



Research & Development Highlights

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Atlantic Canada Wood Framing Moisture Survey

Moisture causes more problems in buildings than any other single factor. Researchers are discovering that the air quality in air-tight houses with little or no ventilation is quite poor, and that a major contributor to this poor air quality is moulds, mildews, and wood-inhabiting fungi. These are often the result of excess moisture.

One of the major contributors of moisture is the framing material. Wood materials used in construction often contain significant quantities of moisture. For example, the framing lumber used in construction today is usually quite wet, or "green." During the first year or two after a house is constructed, the drying lumber releases moisture, causing high relative humidities and condensation problems. This moisture could remain for months or years, depending on construction materials and technical details, leading to material degradation and decay.

Wood installed at a high moisture content will shrink as it dries. Differential shrinkage may result in warping, cupping and twisting. In general, wood at or below a moisture content of 19 percent can be considered "pre-shrunk" and will not experience significant distortion problems upon further drying. The National Building Code of Canada (NBC) requires the moisture content of lumber to be below 19 percent at the time of installation but this requirement is not always met.

To determine if the use of wet lumber (i.e., above the 19 percent specified by the NBC) could be expected in housing construction in Atlantic Canada, Canada Mortgage and Housing Corporation (CMHC) commissioned a survey of framing lumber.

Surveys were conducted in November 1987, and January and June 1988. Lumber originating from seventeen different sawmills and used in and around Saint John, Halifax, St. John's and Charlottetown was surveyed.

Observations

Most all the wood surveyed was grade-stamped as S-P or Spruce-Pine-Fir, (S-GRN). "S-GRN" in the grade mark signifies that the lumber was surfaced at a moisture content higher than 19 percent at a size to allow for natural shrinkage during seasoning. Ninety percent of the studs

tested measured higher than the 19 percent moisture content allowed by the National Building Code of Canada. More than half of these were beyond the fibre-saturation point, indicating that the moisture content was in excess of 30 percent. Only one specimen in ten had a moisture content of less than 19 percent.

The limited availability of dried lumber is due to the perceived additional cost of supplying air-dried or kiln-dried lumber to a local market area. Builders don't demand dry lumber because they are unaware of the consequences of building with green lumber. The survey results suggest that framing lumber may be a significant source of moisture in wall cavities of houses built in Atlantic Canada.

Perhaps most significant was the finding of excessively high moisture content in houses that had been framed up to two months prior to the survey. This leaves in some doubt the idea that framing lumber, installed and left unclad during winter, will dry in a sufficiently short time to avoid moisture problems.



A typical woodframe house under construction

Conclusions

The results of this survey indicate that many houses have the potential for wood deterioration in one or more walls due to high moisture levels in the lumber. The composition of the wall system and its method of construction are key elements affecting the drying time and future problems. The lack of availability of dry framing lumber is a significant contributor to the moisture load in wall systems.

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Research Report: Atlantic Canada Wood Framing Moisture Survey

A full report on this research project is available from the Canadian Housing Information Centre at the address below.

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