ENGLISH SUMMARY

ULTIMATE STRENGTH OF RECTANGULAR REINFORCED CONCRETE SECTIONS UNDER BIAXIALLY ECCENTRIC LOADS

Pekka Kanerva and Esko Kastarinen

Rakenteiden Mekaniikka 2 (1969) pp. 52 to 70

This paper describes the results of a theoretical investigation concerning the ultimate strength of symmetrically reinforced rectangular concrete sections. As the limits of failure for concrete the maximum compression strain 0,3 % and for steel the maximum tension strain 5 % are used. For the stress-strain relations of concrete and of steel an exponent function and a bilinear function are chosen respectively. The failure surfaces are presented in $M_x + M_y$ curves using the normal force as a parameter. The theoretical results are compared with some experimental values. Finally a design method based on the use of presented tables is proposed.

THE WEIGHT BASIS OPTIMIZATION OF STRUCTURES WITH BOX SECTIONS

Erkki Pennala, Veikko Linnaluoto

Rakenteiden Mekaniikka 2 (1969) pp. 71 to 74

This paper deals with the weight basis optimization at first in common sense. Then the weight-optimizing method proposed by G. C. Best is treated. The application of this method to the structures the members of which have box sections and the problems appearing in practice are then discussed.

LATERAL BUCKLING OF A PRECAST, PRETENSIONED CONCRETE BEAM SUSPENDED AT ITS ENDS

Ilpo Salo

Rakenteiden Mekaniikka 2 (1969) pp. 75 to 80

The article deals with the stability problem occurring in hoisting of pretensioned concrete beams, when the beam can buckle laterally under the action of its own weight. The cross section of the beam is assumed to be constant, bisymmetric and free to warp.

The differential equation (3) of the problem is solved by choosing an approximate expression for the angle of rotation Φ in a form of a power series (7). The boundary condition of the problem is provided by the torsional aquation (10) at the end of the beam. The solution yields the relationship (14) between the parameters k and γ which is presented graphically in fig. 2.

As the value of k is usually small, the powers of higher order in equation (14) can often be neglected and the critical load can be determined from the formula (16). From equations (14) or (16) (if k is small enough) it is now easy to evaluate the critical load or the sufficient hoisting distance e from the center of gravity of the cross section of the beam.

The solution obtained can also be used with good accuracy for saddle-shaped beams, because the rigidities C and B_y usually vary smoothly in such beams. For illustrative purposes two numerical examples are treated.