

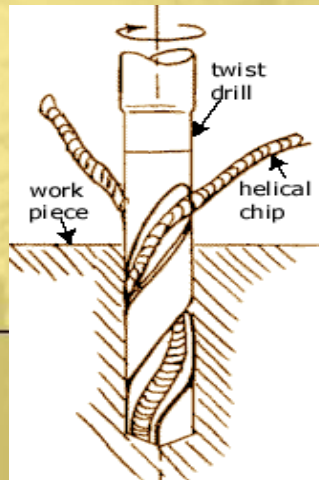


# Proses drilling (bor/gurdi)

Oleh:

**Dr. Dwi Rahdiyanta**

Jurusan Pendidikan Teknik Mesin FT-UNY



Pendahuluan

**Salah satu proses machining yang cukup mudah (sederhana)**

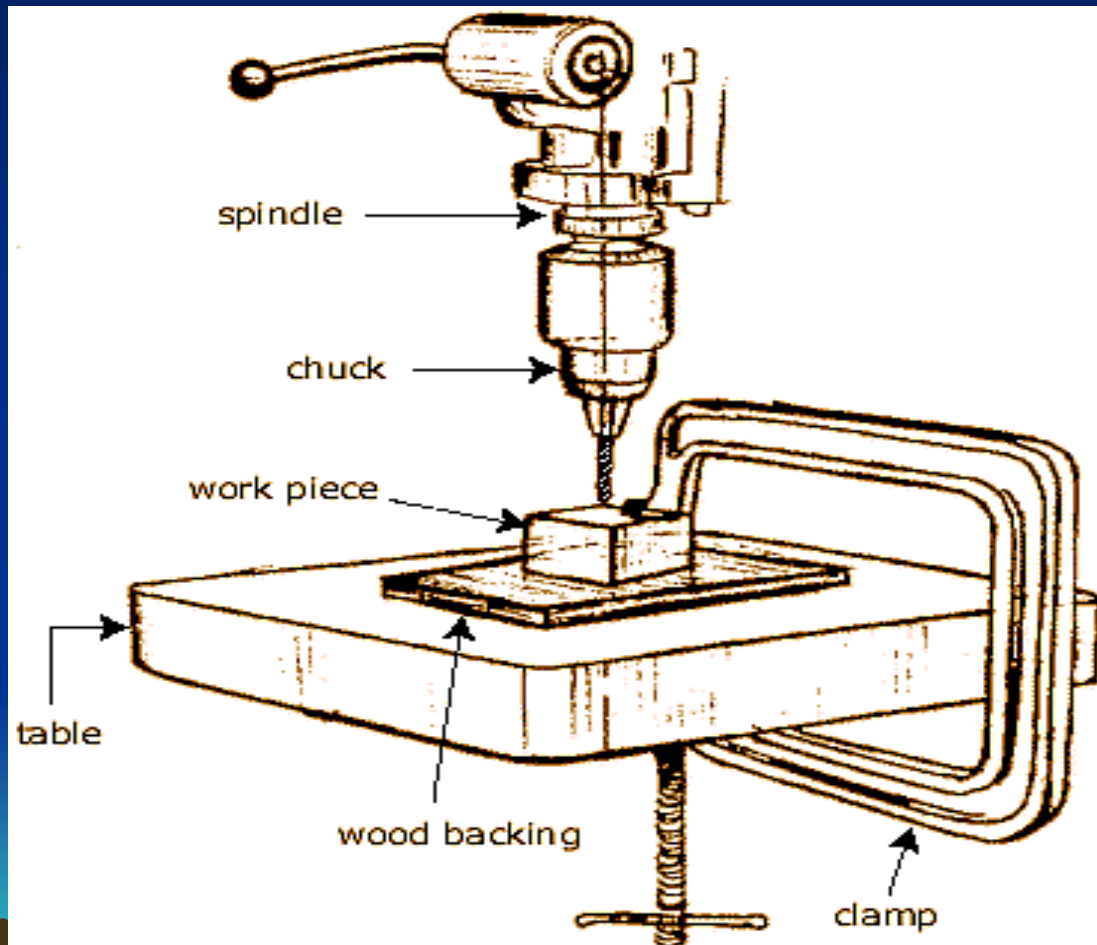
**Hampir 75 % proses pembuatan komponen mesin melalui pengeboran**

