OPTIMIZATION CUTTING PARAMETERS ON TURNING PROCESS TO INCREASING SURFACE ROUGHNESS SKT4 MATERIAL WITH TAGUCHI METHOD

By

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

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ABSTRACT

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This experimental is present the best parameter to get increasing surface roughness for JIS SKT4 material. Taguchi method was involved to combine parameter were used in turning process, namely cutting speed, feeding, depth of cut and tool nose radius. This experiment was conducted to find out best parameter combination for turning process which the result is minimum roughness average JIS SKT4 material with carbide cutting tool material. The experimental used was taguchi L_{27} with 3 times of replication. Backpropragation Neural network (BPNN) method is used to recognize relation between parameter process and experimental response, while Genetic Algorithm method is used to determine the best combination of process parameter that can optimize the surface roughness of JIS SKT4 material.

BPNN have a 4-8-81 network architecture which consist of 4 input layers, 2 hidden layers with 8 neurons in the output layer. Tansig activation program and training program is used to process the data from taguchi metdod and experimental data. The optimum parameter recommendation from Genetic Algorithm are cutting speed 131.62 m/min, feeding 0.04 mm/rev, depth of cut 0.3 mm and nose radius is 0.39. The optimum parameter recommendation from Genetic Algorithm done with cutting experimental on turning machine with 3 repetation and the surface roughness average result is 1.5 µm. This experimental improve 301.03% surface quality from the product of guide pin JIS SKT4 material.

Keywords: Taguchi method, SKT4, Roughnes average, ANN, BPNN, GA

DEDICATION

This study is wholeheartedly dedicated to my beloved father and sister, who have been our source of inspiration and gave me strength when I thought of giving up. To Polman Astra who has provided funding and support during the study period. And lastly I dedicated to the God, thank you for the guidance, strength, power of mind, protection and for giving us a healthy life.

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Tangerang, February 2021

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