

How to think about replacement windows for historic buildings.

NAPC – virtual talk

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LEARNING GOALS:

- Review what makes historic windows great.
- Discuss challenges with windows in historic buildings. Wood, glass, maintenance.
- Understand window options and balancing energy efficiency with cost and performance
- Planning for the next 100 years.



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THE CHALLENGE

Living with and maintaining an historic building takes courage, hard work and perseverance. It is a FIGHT! Everybody will push back on your decision for thoughtful restoration; Bankers, building codes, contractors, review boards and the budget. You are going into battle, especially with windows. Remember, the fight is worth it.



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HOW TO KNOW WHEN TO REPLACE



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HOW TO KNOW WHEN TO RESTORE



After restoration

Before restoration



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1930's & 1950's Gothic Revival Church in Dallas, Texas.



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1920 Booker T Washington High School. Dallas



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WHEN TO REPLACE

- When original historic windows have been removed
- When original windows are beyond repair *
- When replacement windows have failed.



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REPLACEMENT CHOICES

- Custom Windows- Most customizable, most options
- Production Wood Windows- Better price, new features
- Vinyl/Aluminum/Fiberglass Windows- Better pricing, assumed longevity



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CUSTOM WINDOWS



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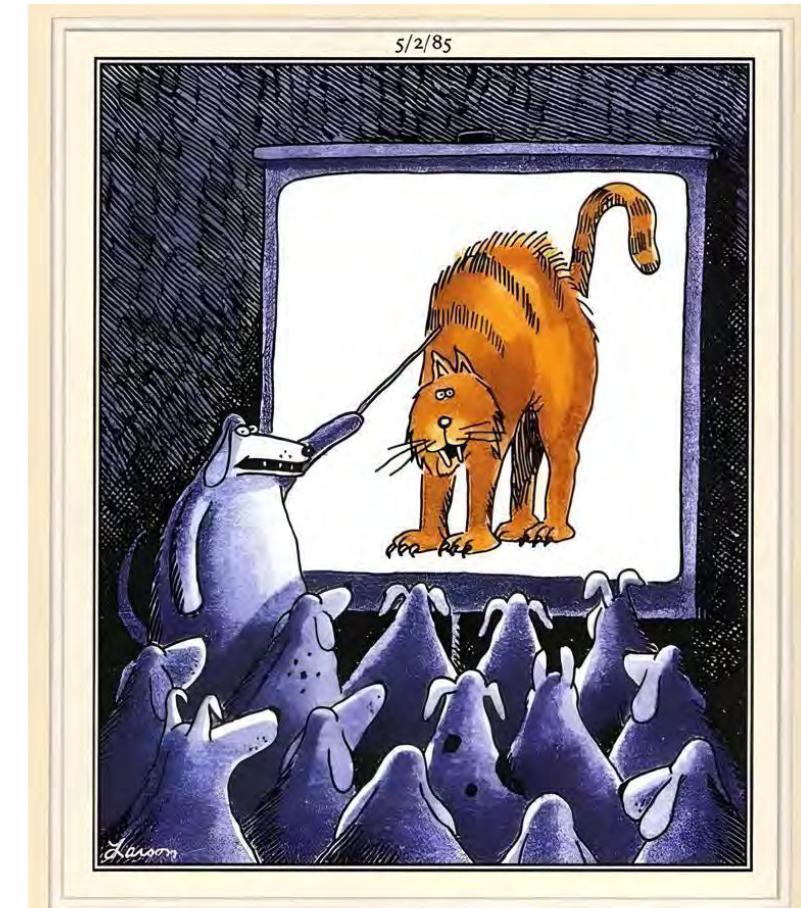
PRODUCTION WINDOWS

Familiar Brands

- Marvin
- Pella
- Kolbe
- Anderson
- JELD-WEN
- Sierra Pacific
- Etc.

Common Cheats:

- Simulated Divided light
- Cladding that doesn't match historic detailing
- Reduced sizing of trim and historic details.
- Thinner Jambs and sills
- Reduced shadow lines



"Now, in this slide we can see how the cornered cat has seemed to suddenly grow bigger. ... Trickery! Trickery! Trickery!"



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CLAD WINDOWS



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DIVIDED LITE WINDOWS



Simulated Divided Lites



Grilles-Between-the-Glass



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DIVIDED LITE WINDOWS

Colonial Window Grids

Colonial window grids separate the window into either four, six, or nine equal portions for a clean look. Colonial homes feature symmetrical designs and window grilles follow the pattern. Some houses will feature grids on the upper sash of a window. Colonial style grids can often appear in Cape Cod style homes, too.



