

## TIME AND LEVEL ANALYSIS OF CONTACT VOLTAGE INTERMITTENCES INDUCED BY FRETTING IN POWER CONNECTOR

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It is well known that vibration of contact interfaces is the main cause of contact degradation by the so called fretting corrosion phenomena. In fact the process of generated particles by mechanical wear produce either the increase of contact voltage accompanied with rapid fluctuation and micro-interruption.

The main objective of this work is to examine the electrical behaviour of connector terminal under vibration and characterize these intermittences, in term of occurrence apparition and duration during the fretting

The spring lamellas of connector are submitted to high number of vibration ( $10^3$  to  $10^7$ ) in frequency oscillation (1-100Hz) with amplitude of  $50\mu\text{m}$  is used. The contact is inserted in a resistive circuit supplied by 14V and few tens of amperes. The contact voltage is acquired with fast sampling oscilloscope and intermittence duration and occurrences are extracted in real time at various threshold voltage level.

We have found that depending on the degradation stage this electro-mechanical phenomena leads to the apparition of intermittences from few millivolts to open circuit voltage. In addition the period of these fluctuations cover wide range of duration.

In fact voltage intermittences are increased from some millivolts (in initial state) to few hundred millivolts (corresponding to material wear and oxidation) and can reach open circuit voltage or arc voltage. However some of fluctuation durations are well correlated to vibration period while the rapid ones is believed to electrical conduction perturbation in granular interface by movement.

Furthermore, the self- heating by such high contact voltage at high current levels are examined in term of connector reliability.

*Key words: contact intermittence voltage, fretting corrosion, contact heating.*