



IIIi27-002

Ball-on-disc laboratory experiments to evaluate post-drying water-based friction modifiers for railway application

Tayer, P.N.(1); Ferrer, B.P.(1); Cavalcanti, L.B.(2); Zuin, A.(1); Cousseau, T.(1);

(1) UTFPR; (2) UoS;

On wheel-rail lubrication, friction modifiers are water-based lubricants used to keep the friction coefficient at an intermediate level, so that the lubrication benefits are achieved without compromising the train traction or breaking. The wheel-rail interface is lubricated by depositing the friction modifier in a liquid state over the rail, then it is carried ahead the rail by the wheels passages. This process results in the drying of the friction modifier. There is a lack of knowledge regarding friction modifiers' working principle, one of the hypotheses is that they form a dry solid film that protects the surfaces, avoiding contact between asperities. To verify this hypothesis, laboratory experiments using ball-on-disc configuration and simulating the field conditions were performed using three friction modifiers. The friction modifiers were deposited on the discs in a liquid state and dried on a stove before the tests and their efficiency in terms of surface separation was evaluated by measuring the electrical resistance between the ball and the disc. For the three friction modifiers: one of them withstood field conditions and was able to separate the surfaces, unlike the second one, the third presented mixed behavior. The results indicated that the dry friction modifier may be able to withstand field conditions and separate the wheel and rail surface, but this may not be a necessary condition to achieve their benefits.