THE BEHAVIOUR OF PROTECTED AND UNPROTECTED WOODEN MEMBERS UNDER FIRE

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This presentation is focused on the timber structures exposed to fire, especially on the contribution to the fire resistance of timber structures boards. The calculation of this contribution according to Eurocode 5 is simple but applicable to only limited amount of materials. The correct modelling of the fire and sufficient knowledge of wood behaviour at elevated temperatures leads to improvement and specification of the results of the fire resistance times. The focal point of this study is the research of the contribution to the fire resistance of timber beam using boards. On the basis of the test results when the timber beam was covered by calcium silicate fire protective boards, evaluation and numerical model in ANSYS was carried out.

For the elements which are protected by the fire shell, the beginning of charring moved till the time tch. The charring of the timber element can occur before the deformation of the fire protection but with lower speed than specified in Eurocode 5.

Using the new testing standards which are not much used in the Czech Republic yet, the fire test was performed to determine the contribution to the fire resistance. This test standard specifies a test method for determining the contribution of the fire protection systems to the fire resistance of structural timber members Based on this standard is determined the ability of the fire protection system to delay the temperature rise throughout the timber member, to maintain coherence and link to the timber member and to provide data of the thermal characteristics of the fire protection system, when exposition to the load according to the standard temperature/time curve. This test procedure is also applicable to timber structural members incorporating insulating materials between the timber members.

The Annex B describes the relationship of this test method and the assessment of the results obtained therefore to EN 1995-1-2 and guidelines for the use of this test method. Based on this test is determined the time when the temperature of the timber member reaches 300 ° C, the temperature when we assume that the timber element will burn. By this tests is also determined the coefficient k_β, which reduces the rate of charring β_0 (β_n).