ENGLISH SUMMARY

UDK 624.042:624.19:621.039.743

NORO, HEIKKI, Nonlinear structural analysis of a nuclear waste storage.

The paper contains a materially nonlinear structural analysis of a rock tunnel storage. The calculations have been carried out by the finite element method assuming the plane strain state. Isoparametric eight-noded elements with the linear two-parametric (cohesion and friction) Mohr-Coulomb yield function are used. The loads are caused by the rock mass, by from the ice age still actuated residual stresses and by the rest temperature of the waste. The primary goal of the calculations is to explain the effect of the temperature and the material parameters on the yielded area. After this there are presented the requirements necessary for this structural analysis scheme to be applicable in practice.

UDK 532.516:536.22:519.6: 681.3.06NACHOS

MARTIKKA, HEIKKI, Analysis of viscous flow, heat transfer and conduction by the finite element method, part I.

The first part of the article deals with the premises of a large finite element program, NACHOS, its formulation and computational aspects, general fields of application and restrictions.
In the present form the program is applicable to solution of two dimensional problems, either plane or axisymmetric. The shape of the boundary is arbitraty. Problems may involve laminar viscous flow of a Newtonian fluid, heat conduction in the fluid and solid and free and forced convection. Boundary conditions on the hydrodynamic part and the thermal part are required. Transient and steady state solutions are possible. Material properties, such as viscosity, thermal conductivity and the coefficient of volume expansion may vary arbitrary with temperature.

UDK 532.516.013:536.22:519.6: 681.3.06NACHOS

MARTIKKA, HEIKKI, Analysis of viscous flow, heat transfer and conduction by the finite element method, part II

The second part of article deals with the application of the the finite element program, NACHOS, to the solution of problems of hydrodynamic lubrication and flow. The results are compared also with the results derived by analytic hydrodynamic and fluid mechanics theory. The program has proved a reliable and versatile numerical tool for the solution and research of a wide class of continuum mechanics problems.