



Washington Grove Energy Workshop

November, 2011

Strategies for effective insulation

Presenters



- J. Bryan Blundell,
Dell Corporation, since 1972
Architectural Preservation Specialties
- Specialty Contracting
(wood, stone, masonry, metals, plaster)
- Maintenance / Conservation of Historic Materials
Condition Surveys, Moisture Evaluations
Historic Materials Investigation & Documentation
- Maintenance Planning
Digital archiving of documents and artifacts



- Mike Patterson, Owner of Patterson Builders-Remodelers, LLC
- Award winning remodeling contractor; working primarily on older homes.
- 25 years in the industry.
- Board member of the National Association of the Remodeling Industry's Metro DC Chapter.

Introduction

- What architectural styles are encountered in Washington Grove?
- What construction techniques and methods were used in building these homes?
- What are some of the challenges encountered in keeping these homes both comfortable and energy efficient?
 - How do we manage water, both in bulk liquid and in vapor form?
 - What is some of the science behind this?
- For large scale energy retrofitting, what's out there?
 - Discussion of different types of insulation strategies.
 - Discussion of window/door replacement.
 - Discussion of window & door insulation strategies.
- For seasonal/ small scale energy conservation, what can homeowners do?

Architectural Styles in Washington Grove

- Original camp buildings are from the “Victorian” era. A subset of this general theme is “carpenter gothic”, a style which many of the original camp buildings conform to.



Architectural Styles in Washington Grove

- Into teens and 1920's, the “craftsman/bungalow” style became popular.



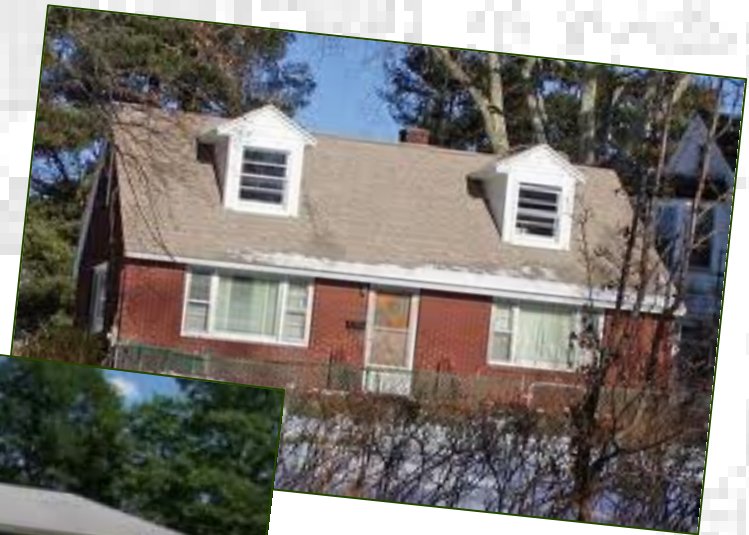
Architectural Styles in Washington Grove

- As the bungalow era faded in the 1920's, "neo-colonial" styles became popular.



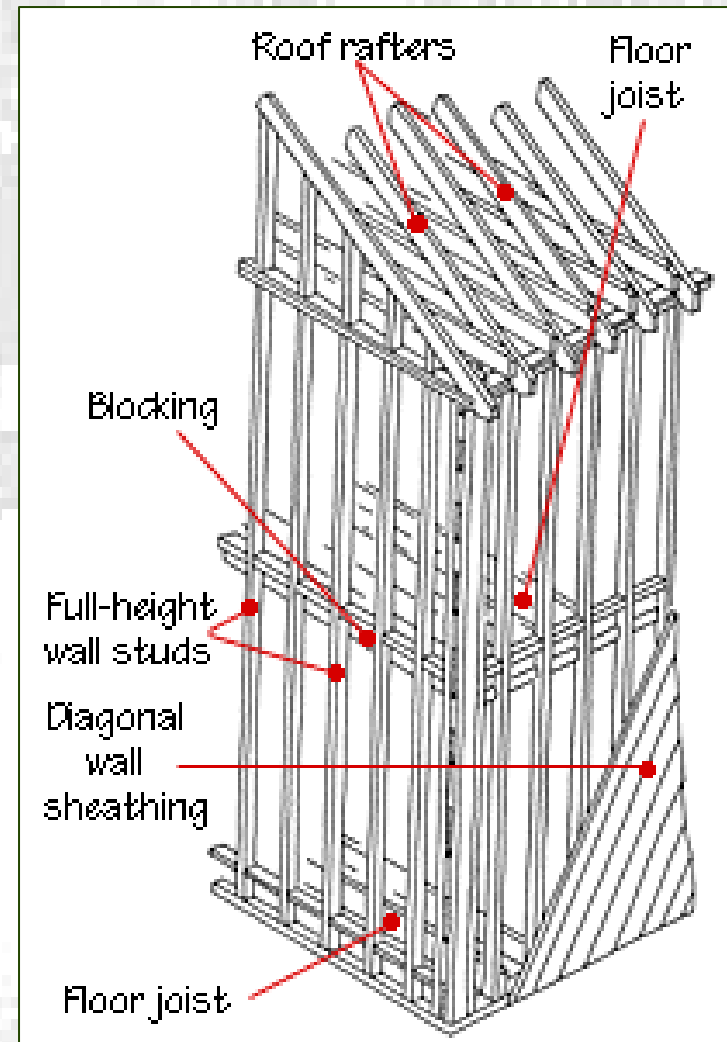
Architectural Styles in Washington Grove

