

Protecting Wooden Doors, Windows, and Wall Framing from Decay

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Openings in the building envelope for windows, doors, etc. frequently are areas where water penetrates the wall voids and results in decay of framing and other building components. Condensation on the windows, building features that direct rainfall toward windows or doors (Figure 1), and/or wind-driven rain/moisture are the principal ways moisture enters these areas. Window manufacturers utilize dip, spray, or vacuum preservative treatments and have developed alternative installation procedures to protect the wooden components of their products from decay and to decrease the ingress of moisture past the envelope. However, wetting and decay of building materials such as framing and window components persist.

An alternative procedure for obviating the effects of water penetration at openings in the exterior walls of structures has been developed and patented (United States Patent #7,195,823) that utilizes a fibrous pad that is impregnated with a water-diffusible biocide (usually borates). By placing the pads either on the portions of windows/doors adjacent to framing or on the surrounding framing, the water intercepted by the pads solubilizes the biocide which then diffuses into the adjacent wood to protect/preserve it. One feature of this technology is that it allows for periodic reapplication of the biocide. Variations of this method have been used on some of the windows and/or doors installed in North and South walls of the Research/Demonstration House constructed by the Southern Climatic Housing Research Team at Mississippi State University. Windows installed according to the manufacturer's specifications with no subsequent treatments or means to obviate and/or control moisture serve as controls. Some of the test windows are installed in the North wall with no roof overhang; to be sure they are wetted each time it rains. The remaining test windows are installed in both the lower and upper level of the South wall that has an 18-inch roof overhang.



Figure 1 – Wind-driven rain and/or building design features that direct moisture to windows are some of the many ways moisture penetrates wall openings.

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Other than the untreated controls discussed above, the treatments include:

- Treatment #1 - Stapling a 3-inch wide strip of non-biodegradable absorbent material that had been previously treated to refusal with a 10% aqueous solution of Timbor , a water diffusable borate product, and allowed to dry before the material was fastened to the pre-hung windows (Figure 2) or doors (Figure 3).



Figure 2 – A non-biodegradable material treated with a diffusible preservative can be applied to pre-hung windows at the factory, building site prior to installation, or in place on existing windows.



Figure 3 - A non-biodegradable material treated with a water - diffusible preservative can be applied to pre-hung doors at the factory, at the building site prior to installation, or while in place.

- Treatment #2 - In addition to the procedure used in treatment #1, the framing surrounding window openings, and the framing and sheathing from below the windows to the floor, were treated with a commercially available water-repellent preservative (WRP) formulation.
- Treatment #3 -Rather than the procedure described in Treatment #1, the borate-treated fibrous strips were stapled to the wall framing surrounding the window opening (Figure 4).
- Treatment #4 - No treated fibrous strip of material was applied to either the window or adjacent wall framing. A WRP was applied as discussed in Treatment #2 (Figure 5).



Figure 4 – A borate-treated fibrous strip being fastened to the house framing prior to installation of windows.



Figure 5 – Framing adjacent to a window opening, and framing/sheath below the opening being sprayed with a water-repellent preservative prior to installation of a window.

All windows were installed according to the manufacturer's specifications, with one window per treatment, including control, installed in the North wall and one per treatment installed in the South wall. Moisture sensors were installed in the wall voids below each test window to monitor when/where moisture is penetrating the building envelope.

The interior trim surrounding each test window and door will be removed annually and the window/door components, as well as the adjacent framing, checked for signs of water penetration, fungal deterioration and/or insect activity. The treated absorbent strips in areas of moisture intrusion will be re-treated with a 10% aqueous borate solution. Moisture sensors in the wall voids will be monitored monthly.

Mention of trade names is for clarity of procedures and does not indicate an endorsement by Mississippi State University over equivalent products.



The MSU Southern Climatic Housing Research Team is a collaborative effort involving Architecture, Civil Engineering, Electrical Engineering, Forest Products, Landscape Architecture, Mechanical Engineering, and Agricultural and Biological Engineering. The MSU Southern Climatic Housing Research Team is affiliated with the Coalition for Advanced Wood Structures (CAWS) as a partnership with the USDA Forest Service, Forest Products Laboratory in Madison, Wisconsin. CAWS is a partnership between universities, industry and government to advance research for wood structures related to residential, non-residential and transportation uses.

