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Tribological behaviour of a continuous hot dip galvanized steel

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Abstract: The aim of this work is to investigate the tribological behaviour of a continuous hot dip galvanizedsteel. This paper presents a fundamental study of the characteristics of zinc coating in terms ofmorphology, surface roughness and tribological behavior according to process parameters typical ofindustrial processes continuous galvanization. The morphology of the zinc coating was observed byscanning electron microscope (SEM), optical microscopy, and the mechanical properties of thecoating layers were determined by nanoindentation. The tribological tests were carried out on arotating ball-disk tribometer under loads of 1, 2, 3Nwith a sliding distance of 15, 30 and 50 m. Theresults showed a marked increase of the coefficient of friction with increasing applied load. Under thesame conditions, wear slightly increased due to the hardness of intermetallic phases. The resultspresented show that heating promotes the diffusion of iron in the zinc coating giving shape to a binaryalloy Fe–Zn whose characteristics depend on the parameters; moreover, it is proved that thetribological characteristics of the surface of the metal blank in terms of coefficient of friction dependon the temperature of the contact pressure.

Keywords : galvanized steel, wear, roughness, Nanoindentation, intermetallic phases