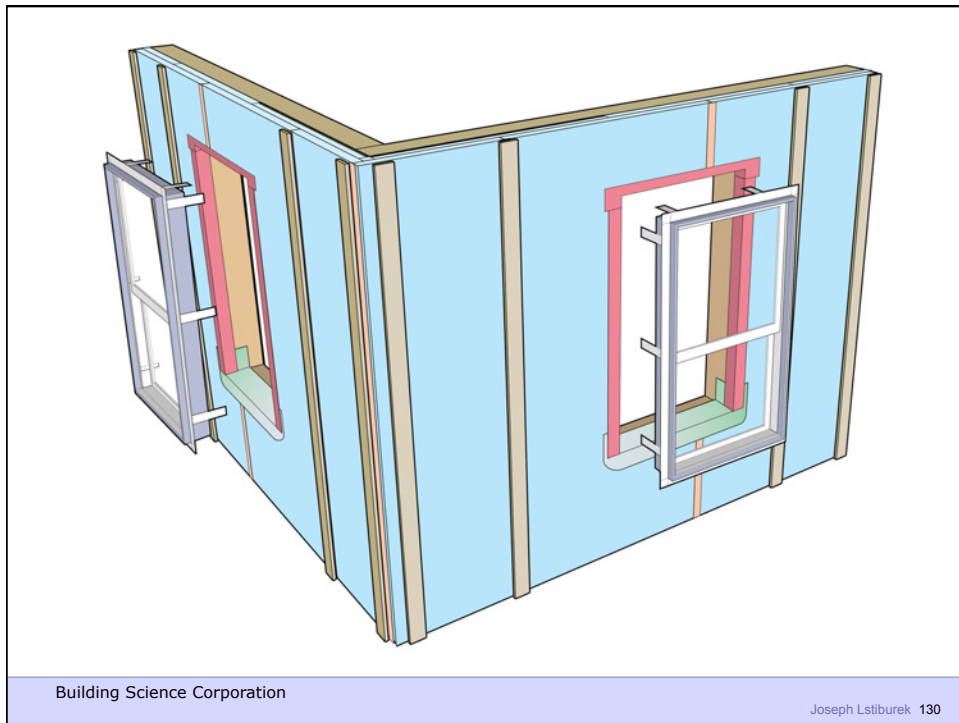
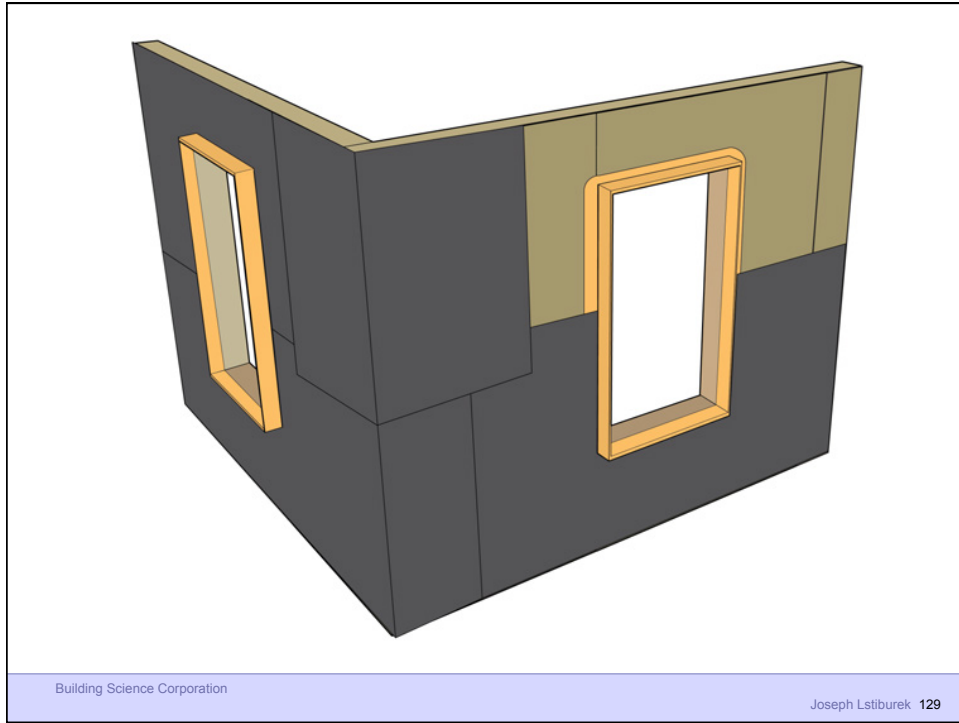
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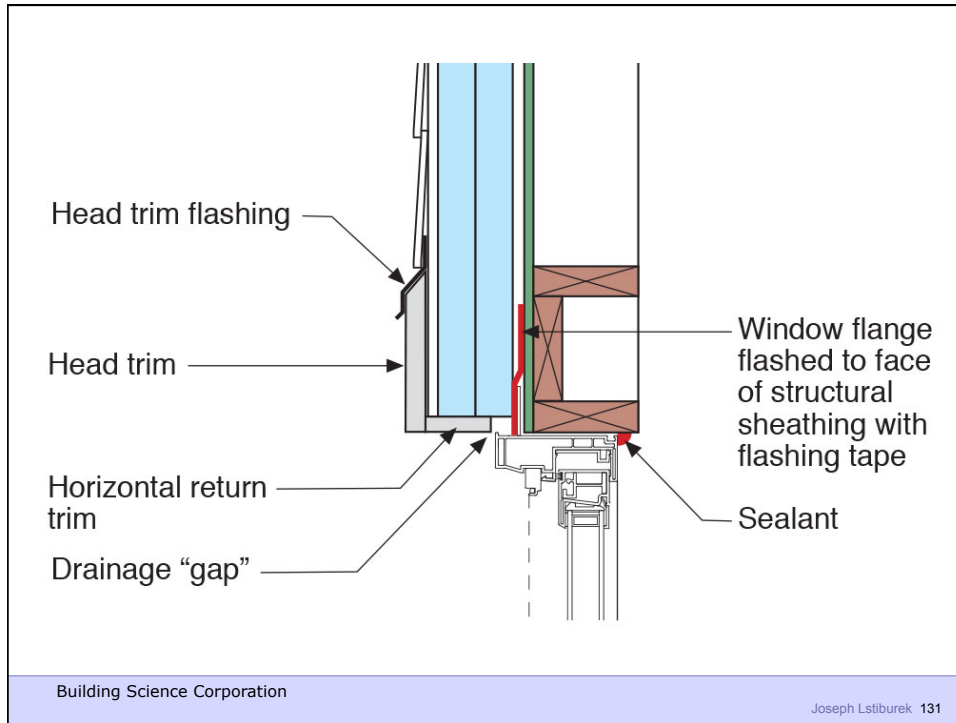