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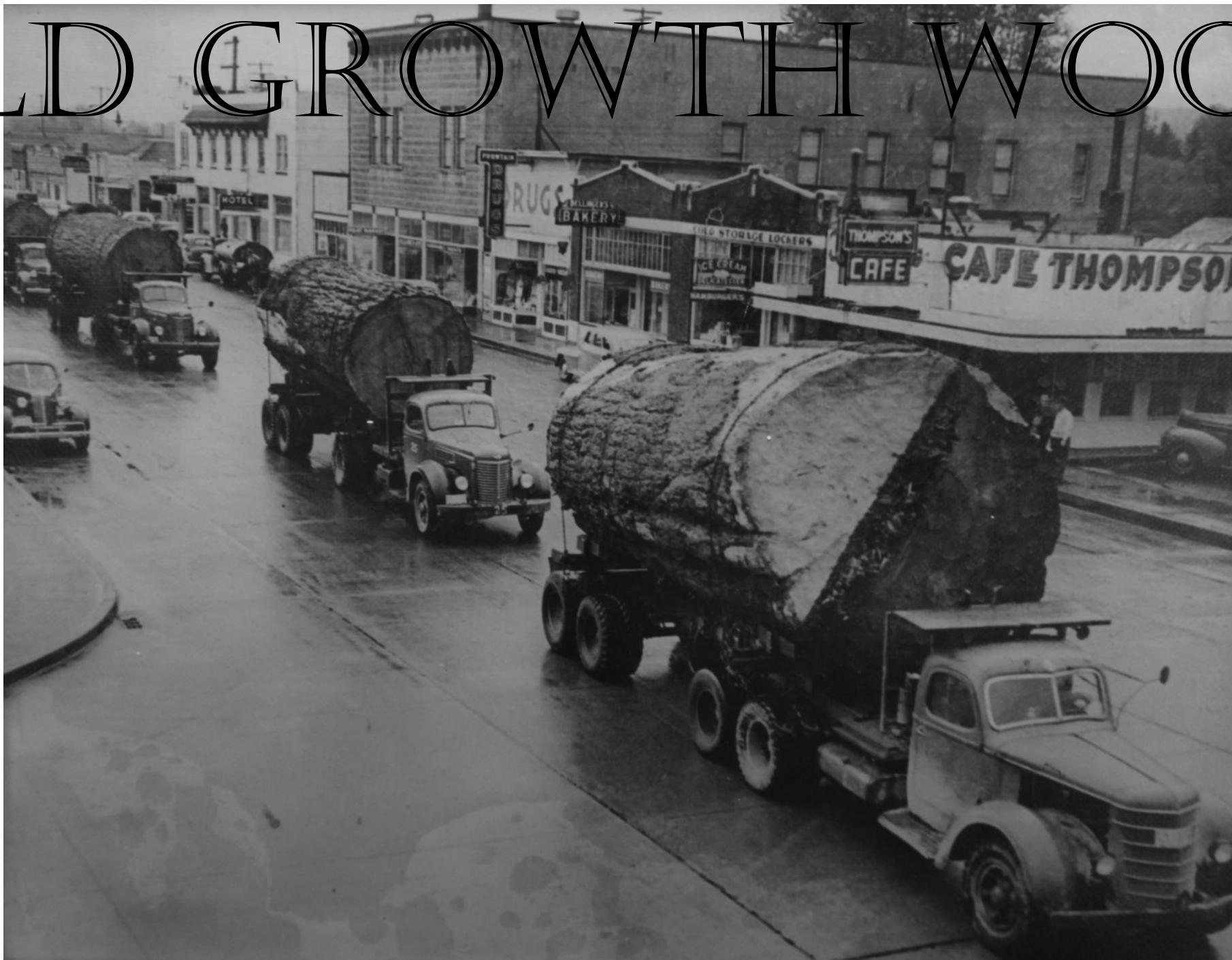
3 REASONS HISTORIC WINDOWS ROCK!

- Wood Quality
- Energy Efficiency
- Glass Flexibility



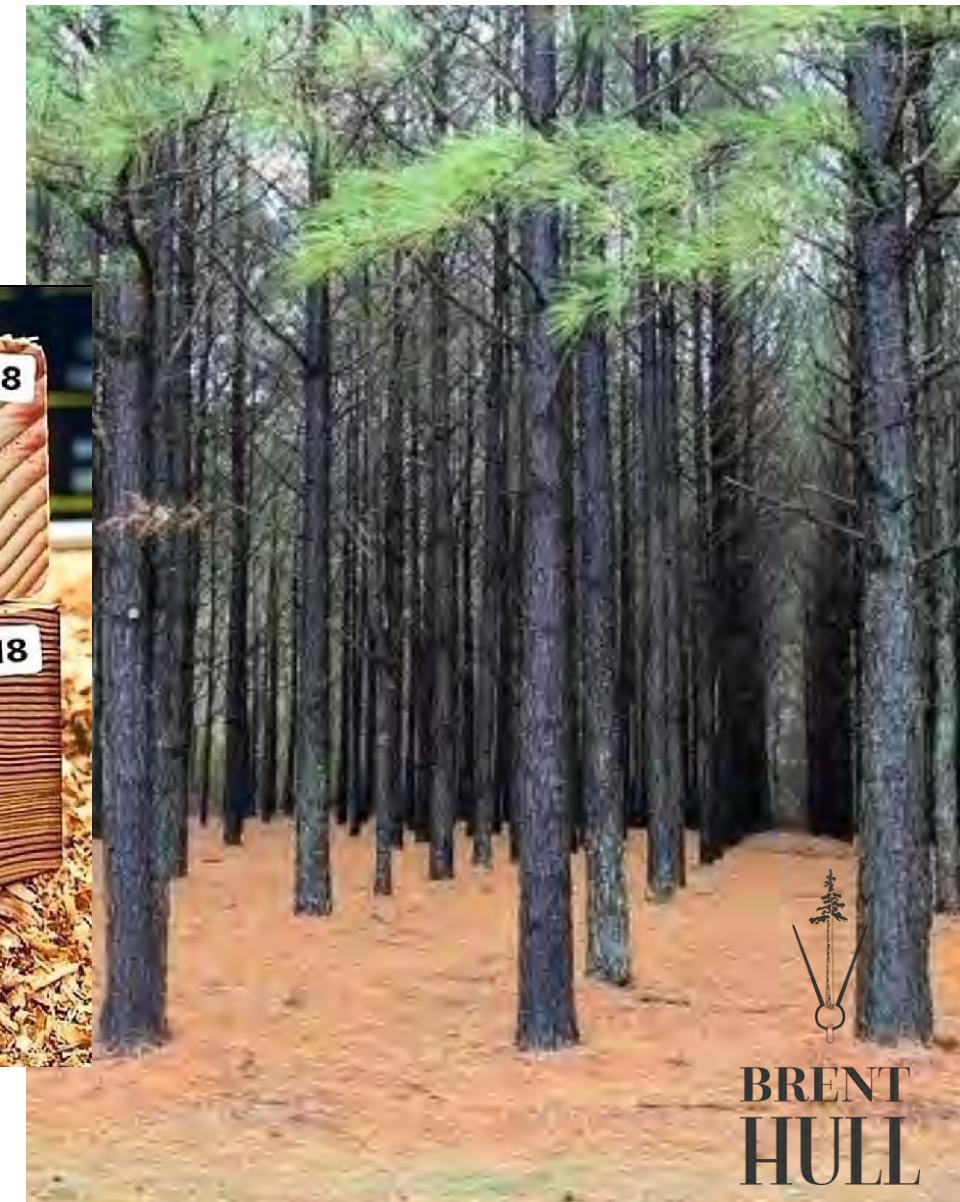
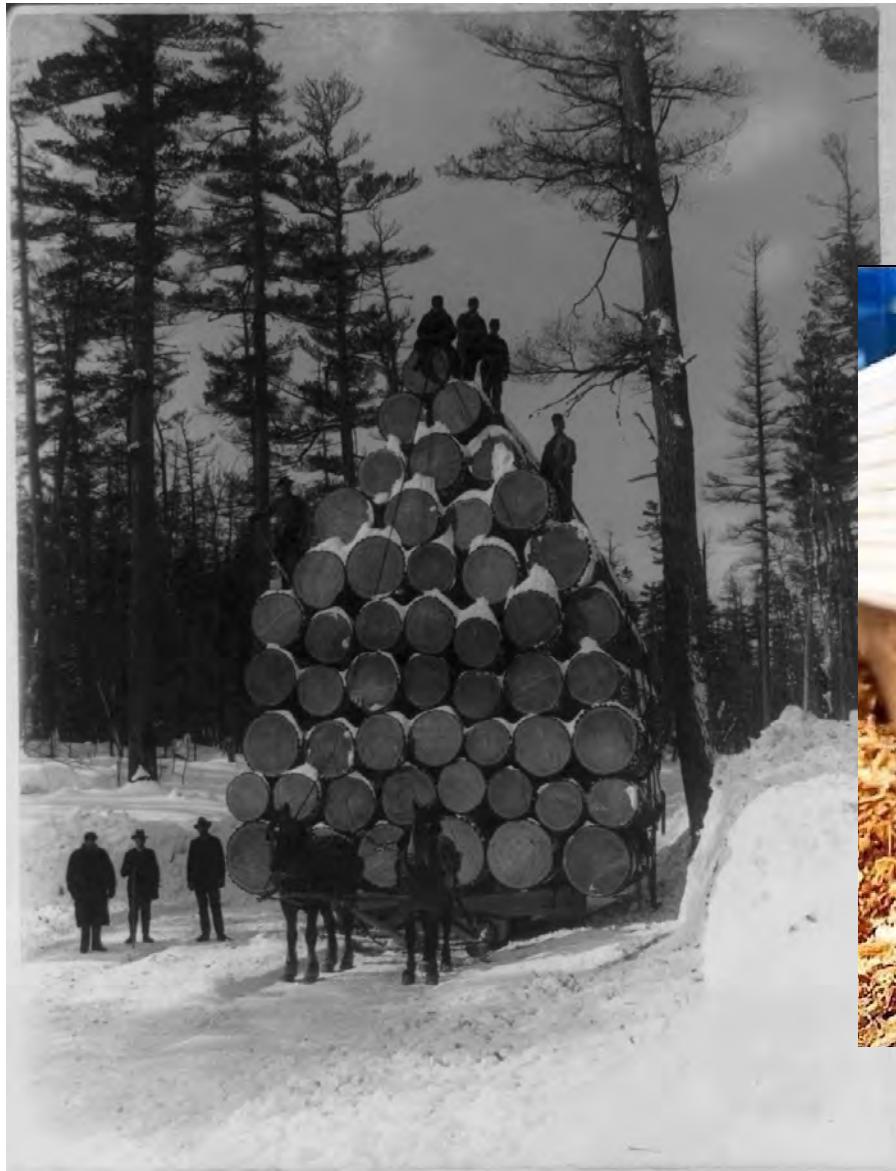
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OLD GROWTH WOOD

