

ENGLISH SUMMARY

Orivuori, Seppo, OVERVIEW OF THE IVOFEM PROGRAM

A detailed chronological overview of the development history of IVOFEM program is given. New features and changes are reported on year by year basis. Applicability, special features and various pre- and postprocessors are mentioned in the description of the status of the program. Special cylindrical element is fully described. Three examples using this element are also included.

Lundgrén, Rune, IVOPLAST - PLASTIC 2D-FINITE ELEMENT PROGRAM

IVOPLAST is an extension to a linear, elastic program, IVOFEM. Both programs are based on the finite element method. The program can be used for stress analysis of solids which conform to plane stress, plane strain or axisymmetric conditions. The yield criteria of von Mises and Tresca are implemented and the material model can be elasto-plastic and strain hardening. For a plastic analysis the solution becomes iterative. This leads to different solution algorithms, depending on how often the stiffness matrix is updated. The load is applied in increments, and it can consist of distributed load, pointload, line load and thermal load.

Neuvonen, Alpo, ELASTO-PLASTIC METHODS IN CRACK ANALYSIS

The article gives an overview of the methods used for calculation of the J-integral in the elasto-plastic regime. The Virtual Crack Extension method (VCE) is briefly presented with the VIRTUAL-program used to derive the energy release rate G. The G values for a circumferential crack (29 mm depth) are determined using elastic and elasto-plastic material models (von Mises and Ramberg-Osgood). The G values are then compared with those obtained from 3-D semi-elliptical crack.

Rajamäki, Pentti, Penttilä, Kalle-Erkki, USE OF THE FINITE ELEMENT METHOD IN ANALYSING FATIGUE CRACK INITIATION

A method to approximate fatigue crack initiation in geometrical singularities is presented. Geometrical singularity is understood as a sharp structural notch. The method is based both on the stress theory of the crack tip and also on the experimental analysis. The effect of the notch radius to the crack initiation is shortly discussed. The crack initiation analysis is easy to perform with normal finite element codes by describing the crack tip area with singular elements. As an application example a crack initiation analysis of a sleeve construction with a sharp notch is presented.