

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 characterize the surface are influenced. Therefore, the objective of this work is to identify the parameters most influencing the friction coefficient (f), the wear rate (W_s), and the volume parameters (V_{mc} and V_{vv}) during the friction test. The friction tests were carried out by adopting the methodology of 23 complete planes with three factors (D , V , and P_y), at two levels each. The results show a decrease in the wear rate when all three factors are at their highest level and a decrease in the friction coefficient when using minimum load on speed long distances. In addition, the mathematical models developed allow to reveal a correlation between the test parameters (D , V , and P_y), and the responses studied (f , W_s) 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 that the friction under a load of 1 N leads to the predominance of an abrasive wear mechanism, while a load of 10 N promotes an adhesive wear mechanism.

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