

ENGLISH SUMMARY

UDK 624.21.093:624.042.3:539.31

SÖDERLUND, KLAUS, The normal stress state of a box girder caused by a general twisting load. Rakenteiden Mekaniikka 9 (1976) 3, p. 1...30.

The article treats the normal stress state of a box girder caused by a general twisting load. The theory is based on a theory of elasticity simplified on certain hypotheses. Girders with a geometry used in practice have been studied. Under special circumstances it has then been possible to reduce very complicated equations in their general shapes to fairly simple ones. The theory has further been used as the mathematical model for a prestressed concrete bridge in order to study the antimetrical state of stress for bridges loaded with unit loads. The theory does not apply to the model of a reinforced steel concrete bridge, as the girder material is assumed to have continuity in accordance with the elasticity theory. A crack will completely change the state of stress in construction. The derivation of the equations cannot be fully presented in this article.

UDK 624.072.33:539.415:624.046:519.852

KOSKI, JUHANI, Weight minimization of plain frame using by limit state. Rakenteiden Mekaniikka 9 (1976) 3, p. 31...41.

Plastic minimum-weight design of a plane frame is discussed from a linear programming point of view. The plastic moments of the beams are taken as design variables. The number of loading conditions is one. The paper is based on the kinematic method of limit analysis. The influence of normal or shear force in the yield condition is not considered. The weight of the frame is the object function in the design problem and it is linearized for optimization. The constraints are taken from the work equations of the collapse mechanisms. The problem formulated is one of linear programming. A rectangular frame of three members is considered as an example. This problem of three variables is solved in detail with a very simple computer program based on simplex-method.