mgr inż. Wiesław Budzisz

Abstract

The teeth finishing process research for the highly loaded gears in aviation against scuffing

The aim of the doctoral dissertation is to develop the parameters of vibro-abrasive machining, which, under the influence of the abrasive medium, shapes the geometric structure of the tooth flanks of the Fan Drive Gear System (FDGS) gears ensuring the required service life and reliability of the gearbox. In the experiments, detailed analyzes of the obtained topographies were made including roughness, involute waviness, primary profile, isotropy tests using a number of measuring instruments to help draw the necessary conclusions.

Fan Drive Gear System reduces the fan rotation speed, allowing the fan diameter to be enlarged to optimal dimensions. As a result, the turbofan engine bypass ratio has been significantly increased. The solution has obtained a number of benefits defining the PW1000G engine program as the most modern in the development of civil aviation medium-range propulsion units. The operating conditions of the FDGS gearbox are defined as hard.

A review of the literature allowed to determine additional requirements for the geometric structure of the gear teeth, subjected to the correct vibro-abrasive machining parameters. These are additional requirements to be applied in parallel with the current design, technological and operational requirements. The assumed geometrical structure was achieved, confirmed in the tests of seizure gears, FZG spur gears at the T-12UF RIG at the ITE Radom Institute. The conclusions of the doctoral dissertation also describe in detail the technological and construction works that should be performed in the future process of manufacturing parts for each part number or engine program, depending on the size of the gears and the module of the part. The parameters of the vibratory process should be selected individually.

Key words: *gears, PW1000G, topography, wear, gearbox, superfinishing, vibro-abrasive machining, roughness, involute.*