- After the World War Two, production housing was born, and styles became more modern, and less ornamented. Classical forms remained, but were altered and simplified, to fit rapid production needs.



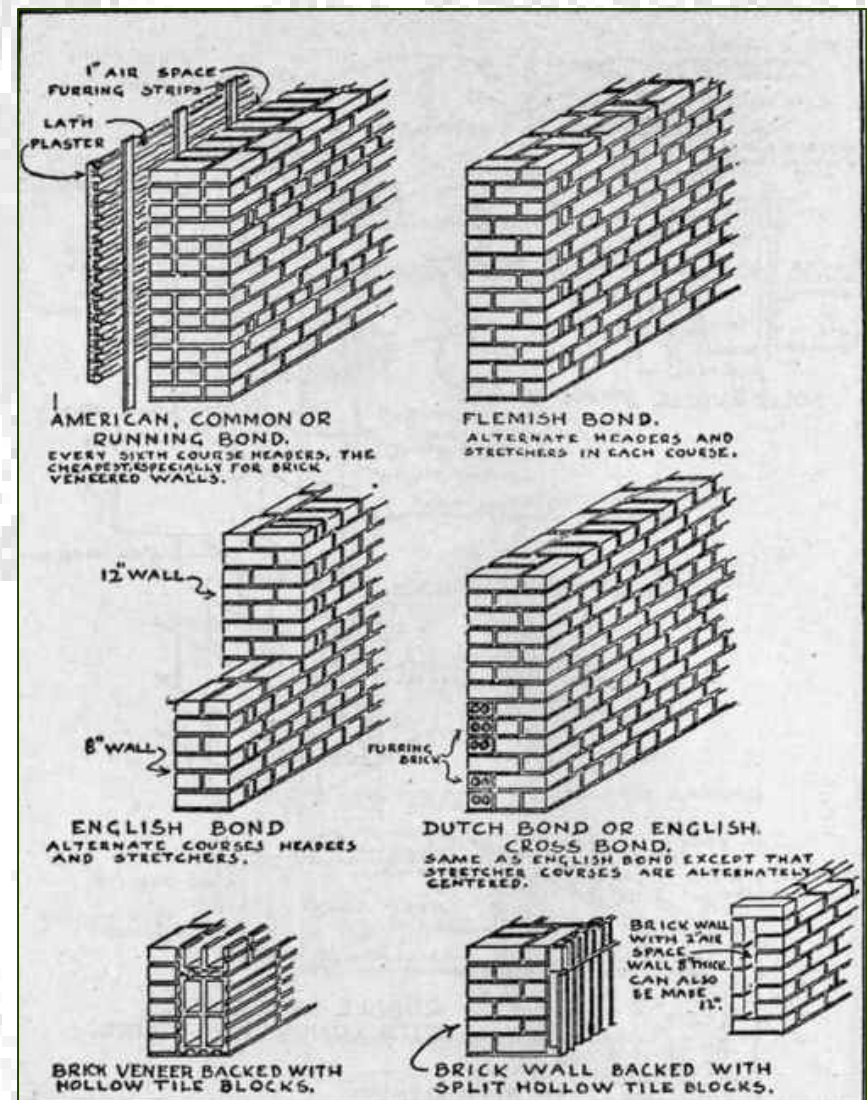
So, How Were They Built?

- For framed houses, from the earliest camp buildings and up until World War 2, the most common method of construction was known as “balloon framing”
- A highlight of this method is the use of full length studs from sill to 2nd floor top plate.



