

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 galvanized steel. This paper presents a fundamental study of the characteristics of zinc coating in terms of morphology, surface roughness and tribological behavior according to process parameters typical of industrial processes continuous galvanization. The morphology of the zinc coating was observed by scanning electron microscope (SEM), optical microscopy, and the mechanical properties of the coating layers were determined by nanoindentation. The tribological tests were carried out on a rotating ball-disk tribometer under loads of 1, 2, 3 N with a sliding distance of 15, 30 and 50 m. The results showed a marked increase of the coefficient of friction with increasing applied load. Under the same conditions, wear slightly increased due to the hardness of intermetallic phases. The results presented show that heating promotes the diffusion of iron in the zinc coating giving shape to a binary alloy Fe–Zn whose characteristics depend on the parameters; moreover, it is proved that the tribological characteristics of the surface of the metal blank in terms of coefficient of friction depend on the temperature of the contact pressure.

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