iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** V **Month of publication:** May 2024

DOI: https://doi.org/10.22214/ijraset.2024.62711

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue V May 2024- Available at www.ijraset.com

The Study on Optimization of Cutting Parameters to Enhance Surface Finish

Koshti Pramod[1], Vinayak Mangalekar[2], Mahesh Korde[3], Sandesh Chakranarayan[4], Prof. M. A. Mane[5]
[1, 2, 3, 4]*UG Students, Department of Mechanical Engineering, Suman Ramesh Tulsiani Technical Campus - Faculty of Engineering, Kamshet, Pune, Maharashtra*
[5]*Project Guide, Department of ME, Suman Ramesh Tulsiani Technical Campus - Faculty of Engineering, Kamshet, Pune, Maharashtra*

Abstract: ***The Objective of this project work is to Productivity and Surface finish improvement in CNC Die and Punch machining through optimization in cutting parameters. This technical paper studies the different machining parameters i.e. DOC, cutting feed and cutting speed by using different material cutters like cemented carbide cutters, HSS cutters, Insert types cutters. In this thesis an attempt to make use of Japanese optimization technique to optimize cutting parameters during high-speed milling of aluminum alloy using cemented carbide cutting tool.***

I. INTRODUCTION

A. Study Of Process Parameters in Machining

For any machining or metal cutting operation, three relative motions between the work piece and cutting tool are indispensably necessary for gradual removal of material from the work piece. In fact, the simultaneous action of all three relative motions causes advancement of cutting tool towards work material along the intended path generating a finished surface with intended shape, size and tolerance. These three relative motions are called Cutting, Parameters Such parameters directly affect machining performance .

II. PROBLEM STATEMENT

In Enhance Surface Finish And Productivity In CNC Die And Punch Machining Surface Finish Not Meet Requirement, We Not get The Surface Finish In Surface Finishing of Complex Shape Components ,inaccessible area geometry try and Difficult to Machine Material The process itself is very complex, The efficiency And Performance of will be improved by Taguchi Method.

III. OBJECTIVES

1) To improve Appearance .
2) To wear and Tear .
3) Increase Durability .
4) To Avaid Corrosion .

IV. FUTURE SCOPE

It Increase the range of suitability ,Specifically allowing cheaper metals to be used in place of more expensive ones . Surface Finish refers to the texture and Smoothness of the Machined parts exterior . It's a critical parameter that affects not only the appearance but also the mechanical properties and performance of the part. Controlling the Surface finish Manufacturers can enhance corrosion resistance , reduce friction improve sealing capabilities and ensure the part meet the required specification for its intended application

V. LITERATURE SURVEY

The Objective of this project work is to Productivity and Surface finish improvement in CNC Die and Punch machining through optimization in cutting parameters. International journal of scientific research- "Optimization of Milling Process Parameters using Taguchi Parameter Design Approach." This technical paper studies the different machining parameters i.e. DOC, cutting feed and cutting speed by using different material cutters like cemented carbide cutters, HSS cutters, Insert types cutters. International journal of innovative research in science, engineering and technology- "Optimization of Milling Process Parameters of HSS using Taguchi Parameter Design Approach".

©IJRASET: All Rights are Reserved

In this thesis an attempt to make use of Taguchi optimization technique to optimize cutting parameters during high-speed milling of aluminum alloy using cemented carbide cutting tool. The cutting parameters are cutting speed, feed rate and depth of cut for milling of work piece aluminum alloy. In this work, the optimal parameters of cutting speed are 2000rpm, 3000rpm and 3500rpm, feed rate are 200mm/min, 300mm/min and 400mm/min and depth of cut are 0.2mm, 0.3mm and 0.4mm. Experiment is conducted by considering the below parameters. Cutting forces, surface finish and cutting temp. are validated experimentally. welding process.

VI. CONCLUSIONS

For 25 Mm Dsiameter Cutter

1) For smaller die-punch machining of the size 300×150×60 or less, the optimum parameters for getting N6 surface finish is 0.3 mm step-over with a feed-rate of 1800 mm/min. This will result in better surface finish and decrease in average surface roughness by 0.108µm. This will result in saving in production time by 16.71%.

2) For bigger die-punch machining of the size 500×300×80 or more with large overhang (l/d ratio), the optimum parameters for getting N7 surface finish is 0.4 mm step-over with a feed-rate of 1500 mm/min. optimized parameters will result in saving of 24.96% of production time. This will result in increase in average surface roughness by 0.21µm which is almost negligible compared to substantial increase in production time.

VII. ACKNOWLEDGEMENT

Inspiration and motivation in presentationhave always played a key role in the success of acompany. We express our sincere thanks to our BE Project Guide Prof. M.A. Mane for his encouragement and support throughout our project, especially for the useful suggestions Wewould like to thank Dr. J. B. Satpute, Head of Mechanical Engineering Department for hisunwavering support during the entire course of this final year project work.

