

THE RESEARCH OF THE INFLUENCE OF THE MAXIMAL STRESS DURATION IN THE CYCLE OF LOADING UPON THE LOW-CYCLE FATIGUE AND THE LONG-TERM STRENGTH OF THE TURBINE SHAFT MADE OF THE MATERIAL ЭИ 961-III

© 2009 A. M. Porter, S. A. Bukaty, A. L. Vodolagin

«NPO «Saturn» Corporation

The results of the experimental research of the interference influence of the cyclic and static failure rate on the low-cycle fatigue and long-term strength of the turbine shaft made of material ЭИ 961-III at the temperature of 500°C are examined here. The tests were carried out in the conditions of the cyclic, static and repeated static loading of the standard specimens and LPT shafts of a gas turbine.

Gas turbine shaft, low-cycle fatigue, long-term strength, creep, stress relaxation

Porter Aleksandr Markovich, Candidate of Science, Head of “Engineering department of analysis and service life management” of NPO “Saturn” Corporation. Phone: (4855) 296-012. E-mail: alporter@rambler.ru. Area of research: gas turbine reliability and durability, low-cycle fatigue and long-term strength.

Bukaty Stanislav Alekseevich, Doctor of Science, Professor of the chair of theoretical mechanic and strength of materials of Rybinsk state aviation technological academy, LTD Scientific-business firm “SBK” Director. Phone: (4855) 213-964. E-mail: bukaty_sa@mail.ru. Area of research: Residual stress and strains, strengthening technologies, low-cycle fatigue, fracture mechanics.

Vodolagin Aleksei Lvovich, Candidate of Science, Engineering team chief of “Engineering department of analysis and service life management” of NPO “Saturn” Corporation. Phone: (4855) 296-012. E-mail: vodolagin@inbox.ru. Area of research: Process technologies of a gas turbine parts, performance attributes of parts, strength analysis.

References

1. Strength solutions of the machine parts: Reference book / I.A. Birger, B.F. Shorr, G.B. Iosilevitch. – M.: Mashinostroenie, 1979. – 702 p.

2 Demianenko I.V., Birger I.A. Strength solution of the rotating disk – M: Mashinostroenie, 1978. – 277 p.

3. A.V. Sheremet'ev. Prediction of the cyclic durability and average life of the main parts of the aviation engines / X International Engineer's congress. Aviation-cosmonautic techniques and technology. № 8, 2005. – 5 p.

4. A.M. Porter. The research of the damage accumulation process and failure of shafts and disks of aviation engines made of ЭИ-961 end ЭИ-609III with the depending on time of maximum stress in the load cycle. / Porter A.M., Bukaty S.S., Okrugin A.A. // Rybinsk aviation technological academy: Scientific proceedings. – Rybinsk, 2008. – № 2(14). – 165 p. P.65–74.

5. Wood D. Effect of creep on the High Strain Fatigue Behaviour. [Текст] / D. Wood // Welding Journal.–1966.V. 45.– № 2. Pp.92-96.