

Influence of dry friction on the wear behavior of X52steel—experimental study and simulation using response surfacesmethod

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Abstract: Friction and wear phenomena alter the behavior of the material surface, where certain relevant parameters which characterizethe surface are influenced. Therefore, the objective of this work is to identify the parameters most influencing the frictioncoefficient (f), the wear rate (Ws), and the volume parameters (V_{mc} and V_{vv}) during the friction test. The friction tests werecarried out by adopting the methodology of 23complete planes with three factors (D , V , and P_y), at two levels each. Therresults show a decrease in the wear rate when all three factors are at their highest level and a decrease in the friction coefficientwhen using minimum load on speed long distances. In addition, the mathematical models developed allow to reveala correlation between the test parameters (D , V , and P_y), and the responses studied (f , Ws) in their study field. Moreover,the volume parameters V_{mc} and V_{vv} were evaluated during the tests, and the morphology of the worn surface shows thatthe friction under a load of 1 N leads to the predominance of an abrasive wear mechanism, while a load of 10 N promotesan adhesive wear mechanism.

Keywords : Complete plans, modeling, friction coefficient, Wear rate, volume parameters