OPTIMIZATION OF CUTTING PARAMETERS FOR CNC TURNED PARTS USING TAGUCHI'S TECHNIQUE

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ABSTRACT

In modern manufacturing industries, the ultimate goal is to manufacture products at low cost and high quality in short time. Automated and flexible manufacturing systems are employed for that purpose along with CNC machines that are capable of achieving high accuracy and very low processing time. Turning is one of the most common methods for cutting and especially for machining cast parts. Furthermore in order to produce any product with high cutting performance, proper cutting parameters have to be selected.

To select the cutting parameters, several mathematical models based on statistical techniques and neural networks have been developed to establish a relation between cutting parameters and cutting performance. To conduct a real time test for process optimization, traditional Design of Experiments method can be done. But this technique is time consuming and costly. The solution is, to adopt the recent Taguchi's technique for parameter optimization. Reducing the energy consumption in a CNC machine is the concern of the study.

Using Taguchi's technique, experiment was conducted on a CNC lathe with cutting speed, feed rate and depth of cut as process parameters and energy consumption was measured. The data were analyzed and appropriate process parameters were selected for minimum energy consumption.

KEYWORDS*:* Power optimization, CNC, Taguchi technique, high tare machines, cutting parameters.