DEVICE, METHOD AND PRELIMINARY RESULTS OF ROLLING FRICTION COEFFICIENT EVALUATION

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Abstract: *This paper presents a test rig and an experimental method for the rolling friction coefficient evaluation, in the case of a contact between a ball and an outer ring from a ball bearing. The ball is free positioned on the outer ring raceway and, at zero speed, it will stay in the position corresponding of the minimum potential energy. The ring can be rotated with a controlled speed. Due to the rolling friction effect, the ball will get a new equilibrium position, deviated from the initial one, with a deviation angle. This angle is in correlation with the rolling friction coefficient and allows calculating it. After a short presentation of the previous device, this paper presents the upgrading elements and the new experimental method. This new method allows to evaluate the dynamic rolling friction coefficient but also the static one. Some experimental results are presented too.*

Keywords: *friction, rolling friction*

1. Introduction

It's known that the rolling movement is present in the majority of the machines in our daily life. It can be affected by a series of factors such as: the micro-slip into the contact, the losses through elastic hysteresis, the hydrodynamic resistance of the lubricant, the surfaces finition grade, the dynamic interactions between the parts in contact, the thermal regime, load and other.

Many researchers were pay attention to the rolling friction coefficient, and were proposed many and variate equipments and methods to determining it, such as: Olaru [1], Ta-Wei Lin [2], Stamate [3], Houpert [4], Maeda [5], Biboulet [6], Takemura [7], Drutovschi [8], Muscă [9], [10].

2. Theoretical aspects

The ideal contact between a bearing ball and an exterior bearing ring, in a non-operative state, when the bearing ball is in the position corresponding to minimum potential energy, assumes that the geometric centers of the bearing ball and the bearing ring are situated as they are presented in figure 1, on the same vertical axis.