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Dr John Straube, P.Eng.

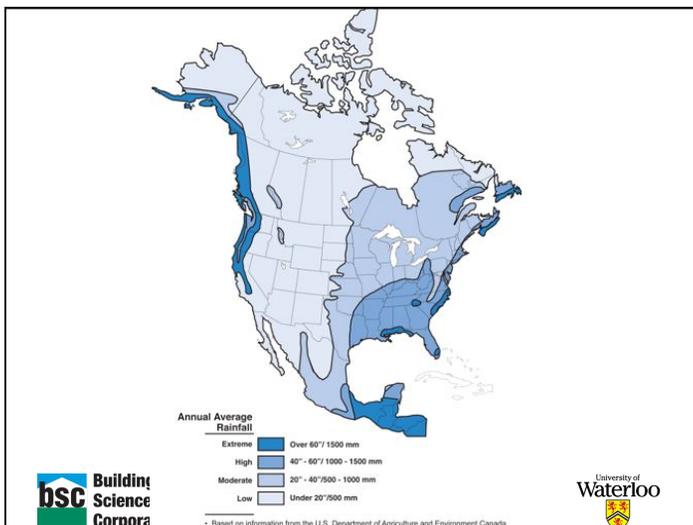
Rain Control for Walls: Venting, Ventilation and Drainage

University of Waterloo www.BuildingScience.com **WATERLOO ENGINEERING**

Overview

- Rain Control basics review
- Role of ventilation and drainage
- What makes them work?
- When do we need them?

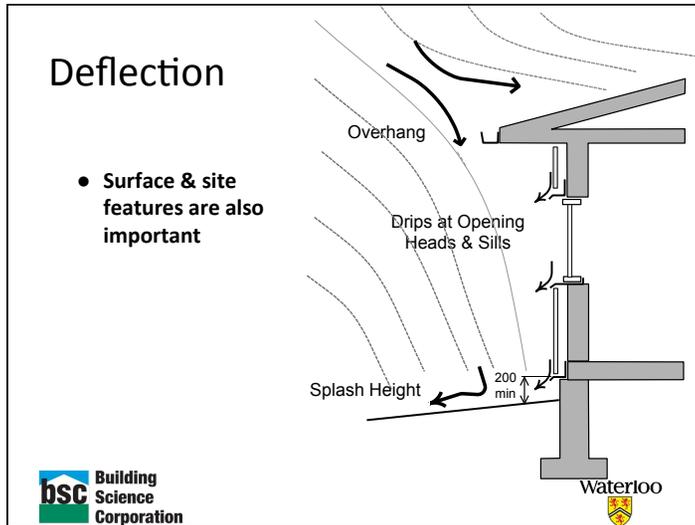
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Controlling Rain Penetration

- *Deflection*
 - reduce water on building
 - redirect water away
 - slope surfaces, use flashing
- *Drainage / Exclusion / Storage*
 - enclosure design choice
 - provide drainage, barrier or storage
- *Drying*
 - allow any remaining water to dry

