



## SEVEN TO SAVE ENDANGERED PROPERTIES LIST, 2006:

### *Original & Historic Wood Windows: Repair and Preservation*



PROJECT CO-SPONSORS: HISTORIC ALBANY FOUNDATION, INC. & ASSOCIATION FOR PRESERVATION TECHNOLOGY, NORTHEAST CHAPTER.

***The Preservation League of New York State designated Original & Historic Wood Windows as one of the listing for the “Seven to Save Endangered Properties Program” of 2006.***

Each year thousands of historic wood windows are removed and sent to landfills across New York State. Along with project partners Historic Albany Foundation and the Association for Preservation Technology-Northeast Chapter, the League has been particularly concerned about this issue because original wood windows are such an important part of the appearance and character of a historic home. Property owners should have all of the facts before they opt for replacement.

#### ***What’s all the fuss about windows?***

You might think that windows mainly serve as functional components of a building to provide light, ventilation and a view outside. Of course, they also impact the overall appearance of the building—just consider the effect of unpainted windows on an otherwise attractive building. And that may be why you are thinking about sprucing up the exterior of your property with new windows.

You have many options for improving the looks and function

of your historic wood windows.

***I’m just changing the windows and keeping the rest of the house the same.***

While often seen as interchangeable parts, windows are actually one of the most important aspects of a building’s original material fabric and historic appearance. The design of the windows is just as important as any other decorative element. Windows offer clues to the age of the house, demonstrate the styles or construction techniques of a region or period, reflect later changes to the building, and can be exceptional examples of craftsmanship or design. Since they are original design elements which relate to other parts of the architectural style, overall scale and proportion of a building, we say that the windows are an important part of a building’s character.

By considering the changes in window design brought about by changes in technology and in design ideas, we can construct a timeline of window types that help us identify the original style of a house or the period during which it was updated. In the United States, the earliest windows were casement (hinged windows opening out like a door), and buildings retaining such windows were likely constructed during the

earliest period of European settlement. In later revival styles they were installed to imitate the historic period. An examination of the materials themselves would help determine the age and date of the windows in each case.

As double-hung windows (with top and bottom sash) became more common in the eighteenth century, glass technology improved to produce larger panes of glass. The earliest sash commonly contained anywhere from 6 to more than 16 individual panes (also called “lights”). As the nineteenth century progressed, the industry was able to make larger panes until only two panes were used per sash or even a single pane sash became more common. At the end of the nineteenth century, as revival styles came into vogue, multiple-light and patterned sash became the norm, solely for aesthetic reasons, as technology allowed for virtually unlimited pane size. There were also stained glass windows available and affordable even for middle class homes. In addition to the number and size of panes, the shape of the window also changed over time. Certain window types are essential parts of architectural styles.

***But my windows are old and junky.***

In the case of wood windows, old does not necessarily mean

obsolete or lower quality. In fact, given the quality of materials and craftsmanship involved in the original fabrication of your windows, they may be better than anything being made today. Windows built before the 1950s were likely constructed of milled heartwood or old-growth wood which is more dense than the woods now available. Older windows will nearly always far outlast their replacements if properly restored. In addition, traditional joinery such as pegged mortise and tenon joints used in older windows have proven to be more durable through changes in climate and moisture than are glued finger joints.

If just one part of an old wood window fails, it is easier to repair than a component in a modern window. The wood window sash can be removed from the window openings, the problem piece can be repaired and the sash reinstalled in good working order. With a modern window unit, a broken pane of glass usually requires the installation of an entirely new insulated glass unit which is not easily removed from the wood, aluminum or vinyl window members. Typically the cost for repairing the glass alone is close to the amount of a new replacement window.

***When I do finally get my windows to open, I can't get them to stay in place. I'd rather have new, working windows.***

Many a stubborn window can be repaired by simply replacing a cord which is broken or painted so that it no longer rolls easily along the pulley. This allows it to properly use the counter weight which not only aids in moving the window but also in keeps it in place. If you are replacing the weights, make sure that they are the right size—neither too heavy

or too light—to function properly with your windows. If the cords are not the culprits, you may need to remove paint from the window or frame itself which is causing the window to stick.