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

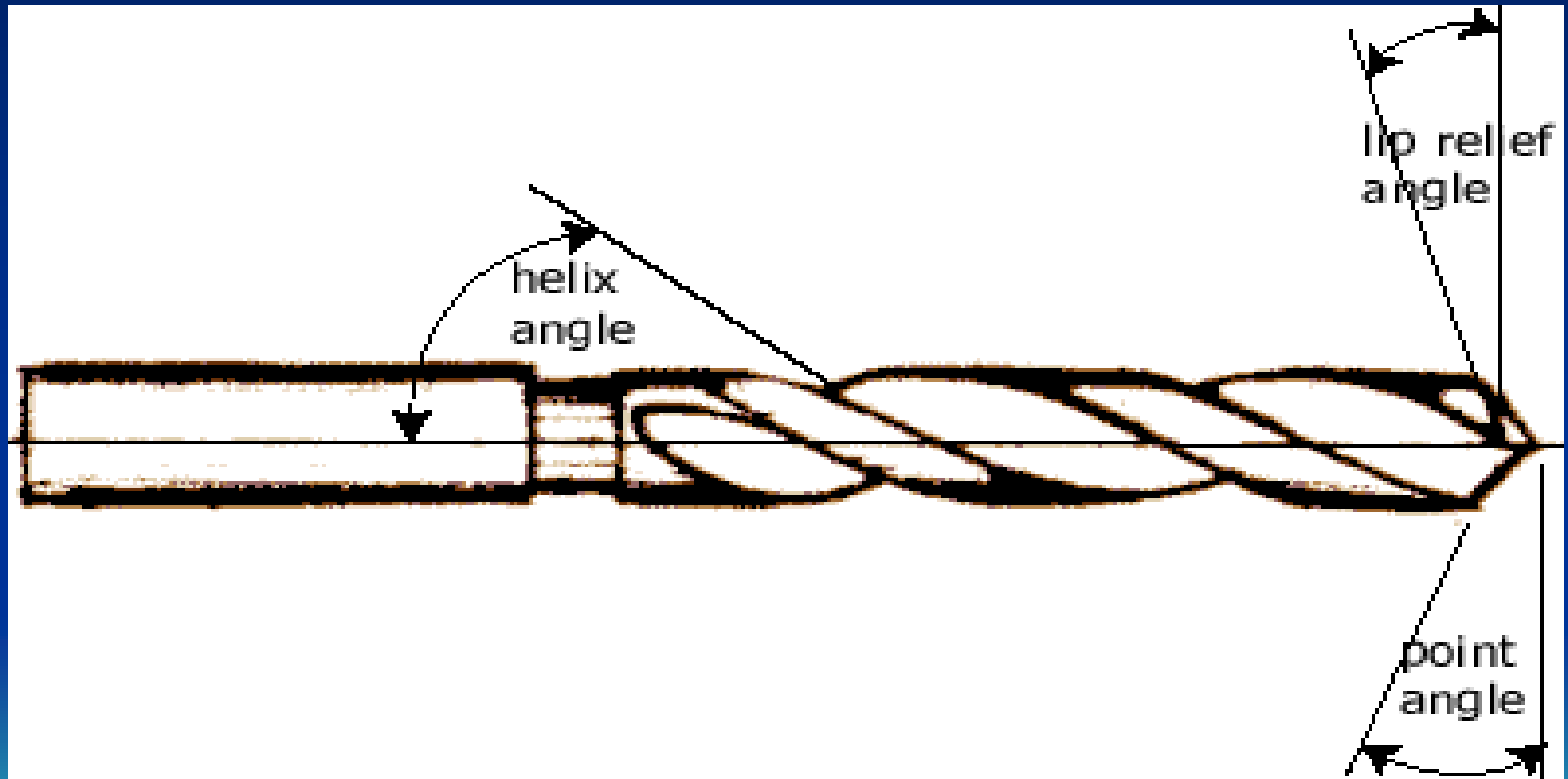
# Karakteristik proses drilling

- 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.

