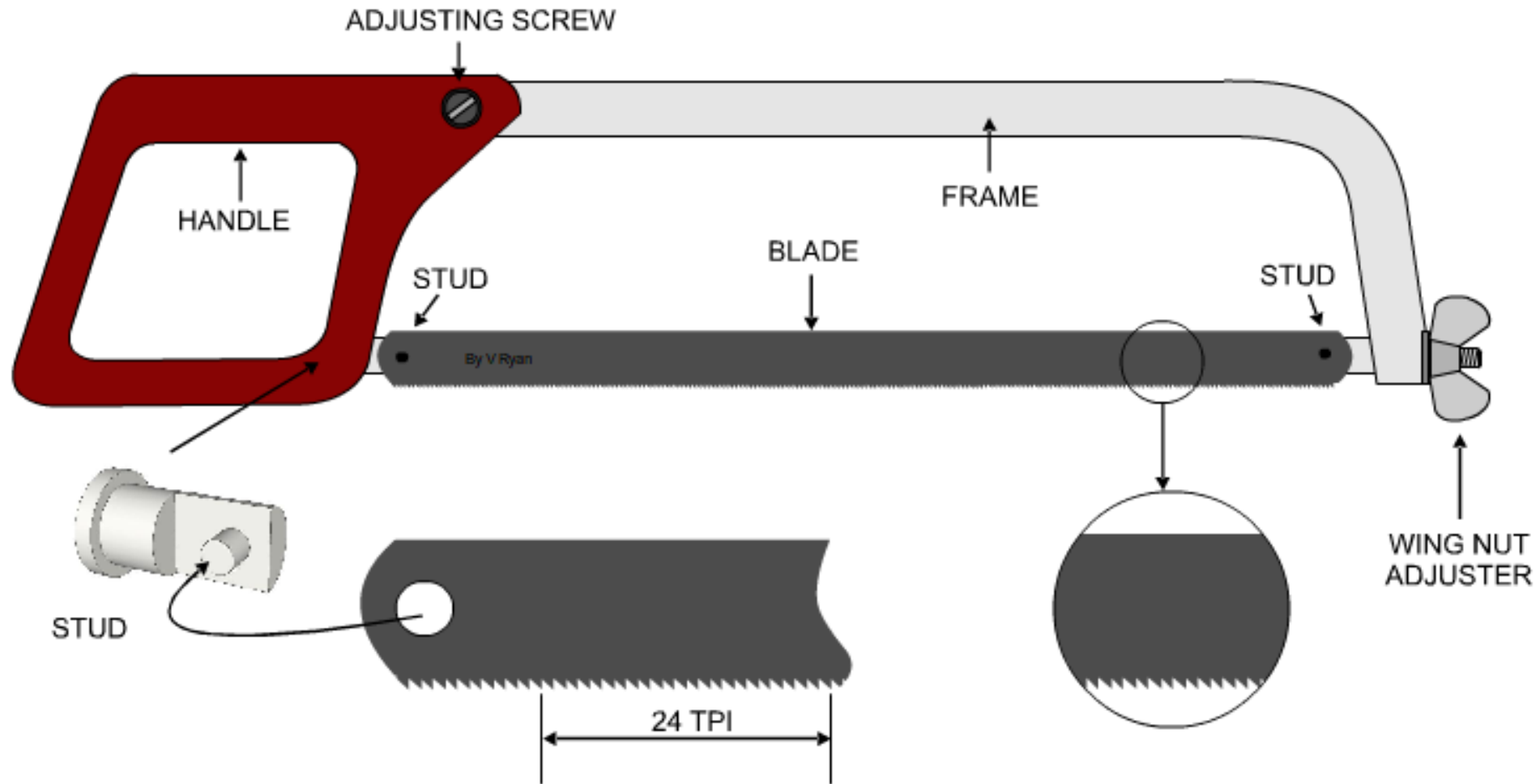


Workshop Technology

[Hand Working Operations]

WORKSHOP TECHNOLOGY

Sawing

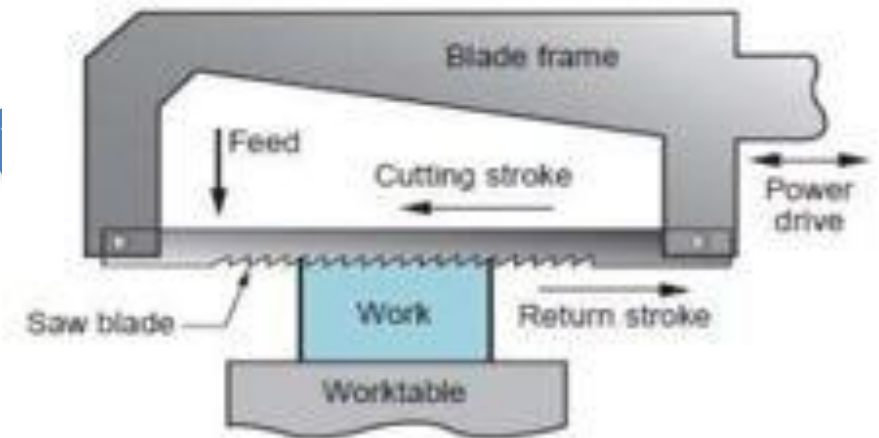


Sawing

- Sawing is a process in which a **narrow slit is cut into the work by a tool called saw consisting of a series of narrowly spaced teeth.**
- Each tooth forms a chip progressively as it passes through the workpiece.
- Can be used for all metallic and non-metallic materials and is capable of producing various shapes.
- It is one of the most economical means of cutting metal.
- Sawing is normally used to separate a work part (bar stocks, tubing, pipes) into two pieces, or to cut off an unwanted portion of a part (Cutoff operations)

Sawing

- It involves a **linear reciprocating motion** of the saw against the work.
- Often used in cutoff operations.
- **Cutting only in forward stroke** of the saw blade.
- Due to **intermittent cutting action**, less efficient than the continuous sawing methods.
- Hacksawing can be done either manually or with a power hacksaw.