***I don't think there are any repairs that I can do myself.***

This is the true benefit of old wood windows – they were built to be repairable. Most homeowners have the skills needed to repair old wood windows, whether the problem is a broken sash cord preventing the window from moving up and down easily or staying in place, or there is a broken pane of glass. Old window sash can be easily removed from the window openings, paint and glazing putty that has built-up can be stripped and renewed, a broken pane can be swapped out for a new pane (reglazing), the cord holding the weight can be replaced and reattached and window put back in place.

No engineering degree is necessary, and all the tools and materials needed are available at your local hardware store. Replacing the glazing putty, the glass, the sash cords, and the weather-stripping can be done at a cost equal or less than \$1/linear foot. There are countless step-by-step instructions available in books or on the Internet to guide a homeowner in making these repairs. Don't be overwhelmed by trying to do all the windows at once. Try to assess which windows need which type(s) of repair and break the project down into phases. Begin with the more simple repairs. Find out whether a workshop is available in your region.

***I barely know a hammer from a handsaw, and I don't know of any contractors who repair windows.***

A local hardware store can easily replace a broken pane of glass within a sash (reglazing). Most contractors can do simple repairs to wood elements or reglazing. (Others may try to sell homeowners on replacement windows, where most of the mark-up is in the product, not the labor.) For larger projects, property owners can contact a local historic preservation organization which might maintain a list of contractors who work on historic buildings. Homeowners can also reach out to their municipality or state preservation office for contractor lists.

When interviewing a contractor it is important to ask for and check references. It is also a good idea to get several contractor estimates to compare. What one person says is irreparable may be another person's idea of a simple repair.

***I live in an historic district and am not allowed to install storms or screens over my windows.***

***I don't want to have to mess with installing and removing storm windows.***

Many buildings dating to the late-19th and 20th century added protection during the winter by using wooden storm windows in the North and shutters or blinds in the South. Therefore, it is absolutely historically appropriate to install wood storms over your wood windows. In fact, this added layer will protect the paint and glazing of your primary window and eliminate any drafts the weather-stripping has not stopped.

Most homeowners associate wood storms with the obligation of having to install them in the fall and remove them in the spring. This was often the case in the past,

when homeowners would take that opportunity to wash the windows and touch up any failing paint. Today there are many manufacturers of traditional-looking wood storm windows that incorporate screen panels which eliminate the need to swap the storms for screens each year.

***My contractor just shook his head and told me it would be cheaper to replace all the windows.***

It is rare that *all* windows on a single building fail at the same time, and the most cost effective approach to windows is to repair and maintain individual windows as they need work. By definition, repair work is most often done on site by local workers and is limited to only the work needed for each individual window: One window may need only new or reset hardware while another more deteriorated needs an entire new bottom sash. One advantage of repair is that it can be easily phased to spread the work and costs over a time period, as permitted by weather and budget. One efficient way to carry out needed maintenance may be to combine the work with an exterior painting project. This will most likely require coordination between the painter and window repair specialist.

Because wood has the advantage of being repairable with readily available materials and tools, a program of repairing windows to a like-new condition, followed by periodic maintenance, is the most cost efficient long term solution. Stop and think—if only one or a few windows are in bad shape, repairing them is easier than replacing all windows in the whole house.

***I was told I'd be better off with all new windows that would help me battle high heating bills.***

Many property owners think they must replace their old wood windows in order to save energy. Studies have indicated that in most cases [15 to] 20% of heat loss in a building is through the windows. The remaining 80% is through walls, roofs, floors and chimneys. Following this model, reducing the heat loss through windows by 50% will only result in will only result in a 10% decrease in the overall heat loss in the building.

