INFLUENCE OF THE TEMPERATURE ON THE WEAR OF AUTOMOTIVE TRANSMISSION BELTS

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KEYWORDS

Wear; friction; experiments in tribology, elastomers

ABSTRACT

Cars are one of the main forms of transportation that we use on daily basis. Poly-V belts are flexible members used for power transmission between rotational elements of automotive engine drives. Wear is inevitable because friction between the belt and the pulley is needed for the transmission of momentum. Furthermore, slip between the belt – pulley is induced by the resistant torque [1]. The combination between the initial tension and the slip generates frictional heating in the interface between the belt – pulley. Frictional heating can produce significant damage to the external surface of the transmission belts (Fig. 1). In this framework, the elastomeric coatings of transmission belts must have a considerable wear resistance at high temperatures while maintaining their power transmission capacity and anti – noise properties.

The aim of this study is to evaluate the wear behavior of different elastomeric coatings in order to select future materials solutions that shall enhance wear resistance and increase the lifetime of transmission belts.

First, the wear features of the surface of the belts abraded under realistic conditions are identified using Scanning Electron Microscopy (SEM). Then, abrasion tests on different elastomeric compounds are carried out using an innovative rolling-sliding tribometer with controlled environmental temperature. This device is able to reproduce the real operating conditions of an engine drive with a good similarity, in terms of kinematics and contact temperature, at a laboratory scale. Normal load and slide-roll ratio (SRR) are used as operating parameters, whereas conditions such as contact temperature and coefficient of friction (COF) are monitored during the wear test. Lastly, the linear wear loss is measured using the wear track profile scan.

Preliminary results indicate that different elastomeric coatings exhibit distinctive wear features and consequently different COF and wear rates.

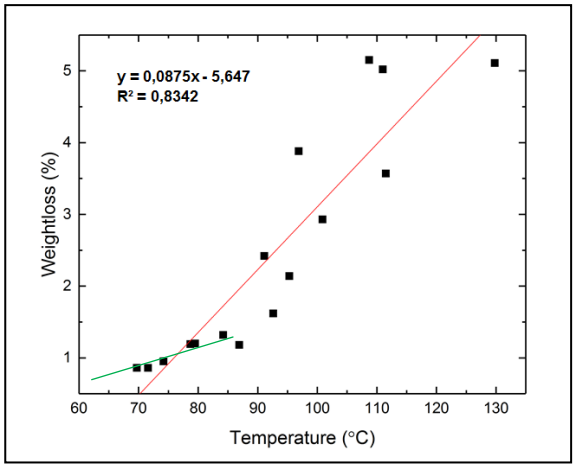

Fig.1 Effect of the pyrometer-measured contact temperature on the weight loss for an elastomeric coating (tests on a belt-pulley laboratory simulator)

REFERENCES

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