A Review on Milling machine Process Parameters on Aluminium 6061

Vikrant Mahajan[1]

[1] Assistant Professor, Mechanical Department, Swarrnim Institute of Technology, Gujarat, India

ABSTRACT

Manufacturing industries try to make excellent products at a low price to survive in the competitive market. Milling is many of the most common machining processes used to make planar surfaces with a good amount of material removal rate. The vital objective of the technology of steel reducing is the solution of realistic issues associated with the green and particular removal of metal from the work piece. It has been diagnosed that the dependable quantitative predictions of the numerous technological overall performance measures, preferably in the form of equations, are critical to broadening optimization techniques for deciding on slicing situations in procedure making plans. In this experiments were conducted to improve the floor end pleasant of aluminium alloy 6061 work pieces by way of the use of carbide insert cutter, by using Taguchi's approach including L9 orthogonal array in Design Expert Software. A series of experiments can be accomplished through various the milling parameters spindle speed, feed and depth of cut. The spindle speeds are 800 rpm, 1000 rpm and 1200 rpm. The feed charges are 150 mm/min, 200 mm/min and 250 mm/min. Depth of cut is 0.5 mm, 1.0 mm and 1.5 mm. Taguchi method is used to observe the impact of process parameters and establish correlation some of the reducing speed, feed and depth of reducing with recognize to the primary machine ability component, surface end. Validations of the modelled equations are proved to be well within the settlement with the experimental statistics.

Keyword: - *Milling, Material Removal Rate, Aluminum 6061, Spindle Speed, Feed, Depth of Cut*

1. INTRODUCTION

Milling system is one amongst the vital machining operations. During this operation the paintings piece is feed opposition to a rotating cylindrical tool. The rotating device includes over one slicing edges (multipoint slicing device). Ordinarily axis of rotation of feed given to the work piece edge operation is distinguished from alternative machining operations on the premise of orientation between the device axis and therefore the feed route; but, in alternative operations like drilling, milling, so forth. The tool is fed within the trail parallel to axis of rotation. The reducing tool used in edge operation is understood as edge cutter that consists of over one edge referred to as teeth. The system device that plays the edge operations by means that of manufacturing needed relative motion between paintings piece and power is cited as shaper. It provides the required relative motion below a lot of managed things. These things can be mentioned later during this unit as edge velocity; feed fee and intensity of cut back. Normally, the edge operation creates craft surfaces. Alternative geometries can also be created by means of edge system. Edge operation is taken into account Associate in Nursing interrupted slicing operation enamel of edge cutter enter and leave the paintings at some stage in each revolution. This interrupted cutting movement topics the tooth to a cycle of impact force and thermal surprise on every rotation. The tool material and cutter pure mathematics has to be compelled to be designed in touch the higher than aforementioned things. Relying upon the positioning of the device and paintings piece the edge operation could also be classified into different types.

Fig -1: Vertical Milling Machine

2. LITERATURE REVIEW

Anil Choubey optimized "Optimization of gadget parameters of CNC Milling device for moderate metal using Taguchi layout and Single to Noise ratio Analysis" [1].

Balinder Singh minimized "Optimization of Input Process Parameters in CNC Milling Machine of EN24 Steel" [2].

N. Gopikrishna and M. Shiva Chander determined the surface roughness in the paper "Determining the Influence of Cutting Fluid on Surface Roughness during Machining of EN24 and EN8 steel by using CNC Milling Machine" [3].

G., Krishna studied and investigated "Selection of Optimum Process Parameters in High Speed CNC End-Milling of Composite Materials Using Meta Heuristic Techniques – a Comparative Study Pare" [4].

B. Satish Kumar and N. Gopikrishna made an investigation in "optimization of turning process parameters, on EN 9 carbon steel using grey relational analysis" [5].

G. Petropoulos, I. Ntziantzias, C. Anghel, made observations in "A predictive model of slicing forces in milling the usage of Taguchi & response floor strategies" [6].

C. Tsao, in his paper, "Grey–Taguchi technique to optimize the milling parameters of aluminum alloy", studied parameters [7].

3. METHODOLOGY

3.1 Taguchi Method

Taguchi methodology is evolved via Dr Genichi Taguchi, a Japanese superior management representative. the tactic explores the concept of the quadratic exceptional loss perform and uses a applied mathematics degree of overall performance named as quantitative relation signal/noise ratio or (S/N) ratio. The S/N magnitude relation takes each the implies and also the variability under consideration. The S/N magnitude relation is that the magnitude relation of the imply (Signal) to the standard deviation (Noise). The magnitude relation depends on the high-quality characteristics of the product/technique to be optimized. the final S/N ratios commonly used square measure as follows: - Nominal is Best (NB), Lower the higher (LB) and better the higher (HB).In this assignment, the experiments square measure designed with the assist of Taguchi L9 orthogonal array. The software package program used for DOE (Design of test) is Minitab18. The mission incorporates several procedures that square measure delineates one once the opposite inside the methodology severally.

Input parameters and their levels:

Selected input Parameters

Table 1: Process Parameters

Process Parameter	Level 1	Level 2	Level 3
Cutting Speed (rpm)	800	1000	1200
Feed Rate (mm/ rev.)	150	200	250
Depth of Cut (mm)	0.5	1.0	1.5

CUTTING TOOL MATERIAL – Carbide Insert Cutter Tool

WORK PIECE MATERIAL – Aluminium 6061

4. REFERENCES

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[3]. Determining the Influence of Cutting Fluid on Surface Roughness during Machining of EN24 and EN8 steel by using CNC Milling Machine by N. Gopikrishna and M. ShivaChander.

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[6]. A predictive model of slicing forces in milling the usage of Taguchi & response floor strategies by G. Petropoulos, I. Ntziantzias, C. Anghel.

[7]. Grey–Taguchi technique to optimize the milling parameters of aluminum alloy by C. Tsao.