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SIMULATION OF STRAINING THE PLATE WITH ELASTIC EXTENDED INCLUSIONS BASED ON FINITE ELEMENT METHOD

The research aim is to study numerically the stressed-strained state of rectangular plates with arbitrarily-oriented extended inclusions (strip ones with and without twists at ends) depending on the combination of rigidities of inclusions, theirs sizes and orientations, relations of rigidities of inclusions and the plate. The research method is the finite-element method in the form of the ANSYS standard licensed package. The following results are obtained: the effects of the relation of rigidities of inclusions and the plate (matrix), their sizes, mutual orientations of inclusions on distribution of stresses and strains over a wide range of materials (the paper deals with aluminium and its alloys, steel, copper as examples) are analyzed. Plots of distributions of stresses intensities are built. Two inclusions in the form of strips and ones with rounding at ends are examined. Algorithms for calculating allow consideration of the stressed-strained state with variations in characteristics of extended inclusions, their forms, quantities as well as relations of rigidities of inclusions and the matrix over wide range of rigidities. The analysis made is of scientific and practical use for modelling processes in powder metallurgy and ceramics production, deforming the media with discrete variations in the structure and structural members with thin straps and inclusions.

Keywords: numerical simulation, stressed-strained state, inclusions, finite-element method, ANSYS standard licensed package.

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