DIE THREADING MACHINE

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Abstract

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. Automation plays a major role in the development of the nation. In this paper the conventional threading machine is modified by reducing the manual handling time by means of automation as well as reduces the consumption of coolant oil by design of radiator.

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 Project Idea

Now a day in many industries production of threaded bars by using manual operated threading machines so it required more time and lower efficiency of machine. In order to reduce time and labor costs, we design circuit for automation in threading machine.

1.2 Automation

In today's competitive global economy, manufacturers are experiencing more pressure than ever to automate their production processes. As a result, designers of automation systems face many challenges during system development, some with far reaching consequences that may not initially be realized. The aim of this project is to evaluate these design decisions and present them in a general way which can be applied to other systems and applications. Specifically this project addresses the design of an automatic loading and unloading system for a thread rolling machine, used in producing threaded bars. The design of any Automation system should begin on the macro scale. Issues such as the system's role in the overall manufacturing process and material flow through the plant should be addressed before considering any specific mechanical designs.
In this specific case, it is desired to use the concept of a work cell to plan the overall process in an effort to maximize productivity and minimize costs.

1.3. LITERATURE SURVEY

M.Muthukkaruppan & K. Manoj, 24TH international symposium automation & robotics in construction, is arc. Low cost automation using electro pneumatic system-an online case study in multistation part transfer, drilling&
tapping machine case study & comparison of productivity of a component using real time multi-stationed automated rotory transfer line used for drilling, tapping.

Sameer chowdhary, o. Burak ozdoganlar, shiv g. Kapoor, richard e. Devor, university of illinois at urbana-champaign, urbana, il 61801, usa modeling and analysis of internal thread forming this paper presents a mechanistic model for the prediction of thrust and torque experienced by a forming tap during an internal thread forming process.

Darshith, Ramesh Babu & Manjunaths.-iosr journal of mechanical and civil engineering (IOSR-JMCE) .this paper deals with the thread cutting and thread rolling process for special threads. The various methods of thread cutting and thread rolling process are discussed.

Wagner Matthew - Aerospace fastener production contains many machining and forming operations, such as heading, centerless grinding and thread rolling. Typically many of these processes have been hand fed, especially for large diameter parts. This project presents a general automation plan, based on the concept of a workcell, by which large diameter fastener production processes can be automated. Specifically, an automatic loading and unloading system for a thread rolling machine is developed and prototyped to prove the overall workcell concept.

1.4 Types of Thread

1.4.1 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].

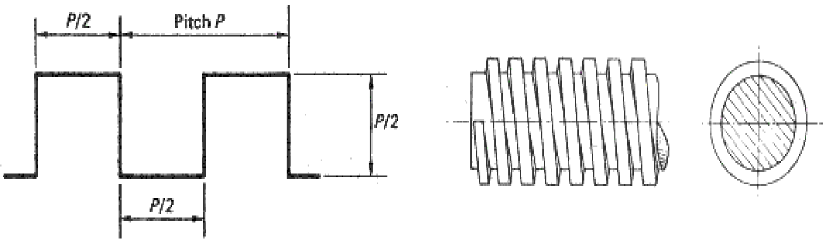

Fig: 1.1.1 Square thread

1.4.2 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].

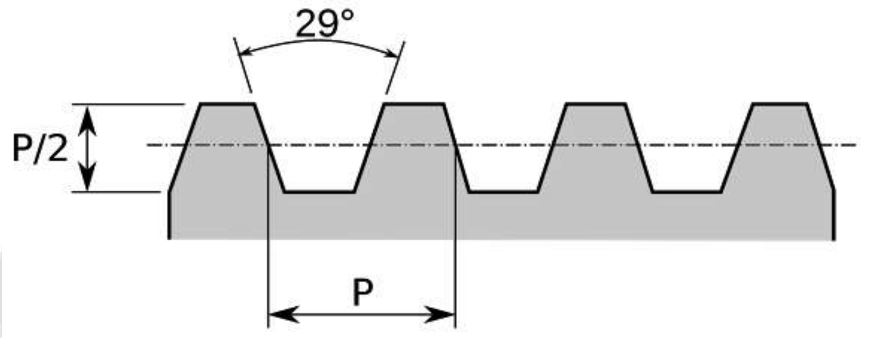

Fig: 1.1.2 Acme thread

1.4.3 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].