Replacement windows can be built using wood, vinyl, or aluminum sash, and may have single, double, or even triple glazing. It is this capacity for double or triple glazing which is thought to be more energy efficient.

However, most heat loss from a window occurs from air infiltration between the sash and the window frame. Homeowners will gain better energy efficiency by maintaining the caulk around a window and using a properly-fitting storm window (R factor 1.79), than with a double-paned replacement window (R factor 1.72). To put it a different way, according to the American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE), an historic wood window with storm transfers LESS heat per square foot of material (known as U-value), than replacement windows on vinyl tracks with either a double-glazed wood sash or a double-glazed metal sash.

Replacement windows can contribute to heat loss due to the spring-loaded vinyl track along the frame. As previously stated, most air loss occurs in the space between the sash and the frame. Wood is a far superior insulating material than vinyl, particularly the dense, old-growth wood found in historic houses. New window installation, no matter what the material used for the sash,

requires vinyl tracks to hold the sash and allow it to move up and down. Vinyl, which contains vinyl chloride, classified by the EPA as a Group A, human carcinogen, expands and contracts in heat and cold, and will deteriorate with sun exposure more rapidly than wood.

Because vinyl window tracks are naturally exposed to heat, cold and sun, they will degrade and eventually lose their air seal. When this happens, they must be completely replaced. Historic wood windows, which run along wood tracks with the help of counter weights, can be maintained. If the wood finally deteriorates, it can be easily repaired or replaced without having to replace the entire window. In many instances, therefore, the vinyl windows do not deliver energy savings nor last as “permanent” windows.

***I was told that my historic windows aren't up to code.***

Code requirements for windows are generally applied only when rehabilitation or construction projects are undertaken. One- and two-family residences are governed by the *Residential Code of New York State* which regulates various aspects. Sections:

**a) Energy Conservation.** Historic buildings are exempt from the energy conservation requirements of the code, per Section 1101.2.5.3. The code's definition of historic buildings includes those determined significant by the state or local governing body, and those listed in or determined eligible for the National Register of Historic Places. For existing (non-historic) buildings, Section 1101.1.3 of Chapter 11 identifies buildings and conditions that need not comply with the chapter's energy provisions, including when less than 50% of the building's

windows are not being altered.

**b) Light and Ventilation** (Section 310.1). When windows or rooms are changed or substantially altered, windows are required to provide a minimum amount of light and ventilation for basements and habitable rooms. For light, habitable rooms must be provided with aggregate glazing area of not less than 8 percent of the floor area of that room. For ventilation, the minimum operable area is calculated as 4 percent of a room's floor area, a total of the amount provided by windows, doors, louvers or other approved openings.

**c) Emergency Egress.** Windows may also be required for emergency egress purposes. Section 310.1 requires one emergency escape opening for basements with habitable space and every sleeping room. These must have a sill height of not more than 44" above the floor, and a minimum net clear opening of 5.7 square feet (5.0 square feet for grade floor openings): minimum dimensions are 24" in height and 20" in width.

***I know there is lead paint on my windows and I've heard that they are not safe.***

While eliminating lead paint on windows may be required for projects funded by the U.S. Department of Housing and Urban Development (HUD), no such requirements exist for New York State homeowners undertaking work at their own houses. Lead dust can create critical health issues, especially for children, however the presence of a stable lead surface is acceptable. The key is to keep finishes in good condition, repair and repaint on a regular cycle, and avoid stripping paint unless there is evidence of real paint failure.

When stripping is determined to

be necessary, the procedures outlined in the National Park Service's publication *Preservation Brief #37 Appropriate Methods for Reducing Lead-Paint Hazards in Historic Housing* will provide excellent guidance. Among the most important recommendations for dealing with lead paint:

- (1) children should live elsewhere while the work is being done
- (2) all existing paint need not be removed-only that required to provide a sound surface for repainting
- (3) it is important to use appropriate protective gear which can be found at a hardware store
- (4) clean up after every work session.