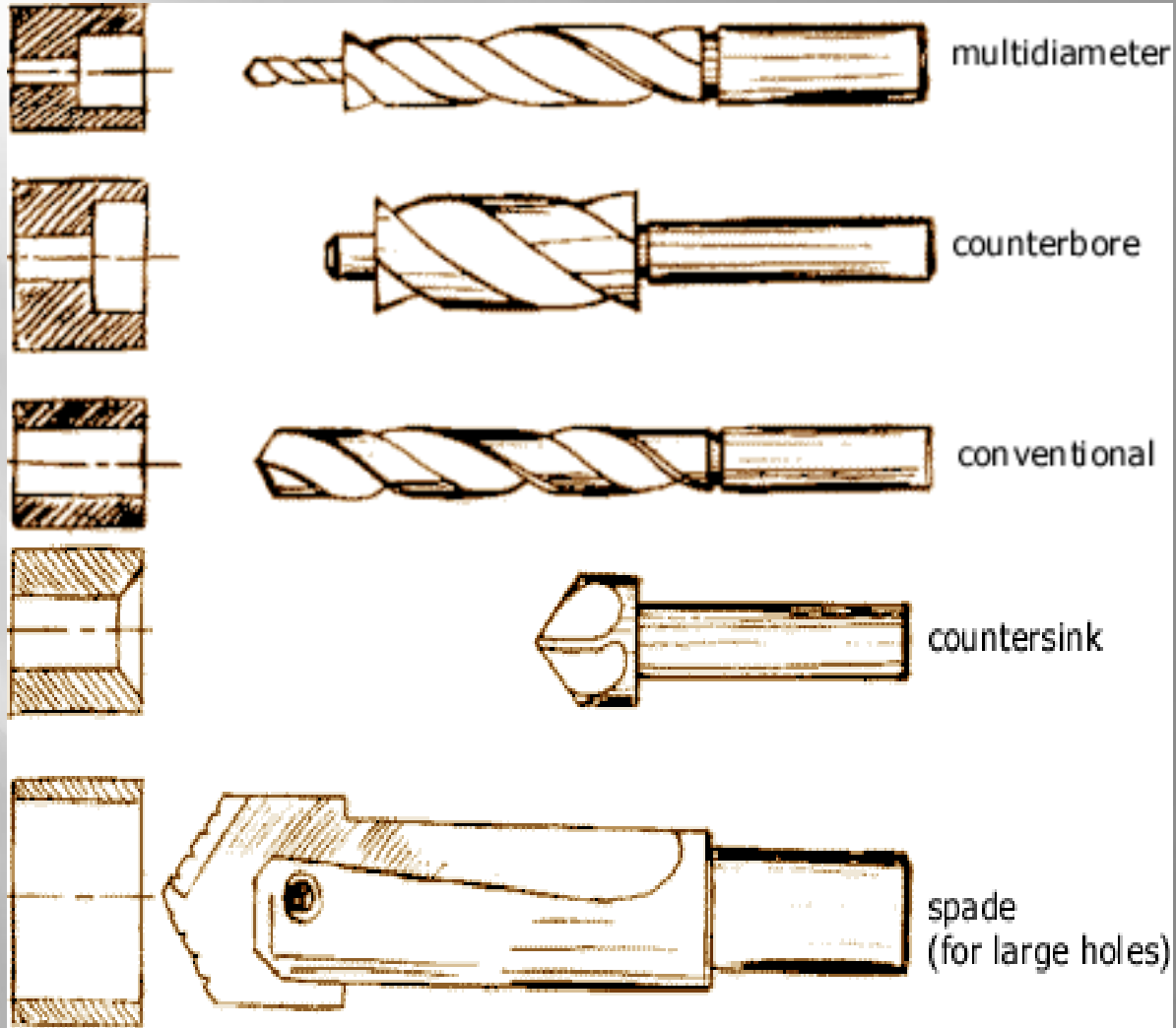
# Drill Press Work Area



