

Industrial Machinery Management

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ABSTRACT

Today most of the industries are trying to make improvement in their production processes as well as relevant machinery to improve the productivity along with the automation. Tapping is one such operation which is most frequently used in small and large scale industries. Thread tapping is the method to produce the fine thread inside the drilled hole on the plate. Most of the industries uses the conventional method says hand tapping. This conventional method is very time consuming process, less accurate and includes higher labour cost, and ultimately leads to less productivity. So there is a scope to develop the machine for tapping operation which would overcome all the problems faced by the conventional process.

PROJECT OVERVIEW

INTRODUCTION

The main objective of our project is to perform tapping operations using Auto feed mechanism in tapping machine with the help of pneumatic sources. For a developing industry the operation performed and the parts or components produced should have it minimum possible production cost for it to run profitability.

Bottoming Tap (1 - 1.5 Tapered Threads)



Plug Tap (3 - 5 Tapered Threads)



Taper Tap (8 - 10 Tapered Threads)



PROBLEM FORMULATION

A tap cuts a thread on the inside surface of a hole, creating a female surface which function like a nut. During operation, it is necessary with a hand tap to periodically reverse rotation to break the chip formed during the cutting process, thus preventing an effect called "**crowding**" that may cause breakage.

WORKING:

Pneumatic tapping machine makes use of compressed air as power source, the compressed air is obtained through a compressor. This compressed air passes through air pressure regulator to the pneumatic motor through a hose pipe. This high pressure air exerts a axial spinning force on the rotor located inside the tool head And causes the tap tool to rotate inside the work piece. The working air pressure is depends on the tap size and product material to be tapped.

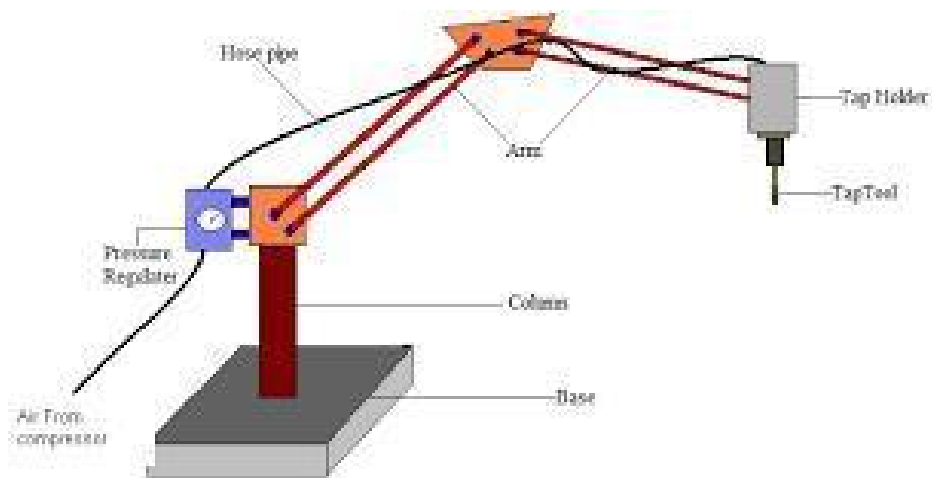


Figure: proposed Pneumatic Tapping Machine

CONCLUSION

In this paper, we are mainly concerned with the study of tapping operation and have recommended a pneumatic technique for tapping which would overcome the problems faced by conventional method. This new technique will be helpful for better quality of tapped holes, improve the productivity as well as, reduce the time required for the tapping operation.

Definition:

The word TAPPING is a machining process for producing internal threads and tapping is the action that creates a thread into the side of the hole.

Tapping machine are used to make thread holes in a surface. Tapping machine vary from the tiny bench machine used in the finest jeweler's operation to the huge, heavy-duty machines that bore large holes in steel forgings at an astonishing rate. Proper selection of a tapping tool depends on the material on which we have to make threads, the length of the thread to be formed, and the accuracy required. There are several types of tapping machines. Examples include a thread tapping machine and a pneumatic tapping machine. A thread tapping machine is used for tapping taper holes. A pneumatic tapping machine is a tapping machine that is driven by compressed air. Special tapping machine are used for wood, glass, and plastics for which standard machine cannot be used.

The tapping machines are commonly available.

Tapping can be done on the lathe by power feed or by hand.

TAPPING PROCEDURE:

Using Tap Guides

Tap guides are an integral part in making a usable and straight tap. When using the lathe or the mill, the tap is already straight and centered. When manually aligning a tap, be careful, as a 90° tap guide is much more accurate than the human eye.

Using Oil When drilling and tapping, it is crucial to use oil. It keeps the bits from squealing, makes the cut smoother, cleans out the chips, and keeps the drill and stock from overheating.

