ENGLISH SUMMARY

UDK 624.072.2:624.072.3:624.012.45:539.389.1

SALONEN, SEPPO and KANERVA, PEKKA, The analysis of reinforced concrete grids using yield-line method. Rakenteiden Mekaniikka 10 (1977) 1, p. 1...10.

A method analogous to the well-known yield line theory of reinforced concrete slabs has been presented for analyzing and design of reinforced concrete beam-grids in the yield limit state. The influence of twist to the bending capacity of a beam has been shortly discussed. Two beam-grids with top slabs have been considered in examples: the virtual work equations have been put forward for different yield-line patterns.

UDK 624.072.233:534.1

PRAMILA, ANTTI, Free vibrations of a beam on elastic foundation. Rakenteiden Mekaniikka 10 (1977) 1, p. 11...20.

The article is concerned with free vibrations of a beam on elastic foundation. The model of foundation is the one of winkler. The statical effect of the foundation turns out to be only some per cent increase in the first natural frequancy. The dynamical effect of the foundation, which is treated using added mass turns out to be more significant. If the dynamical effect is neglected the natural trequencies can become about 50 per cent higher than the correct values.

UDK 624.072.2/.3

KANERVA, PEKKA and NORDLUND, OLLI-PEKKA, Spiral formed three dimensional curved beam. Rakenteiden Mekaniikka 10 (1977) 1, 21...37.

The article discusses the spiral-formed three dimensional curved beam. After description of the geometry of spiral-curve the equilibrium-conditions of spiral-formed beam-element are derived. As special applications the equilibrium-conditions of circular arch and of circular ring-beam are given. The examples dealt with consist of the helicoidical staircase the sylindrical spiral spring and the twisted closed circular ring.

UDK 624.072.223:620.17:6813

PAAVOLA, JUHA and MIKKOLA, MARTTI, Stress analysis of the boxgirger. Rakenteiden Mekaniikka 10 (1977) 1, p. 37...

In this paper, a method is presented for the determination of the state of a thin-walled beam with open or closed cross section. The solution has been derived by the principle of virtual displacements.

The method is based on the theory presented by Vlasov in his monograph "Thin-walled Elastic Beams". The crosswise displacement state is chosen in advance to describe the various unit displacements. The beam is divided into "slice"-elements in axial direction. The displacement functions are approximated in these elements by polynomials of third degree as is common in the finite element method. The nodal values of the displacement functions are the unknown parameters.

The results calculated with the computer program developed for the straight one-box girder have been compared with the solutions evaluted by use of various conventional methods.