

Durability Issues Associated with Installation of Windows

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The most significant architectural feature affecting the energy efficiency and durability of houses is the window. Proper location, specification, and installation are all required to insure the requisite energy efficiency and durability. Moisture infiltration at windows is a hidden problem. Owners are completely unaware of decay or structural degradation until failure occurs. The objectives for this research are two-fold. First, demonstrate a correspondence between particular construction errors and potential damage. Second, to develop alternative construction strategies that address the physics of moisture and vapor transfer so to insure a moisture content (MC) of less than 20% without relying solely on caulks or sealants. MC 20% is the threshold above which wood begins to promote growth of fungi, cause decay, and attract termites. A laboratory structure four feet by thirty-six feet will be constructed with five chambers. Each chamber will contain a window, climate control equipment, and sensors to monitor temperature and humidity for each chamber. Windows will be installed with a variety of different construction problems. Moisture levels of variety of different elements of the wall, such as the sheathing, studs, interior wall materials, and different locations in the wall, such as at the window jambs, sills, and header, as well at the floors, and ceiling, will be monitored on a regular schedule. These values indicate the rate of spread of MC levels above 20%.

Budget (3-years):

Salaries	\$12000
Construction of Laboratory	1500
Salary and Lab	13500
Overhead (43%)	58050
Total	193050
Mechanical Equipment	3500
Sensors	3500
Total	\$200,050



The MSU Southern Climatic Housing Research Team is a collaborative effort involving Architecture, Civil Engineering, Electrical Engineering, Forest Products, Landscape Architecture, and Mechanical 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.