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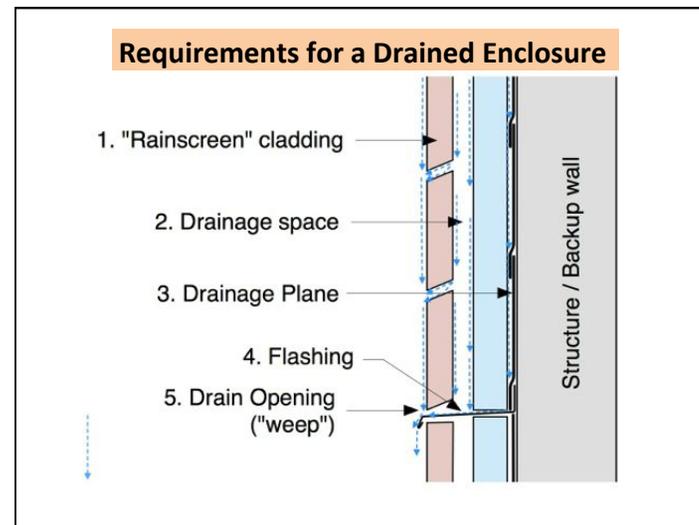
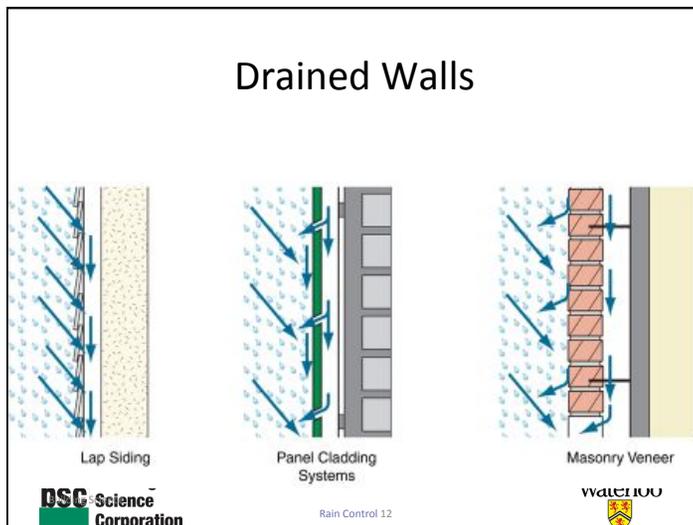