Pecking

Pecking helps ensure that bits don't overheat and break when using them to drill or tap. Peck drilling involves drilling partway through a part, then retracting it to remove chips, simultaneously allowing the piece to cool. Rotating the handle a full turn then back a half turn is common practice. Whenever the bit or tap is backed out, remove as many chips as possible and add oil to the surface between the drill or tap and the work piece. Hand Tapping Procedure 1. Select drill size from chart.

When choosing a tap size, the chart is the first place to look.

HAND TAPPING PROCEDURE

1. Select drill size from chart.

2. **If necessary, add chamfer to the hole before tapping.** Chamfers and countersinks are additional features that are sometimes desired for screws. For best results, the speed of the spindle should be between 150 and 250 rpm.

Get a tap guide. The hole is now ready to tap. To do this, use the taps and guide blocks near the manual mills. The guide blocks will have several holes for different sized taps. Select the one closest to the size of the tap being used and place it over the drilled hole.

3. **Tap the block.** Peck tap using the tap wrenches. Apply gentle pressure while turning the wrench a complete turn in, then a half-turn out. Peck tap to the desired depth.

4. **Complete the tap.** If the tap does not go any further or the desired depth has been reached, release pressure on the tap; it has likely bottomed out. Remove the tap from the hole.

Applying any more pressure is likely to break the tap. The smaller the tap, the more likely it is to break.

TAPPING PROCEDURE FOR LATHE

1. Mount the work piece in the chuck.

2. Face and center drill.

3. Select the proper tap drill for the tap to be used.

4. Example: ¼ – 20 unc used # 7 drill.

5. Set the lathe to the proper speed and drill with the tap to the required depth. Use plenty cutting fluid.

6. Note: the work piece will rotate when tapping using the lathe power. Use a very slow spindle speed. (40 to 60 rpm) and plenty of cutting fluid.

7. Chamfer the edge of the hole.

TYPES OF TAPPING MACHINES

Tapping Machines are used to thread holes in the surface. Tapping machines vary from the tiny bench machine used in the finest jeweler's operation to the huge, heavy duty machines. There are several types of tapping machines depending upon the material to be tapered.

Angular Tapping machine

Angular tapping machine is widely demanded to automatically make holes and threads in a hassle free manner.



The arms of this tapping machine are inclined an angle which make this machine widely popular and much efficient than others. The tap in this machine comes with longitudinal grooves in it. This tapping machine is well suited for tapping small products in huge quantity, that's why used widely in the industrial fields.

Key Features Of Angular Tapping Machine:

- o Optimum performance
- o Easy to operate
- o Energy efficient
- o Longer operational life
- o Threading operation from M3-M60 size
- o Cost efficient
- o Easy dissemble and assemble

5.

Articulated Arm Tapping Machine

Unlike other tapping machines articulated arm tapping machine has a unique design which make it stand out from the rest of machines.

One arm is fixed and the tap is attached to the third arm and these two are connected to an articulated arm, that's why it is called articulated arm tapping machine.

This machine is widely used where there is a need of making holes or threads in a perfect circular path.

The tap is adjustable according to the need and desire, the tap comes with longitudinal flutes and screws.

This is designed in such a manner that it can be installed anywhere which make it more portable and easy set up with no cost or minimal cost.

Features of articulated arm tapping machine:

- o This also used widely in the industries according to the purpose
- o The unique of articulated arm helps in tapping a hole anywhere within the prescribed area of 1-meter



radius.

- o This machine is made of aluminum
- o Articulated arm
- o Electrical operated four speed 750W servo motor with gear box.

in steel and 1" or M24 in diameter.

Pneumatic Tapping Machine

Anything which contains air or operated by air is called pneumatic and the machine which runs on this principle is called pneumatic machine.

Pneumatic tapping machine is a machine which is used to make holes or threads on a particular surface with the help of air or gas under pressure.

The setup of this machine is as simple as the other machines but the only difference which make this machine stand out is, it works with air or gas under pressure.



These Pneumatic tapping machines are used to making thread holes on a surface.

Features of pneumatic tapping machine:

- o Easy to operate
- o Robust construction
- o Durable finish standards
- o High performance

Vertical Tapping Machine

In vertical tapping machine the arm where the tap is inserted is aligned vertically and the rest is almost same.

This machine enables the user to see the process of threading more clearly than in horizontal tapping machine.

Changing of taps vertically become little difficult for the user than horizontally.