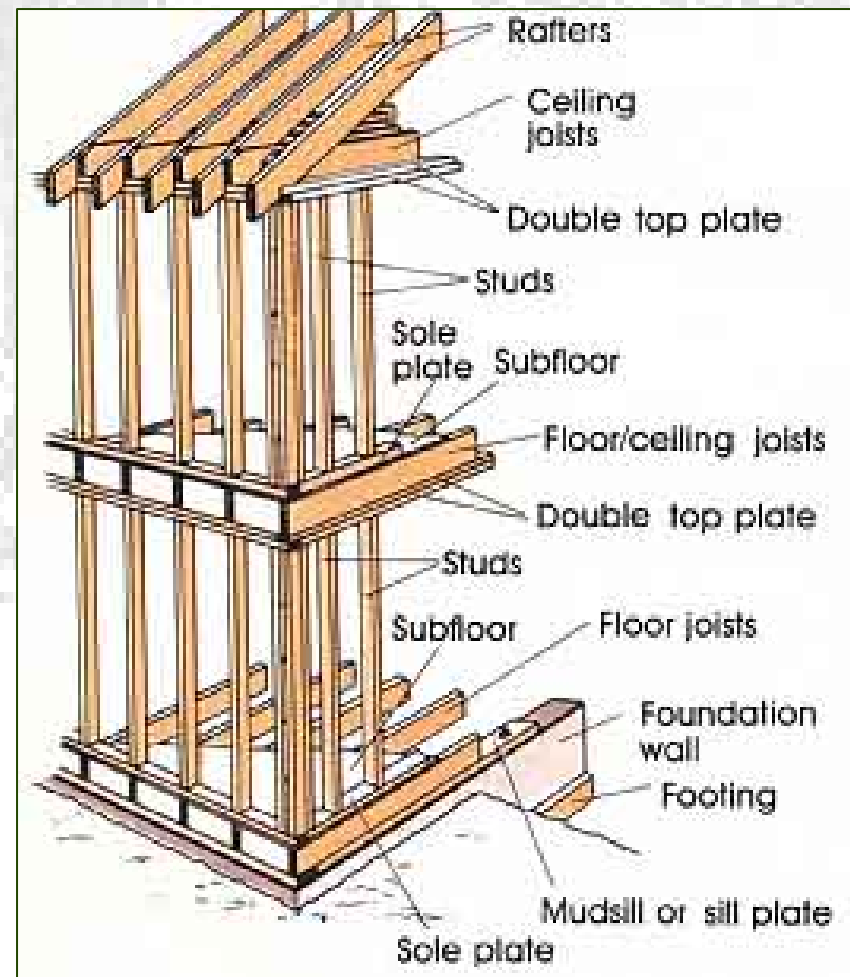
So, How Were They Built?

- Earlier homes that were not framed used what is called “solid masonry” construction.
- The earliest homes were brick through and through.
- In the teens/early 20’s, terra cotta block was introduced as a labor and material saving inner core
- In the 1930’s, concrete block came into popular use; replacing terra cotta block.
- In the earliest homes, plaster was applied directly to the interior surface of the wall.
- By the 1920’s it had become common for wood furring to be applied to the interior of the wall, to be then covered with wood (later gypsum based) lath and then plaster.