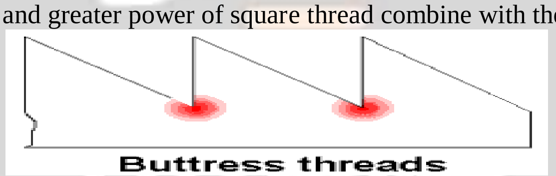

Fig: 1.1.3 Buttress thread

1.4.4 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. Space Requirement

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

2. Power Required

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

3. Lubrication Requirement

It requires more lubrication.

4. Speed

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

IV. OBJECTIVE.

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. VARIOUS TYPES OF DIE THREDING TOOL & PARTS :

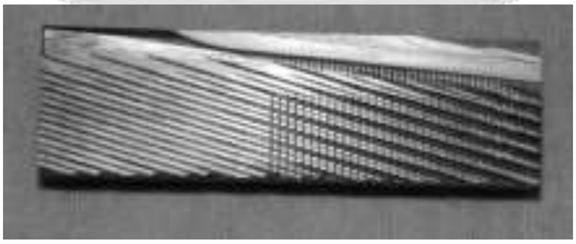

Fig.1. Flat rolling die.

Fig.2. Flat rolling mechanism.

Fig.3. Rotary rolling die.

(a)

(b)

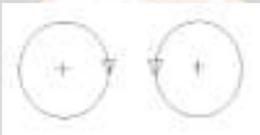

Fig.4. (a) Cylindrical rolling with two rollers (b) Direction of roller rotation (a)

(b)

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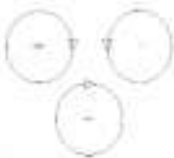

Fig.5. (a) Cylindrical rolling with three rollers and (b) Direction of roller rotation.

Fig.6. Thread cutting process.

Fig.7. Top view of two tool feed methods during thread cutting on a lathe: (a) the compound straight and (b) the compound swiveled methods.

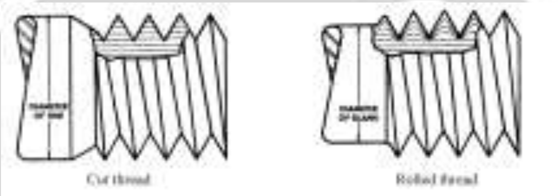

Fig.8. Grain flow lines in cut and rolled threads.

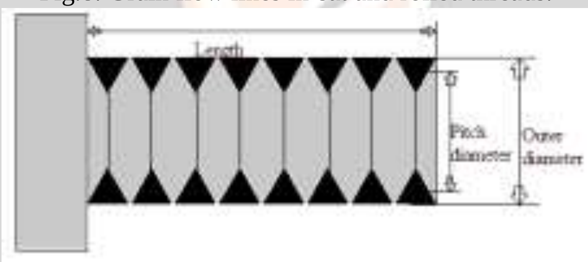

Fig.9.Typical screw

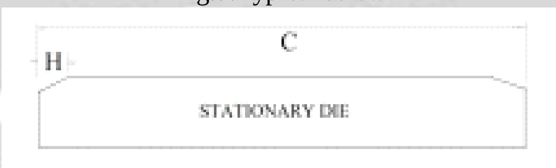

Fig. 10.Flat rolling die.

VII. 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

$P=2\prod NT/60$

$T = 60\ P/2\prod N$
Torque $T= (60*1492)/2\prod 257.14$
$T=55.40$ Nm
Case 1: First Gear Engaged
Gear ratio = 1:3
$No = Ni/3$
$=257.14/3$
$No = 85.71$ rpm
Torque $= (60*1492)/(2\prod *85.71)$
$T = 166.22$ Nm

Case 2: Reverse Gear Engaged
Gear ratio = 1:4
$No = Ni/4$
$=257.14/4$
$No = 64.29$ rpm
Torque $=(60*1492)/(2\prod *64.29)$
$T = 221.61$ 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.

VIII. 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.

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.

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.

IX. 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.

X. REFERENCE :

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