

LESSON 6

OPERATIONS ON LATHE

Introduction

Though lathe is used for producing cylindrical jobs, with special accessories and attachments, it can be used for machining of non-cylindrical jobs. The different operations that can be done on cylindrical job include turning, facing, knurling, thread cutting, grooving, and drilling. These operations are described briefly in the following sections.

6.1. Turning:

Turning is a machining process to produce parts round in shape by a single point tool on lathes. The tool is fed either linearly in the direction parallel or perpendicular to the axis of rotation of the workpiece. The primary motion of cutting in turning is the rotation of the workpiece, and the secondary motion of cutting is the feed motion. The operation in **Figure-1** is the turning operation. This operation is used to reduce the diameter of a part to a desired dimension for the desired length of job. The resulting machined surface is cylindrical. The reduction in diameter of the job depends upon the depth of cut chosen. For example, if the depth of cut is 2 mm it will reduce the job diameter by 4 mm. The tool used for the turning operation is called turning tool.

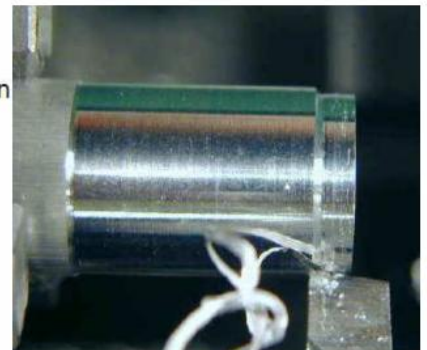
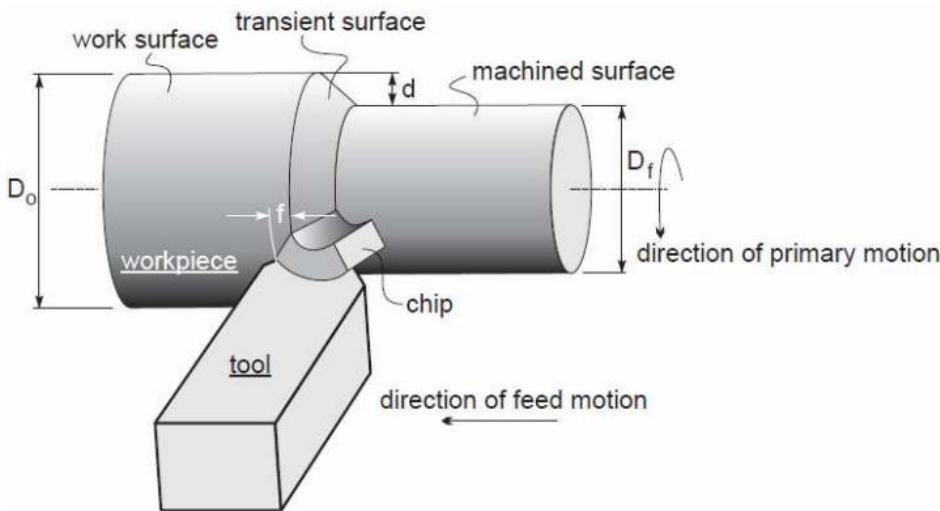


Figure 1: Turning operation

6.2. Facing:

Facing is the operation of machining the end or face of the job. Facing is used for reducing the length of the workpiece. The operation involves feeding the tool perpendicular to the axis of rotation of the workpiece from outer surface to centre. Note that in case of facing operation, the length of tool travel is equal to half the diameter of the job. The depth of cut is along the axis of the job.

The facing operation is shown in Figure-2. Facing produces a flat surface.

