**International Journal of Emerging Technology in Computer Science & Electronics (IJETCSE) ISSN: 0976-1353 Volume 25 Issue 5 – APRIL 2018 (SPECIAL ISSUE).**

# DESIGN AND FABRICATION OF MULTIPLE OPERATION OF DRILLING GRINDING BROACHING

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***Abstract*- In this, we fabricate hybrid multiple machining used for different applications. In this project we are using DC motor, belt and pulley to operate the machine and any multiple type various machining process variable operation can be done. We have developed a conceptual model of a machine which would be capable of performing different operation simultaneously, and it should be economically efficient. Objective of this model are conservation of electricity (power supply), reduction in cost associated with power usage, increase in productivity, reduced floor space.**

## I. INTRODUCTION

In this project we are fabricate the hybrid multiple machining using for different application. These projects we are using motor and belt and pulley to operate the machine are any multiple type various machining process variable operation. Some needs of automation are described below.

### *1.1 Need for Automation*

Automation can be achieved through computers, hydraulics, pneumatics, robotics, etc., of these sources, pneumatics form an attractive medium for low cost automation. The main advantages of all pneumatic systems are economy and simplicity. Automation plays an important role in mass production. Nowadays almost all the manufacturing process is being atomized in order to deliver the products at a faster rate. The manufacturing operation is being atomized for the following reasons.

- To reduce man power
- To reduce the work load
- To reduce the production time
- To reduce the fatigue of workers

A drill is a tool fitted with a cutting tool attachment or driving tool attachment, usually a drill bit or driver bit, used for drilling holes in various materials or fastening various materials together with the use of fasteners. The attachment is gripped by a chuck at one end of the drill and rotated while pressed against the target material. The tip and sometimes edges, of the cutting tool does the work of cutting into the target material. This may be slicing off thin shavings (twist drills or auger bits), grinding off small particles (oil drilling), crushing and removing pieces of the work piece (SDS masonry drill), countersinking, counter boring, or other operations.

Shearing, also known as die cutting, is a process which cuts stock without the formation of chips or the use of burning or melting. Strictly speaking, if the cutting blades are straight the process is called shearing; if the cutting blades are curved then they are shearing-type operations. The most commonly sheared materials are in the form of sheet metal or plates; however rods can also be sheared. Shearing-type operations include: blanking, piercing, roll slitting, and trimming. It is used in metalworking and also with paper and plastics.

A cam is a rotating or sliding piece in a mechanical linkage used especially in transforming rotary motion into linear motion or vice-versa. It is often a part of a rotating wheel (e.g. an eccentric wheel) or shaft (e.g. a cylinder with an irregular shape) that strikes a lever at one or more points on its circular path. The cam can be a simple tooth, as is used to deliver pulses of power to a steam hammer, for example, or an eccentric disc or other shape that produces a smooth reciprocating (back and forth) motion in the follower, which is a lever making contact with the cam.

The cam can be seen as a device that rotates from circular to reciprocating (or sometimes oscillating) motion. A common example is the camshaft of an automobile, which takes the rotary motion of the engine and translates it into the reciprocating motion necessary to operate the intake and exhaust valves of the cylinders.

## II. LITERATURE REVIEW

### *2.1 Broaching*

Research done at Ohio University, Chad Richards, A former student of the Industrial and Systems Engineering, department at Ohio University, developed a knowledge based system that designs the round hole broaches. The codification of the knowledge base system was done using procedural based programming. Most of the broaching tools have procedure based

### *2.2 Grinding*

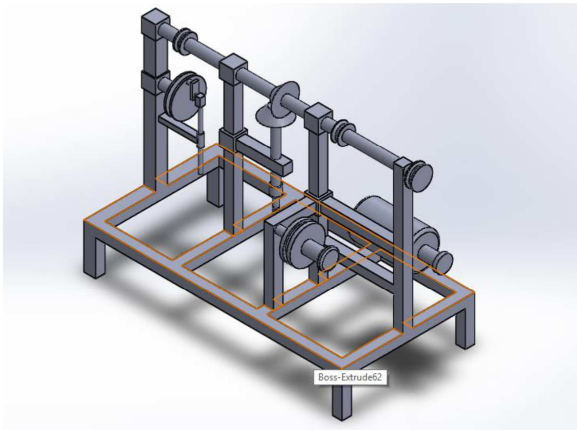
Faculty of materials science and technology in Trnava, Slovak university of Technology in Bratislava Process center less recess grinding Andrej malik, Augustin Gorog, The article deals with special center less grinding using various methods, particularly the center less grinding recess methods. The results of measuring the surface roughness of frontal and cylindrical areas of a work piece, as well as the roundness of the cylindrical surface of the work piece are presented in the paper. Qualitative parameters of the machined surfaces are supplemented by the course of the grinding process. The change in the shape of the work piece in the process of grinding causes also the change of position of the work piece in the work zone.

