UDK 624.012.46:624.012.454

LAUL,HENDRIK and KULBACH, VALDEK, Analysis of a cable network with negative gaussian curvature. Rakenteiden Mekaniikka 7 (1974) 1, p. 3...18.

The paper is divided into three parts.

The first part deals with the determination of the co-ordinates of the nodes of a prestressed cable network. The case of freely sliding cables where the prestressing forces are constants along the entire length of each cable is considered.

In the second part the determination of the deflections and inner forces of a discrete cable network under living load is studied. After making some approximations based on experimental and computer experience the resulting equations can be given in a remarkedly simplified form.

The final part deals with the analysis of a hyperbolic paraboloid cable network with a continuous net. The influence of the bending stiffness of the edge beam on the solution is given special consideration.

UDK 624.072.2:624.012.45
69.003

MÄKELÄ, KARI, Cost optimization of reinforced concrete beams with rectangular cross-section. Rakenteiden Mekaniikka 7 (1974) 1, p. 19...32

The article deals with optimization of reinforced concrete beams designed according to the method given by the author in the previous number (6 (1973) 3-4, p. 147...158) of the journal. The design space is formed by the effective depth and the breadth of the beam. Constraint equations are given by the strength demands for bending and shear. A method for optimization suitable for hand calculations is presented and three examples using the method are given.

UDK 624.044:624.072.2

RIIKONEN, ILKKA, Determination of the deflections of a piecewise uniformly stiff cantilever beam as the sum of a series. Rakenteiden Mekaniikka 7 (1974) 1, p. 33...42.

The deflection and distortion of a piecewise uniformly stiff cantilever beam due to a concentrated end force and moment can be expressed in series form. These series formulae are derived in this paper using the superimposition method. As applications of the formulae the calculation of the stiffness matrix of a cantilever beam and pin ended continuous beam are presented. The formulae are also applied to the determination of the deflections of the linearly changing hollow sectioned cantilever beam and the results are compared with those got by numerical integration with the trapezoidal rule with equal mesh divisions. When calculating the deflection due to the force the convergence of the series formulae is clearly more rapid, but the methods are found identical in the determination of the deflection due to the moment and the distortions due to both force and moment.