**Experimental Study of Specific Energy Consumption During Turning of Different Materials**

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**ABSTRACT**

In any metal cutting operation, the features of tools, input work materials, machine parameter settings will influence the process efficiency and output quality characteristics. A significant improvement in process efficiency may be obtained by process parameter optimization that identifies and determines the regions of critical process control factors leading to desired outputs or responses with acceptable variations ensuring a lower cost of manufacturing. For the turning process, the cutting conditions i.e. Speed, Feed and Depth of cut plays an important role in the efficient use of a machine tool. In order to determine the optimum cutting conditions, one has to estimate the power consumption and material removal rate. For every machining operation, power consumption should be low and material removal rate should be high. Specific energy is defined as the ratio of power consumption to the material removal rate. In order to reduce manufacturing cost, specific energy should be minimum. As part of my project, feed rate and depth of cut are considered as input process parameters and their effect on specific energy is studied through experimental investigation. In this work input process parameters with three levels with full factorial array design of nine experiments for five different materials are considered. These different materials are (AA2014, MDN250, 15-5PH, 15CDV6, SAE4340). Finally, optimum values of feed, depth of cut are found for minimization of specific energy for different materials. These values are set up in the machine to reduce the effective cost of machining.

*Keywords: CNCTurning, Speed, Feed, Depth of Cut, Specific Cutting Energy*