

# Parameter Optimization of Turning Process (Cast Iron) Using Taguchi Method

Prof. S. S. Patil

Project guide

Department of Mechanical Engineering, Shivaji university, Ashokrao Mase Group of Institution, Vathar, 416112 Maharashtra, India.

Madhav Kanade

Project leader

**Abstract** -This paper focuses on the optimisation of turning parameters using Taguchi technique to obtain minimum cycle time & surface finish. A number of turning experiments were conducted using the L9 orthogonal array on a CNC machine. The experiments were performed on cast iron by using coated carbide insert. Minitab is employed to determined most significant control factor affecting cycle time & surface finish. The cutting speed ,Feed ,Depth of cut were selected as control factors . After the nine experimental trials, It is found that cutting speed is the most significant factor on the Cycle time. Result of the Validation test shows that Taguchi method was notably successful

**Keyword**- Optimization, Turning process parameters ,Taguchi method, orthogonal array, MINITAB-17.

## INTRODUCTION

There is a need for optimizing the process parameter both from technological and economic point of view, optimization of process parameter helps to finding out the correct adjustment of parameter which improve the quality and quantity of the product .This must be done in timely manner to avoid production delay and effectively

Design of experiments and procedure-

Design of experiments and procedure as follows:

Techniques of experimentation- There are different types of experimentation. The most widely used strategies for experimental analysis.

### 1. By guess approach-

In this approach an artificial combination of factors are selected and then tested and its effect on output response is observed. If guessing doesn't produce a desired result the research take another guess for correct combination of factor level. Thus may continue for long period of time without any proper prediction of the combination. If guess is found to be correct at correct at the initial level then it is well and good but still it may not be the best combination

### 2. Pilot experiment-

Pilot experiment is same as guess approach but the difference is that whatever combination is predicted is tested on the actual machine and result are observed if the result are satisfied then the combination

to avoid defect. Therefore in the situation, it is important for the engineering or technician to use past experience to select parameters which will likely yield a surface finish below that of a specified level and perhaps make some parameter adjustment as a time allows or quality control require.

Engineers and technicians establishing such and operation would ideally consider other implications of setup parameters such as production schedules, processing time and noise factors. A more methodical, or experimental approach to setting parameters should be used to ensure that the operation meets the desired level of quality with given noise condition and without sacrificing production time. As we are dealing with the cycle time and surface finish, low speed affect the cycle time and higher depth of cut damage the surface.

In order to optimize such an operation with such restrictions, a more efficient experiment method is needed. An excellent solution to this issue is an approach known as Taguchi Parameter Design.

may be valid. Mostly pilot experiment depends upon the type of machine capacity and other important factors.

### Taguchi based design of experiment-

Among the various method available, Taguchi method is one of the most powerful and best method in short simple but smart method for analysis. It is widely used in many fields. In application and development of new process and product in quality control.

The salient feature of method are:

- A simple, smart and efficient method optimise process to improve the performance and productivity or reducer cost.
- It gives best parameters for the optimal condition with least number of analytical invention.
- Therefore Taguchi method has great potential in area of low cost experiments.

# Optimization Of Turning Parameters Using Taguchi Method

**Patrick Vollmar**



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