

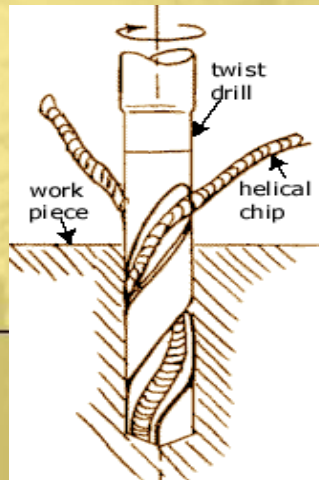


Proses drilling (bor/gurdi)

Oleh:

Dr. Dwi Rahdiyanta

Jurusan Pendidikan Teknik Mesin FT-UNY



Pendahuluan

Salah satu proses machining yang cukup mudah (sederhana)

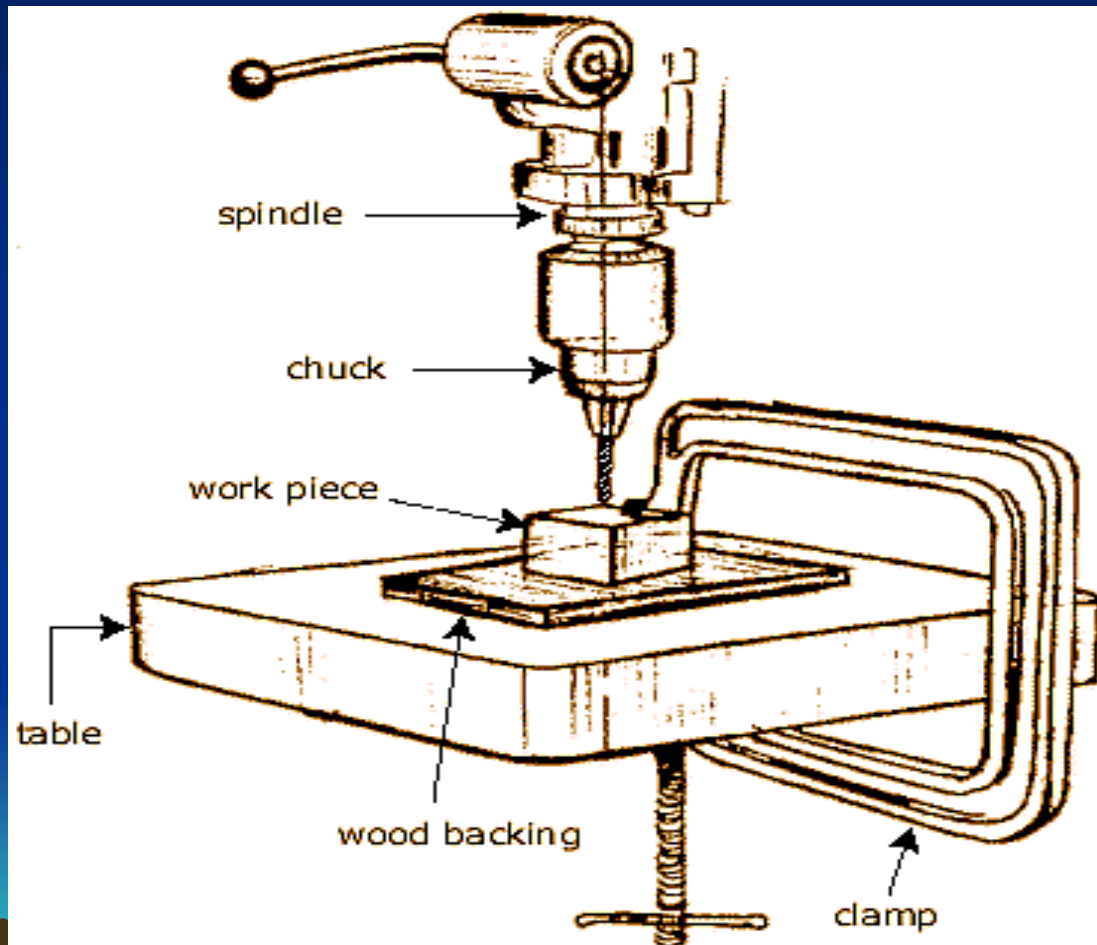
Hampir 75 % proses pembuatan komponen mesin melalui pengeboran

