The Value of Historic Wood Windows

Perhaps the most vulnerable architectural elements of any historic buildings are the windows. Sadly, windows are often relegated to secondary or third-tier importance to the building in which they are installed. But one must keep in mind that windows play a very pivotal role in the overall design and appearance of historic structures.

Throughout the centuries, advances in technology have transformed the manufacture and styles of windows. Beginning in the early 1700's, an increase in the availability of larger panes of glass contributed to the creation of wood sash windows which quickly replaced casement windows.[1] Double-hung wood sash windows feature wood frames with upper and lower vertical sliding sashes with glass panes held together by wooden glazing bars, known as muntins. Glass panes are present in countless configurations, the most common being 1/1, 4/4 or 6/6 arrangements.

Photo courtesy of Suzanne Stasiulatis

Historic wood windows are designed in a variety of forms and patterns which include square, rectangular, fanlight, and even round or elliptical. These differences in composition and construction help identify building practices and craftsmanship, and, most importantly, are associated with specific architectural styles both nationally and regionally.

Among the top reasons people choose to replace historic windows are damage due to wood rot, water or insects; inoperable sashes; recurring costs, and, of course, energy efficiency. In many cases these problems can be successfully addressed by correctly maintaining and repairing existing historic windows. Factors to be considered in making the choice to repair or replace include aesthetics and the integrity of the historic structure; the yearly cost of maintenance and repair; energy efficiency; and long- term economics.

Aesthetics

Architectural styles ebbed and flowed, dictating the appearance of windows. An example is the relationship between glass panes and muntins. Historically, muntin bars were not simply decoration. They provided a mounting surface for the glass, unlike today's replacement windows which use muntins more for aesthetic reasons rather than functionality. Technological improvements in the early 18th century allowed the use of larger glass panes, which altered the proportions of glass panes and muntins. Windows with smaller panes of glass utilized wide muntins whereas larger panes of glass were fitted to narrow muntins. The profile, or contour, of historic muntins underwent numerous stylistic changes as well. These variations reflect not only specific architectural periods, but also specific regional preferences. This information allows historians to not only date historic buildings but to identify their specific origin as well.

[1] McAlester, Viginia, McAlester, A. Lee. (1984). *A Field Guide to American Houses*. New York, Knoph.

The rich variations in historic muntins' depths and profiles make it impossible for vinyl and aluminum replacement windows to recreate the look of an historic window. Furthermore, the modern windows which come closest to accurately reproducing historic windows are very expensive and can cost many hundreds of dollars per window. Window replacements offer two types of muntin affects: simulated divided lites or removable grills. Simulated divided lites are applied to the exterior of the window, the depth and profiles of which are usually more exaggerated than that of historic muntins. Another factor is the manner in which replacement windows are manufactured. Historic windows were usually built on site according to the latest architectural style and regional variation. Today, replacement windows are mass produced and do not feature the subtle variations which are the result of hand craftsmanship found in historic windows nor do they feature the variety in pane size, muntin depths or profiles which were important architectural and regional indicators. One feature of modern windows is the use of removable grills, which are placed within the glass of replacement windows. This type of system provides little profile or depth. Although these types of modern windows attempt to evoke the look of historic divided lites, a lack of depth and shadow makes these replacement windows appear flat and lifeless.

Photo courtesy of Thomas McWhorter

Fenestration must also be considered when evaluating the aesthetic qualities of historic windows and replacement windows. Historic windows, built on site, were custom-fit for their window openings. As a rule, mass-produced replacement windows are offered only in specific sizes and are often impossible to fit into historic window openings. Many times the existing opening is either widened or narrowed to receive the replacement window. This modification is extremely significant and alters the fenestration of the entire building, thus compromising both the intent of the designer and the historic integrity of the building. When considering the total amount of wall surface windows represent, the installation of modern windows can drastically alter the appearance of a historic building.

Maintenance and Repair

It is true that historic wood windows require more maintenance than vinyl or aluminum replacement windows, but they also offer proven advantages.

