DIE THREADING MACHINE

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Abstract— *Now a days glasses are cutting manually or CNC automatic programming. But the manually operation is the very dangerous , because the dimension or marking will change due to wrong alignment or sense of sight and operator's error. So we require the skilled labour.*

So our project deals how to reduce the labour cost and how to increase the accuracy of the cutting. But in the automatic CNC machine the above difficulties are not induced. But the cost of CNC machine is high. So we can use the "DESIGN AND FABRICATION OF OUTER THREAD CUTTING MACHINE". It is very accurate cutting in taper angles and also the straight line, square or rectangular cutting. In future we can produce it for fully automatic and also rotary motion. Day by day, the requirement of the finished goods is increased tremendously in the market, so that to meet the requirement of goods the industry has required adopting the automation.

I. INTRODUCTION

The subject of threads and threading is a prime importance to an engineer because nearly every piece of equipment will have some form of screw thread or other on it. Most of the machine part are held together, adjusted or moved by threads of any sizes and kinds [3].

Threads are commonly used for the following purpose,

As a fasteners.

To transmit power or motion.

For adjustment.

No single threads from is equally suited for all these application. These screw threads used in manufacturing should confirm to some established in order to be inter changeable and replaceable. The standard used are British standard white worth, British standard fine, American national standard and isometric saw threads.

The proportions for B.S.W., B.S.F, and B.S.P are the same. These threads are used were small axils adjustment are necessary such as bolts for piston rods, connecting rods and other automobile works. ACME, square and buttress thread are used for power transmission such as:-

1.Screw jack

2.Lead screw of lathe

3.Vices

4.Press etc.

There are many operation of producing screw thread like thread rolling, thread cutting etc. So to avoid time loss we introduced the machining called as Die Threading Machine. ACME threads are sometimes used with split nuts, transmit power in any direction. ACME threads are used in machine tools where disengaging nut is required. Buttress threads are used to transmit power in one direction. Square threads are difficult to manufacture but their efficiency is more than other types of threads [3].

1.1 Types of Thread

1.1.1 Square Thread:

The square thread form is a common screw thread form, used in high load application such as lead screws and jackscrew. It gets its name from the square cross section of the thread. It is the lowest friction and efficient thread form, but it is difficult to fabricate. The greatest advantage of square thread is that they have much higher intrinsic efficiency than trapezoidal threads (Acme or Metric Trapezoidal). The single-point cutting tools for taps and dies used to cut the thread cannot have efficient rake and relief angle [1].

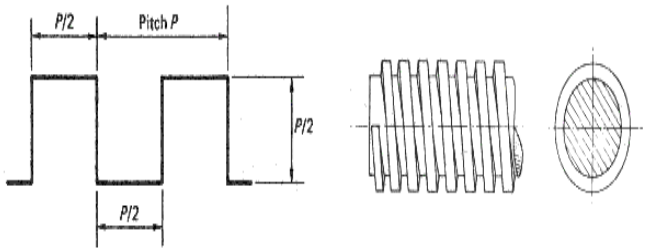

Fig: 1.1.1 Square thread

1.1.2 Acme Thread:

Acme thread is cheaper to manufacture stronger than square thread but is less efficient. It is particularly suitable for use where a split nut has to be engaged and disengaged as in the feed drive of lathe. Because of the sloping flanks of screw thread the nut can be easily engaged and disengaged [2].

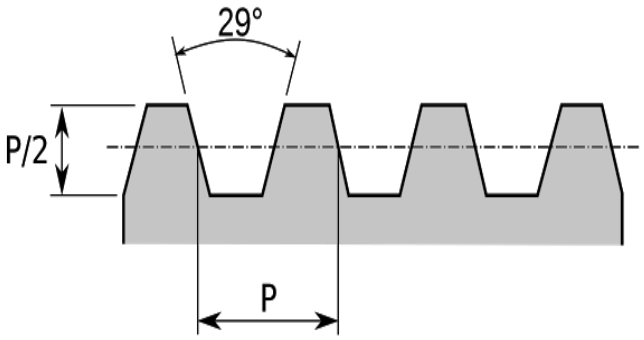

Fig: 1.1.2 Acme thread

1.1.3 Buttress Thread:

Buttress threads resist forces in one direction. The buttress thread form, also known as the breech lock thread form, refers to two different thread profiles. One is the type of lead screw and the other is a type of hydraulic sealing thread form. The lead screw type is often use in machinery and the sealing type is often use in oil fields. It has the low friction and greater power of square thread combine with the strength of V-thread [3].

Fig: 1.1.3 Buttress thread

1.1.4 Knuckle Thread:

This thread is modification of the square thread made without sharp corners. Knuckle threads are an un-usual highly rounded

II. LITERATURE REVIEW

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The modulated tool path (MTP) chip breaking process has been modified to improve chip management capabilities and to prevent large chip nest accumulations commonly encountered in threading operations. The primary difference between MTP for threading and for straight turning is that the part surface that the tool repeatedly engages and disengages, during the modulation process, is the thread root rather than the cut face. The threading MTP part program developed in this paper is capable of machining a thread with the desired lead, depth, undercut angle, and taper angle while also producing segmented chips [1].

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In this paper, the mechanistic cutting forces for thread milling of the ISO metric screw thread are predicted. The force model is composed of surface and edge force components. The cutting edge is modelled from the geometry of the milling cutter, including the helix angle and thread tooth profile. To determine the specific cutting force coefficients for surface and edge force components, the cutting forces are measured with a dynamometer along a horizontal linear path and compared with the calculated force by means of the exact uncut chip thickness which results from the modelling of chip volume per tooth at a prescribed time on the thread milling cutter.. The measured cutting forces for the brass work piece material (CuZn37) for a linear path shows quite good agreement with the simulated cutting forces. The results indicate that the proposed cutting force model for thread milling can be used in order to adapt cutting parameters, such as feed per tooth and axial depth of cut for the purpose of increasing productivity in practical application [2].