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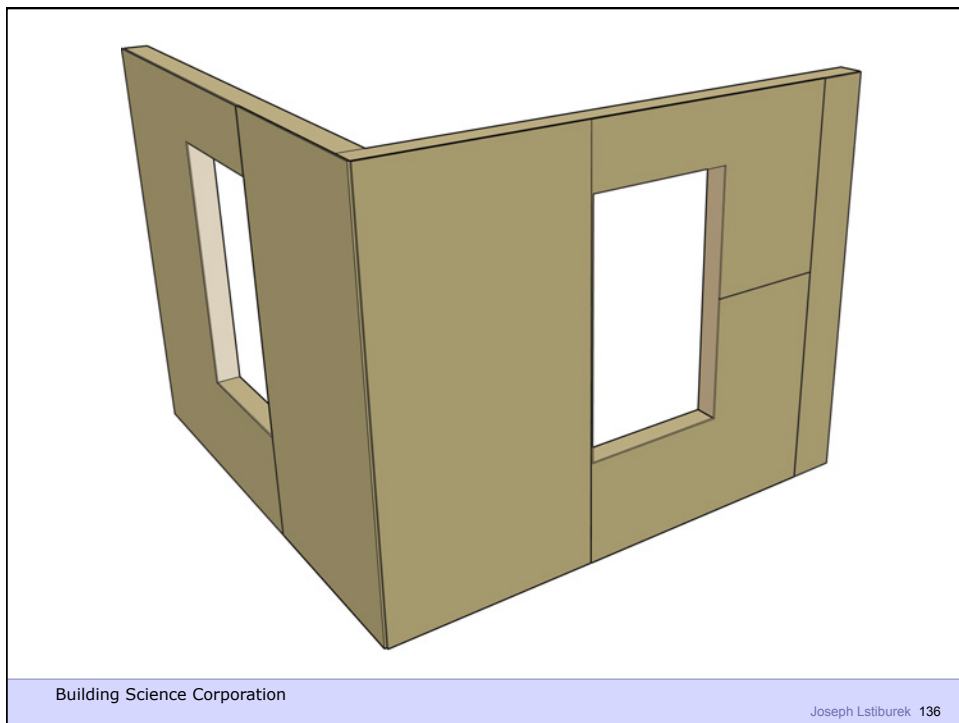
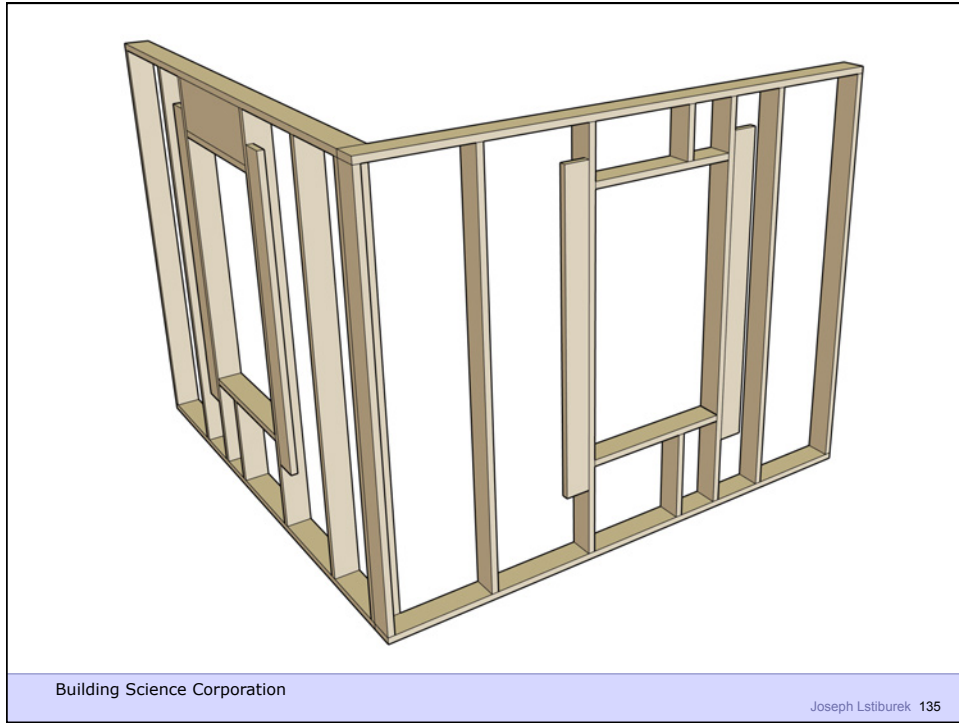
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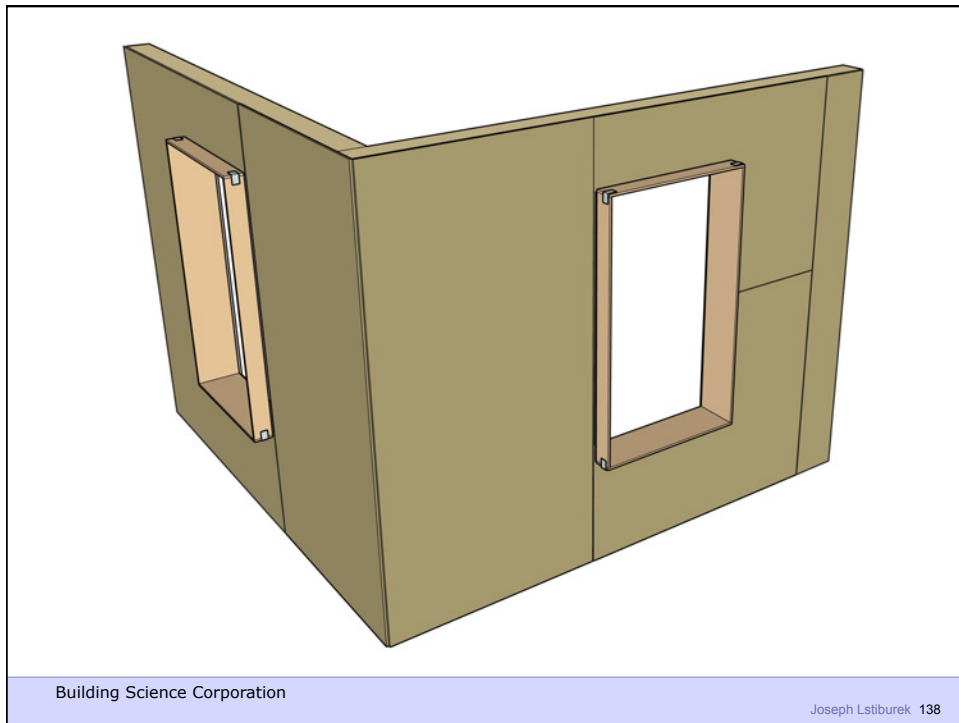
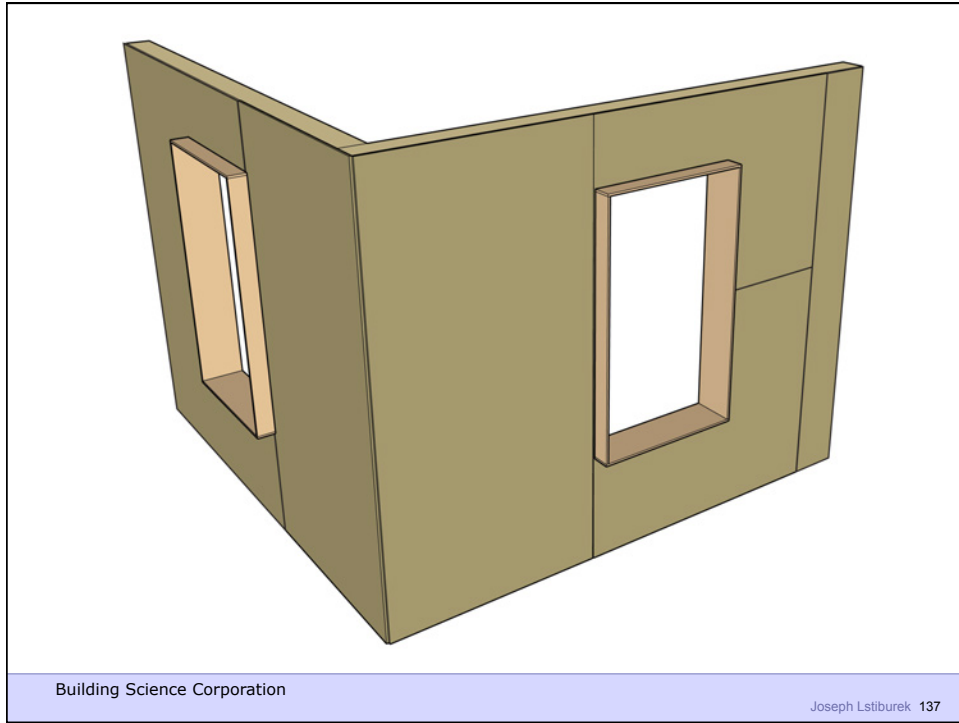