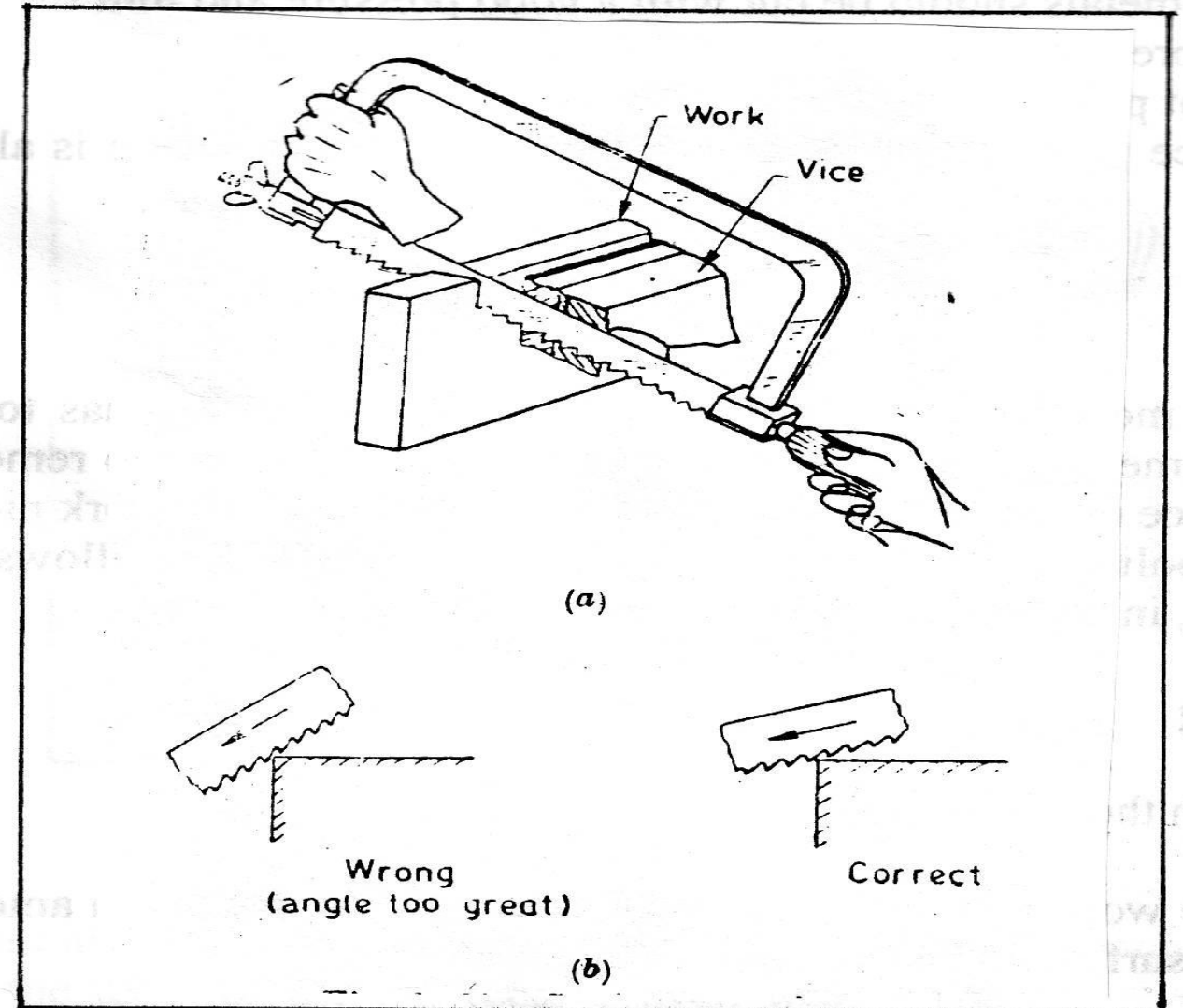


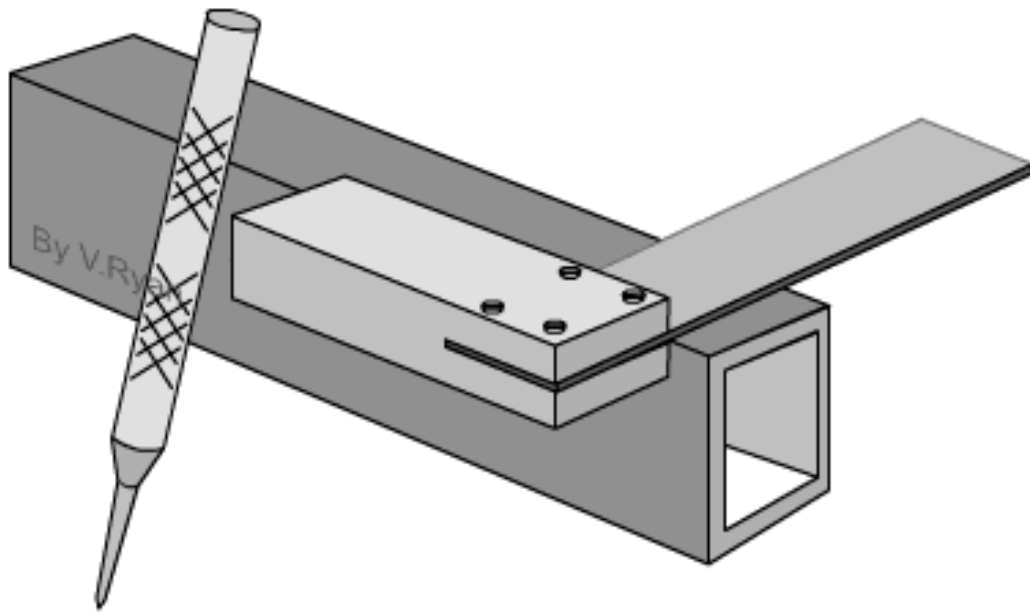
Sawing

Sawing Techniques

- Hold job piece tightly on a vise.
- Mark the sawing line with scriber.
- Fix blade tightly on frame.
- Begin with backward stroke.
- Guide with particular care.

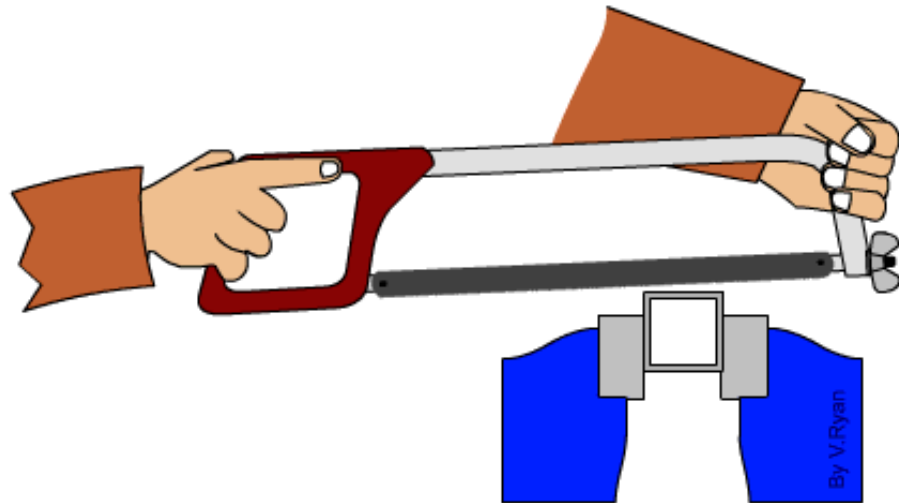
{**NOTE:** minimum no. of teeth in contact — not less than 3 when sawing.}



