THE STRENGTH OF REINFORCED CONCRETE SLABS ELEMENTS

S. Rajendran

Abstract

An upper bound method to obtain the yield criterion for reinforced concrete slab elements subjected to combinations of moments and membrane forces is developed, by making simple assumptions about the properties of steel and concrete. The stresses in concrete and steel corresponding to an assumed set of plastic strain rates are determined and integrated over the slab depth to give the total stress resultants. Then using the convexity and the normality rules in plasticity theory an upper limit for the yield value of any combination of stress resultants is determined.

The above method is verified by experiments on push-off specimens which are tested under combinations of longitudinal shear and transverse bending moment. By making use of simple assumptions which are justified by the experimental results on push-off specimens, a method is developed to determine the necessary transverse reinforcement in the flange of composite beams, where similar stress resultants act.

Also tests are done on beams under combined shear and compression to justify the assumption made in the general yield criterion theory that shear force normal to the plane of a slab has no significant effect on the yield value.