ENGLISH SUMMARY

Fonselius, Mikael, MODE I FRACTURE TOUGHNESS OF PLV

Mode I fracture toughness for PLV (Parallel-Laminated-Veneer) cannot be determined as for pine and spruce. PLV is non-linear and not brittle which leads to the fact that elastic-plastic fracture mechanics should be used instead of linear-elastic fracture mechanics. In this study the fracture toughness of PLV has been studied to make comparision and development possible.

The fracture toughness in the four different directions is K_{ICRL} = $kNm^{-3/2}$, K_{ICTL} = 300 $kNm^{-3/2}$, K_{ICRT} = 129 $kNm^{-3/2}$ and K_{ICRT} = 163 $kNm^{-3/2}$. There are no differences in fracture toughness at the moisture 11 %, 12 % and 15 %. Freezing of the specimens does not change fracture toughness. The amount of branches in the veneers has an influence on the results in the TL-orientation.

Leskelä, Matti, BEAM ELEMENT FOR A LAYERED STRUCTURE

In the commonly used two-noded plane beam element one usually considers the longitudinal and transverse displacements together with the rotation as the three degrees of freedom per node, and the stiffness matrix for the element is well known. The plate elements have been used in beam problems where different types of interconnected members are encountered, e.g. layered beams and composite beams. The ordinary beam element can also be used as a basis when special types of layered beam elements are derived. This paper introduces a transformed plane beam element, which has a variety of uses also for the plate problems. The coefficients for the stiffness matrix are derived by superimposing the displacement states of the plane beam element so that a state results where only one displacement component of the transformed element is nonzero at a time.

Weck, Tor-Ulf, DETERMINATION OF PARTIAL SAFETY FACTORS

The paper deals with the determination of partial safety factors in a partial safety method used in the National Building Code of Finland. The factors are determined by comaprison of results given by the partial safety method with results obtained by the probabilistic design method.

Wright, Kirsti, MODE II FRACTURE TOUGHNESS OF PINE

Mode II fracture toughness has been studied by means of beam specimens. The material used was of the same lot of Pinus Silvestris as in the previous mode I tests. In short term tests, the value of K_{IIC} fracture toughness was found to be 1760 $kNm^{-3/2}$.

Fracture toughness is best predicted by density and the quarter of density. Moisture content, annual ring angle or other variables had no effect. Correlations were for the most poor, which may depend on the relatively large fracture toughness of the wood from Northern Finland compared with its density.

In the long-term tests, the deflection growth was proportional to the bending stress and the 1/3th power of time. The 90 % stress level correspond to a median life time of 5 h.