Vol. 38, No. 1 (2016) 83-89

Tribology in Industry

www.tribology.fink.rs

RESEARCH

Static Coefficient of Rolling Friction at High Contact Temperatures and Various Contact Pressure

B. Tadić[a], V. Kočović[a], M. Matejić[a], Lj. Brzaković[b], M. Mijatović[b], Đ. Vukelić[c]

[a] *Faculty of Engineering, University of Kragujevac, Sestre Janjić 6, 34000 Kragujevac, Serbia,*
[b] *Higher Technical School of Mechanical Engineering, Radoja Krstića 19, 37240 Trstenik, Serbia,*
[c] *Faculty of Technical Sciences, University of Novi Sad, Trg Dositeja Obradovića 6, 21000 Novi Sad, Serbia.*

Keywords:

The coefficient of rolling friction
Temperature
Contact load
Curve radijus
Steep plane

Corresponding author:

V. Kočović
Faculty of Engineering,
University of Kragujevac,
Sestre Janjić 6,
34000 Kragujevac, Serbia
E-mail: kocovic49@gmail.com

A B S T R A C T

The paper theoretically and experimentally analyzes the influence of increased temperature and load contact in the value of the coefficient of rolling friction. Theoretical analyzes show that at temperatures of the order of 200 ^{0}C, exist thermal potential necessary to narrow contact zone leads to a redistribution of the contact pressure and an increase in torque performance. Based on the measurement results, established the regression coefficient of friction depending on the temperature, normal load and geometry parameters of contact elements (radius of curvature of the contact elements). Material of examination contact pairs is steel ASTM A-295 hardness 64-66 HRC. The measurement results indicate a very significant impact on the temperature coefficient of friction, normal load and contact geometry (the radius of curvature of the contact elements). According to the authors future research should focus on optimizing the choice of materials that under the given conditions of mechanical and thermal load of contact to ensure a minimum value of the coefficient of rolling friction.

1. INTRODUCTION

The force of friction occurs at the contact of two bodies. Friction can be divided into static friction and dynamic friction [1]. The force of friction in the stationary phase increases with the tangential displacement to the amount needed to keep body movement occurred in contact. Micro movement, which can be called the intial movement, occurs in the contact zone and the preceding the phase of movement. This micro movement could reach a relatively large value when one of the contact surface has a small tangential stiffness compared with the second contact surface, such as rubber and metal contact. The main parameters of static friction of are the maximum force of static friction, which is realized at the time the macro movement, and the corresponding value of the micro-movement.

The static coefficient of friction depends on many parameters, first of all of a normal load, temperature, processing quality and material of the contact surfaces [2-6]. Many authors have investigated the influence of contact surface roughness parameters on the value of the