

Design and Analysis of Peep Removing Machine

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Abstract— these days CNC machines are found in almost all industries. It comprises of the computer in which the program is fed as per the requirements for cutting of the work piece. It is broadly used for lathe, drill press, milling machine, grinding unit, sheet-metal, press working machine, laser, tube bending machine etc. This project is based on the requirement of Precision Turn component. The company faces a problem as the tip remained at the center of the fastener during parting operation on CNC lathe machine. This tip is removed separately on the grinding wheel which was time consuming. The scope of this project is limited to design and analysis of tip removing machine. In which number of work piece are mounted against the grinding wheel to remove the tip.

Key words: CNC Lathe, Parting

I. INTRODUCTION

Parting uses a blade-like cutting tool plunged directly into the work piece to cut off the work piece at a specific length. It is normally used to remove the finished end of a work piece from the bar stock that is clamped in the chuck. Other uses include things such as cutting the head off a bolt. Parting cuts should be made at low speed; say 200-300 RPM or even slower.

With the tip of the tool just beyond the surface of the work piece, turn on the lathe. Slowly advance the cross-slide crank until the tool starts cutting into the metal. Keep advancing the tool until you get a steady chip curling off the work piece and then try to maintain this cutting speed.

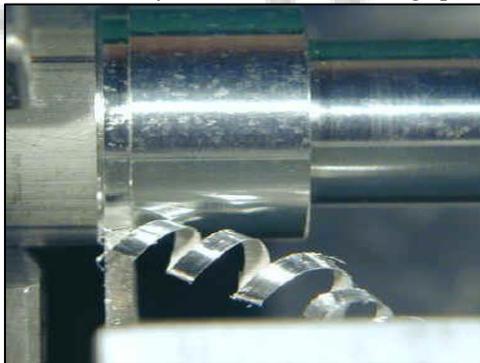


Fig. 1: Parting Operation

II. LITERATURE REVIEW

A. Jahnvi Madireddy

The lathe, probably one of the earliest machine tools, is one of the most versatile and widely used machine tool, so also known as mother machine tool. An engine lathe is the most basic and simplest form of the lathe. It is called so because in early lathes, power was obtained from engines. The job to be machined is held and rotated in a lathe chuck; a cutting tool is advanced which is stationary against the rotating job. Since the cutting tool material is harder than the work piece, so metal is easily removed from the job. Some of the common

operations performed on a lathe are facing, turning, drilling, threading, knurling, and boring etc. [1]

B. Richard A. Maker

The milling machine lathe attachment is attachable to an existing milling machine so as to eliminate the need for an operator owning both a milling machine and a lathe. It is designed to be mounted to the side of the milling machine and to be used without disturbing a setup in the associated vise. The attachment is also designed to be mounted to the front of a milling machine and allows the programming of the very point of single point tool contact so as to follow whatever contour or steps are desired. This type of cutting is not possible on a lathe with guaranteed accuracy, while on a milling machine it is quite feasible. Since the lathe is the most oldest form of machine that a man has ever known .it is the most basic of all machine and almost all the operations can be done on a Lathe machine hence it is often called as “mother of machines”. But there are certain operations which cannot be done on lathe machine particularly those operations which can be done only parallel to spindle axis like those of Grinding, and few those which consist of perpendicular to spindle axis like those of Drilling or milling. [2]

C. K. Adarsh Kumar, Ch.Ratnam, BSN Murthy, B.Satish Be4, K. Raghu Ram Mohan Reddy

Surface roughness has received serious attention for many years. It has formulated an important design feature in many situations such as parts subject to fatigue loads, precision fits, fastener holes, and aesthetic requirements. In addition to tolerances, surface roughness imposes one of the most critical constraints for the selection of machines and cutting parameters in process planning. Surface finish is the method of measuring the quality of a product and is an important parameter in machining process. It is one of the prime requirements of customers for machined parts. Productivity is also necessary to fulfill the customers demand. For this purpose quality of a product and productivity should be high. In addition to the surface finish quality is also an important characteristic in turning operation and high MRR is always desirable. Even in the occurrence of chatter or vibrations of the machine tool, defects in the structure of the work material, wear of tool, or irregularities of chip formation contribute to the surface damage in practice during machining [3]