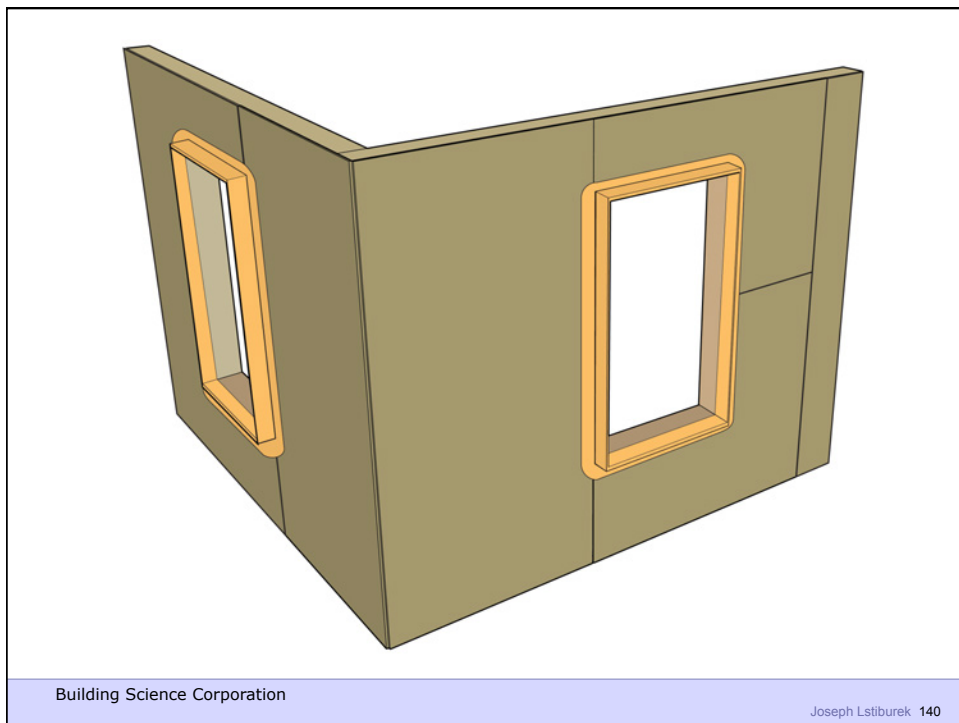
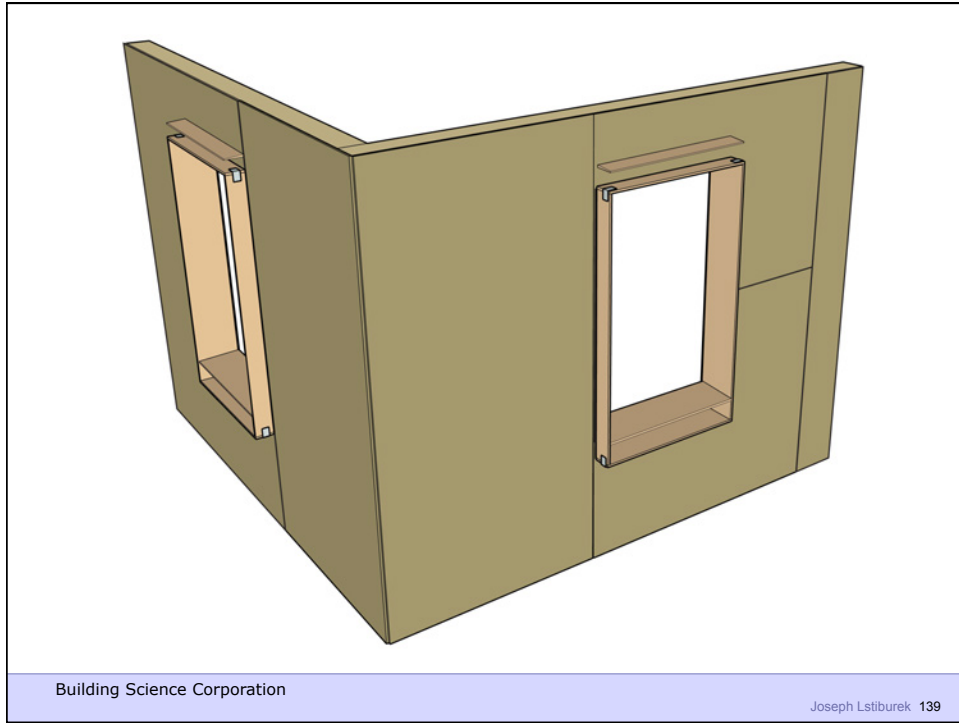


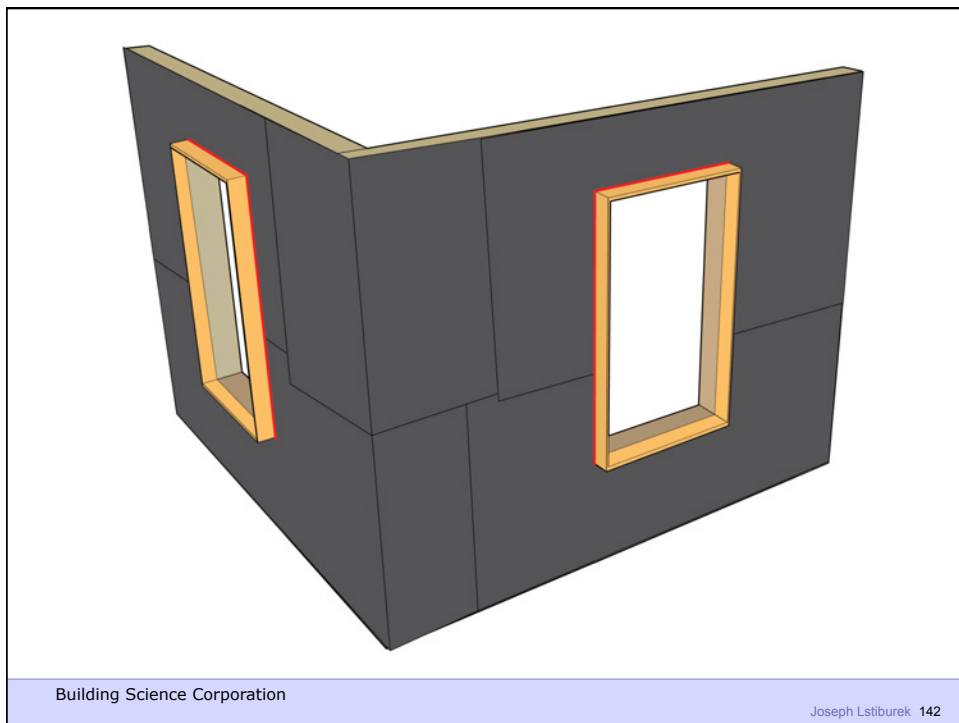
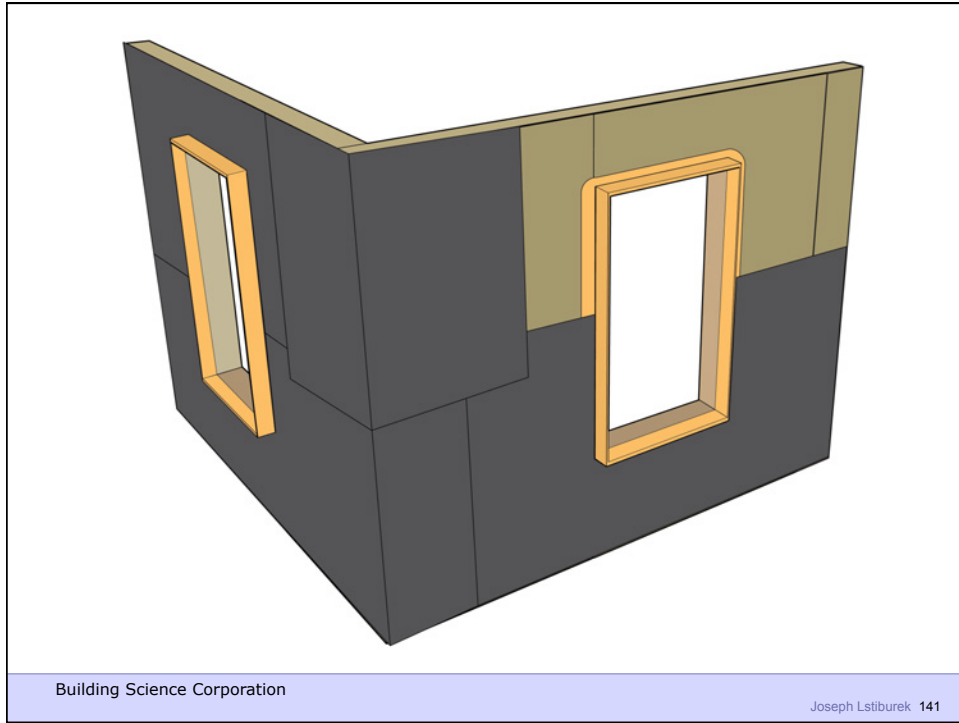