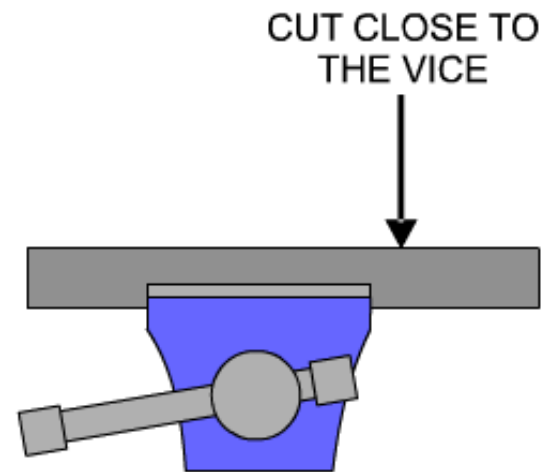


Marking

Sawing

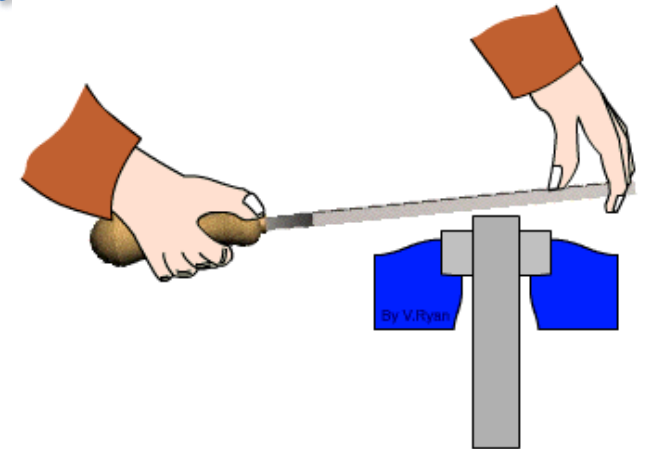


SIDE VIEW

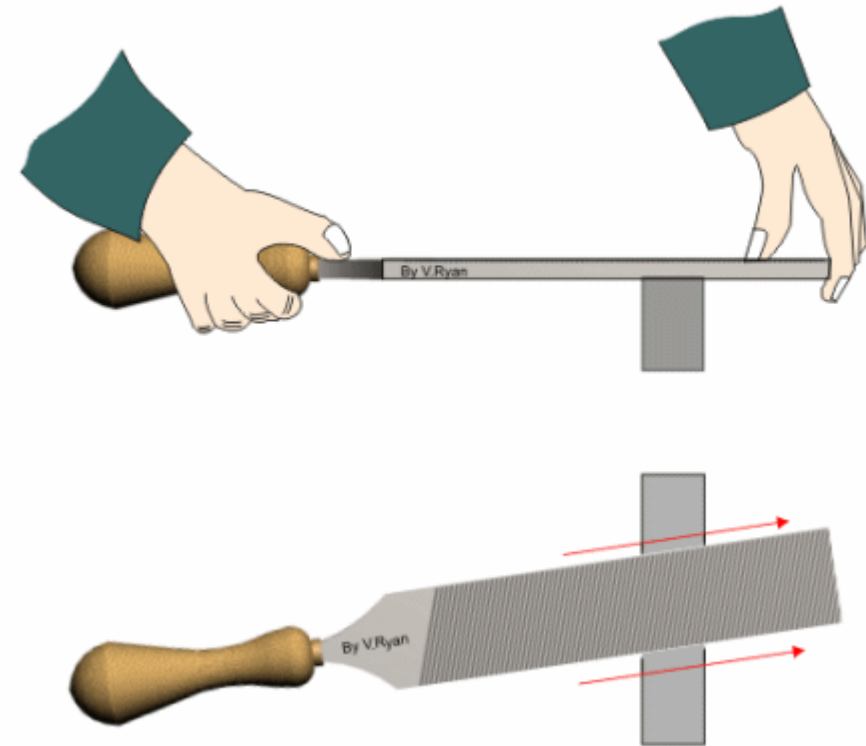
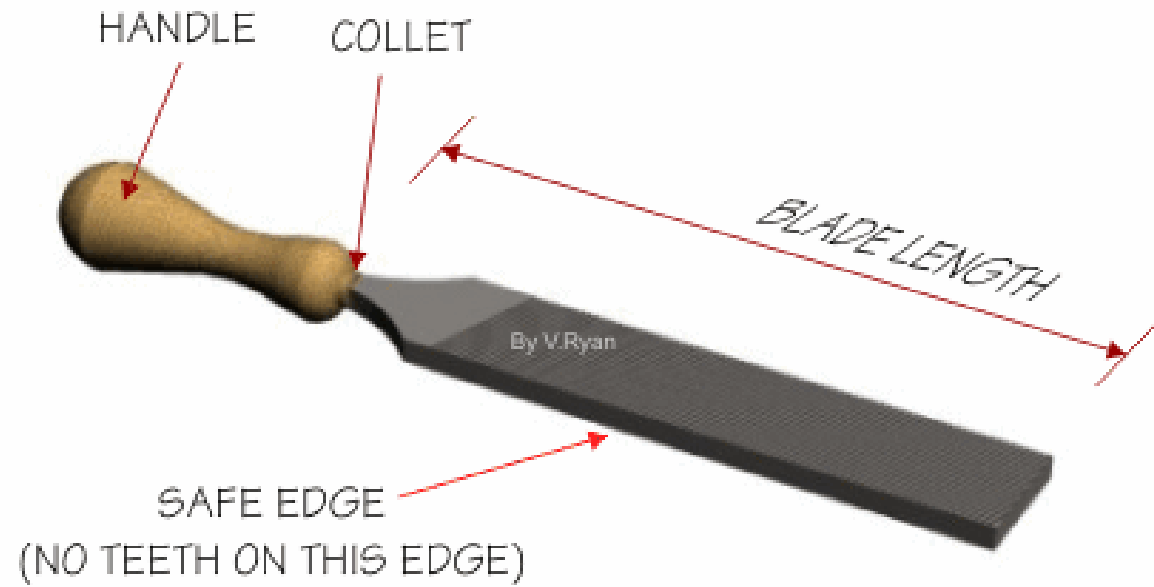


FRONT VIEW

CUT CLOSE TO
THE VICE



Filing



WORKS

Filing

Filing Process

- Select the proper file that is best for the job.
- Clean the file out with a stiff wire brush.
- Clamp firmly the work piece in the vice.
- Take the correct filing position.
- Grab the handle of the file with dominant hand and place the palm of the other hand on the end of the file.
- Orient the file so that it points away from you.
- Press down firmly, and make long slow strokes away from the body
- Remove downward pressure on the return stroke to prevent dulling the file.

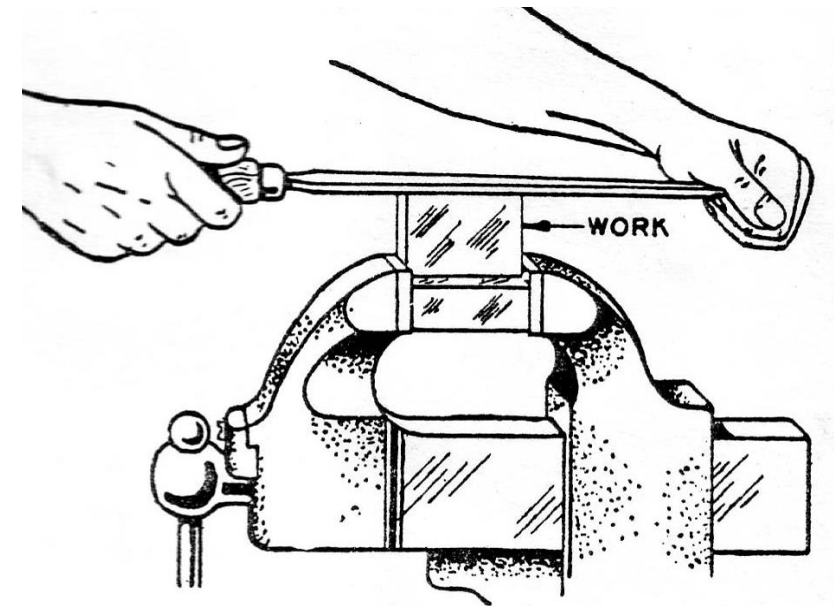
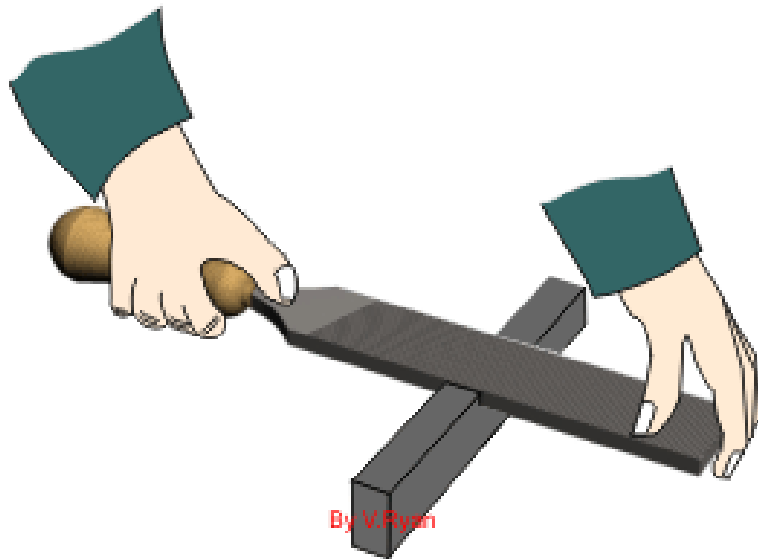


Filing

Methods of Filing

Straight Filing:

In this method of filing, file is run at an angle of 90° to the work piece edge. In return stroke, the file is carried slightly up to prevent the teeth to become blunt. Those jobs whose width is smaller than the width of file are filed by this method.