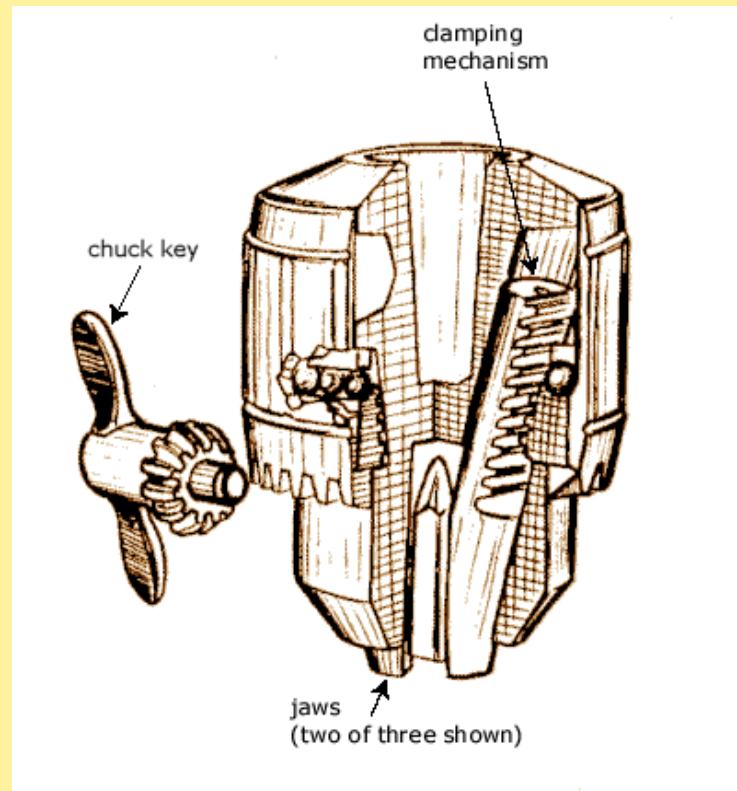
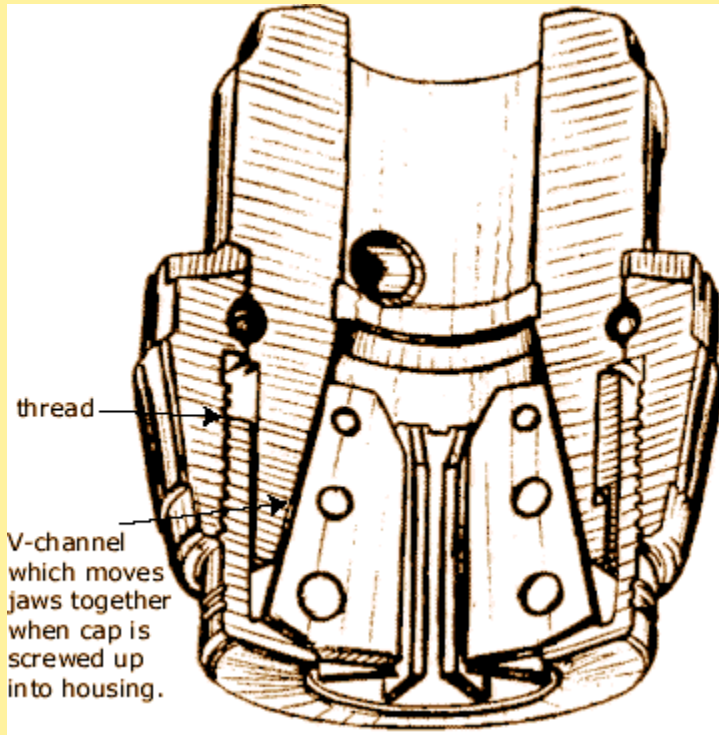
# Twist Drill Bit