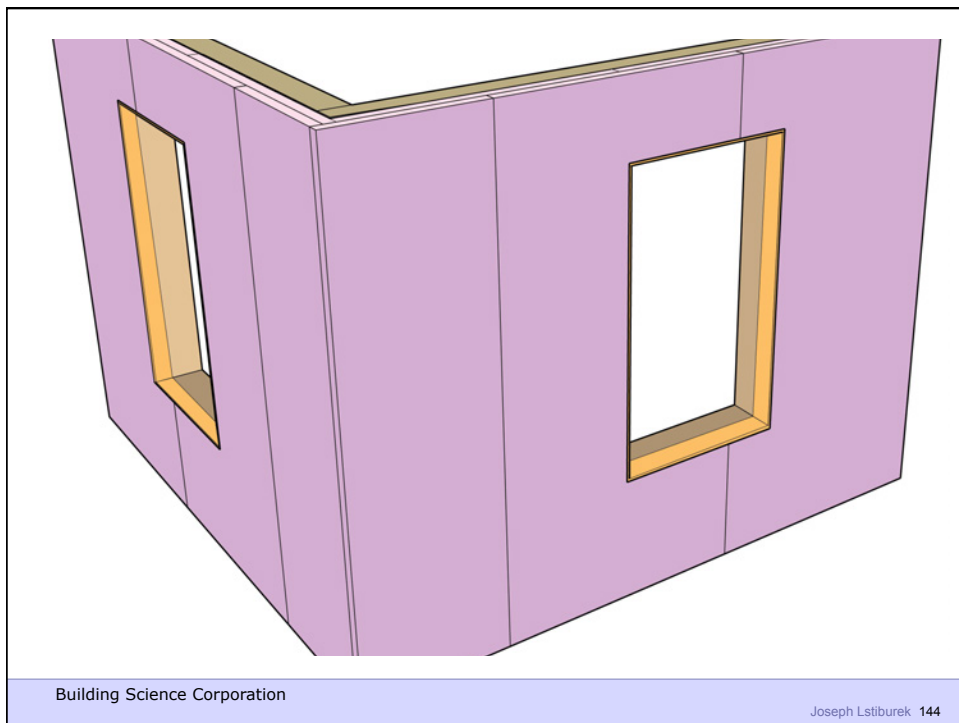
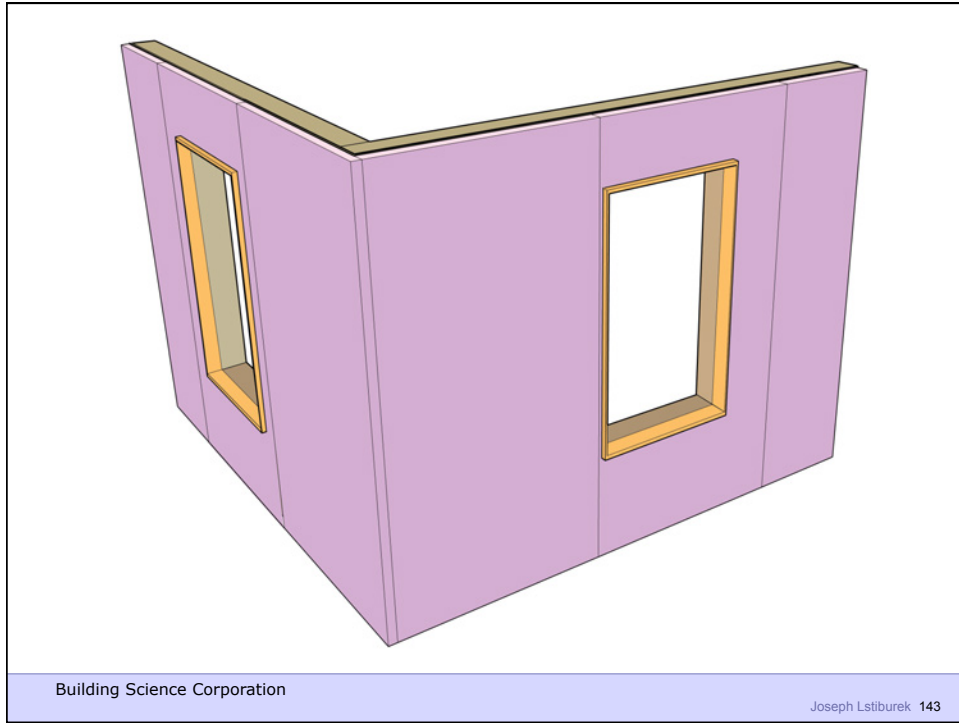




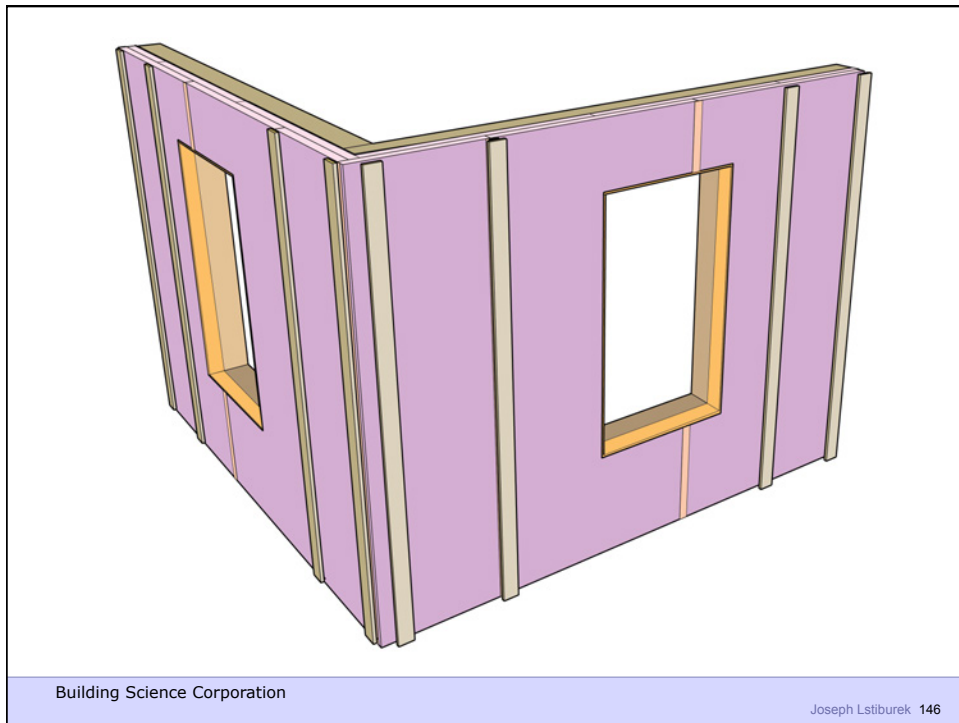
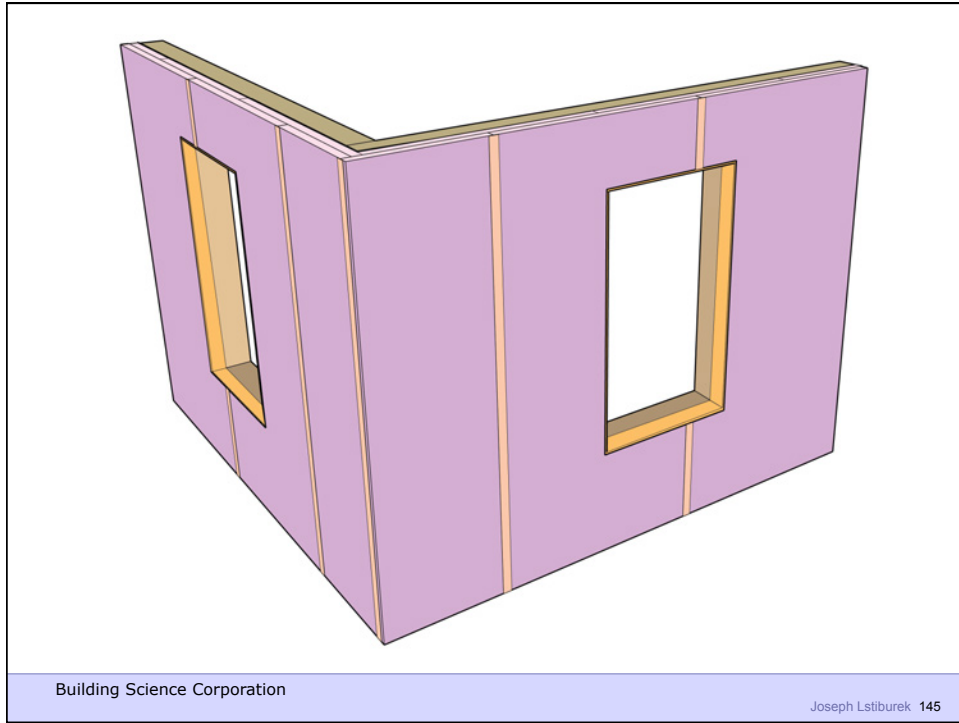


