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A Review Report for Quality Improvement in C55 Housing Component by Using Taguchi Method

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Abstract: Machining processes are important due to increased consumer demands for quality metal cutting related products reduce quality defects that have driven the machining. To improve the production facilities, research has been done on to analyze the defects and turning parameters. Many turning parameters in DNC turning are studied to get better results and quality improvement. A survey about DNC turning is carried out as review report in this paper.

I. INTRODUCTION

Direct numerical control (DNC), also known as distributed numerical control (also DNC), is a common manufacturing term for networking CNC machine tools. On some CNC machine controllers, the available memory is too small to contain the machining program (for example machining complex surfaces), so in this case the program is stored in a separate computer and sent *directly* to the machine, one block at a time. If the computer is connected to a number of machines it can *distribute* programs to different machines as required. Usually, the manufacturer of the control provides suitable DNC software. However, if this provision is not possible, some software companies provide DNC applications that fulfill the purpose. DNC networking or DNC communication is always required when CAM programs are to run on some CNC machine control. The PC explosion in the late 1980s and early 1990s signalled the end of the road for proprietary DNC terminals. With some exceptions, CNC manufacturers began migrating to PC-based controls running DOS, Windows or OS/2 which could be linked in to existing networks using standard protocols. Customers began migrating away from expensive minicomputer and workstation based CAD/CAM toward more cost-effective PC-based solutions. Users began to demand more from their DNC systems than secure upload/download and editing. PC-based systems which could accomplish these tasks based on standard networks began to be available at minimal or no cost. In some cases, users no longer needed a DNC "expert" to implement shop floor networking, and could do it themselves. However, the task can still be a challenge based on the CNC Control wiring requirements, parameters and NC program format. To remain competitive, therefore, DNC companies moved their offerings upmarket into DNC Networking, Shop Floor Control or SFC, Manufacturing Execution Systems or MES. These terms encompass concepts such as real-time Machine Monitoring, Graphics, Tool Management, Traveler Management and Scheduling. Instead of merely acting as a repository for programs, DNC systems aim to give operators at the machine an integrated view of all the information (both textual and graphical) they require in order to carry out a manufacturing operation, and give management timely information as to the progress of each step. DNC systems are frequently directly integrated with corporate CAD/CAM, ERP and Computer-aided Process Planning CAPP systems.

II. HISTORY OF SURVEY

Some literature survey about cnc turning has been made for a period.From that study the following observations are made.

Mihir T. Patel , Vivek A. Deshpande during 2014 have given cnc turning process can be done for Alloy steel. The investigation is based on the surface finish, highproduction rate and increase the product life of the material. The typical controllable machining parameters for the DNC lathe machines are speed, feed, depth of cut, tool geometry, cutting environment, tool material, work material, etc. which affect desired output like material removal rate, surface roughness, power consumption, tool wear, vibration etc. one of the technique widely used for optimization of machining parameters is Taguchi and ANOVA approach help to determine which parameters are most significant.

Quazi T Z, Pratik More, Vipul sonawane had done Study of Taguchi Method in the Optimization of Turning Parameters during 2013. The settings of turning parameters were determined by using Taguchi's experimental design method. Orthogonal arrays of Taguchi, the signal-to-noise (S/N) ratio, the analysis of variance (ANOVA) are employed to find the optimal levels and to analyze the effect of the turning parameters.

During 2012, Brij Bhushan Tyagi, Mohd.Parvez,Rupeshchalisgaonkar,Nitin Sharma had done DNC. Experiments were performed under different machining conditions of boring, facing, turning . The output responses were optimized using signal-to-noise (S/N) ratio in addition to Taguchi's parametric design approach. Analysis of variance(ANOVA) was employed to identify the level of importance of the machining parameters on theperformance characteristics.

During 2011 S.Thamizhmanii and S.Hasan had characterized Turning Process. Machinability of materials depends on surface roughness, tool wear, and work material.In this research turning is takes place for DNC is used to turn the work materials**.**

M. Kaladhar, K. Venkata Subbaiah, Ch. Srinivasa Rao and K. Narayana Rao during 2010 had optimization of machining parameters in turning of DNC.During the experiment, process parameters such as turning,boring are used to explore their effect on the surface roughness (R_a) of the work piece. The experiments have been conducted using full factorial design in the Design of Experiments (DOE) on Direct Numerical Controlled (DNC) lathe. Further, the analysis of variance (ANOVA) was used to analyze the influence of machining parameters.

