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The influence of climatic parameters on wood durability- a review

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Wood is a natural and "CO_2 neutral" material and has a widely variety of applications due its mechanical and physical characteristics.

It is known that wood can also contribute to energy efficiency in buildings by using this material as a thermal insulation. many applications exist in building façades, exterior decks and in urban furniture [1]–[4].

Many factors can compromise the mechanical and physical properties, specifically the combination of weather conditions, humidity, temperature, solar irradiation, salinity variations and biodegradation [5]–[8]. With climatic changes extreme drought scenarios are predicted which can cause cracking and shrinkage of wood. So its durability evaluation is very important in order to prevent a negative impact in wood that is already applied and in new wood that will be applied.

Currently several wood treatments are used for its protection, depending on the final use. Chemical modifications of the solid wood allow to improve dimensional stability, mechanical properties or resistance to biodegradation [9]. These modifications can be made by use of chemicals or by heat treatment and help to improve wood surface and in its structural behavior [9].

The present work aims to do a review in studies and standards that are already made for the evaluation of wood durability.

Several studies were already done where the authors evaluated natural and accelerated exposure in some wood species with different treatments and they evaluated the degradation in wood surface, some mechanical properties (MOE and MOR) and dimensional stability [10]–[13].

As wood can be exposed to adverse weather conditions, it is very important to evaluate its durability. Presently the European Standards only consider biodegradation for the evaluation of wood durability. These assays are made by using wood or treated wood specimens in ground contact or by xylophages [14]. The European Standard EN 927 includes atmospheric and accelerated exposure but only for the evaluation of wood coatings.

The international standard ISO 21887 [15] specifies five classes of durability for wood and wood-based products that are based on the degree of exposure to water and soil in different service conditions and the biological agents of deterioration expected in these conditions.

As wood is not only exposed to xylophages it is also important to study and predict its behavior under different climatic conditions and to evaluate its durability with use of other assays like natural and artificial exposure [16].

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