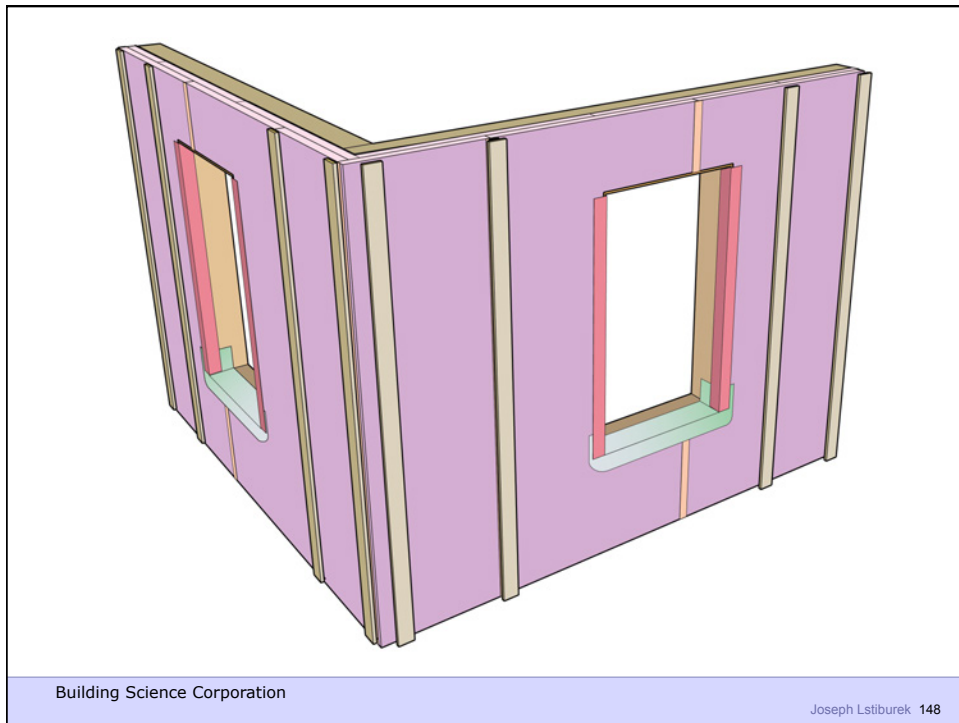
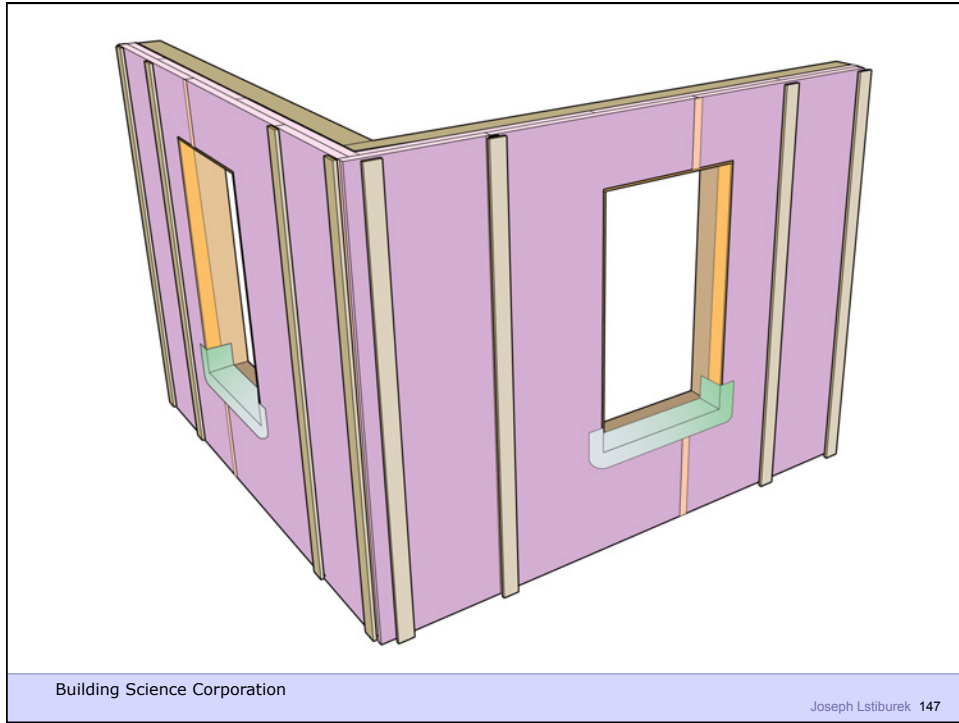


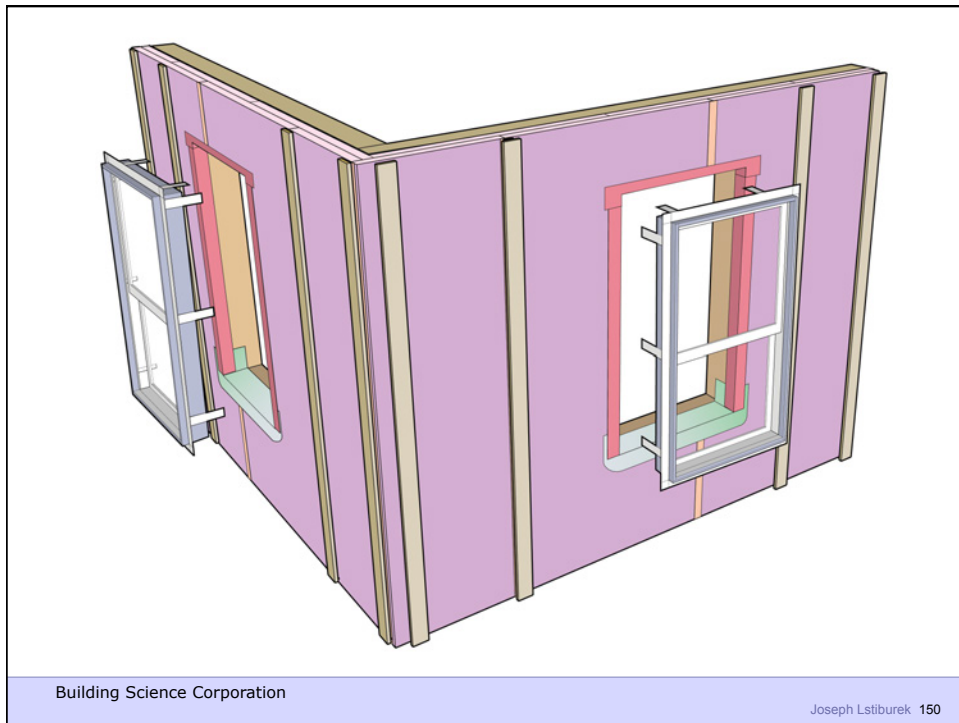
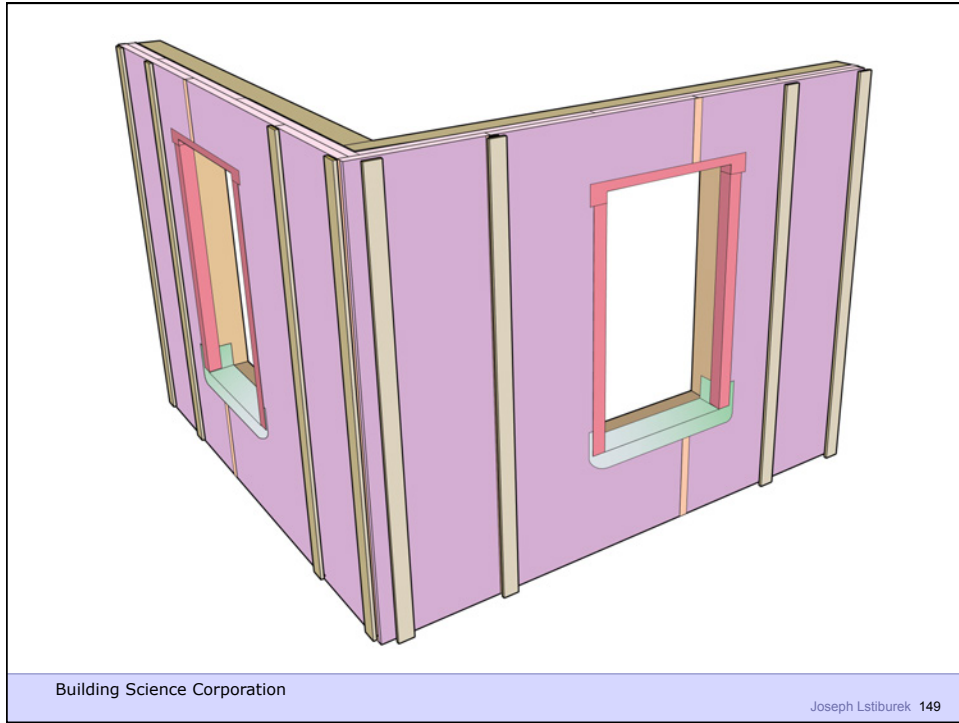


