J Material Sci Eng 2013, 2:4
http://dx.doi.org/10.4172/2169-0022.S1.012

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Materials Science & Engineering

October 07-09, 2013 Hampton Inn Tropicana, Las Vegas, NV, USA

Investigation on the machinability characteristics of Al+12Si /10wt%TiC *in-situ* composite

Belete Sirahbizu Yigezu, M. M. Mahapatra and P. K. Jha
Indian Institute of Technology Roorkee, India

Machining process, when used for metal matrix composites (MMCs), is characterized with unpredictably shorter tool life due to the ceramic nature of reinforcement particles. It is well known that, one of the major indicators of the efficiency of a machining process is the durability of the cutting tools. The cost of cutting tools takes the major part of the total machining cost. The intent of the present study is to investigate the machinability characteristics of in-situ synthesized Al+12Si/10wt%TiC composite and to develop a predictive mathematical model using surface response methodology. An attempt has been also made to optimize the responses using multi-response optimization technique. Machining tests were performed by the turning process using uncoated carbide tools at three different cutting speeds, feed rates and depth of cuts. Cutting force (Fz) and surface roughness (Ra) were considered as output measures. The experimental results revealed that the minimum cutting force (Fz) was observed at higher cutting speed, lower feed rate and minimum depth of cut. The better surface roughness (Ra) was achieved at higher cutting speed, minimum feed rate and lower depth of cut. Accordingly, the optimum cutting force and surface roughness was achieved at 150 m min^{-1}cutting speed, 0.06 mm rev-1 feed rate and 0.75 mm depth of cut. The developed multi linear regression models exhibited a close proximity with the test case results. The comparative result of the predicted and achieved optimized outputs also demonstrates a very good agreement.

Biography

Belete Sirahbizu Yigezu has completed his M.Sc. degree in Mechanical Engineering from Addis Ababa University in July 2008. Then he was working as Lecturer in Dire Dawa University till June 2010. He is pursuing his Ph.D. in the Mechanical and Industrial Engineering Department of Indian Institute of Technology Roorkee. Currently, he is in the position of submitting his thesis. He has published 3 research articles in reputed journals and more than four papers are under review.

kassa2000et@yahoo.com

Modification of wear behaviour of cermet (W,Ti)c-9%co nitrided by gaseous nitrading and salt bath

B. Bouledroua M. A[1], S.BoudebanePr[2] and A. Saker Pr[2]
[1]LarbiTebessi University, Algeria
[2]BadjiMokhtar University, Algeria

The object of this study is the cermets (W,Ti) C-9% Co obtained by sintering at liquid phase according to classical technology of powder metallurgy. For the sake of improving the resistance to wearing of the cut plates, several thermo-chemical treatments (gaseous nitride, liquid nitride) have been tested. Independently from the types of treatment, the plate revealed a modification of the nature of the update phases at the superficial layers. The appearance of TiN, Ti (CN) and other oxycarbonitride generated a hardening of the surface with micro-hardness values exceeding 45.000 MPa. The depth of the modified layer will depend on the type and parameters of the treatment. The friction coefficient has also been sensitive to carbon and /or nitrogen diffusion. The treated cut plates put into exploitation show up a lifetime superior to that of reference plates.

bouledrouabesma@hotmail.fr