

INITIAL DEVELOPMENT OF PLASTIC STRIPS FROM CORNER POINTS

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An approach to the investigation of corner points of elastoplastic body from the point of view of initial development of plastic zones near them under the conditions of plane problem is proposed. Following the widely-used and confirmed by numerous experiments localization hypothesis, the initial plastic zones are modeled by narrow rectilinear plastic strips, emerging from corner points. These strips are plastic slip lines or plastic Dugdale's lines.

The essence of the approach proposed is in the reduction of the mentioned question, concerning to the corner point under investigation, to the static problem of the theory of elasticity for wedge-shaped region with rectilinear cut of finite length, emerging from corner point, and nonclassical condition at infinity, which allows to take into account the influence of external field; in construction by Wiener-Hopf method an exact solution of this problem and in determination on its

base the length and the direction of initial development of the plastic strip.

The approach proposed is used for calculation of initial plastic zones near the corner point of the hole, of the rigid inclusion, of the media-separating boundary, of the intersection of slip lines under the conditions of symmetrical problem in limits of the model with two slip lines; near the end of the crack in limits of <<trident>>-model; near the corner point of a rigid punch, impressed into an elastoplastic body, in limits of a model with only slip line; near the end of the crack at the media-separating boundary in limits of a model with only slip line and a model with only Dugdale's line. In perspective using the given approach, whole classes of new problems of initial plastic strips, emerging from corner points, can be investigated.