ENGLISH SUMMARY

Heinisuo, Markku, SIMPLE BEAM ON RIGID FOUNDATION

The article deals with the frictionless contact between elastic body (simply supported beam) and rigid foundation, when the rigid body motion of the elastic body is known. The equations for numerical calculations are derived. One numerical example is presented. Three problems and their solutions are described: the complementarity problem, the optimization problem based on the displacement method and the optimization problem based on the force method. The force method with the minimization of the complementarity energy seems to be new in this form. The methods can be expanded to the cases in which the elastic body has more complicated contour and the foundation is also elastic, provided that the condensed stiffness or flexibility matrix is known. The situation in which the rigid body motion of the elastic body is not known needs further investigation.

Ikonen, Kari, A METHOD FOR CALCULATING STRESS INTENSITY FACTORS BY USING THE FINITE ELEMENT METHOD

Stress intensity factor is a dominant parameter in linear elastic fracture mechanics. The finite element method is nowadays widely used for calculating numerical values of stress intensity factors in cases, where the structure or the loading is complicated. In applying the finite element method the crack tip area is usually divided into many small elements, which are done singular by suitable operations. In the article a new method is presented. A small circular area is removed from the crack tip and substituted by stress loads, which are known by the analytic solution. The method has proved to be efficient reducing computing costs and simplifying the calculations e.g. so that standard finite element codes can be used straight to calculate stress intensity factors.

Leppävuori, Erkki KM, DESIGN OF GLULAM BEAMS WITH HOLES

Design of glulam beams with holes has been scantily studied in the Finnish literature. This article describes the design of straight and constantly stiff glulam beams when the circular or rectangular hole is in the middle of the beams' depth. Two of the four studied theories are based on plate theory. Analytic solution is applicable only to the case of circular hole. Numerical design method is generally accepted but poorly applicable in practice. The two other methods are based on structural simplifications. They are, however, extremely applicable to practical work when the hole in the beam is in the area of dominating shear stress which in general is in the outermost quarter of the beam.