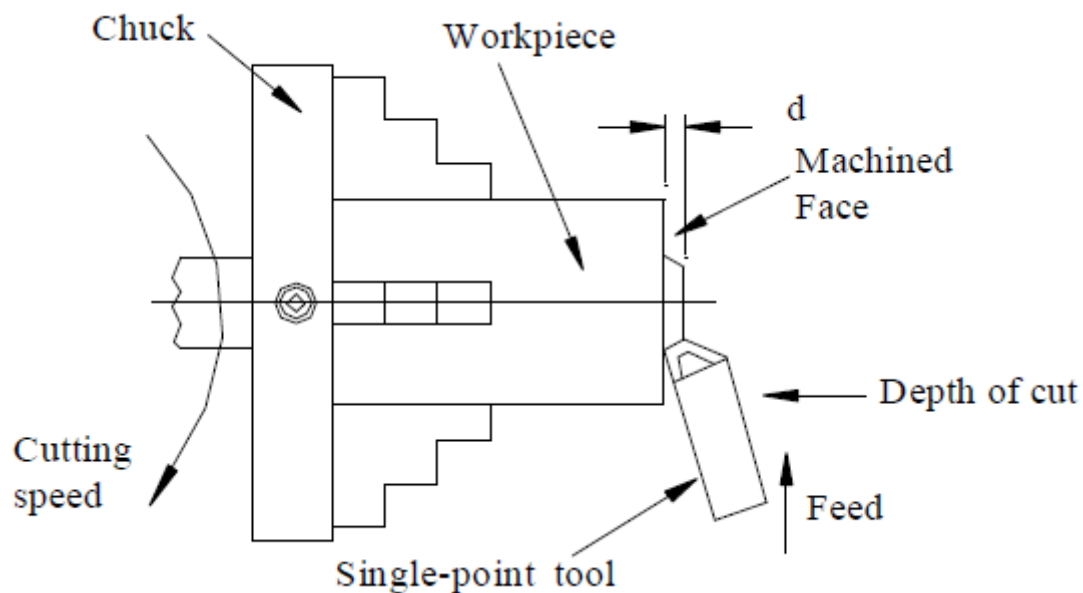


Figure 2: Facing operation

6.3. Knurling:

This is not a machining operation at all, because it does not involve material removal. Instead, it is a metal forming operation used to produce a regular crosshatched pattern in the work surface.

The knurling process is shown in **Figure 3**. The knurling tool consists of a set of hardened steel rollers in a holder with the teeth cut on their surface in a definite pattern.

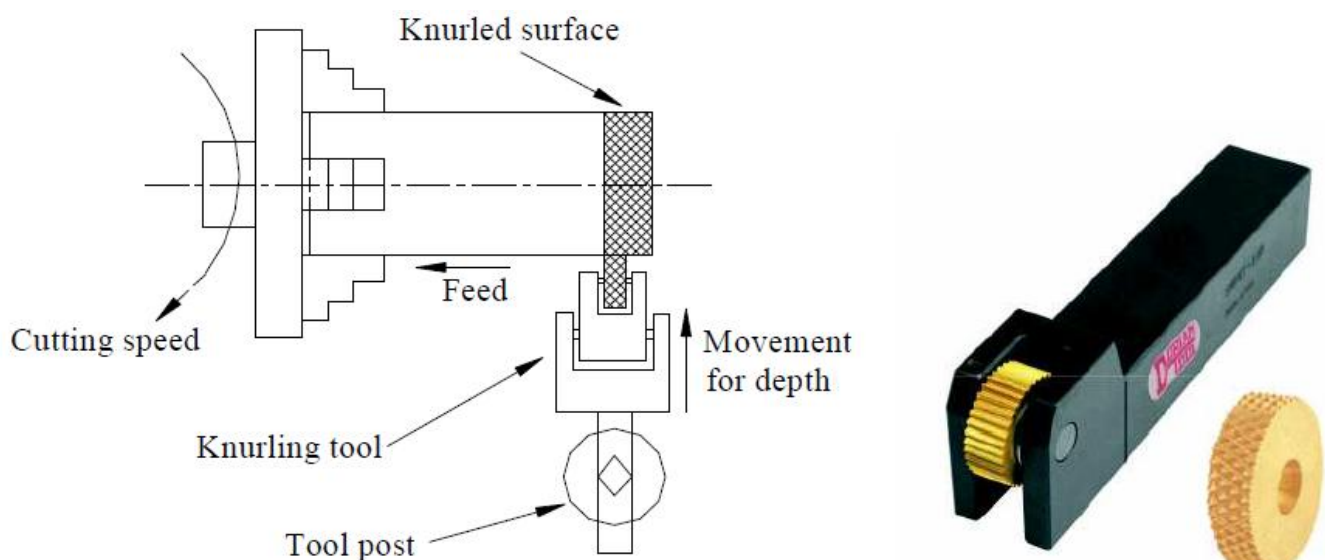


Figure 3: The knurling operation

6.4. Drilling:

Drilling is the operation of production of holes in a workpiece. **Figure 4** shows how drilling operation is performed on a lathe.

