SEMI-AUTOMATIC EXTERNAL THREAD CUTTING DIE-HOLDER

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Abstract- In this paper is mainly deals with production area of product manufacturing process, then the concepts is making of threads at required position on work piece. In open market we find die holder applied to use large scale industrial and small scale industrial. Our major contribution of this project is to develop a thread making products for applicative with to industries and engineering's. We can produced mass production in terms more efficiency **semi-automatic thread cutting die holder** (**Externa**l), how we can improve thread product this concept is our project.

Keywords: Natural lubricants, AutoCAD, Artificial lubricants,

I. INRODUCTION

Semi-automatic thread cutting die holder is used to produce accurate external threads on the work pieces. The die holder cut the thread for required lengths. Die holder has four cutting blades known as chasers. Dropped feed lubrication system is mounded on the die holder. Body of die holder is connected with tapper shank. Tapper shank is fitted to the tail stock. Work piece is rotated while to cut the thread the die head is fed into the work piece. Than after required length of the thread has cut movement of the tail stock is stopped. Than release the die from the thread piece so the spindle rotation is stopped than reversed. While the die holder automatic return out from the work piece.

II. BASIC CASE STUDY OF GENERAL LATHE MACHINES

Figure1:General lathe Machines

Lathe is the father of all machine tool, and the main function of a lathe is to remove metal from piece of work to give it the required shape and size. The lathe is used to machining cylindrical shape of components.

2.1 STANDARD COMPONENTS OF MOST LATHES

2.1.1 Bed

Bed is usually made of cast iron, provides a heavy rigid frame on which all the main components are mounted.

2.1.2 Guide Ways

Inner and outer guide rails that are precision machined parallel to assure accuracy of movement.

2.1.3 Head Stock

Head stock is mounted in a fixed position on the inner ways, usually at the left end. Using a chuck, it rotates the work, with a geometric ratio by moving levers.

2.1.4 Spindle

Hole through the head stock to which bar stock can be fed, which allows shafts that are up to two times the length between lathe centers to be worked on one end at a time.

2.1.5 Gear Box

Gear box is placed on inside of head stock, providing multispeed.

2.1.6 Chuck

Chuck is job holding device, it's have normally two types, one is 3-jaw (self centering) and another one is 4-jaw (independent) to clamp part being machined.

2.1.7 Tail Stock

Its fits on the inner ways of the bed and can slide towards any position the head stock to fit the length of the work piece. An optional taper turning attachment would be mounted to it.

2.1.8 Lead Screw

Lead screw is an elongated shaft and its outer surface have helical cuts for feed the tail stock as well as tool post for thread cutting and knurling operations.

2.1.9 Tail Stock Quill

Has a Morse taper to hold a lathe center, drill bit or other tool.

2.1.10 Carriage

Moving on the outer ways, used for mounting and moving most the cutting tools.

2.1.11 Cross Slide

Mounted on the traverse slide of the carriage, and uses a hand wheel to feed tools into the work piece.

2.1.12 Tool Post

To mount tool holders in which the cutting bits are clamped.

2.1.13 Compound Rest

Mounted to the cross slide, it pivots around the tool post.

2.1.14 Apron

Attached to the front of the carriage, it has the mechanism and controls for moving the carriage and cross slide.

2.1.15 Feed Rod

Has a keyway, with two reversing pinion gears, either of which can be meshed with matting bevel gear to forward or reversed the carriage using a clutch.

2.1.16 Split Nut

When closed around the lead screw, the carriage is driven along by direct drive without using a clutch.

2.1.17 Quick Change Gear Box

Controls the movement of the carriage using levers.

2.1.18 Steady Rest

Clamped to the lathe ways, it used adjustable fingers to contact the work piece and align it. Can be used in place of tail stock or in the middle to support long or unstable parts being machined.

2.1.19 Follow Rest

Bolted to the lathe carriage, it used adjustable fingers to bear against the work piece opposite the cutting tool to prevent deflection.