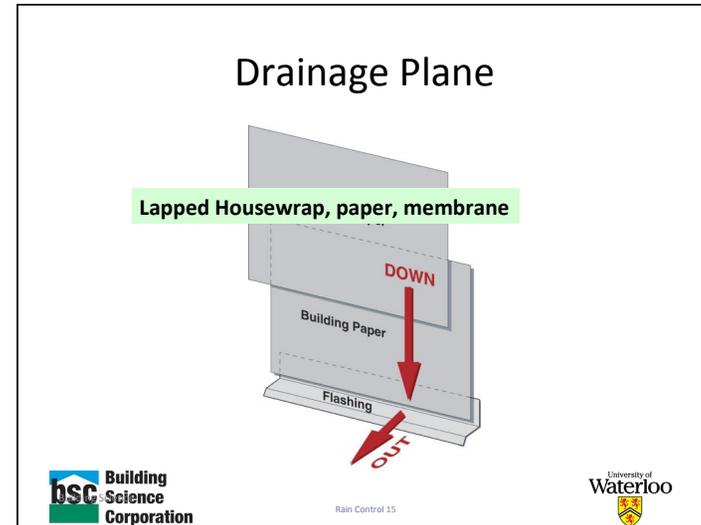
Many claddings leak

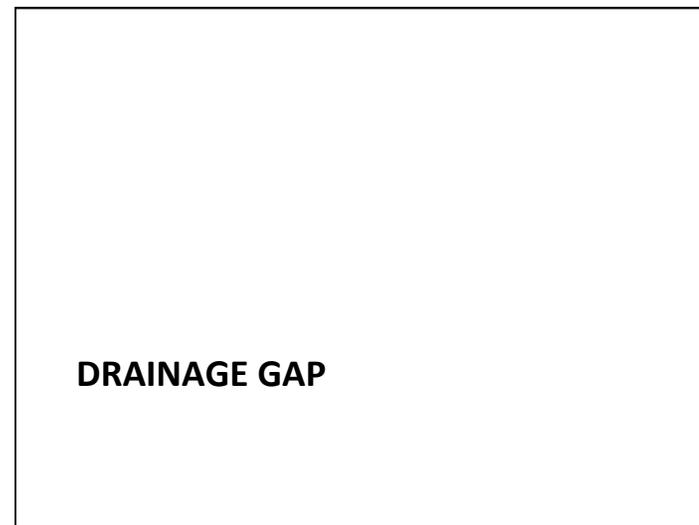
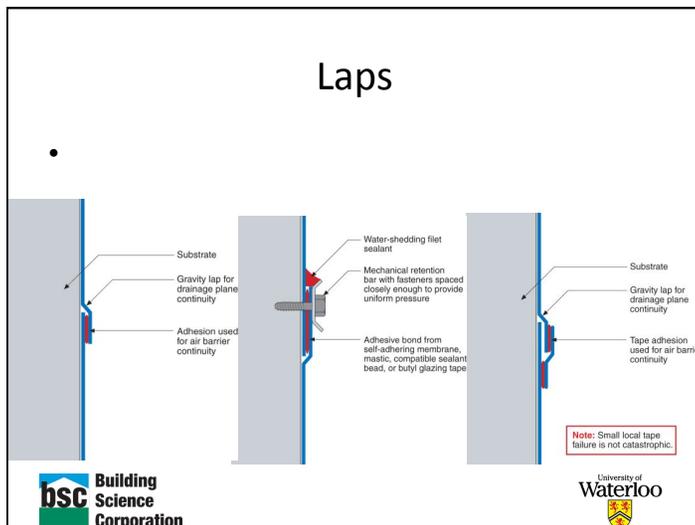
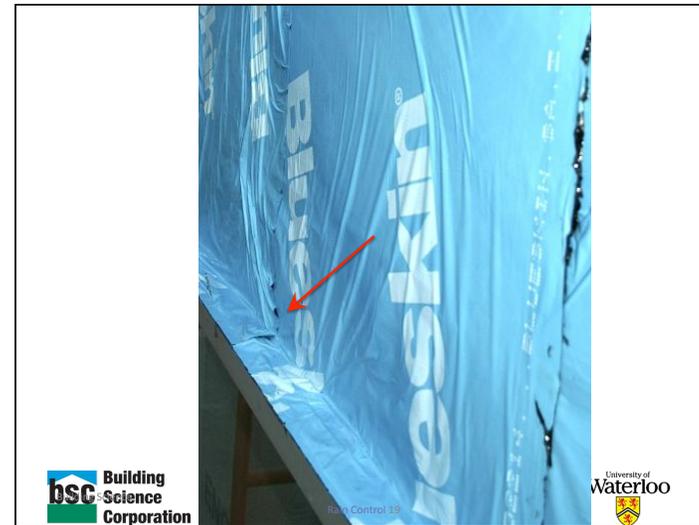
- Brick
- Wood, vinyl, fiber-cement siding
- Stucco
- Metal panels

- Joints leak: window, precast, curtainwall

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Drainage Gaps

- We have long built gaps in walls/roofs
- Why?
Both drainage and ventilation use gaps
- What is the proper gap size for:
 - Drainage?
 - Ventilation?
- When do I need drainage? Ventilation?



John Straube



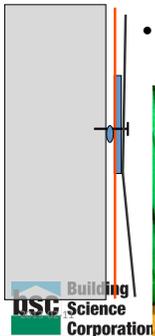
Drainage Gaps

- Gap avoids hydrostatic pressure
 - drains away water
- Reduces time of wetness on housewrap, membrane, cladding
- Requires only small gap, e.g. <math><1/16''</math>



Leaks

- If obstruction, head builds up and small nail/staple holes leak
- Some housewraps come with pre-manufactured holes