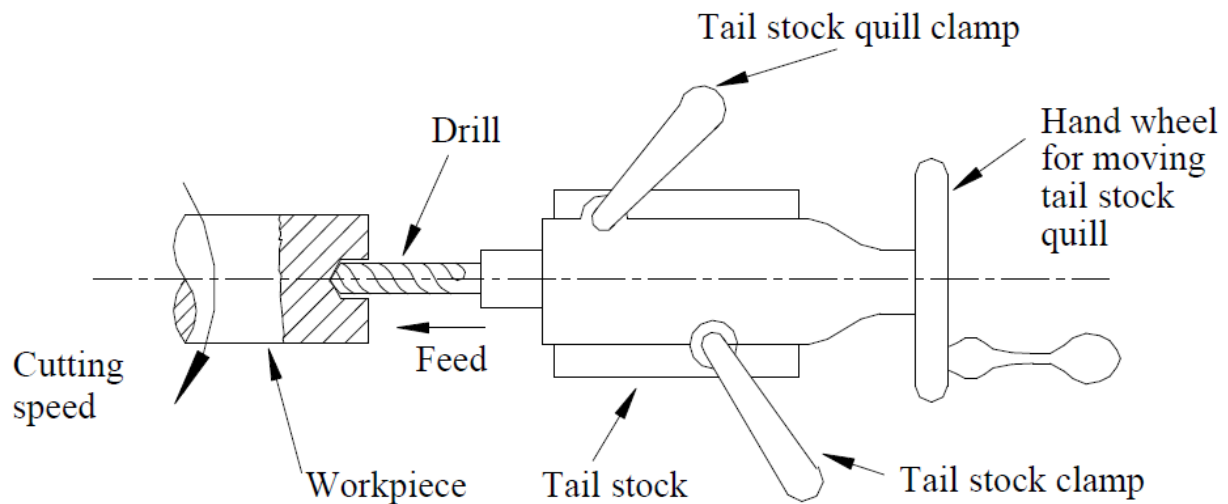


Figure 4: Drilling operation on a lathe

While doing the drilling operation on a lathe, the workpiece is held in a chuck. The drill (the cutting tool) is held in the tailstock and is positioned near the workpiece by moving the tailstock along the guideways. The tool is fed against the workpiece (the feed motion) by rotating the handle of the tailstock in clockwise direction. Once the hole is drilled, the tool is withdrawn by rotating the tailstock handle in the anti clockwise direction.

6.5. Thread Cutting:

Thread cutting is the operation of producing a helical groove of specific shape on a cylindrical surface. Figure 5b shows the setup of a lathe for thread cutting. Thread cutting operation is done using a single point tool called *thread cutting tool*.

Threads are cut using lathes by advancing the cutting tool at a feed exactly equal to the thread pitch. For producing threads of pitch p mm, the tool must travel a distance equal to p mm as the workpiece makes one complete rotation. The single-point cutting tool cuts in a helical band, which is actually a thread.

The definite relative rotary and linear motion between the workpiece and tool is achieved by locking or engaging the carriage with the lead screw through a screw and nut mechanism and fixing a gear ratio between the head stock spindle and lead screw. This is done by using change gear mechanism or a gearbox between the spindle and lead screw.

