

INFLUENCE OF THE FREQUENCY AND LOAD ON WAVE DEFORMATION PROCESSES UNDER HIGH CYCLE FATIGUE

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Main and fatigue crack front in homogeneity under high cycle loading was considered. It was considered in the view of wave deformation process in metals. Represented rules on the basis of plane longitudinal section hypothesis allow using wave equations for crack structure description. This method of crack front differential analysis is the basis of cyclic strength wave theory.

Flat, cylindrical samples, macrostructural analysis, creeping fatigue crack, heterogeneity of the crack front, wave deformation process, frequency loading

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References

1. Koltoun, Yu. I. Macrostructure analysis of fatigue dog-leg. Problems, achievements and prospects [Article]/ Yu. I. Koltoun // Problems to strength material and buildings on transport: VII International conference on problem of strength material and buildings on transport 23-24 apr. St. Peter univ. ways and messages. – St. Peter., 2008. – p.149-182.
2. Koltoun, Yu. I. An engineering method calculation of fatigue crack growth period / Yu. I. Koltoun, T.A. Khibnick, A.Yu. Koltoun // International Conference RELMAS' 2008. St. Petersburg, Russia, 17-20 June – 2008 – p.173-177. [In Russian].
3. Parton, V.Z. Mechanics of elastic-plastic fracture [Article]/ V.Z. Parton, E.M. Morozov. – M.: Nauka, 1985. – 504p.
4. Koltoun, Yu. I. Wave processes at under high cyclic loading to a part. Theory of plane longitudinal sections [Article]/ Yu. I. Koltoun // Vestnic of Samara State Technical University. – Samara state techn. Univer. – Samara, 2005. – Vol. №34. – p.199-202.
5. Koltoun, Yu. I. Conceptual forecasting of the fatigue fracture of the surface. Theory of plane longitudinal sections [Article]/ Yu. I. Koltoun // Scientific and technical problems of forecasting of strength and durability of constructions and methods of solving them: VI International scientific conference. – St. Peter. Polit. Univ. – St. Peter., 2005. – p. 248-252.