

SAVING WOOD WINDOWS

DEPARTMENT OF ENVIRONMENTAL PROTECTION • NATURAL & HISTORIC RESOURCES • HISTORIC PRESERVATION OFFICE

Windows are one of the few building elements which visually and operationally impact both the interior and the exterior of a building. On the interior, they are distinctive features, framing light and views, and providing ventilation. On the exterior, they reflect the style and design intent of the building, being also perceived in relationship to the streetscape.

Most property owners do not notice their windows until they perceive a problem. When a problem is noticed, they may get their information on solutions from contractors or window manufacturers who are not always aware of all the options for saving existing windows, and may be encouraging the purchase of replacement windows. This brief is intended as an overview of approaches for repairing existing windows.

Evaluating Existing Windows

The replacement of windows is usually driven by the perception of deterioration and heat loss. Before deciding that the costly wholesale replacement of existing windows is necessary, the actual condition of each individual window should be evaluated. In many cases, selective repair or replacement of parts of a window or select windows, and implementing a routine maintenance program is all that is required to retain existing windows. The condition of the following items should be evaluated:

- **Paint** - Peeling or cracked paint can allow water penetration and deterioration of wood elements. This is particularly true at horizontal elements such as wood sills.
- **Glazing and glazing putty** - Cracked glass and gaps between the glazing putty and the glass can allow air and water to enter the window and deteriorate the wood sash.
- **Gaps** - Gaps between components of sash and frame and around frame allow air and water infiltration, resulting in drafts and wood deterioration.
- **Base of operation** - Windows should be easily operable. Verify that sashes are not painted shut, disconnected from sash weights, or wracked [twisted] in their frame.
- **Hardware** - All hardware should be present, well-attached, and operational. This includes locks, pulleys, sash cords and chains, etc.

Many necessary repairs can be performed in place by a property owner or a skilled carpenter. For more substantial deterioration, a carpenter with demonstrated expertise in window repair may be needed.

Energy Performance and Weatherization

A common and often exaggerated reason for replacement windows is that new windows will significantly reduce heating costs. Studies have indicated that in most cases approximately 20% of the heating loss of a building is through windows. The remaining 80% is through roofs, walls, floors and chimneys, with roofs being the greatest culprit. Following this model, reducing the heat loss through windows by 50% will only result in a 10% decrease in the overall heat loss in the building. Given the significant expense associated with replacement windows, it may not be the best way to spend energy dollars.

Weatherization of existing windows is an economical alternative to replacement windows and can result in a substantial reduction of energy loss by drafts. Weatherization can have the added benefits of reducing the transmission of noise and dust from the exterior. It is also an option which only minimally impacts the visual aesthetic of the window.

Typically, weatherization for existing windows consists of weather stripping and secondary glazing, or storm windows. The two types of weather stripping are joint fillers, such as sealant and glazing putty, and those which create a snug fit between operable components. Sealants and putty are used at non-moving parts, such as around frames and to hold glazing in place. Snug joint materials, such as metal “Z” or “V” strips, silicone rubber tools, brushes, felt, etc., are used between moving parts to allow for continued operation.

Quality weather stripping materials and installation can last twenty years before replacement is required. Most installations of snug joint materials will require removal of the window sash and may necessitate the expertise of an experienced carpenter to rout joints for proper installation.

Secondary glazing, or storm windows, can also increase the thermal efficiency of windows. Added benefits are that they tend to be removable, allowing for operation and maintenance of the existing window. When purchasing storm sashes, it is important that any divisions in the glass align with the divisions in the existing window to minimize their visual intrusion.

An alternative to exterior triple-track storm windows that is gaining popularity is interior storm installation. Interior storm sash have the following advantages:

- Reducing air leakage through the sash and rough window opening
- Less visually intrusive than exterior installations

In cold climates, such as New Jersey, interior storm windows can cause moisture to condense on the inside surface of the outside sash in the winter, increasing the potential for moisture damage to the historic sash.

Materials and Durability

Most traditional wood windows were manufactured from durable, close, straight grain wood of a quality which can not be commonly found in today's market. In many cases, these windows have been in service for over a hundred years, with much of their deterioration resulting directly from a lack of maintenance. With repairs and regular maintenance, the life of these windows can potentially be extended for an additional fifty or one hundred years.

Replacement windows and their components tend to have a significantly shorter life span. Durability in new wood windows has decreased as new growth timber and soft wood replace hardwoods in construction. Vinyl and PVC materials, commonly used in residential replacement, break down and discolor in ultraviolet light [UV or sunlight], and have a life expectancy of approximately twenty-five years. The finish on aluminum windows and the resulting effects on the window system continues to be tested to determine durability.