**Alat potong yang digunakan :
*twist drill***

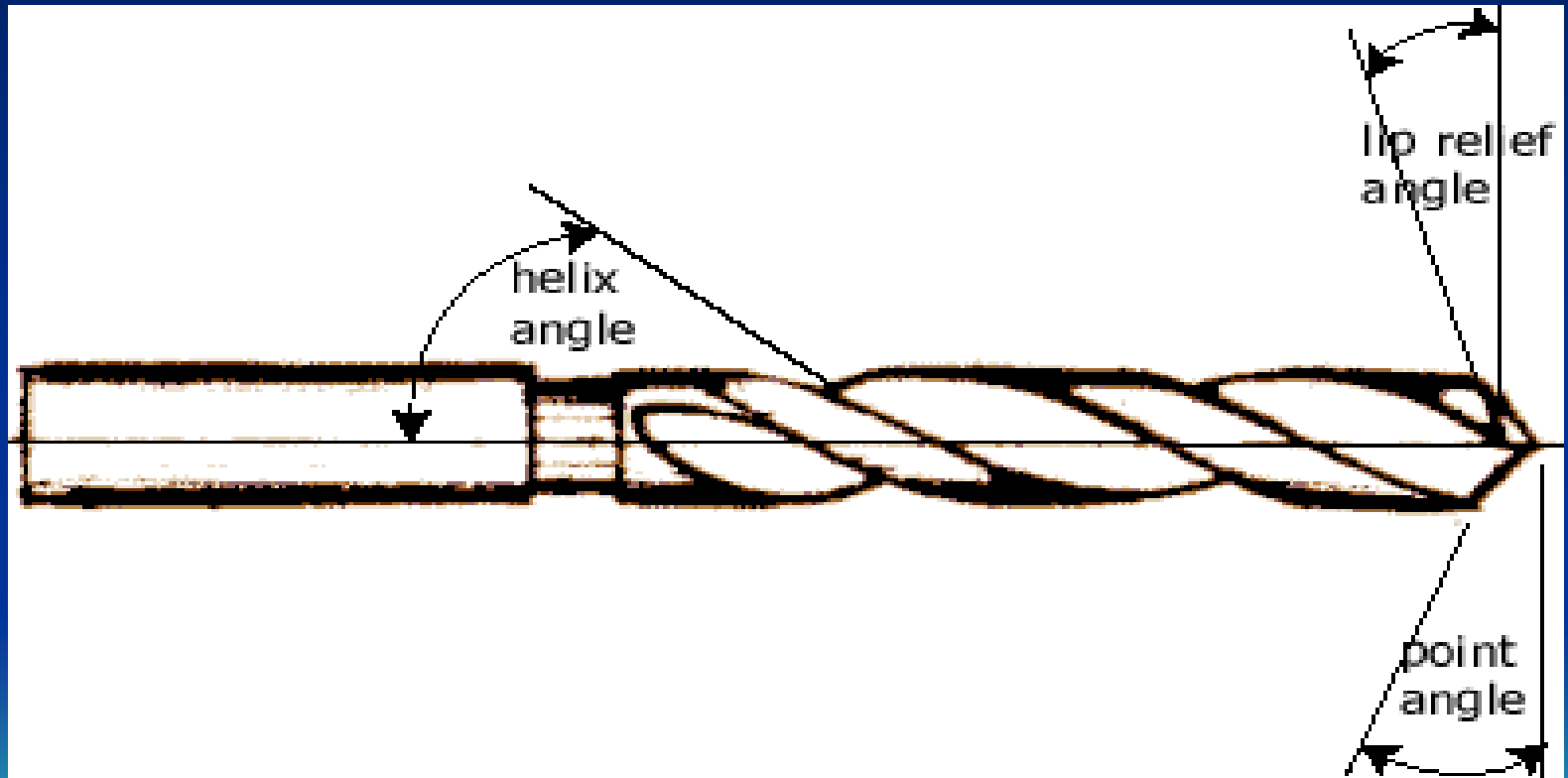
Karakteristik proses drilling

- The chips must exit out of the hole created by the cutting.
- Chip exit can cause problems when chips are large and/or continuous.
- The drill can wander upon entrance and for deep holes.
- For deep holes in large workpieces, coolant may need to be delivered through the drill shaft to the cutting front.
- Of the powered metal cutting processes, drilling on a drill press is the most likely to be performed by someone who is not a machinist.