Drained gap behind brick





- Vinyl drains well with no strapping



Lap Siding

- Water ran out the front of wall
 - Good design for drainage



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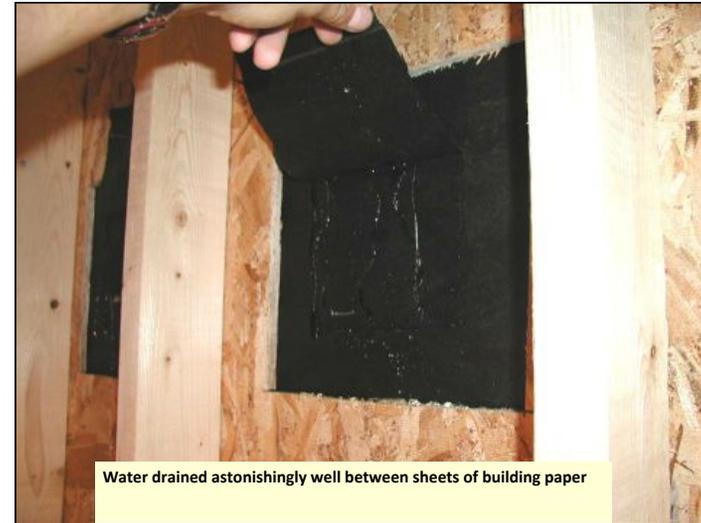
“Adhered Veneer”



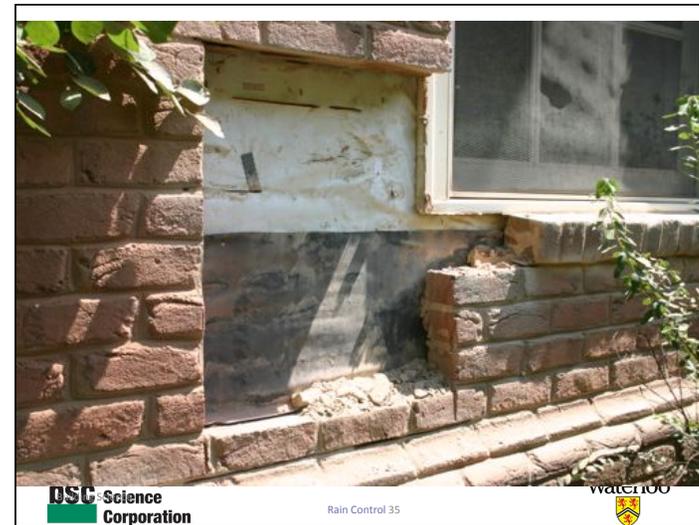
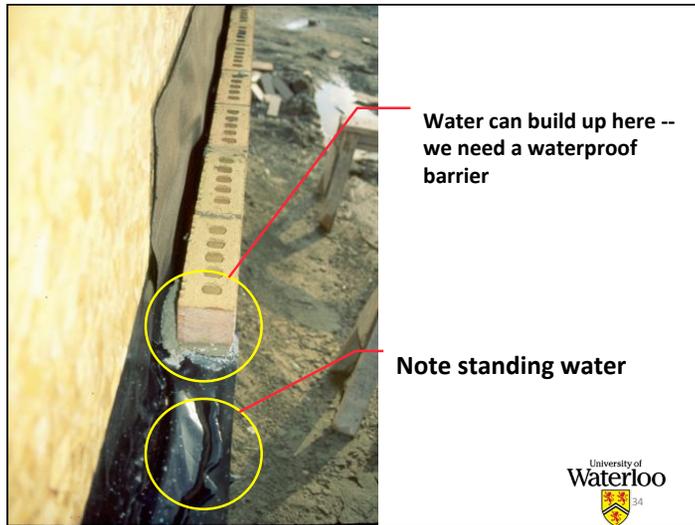
JJAC Test house 2001