D. Akash Tiwari/ Niral Panchal

In today's world everyone wants to earn good money and raise their standard of living, people who have good degrees generally succeed in doing this. But there is also one class of people who want to work independently as an 'Entrepreneur'. These people mostly comes from lower or middle strata of society which face major problem of financing their project as they have limited budget and cannot afford more than one or two machine at initial level. Also, any product be it finished or semi-finished consists of one or more machining

operations. And all processes cannot be done on same machine. So we came up with idea of designing and fabricating a multipurpose tool post for a lathe machine. We selected lathe machine cause it is most basic and versatile of all the machine and this is the only reason they call it 'Mother of all Machine', so we have tried to do operations which were perpendicular to Spindle axis like Grinding, Drilling, Milling in our project. The convention lathe machine only carry out the limited operation that's include, Turning(reducing diameter), Facing(reducing length), Tapering(making a conical shape), Knurling (making a diamond shaped pattern for easy grip), Grooving (making a symmetrical indentation), Parting (removing a section), Eccentric turning (turning about a point other than axis), Chamfering (creating a radially symmetrical chamfer) other than that Drilling ,reaming, can also be done only parallel to spindle axis (Operations which are perpendicular to spindle axis cannot be carried out.).Conventional lathe machine involves carrying of work piece to different machines to machine them which increases setting up time and cost. It would be very dreadful for the people who are running micro industry, because they cannot afford to have all machines at their door step.[4]

Wen Jun Deng, Zi Chun Xie, Ping Lin, and Tong Kui Xu: Burrs are one of the most serious obstacles to precision manufacturing and manufacturing process automation. Burrs are formed in various machining process as a result of plastic deformation due to plasticity during mechanical manufacturing process and have been defined as undesirable projections of material beyond the edge of a workpiece. Recently, the trends of machined parts move towards more miniaturization and precision, burrs cause many problems during inspection, assembly, and manufacturing automation of precision components. Burrs have to be removed by a deburring process for functional and aesthetic reasons after the part is machined. However, deburring processes are usually not very precise and may decrease the precision of the machined parts, damage surface finish, and produce residual stresses in the component. Moreover, adding a deburring process means extra cost, extra manufacturing time, and an extra machining station. Gillespie [1] found that on precision components, deburring operations can account for as much as 30% of the total part cost. Since burr generation in cutting cannot be avoided completely, it is very important to find a solution for minimizing the burr formation or more effective deburring method.[5]

III. PROBLEM STATEMENT

- During parting operation of fastener on CNC lathe machine at precision turn component, there was a tip remained behind at the center of the fastener.
- Hence they have to remove this tip separately on the grinding wheel manually which was time consuming.
- Also they faced the poor product quality problems due to manual grinding which leads to mass rejection.
- To overcome such serious problem, they wanted to design a machine which will clear the tip remained after parting operation.

IV. PLAN OF WORK

This project is limited to tip removing machine (CNC Lathe) attachment design and analysis using FEA. The project will

involve building the CAD models of special purpose fixture (CNC Lathe) and performing FEA analysis for optimum design for Precision Turn. comp Pvt. Ltd. Hingna, Nagpur.

- Data accumulation
- Loads Calculation for parting off operation.
- Design Calculation for structure of machine.
- CAD modelling of the concept peep removing machine.
- Analysis of design in FEA
- Modification of the design
- Analysis of modified design in FEA
- Result discussion
- Design finalization

V. CONCLUSIONS

This solution will terminate manual grinding of individual fasteners, thus it save lots of time, additional manpower to complete this simple task and also product quality will be improve.

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