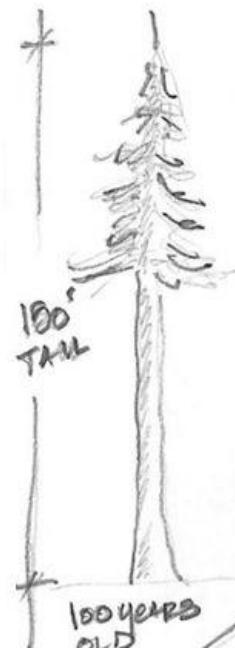


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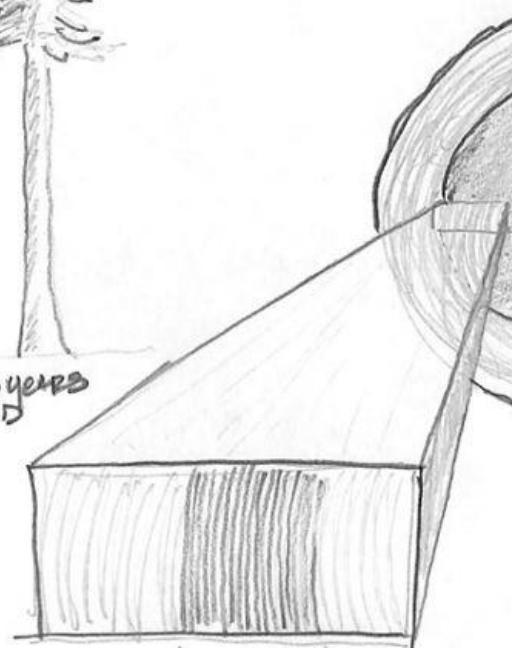
OLD GROWTH VS NEW WOOD