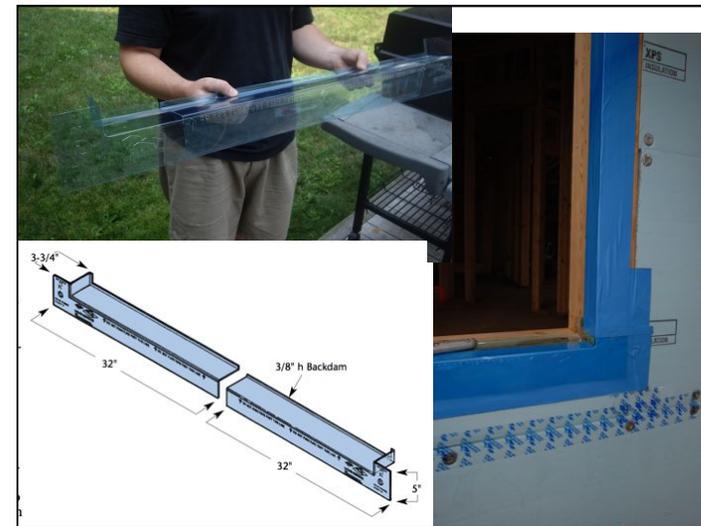
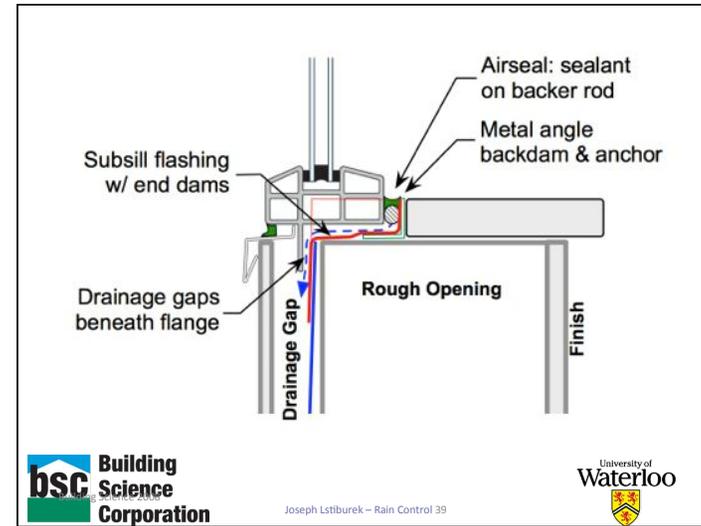
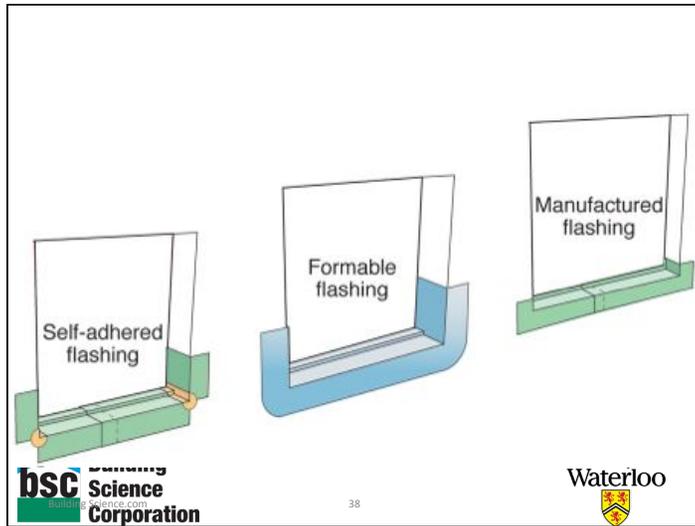