Note that wet sanding can minimize dust. Chemical strippers can present problems. In addition to the potential health concerns associated with working with chemicals, the pores of wood wet from the chemical reaction can open up and permit lead based paint to seep into the wood. You can find the Preservation Brief on the National Park Service website at:

[www.cr.nps.gov/hps/tps/briefs/brief37.htm](http://www.cr.nps.gov/hps/tps/briefs/brief37.htm), or visit [www.cr.nps.gov/buildings.htm](http://www.cr.nps.gov/buildings.htm), then go to "Preservation Briefs" No. 37.

## Resources

### Books and Booklets

***The Repair of Historic Wooden Windows***, John H. Myers, National Park Service Preservation Brief #9. Online version in Preservation Briefs section at [www.cr.nps.gov/buildings.htm](http://www.cr.nps.gov/buildings.htm) or order at 866-512-1800.

***Repairing Old and Historic Windows***, New York Landmarks Conservancy, 1992; [www.nylandmarks.org/](http://www.nylandmarks.org/); 212.995.5260

***Save Your Wood Windows***, John C. Leeke, [www.historichomeworks.com/hhw/office/consult.htm](http://www.historichomeworks.com/hhw/office/consult.htm); 207 773-2306;

***Windows on Preservation***, John C. Leeke, William McCarthy & Ann Lawless,

American Precision Museum, 2005; 802-674-5781; [www.americanprecision.com](http://www.americanprecision.com)

### Articles

***What Replacement Windows Can't Replace: The Real Cost of Removing Historic Windows***, Walter Sedovic & Jill Gotthelf, Association for Preservation Technology (APT) Bulletin, 36:4, 2005.

***"What Should I do about my Windows?"*** by Bill Mattinson, Ross DePaola, Dariush Arasteh, Home Energy, July/Aug 2002, p. 24-31.

***"Wood Windows: A Guide to Repair and Replacement"*** by Richard Spigelmyer, Traditional Building, Jan/Feb 1997, p. 35, 44.

### Websites:

***Secretary of Interior's Standards for Rehabilitation.*** Detailed guidelines on the accepted practices for various approaches to preservation work, see [www.cr.nps.gov/local-law/arch\\_stnds\\_0.htm](http://www.cr.nps.gov/local-law/arch_stnds_0.htm).

[www.historichomeworks.com](http://www.historichomeworks.com) Includes many restoration topics including windows.

[www.windowrepair.com/](http://www.windowrepair.com/) "A website devoted to the fine art of making old windows work like new and be energy efficient too."

The ***Old House Journal*** has all types of information about preservation issues, restoration, history and products: [www.oldhousejournal.com/index.shtml](http://www.oldhousejournal.com/index.shtml) (Not to be confused with "This Old House")

[www.oldhouseweb.com/](http://www.oldhouseweb.com/) Has a section on step-by-step window repair.

### Project Co-sponsors:

Historic Albany Foundation:

[www.historic-albany.org](http://www.historic-albany.org)

Association for Preservation Technology:

[www.apti.org/](http://www.apti.org/),

APT Northeast Chapter:

[www.apti.org/chapters/northeast/index.cfm](http://www.apti.org/chapters/northeast/index.cfm)

Contributors: Kimberly Konrad Alvarez, Landmark Consulting ■ Erin Tobin Bearden, Director of Preservation Services, Historic Albany Foundation ■ Marilyn Kaplan, Principal, Preservation Architecture ■ Tony Opalka, Historic Preservationist and Architectural Historian ■ Lorraine E. Weiss, Program Manager, Technical and Grant Programs, Preservation League of New York State

Please send suggestions for useful publications, articles or websites to: Kim Konrad Alvarez; 518-458-8977-fax, [kkalvarez@landmarkconsulting.net](mailto:kkalvarez@landmarkconsulting.net), or Lorraine Weiss. 518-462-5684-fax; [lweiss@preservenys.org](mailto:lweiss@preservenys.org)