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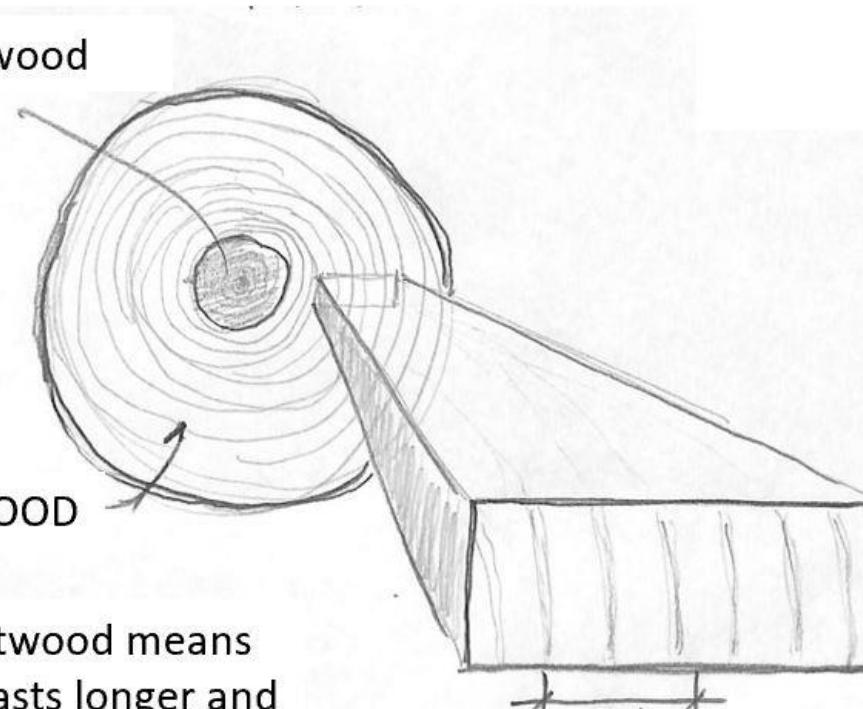


OLD GROWTH vs Timber

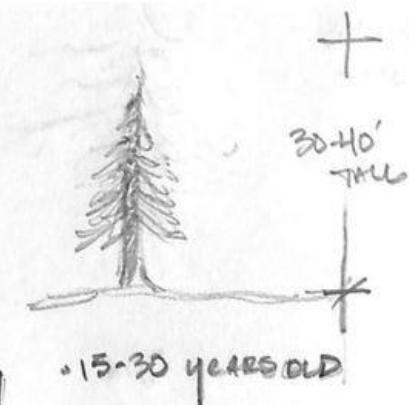


12-25 growth
rings per inch

NEW GROWTH Timber



3-4 growth
rings per inch



More Growth Rings means the wood
is more stable and less susceptible to
warp



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Woods by average heartwood decay resistance

Resistant or very Resistant

Bald Cypress- O.G.
Cedar- most types
Cherry, black
Chestnut
Redwood- O.G.
Walnut, black
Mahogany, American*
Teak- O.G.*

Moderately Resistant

Baldcypress-2nd G.
Douglas Fir
Long Leaf Pine- O.G.
Redwood- 2nd G
Tamarack
Eastern White Pine- O.G.
Mahogany, African
Teak, 2nd G

Slightly or nonresistant

Ash
Beech
Birch
Cottonwood
Elms
Firs-other than douglas
Hickory
Maples
Pines- other than those listed
Spruces
Gum
Poplar ***

O.G.=Old Growth

2nd G=2nd Growth

* imported

Source:

Forest Products Laboratory. 1999. Wood handbook--Wood as an engineering material. Gen. Tech. Rep. FPL-GTR-113. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 463 p



GOOD WOOD

- Old Growth Wood is the best, longest lasting and historic solution.
- Stop using finger-jointed wood
- Cladding does not guarantee longevity



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ENERGY EFFICIENCY

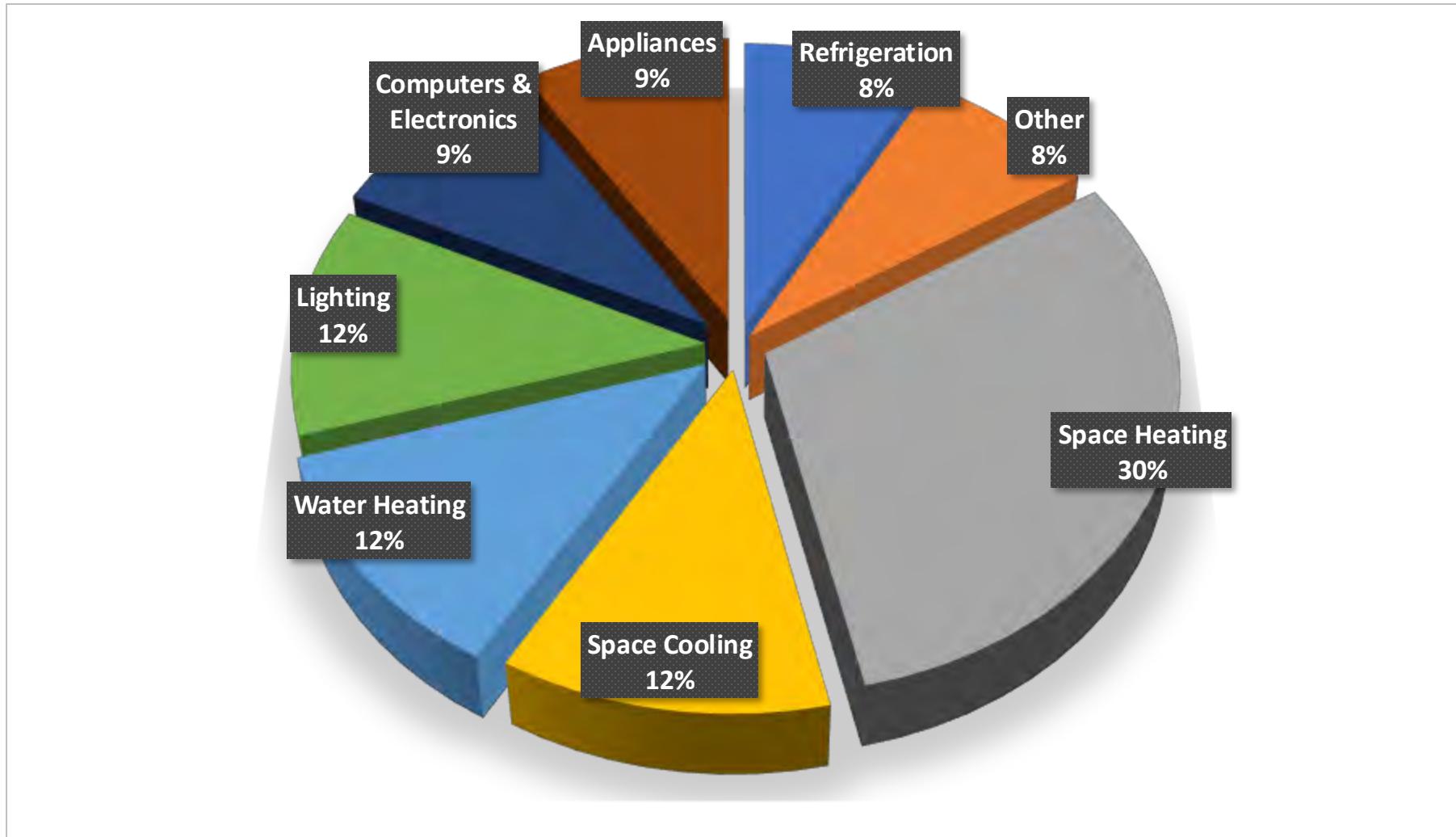
“I’ve looked at a lot of window replacement data...I’ve heard window salespeople say that you can save 50% on your heating bills if you replace all your windows. In fact, the amount of energy saved by replacing all of the windows in a home is generally on the order of 1% to 4% of the heating energy usage.”