2.2 TYPES OF OPERATION DONE ON LATHE MACHINE

1. Straight Turning.
2. Thread Cutting.
3. Eccentric Turning.
4. Chamfering.
5. Facing.
6. Parting Off.
7. Drilling.
8. Boring.
9. Reaming.
10. Tapping.
11. Tapering.
12. Knurling.
13. Forming.
14. Grooving.
15. Polishing.
16. Spinning.
17. Counter Sinking.

18. Counter Boring.

When the various operations are done automatically, then the lathe is called automatic lathing.

III. BASICS CASE STUDY OF LUBRICATIONS

Lubrication is functional member of moving elements because its will helps to reduce friction as well as reduce heat dissipation between frictional areas, then its act a cooling system and maintain constant temperature maintaining. In ancient period used like a low viscous fluid like water, it will give good result but this lubricate is not use range of period because water is evaporated, after our ancient people are evaluate the lubricants from various source like (tree resin, graining of sand, minerals from sand, combination of all thinks with water) after the ancient follows are concluded the result, they are

(a) Natural lubricants.
(b) Artificial lubricants.
Both have three category that is (solid lubricants, semi-solid lubricants and liquid lubricants).

1. Solid lubricants are - (graphite, mineral powders, Colet foil).
2. Semi-solid lubricants are - (grease, fillet pastes).
3. Liquid lubricants are – (oils, resins, water base fluid, mineral spirits oils, animal oils, vegetable oils, synthetic oil and WD-40 and 3-in one oil).

3.1 PURPOSE OF LUBRICATION

The use of a suitable lubricant is essential with most dieing and reaming operating.
Recommended lubricant for some common materials are as follow:

Table1 : Lubrication To Respected Materials

S.NO	MATERIALS	LUBRICATION TO RESPECTED MATERIALS
1	Carbon Steel	Petroleum-based or synthetic cutting oil.
2	Alloy Steel	Petroleum-based cutting oil mixed with a least amount of kerosene.
3	Cast Iron	No lubricant. An air blast should be used to clear chips or using mist type systems.
4	Aluminium	Kerosene or mineral spirits mixed with a least amount petroleum-based cutting oil. Wd-40 and 3-in one are acceptable in some cases.
5	Brass	Kerosene or mineral spirit.
6	Bronze	Kerosene or mineral spirit mixed with a least amount petroleum-based cutting oil.

IV. METHODOLOGY

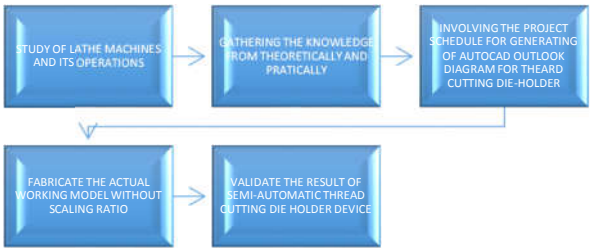

Figure2: Architecture

V. FABRICATION PROCESS

5.1 ADJUSTABLE SCREW

Figure3: Fabrication Process

The adjustable screws allow the die to be compressed or expanded to accommodate slight variation in size, due to material, manufacture, or die sharpness. If the screw is tightened up the die is opened up slightly, whilst unscrewing will cause the die to spring in.

5.2 SLEEVE AND DRIFT PIN

5.2.1 SLEEVE

Figure4: Sleeve

Tapered cylindrical form is called sleeve. Sleeve is used to extend rear end of the die holder tapper shank projection. Different types of sleeve are available in industries.

5.2.2 DRIFT PIN

Figure5: Drift Pin

A form of tapered wedge is called drift pin. Drift pin is to remove the die holder from the sleeve and socket, then it is forced into the slotted hole in the sleeve and socket.

5.3 SUPPORTING LEVER

Figure6: Architecture

Supporting lever is fixed on the outer surface of the die holder, then it is made up of hardened steel and to avoid the die holder tilted, during thread cutting by using supporting lever.