Surface roughness has become the most significant technical requirement and it is an index of product quality. In order to improve the tribological properties, fatigue strength, corrosion resistance and aesthetic appeal of the product, a reasonably good surface finish is desired. Nowadays, manufacturing industries specially concerned to dimensional accuracy and surface finish. In order to obtain optimal cutting parameters, manufacturing to obtain optimal cutting parameters, manufacturing industries have depended on the use of handbook based information which leads to decrease in productivity due to sub-optimal use of machining capability this causes high manufacturing cost and low product quality.

During 2012, the study has been aimed to search an appropriate process environment for simultaneousoptimization of quality-productivity favorably. Various surface roughness parameters (of themachined product) have been considered as product quality characteristics whereas material removalrate (MRR) has been treated as productivity measure for the said machining process. In this study, three controllable process parameters, cutting

speed, feed, and depth of cut, have been considered for optimizing material removal rate (MRR) of theprocess and multiple surface roughness features for the machined product, based on L9 orthogonal arrayexperimental design. To avoid assumptions, limitation, uncertainty and imprecision in application of existing multi-response optimization techniques documented in literature, a fuzzy inference system (FIS) has been proposed to convert such a multi-objective optimization problem into an equivalent singleobjective optimization situation by adapting FIS. A multi-performance characteristic index (MPCI) hasbeen defined based on the FIS output. MPCI has been optimized finally using Taguchi method.

III. METHODOLOGY USED

Taguchi Methods is a system of cost-driven quality engineering that emphasizes the effective application of engineering strategies rather than advanced statistical techniques. It includes both upstream and shop-floor quality engineering. Upstream methods efficiently use small-scale experiments to reduce variability and find cost-effective, robust designs for large-scale production and the marketplace. Shop-floor techniques provide cost-based, real-time methods for monitoring and maintaining quality in production.

Taguchi Methods allow a company to rapidly and accurately acquire technical information to design and produce low-cost, highly reliable products and processes. Its most advanced applications allow engineers to develop flexible technology for the design and production of families of high quality products, greatly reducing research, development, and delivery time.

In general, the farther upstream a quality method is applied, the greater leverage it produces on the improvement, and the more it reduces the cost and time. Most typical applications of Taguchi Methods thus far have centered around two main areas:

Improving an existing product

Improving a process for a specific product

Tremendous additional benefits can be derived from improving the robustness of generic technology (in R&D) so that it is applicable to a family of present and future products and processes. This application, called Robust Technology Development is currently being practiced by only a few leading companies worldwide. Farther downstream, Taguchi's methods for what he terms "on-line" quality control (Manufacturing Process Control) can achieve a more cost-effective process control.

Taguchi Methods require a new way of thinking about product development. These methods differ from others in that the methods for dealing with quality problems center on the design stage of product development, and express quality and cost improvement in monetary terms.

The key to competitive leadership is the timely introduction of high quality products at the right price. Achieving maximum efficiency and effectiveness in the research and development process is critical to this effort.

The DOE with Taguchi approach is divided into three main phase, which encompass all experimentation approaches and they are

Planning Phase
Conducting Phase
Analysis Phase

The planning phase is the most important phase for experiment to provide the expected information. Sometimes the information from the experiment is in positive or negative sense. Positive information is an indication of which factor and which level lead to improve or process performance. Negative information is an indication of which factor don't lead to improvement. In the planning phase the factors and levels are selected, therefore the planning phase is the most important phase of the experiment. Also, the correct selection of factors and levels is non-statistical in nature and is dependent upon product and process expertise.
The second and most important phase is the conducting phase, when test results are actually collected. If experiments are well planned and conducted, the analysis is actually much easier and more likely to positive information about factor and level.
The analysis phase is when the positive or negative information concerning the selected factors and levels is generated based on the previous two phase.