Historic windows were constructed of old-growth wood. Old-growth wood is more rigid and resilient, is more rot and wear-resistant, and typically comes from the surrounding area, thus making it a green building resource. These qualities make the material more capable of handling regional elements and temperatures. A good example of this is cypress wood, which is native to the southeastern United States, and was widely used to make windows and siding. Cypress lumber is found on many historic houses in the Houston area as it is very well adapted to the local climate. Vinyl windows, although a seemingly quick fix for older windows, are not as strong as wood and tend to sag and warp over time in extremely hot and humid areas such as Houston. Sagging and warping can allow serious air and water penetration, and also lead to

inoperable windows, often necessitating total replacement in a shorter time span than their wood counterparts which can last for one hundred years or more with proper maintenance.

Photo courtesy of Suzanne Stasiulatis

Painting is the number-one maintenance factor in a decision between wood or replacement windows. Wood windows must be painted on a regular basis in order to prolong their lifespan. However, that repetitive chore also presents an advantage. A homeowner may update their home and change their color scheme at any time. Vinyl and aluminum window replacements cannot be painted and discolor over time, making a house look dated and drab. Once this occurs, homeowners must choose between the existing replacement windows or investing in new replacement windows.

Vinyl and aluminum windows are not maintenance free; both require regular cleaning in order to avoid mold and mildew build up. It is much easier to repair wood windows than aluminum and vinyl. Historic wood windows were constructed of separate components each of which can be easily removed, repaired and replaced. Other than replacing glass panes, vinyl and aluminum windows can not be easily repaired. They are constructed in such a way that disassembly is impossible and it is often more feasible to replace the entire window rather than repair a defective segment.

While many modern replacement windows claim to offer no maintenance and lifetime guarantees, these products are too recent to adequately evaluate their long term characteristics, unlike the proven track record of traditional cypress wood windows which are viable for a century or more after installation.

Energy Efficiency

It is a misconception that new replacement windows are much more energy efficient than historic wood windows. Studies that purport to prove this point unfairly compare replacement windows with heavily damaged historic windows with no weather stripping or storm windows. With proper maintenance, wood windows are able to offer the same level of energy efficiency as replacements.

Photo courtesy of Thomas McWhorter

Embodied energy is a factor often overlooked when evaluating environmental efficiency. Embodied energy is the amount of energy it takes to create a product, everything from milling the wood to transportation to creation and installation. Retaining and repairing historic windows conserves all of that embodied energy and prevents more energy from being expended to make replacement windows.

Unfortunately, wood windows are blamed for much of the air penetration and loss resulting in unwanted high electric and gas bills. The result is that wood windows are usually the first items to be replaced in an effort to cut those bills down. However, windows themselves are not the main

culprit. According to the U.S. Department of Energy, only 10 percent of air loss is caused by window leakage, whereas one-third of air infiltration wafts through openings in floors, walls and ceilings.[2] Adding just 3 ½ inches of insulation in an attic has a greater impact on thermal resistance than replacing a single-pane window with a high energy efficiency replacement window.[3]

Today, replacement windows offer double panes, low U-vales (measure of heat loss) and low-e glass (type of infrared radiation barrier), but that same energy efficiency can be achieved with a historic wood window. Routine maintenance, caulking around the windows, the use of exterior or interior storm windows, and weather stripping can prevent unwanted air penetration. The application of low-e film, which is removable, to the interior panes of historic windows and the use of curtains can help prevent heat gain during the summer months. These are simple solutions requiring no special skills and may be applied by any homeowner.

Double-hung sash windows, the type most commonly found on historic homes, are inherently energy efficient. Before the days of mechanical heating and air conditioning, strategically-positioned double-hung windows enabled cross ventilation within houses. Windows took advantage of the prevailing breeze; their top sashes were lowered to allow hot air to escape, while the bottom sashes were raised to allow the cooler outside air to flow in. This method still works today, and, if used properly, can significantly lower the cost of cooling a home.

