Serbian Tribology Society

SERBIATRIB '13

13th International Conference on Tribology

Faculty of Engineering in Kragujevac

Kragujevac, Serbia, 15 – 17 May 2013

ANALYZING THE INFLUENCE OF THE CONSTRUCTION ELEMENT POSITION ON TORQUE TRANSMISSION BY FRICTION

Marija Jeremić[1], Bojan Bogdanović[1], Aleksandar Simić[1], Dragomir Miljanić[2]
Petar Todorović[1], Sasa Randjelovic[1], Branko Tadić[1]
[1]Faculty of Engineering, Sestre Janjić 6, Kragujevac, Serbia, mjeremic88@yahoo.com, bogdanovicboki@gmail.com, aleksandarsimickg88@gmail.com, petar@kg.ac.rs, sasarandjelovic@yahoo.com, tadic@kg.ac.rs
[2]Metalik, Nikšić, Montenegro

Abstract: *This paper is analysing the impact of the construction element position of ship winch drum on the effects of torque transmission by friction in the mechanization welding process. The driving and driven wheels (construction elements) were examined for the general case of the load distribution. Based on this examination, the construction of the device that should provide the reliable torque transmission and the movement of the drum in the process of its welding is proposed. This construction is characterized by a high level of flexibility and ability to change the friction torque based on changing drum position in regard to the driving and driven wheels (construction elements). With this new construction, problems related to the movement synchronization are avoided, unlike the all previously known constructions of this type, which lead to the positive impact on the wear intensity of friction gears.*

Keywords: *friction, wear, transfer of torque, special device, marine winch drum*

1. INTRODUCTION

Research described in the paper is related to the problems of friction torque transmission. Research is applicative and connected with design of boot device (reversal) drum ship winches during welding process. Torque transmission is performed by friction tribological contact with rubber and metal. Movement can be reached by using only the effects of friction, but friction during movement always brings different types of losses. Connected with this, knowledge of the value of coefficient of friction is very important for every engineer and designer who is involved in design and development of mechanical structures, which perform their function through interaction of surfaces which move relatively. It is well known that the process of friction follows every kind of body movement. Friction is a necessary process because only with effects of friction can be achieved starting, moving, changing speed or stopping. On the other hand, during movement, as a consequence of frictional resistance, that resistance must be overcome in order to continue movement, which is why the energy losses exist. In addition to energy loss, friction is always accompanied with wear of material on contact surfaces, which produces an additional costs and loss of functionality of elements in contact.

Friction is, therefore, such a process which, at the same time, manifests positive and negative effects. It is therefore natural that there is a tendency to eliminate its negative effects, or at least minimize, and to increase the positive [1]. A review of the knowledge of the friction force, as well as ways for measurement are presented by Peter J. Blau [2], he presented some of the most common standards-defined measuring methods for static and dynamic friction coefficient, and its potential uses. Beginning of movement of any kind is related to the existence of static friction. Static coefficient of friction depends of many parameters, especially from the surface of contact, normal load, and temperature of the atmosphere in which contact occurs, surface absorption, quality of contact surface materials [3-7]. Analyzing the rolling process [8] in the absence of any load, the conclusion is that the energy losses are result of collisions of two moving rolling mass, i.e. mass of rolling body with the body on whose surface is