Michael Blasnik, a Boston-based energy consultant with access to utility bill data for millions of U.S. homes.



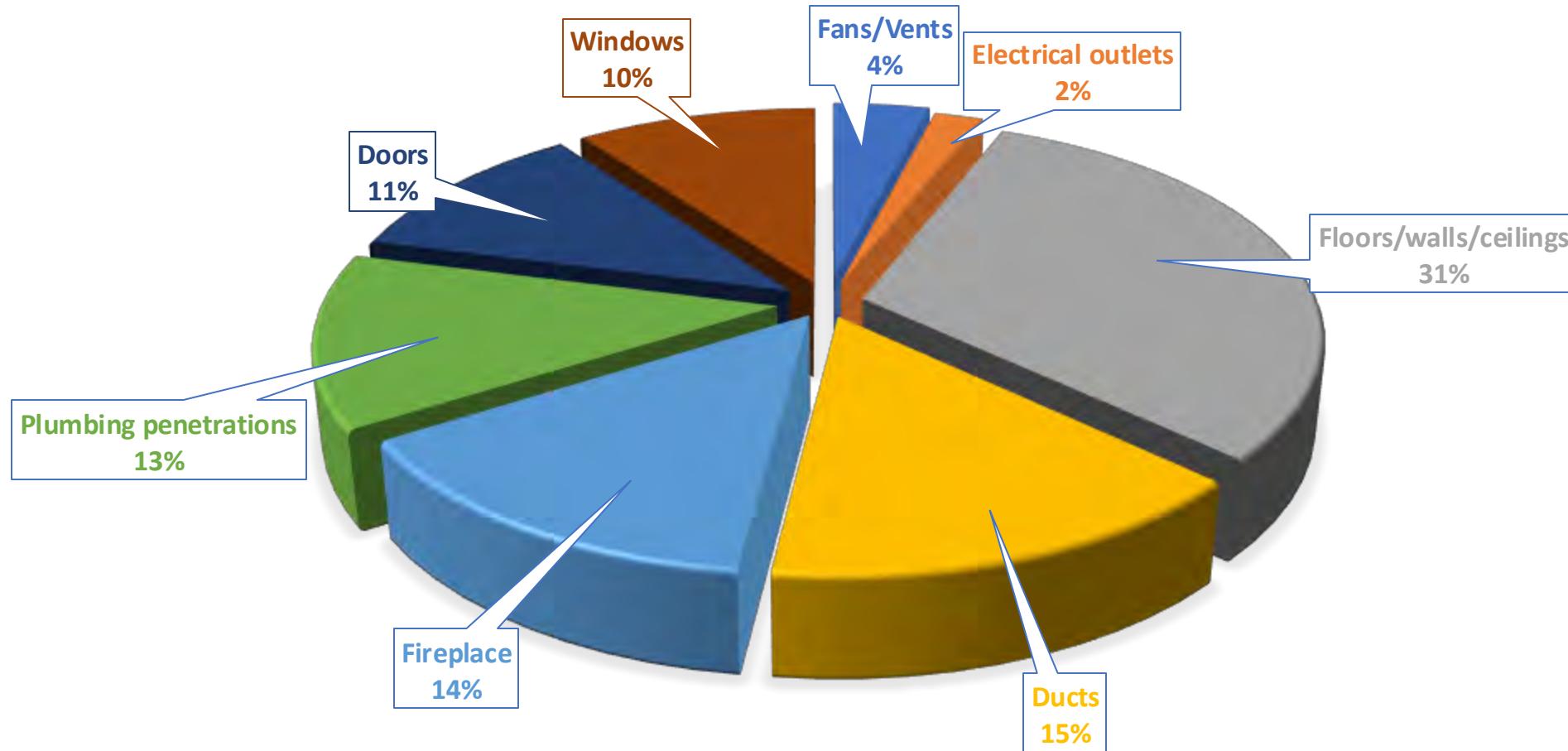
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BUILDING ENERGY USE



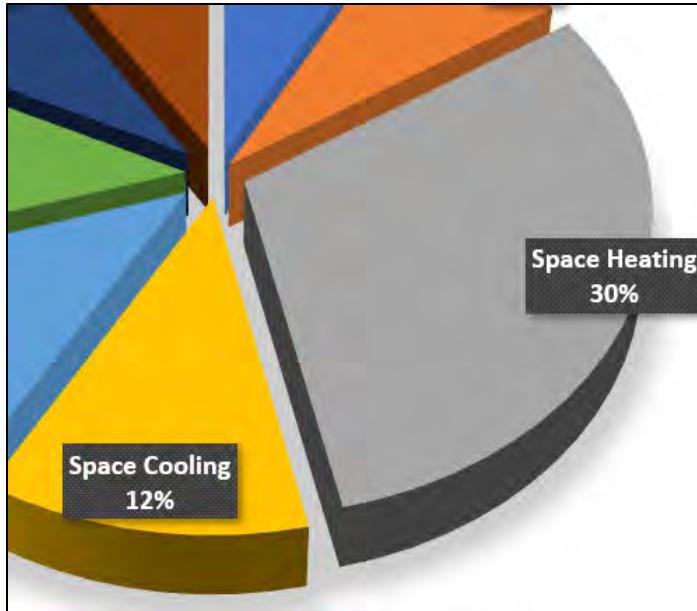
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HOLES IN OUR BLDGS