For replacement windows, the payback period is longer than it is for repaired historic windows or the addition of storm windows. A homeowner can save approximately $11 to $12 dollars a year in energy bills with a simple storm window. If that window costs $50, a homeowner can recoup their investment in less than five years. A replacement window costs roughly $400 (and may cost as much as $1,500), saves approximately $2 to $3 dollars per year, and takes about 220 years to recoup its cost.[4]

Economics

The life span of a wood window is anywhere from 60 to 100 years or more while the life cycle of a replacement window ends after 10 or 20 years. In the long run, it is more cost effective to repair existing historic windows. Depending on the type of repairs that are needed, restoring a historic wood window can cost from $50 to $400 per window.[5] The upfront costs of replacement windows and repairing existing windows can end up costing a homeowner relatively this same amount; but the homeowner that chooses replacement windows will have to make another investment of that same amount or more in less than 20 years. The homeowner with wood windows will only have the yearly cost of maintenance, and those who learn to make repairs themselves can reduce costs even further. Many opportunities for homeowners of historic

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[2] U.S. Department of Energy. *Energy Saver Tips for Saving Energy & Money at Home*. http://www1.eere.energy.gov/consumer/tips/printable_versions/air_leaks.html. Accessed April 20, 2010

[3] Rypkema, Donovan. "Economics, Sustainability and Historic Preservation." National Trust Conference. Portland, Oregon. October 11, 2005.

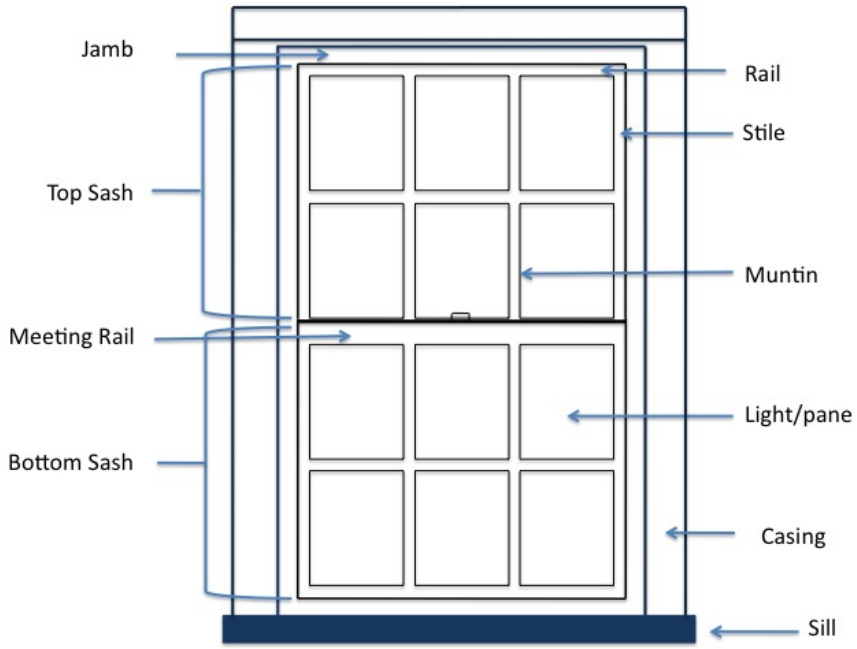
[4] Haberern, Keith. *"Old" Wood Window/Replacement Window Energy Analysis.* www.historichomeworks.com/hhw/education/WindowsHandouts/WindowEnergyAnalysis.pdf. Accessed April 20, 2010

[5] Leeke, John C. ed. *Windows on Preservation*. Windsor, Vermont: American Precision Museum, 2005.

structures to learn these types of skills are available through neighborhood workshops or online videos.

When it comes to restoring an historic structure, one must carefully consider all these factors when making the decision to replace or repair. It is important to remember that historic wood windows not only provide an excellent insight into architectural history but are an important character-defining feature worthy of preservation.

ELEMENTS OF A WINDOW



Jamb – vertical or horizontal wood that frames the window opening

Rail – horizontal part of sash

Stile – vertical part of sash

Muntin – strip of wood or metal holding together panes of glass, can be horizontal, vertical or curved

Light/pane – glass within the sash held together by the muntins

Casing – frame around the window

Sill – horizontal frame at the bottom of the window

Meeting Rail – where the top sash and bottom sash meet

Top Sash – upper portion of window which slides down

Bottom Sash – lower portion of window which slides up