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**Effect of desert sand on wear and rolling contact fatigue behaviour of various railway wheel steels**

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**Abstract**

This work studies the effect of desert sand at the wheel-rail contact interface on two standard railway wheel steels (ER8 and CLASS C) and two upgraded steels (SANDLOS<sup>®</sup> S and SANDLOS<sup>®</sup> H) specifically designed for sandy environments. Rolling contact tests were carried out by means of a two-disc testing machine with and without sanding at the contact interface. The tests were performed for various durations in order to study the disc damage evolution. The response of the steels to the same contact pressure, rolling speed, sliding/rolling ratio and sand feed rate was evaluated in terms of wear rate, strain hardening and surface and subsurface damage. The ER8 discs performed worst, incorporating sand into the subsurface layer by extremely high plastic flow and were, therefore, subject to material detachment by rolling contact fatigue. The SANDLOS<sup>®</sup> H discs performed best, with a wear rate 2.5 times lower than that of ER8 discs, due to the steel having the highest mechanical properties, and thereby restricting the sand embedding

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