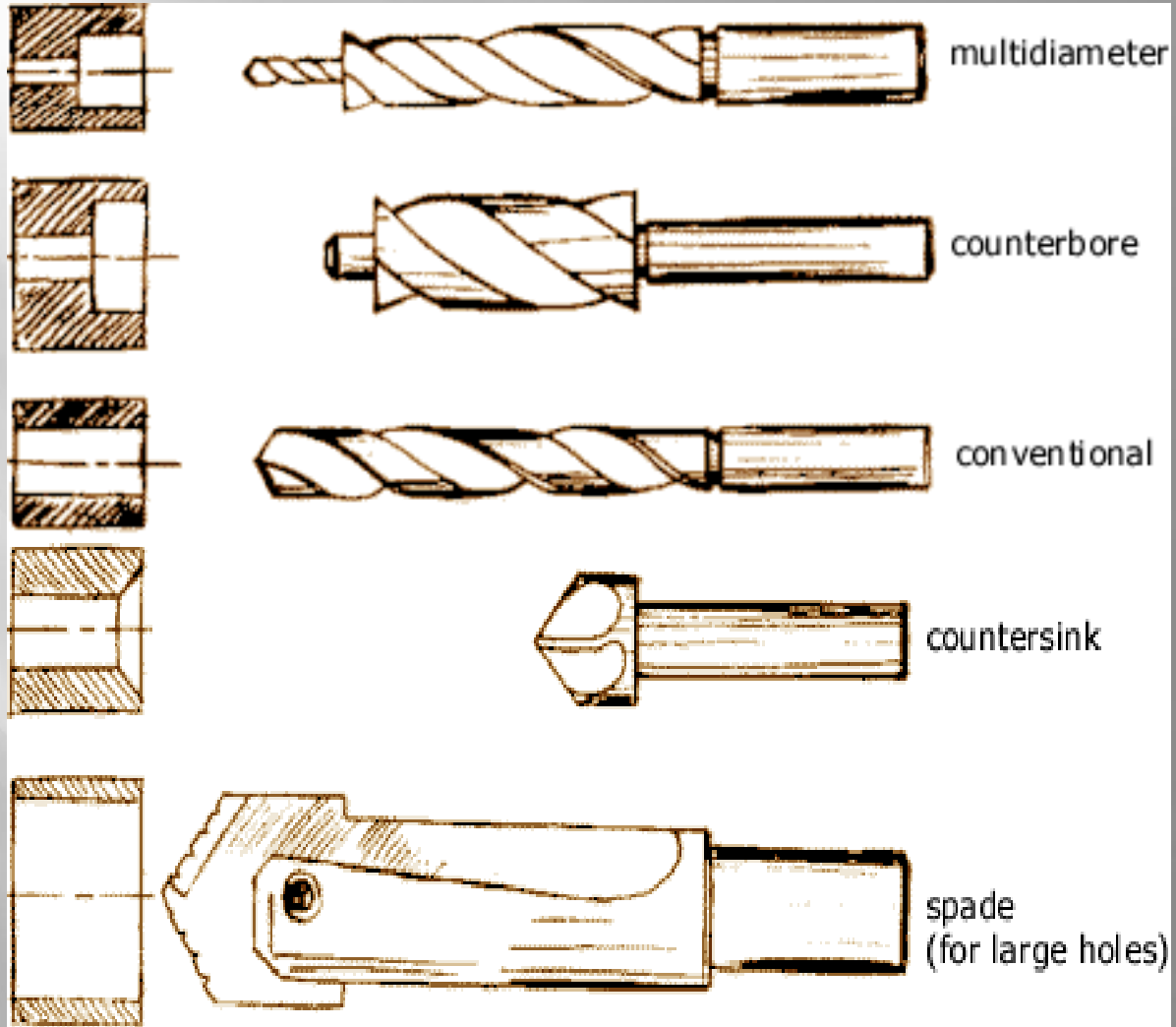
Drill Press Work Area