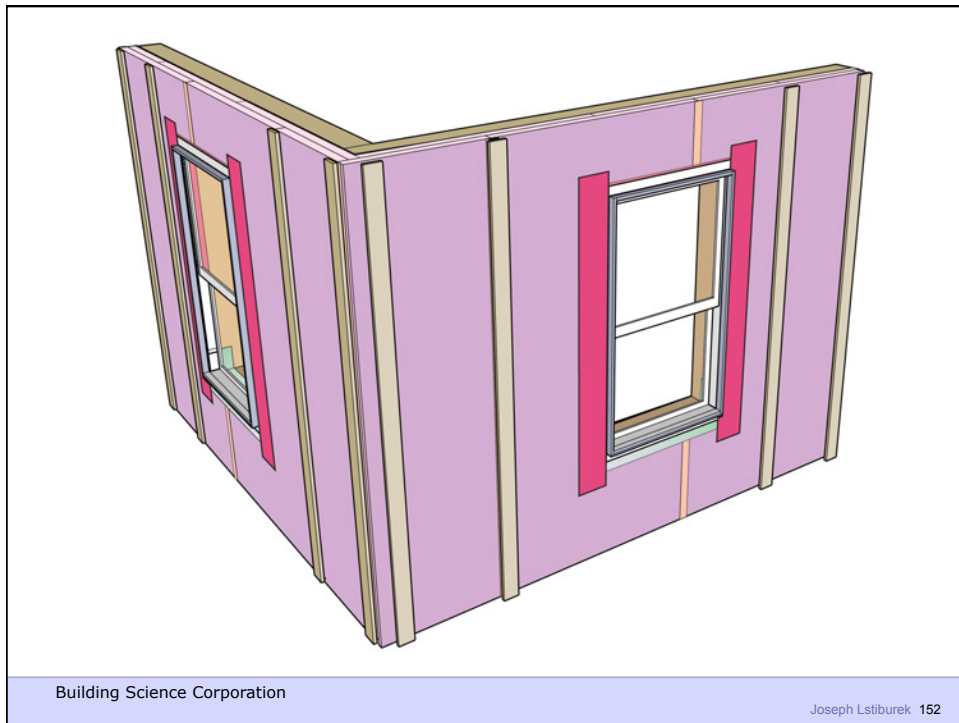
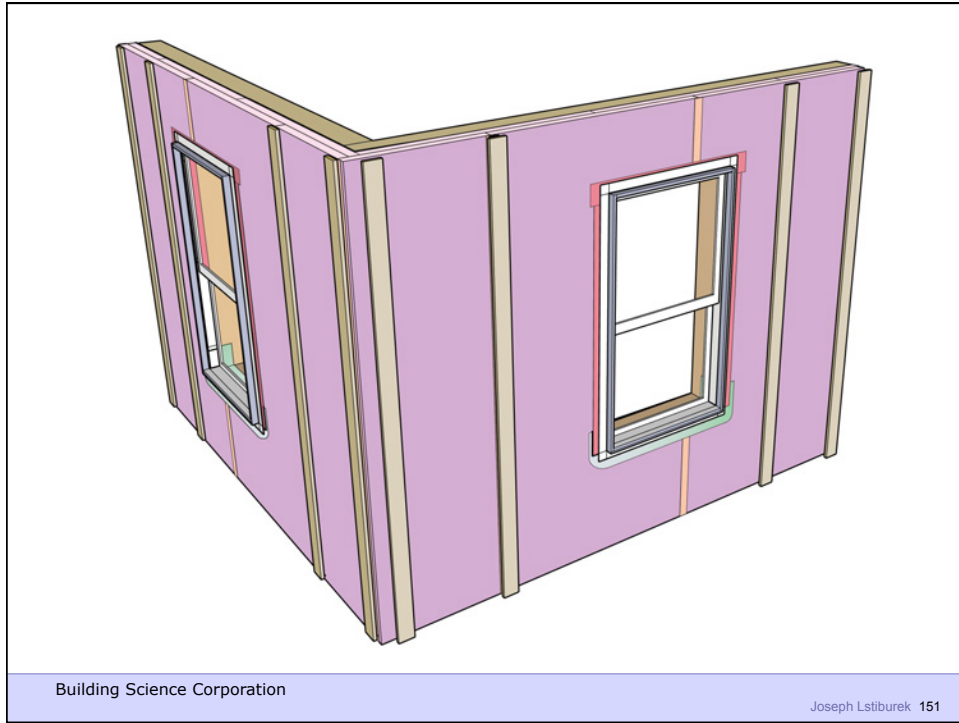


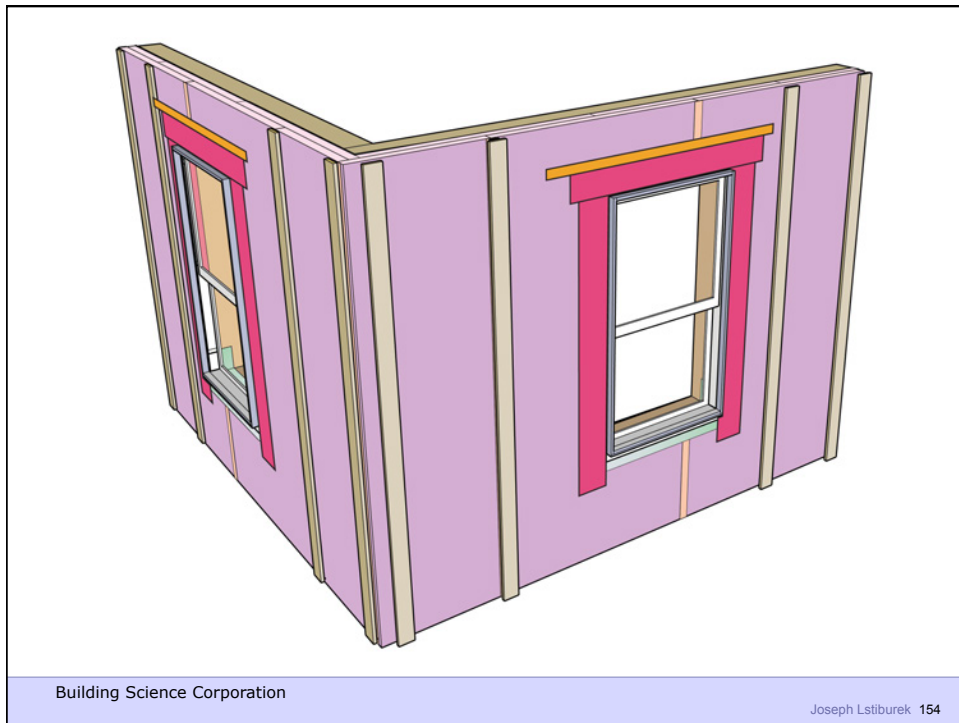
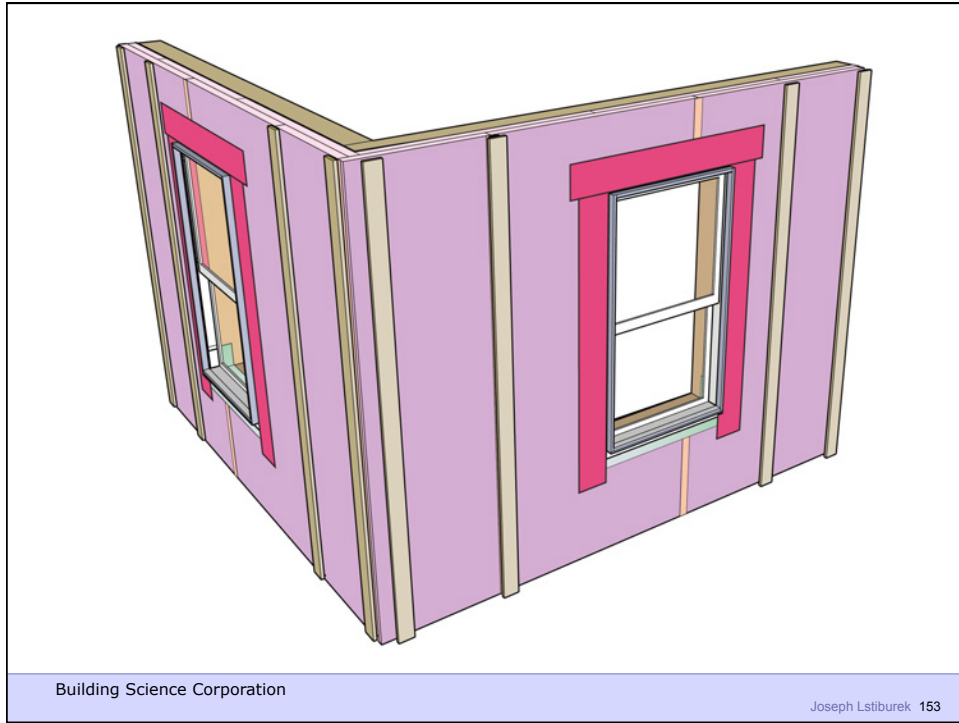