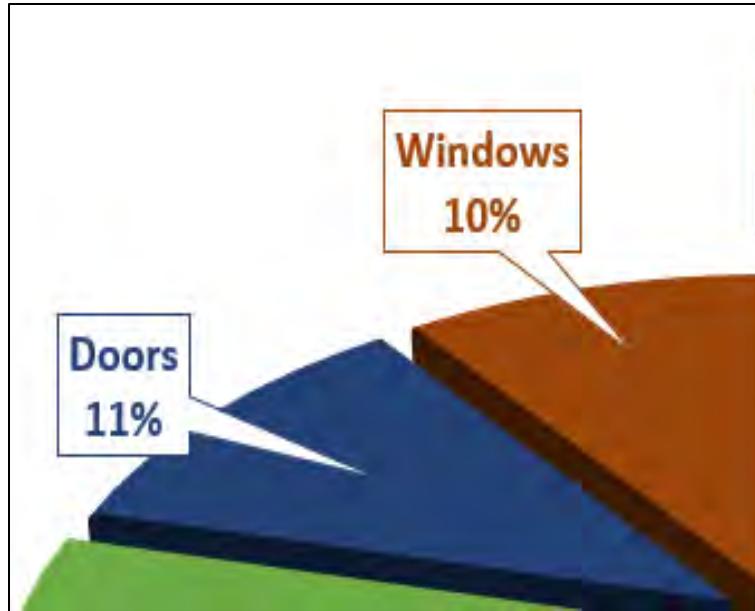


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SAVINGS?



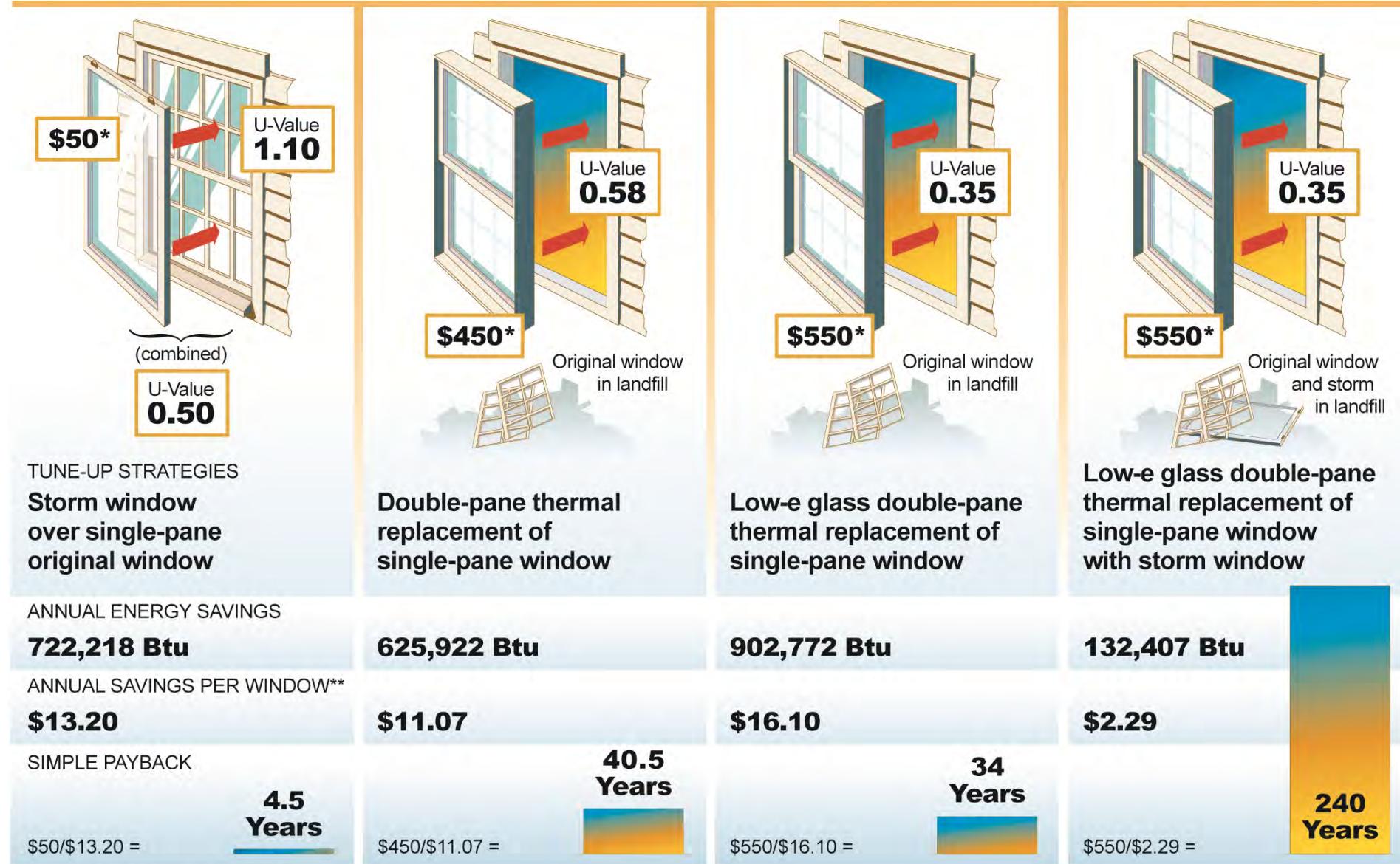
Since only 40% of energy use is used for heating and cooling



And only about 10% of energy loss happens on windows

Payback on new windows is estimated between 40 and 100 years!!





* Cost of 3' x 5' window, installed

** Assuming gas heat at \$1.09/therm



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Single-glazed windows with exterior triple-track storm windows don't perform quite as well as new double-glazed windows but their performance is surprisingly close. The annual difference in energy bills may amount to just \$1 or \$2 per window.

