
Thermal Integrity in Wood-Framed Houses: the Good, the Bad, and the Ugly

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ABSTRACT

Framing of the structure, insulation installation, and heating and cooling equipment have stayed much the same (other than efficiency) over the past few decades. Many energy-saving improvements have been incorporated into residential wood-framed houses. Even with these improvements, heating and cooling equipment (which is much more efficient) is still being oversized in most production houses. Excessive energy use and comfort problems are often the result. This session will focus on four major factors that have been found to cause the thermal integrity in many buildings to be less than expected.

- 1. The misalignment of the air barrier and thermal barrier (insulation): House plans do not identify where the air barrier is located, leaving the installer of insulation to rely upon judgment and experience.*
- 2. Common framing details that contribute to thermal failure: The framer should follow the house plans to ensure the establishment of the air barrier. The problem is that no house plan shows where the air barrier is located. Ten prevalent framing details will be identified that most often cause thermal failure.*
- 3. Improper installation of insulation: Good performance of insulation requires that it be complete, continuous, and contiguous with the air barrier.*
- 4. Disregard for pressure differences across interior and exterior partitions: Imbalance of flow within residential buildings has been an oversight in design that has caused failure of thermal integrity. Closing interior doors can short-circuit the insulation, reducing its effective R-value.*

The backdrop of this session will be numerous slides and infrared photos of projects across the nation of the good, the bad, and the ugly of framing, insulation, and imbalanced flow.

- Twenty-two geothermal heat pump houses that have heating and cooling bills of less than one cent per square foot of conditioned space per month, but all had bad comfort problems.*
- Field walks and inspection results of over 200 houses in North Carolina, Arizona, Florida, and Nevada.*
- What worked in over 3,000 houses that resulted in the thermal performance being guaranteed in writing for three years.*

Solutions will be given for all of the identified problems.

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