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The Effect of Surface Conditions on Wear of a Railway Wheel and Rail

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Abstract : Understanding the nature of wheel and rail wear in the railway field is of fundamental importance to the safe and cost effective operation of the railways. Twin disc wear testing is used extensively for studying wear of wheel and rail materials. The University of Huddersfield twin disc rig was used in this paper to examine the effect of surface conditions on wheel and rail wear measurement under a range of wheel/rail contact conditions, with and without contaminants. This work focuses on an investigation of the effect of dry, wet, and lubricated conditions and the effect of contaminants such as sand on wheel and rail wear. The wheel and rail wear measurements were carried out by using a replica material and an optical profilometer that allows measurement of wear in difficult location with high accuracy. The results have demonstrated the rate at which both water and oil reduce wheel and rail wear. Scratches and other damage were seen on the wheel and rail surfaces after the addition of sand and consequently both wheel and rail wear damage rates increased under these conditions. This work introduced the replica material and an optical instrument as effective tools to study the effect of surface conditions on wheel and rail wear.

Keywords : railway wheel/rail wear, surface conditions, twin disc test rig, replica material, Alicona profilometer
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