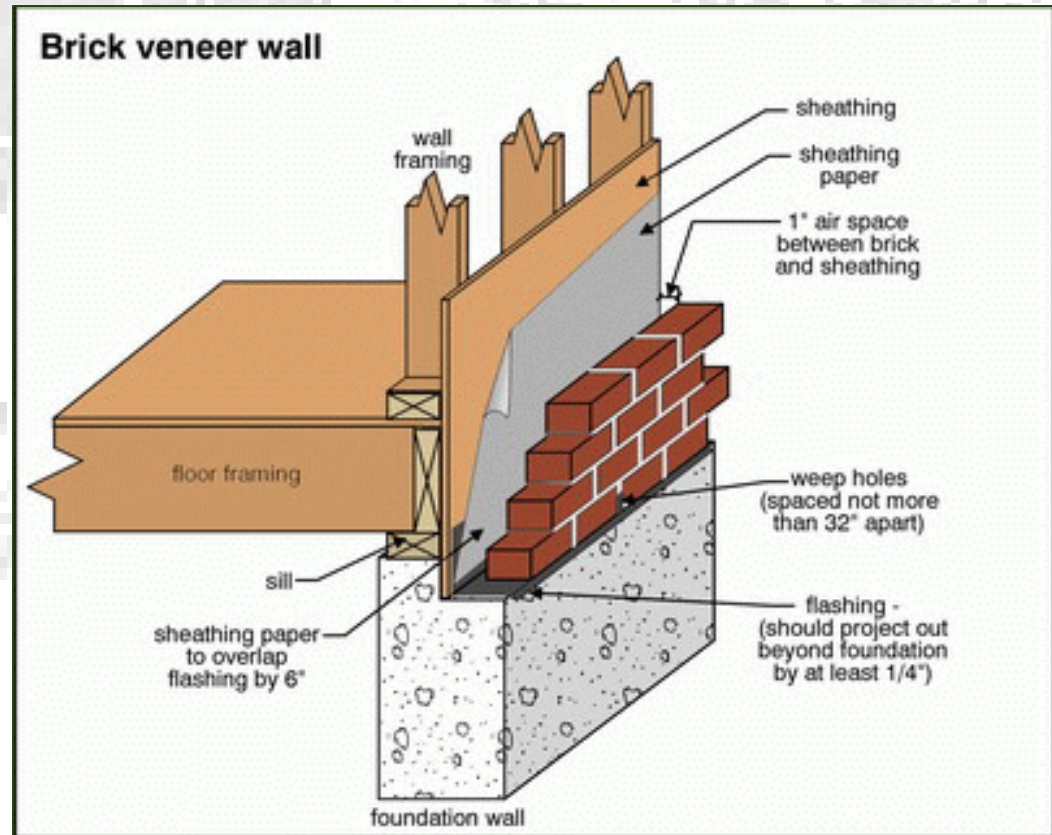
So, How Were They Built?

- After World War Two, the need for production efficiency led to two main changes in the way framed and masonry houses were built.
- In framed homes, “platform framing” or “western framing” became the norm.
- Full length studs were no longer used. Rather, the first floor walls were framed and erected, followed by the second floor and its walls.



So, How Were They Built?

- For masonry homes, solid masonry gave way to veneer masonry.
- The brick was no longer a structural element, but only a decorative one. The house itself was framed.



The Challenges of Older Homes

- Original camp buildings were not intended for year round occupation, and were not set up to be efficiently heated.
- Older homes were constructed prior to modern insulation theory & technology and in an era where energy costs were low.
- Construction techniques were not as tight as today's homes; leading to substantial air/heat leakage.
- Original construction details make insulation difficult, particularly in masonry walls.

Bulk Water Management



Getting the Right Help



LOW LUSTRE ENAMEL

To be used on new and previously used drywall application. Finish with SATIN IMPERVO Enamel. Previously Painted and Metal Surfaces: Apply over a good quality primer. MOORE'S Alkyd Enamel Underbody can be used as a primer on metal.

If they are in good repair condition, the color should be applied at the rate of 500-550 sq. ft. (46.4-51.1 sq. ft. per gallon).

APPLICATION

Apply by brush, roller or airless spray. Do not apply in the can. Do not thin.

DRYING

SATIN IMPERVO Enamel dries in a few hours. Do not touch for seven days. If a second coat of Enamel is required, allow a minimum of seven days.

CLEAN UP

Clean brushes and equipment with mineral turpentine.

MOORE'S and IMPERVO are registered trademarks of Benjamin Moore & Co.

235-74 L	CAS Number
Stoddard Solvent	6474-10-1
Calcium Carbonate	4713-14-0
Titanium Dioxide	1344-76-2
Hydrous Aluminum Silicates	1344-76-2
Sunflower Alkyd	6707-11-8

CAUTION! COMBUSTIBLE

Keep away from heat and open flame. To avoid breathing vapors or skin irritation, wear protective clothing and eye protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Close containers after use. Do not use in confined spaces. Do not use in areas where fire is a hazard.

