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**IX MIĘDZYNARODOWĄ KONFERENCJĘ
MODELOWANIE I SYMULACJA ZJAWISK TARCIOWYCH W UKŁADACH
FIZYCZNYCH I STRUKTURACH TECHNICZNYCH
„TARCIE 2016”**

**IX CONFÉRENCE INTERNATIONALE
MODELISATION ET SIMULATION DES PHÉNOMÈNES DE FROTTEMENT DANS LES
SYSTÈMES PHYSIQUES ET STRUCTURES TECHNIQUES
„FROTTEMENT 2016”**

**IX INTERNATIONAL CONFERENCE
MODELING AND SIMULATION OF THE FRICTION PHENOMENA IN THE PHYSICAL
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Building of Vehicles and Tractors PW/ Warsaw, Narbutta 84 Str.

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Hot Bands on a Surface of Brake Discs Used in The High Speed Trains - Experimental Investigation

Abstract

The heat produced between friction couple during braking induces thermal distortion in the disc and leads to appearance of hot bands. The Hot bands are generated by thermoelastic phenomena appearing in systems with high energy dissipation like brake or clutch systems. Systems exposed to thermoelastic instabilities show a characteristic temperature distribution that can lead to local material change, vibrations of the braking system element or coefficient of friction fluctuations. In the framework of studies there are presented results of experimental investigation on influence of the hot bands on properties of friction pair elements and parameters of the high-speed train brake system.

Introduction

Experimental study of the effect of the formation of the hot areas on the disc brakes are the aim of presentation. The heat produced in the brake system during rapid braking from high speed often leads to the appearance of hot bands and hot spots on the surfaces of friction pairs. Nature and extent of the intensity of the phenomenon depends greatly on the mechanical and thermal properties of materials of frictional pairs. The temperature distribution in the elements analyzed systems friction effects on initiating of thermal deformations. One of the effects of such a process is the increased wear and reduce the coefficient of friction, as a result the efficiency of such systems is decreasing. In the literature, there is a lot of papers analyzing the hot spot in automotive braking systems. Such systems are moving at lower speeds and stop the vehicle with smaller weights. On the hot bands phenomenon in railway brake systems is hardly publication

Experimental test stand

A test stand-dynamometer consists of the following main elements. The drive-train consists of the following elements: motor, interchangeable flywheels and brake disk. The test bed consist of the following elements: caliper and adapter, power transfer axle, load bearing arm and load cell to calculate the breaking force. Brake dynamometer is designed to simulate the brake characteristic of the high speed train (450 km/h), and has a function of record the parameters like: rotational speed of disc, temperatures of a brake disc and a brake block by thermocouples and an infrared camera.