

ENGLISH SUMMARY

UDK 624.67:534.1

LOIKKANEN, PENTTI, Free vibration of some tied arch bridges.

The vibration theory is applied to a single span tied arch steel bridge with a concrete roadway slab to find out the free frequencies and mode shapes of the whole bridge and the hangers with various lengths. The whole bridge is analysed using a discretised lumped model. In addition to flexural frequencies and shapes one extensional frequency and shape were found. The dependencies of these types of frequencies on the rise-span ratio of the arch rib and on the ratio of flexural rigidities of the stiffening beam and the arch rib are contrary to each other. The vibration frequencies of hangers are derived from differential equation for various end conditions as a function of a dimensionless parameter depending on the tension force, the flexural rigidity and the length of the hanger. The theory was applied to three road bridges to compute the frequencies of the whole bridge and the hangers. These computed values are very close to the experimentally measured lowest frequencies.

UDK 624.073.6:624.042

HEINISUO, MARKKU, The Approximate solution of a rigid punch.

The joint where a rigid punch is compressed against halfplane is considered. The state of stress of the plate is plane stress. The edge of the punch is straight and its length is finite. If the compressive force is not in the middle, it can be divided into a force  $P$  in the middle and a moment  $M$ . Here is investigated the pressure of the plate and the rotation  $\phi$  at the punch caused by the moment  $M$ . We suppose that the loading is transferred to the plate only with the pressure  $p$  (the frictionless case). The Approximate solution is based on the extremum principle of stiffness, which proves to be very suitable in the case with the classical theory of plates, especially when the exact solutions are complicated. The pressure is supposed to be a polynomial. The result is compared with the rigorous solution.

UDK 624.073:624.016:551.332:62-419.8:  
620.172.2

KARRI, JUHANI, Tensile reinforcement of ice.

The article deals with reinforcement of ice with material having tensile strength. First some general points of view on the bearing capacity of ice cover are presented. To clarify practical possibilities of reinforcing, a comparative test serie with glassfibre reinforced ice has been made in the Laboratory of Structural Engineering at the Technical Research Centre on Finland. Some results of the experiments are presented in the paper. Some test results of reinforcing experiments made in other countries are shortly reviewed.