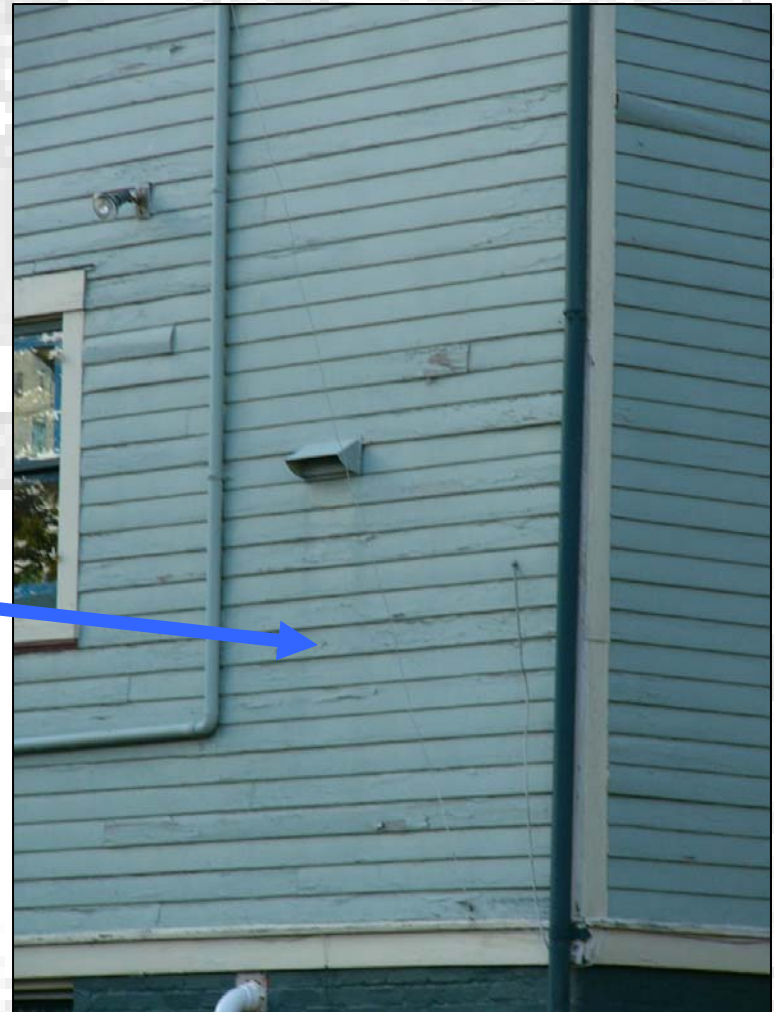
KEEP OUT OF REACH OF CHILDREN

Repeated exposure may cause permanent brain and nervous system damage with repeated prolonged exposure. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal.

Understanding and Managing Water



Understanding and Managing Water



Understanding and Managing Water



What's the Science Behind This?





Where Do I Start?

- Mitigate any water issues.
- Have an energy audit done, including a blower door test.
- These results will let you know what key issues your home has.



Techniques for Adding Wall Insulation in Older Framed Homes

- Blown in cellulose or fiberglass.
- Typically done by drilling holes in the siding, and blowing from the exterior, but can also be done from inside.
- After installation, the holes are patched and painted.
- Costs app. \$2.50 sf installed, not including painting or patching drywall or plaster,



Techniques for Adding Wall Insulation in Older Framed Homes

- Adding rigid insulation board to the exterior.
- Typically, polyisocynurate board is used, with an R-value of approximately 7 per inch of thickness.
- Not really practical, unless the siding is being replaced.



Techniques for Adding Wall Insulation

- Fiberglass batt insulation.
- Works fairly well when installed properly.
- Does not work well when wet, and can lead to mold issues.
- Inexpensive
- Is only practical to install when wall is open on either side.



Techniques for Adding Wall Insulation

- Spray foam.
- Can be either closed or open cell.
- Closed cell has an R-value of app. 6.5 per inch
- Open cell has an R value of app. 3.6 per inch
- Practical only if wall is open.
- DIY kits are available, for smaller areas.



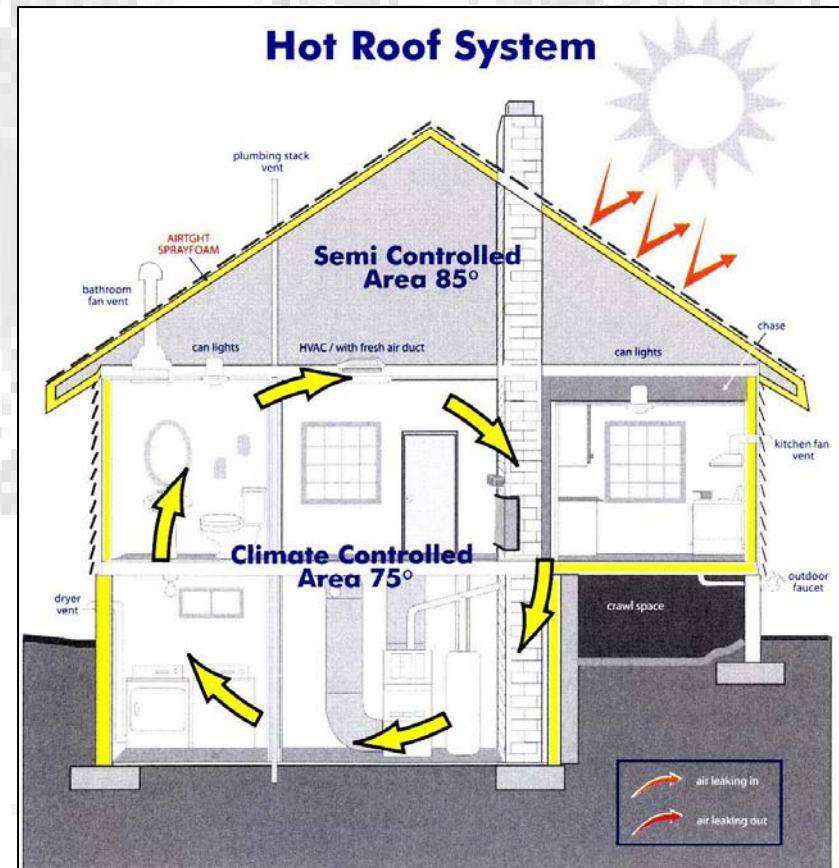
Techniques for Adding Ceiling Insulation

