Research in Progress
Advanced Housing Research Center
Forest Products Laboratory
Madison, Wisconsin

Measurement of Moisture Content in Composite Siding

Improper finishing or installation of wood composite siding can allow water to wick into the edges of the panel. Excessive moisture intrusion into the wood composite can cause degradation of the siding.

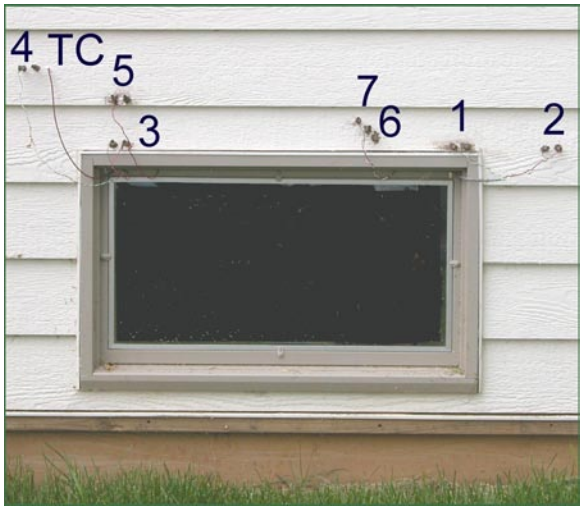

Figure 1. Location of moisture pins (pairs 1–7) and thermocouple (TC) around basement window of the research demonstration house in Madison, Wisconsin.

Background

All sawn edges of wood composite siding should be sealed with an appropriate primer or paint. However, in practice, this is usually done incorrectly or not at all. An unsealed or poorly sealed edge may allow water to wick into the siding. Excessive moisture intrusion into the wood composite will cause thickness swelling at the edge of the panel. Repeated swell–shrink cycles will degrade both the sealed edge and the underlying wood composite.

Another area of concern is composite T-111 siding where two sheets of siding meet in a horizontal butt joint separated by Z flashing. Proper installation requires at least a 10 mm gap between the upper panel and the top of the flashing to prevent standing water from wicking up into the siding. On the siding of the Research Demonstration House in Madison, Wisconsin, this gap varies from approximately 10 mm in some places down to nothing in others. Several areas, where the upper siding panel touches the top of the flashing, are already exhibiting bowing of the siding because of moisture-induced swelling.

Objective

The objective of this research is to determine if water absorption by wood composite siding (both lap siding and panel siding) increases where the siding is cut to fit around a window (Fig. 1) or where the siding is installed above Z flashing (Fig. 2)

Approach

Moisture pins were installed in the wood composite lap siding around a basement window (Fig. 1) and in the T-111 siding above the flashing (Fig. 2). Each pair of moisture pins consists of two insulated steel pins driven about 6 mm into the siding and spaced exactly 25.4 mm apart. Each pin is connected to a digital multimeter that is interfaced with a PC, and resistance measurements are recorded hourly. Resistance decreases with increasing moisture content. Temperature is also recorded hourly and used to adjust moisture content calculations.

Moisture pin pairs 1 and 3 are adjacent to the sawn edge of the siding; pair 5 is adjacent to the manufactured edge (Fig. 1). Pairs 8 and 9 are installed in the T-111 siding where there is an adequate gap between the siding panel and the flashing (Fig. 2); pair 10 (not shown) is near the bottom edge of a siding panel where there is insufficient gap.

Figure 3 shows that the moisture content in the wood composite lap siding was largely correlated with relative humidity. That is, the moisture content was higher in the morning after a cool humid night and lower in the afternoon when the relative humidity was lower. The area adjacent to the sawn edge of the siding over the window (pair 1, identified as location MC1) shows a period of extremely high moisture content, which coincided with a week of thunderstorms. Moisture pins away from the sawn edge detected a much less severe increase in moisture content. A slight change in moisture content caused by the seasonal effect of relative humidity was also detected. The average moisture content varied from about 18% (rainy spring) to about 12% (dry summer).

Preliminary data from the T-111 siding indicates that moisture content is highest adjacent to the edge of the siding panel where there is insufficient gap to the flashing. The largest difference was observed after a rain.

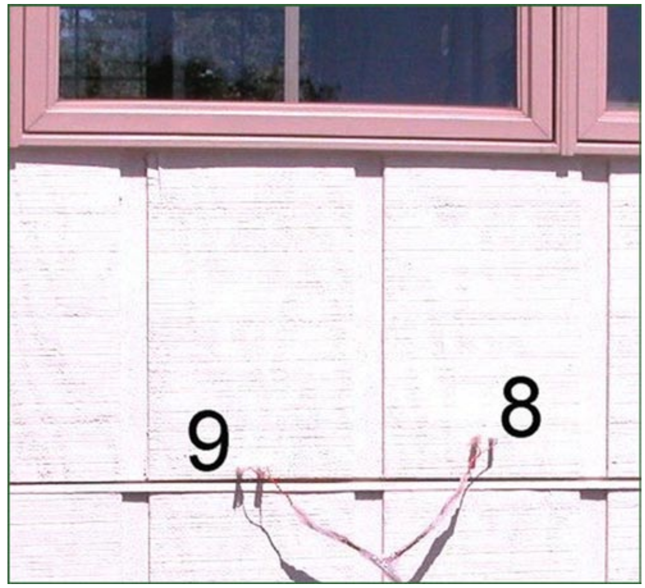

Figure 2. Moisture pin pairs 8 and 9 in T-111 siding above Z flashing where there is an adequate gap.

Expected Outcomes

Results from this work can be used as a basis for developing national building codes and other standards to ensure that siding is installed correctly. In addition, we will expand this work to evaluate the effectiveness of sealants and caulking compounds to retard moisture uptake and its resulting damage.

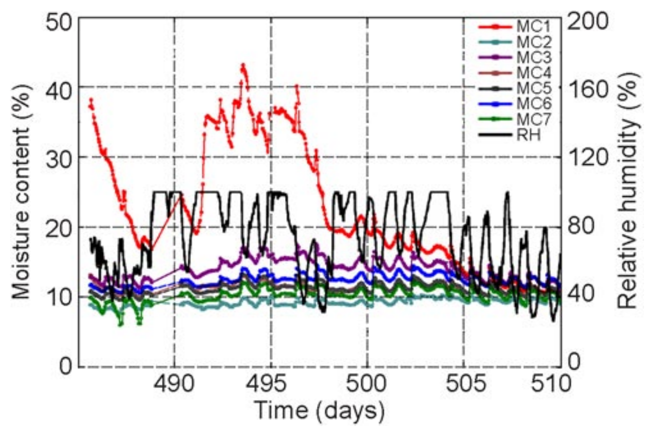

Figure 3. Relative humidity and moisture content of siding on the research demonstration house in Madison, Wisconsin.

Timeline

Data collection began in July 2003 and will extend through July 2006. Data analysis will be completed by September 2006, and a report will be prepared for publication by December 2006.

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