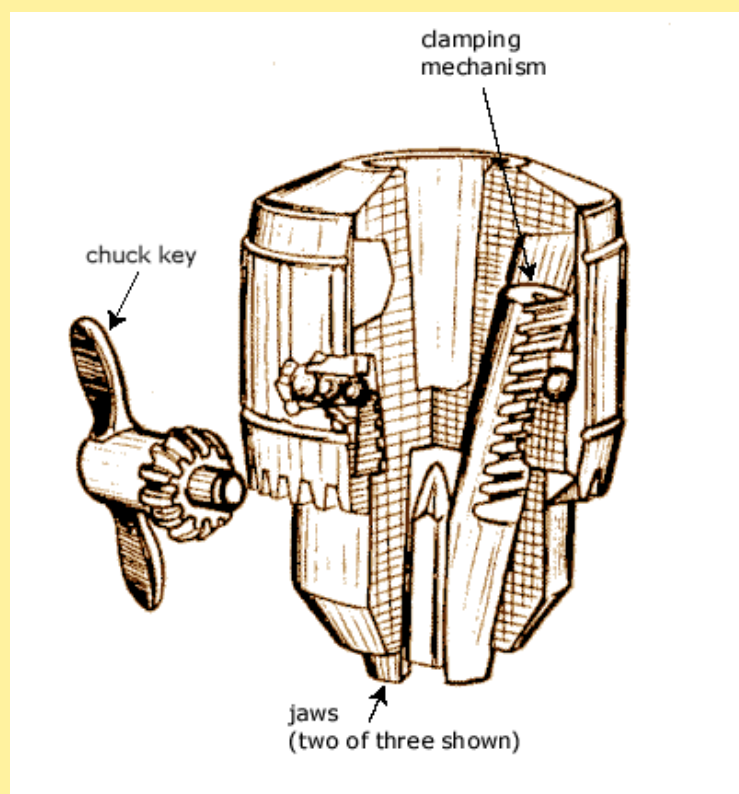
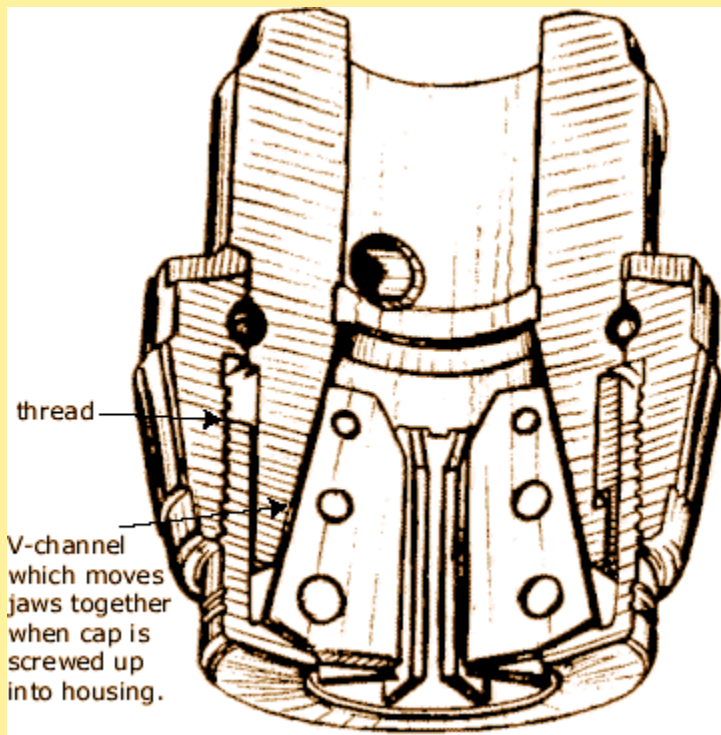
Twist Drill Bit