- Blown in cellulose or fiberglass is the most common method, when an attic is present.
- Ratings of R-38 are fairly easily achieved.
- Typically done by an insulation contractor, but home centers often rent the equipment.



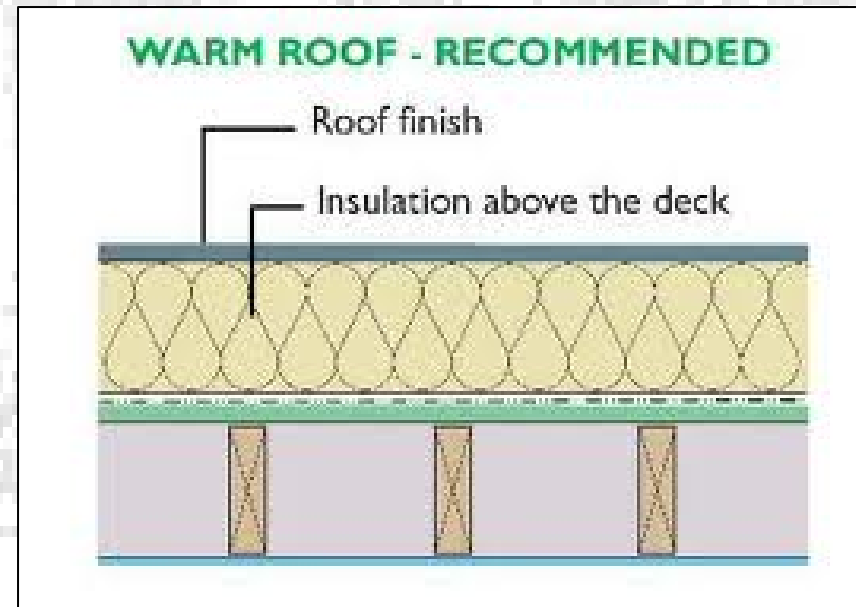
Techniques for Adding Ceiling Insulation

- Insulating the rafter bays with foam is becoming more common.
- Creates a “hot roof”
- Makes attic space semi-conditioned, allowing more efficient location of HVAC systems.
- Typically done with spray foam.
- Generally requires a fire resistant barrier over the insulation.



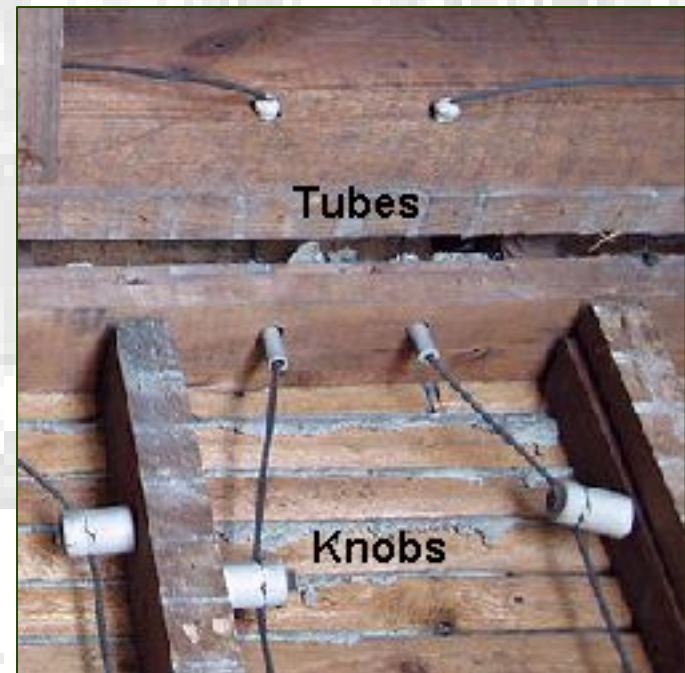
Techniques for Adding Ceiling Insulation

- Applying rigid polyisocynurate board on top of the existing sheathing is another option.
- Useful when ceiling is vaulted with exposed framing below.
- At least 4" of foam board would be required to achieve an R-28 rating.
- Requires changes to rake details, which may pose aesthetic issues, particularly in historic work areas.