This machine is also used for making holes/threads on the surface. The features of vertical tapping machine:

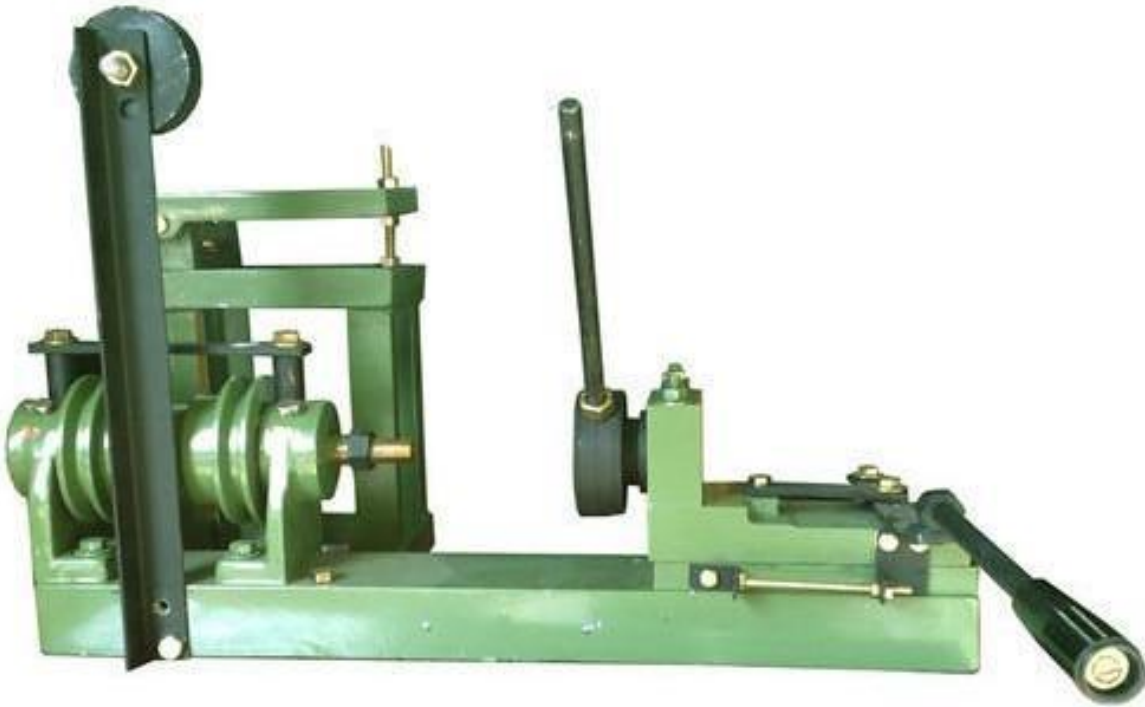
- o Streamline design and compact construction
- o Facilitates spindle speed to suit the cutting speed
- o Higher output
- o Easy to operate
- o Less maintenance cost
- o Longer life
- o Once the tap enters the work the feed is automatic
- o Manually operated switch for starting and stopping the machine.

Horizontal Tapping Machine

Like lathe machine this is horizontally aligned in design and shape. The tap and the job is horizontally inserted manually by the user.

The working of this machine is as similar as lathe, this can be operate automatically or manually according to the users preference.

This machine is highly in demand because of its performance and is widely used in industrial fields, and to operate this machine no skilled labor is required .



The horizontal tapping machine is used for making threads and holes on the surface.

A horizontal tapping machine center is a numerically controlled machine tool used for machining parts in every industrial field.

Features of horizontal tapping machine:

- o High speed
- o High accuracy
- o Easy to use
- o High productivity
- o Minimal maintenance cost
- o Easy setup
- o Long lasting life
- o Finished products.

Hydraulic Tapping Machine

Anything which contains fluid or operated by fluid is called hydraulic and the machine which runs on this principle is called hydraulic machine.

Hydraulic tapping machine is a machine which is used to make holes or threads on a particular surface with the help of fluid under pressure.



In order to eliminate the heat produced by the pressure it uses coolant.

Hence it is movable and portable and can be used anywhere without any tension of installation and set-up cost.

Hydraulic machines works according to Pascal's law of transmission ,a number of devises are based on this law.

Features of hydraulic tapping machine:

- o Highly efficient
- o Sturdy
- o Easy to operate
- o Long lasting
- o High productivity
- o Finished output/product
- o Environment friendly

ADVANTAGES AND DISADVANTAGE OF TAPPING MACHINE

ADVANTAGES

The pneumatically operated multi purpose device has many advantages. They are as follows:

Low cost, so it can be used in small scale industries.

Higher rate and quicker operations

A number of operations like (drilling), screw driving, reaming etc., can be done.

The nuts and bolts can be tightened to a particular pressure by operating the gate valve placed in the control unit and the pressure gauge.

Both loosening and tightening is possible. Since there is air flow in both directions.

The weight of the unit is less and can be easily handled.

Efficient operation. Since it does not require any electricity for running.

DISADVANTAGES

While working, the compressed air produces noise therefore a silencer may be used.

High torque can not be obtained.

Load carrying capacity of this unit is not very high.

