عنوان مقاله:

Stress and Temperature Distribution Study in a Functionally Graded Brake Disk

محل انتشار:

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خلاصه مقاله:

In this paper, finite element elastic contact analysis of a functionally graded (FG) hollow brake disk in contact with pad, subjected to rotation, contact pressure and frictional heat is presented. The material properties vary through the thickness according to a power-law characterised by a grading index, n. The material property is purely steel at the core part and gradually moves and approaches to the ceramic properties at the surfaces of the FGM disk. In this task, thermal analyses are performed on two ventilated disk brake one of them is constructed of functionally graded composite material and the other is a homogeny disk brake which is constructed of steel alloy. In this study three-dimensional finite element model and ABAQUS software is used. Through comparison of temperature and displacement fields the benefits of using functionally graded material is investigated. It is shown that temperature variation in FGM disk is much lower than steel disks, it may be concluded that FGMs disk restrain the growth of thermal perturbation and delay the contact separation..

کلمات کلیدی:

Brake disk, FGM, contact pressure, thermal perturbation.