MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Structures - Dynamics and Microdynamics (3)

Author: Dr. Mário Ricci
INPE, Brazil, mariocesarricci@uol.com.br

INTERNAL LOADING DISTRIBUTION IN STATICALLY LOADED BALL BEARINGS SUBJECTED TO A COMBINED RADIAL, THRUST, AND MOMENT LOAD

Abstract

Rolling-element bearings are simple machine elements of great utility used both in simple commercial devices (roller skates, for example) as in complex engineering mechanisms (reaction and momentum wheels for ACS). Because is a very popular machine element there is a lot of literature on the subject. With regard to the behavior of internal loading distribution, elastic deformations at point or line contacts, and geometric parameters under loading, although there are many works describing the parameters variation models, few works show such variations in practice, even under simple static loadings. In an attempt to cover this gap, an iterative computational method described in the literature is re-examined, which calculates internal normal ball loads in statically loaded single-row, angular-contact ball bearings, subjected to a known combined radial, thrust, and moment load. Numerical examples results for a 218 angular-contact ball bearing have been compared with those from the literature and the sources of discrepancy are discussed. Several figures are presented showing the following parameters variations as functions of the combined load: contact angle, contact ellipse parameters, normal ball loads, distances between groove curvature centers, normal and axial deflections and loading zones.