

A Multi-Scale Contact Temperature Model for Dry Sliding Rough Surfaces

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Abstract : A multi-scale flash temperature model has been developed and validated against existing work. The core strength of the proposed model is that it can be adapted to predict flash contact temperatures occurring in various types of sliding systems. In this paper, it is used to investigate how different surface roughness parameters affect the flash temperatures. The results show that for decreasing Hurst exponents as well as increasing values of the high-frequency cut-off, the maximum flash temperature increases. It was also shown that the effect of surface roughness does not influence the average interface temperature. The model predictions were validated against data from an experiment conducted in a pin-on-disc machine. This also showed the importance of including a wear model when simulating flash temperature development in a sliding system.

Keywords : multiscale, pin-on-disc, finite element method, flash temperature, surface roughness

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