Study of surface quality
- Effect of fractal dimension and texture parameters

Bourebia.Mounira
Centre de Recherche en Technologies Industrielles.CRTI.ex-CSC, Algéria
Université Badji Mokhtar BP12 -2300, Laboratoire de Mécanique Industrielle
Annaba, Algéria
mounirabourbia@gmail.com

Laouar Lakhder
Université Badji Mokhtar BP12 -2300, Laboratoire de Mécanique Industrielle
Annaba, Algéria
lakla_55@yahoo.fr

Hamid Hamadache
Mechanical Engineering Department, Badji Mokhtar- Annaba University, P.O. Box 12, 23000 Annaba, Algeria.
hamham36@yahoo.fr

Abstract

The lifetime of a mechanical system is greatly influenced by surface state in service and the operating conditions such as friction and lubricantion. So the proper functioning of in service pieces depends heavily on the quality of their machinings as well as their finishes. This quality can be approximated by the fractal dimension "D", this latter is a major parameter for the automotive industry because it helps differentiate the gloss to the treated surfaces. It varies within 2 <D <3, more D tends toward 2 the surface is more regular, smooth and bright. this Study aims of highlighting the evolution of the surface quality by considering the parameter "D" and the texture parameters (Str ... Std.). Experimental work was conducted by means of a mechanical surface treatment process (burnishing ball) applied on a commercial aluminum alloy material. Three parameters of the regime were considered namely: "burnishing feed f", "burnishing force Py" and "burnishing ball diameter Db".A mathematical model was obtained using the plans of multifactorial experiments of "Box-Behnken" for predicting the fractal dimension "D". A optimal regime has been applied to evaluate the interaction between D and the texture parameters.