REFERENCES

[1] Mr. Gopalkrishna Nidigonda, Mr. G. Ramya, Mr.B. Satish Kumar “Optimization of Milling Process Parameters using Taguchi Parameter Design Approach”, International journal of scientific research.

[2] Dr. Ch. S. Naga Prasad “Optimization of Milling Process Parameters of HSS using Taguchi Parameter Design Approach”, International journal of innovative research in science, engineering and technology.

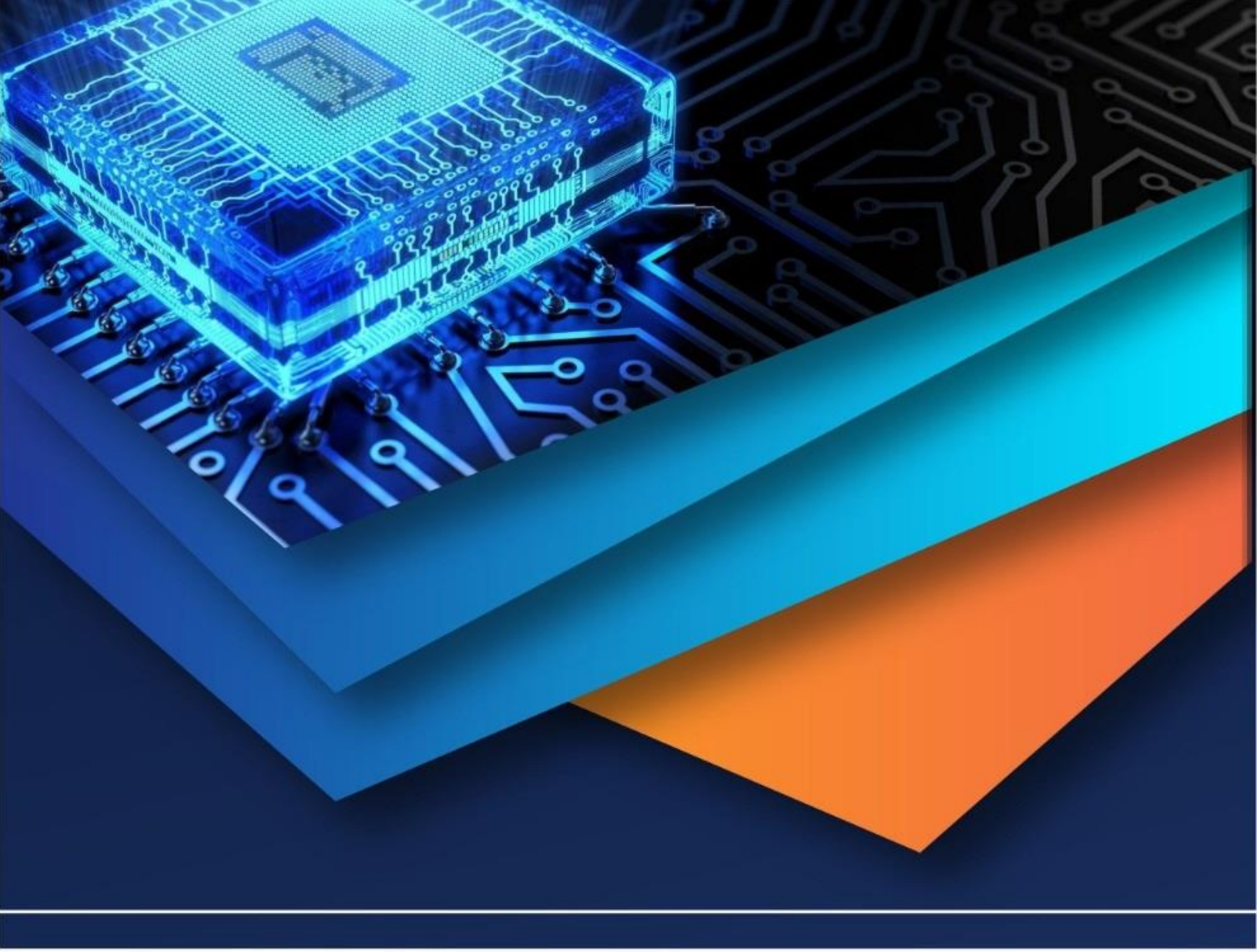
[3] Mr. Yubin Lee, Mr. Alin Resiga, Mr.Sung Yi, Mr. Chein Wern “The Optimization of Machining Parameters for Milling Operations by using the Nelder - Mead Simplex Method.” Journal of manufacturing and material Processing.

[4] Pankaj Chandna, Dinesh Kumar, “Optimization of End Milling Process Parameters for Minimization of Surface Roughness of AISI D2 Steel”, World Academy of Science, Engineering and Technology, International Journal of Mechanical, Aerospace, Industrial and Mechatronics Engineering

Book References

[1] Mr. Gopalkrishna Nidigonda, Mr. G. Ramya , Mr .B. Satish Kumar “Optimization of Milling Process Parameters using Taguchi Parameter Design Approach”, International journal of scientific research.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)