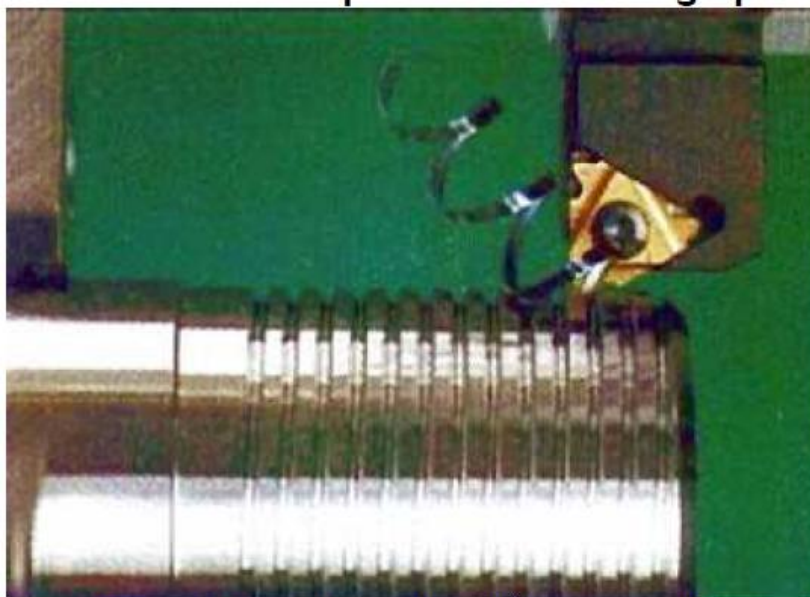


Figure 5a: Thread cutting operation

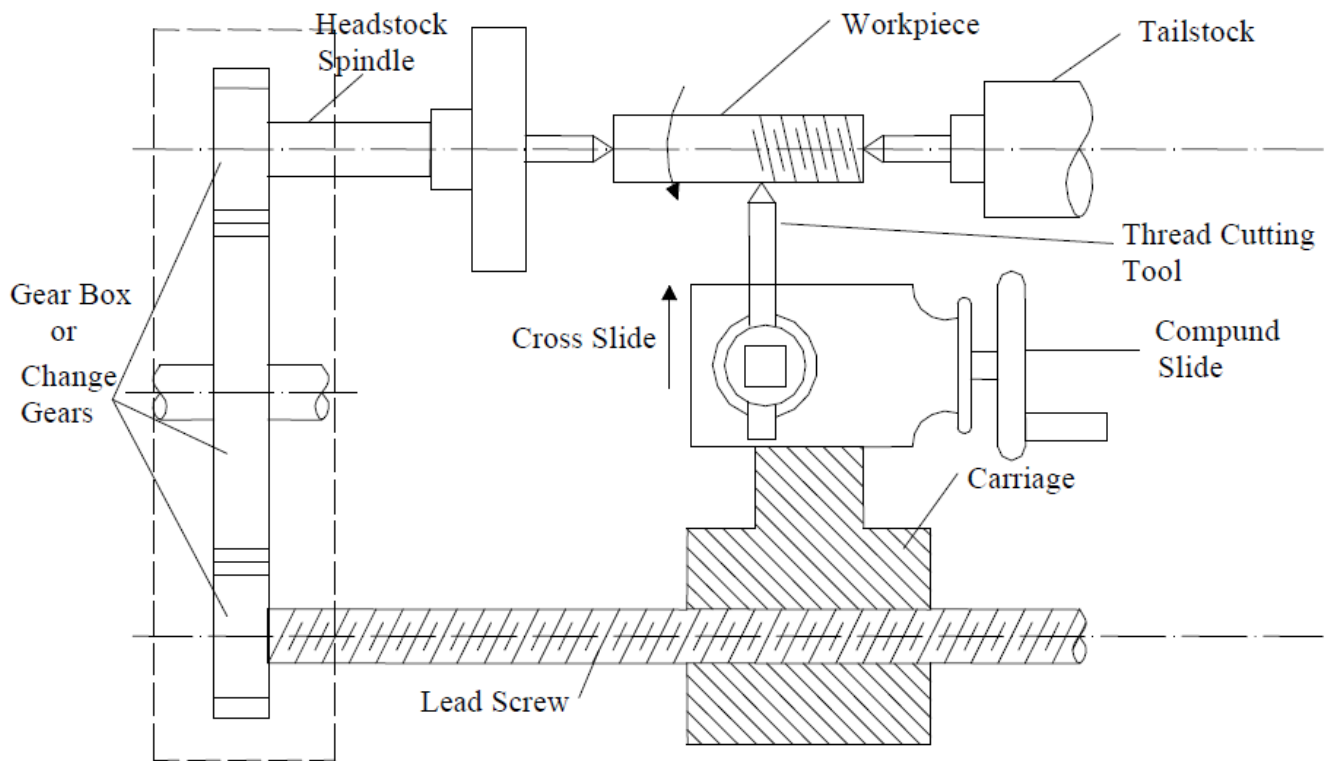


Figure 5b: Lathe set up for thread cutting operation

6.6. Grooving:

Grooving or groove cutting is the process of producing a narrow groove on the surface of a cylindrical job. The diameter of the workpiece is reduced slightly from the surface over a narrow width.