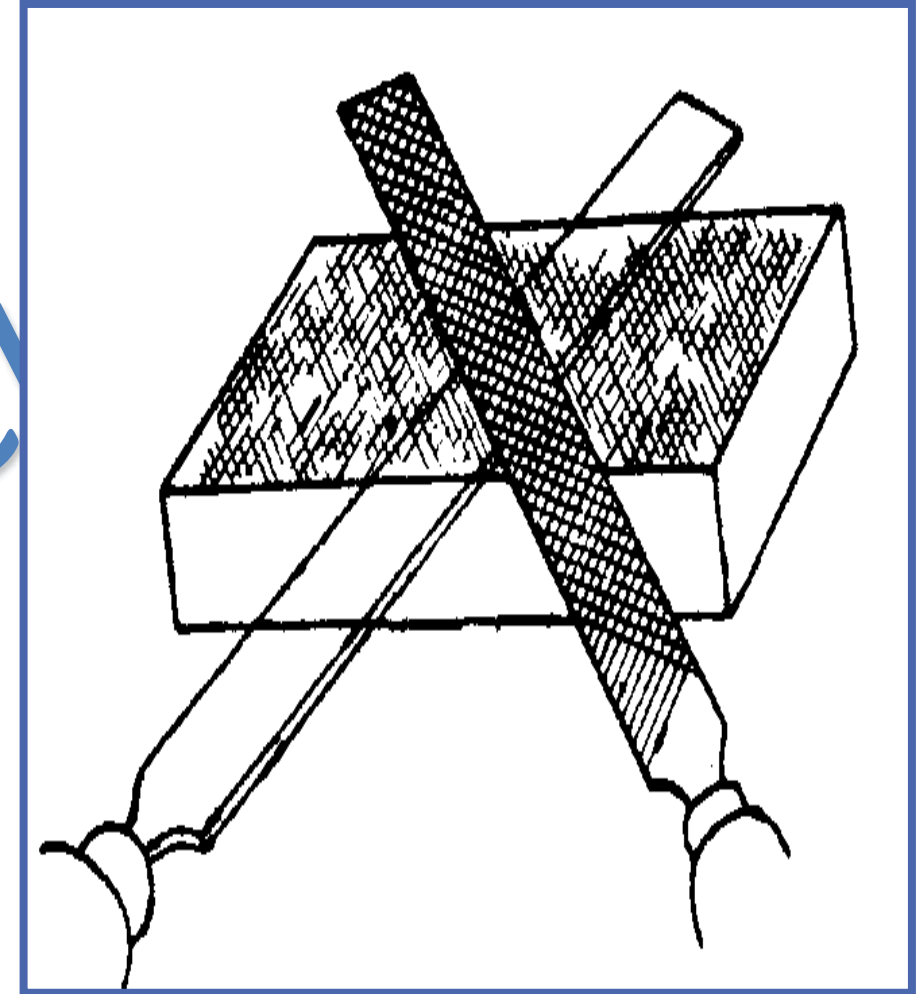


Filing

Methods of Filing

Cross Filing:

In this method of filing, the work piece is first filed in **one direction** and then filed again at a **certain angle to the original strokes**. In this method, curves in work pieces can be minimized. Maximum material can be removed due to the cross marks of files. The whole surface of job is covered in a stroke.



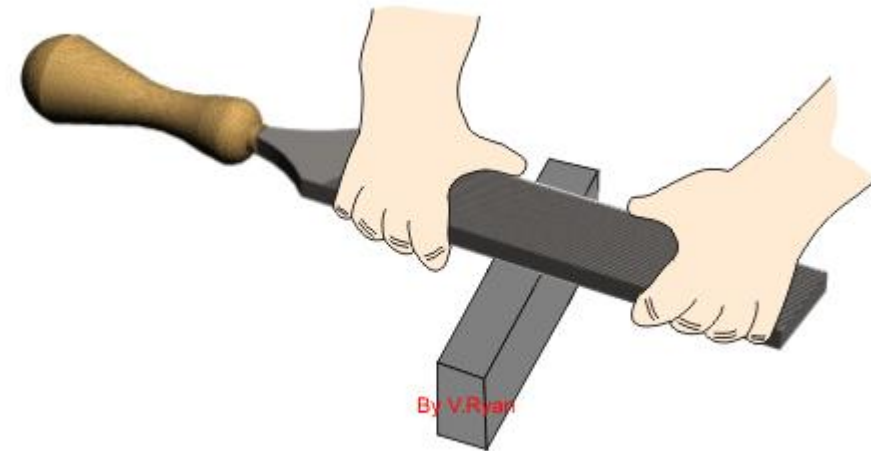
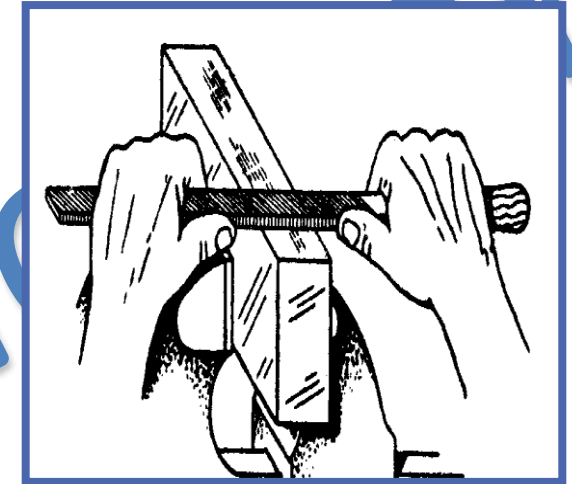
Filing

Methods of Filing

Draw Filing:

In this method of filing, files are handled by both hands on the blade of file.

This method is used to **remove file marks** and **produce a good finish** on completed work. A **smooth** file is used to produce a good finish.





