Greening Your Home: Rehab - Exterior Walls & Surfaces

Jim LaRue

Presented by
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Greening Your Home: Rehab

Green or sustainable building means construction or rehab of our living spaces so there is little or no harm done to the natural environment or to the health of the residents.

Some building science to help us with our greenbuilding:

- Wet always moves toward dry!
- Warm always moves toward cold!

Some more building science to help with our greenbuilding!

Heat transfer occurs in three ways:

- Convection
- Conduction
- Radiation

And more building science to help us with our greenbuilding!!

We control condensation by:

- Reducing moisture levels
- Increasing temperatures

And yet more building science to help us with our greenbuilding!!!

We control moisture entering walls by use of:

- Rain screens
- Air sealing
- Vapor barriers
- Reducing vapor pressure

And yet more building science to help us with our greenbuilding

Humidity: the amount of moisture in the air

- Keep the humidity level in the 35% range when house is closed up for heating or air conditioning.
- Use a hygrometer to measure humidity in your home.

And more!!

Air flow into walls depends on three things:

- Size of the opening
- The pressure difference between exterior and interior of wall.
- Air flows from higher pressure to lower pressure

And finally!!!!

Stack effect:

- In winter as heat rises because of temperature differences, it escapes from above and cold air enters from below.
- In the summer, it is reversed - but less so because there is less temperature difference.

Insulating/air sealing existing walls

Words of caution:

There are two potential dangers from doing this work:

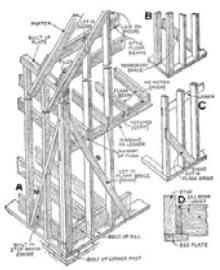
1. Knob and tube wiring can be a fire hazard when insulated.
2. Moisture can penetrate insulated walls and damage the structure.

Insulating/air sealing existing walls

- There are two basic kinds of wall construction in our homes:
  1. Balloon Construction
  2. Platform Construction
- Each system requires different treatments when weatherizing.

Balloon construction

- Depending on detail in the framing, each wall cavity in a balloon wall can become like a chimney that carries lots of house air up and out of the structure.

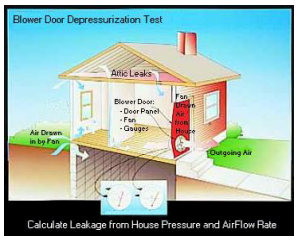


Platform construction

- Each floor of the structure is a separate section.
- There is no continuity of studs from basement to top of second or third floors.
- Less chimney effect.

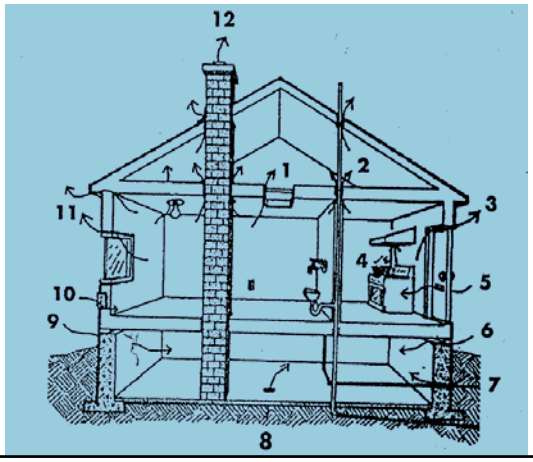
Air sealing a rehab

- Air sealing a rehab is much more difficult than new construction.
- A blower door test of the house is the most effective way to determine most leakage.



Some common air leakage spots

- Windows/doors
- Baseboards
- Electrical receptacles
- Openings from interior into attic
- Between floor joists



Where to look for air leakage – see drawing:

1. Attic hatch
2. Ceiling penetration into attic
3. Doors
4. Exhaust vents
5. Mail slot
6. Sill and header
7. Service entries
8. Floor drain
9. Foundation cracks
10. Electrical outlets
11. Windows
12. Chimney

Air sealant materials

- Caulk - small cracks
- Foam - larger cracks
- Plastic sheeting - large openings
- Weatherstripping around doors and windows

Insulating side walls

- Challenges:
  - identifying all wall cavities
  - accessing them from exterior/ interior
  - making sure cavities are effectively filled
  - settling and shrinkage potential

Types of insulation

- Cellulose
- Fiberglass
- Aircrete foam
- Other foams

Gut rehabs can use damp spray cellulose, fiberglass and foams

Insulating attic floor

- If attic has a floor, insulate under flooring. If no floor consider blowing insulation up to R38-40.
- If attic has a finished section, insulate perimeter of the finished space.

Doors

- Most existing doors have very little R-value, so weather-stripping is most effective measure including some kind of threshold treatment.
- Replacement doors are available that have insulation of about R-5. If metal make sure there is thermal break.

Windows

- Weather-stripping comes in many forms.
- Storm windows are a mixed blessing.
- Replacement windows are not likely to ever recover their cost in energy savings in a reasonable time.

Window replacement

- reasons for replacement
- type of window
- type of materials they are made of
- type of glazing
- insulation of weight cavities
- insert replacement or full replacement
- should have NFRC rating

Siding

- Siding serves two primary purposes:
  - it's the primary exterior moisture/wind barrier
  - it provides a decorative exterior finish for the house.

Siding

- Critical role of underlayment (sheathing) for siding:
  - provides racking strength for walls;
  - serves as a "rain screen" behind the siding, when a moisture repellent but vapor permeable sheeting is applied over it.

Types of siding – insulation impact

- clapboard
- cedar shakes
- asbestos
- brick/stone
- stucco
- add on sidings: vinyl, asphalt, aluminum