Session 4: Insulation & Air Sealing
May 5, 2015

Ben Tucker & Jake McAlpine
Minnesota Department of Commerce
Division of Energy Resources
Wall Air Sealing

- **Air Sealing Walls**
  - Built-In Cabinets/Shelves
  - Wall Framing Around Fireplaces and Chimneys
  - Pocket Door Cavities
  - Cooling Appliances Installed through Walls or Windows
  - Balloon Framed Walls

- **Minor Air Sealing**
  - Window and Door Frames
  - Rim Joist Area
  - Masonry Surfaces
  - Interior Wall Top Plates
Wall Air Sealing

• Durability
  – Pressure envelope
  – Driven Moisture

• Energy Savings

• Comfort
Exterior Sealing?

• Techniques and work standards verses measure type. Pg 162

• Commerce will align “Allowable Activities Chart” to SWS

• Exterior Sealing is technically a general repair, not air sealing. The pressure barrier is almost always to the interior
  – Exceptions, tuck under garage. The ceiling and walls of a tuck under garage should be considered air sealing.
Walls

- Wall Insulation
  - Wall Insulation: Preparation and Follow-up
  - Retrofit Closed-Cavity Wall Insulation
  - Open-Cavity Wall Insulation
  - Insulated Wall Sheathing
  - Wall Insulation in a Retrofitted Frame Wall
  - Insulating Unreinforced Brick Walls
Quality Control Methods

- IR—looking for consistency, with blower door on
- Testing around protrusions for densepack
- Bag count/ weight
- Pg. 167
Field Guide Examples

• Some methods and materials in the field guide
  – Are not approved by MN WAP
  – Are not feasible for a WAP Program
• They are included in case other funders allow
• A number of wall insulation techniques fit this category
Floors and Foundations

• Thermal-Boundary Decisions: Floor or Foundation
  – The auditor’s responsibility
  – Most often MN crawlspaces and basements are INSIDE
  – Field Guide Offers Guidance
Air Sealing Foundations and Floors

• When Building Envelope is at a floor, air seal
  – Plumbing Penetrations
  – Stairways to Unconditioned Areas
  – Incomplete Finished Basements
Cantilevered Floors

• Modelled in NEAT as an exposed floor
• Leaky ducts in Cantilevers can drive moisture into the insulation cavity
  – Part of why new code requires duct sealing on ducts “outside” of pressure boundary
Cantilevered Floors

• Where is the pressure boundary?
  – Is backing accessible?
  – What about when it isn’t

• What is a cantilever most like?
  – A wide wall cavity
  – A tuck under garage ceiling
  – A flat attic
  – A band joist cavity?
Cantilevers SWS Field Guide

- Remove a piece of soffit or drill a hole under the overhanging floor to determine the condition of insulation and air barrier.

- Stuff the overhanging floor with fiberglass batts or blown fibrous insulation.
- Bed the sheeting underneath the overhanging floor in sealant where possible. Caulk joints and seams where the sheeting isn’t bedded in sealant.
- Seal any ducts you find in the cantilevered floor sections.
Floors and Foundations

• Preparing for Foundation or Floor Insulation
  – Rim-Joist Insulation and Air-Sealing
    • Not considered to be part of habitable space
    • Air sealing all six sides of the rim joist
    • Spray foam is most versatile
    • Foam board and one part as caulk can work
      – Make sure there is no leakage from any of the six sides
Floors and Foundations

- Preparing for Foundation or Floor Insulation
  - Installing Floor Insulation
  - Installing Fiberglass Batt Floor Insulation
- Consider
  - Plumbing
  - Heating
  - Electrical
  - Etc.
- Larger Cantilevers are more like exposed floors and less like widened wall cavities
Floors and Foundations

• Preparing for Foundation or Floor Insulation
  – Crawl-Space Wall Insulation
  – Basement Insulation

• SWS is the “how” not the “what”

• Currently Policy is that all foundation insulation projects require Commerce approval
  – Moisture conditions
  – Potential for outward drying
Windows and Doors

• SWS is the “How,” not the “What”
• Refer to Allowable Measures Chart and program policy to determine “what” to do
• SWS Field Guide Very Detailed and Thorough
Windows and Doors

• Storm Windows
  – Exterior Storm Windows
  – Allowed for Single Family homes, when NEAT shows and SIR greater than 1.0
  – pg. 200-203
Windows and Doors

- Window Repair and Air Leakage Reduction
  - Double-Hung Window Weatherization
  - Weatherstripping Double-Hung Windows
- The detail level in the SWS is staggering when it comes to window repair
- Discussion on page 203-206
Windows and Doors

• Window Replacement Specifications
  – Window Energy Specifications
  – Removing Old Windows
  – Installing Replacement Windows
  – Replacing Nailing-Fin Windows
  – Block-Frame or Finless Windows
  – Flush-Fin Window Replacement
Windows and Doors

• Window Safety Specifications
  – Windows Requiring Safety Glass
  – Fire Egress Windows
Windows and Doors

- Door Replacement and Improvement
  - Door Replacement
  - Door Adjustment and Repair
  - Allowable Measures Chart
    - If the problem is more than just a weatherstrip and sweep, do what it takes as air sealing allows