Half Round File



Three Square File



Knife File



Square File

Filing

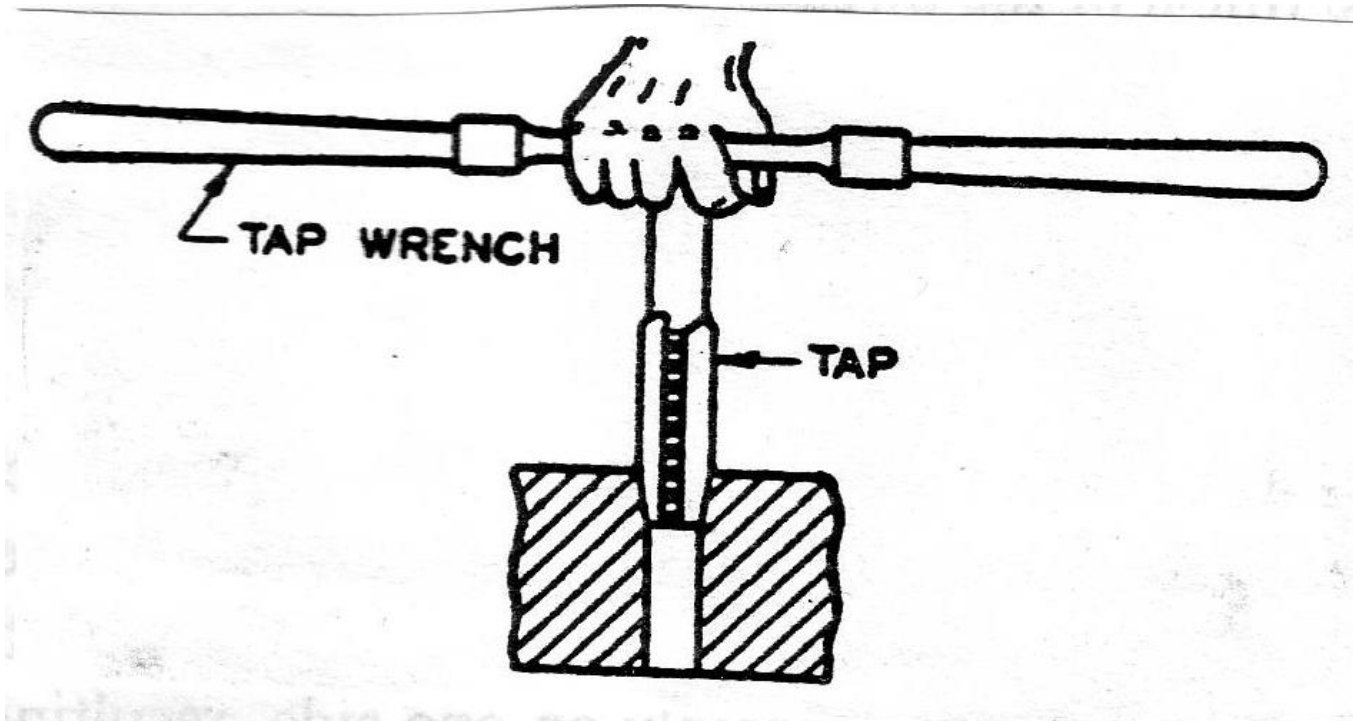
File Card

When filing the soft metals, the small particles of metal will tend to **clog the teeth** and this is called **pinning**. If the file is not cleaned, these particles will scratch on the surface of the work.

The pinning can be removed with a **File Card** which is a **wire brush** mounted on a block of wood. Sweep the file card along the grooves on the file until the pinning is removed.



Tapping



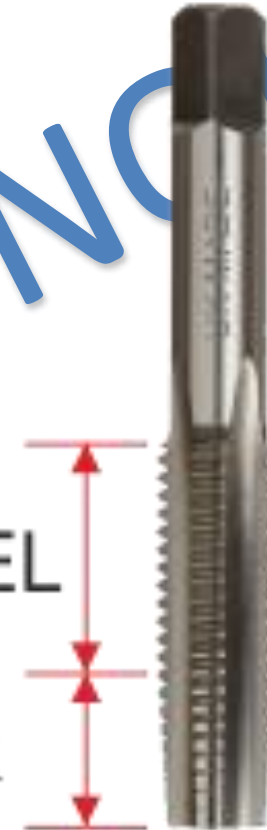
Tapping

Tapping Process

The tapered tap shown right, has a long taper at the **end** and the rest of the thread is parallel.

PARALLEL

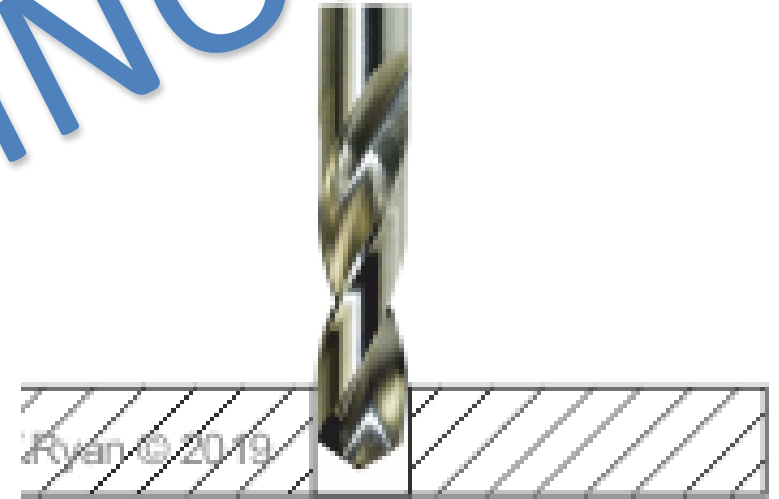
TAPER



Tapping

Tapping Process

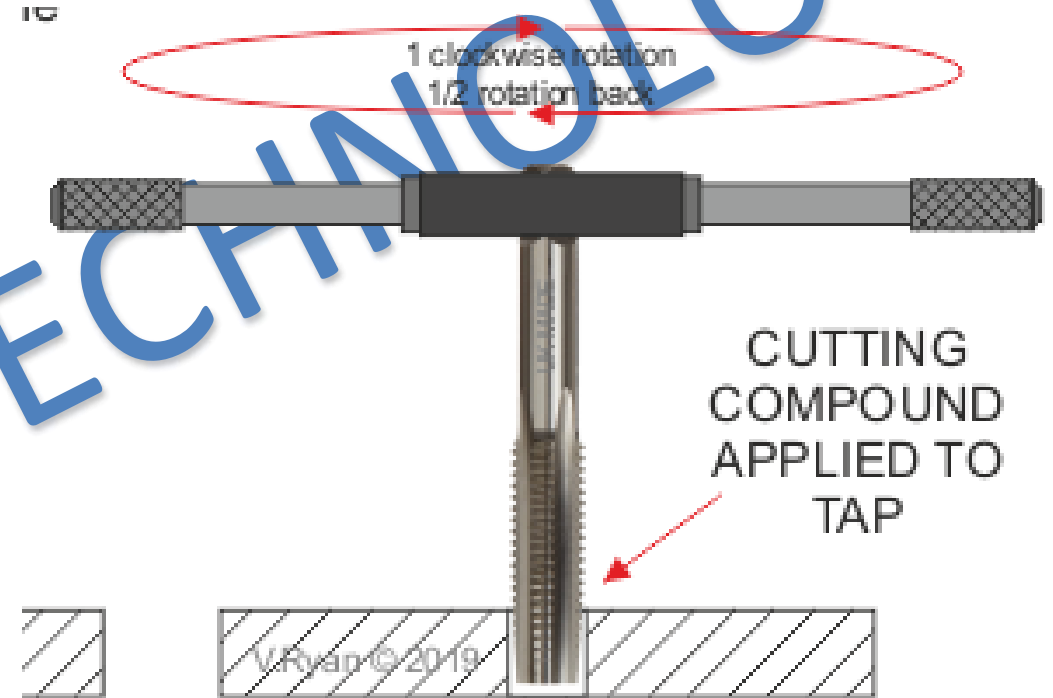
A hole is drilled through the work piece (metal), to the correct tapping size. In this case, an M8 threaded hole is required and as such, a 6.8mm diameter hole has been drilled, using a machine drill



Tapping

Tapping Process

The tapered tap is used first. The long taper at the end of this tap, means that it is easier to start the clockwise turning motion, that cuts the thread. If a this piece of steel is being 'threaded', this may be the only tap that is needed.

