

Influence of Surface Roughness on Voltage Drop of Sliding Contacts under Various Gases Environment

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Abstract— Sliding contact behavior is important in the mechanism of collecting current and is operated under various atmospheric conditions such as vacuum, low-temperature, low oxygen environment and so on. In the present experiment, we examined the relation between sliding contacts phenomena and ambient atmosphere conditions. It is confirmed that the contact voltage drop tends to increase in atmospheric pressure conditions comparison with low-pressure environment. From these results, it is estimated that the physically adsorbed gases on the sliding surface and surface roughness conditions affects the contact voltage drop rise. In this paper, the relation between sliding surface roughness and atmosphere gases variation for sliding contact is examined. As the results, it becomes clear that the contact voltage drop changed for various surface roughness conditions in vacuum and inert gases environment. However, in the including oxygen environment, it is obtained experimentally that the surface roughness is difficult to affect the contact voltage drop. Therefore, the effect of ambient gas (oxygen and argon gas) on contact voltage drop is discussed.

Keywords- sliding contact; contact voltage drop; surface film; brush; gas adsorption