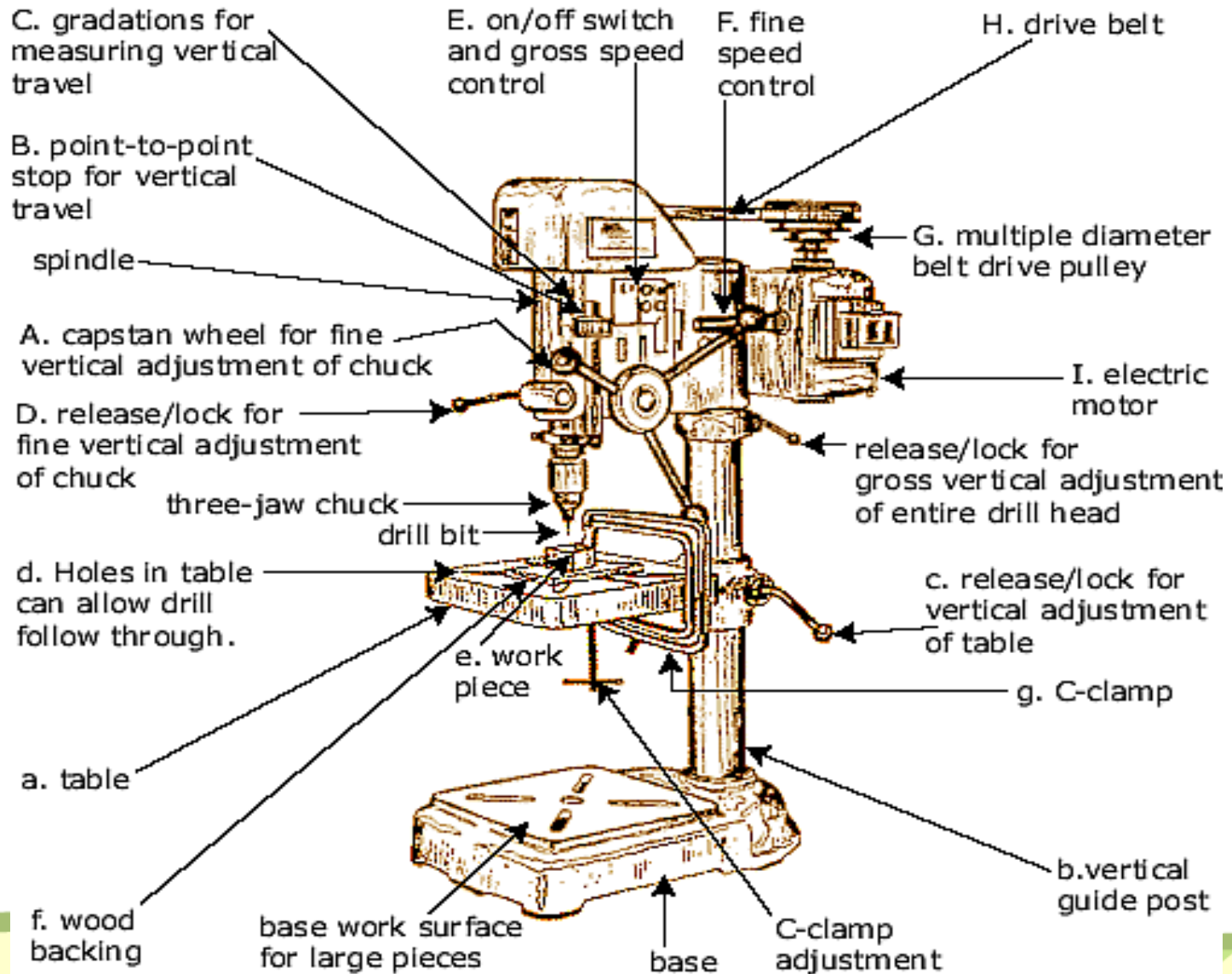
Drill Bit Variety



Drill Chucks



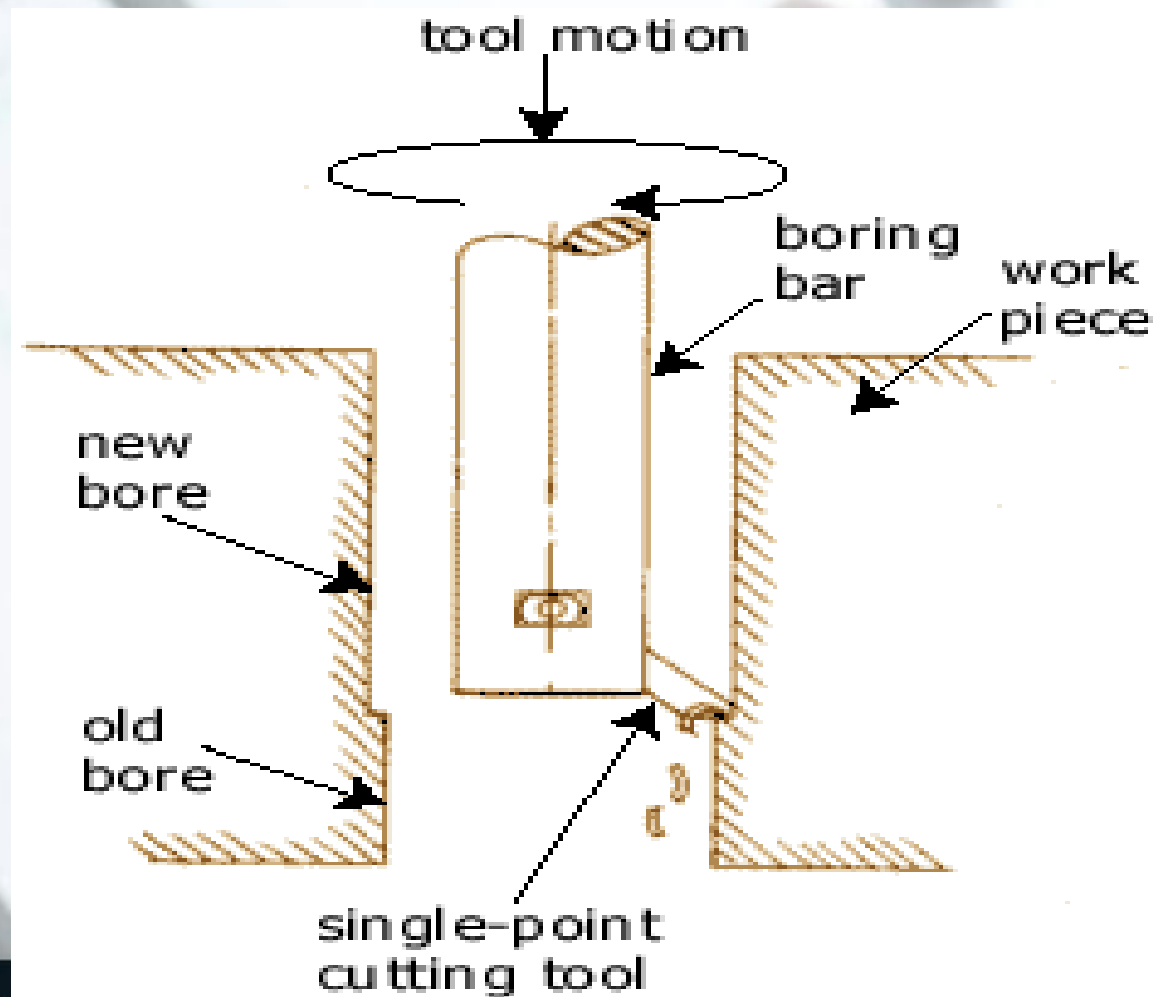
Drill Press Detail



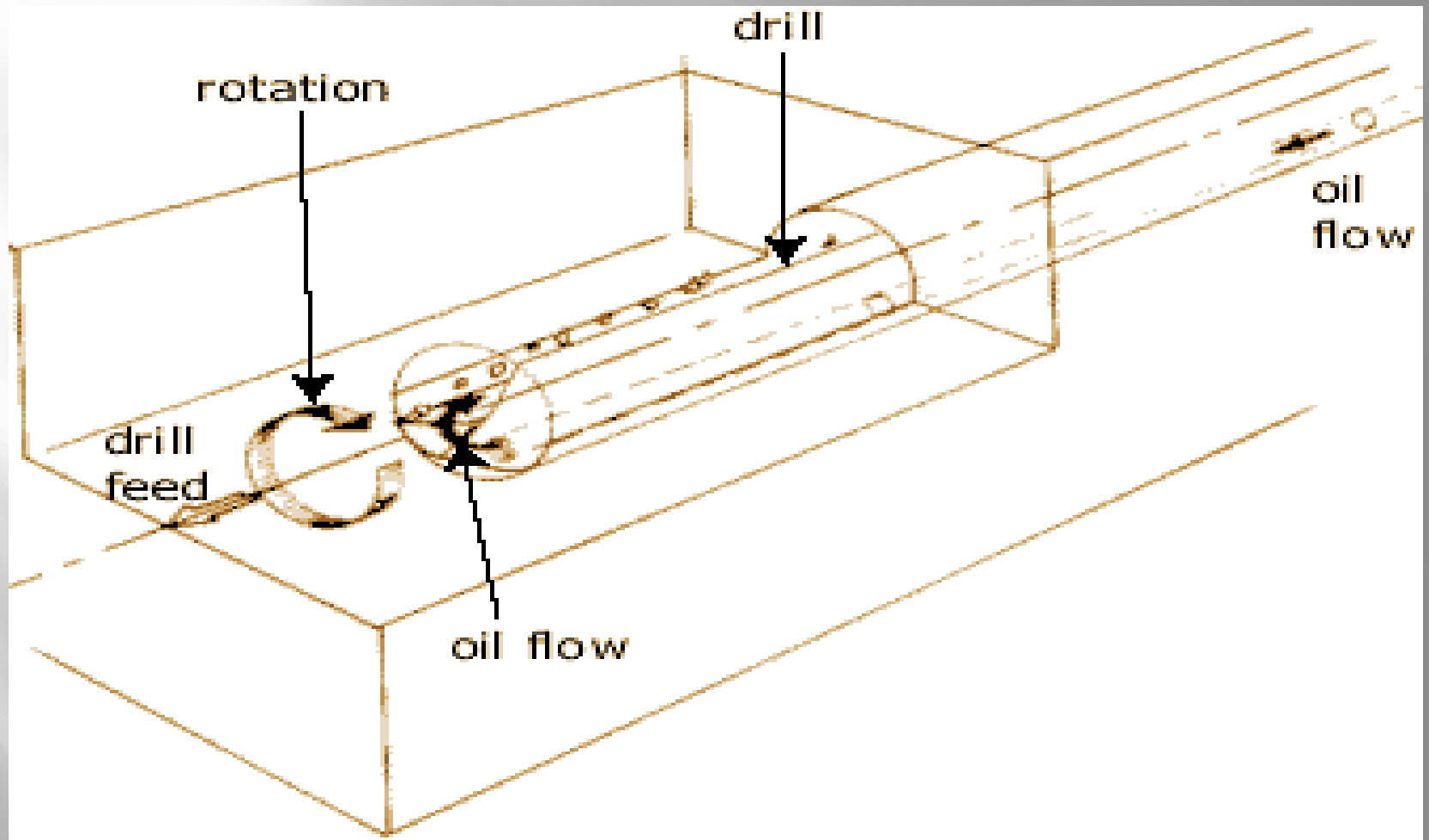
Jig Boring

- **Digunakan untuk memperluas lubang yang sudah ada (presisi)**
- **Ketelitian dapat mencapai $\pm 0,005$ mm (0,0002 inchi)**
- **Extra waktu dan perhatian**

