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Composition du Jury

Civilité	Nom	Prénom	Grade / Qualité	Rôle
M	FOUVRY	Siegfried	Directeur de Recherche	Examinateur
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Résumé

Some engineering components can be subjected to normal and/or rotational fretting wear with contacts that are intermittently exposed to the open-air atmosphere. Exposure to open air may lead to the alteration at the contact due to the changing role of third body particles such as hard oxides which can result in abrasion. Abrasion due to hard oxide particles differs for the closed contact and intermittently opened contact. Standard fretting test setup employed to estimate fretting wear characteristic operates with a constant load such that the contact remains closed between the counter surfaces and does not simulate the opening and closing of the contacts as observed in certain applications. The forceful interruptions to the experiments to simulate open and close condition of the contact require considerable amount of time and effort. An accelerated test procedure is proposed and investigated to capture the effect of intermittent opening of the contact without stopping the experiments. A test rig was designed to simulate the opening and closing conditions and tests were performed with abrasive particles. Friction and wear results are compared with those of intermittently contact opening conditions.

Valve assembly of combustion engines undergo fretting wear due to a complex phenomenon involving structure stiffness and contact tribology. If the wear across the circumference is not uniform, there will be leakage of gas and the engine gives lesser power output. There is a need to thoroughly understand the reason for valve wear and develop a numerical model that can predict valve fretting wear for given number of operating hours. Experiments were performed to understand the wear mechanism and derive wear coefficients that can be used in the numerical model. A numerical wear model is built that captures structural stiffness of the valve assembly and wear mechanism at seat contact.