Impact Analysis of Mutual Rotation of Roller Bearing Rings on the Process of Contact Stresses in Rolling Elements

Lenka Jakubovičová, Milan Sága, Milan Vaško
Department of Applied Mechanics, Faculty of Mechanical Engineering, University of Žilina, Univerzitná 1, 010 26 Žilina, Slovak Republic. {lenka.jakubovicova, milan.saga, milan.vasko}@fstroj.uniza.sk

Purpose of this paper is to present the magnitude of the impact of roller bearing rings mutual slewing to the process of contact stresses in rolling elements. The roller bearing satisfies prescribed basic static load rating if it is loaded by the maximum specified load only in the radial direction according to the ISO/TS 16281. However, the real roller bearings are not loaded only in the radial direction in practice. During operation there is mutual slewing of the bearing roller rings. This leads to a change in the conditions of contact and to a change in contact stresses. Stress state will be evaluated in the most loaded element of the roller bearing. Equivalent stress will be evaluated according to the theory of HMH, stresses $P_1$ to $P_3$ at gradual slewing of the roller bearing rings, angle $\varphi$ from $0'$ to $8'$. For the analysis of this problem was used the finite-element program ADINA.

Keywords: computational analysis, stress analysis, roller bearing, Hertz contact stresses, ADINA

Acknowledgements

This work has been supported by VEGA grant No. 1/1089/11 and KEGA grant No. 004ŽU-4/2012.

We support research activities in Slovakia / The project is co-financed by the European Union.
This contribution is the result of the project implementation: Development of optimum technology for the analysis of limit states of structural elements in contact, ITMS code 26220220118, supported by the Research & Development Operational Programme funded by the ERDF.

References