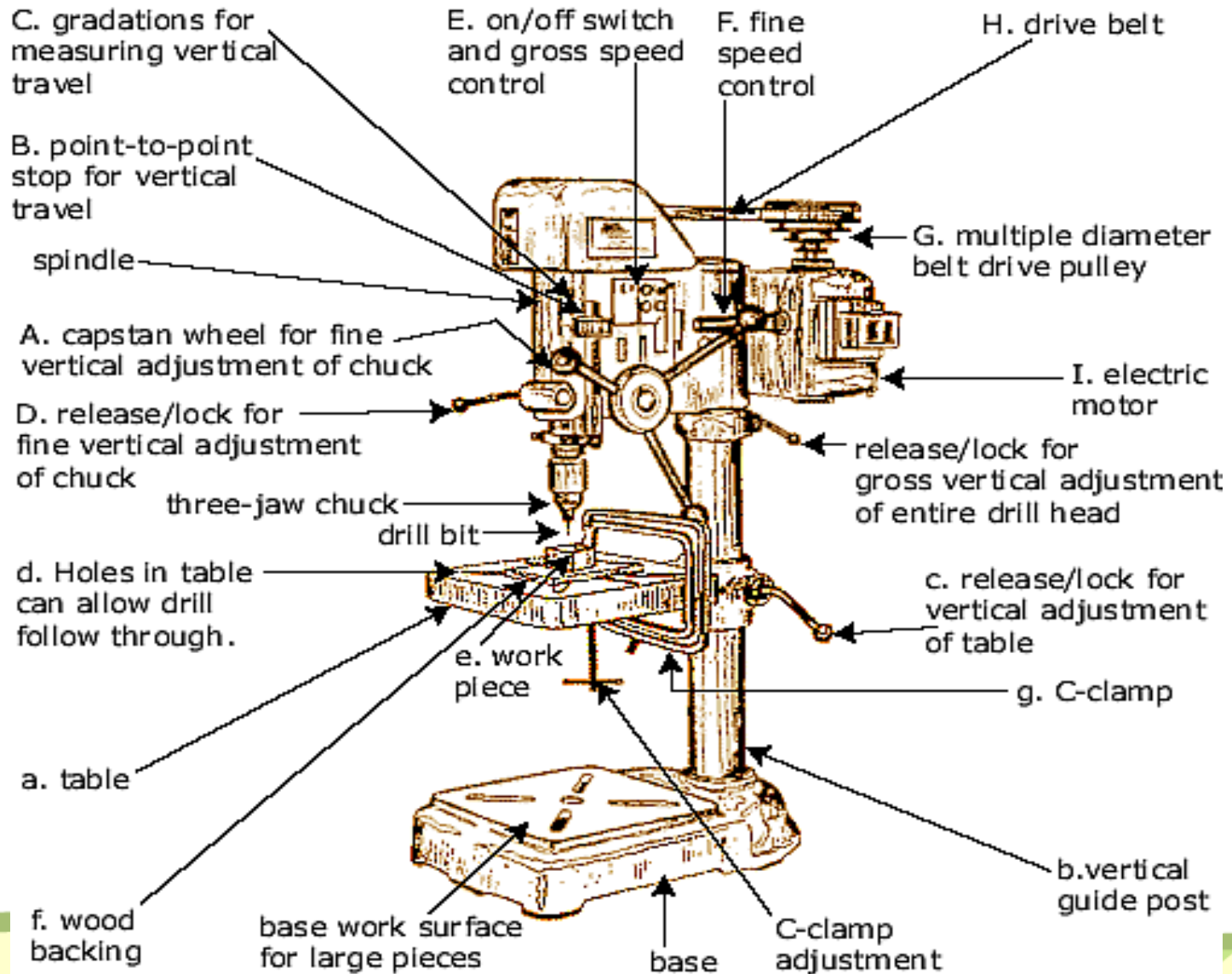
# Drill Bit Variety



# Drill Chucks



# Drill Press Detail

