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WEAR ANALYSIS AND ITS EFFECT ON CONTACT PRESSURE DISTRIBUTION

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Abstract

In the past, wear at the disc and pads interface of disc brakes has rarely been accounted for in a 3-dimensional finite element (FE) model for studying brake squeal. Thus, its effect on disc brake squeal has been investigated largely through experimental methods. In the present paper, wear over time at the pad interface is simulated using a modified wear rate formula. Confirmation of the proposed wear formula is made against experimental results. The surface topographies of two brand new pairs of brake pads are measured. The contact tests using pressure-indicating films are carried out in order to capture static pressure distributions. The same brake pads are tested under braking applications of three durations. For each braking application, the static contact pressure distribution is measured. The results are used to compare with the simulated results predicted by the 3-dimensional finite element model of a real disc brake, which has developed and validated through appropriate analyses. The paper also investigates squeal generation in the above braking applications using complex Eigen value analysis that is available in a commercial software package. The predicted results are then compared to the squeal events observed in the experiments and they are in reasonably good agreement.

Keywords : Wear finite element, disc break, Eigen value, contact pressure distribution.