

### Safety Precautions

- Do not support the work piece by hand – use work holding device.
- Use brush to clean the chip
- No adjustments while the machine is operating
- Ensure for the cutting tools running straight before starting the operation.
- Never place tools on the drilling table
- Avoid loose clothing and protect the eyes.
- Ease the feed if drill breaks inside the work piece.

### Drilling

- Creates a round hole in a workpart
- Contrasts with boring which can only enlarge an existing hole
- Cutting tool is called a *drill* or *drill bit*
- Customarily performed on a *drill press*, but can be done on a *vertical mill* and on a *lathe*

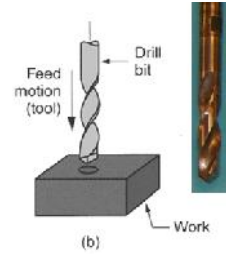


Figure 21.3 (b) drilling

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### Through Holes vs. Blind Holes

*Through-holes* - drill exits the opposite side of work  
*Blind-holes* – drill does not exit work on opposite side

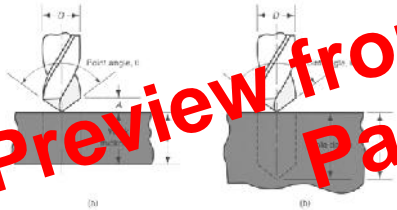


Figure 22.13 - Two hole types: (a) through-hole, and (b) blind hole

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### Reaming

Used to slightly enlarge a hole, **provide better tolerance on diameter**, and improve surface finish

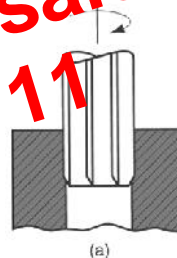


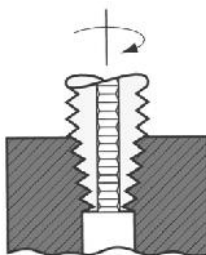
Figure 22.14 - Machining operations related to drilling: (a) reaming

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### Tapping



Used to provide internal screw threads on an existing hole

The tool is called a *tap*

(b)

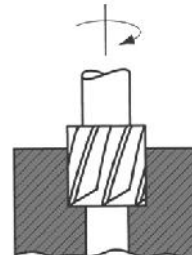
Figure 22.14 (b) tapping

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### Counterboring



Provides a stepped hole, in which a larger diameter follows a smaller diameter partially into the hole

(c)

Figure 22.14 (c) counterboring

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