Karnataka State Biofuel Development Board (KSBDB)
&
Karnataka State Council for Science and Technology (KSCST)

Evaluation of Vegetable Based Cutting Fluids in Turning AA6061 with Minimum Quantity Lubrication

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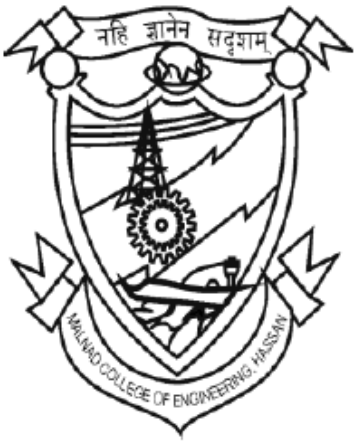

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ABSTRACT

The current work involves study of cutting force and surface roughness while turning of AA6061 under Minimum Quantity Lubrication (MQL) condition by formulating two different vegetable based cutting fluids (VBCFs), Epoxidised Jatropha Methyl Ester and Epoxidised Pongama Methyl Ester as non – conventional cutting fluids. The mineral oil based cutting fluid (Servo cut oil 151) is also used for turning operation as conventional cutting fluid. Carbide tool insert is used as cutting tool. Taguchi's three levels parameter design (L_{27}) is used for obtaining the experimental design.

Minitab 16 software is used for carrying out statistical analysis and regression analysis. Cutting fluid, cutting velocity, feed rate and depth of cut are considered as machining parameters. Regression models are developed to predict surface roughness and cutting force. S/N ratio is used for determining the effects of conventional and non-conventional lubricant upon surface finish and cutting forces for minimum quantity lubrication condition. The results show that, non-conventional cutting fluids perform better than conventional cutting fluids.