Cautions

- Homes up until the 1920's often have "knob & tube" wiring.
- This wiring is not rated to be surrounded by insulation.
- In an uninsulated wall, and left undisturbed, it is not necessarily a hazard.
- Surrounded by insulation, wires can overheat, leading to fire.



Cautions

- In many older homes, vermiculite was used, both in attics and poured into open cells in concrete block.
- Vermiculite often contains asbestos.
- Left in place, it is not a hazard.
- Removal is not advisable.
- In attics, new insulation can be blown on top of the existing material.



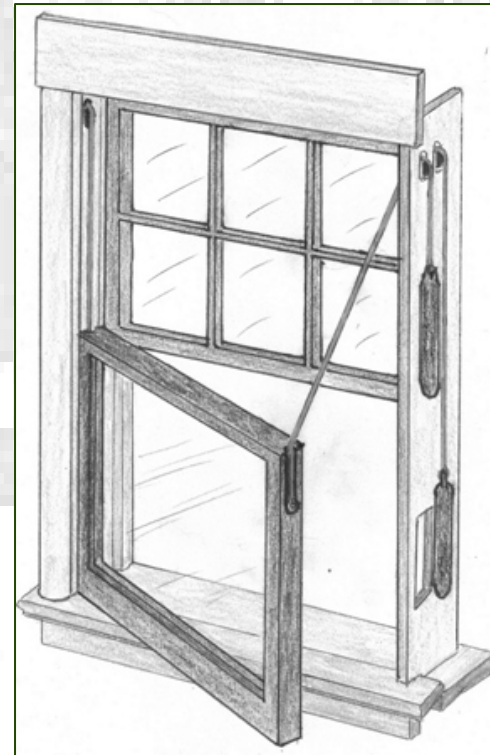
Cautions

- Adding insulation into areas that are not adequately protected from water/vapor intrusion is a recipe for rot.
- Uninsulated homes may be too hot or too cold, but they are able to dry out much quicker.



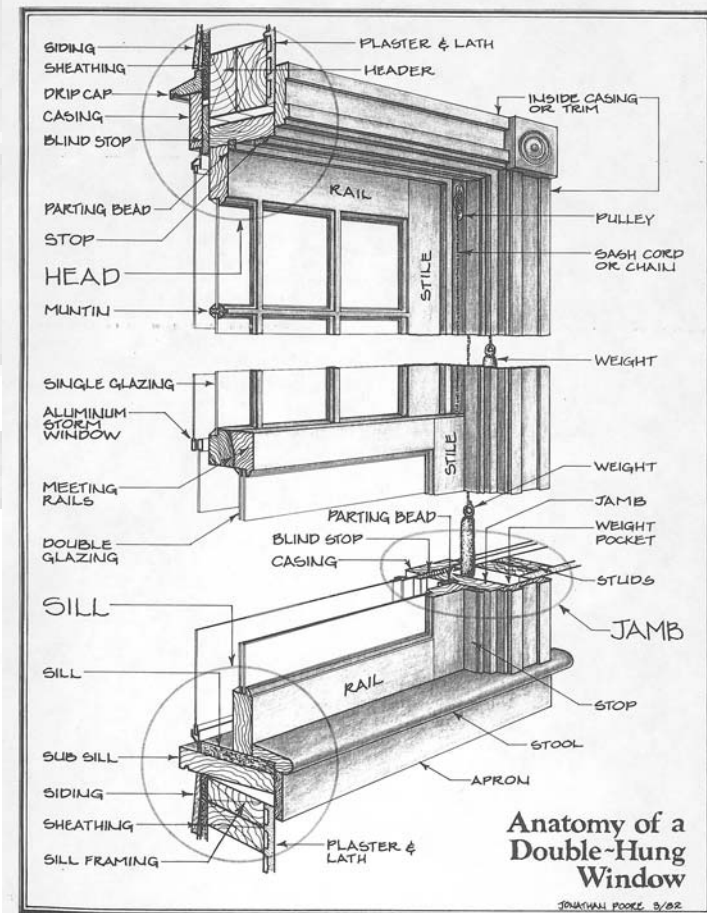
Doors & Windows

- Are a source of significant heat loss/gain, due to air leakage and emmisivity of old glazing.
- Replacement is seldom the “magic bullet” that will solve all of your problems.
- There are simple things that can be done that make a large impact on comfort & energy use.