5.4 DROPFEED RECEIVER

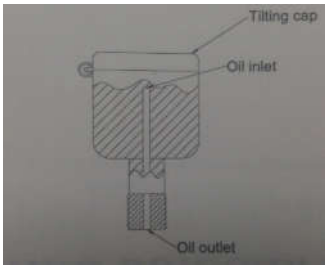

Figure7: Dropfeed Receiver

It is similarly like a small sump for storing an oil and as well as feed the oil at required area with the help of gravity force, then it is placed on top of die holder. Inclined port is provided between machining proceeding areas because that port is used passing way of fluid to operation area. Due to viscosity is higher than increase the power losses automatically.

5.5 DIES

It is a mechanical element for mass production area, then is a forming tool for thread making process, they are two types,

(a). Split Adjustable Dies.

(b). Hexagon Rethreading Dies.

(a). Split Adjustable Dies

Figure8: Split Adjustable Dies

There are fixed size and split adjustable dies which have a screw to expand the die for a better fit.

(b). Hexagon Rethreading Dies

Figure9: Hexagon Rethreading Dies

Hexagon rethreading dies are also available to clean up existing threads and rethreading die is one finishing the external thread area. The stock is then turned and the die will begin to cut the thread. When cutting actually started the die should be turned backward and forward in a similar fashion to the method used for tapping, using of lubricant. When sufficient length of thread has been made the stock is screwed back and adjusting screw tightened up farther and the process repeated. By the process it is possible to gradually cut the thread deeper and deeper until correct depth has been reached.

5.6 AUTO CAD MODELLING

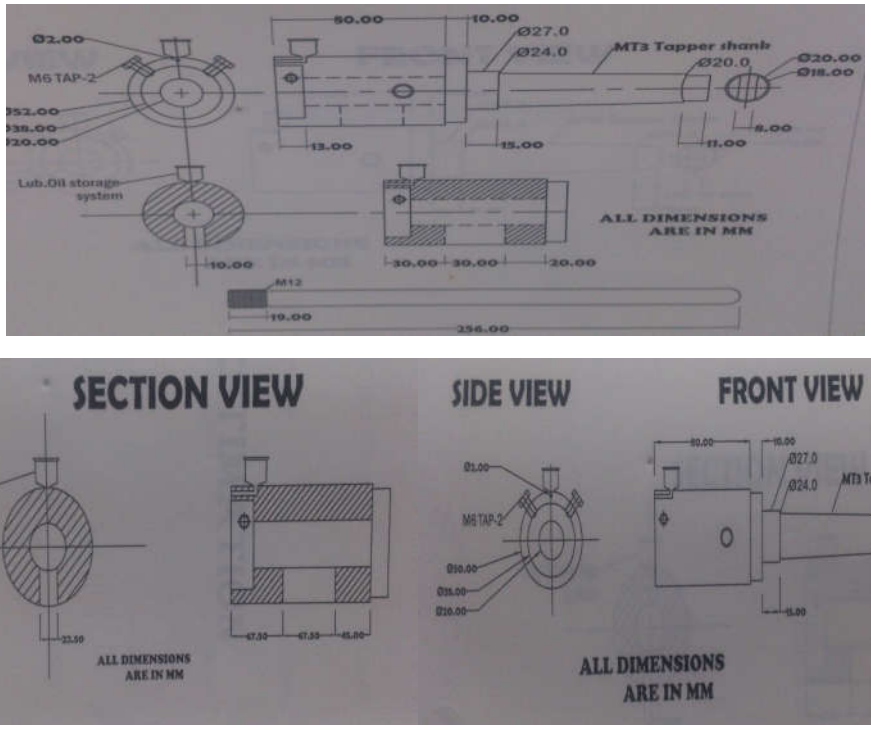

Figure10: Auto Cad Modelling

Above the illustration are draw by using AutoCAD 2012 and it is 2D optical views of each section modules.

