

Indoor Microclimate in a Historic Library: Considerations on the Positive Effect of Historic Books on the Stability of Indoor Relative Humidity

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Abstract : The presented research considers the hygrothermal data acquired in the municipal library of Porto. The library is housed in an XVIII century convent and, among all the rooms in the construction, one, in particular, was chosen for the monitoring campaign because of the presence of a great number of historic books. Temperature and relative humidity, as well as CO₂ concentration, were measured for six consecutive months, in the period December 24th - June 24th. The indoor environment of the building is controlled with a heating and cooling system that is turned on only during the opening hours of the library. The ventilation rate is low because the windows are kept closed, and there is no forced ventilation. The microclimate is analyzed in terms of users' comfort and degradation risks for historic books and valuable building surfaces. Through a comparison between indoor and outdoor measured hygrothermal data, indoor relative humidity appears very stable. The influence of the hygroscopicity of books on the stabilization of indoor relative humidity is therefore investigated in detail. The paper finally discusses the benefits given by the presence of historic books in libraries with intermittent heating and cooling. The possibility of obtaining a comfortable and stable indoor climate with low use of HVAC systems in these conditions, while avoiding degradation risks for books and historic building components, is further debated.

Keywords : books, historic buildings, hygroscopicity, relative humidity

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