Experimental Investigation of the Electrical Contact Characteristics in Rolling Contact Connector

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Abstract—Rolling Contact Connector (RCC) is a new technology utilized in high performance electric power transfer systems with one or more rotating interfaces, such as radars, satellites, wind generators, medical CT machines, etc. Rolling contact components are used in the RCC instead of traditional sliding contact to transfer electrical power and/or signal. Since the requirement of the power transmission increasing in these years, the rolling electrical contact characteristics become more and more important for the long-life design of RCC. In this paper, a typical form of RCC is presented. A series of experimental work are carried out to investigate the rolling electrical contact characteristics during its life-time. The influence of a variety of factors on the electrical contact degradation behavior of RCC is analyzed under both vacuum and air environment. Based on the surface morphology and elemental composition changes in the contact zone, which is assessed by field emission scanning electron microscope (FE-SEM) and energy dispersive X-ray (EDX), the mechanism of rolling electrical contact degradation is discussed.

Keywords — rolling contact connector; contact resistance; surface morphology.