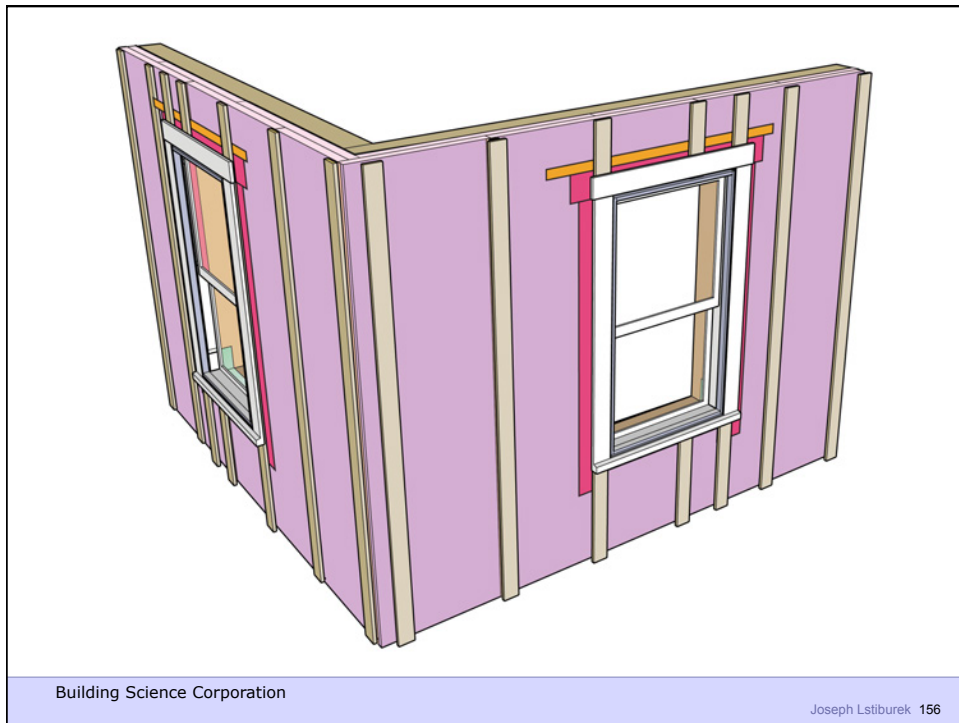
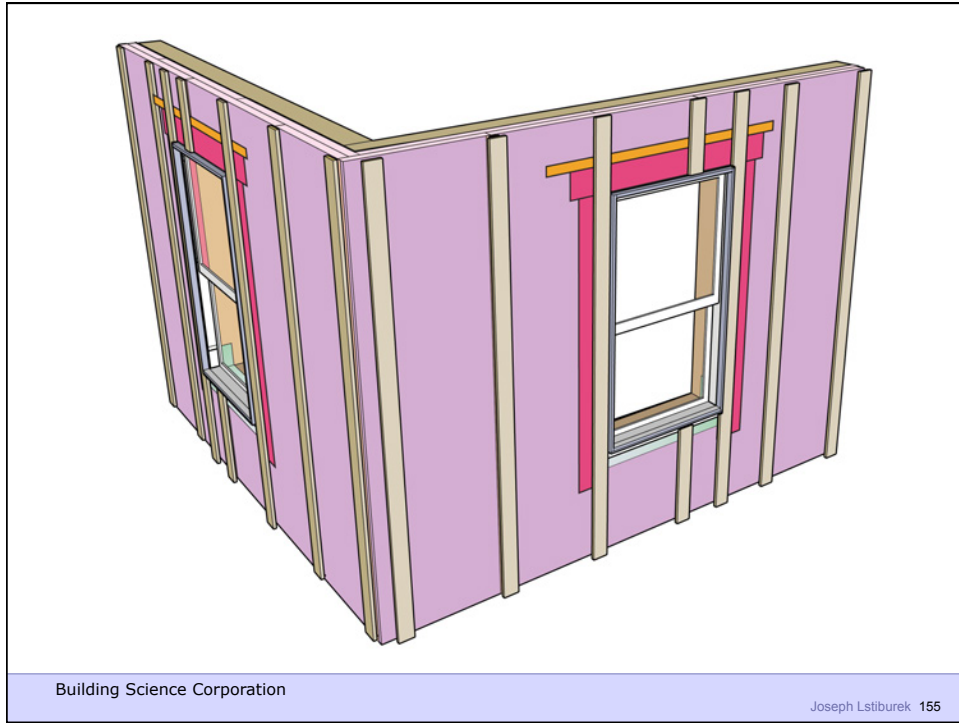


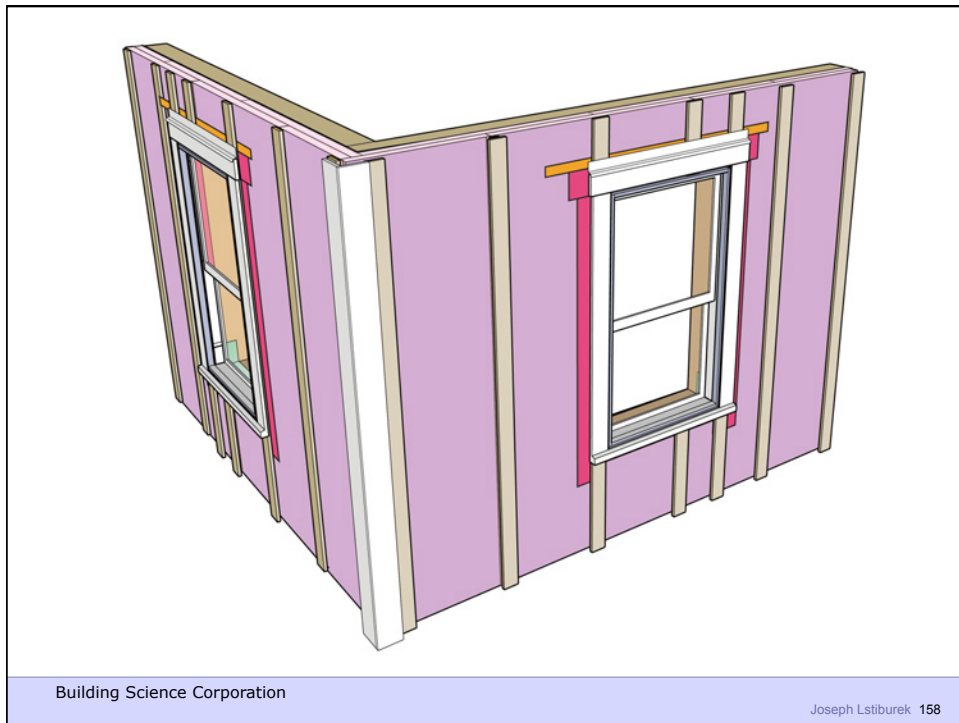
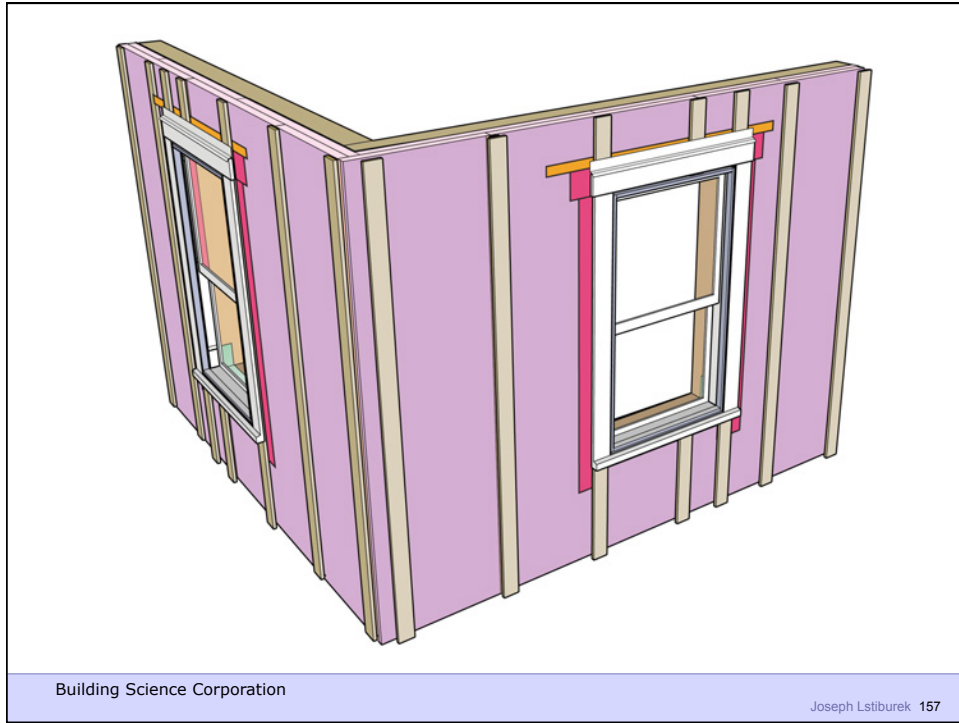