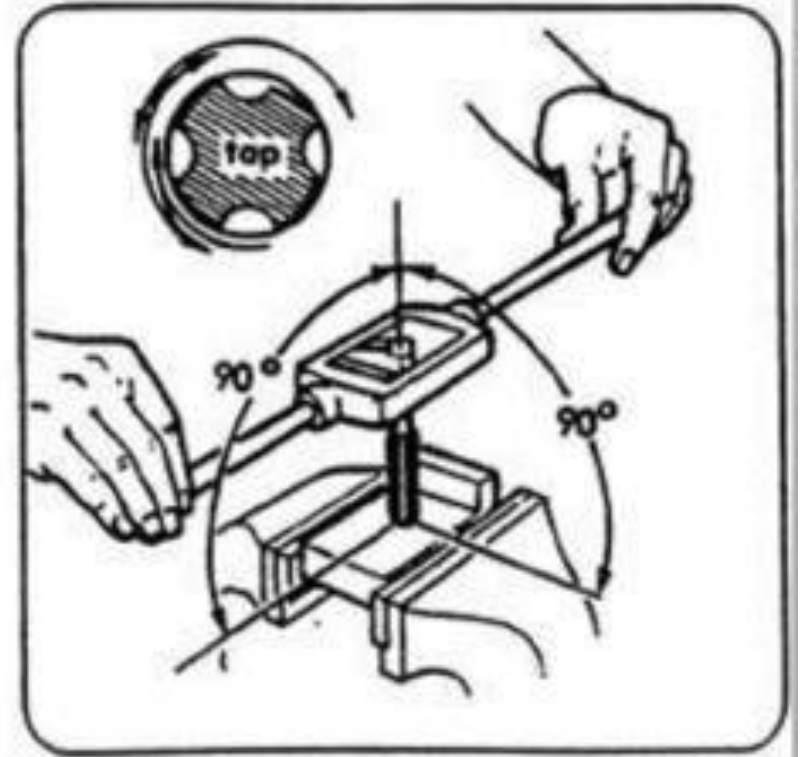


Tapping

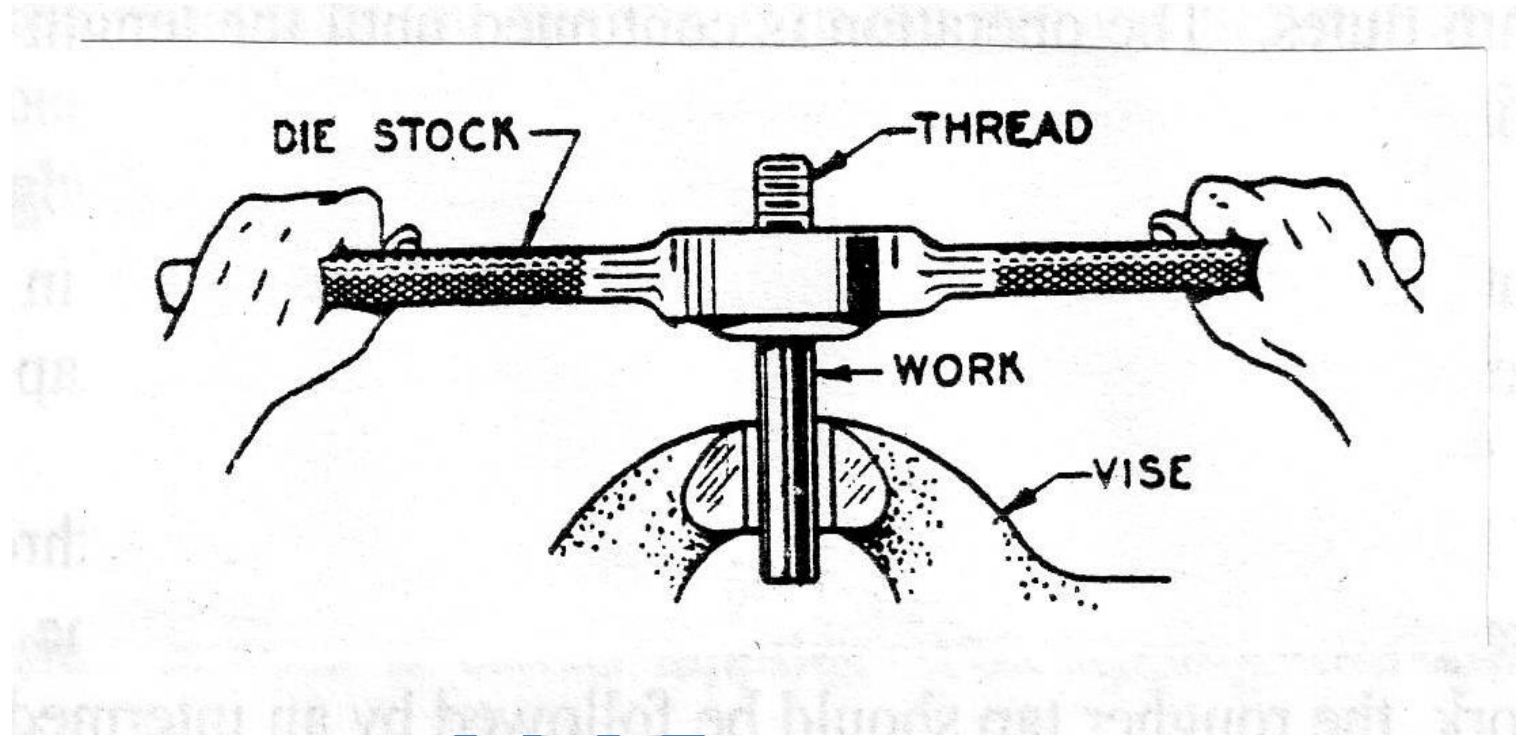
Before tapping the following should be determined:

- The proper tap hole has been drilled.
- The tap has the correct specifications.
- The tap hole is clean and free for all **chips** (particularly for blind holes)
- A suitable **cutting fluid** has been selected for application during the tapping process.

If the thread is too tight, “chase” the threads by running the tap through again until it meets specifications.



Dieing



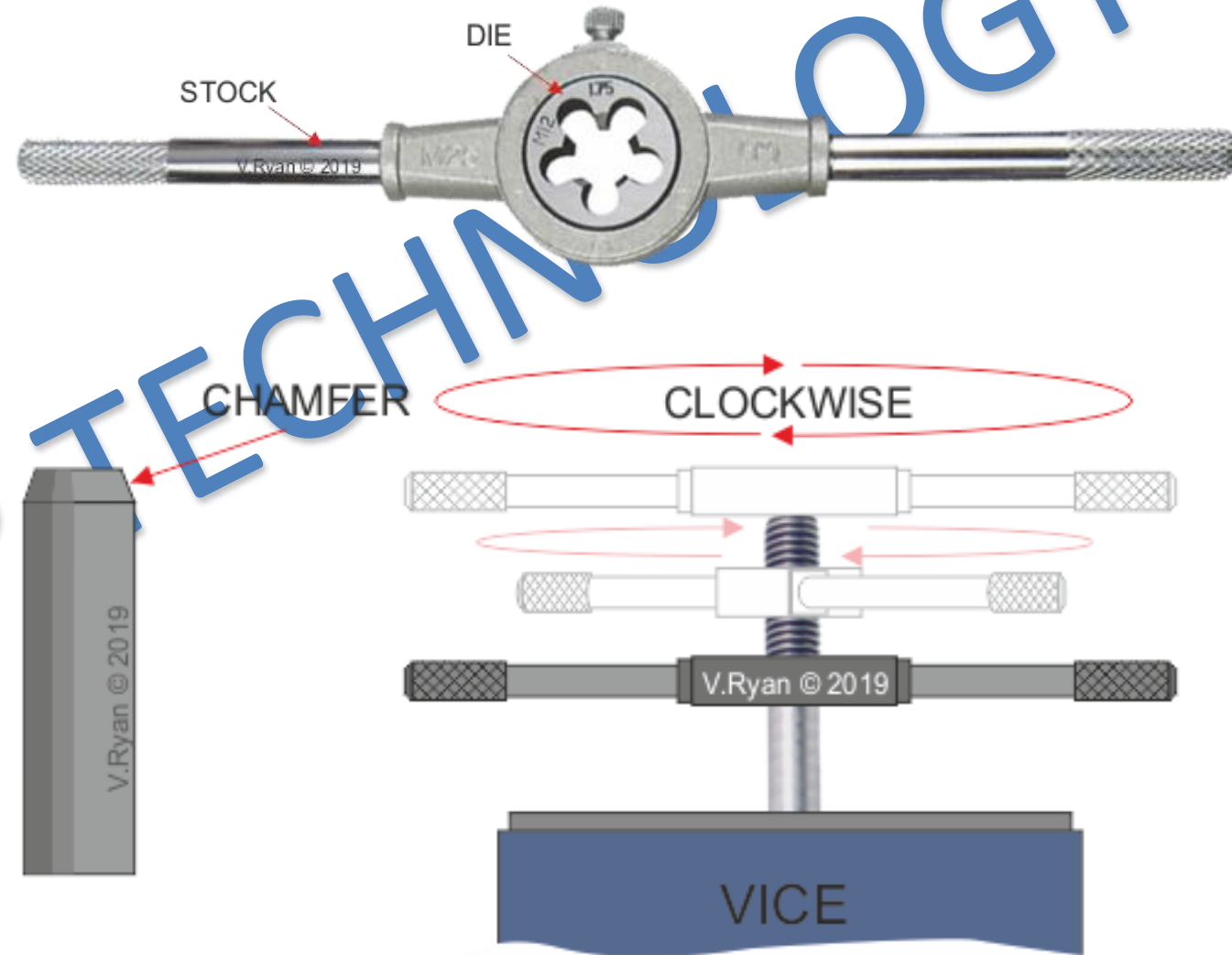
WORK

Dieing

The work should be **chamfered** for ease of starting. The work piece must be securely supported and vertical in the **vise**.

