**Abstract**

Wood, being an organic material of vegetal origin, is combustible, and can therefore be completely destroyed in the event of a fire, thus losing any physical and mechanical characteristic when exposed to heat sources of sufficient intensity and duration. It must however be borne in mind that the behaviour of timber structures under fire cannot be explained by wood chemical composition alone. Material singularities play an important role, especially in the collapse phase.

Therefore, why to choose a combustible material, such as timber and glulam, for structural elements that must ensure a given level of fire resistance? If one observes the evolution of the mechanical properties of another building material, e.g. steel, when exposed to a “standard” fire, the test piece size and shape do not have a significant effect. For this material, moreover, at any time a temperature constant over the whole section can be hypothesized, slightly lower than the environment temperature, and it is therefore correct to think that all material properties vary accordingly. In wood instead, under the "charred layer", there is no significant temperature increase, consequently the material properties remain unchanged.

Wood seems therefore to exhibit a better behaviour, but what is being observed is not the temperature induced evolution of the material properties, but the evolution of performances for an element with a given initial cross section, that is the decrease of the resisting section during the exposure to fire. The advantage when utilising wood does not lies in its mechanical parameters variation with temperature, but in the slow and somehow predictable mass thermal evolution.