Stucco sticks to paper/housewraps

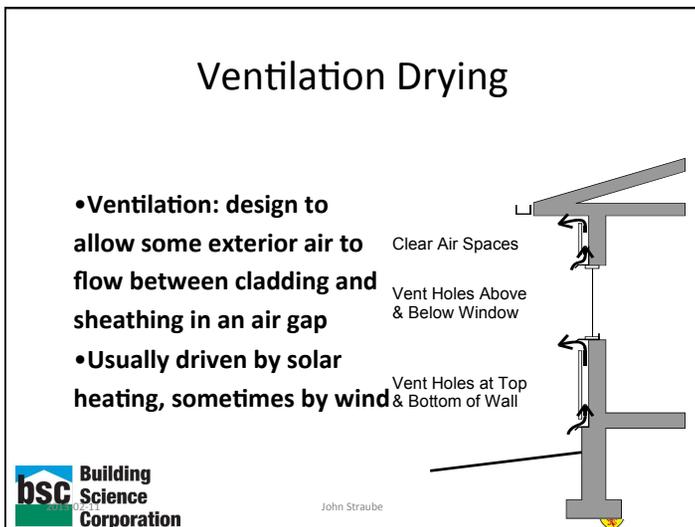
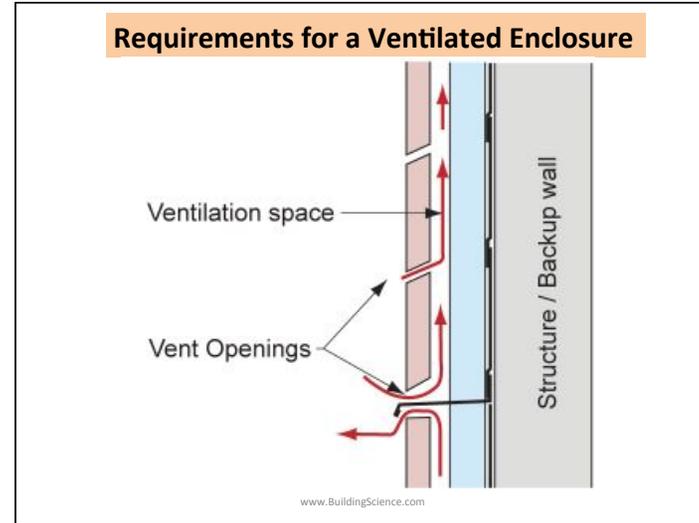


FLASHING + WEEPHOLES

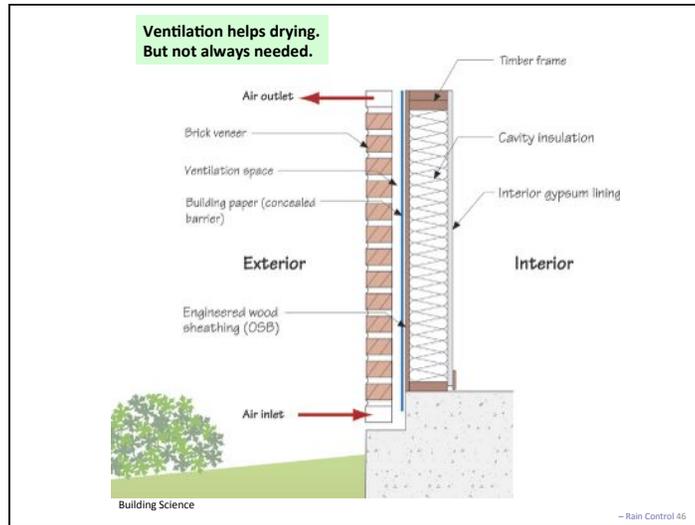




VENTILATION

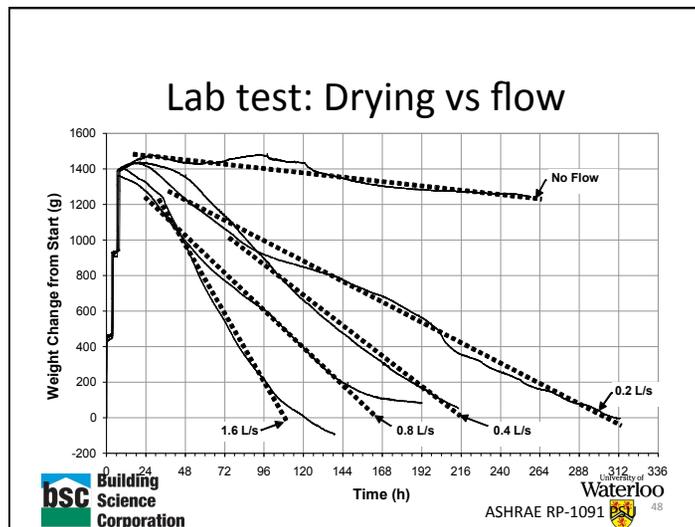
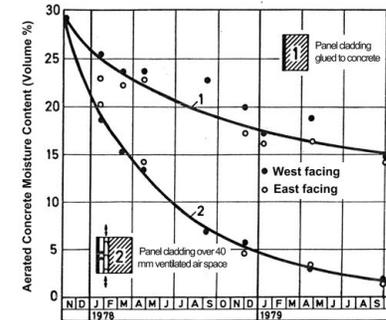