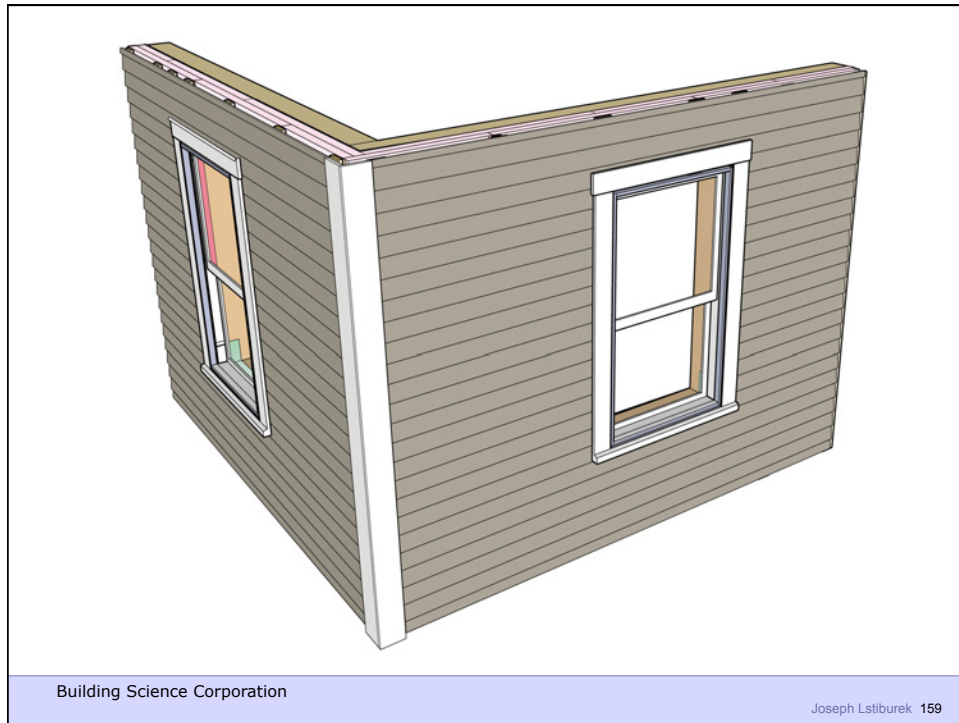




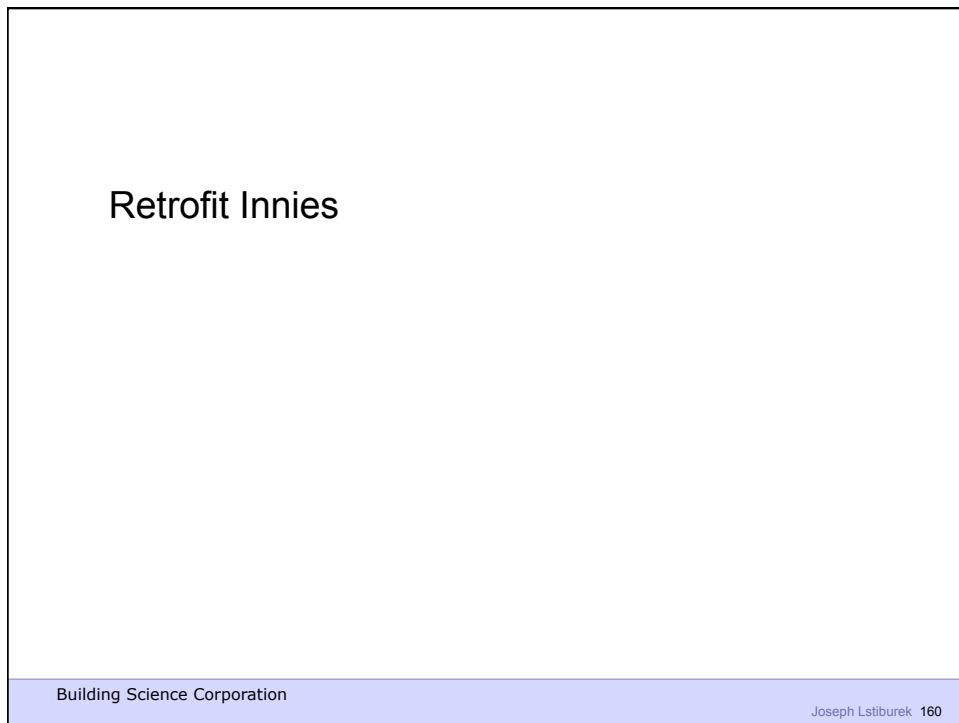








## Retrofit Innies







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## My Place – Retrofit Outies

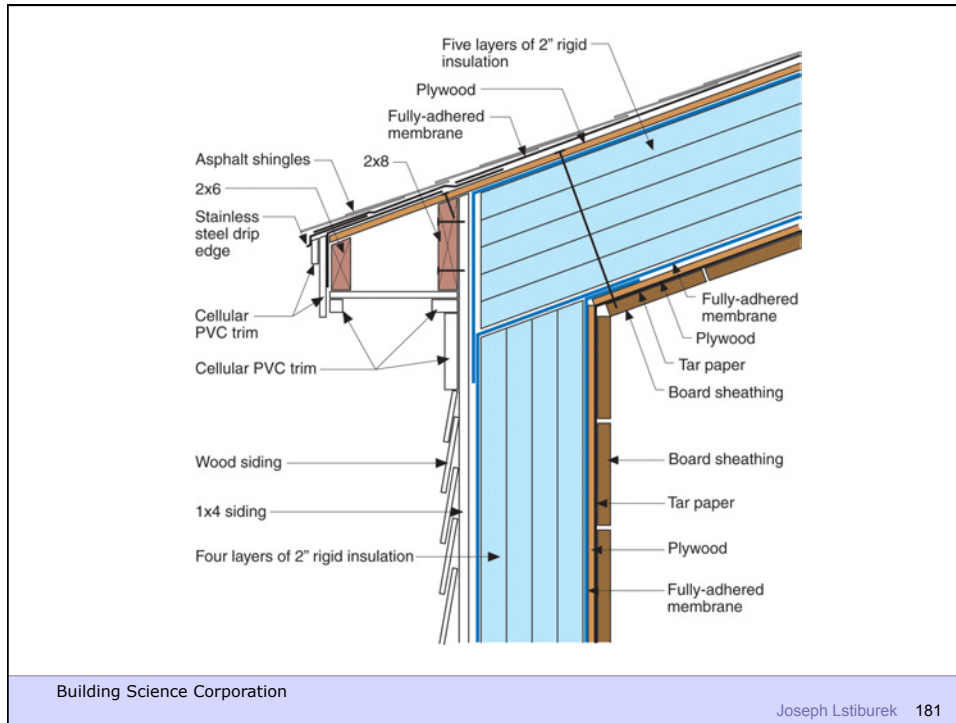
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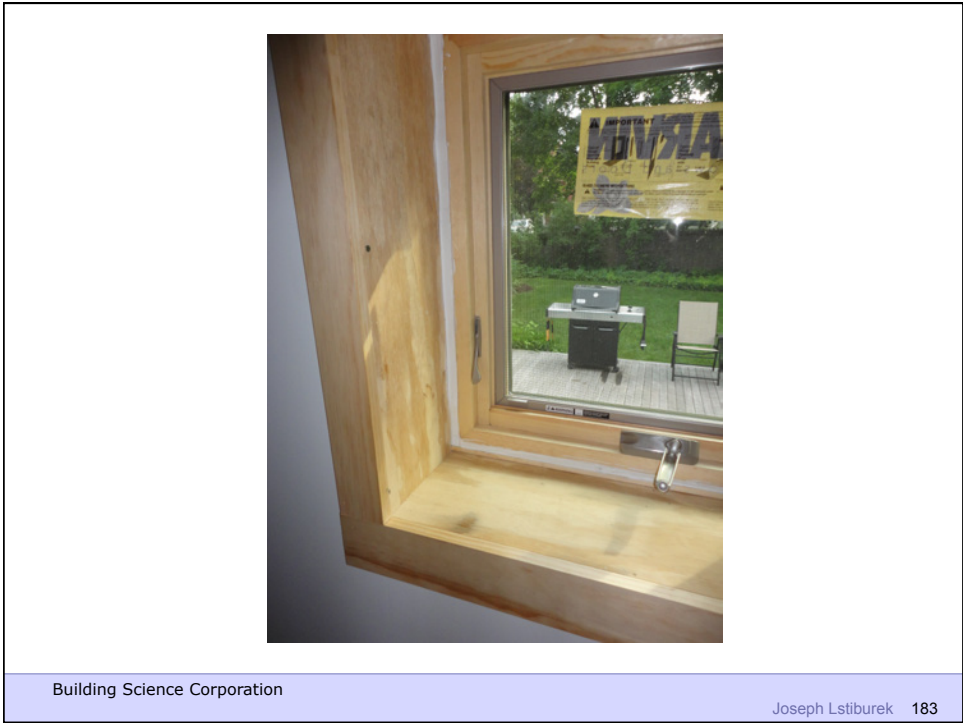
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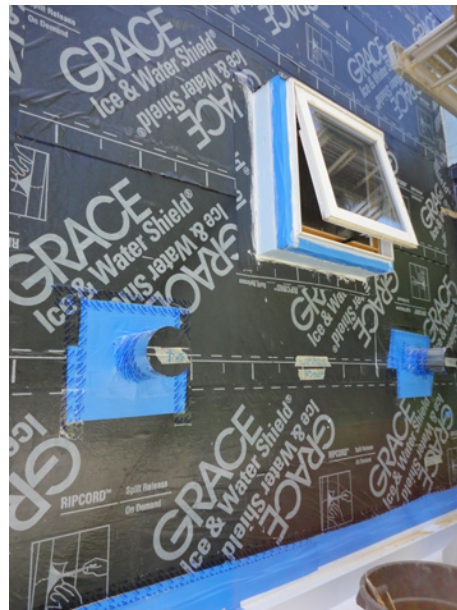






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