### *2.3 Drilling*

This paper published as: Zhang, P.F., Churi, N.J., Pei, Z.J., and Treadwell C., 2008, "Mechanical drilling processes for titanium alloys: a literature review," Machining Science and Technology, Vol. 12, No. 4, pp. 417-444. Titanium and its alloys (Ti) are attractive for many applications due to their superior properties. However, they are regarded as hard to machine materials. Drilling is an important machining process since it is involved in nearly all Ti applications. It is desirable to develop cost effective drilling processes for Ti and/or improve the cost effectiveness of currently available processes. Such development and improvement will be benefited by a comprehensive literature review of drilling processes for Ti. This paper presents a literature review on mechanical drilling processes for Ti, namely, twist drilling, vibration assisted twist drilling, ultrasonic machining, and rotary ultrasonic machining. It discusses cutting force, cutting temperature, tool wear and tool life, hole quality (diameter and cylindricity, surface roughness, and burr), and chip type when drilling of Ti using these processes.

## III. WORKING PRINCIPLE

The motor shaft is connected to belt and pulley arrangement with help of bearing arrangements. The pulley shaft is connected directly to grinding wheel where the grinding operation can be carried out. The same motor shaft is connected to drilling tool with help of belt and pulley and bearing, where drilling operation can be carried out. The motor pulley shaft is connected to a cam arrangement on the other side. Cam arrangement converts rotary motion into reciprocating motion and the reciprocating motion is used for the broaching operation. A dynamo is attached to the rotating shaft hence when the shaft rotates the dynamo shaft also rotates and generates power which is stored on the battery.




## IV. CALCULATION

Power -0.375kw

speedN1 -1420rpm

dia D1 -32mm

dia d2-130mm

Selection of speed;

$N2/N1=D1/D2$

$N2=32/130\times1420$

N2=350rpm

Selection of belt section

Power =0.375kw

Selection of centre distance

C=350mm

Determination of normal pitch length

$L=2c+\pi/2(D+d)+(D+d)^2/4c$

$L=2\times350+\pi/2(130+32)+(130-32)^2/4\times350$

L=961.32MM

B-section L=1008mm

Selection of various modification factors

a)Length of correction factors

Fc =0.83

b)service factor

Fc=1.1

Correction factor of arc of contact

Arc of contact angle =180-60((D-d)/C)

=180-60(130-32)/350

Ø =163.2

V-flat

Fd=0.942

D/d=130/32

=4.0625

Fd=1.14

De=32×1.14

De=36.5

$Kw=(0.79(2.379)^{-0.09}-50.8/36.5-1.32\times10^{-4}\times(2.379)^2)2.37$

Kw=1.574

Number of belts

No.of.belts=P×Fa/(kw×Fc×Fd)

=0.375×1.1/(1.574×0.83×0.942)

=2.5belts

No.of.belts=3belts

Calculation of actual centre distance

$C=A+(A^2-B)^{1/2}$

$C=188.38+((188.3)^2-(1200.5))^{1/2}$

C=373.54mm

**DIMENSIONS FOR GEAR AND PINION**

Diametral Pitch D= 29.38mm

Number of Teeth T=18

Whole Depth Ht=0.0764mm

Addendum a= 0.03404mm

Dedendum b=0.04244mm

Clearance c=0.00840mm

Circular Tooth Thickness T=0.05346mm

Pitch Angle Lp =$45^0$

Pitch Cone Radius Rcp=$0.43322^0$ ,

Face Width F=0.14441mm

Outside Diameter Dop=0.66080mm

Back Cone Radius Rbp=0.4332mm

Virtual Number of Teeth Vp=25

## V. MERITS

Easy to Implement
Low cost
Low maintenance
Easy to operate
Reduces time and increases production rate

DEMERITS

Uneven forces acts on the wok piece
Only small components can be machined

## VI. CONCLUSION

This project is made with pre planning, that it provides flexibility in operation. This innovation has made the more desirable and economical.

The project “HYBRID MULTIPLE MACHINING” is designed with the hope that it is very much economical and help full to transmit power.

This project helped us to know the periodic steps in completing a project work. Thus we have completed the project successfully.

## VII. REFERENCES

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