Great care must be taken to start the thread true to the axis of the bar.

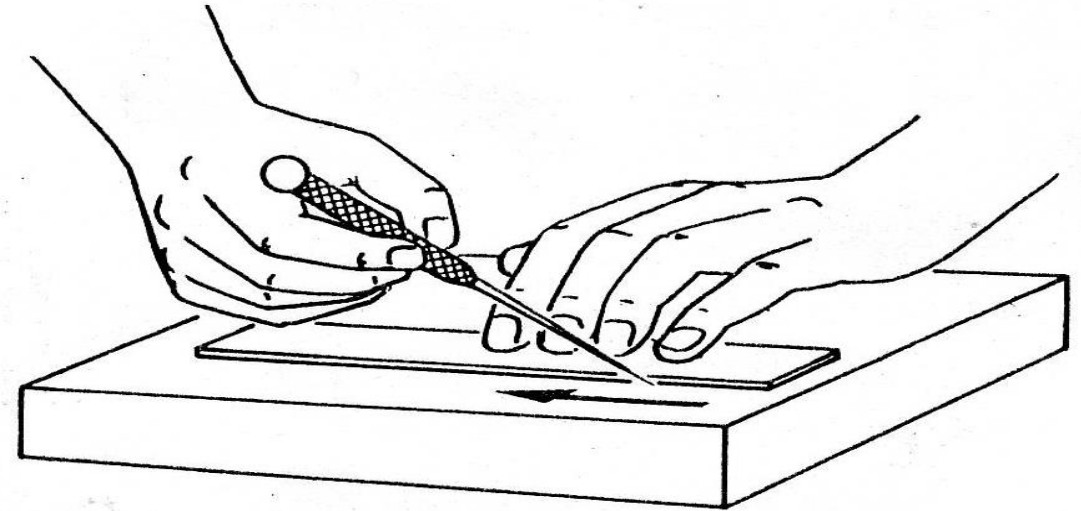
Lubricant should be used. The threads must be cleaned as often as is necessary.



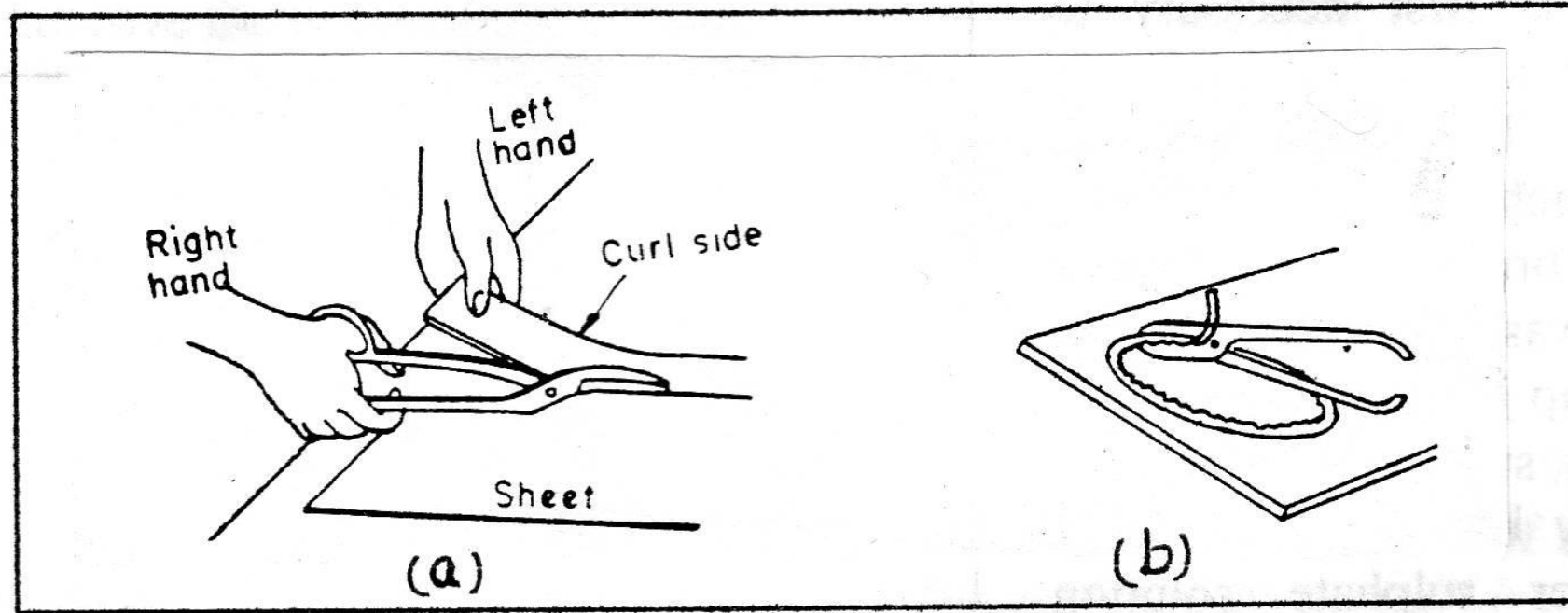
Scribing

- Prepare the surface
- Place the ruler for on surface where marking is to be done
- Tilt the scribe at an angle

Hold the scribe **away from the body** while scribing.