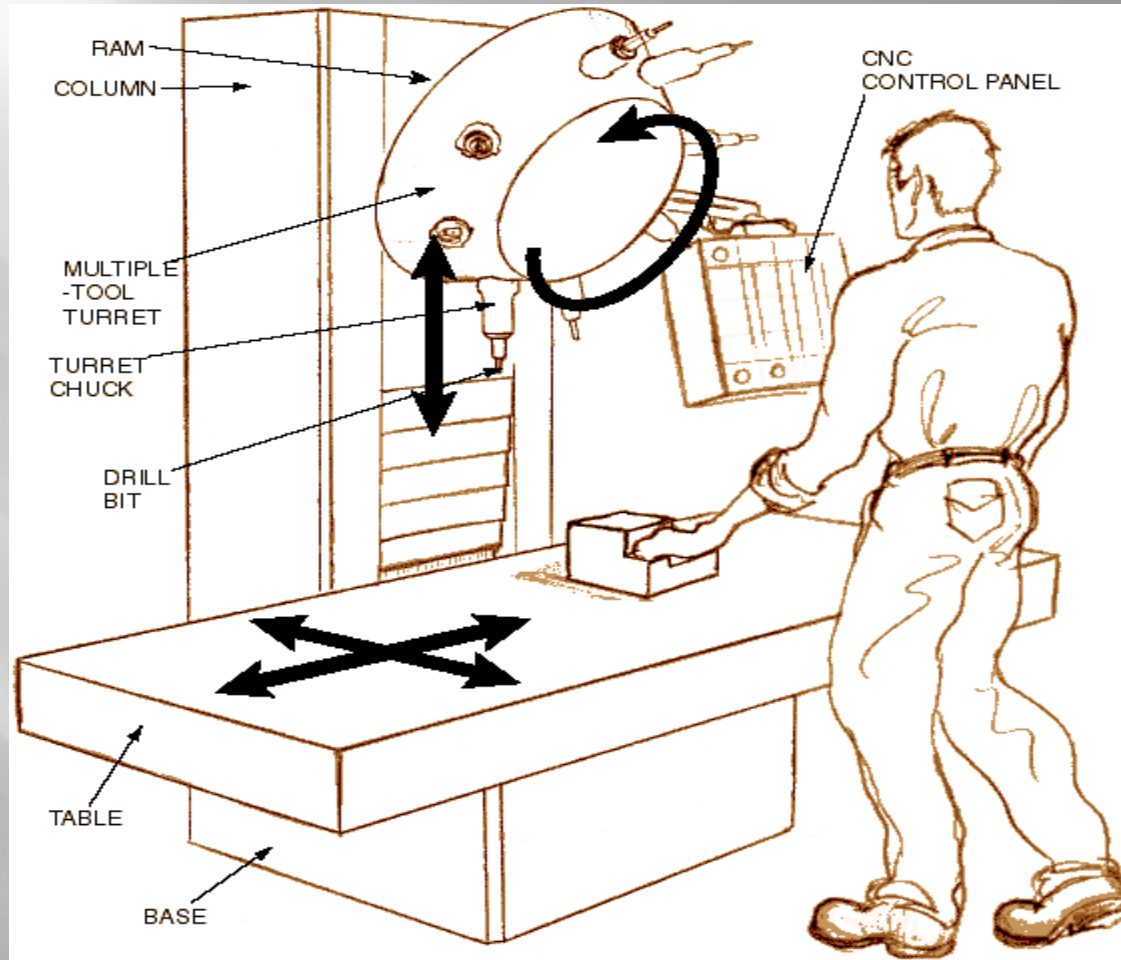
Jig boring...