III. PROBLEMS IDENTIFICATION

By using existing threading processes, we face the following problems.

1. Time

Time required for threading is more because of size of machine is larger, due to this time for taking the work piece, put in the machine and switch ON/OFF machine is taken more time.

2. Space Requirement

It requires more space because of its size due to which earlier machine was not useful for smaller workstation

3. Finishing

It gives poor surface finish. In earlier techniques it requires two to three times the machining the work piece for good surface finish.

4. Operators Required

In other types of threading, skill operator is required.

5. Power Required

It consumes more electricity due to incompactness, for running process.

6. Lubrication Requirement

It requires more lubrication.

7. Speed

Due to high speed and choice of wrong die breakage occurs.

8. Product Finishing Factors

Finish product is not obtained as per required.

As we are using the die threading machine we are mainly focusing on the time required, surface finish, lubrication, and solve all the problems in our project while making the threading machine.

IV. OBJECTIVE

1. To reduced the time required for threading operation.

2. To facilitate the use of different size dies ranging from 5mm to 22mm so as to thread roads of different sizes.

3. In this we can thread the rods of different types of materials and also different types of diameter.

4. The operation of threads is accelerated by use of this machine and considerable time is same the machine can be used to produce threads ranging from 10mm to 18mm and it finds its application in threads rod of foundation bolt and construction sites.

V. PROJECT SETUP

1. Earlier Techniques

Fig: Earlier Die Threading Machine

In the earlier techniques we face problems like :

1. Lubrication required is more.

2. The time required for threading process is more.

3. The floor area/space required was more.

4. The power required is more.

5. Skilled Operator was required.

From the above diagram and problems regarding threading machine, we introduce the new machining techniques called as “Die Threading Machine” from which the above problems are cleared/Solved.

VI. CALCULATIONS

Calculation of gear box:

Finding speed and torque at output shaft

Speed of input shaft of gearbox = Ni

Speed of output shaft of gearbox = No

Speed of motor = 1440rpm

Diameter of driving pulley D = 2.5”

Diameter of driving pulley D1 = 1.4”,

Motor power p-2 HP = 1492 W

Speed of input shaft Ni

Ni / N = D/D1

Ni / 1440 = 2.5/14

Ni = 1440*2.5/14

ANS = Ni = 257.14 rpm

Thus i/p to gearbox is 257.14 rpm

P=2∏NT/60

T = 60 P/2∏N

Torque T= (60*1492)/2∏257.14

T=55.40 Nm

Case 1: First Gear Engaged

Gear ratio = 1:3

No = Ni/3

=257.14/3

No = 85.71 rpm

Torque = (60*1492)/(2∏*85.71)

T = 166.22 Nm

Case 2: Reverse Gear Engaged

Gear ratio = 1:4

No = Ni/4

=257.14/4

No = 64.29 rpm

Torque =(60*1492)/(2∏*64.29)

T = 221.61 Nm

Alteration in Gear box:-

A 35 mm Φ rod is welded to o/p side of gearbox main shaft. The input side of the shaft carries 14" B sections pulley & supported by a PEDASTEL (6307) & the output side of rod is threaded to a square block & supported by 6307 PEDASTEL.

Selection of bearing:-

For value of shaft diameter d = 35mm

We get the bearing No. 6307

a. Die threading machine

b. Other threading machine

We clearly said that;

a. Speed of the process.

b. Lubrication required

c. Time required.

Above graph represent time required for threading process. We conclude that the time required for threading process is less as compared to other threading process.

VII. PRECAUTIONS

Following precautions must be taken before operation or while in operation for safety purpose. Maintenance of machine rather is a way to increase life & performance of machine.

Before Starting:

a. Ensure belt is well fitted over pulley. Pulley is well tightened on shaft.

b. Electric circuit is completely safe.

c. The die with die holder is tightened with bolt.

d. Proper lubrication is provided by grease on guide ways of trolley.

f. Keep all instruments (spanners) away from rotating parts.

While in operation:-

a. Ensure adequate supply of coolant & lubricants.

b. Operation of change of gear by lever should be smoothly.

c. Avoid getting near the rotating part of machine.

VIII. LUBRICATION:

a. Timely fill up grease in clearance between pipe support and pipe.

b. Provide grease in guide ways.

c. For long life of pedestal bearing fill the cover of bearing with grease.

d. Lubricate gearbox with grease.

IX. ADVANTAGES:

1. Easy production of V threads only few setting arrangements are required.

2. Time required is less.

3. Portable machine: It can be easily carried from one place to another whenever required, as foundation is not necessary.

4. Low cost.

5. Skilled operator is not required.

6. Quite simple in design.

7. Road of any material can be thread.

XI. RESULT

a. Die threading machine

b. Other threading machine

We clearly said that;

a. Speed of the process.

b. Lubrication required

c. Time required.

Above graph represent time required for threading process. We conclude that the time required for threading process is less as compared to other threading process.

XII. CONCLUSION

Thus in this project we are using the several references, we are focusing mainly on the points such as time required, surface finish, amount of lubrication required, space required for machine etc.

From the above result and observation we come to know that;

Time: The time required is less in the die threading machining as compared to other threading machine.

XII. FUTURE SCOPE:

1. A grinding wheel may be mounted on frame of the machine for further development of machine. Grinding is required for initial chamfer of bolts.

2. With use of electronics switches, a predetermined length of threads can be cut off on work piece.

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