IV. EXPERIMENTAL PROCEDURE

A. Planning Phase

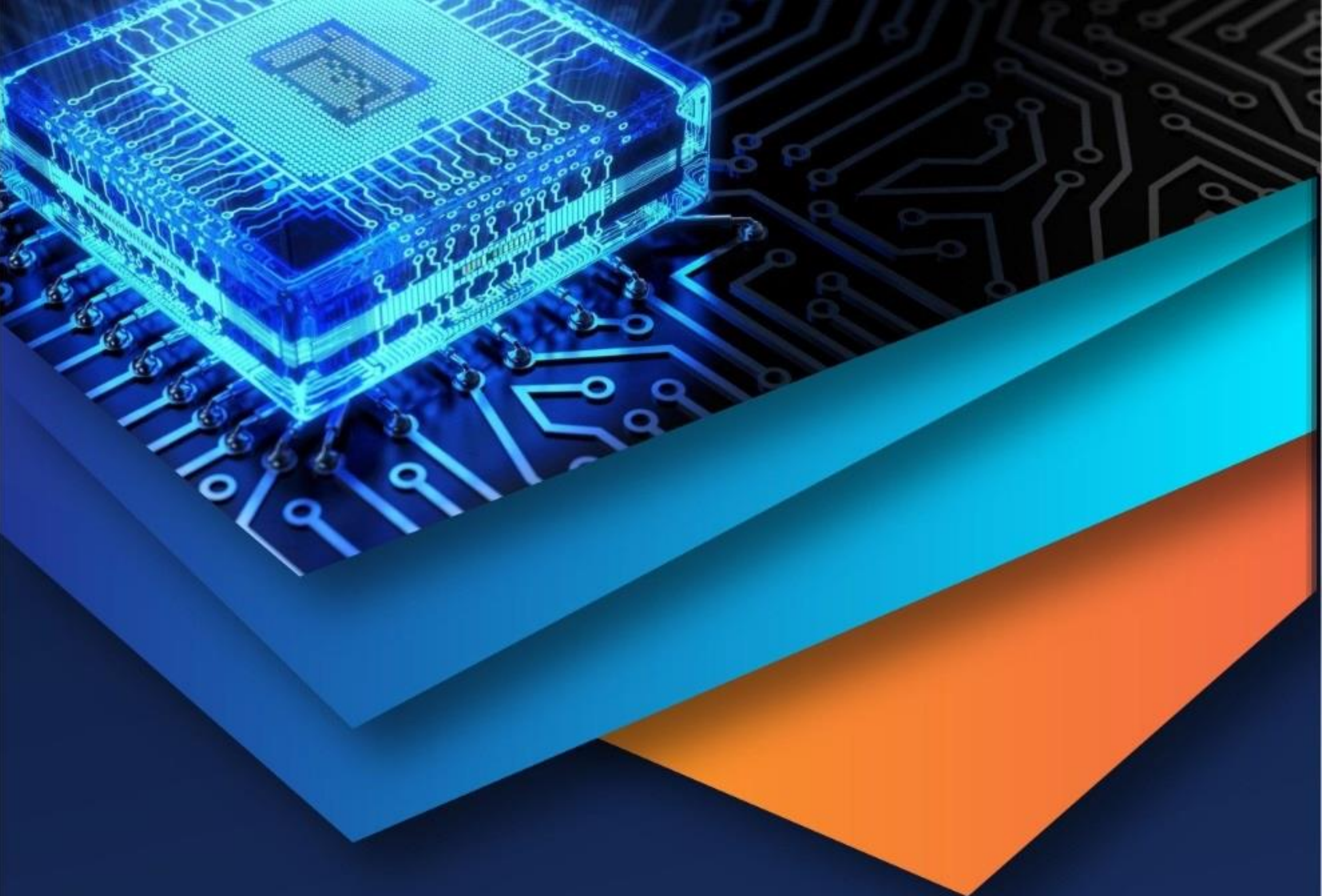
1) State the problem
2) State the objective of the experiment.
3) Select the quality characteristics and measurement systems.
4) Select the factors that influence the selected quality characteristics.
5) Select the levels for the factors.
6) Select the appropriate orthogonal array (OA).
7) Assign the factors to orthogonal array (OA).

V. CONCLUSION

Hence, it is concluded from the review report that the study of various material's and its cutting parameters during DNC turning. Therefore, in the existing work it is observed the machining parameters like turning,facing,boring, grooving are good compare to other machining process . An attempt has been made to analyze the cutting parameters of various materials using DNC turning.

REFERENCES

[1]. Mihir T. Patel , Vivek A. Deshpande Optimization of Machining Parameters for Turning Using DNC -Review, 2014; Vol. 3, Issue 2.
[2] .Quazi T Z , Pratik More , Vipul sonawane , A Case Study of Taguchi Method in the Optimization of Turning Parameters, 2013; Volume 3, Issue 2.
[3]. Brij Bhushan Tyagi, Mohd.Parvez, Rupesh Chalisgaonkar, Nitin Sharma Optimization Of machining Parameters of DNC, 2012; p. 317-327.
[4]. S.Thamizhmanii and S.Hasan, Mach inability by using DNC in Turning Process, 2011; Vol IWCE 2011.
[5]. Kumar Abhishek, Saurav Datta and Siba Sankar Mahapatra Goutam Mandal Gautam Majumdar Taguchi approach followed by fuzzy linguistic reasoning for quality- productivity optimization in machining operation p.no:929



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