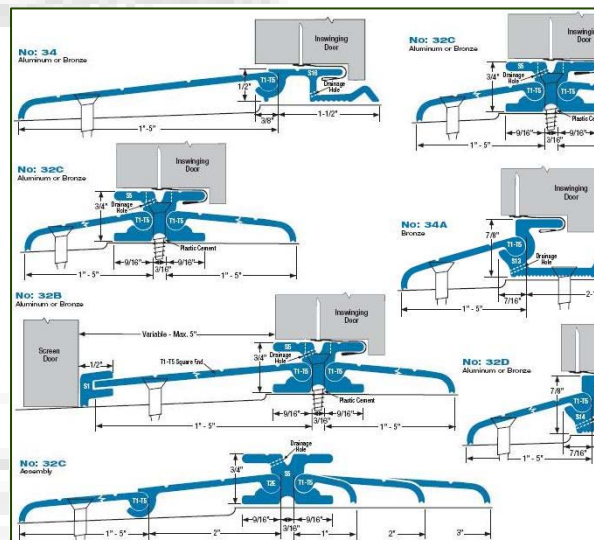
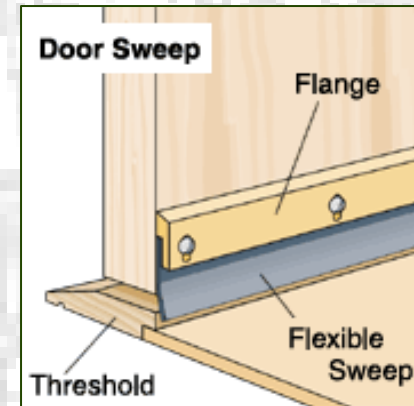
Doors & Windows

- Replacing historic wood windows or doors with new units may make them more easy to operate, but will not necessarily save you money.
- Claims of energy savings are overstated, and installation costs, especially for high quality windows, are quite high, making for very long payback periods.
- According to a number of studies, when properly weatherstripped and fitted with an effective storm window, old windows perform very nearly as well as new units, at a fraction of the cost.
- When you remove an integral original piece of a structure, it is gone forever, and the character of the structure is changed.



Doors

- Weatherstripping along the jamb.
 - Spring bronze
 - Vinyl
 - Bulb type
- Weatherstripping along the door bottom
 - Interlocking bronze
 - Bulb type
 - Sweep type



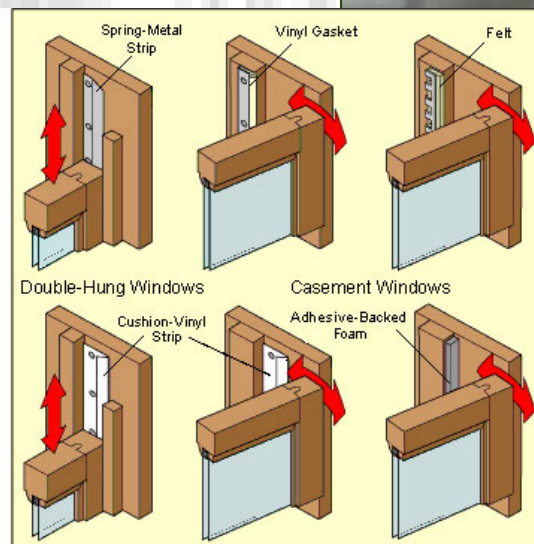
Storm Doors

- Wooden units can accent the architecture of the existing house.
- Aluminum units are often easier to install.
- Not terribly expensive, when compared to replacing an entire unit.



Windows

- Weatherstripping along the sash guides
 - Spring bronze
 - Vinyl
 - Bulb
- Weatherstripping at the meeting rail and the top & bottom of sashes.
- Requires removal and reinstallation of the sash.



Storm Windows

- Can be either interior or exterior.
- Can be wooden or metal.
- When properly fitted, provide nearly the same energy performance as new windows.
- Are removable and don't permanently alter a home's historic character.



Other Things You Can Do

- Reduce drafts with door socks
- Use removable caulking around windows & unused doors.
- Shrink wrap style films at windows.
- Permanent caulking at all areas where air can enter.