HISTORIC SOLUTION



Wood screen



Ext & Int Storms



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GLASS DECISIONS

Performance & Sound

Cylinder Historic

Cylinder Laminated

Float glass

Float glass Laminated

VIG- vacuum insulated glass

Cardinal Clay glass

Window films



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MANAGING SOUND/NOISE ON HISTORIC WINDOWS.

STC – Sound Transmission Class

- An STC rating on glass measures its transmission loss (how well it stops sound) The higher the number the better it blocks sound.
- A quick rule of thumb: A 10-point increase in STC rating displays a 100% increase in noise blocking.
- If decreasing sound is the goal, laminated glass is the best choice. It is approximately 80% more effective in stopping sound than 3/8" IG.
- Note the STC rating for 3/8" IG is actually worse than current historic glass.

Glass Type	STC rating
1/8 monolithic glass	30
1/4 monolithic glass	31
3/8" Insulated glass (1/8"glass, 1/8 space)	28
1" Insulated glass (¼" glass, ½ space)	35
1/4" Laminated glass (1/8"glass, .030pvc*)	36

*pvc is the laminating material between the glass



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OPPORTUNITY

- Well-designed, carefully-built, custom windows can match and exceed original historic windows look and performance.
- Energy efficiency claims need to be carefully studied- including life cycle costs.
- Glass technology and design has changed the game for performance and look.



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WINDOW FIGHT RULES

- A replacement window should last at least 100 years.
- A replacement window should match historic profiles and shapes
- A replacement window should match the exact type of original window type.
 - Double Hung for Double Hung. Not for Casement.
 - Divided lights must match divided lights from historic.
- New production windows are a 20-30 year fix for historic buildings.
- Vinyl and Fiberglass are not historic options.

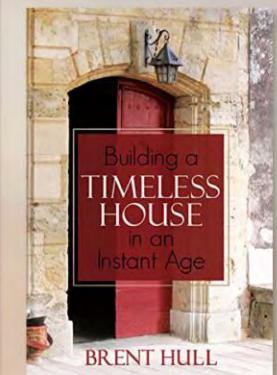
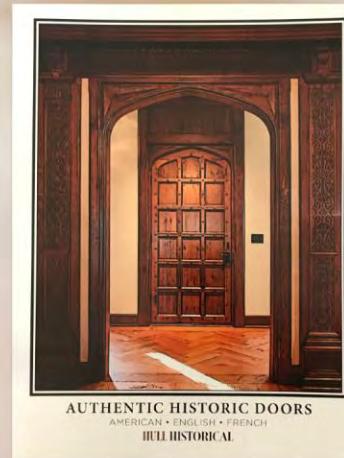
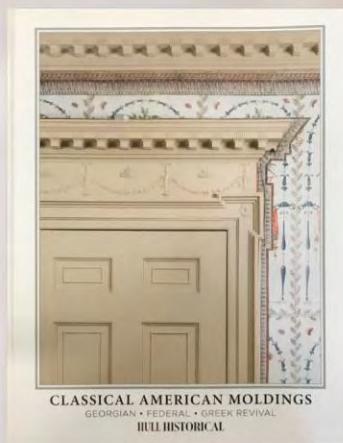
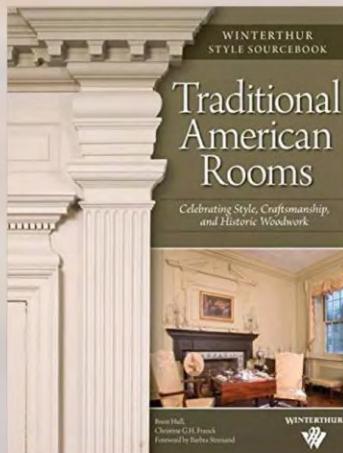
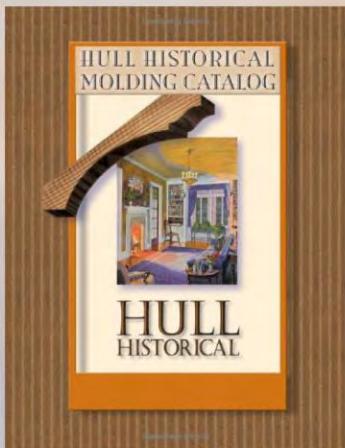
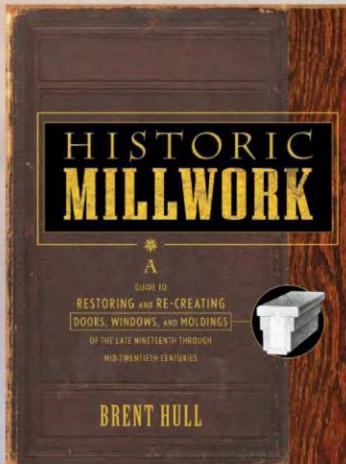


