

## U.S. General Services Administration Historic Preservation Technical Procedures

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PRESERVATION TECH NOTES: WINDOWS Number 4

REPLACEMENT WOODEN FRAMES AND SASH: PROTECTING WOODWORK  
AGAINST  
DECAY

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This standard includes the bulk of information contained in the original Preservation Tech Notes developed by the National Park Service and the Center for Architectural Conservation at Georgia Tech. The Preservation Tech Notes are case studies of exemplary projects designed to provide specific examples of sound preservation techniques. To obtain a complete copy of The Window publications, including figures and illustrations, please contact:

Historic Preservation Education Foundation  
P.O. Box 77160  
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The Window Handbook, jointly prepared by the National Park Service, Preservation Assistance Division and the Center for Architectural Conservation at Georgia Tech, also contains all of the Tech Notes on Windows and is available for purchase from the Historic Preservation Education Foundation for \$32.00. The Window Workbook is available for \$49.00. The two publications together can be purchased for \$72.00.

PROTECTING WOODWORK AGAINST DECAY WITHOUT CHEMICAL  
PRESERVATIVES

\*\*\*INTRODUCTION\*\*\*

The survival of millions of historic wooden windows is a testament to their long useful life. Faced with windows that are beyond repair, however, many owners are reluctant to install wooden replacement windows, in part due to the belief that without constant maintenance the windows will quickly decay. Studies undertaken by the Forest Products Laboratory (FPL), U.S. Department of Agriculture, have convincingly shown that when wooden elements in windows are treated with a water repellent very little decay will occur in the new windows even if many years of maintenance neglect follow. This important finding was an outgrowth of a research project to determine alternatives to potentially toxic chemical

wood preservatives.

\*\*\*PROBLEM\*\*\*

When old wooden windows in historic buildings have to be repaired or replaced, it is always advisable to incorporate treatments that will extend the useful life of the new wood. Application of a water-repellant chemical preservative, such as pentachlorophenol, to new wood prior to painting traditionally has been recommended. The toxicity of some formulations, however, pose potential health problems. A treatment to prolong the useful life of the new wood - and therefore the windows - is needed which avoids certain potential health hazards.

\*\*\*SOLUTION\*\*\*

A 20-year test on wooden windows by the FPL in Madison, Wisconsin has concluded that there is a safer alternative to traditional water-repellent chemical preservatives for treating wood in order to prevent decay. It was found that the easiest way to prevent decay in woodwork items such as frames and sash is the application of small amounts of wax to the surface. The wax, in the absence of chemical preservatives, protects the wood from excessive moisture and provides good long-term protection to window units and other wood exposed above ground.

Twenty years ago, test window units at FPL were dipped for 3 minutes in either a solution of water-repellent with a chemical preservative or a water-repellent without chemical preservatives. Some units were left untreated as comparison controls. After only 6 years' exposure on an outdoor test in Madison, the untreated samples were so badly decayed that they fell apart as they were being removed.

All test units were painted originally, but never repainted. Most paint was gone from exposed surfaces after 10 to 12 years' exposure. The water-repellent with a chemical preservative treatment was very effective in protecting the window unit long after all the paint had weathered away.

But the most surprising result in the 20-year test was that window units treated with a simple water repellent (1.5 percent paraffin wax in mineral spirits plus 10 percent exterior varnish resin with no chemical preservative) performed as well as did the water-repellent preservative (which contained both wax and a chemical preservative). This showed that a non-chemical water repellent like paraffin wax with a small amount of resin, such as exterior varnish, was capable of providing protection to wood exposed above ground to the elements for 20 years in a northern climate.

A water-repellent treatment alone can provide excellent decay resistance to outdoor painted woodwork without the addition of a chemical preservative. This can represent a saving of money and resources and judicious avoidance of chemical preservatives in items such as windows, sheds, porch and fence rails, and other

above-ground wood products.

The water-repellent treatment is easily done before or after construction and before painting. A simple formula, easily prepared is:

- Exterior varnish        3 cups
- Paraffin wax            1 ounce
- Mineral Spirits, or  
  paint thinner, or  
  turpentine              Add to make 1 gallon

Treatment is best done by dipping the wood for 1 to 3 minutes in the solution. If dipping is inconvenient, liberal brush application can be made - paying particular attention to heavy treatment of all board ends and joints. The treated surface can be painted after 2 or 3 days of warm weather. In fact, paint should last longer over the treated surface than over untreated wood.

\*\*\*CONCLUSION\*\*\*

The field test conducted by the Forest Products Laboratory showed that there are safer treatments for protecting woodwork in northern climates than many commonly used. The combination of pretreating and painting provides good long-term protection against decay. Of equal interest, the test showed that there are effective ways to prevent decay in wooden window elements even where the windows are exposed to long periods of maintenance neglect.

In the southeastern states and in the Pacific Northwest where there is a high decay potential due to the combination of higher moisture and moderate to warm temperatures, it is still recommended that wooden windows be treated with both a water-repellent and a chemical preservative. A number of new, less toxic chemical preservatives are now commonly available and will provide similar long-term protection.

END OF SECTION