

STUDY OF STRESSES IN REINFORCED BEAM MODELS WITH CRACKS BY PHOTOELASTIC METHOD

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ABSTRACT. In the present study the important problem has been solved. The influence of cracks on the stresses under loading in tensile zone of reinforced beam models has been investigated by photoelastic method. The stress fields and their concentration coefficients have been obtained in this case.

Beams with one or two naturally developing cracks were investigated to their destruction. Some results of solved problems were given in figure here.

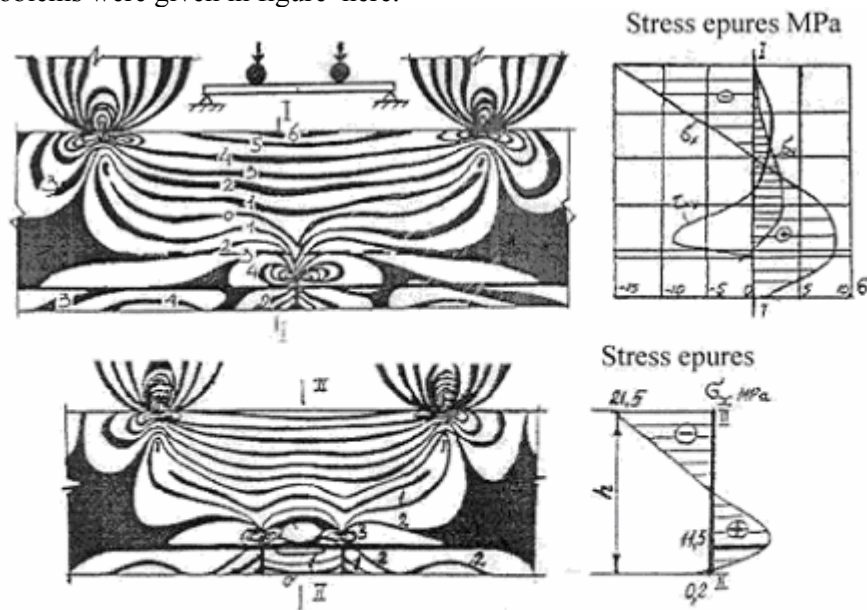


FIGURE. Isochromatic fringe patterns and stress epures in reinforced beam models with one or two cracks

The models of beams were made from optical sensitive materials. This was an epoxy resin or organic glass. The models were reinforced by the wire with the reinforcement coefficient equal to 0.01. During the process of the models manufacture thin notches filled with epoxy glue. The beam models were loaded by pure bend and the cracks in the places of a glued notch appeared.

The scheme and loading of beam model with one crack and the isochromatic fringe patterns for two of the stages of loading represent the curves with principal stress differences of equal level. Epures of the normal stress σ_x , σ_y and the shear stress τ_{xy} were obtained by means of numerical integrating of the equilibrium equation for the plane problem. While analyzing these distribution one may note that the engineering hypothesis of bending theory are not correct near the cracks.

Keywords: photoelastic method, crack