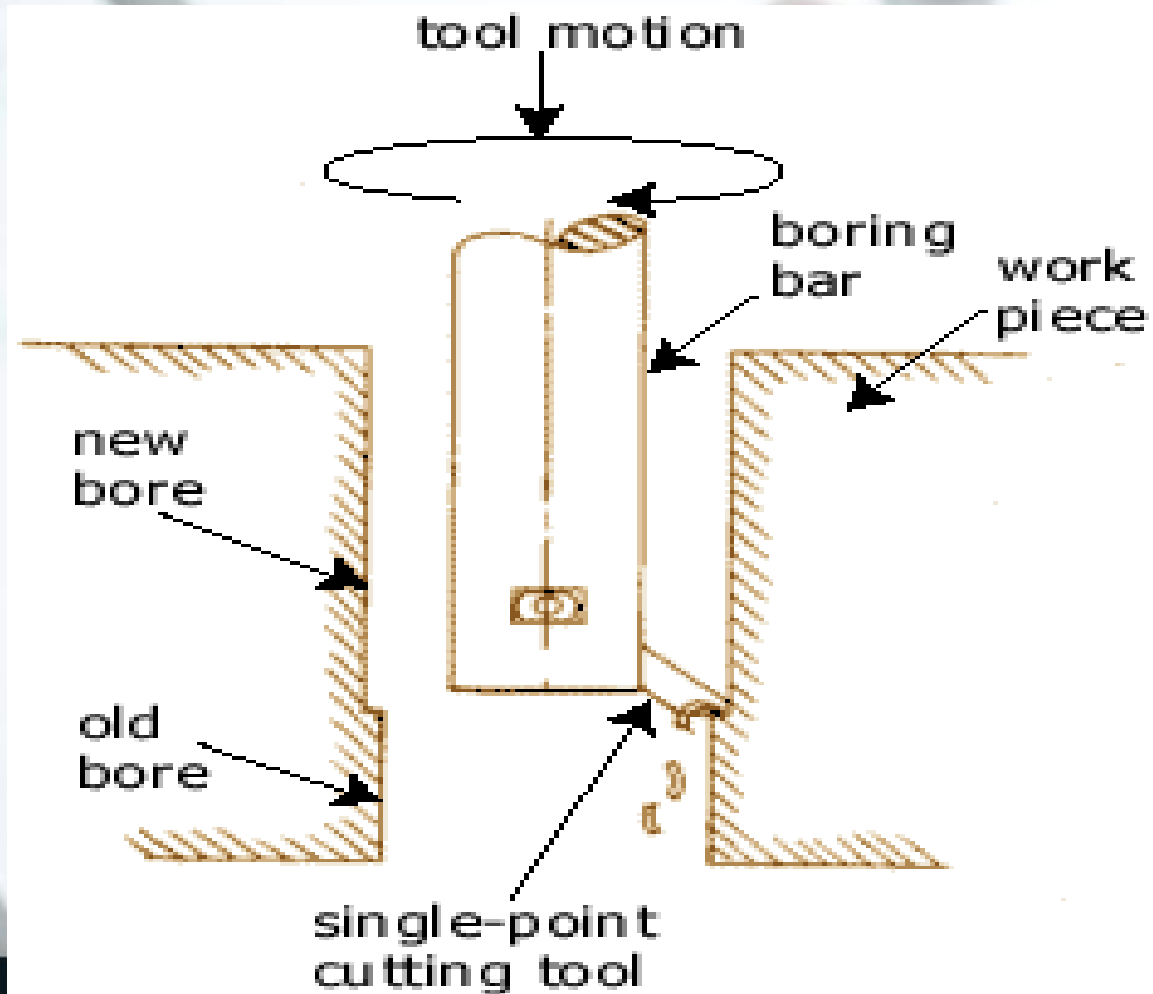




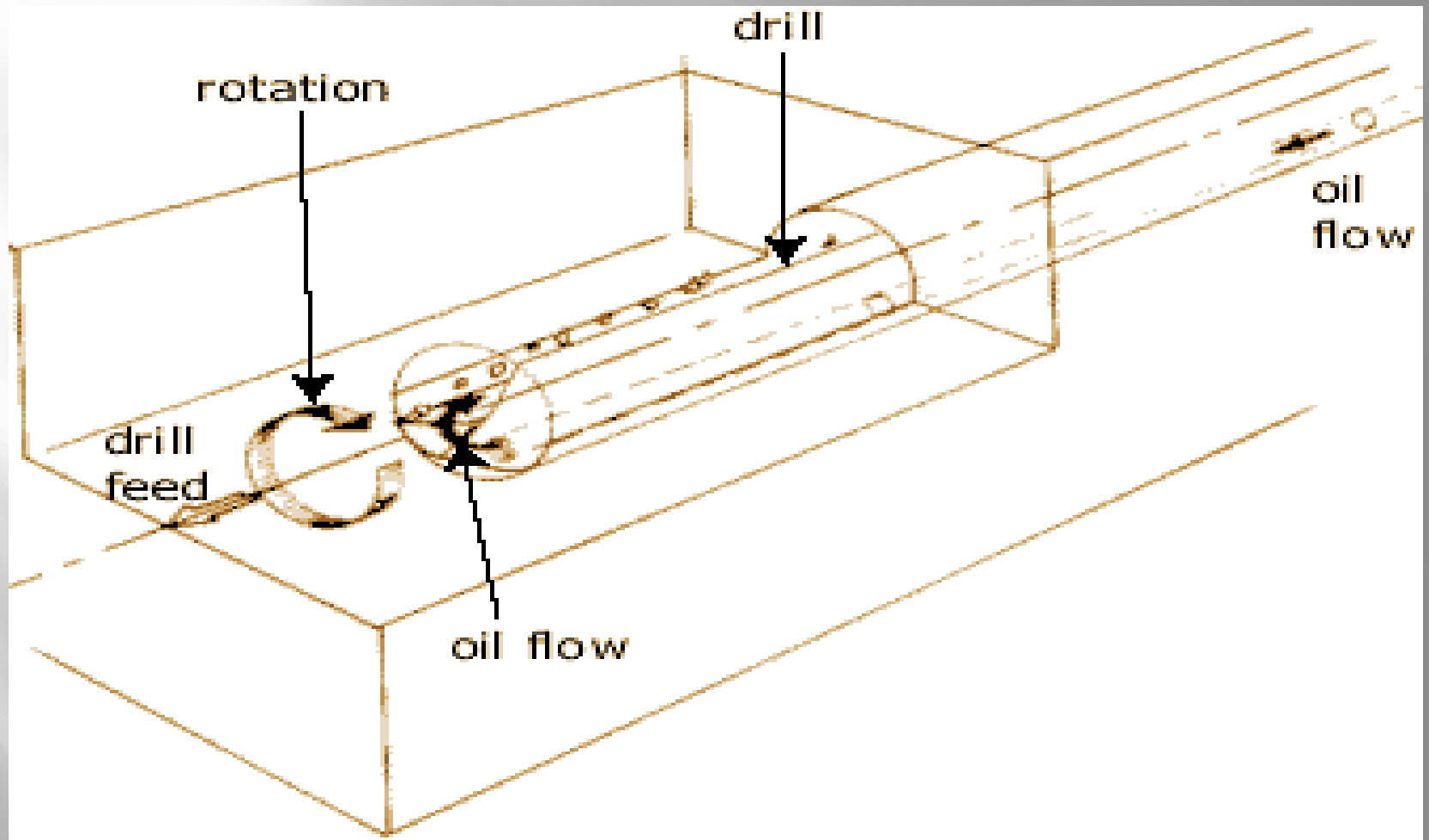
# Jig Boring