- ### How much Ventilation do you need
- Are materials adjoining the gap moisture sensitive, e.g.?
 - Are you drying the cladding back?
 - Wood siding, fiber-cement
 - Are you drying the wall sheathing?
 - OSB exposed to wet cladding like stucco, brick, etc
 - Are you controlling inward vapor drives?
 - Moisture storing claddings, with vapor permeable sheathing
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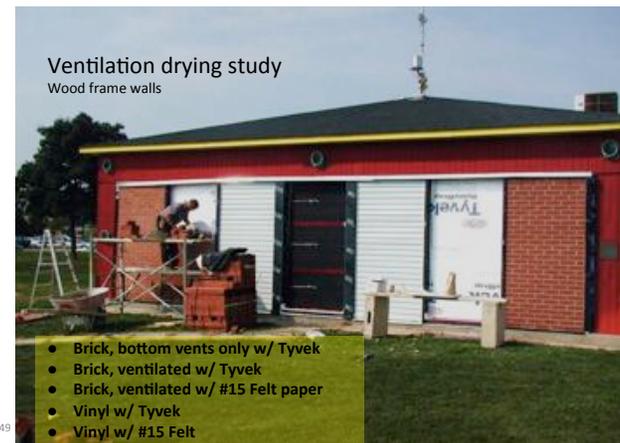


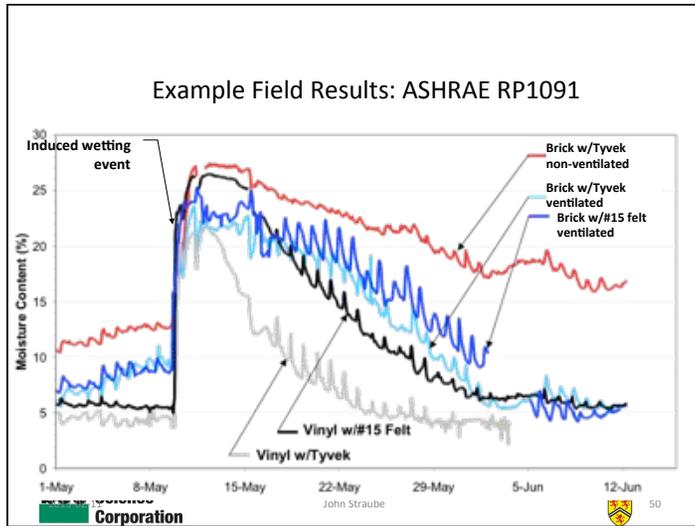
Previous Ventilation Research

- Fraunhofer Institut
 - Cladding on wet AAC
 - Test hut
 - Ventilation allowed faster drying
- Hansen (2002)
 - Initially dry test hut
 - No effect of ventilation found
 - No wetter/drier



Ventilation Research: ASHRAE 1091







Summary

- We need gaps to provide drainage
 - flashing, esp at penetrations, critical
- The required size of the drainage gap is very small (in the 1/16" +)
- Larger gaps can be useful for ventilation drying (1/4" - 3/4" clear)
 - We don't always need ventilation drying