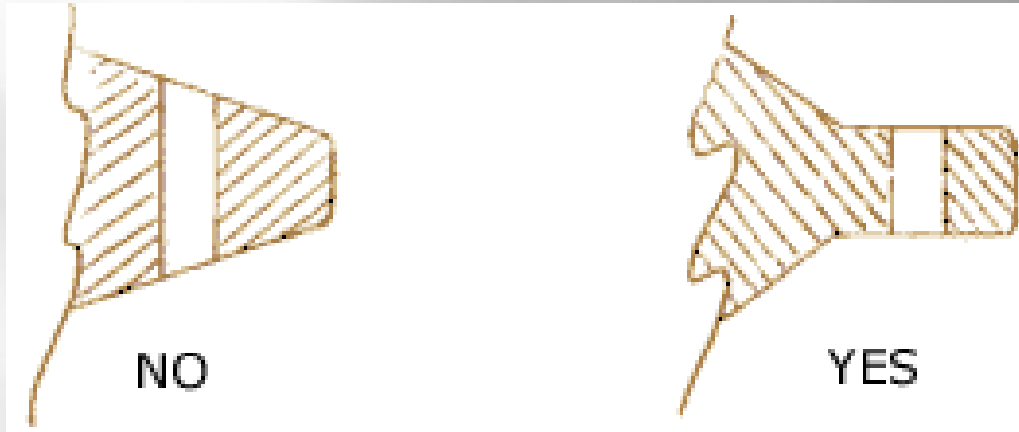
Jig boring...



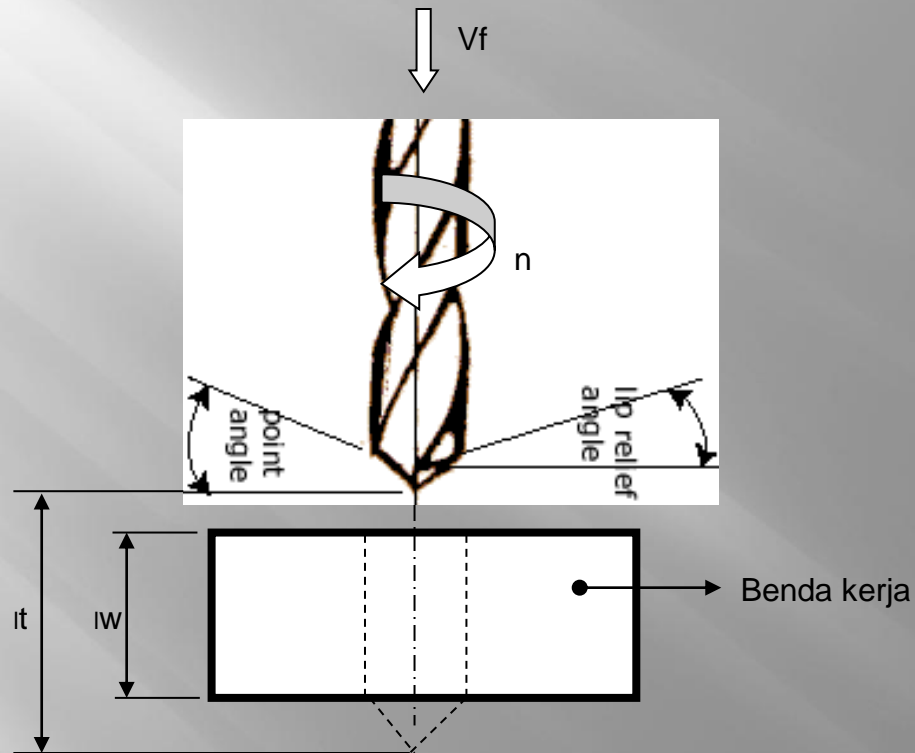
Computer Numerical Control (CNC) Drilling



Good or no good...



Elemen dasar proses drilling ...



Elemen dasar proses drilling ...

1. Benda kerja

- ▣ l_w : panjang pemotongan (mm)

2. Pahat

- ▣ d : diameter pahat (mm)
- ▣ K_r : Sudut potong utama (°)
 $\frac{1}{2}$ sudut ujung pahat (point angle)

Elemen dasar proses drilling ...

3. Mesin

- ▣ n : putaran poros utama (rpm)
- ▣ V_f : Kecepatan pemakanan (mm/min)

Rumus-rumus elemen dasar proses drilling ...

- ▣ Kecepatan potong (V)

$$V = \frac{\pi d n}{1000} \text{ m/min}$$

- ▣ Gerak makan per mata potong (fz)
- ▣ Kedalaman potong (a)
- ▣ Waktu pemotongan (tc)
- ▣ Kecepatan penghasilan total (Z)

Latihan soal...

- ▣ Sebuah disk brake sepeda motor setebal 12 mm akan di bor sejumlah 24 lubang dengan mata bor diameter 14 mm. Cutting speed yang digunakan 22 m/min, feed 0,2 mm/rev. Waktu setting 8 menit ditambah auxiliary time 1 menit setiap lubang. Jika waktu delay adalah 12 % dari waktu machining dan auxiliary, tentukan waktu operasi proses drilling tersebut