Hygrothermal Simulations For The Signal Of An Integrated RH Sensor For Wood Windows

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Abstract

The material wood is frequently used in construction industry for several elements such as window frames. However, as a hygrothermal material, wood is sensitive to moisture induced damage. In this context, the moisture uptake of wood based windows logged with an integrated relative humidity (RH) sensor system was investigated in the present study. The hygrothermal simulations were performed to determine the basic mechanisms for moisture distribution in wood based windows. A design consisting of a wood based window, glass and a layered wall for common annual and humid interior conditions resulting from the drying of screed or mortar were simulated. The hygrothermal simulations revealed a locally and temporally varying moisture distribution in the wood window following the geometrical arrangement of building components as well as seasonal trends. Furthermore, the effects resulting from an intact or a damaged coating layer were elucidated. Since the RH value is logged with the integrated sensor at only one position, the correlation of the RH sensor signal and the moisture content in the wood window was investigated. Crucial RH sensor values related to critical moisture contents were obtained.