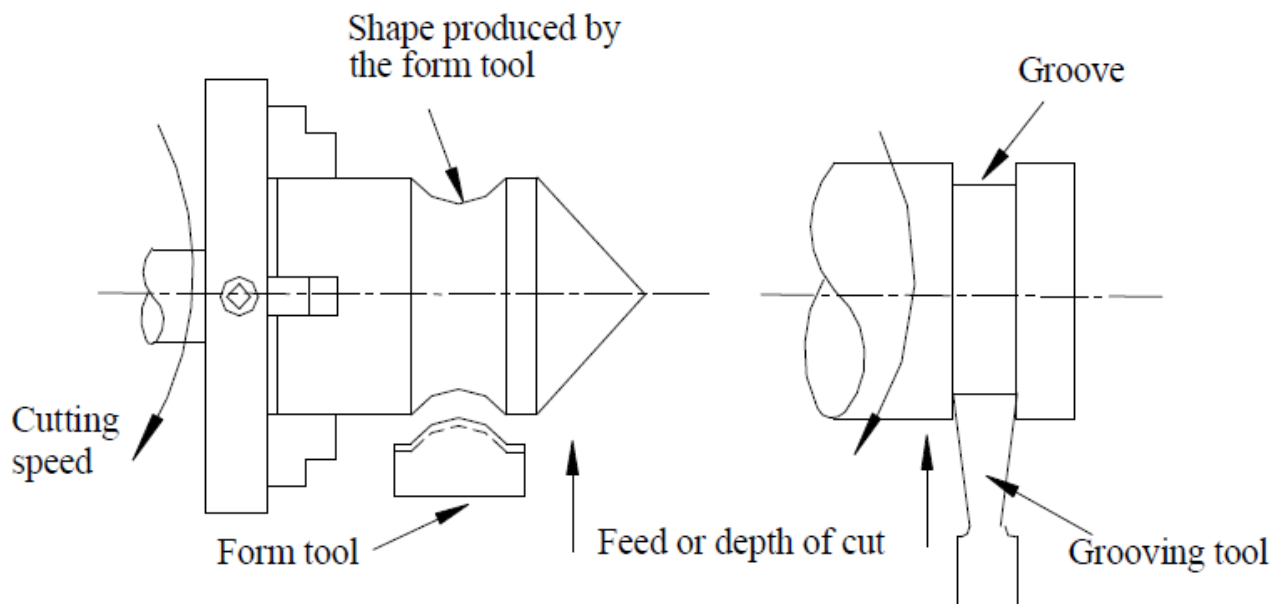


Figure 6: Grooving operations

Depending on the shape of the tool, it is possible to have square, round, or any other shape grooves. In grooving operation, the shape of the tool is reproduced on the workpiece; hence, this process is also known as form turning operation.

Glossary

Attachments: Pièces Jointes

Turning: Tournage

Machined: Usiné

Facing : Le surfaçage

Transient surface: surface transitoire

Outer Surface: la surface extérieure

The depth: La profondeur

Flat Surface : Surface Plane

Knurling: Moletage

Involve Material: Enlèvement Des Matériaux

Instead: Il s'agit plutôt

Crosshatched Pattern: motif hachuré

Hardened Steel Rollers : Rouleaux en acier dure

Holder: support

Drilling: Forage

In Clockwise Direction: dans le sens des aiguilles d'une montre

Is Withdrawn : Est Retiré

Handle: poignée

Thread Cutting: Coupe de Filetag

Helical Groove: Rainure Hélicoïdale

The Setup: La Configuration

Thread Pitch: pas de filetage

Achieved: realize