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# Elastic-plastic model of fatigue crack growth in the surface of thick-walled structures under biaxial loading

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*The model of surface crack growth in thick-walled elements of structures under the biaxial cyclic loading is presented. The dependence of surface crack growth rate on the degree of loading biaxiality is established on the basis of experimental data obtained from the results of testing cruciform specimens. The strain field in the vicinity of cracks is investigated taking into account elastic-plastic material properties using the ANSYS program. Destruction at the fatigue crack tip is represented as a combination of brittle fracture at the crack tip and ductile fracture in the zone of plastic deformation. The formula is proposed for determining the rate of fatigue surface crack growth in view of the brittle and viscous stress parameters at the crack tip. The obtained results allow determining with greater accuracy the remaining service life of structures with a surface crack in the case of biaxial loading.*

**Keywords:** surface crack, biaxial loading, cruciform specimen, finite element method, brittle and plastic zone, crack growth rate

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