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BRENT HULL *Author*

**New book on Historic
Millwork coming 2024!**



Evolution, Anatomy, and Components of Windows in America

Steve Jordan



Paul Revere House, 1680, Boston, MA, Casement Sashes



Inward and Outward Opening Casements

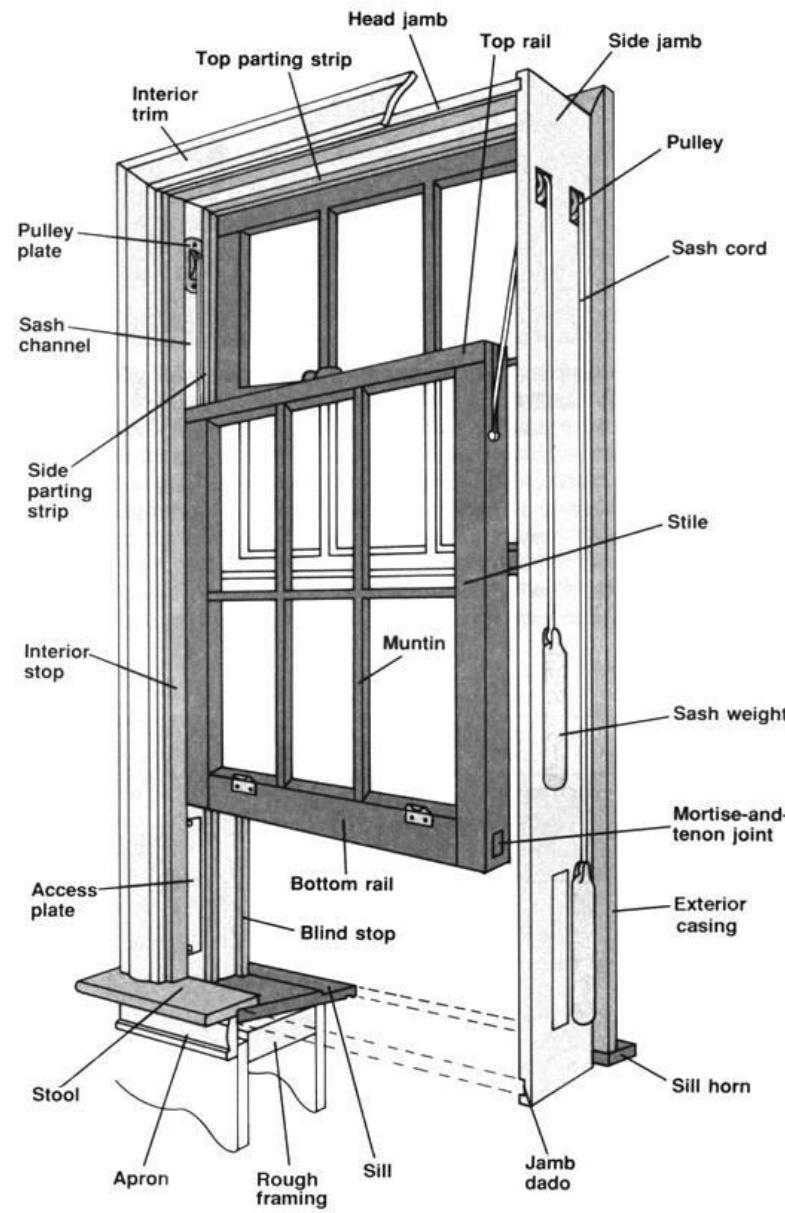


The Racking Problem



Whipple House, Essex County, MA, 1680. 1720 Change from Casement to “Sash” Windows





Colonial Hung Windows



19th Century Windows



Benefits of Repair or Restoration vs. Replacement

Old-Growth wood



Original and Unique Design



Benefits, continued

Ease of Repairs



Retrofitting Weatherseals



Benefits, continued

Original Wavy Glass



Joinery



Benefits, continued

Return on Investment (ROI)



Reuse and Retention of Natural Resources (The “Green” and carbon footprint issue.)



Workshops

Indoor Workspace



Workshops, continued

Outdoor Workshops



Shop Work and Site Work



Painter and Glazier's Shop, c. 1850





NATIONAL ALLIANCE *of* PRESERVATION COMMISSIONS

education + training + advocacy

*Helping to build strong local preservation programs and leaders
through education, training and advocacy.*

Learn more about the programs and resources NAPC has to offer below!

Membership

NAPC currently offers both Individual and Organization level memberships. To learn more and stay connected with preservation at the local level, join NAPC today.

<https://www.napcommissions.org/membership>

The Alliance Review

Since 1984, NAPC has published *The Alliance Review* which brings together preservation voices from across the country. Now published quarterly, *The Alliance Review* continues to provide readers with thoughtful articles written by their peers in the historic preservation field. Each issue focuses on a timely theme and provides diverse perspectives to some of the industry's most discussed topics and challenges. In addition, the nearly four decades worth of issues has become a repository for expert advice and case studies, and is available to NAPC members for research.

<https://www.napcommissions.org/alliance-review>

FORUM

NAPC hosts a biennial conference bringing together commission members, volunteers, consultants, non-profit professionals, state and federal workers, and municipal staff all with the goal of learning from each other to improve preservation in their community. The conference offers engaging tours, intensive workshops, breakout educational sessions, and fun receptions. FORUM is also an opportunity to experience the sights, sounds, and flavors of a different city each year and showcase the hard work being done in local preservation.

<https://www.napcommissions.org/forum>

NAPC Webinar Series

NAPC develops regular webinars with topic experts that address timely subjects in historic preservation. The 60-90 minute live and interactive webinars are perfect for staying current on preservation issues. They are also recorded which make these training opportunities flexible for busy individuals. This format also allows preservation commissions to watch together as a continuing education activity. All webinars are AIA and APA-approved.

<https://www.napcommissions.org/webinar-series>

Virtual Summer Short Course

This training has something for everyone. The brand new commission member will gain a solid understanding of historic preservation, and the seasoned preservationist will benefit from updated course content to meet current challenges in the field. Lessons are delivered by knowledgeable and experienced preservation professionals in this two-day training experience. For commissions that require members to take at least one training a year, this is it!

NAPC-L

NAPC's active listserv consists of over 900 voices from across the country. Newly appointed preservation commission members and longstanding historic preservation experts alike come together on the listserv to ask advice or pose ideas to address common challenges. Past conversations are archived and searchable.

<https://www.napcommissions.org/napcl>

Commission Assistance and Mentoring Program (CAMP®)

NAPC's well established training program provides high-quality, engaging and informative training to preservation-related boards and commissions, city staff and community partners through presentations, hands-on exercises, group discussions, networking and mentoring via live training. CAMP helps communities address the types of challenges discussed at the Open Forum by means of targeted training, specialized advice from trainers, and even reports and recommendations for next steps following training. This training is available in virtual and in-person formats.

<https://www.napcommissions.org/camp>

CAMP Resilience and Disaster Planning

Unfortunately, every community faces the threat of natural disasters or climate-related events. This curated collection of training modules addresses planning for disasters, recovering after the event, and the impact on the economics of historic communities. CAMP Resilience and Disaster Planning Trainers are experienced and offer tangible case studies that empower CAMPers to build resiliency in their communities.

<https://www.napcommissions.org/camp-resilience>

<https://www.napcommissions.org/>