Shearing



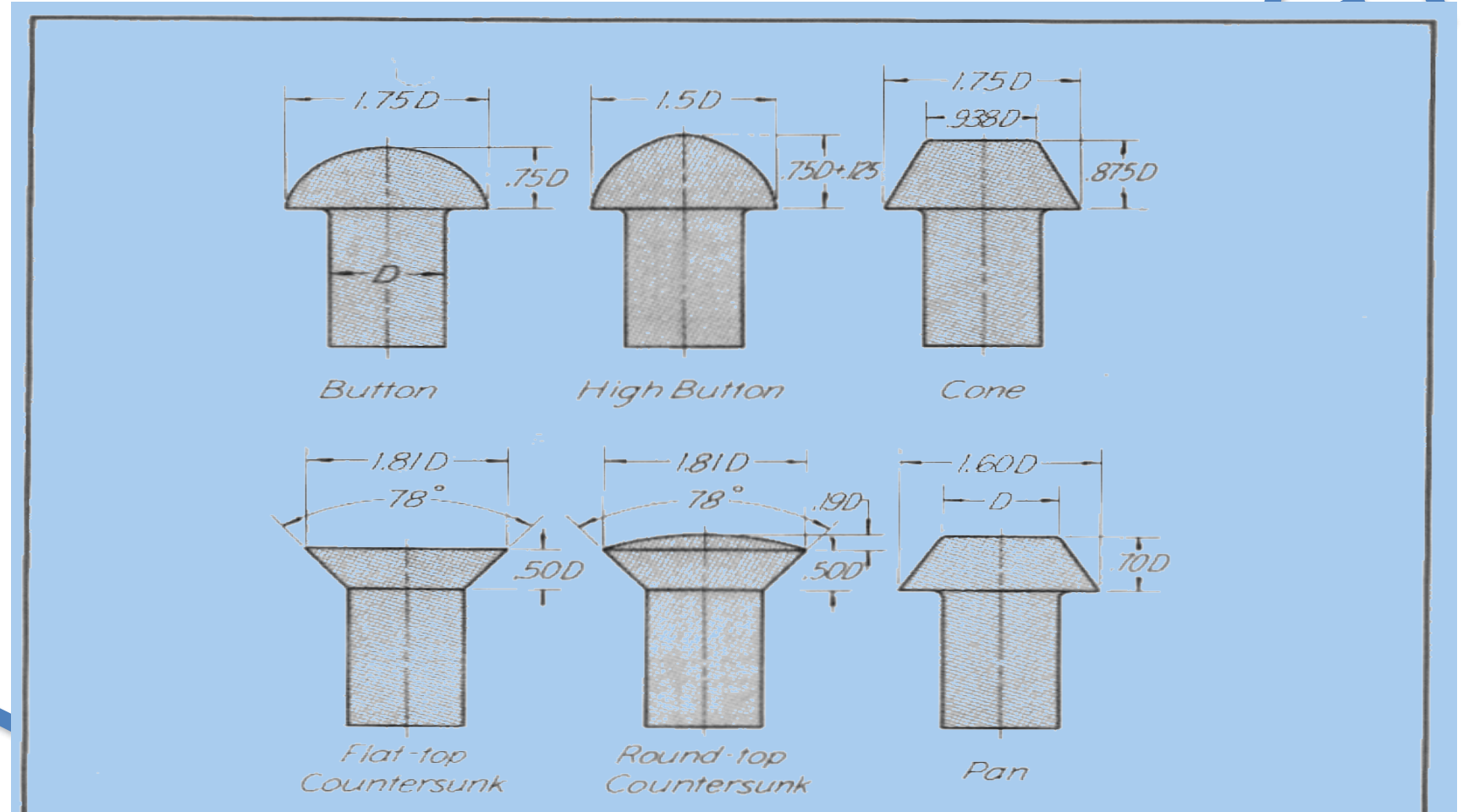
a) Straight cutting

b) Cutting inside curves

Fig: Cutting Process

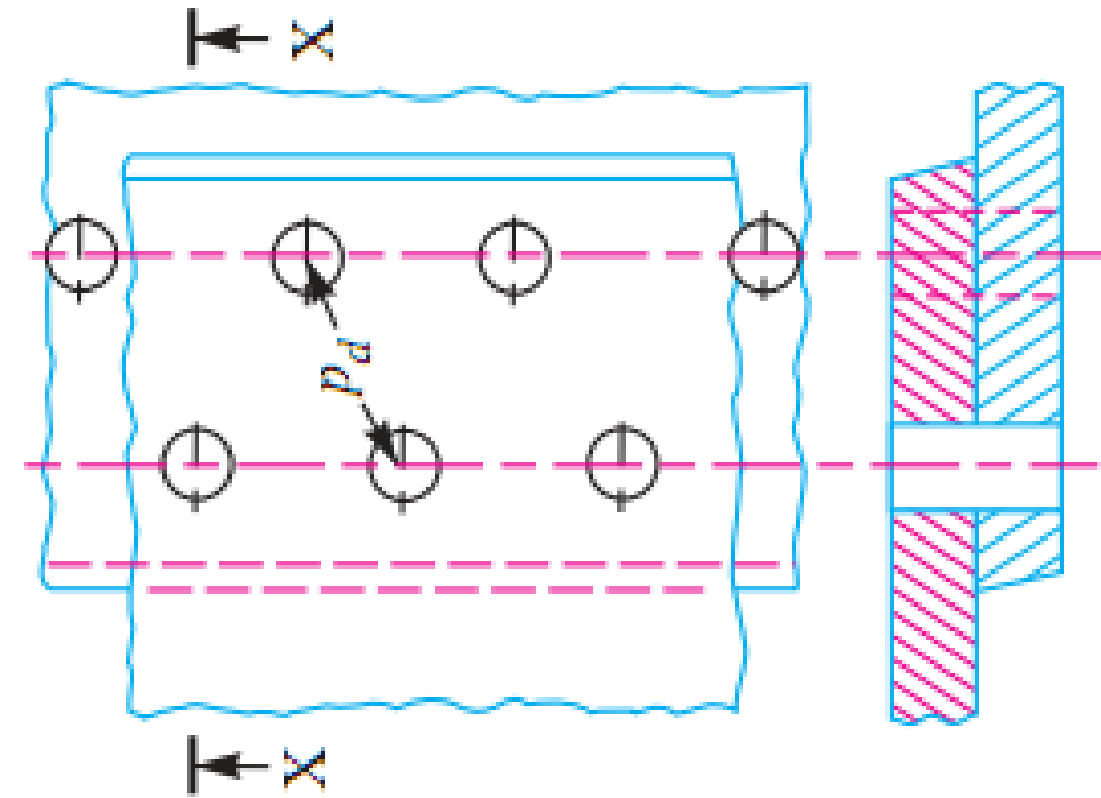
Riveting

$$d = 6\sqrt{t}$$

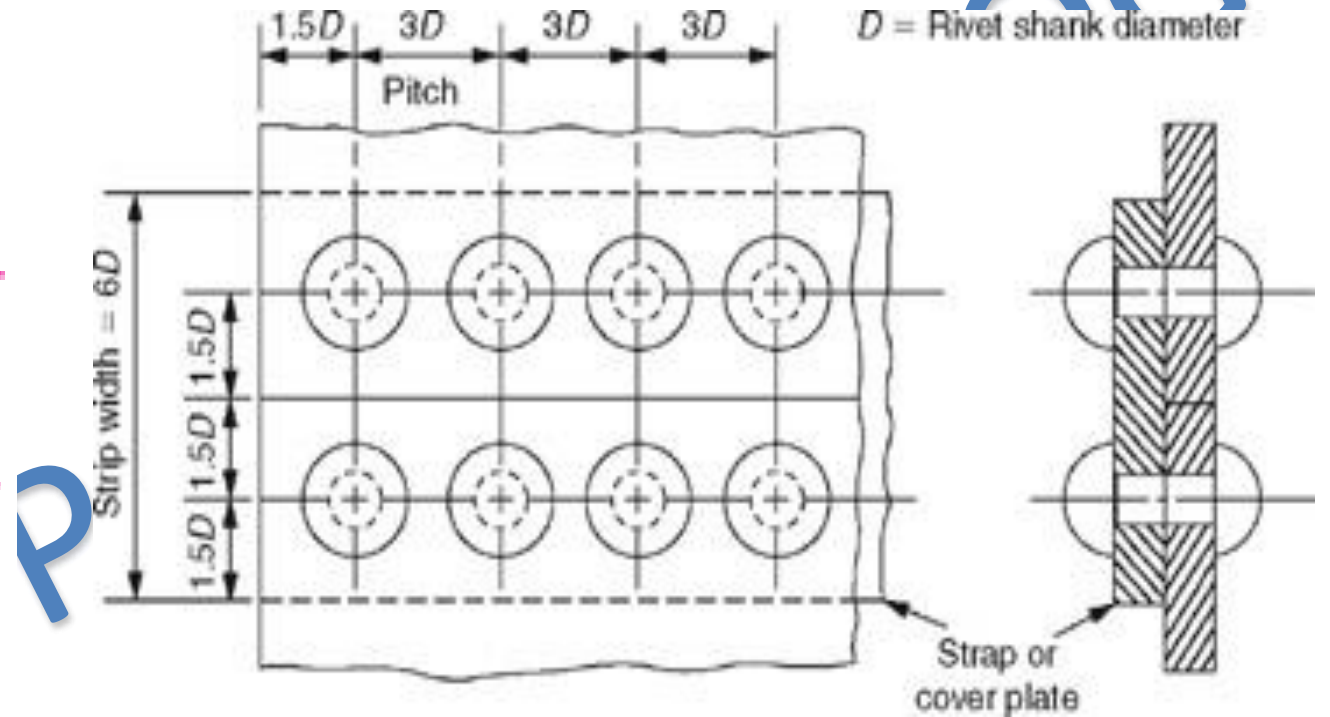


WORK

Riveting



Lap Joint



Butt Joint

Thank You