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

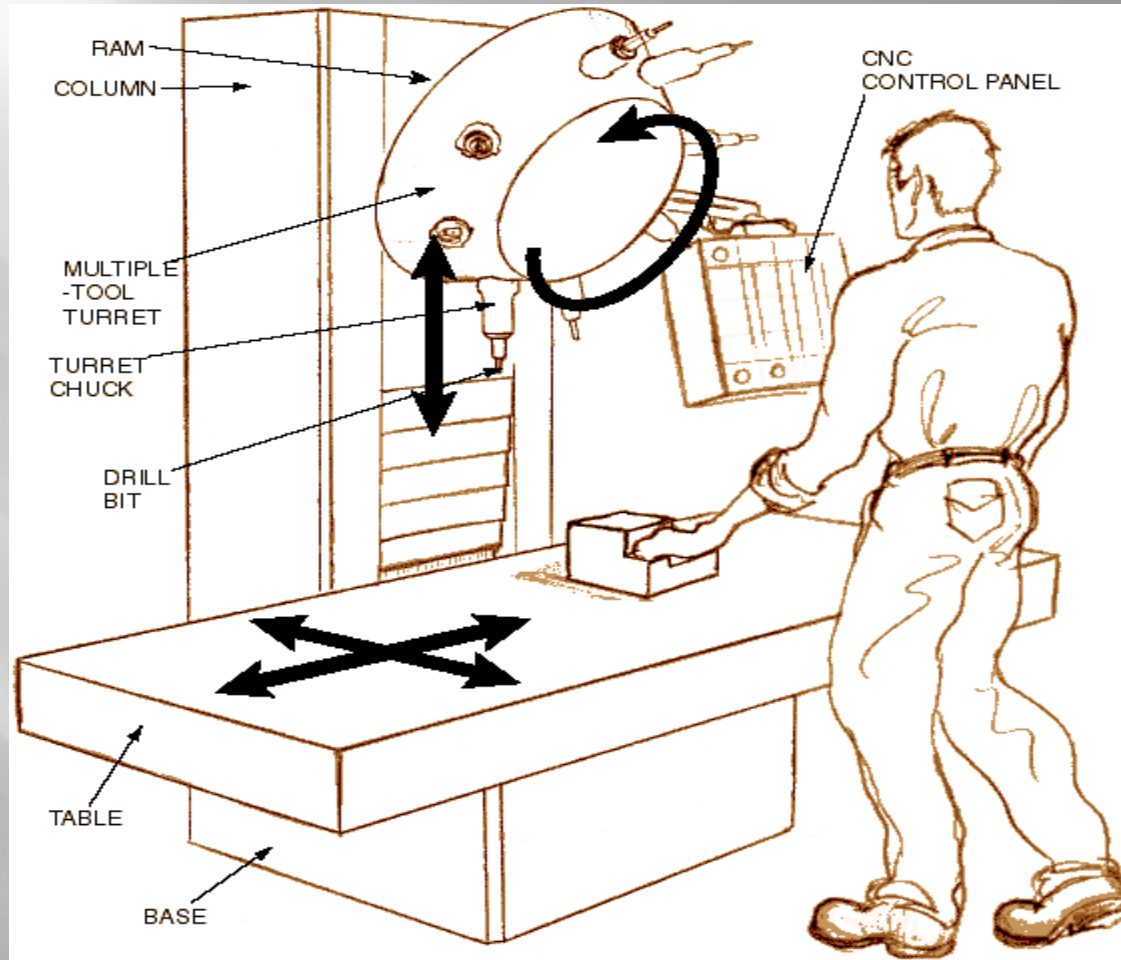
# Jig boring...