In addition to the frame and sash, many other components of replacement windows deteriorate relatively quickly. The seal around double glazing, incorporated into new and existing sash, can fail within ten years and in condensation between the panes of glass, necessitating replacement. Many of the plastic and neoprene seals which hold the glass in place in vinyl and aluminum windows also degrade in ultraviolet light and can have a life expectancy of ten years or less. The quality of the fabrication and installation can also play an important role. Twisted and crooked frames can increase stress on windows and difficulty in operation. Open joints allow air and water infiltration, resulting in drafts and deterioration. If replacement of windows is deemed necessary, quality wood replacement windows are strongly recommended.

Maintaining & Repairing Replacement Windows

An attractive feature of older wood windows is the relative ease with which they can be maintained and repaired. Typically, an ambitious property owner or experienced carpenter can easily repair a wood window, in part because the technology is familiar and has not changed for over a hundred years. This is usually not the case with aluminum and vinyl replacement windows.

One of the big selling points of vinyl and aluminum replacement windows is the promised reduction in maintenance. Many perceive that to mean that the windows do not require any attention. With the limitations on the life expectancy of many of the materials and components which make up these windows, this eventually may not be true.

Failure of a seal or joint can allow water into the windows frame and wall cavity. Even if the frame itself is impervious to moisture damage, the water can easily find its way into the wall cavity and damage structural or finish elements.

Typically, the components of aluminum and vinyl replacement windows vary by manufacturer. Additionally, manufacturers modify their detailing, product line, or even may go out of business by the time a property owner requires "spare parts" for repairs. This may necessitate costly custom fabrication of select elements or replacement of the entire sash and frame.

Replacement of double glazing has similar problems. If one layer cracks, replacement of both layers of the entire sash is typically required. This is far more substantial and costly than replacing a single pane in a traditional installation. This is further complicated when the double glazing has an internal muntin or grid pattern. The new muntin grid for the replacement glass must match the original exactly or it will not align with applied grids at the interior and exterior, or adjacent window patterns.

Visual Impacts of Replacement Windows

Because of differences in their material and construction characteristics, wood, vinyl, and aluminum windows do not look the same and are not constructed in the same manner. Wood windows tend to have articulated mouldings and narrow muntin or grid profiles. Vinyl and aluminum windows, however, tend to have flat or square profiles with wider muntins and meeting rails. While “divided lights” in a multi-pane window are possible, muntins for vinyl and aluminum replacement windows often are “snap-in,” creating a very shallow or “flat” appearance.

If the degree of deterioration necessitates the replacement of windows, wood replacement windows are recommended. It is extraordinarily important that every effort be made to match the style, muntin grids, size, and profiles of elements whenever possible. Altering these features can be dramatic change in a building’s overall historic character.

Conclusion

Historic wood windows are character-defining features and integral to the historic fabric of a building. As such, they should be retained and maintained whenever possible. If retention of historic windows is not feasible, features of replacement windows should match historic windows to the greatest extent possible.

When considering replacement windows, the initial costs of the installation should be reviewed in association with quality and life expectancy. In replacements driven by attempts to reduce maintenance and energy costs, the long-term expense associated with more frequent replacement should also be considered.

Please Note

Repair of historic windows is the recommended treatment for historic properties receiving federal or state funding. Applicants for the federal historic rehabilitation credit must treat windows in accordance with The Secretary of the Interior’s Standards for the Treatment for Historic Properties. Please telephone the Historic Preservation Office at (609) 292-2023 for further assistance.

Suggested Reading

The Secretary of the Interior’s Standards for the Treatment for Historic Properties. Washington, DC:

U.S. Department of the Interior, National Park Service, Preservation Assistance Division, 1995.

For general information, the following FYI documents are available from the Historic Preservation Office:

Repairing Wood Windows

Retrofitting Historic Windows

Store fronts

Insulation

For more technical information, the following Preservation Briefs, published by Technical Preservation Services, U.S. Department of the Interior, are also available from the Historic Preservation Office:

Smith, Baird M., AIA, “Preservation Brief 3: Conserving Energy in Historic Buildings,” 1978.

Myers, John H, “Preservation Brief 9: The Repair of Historic Wood Windows,” 1981.

Jandl, H. Ward, “Preservation Brief 11: Rehabilitation of Historic Storefronts, 1981.

Hensley, Tom, “Preservation Brief 12: The Preservation of Historic Pigmented Structural Glass,” 1981.

Park, Sharon C., AIA, “Preservation Brief 13: The Repair and Thermal Upgrading of Historic Steel Windows,” 1991.

Vogel, Neal A. and Achilles, Rolf, “Preservation Brief 33: The Preservation and Repair of Historic Stained and Leaded Glass,” 1993.

Also available at the cost of \$50 is a comprehensive and highly technical publication, over 600 pages in length:

Window Rehabilitation Guide for Historic Buildings,
1997.

All technical information regarding the life expectancy of materials presented in this brief is more fully described in the *Window Rehabilitation Guide*. For inquiries regarding this publication, please contact:

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