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Effect of erosion parameters on the surface direction texture-Study by experimental plans

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Abstract: The aim of this work is to study the effect of solid particle impact erosion parameters of sand on the isotropy parameter "Std" which presents the direction of surface texture. The experimental methodology adopted for this experimental work is the Box Behnken plan with three factors, each at three levels (-1, 0 and +1), the parameters considered are: time "t", pressure "P" and angle of impact "?". 3D roughness measurements were carried out using a laser source profilometer type Cyper-Technologie-CT100, in order to characterize the different surfaces after erosion test. The statistical analysis was carried out using the Mini Tab software, where a mathematical model was established showing the relationship between the input parameters (t, P, ?) and the output parameter "Std". This model predicts the "Std" response in the field of study as well as the parameters of the sandblasting regime. The results show the significant effect of the impact angle on "Std" and the interaction between the different parameters in the study domain, of which the highest value of "Std" is equal to 130 ° for an average time combined with low pressure and impact angle.

Keywords : erosion, topography, roughness surface, Mathematical model, Box plans