5.7 OPERATIONS IN LATHE FOR MAKING OF SEME-AUTOMATIC THREAD CUTTING HOLDER

1. Straight Turning.
2. Thread Cutting.
3. Eccentric Turning.
4. Chamfering.
5. Facing.
6. Parting Off.
7. Drilling.
8. Boring.
9. Reaming.
10. Tapping.
11. Knurling.
12. Forming.
13. Grooving.
14. Polishing.
15. Spinning.

5.8 THREAD CUTTING

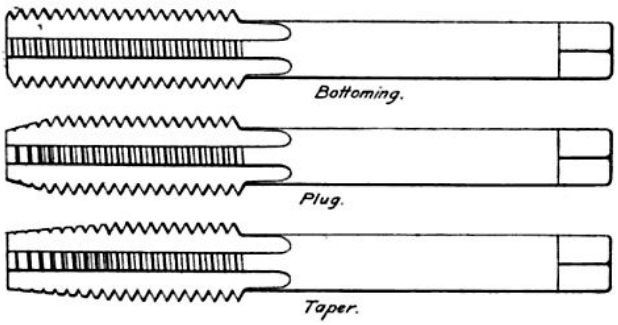

Figure11: Thread Cutting

A thread cutting is a helical ridge formed on a cylindrical or conical rod, and it is cut on a lathe when a tool ground the shape of the thread, is moved longitudinally with uniform linear motion while the work piece is rotating with uniform speed.

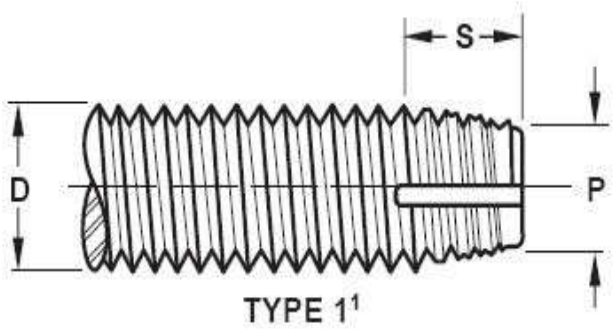

Figure12: Thread Cutting Type1

By maintaining an appropriate gear ratio between the spindle on which the work piece is mounted, and the lead screw which enables the tool to move longitudinally at the appropriate linear speed, the screw thread of the required pitch can be cut. The pointed tool is employed to cut V- threads ground to a squared end. When square threads are to be cut, the tool is ground to a squared end.

5.9 FINAL OUTCOME OF FABRICATE WORKING MODEL

Figure13: Fabricate Working Model

Cutting external threads on a cylindrical rod or bolt with a die and stock is called dieing or external threading. When using a die the blank should be filed clean of hard scale and end slightly pointed for easy entrance into the die. The die is held in a two-handed work, when starting the thread, care must be taken to ensure that the die is square with the axis of the bar being threaded, otherwise it would bear more heavily on one side, resulting in a “drunken” thread.

CONCLUSION

We make this project entirely different from other projects. Since concepts involved in our project is entirely different that a single unit is used to various purpose, which is not developed by any of other team members. By doing this project we gained the knowledge of fabrication work and how the welding is doing and material selection for particular components etc. it is conclude that any fabrication work

can be done with the help of welding, and the main advantage of our concepts is only help for mass production and time saving.

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2. 3 stating, "The [tool shank] is now firmly coupled with the spindle, the complementary tapered portions serving to insure accurate axial alignment while the complementary keys and slots serve to drive the [tool shank] from the spindle in either direction of rotation and the [drawbar] retains the [tool shank] firmly seated in such position."
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   By my invention the blank is rotated between rotating or reciprocating dies, suitably formed, and set in motion, by means of which the thread is impressed on the blank

without removing any part of the metal."
Apparently Harwood and the patent examiner were ignorant of Keane's 1836 patent.

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