

# Interfacial Parameter Analyses for Sleeve-Pin-Shaft Connections under Axial and Torsional Cyclic Loading Using the Finite Element Method

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## Abstract

This study investigates the interfacial behaviour of the contact surfaces of the sleeve-pin-shaft connections under axial and torsional cyclic loading. Fatigue experiments for the connections have been performed in a previous study using a biaxial material testing system. The fretting fatigue cracks initiated at the pin-hole edge of the shafts were found to be the main cause of failure of the connections. In this work, the fretting wear parameters and cyclic stress/strain behaviour of the contact surfaces of the components are simulated using the elastic-plastic finite element method. Several representative interfacial parameters, such as contact pressure, slip displacement, and tangential stress along the pin-hole edge of the shaft are considered herein. The effect of the coefficient of friction between the contact surfaces on the stress/strain behaviour on the pin-hole edge is also investigated. These simulated results can be applied in the future to elucidate the complicated failure mechanism that results from interaction between the plain fatigue and fretting fatigue behaviours of the contact surfaces.

Keyword : Sleeve-pin-shaft connection, interfacial parameter, fretting, finite element method, axial, torsional