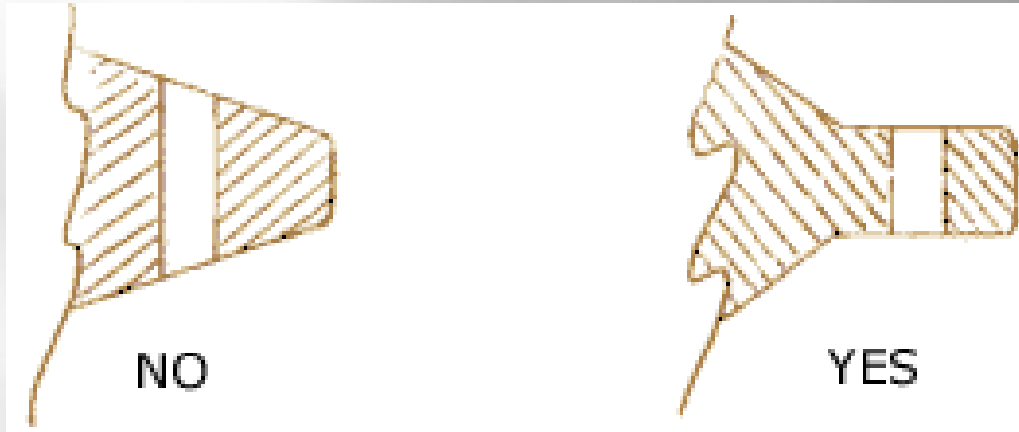
# Jig boring...



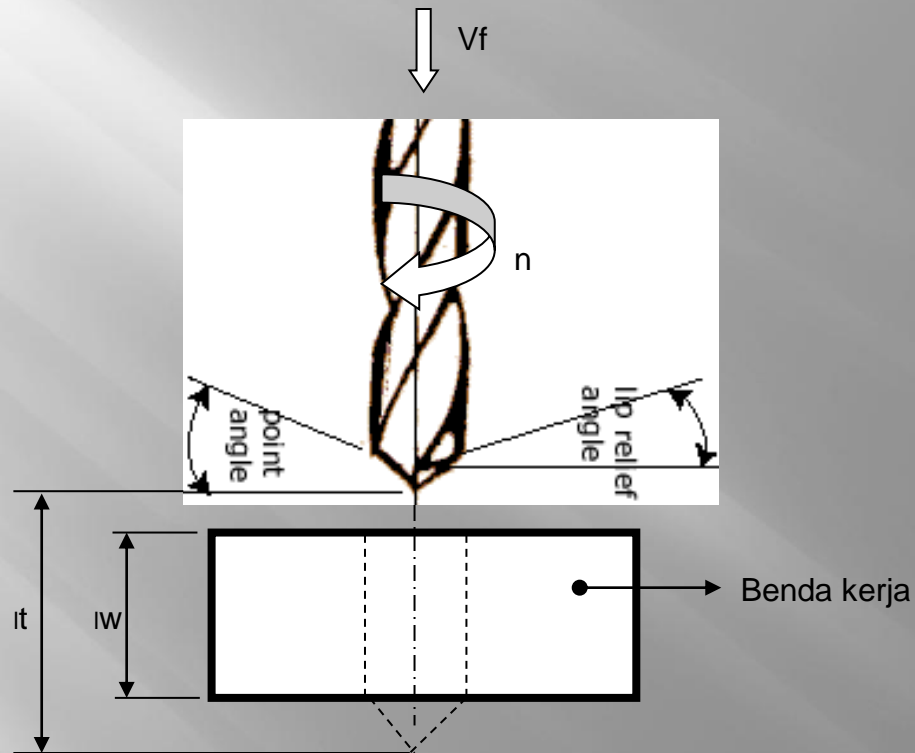
# Computer Numerical Control (CNC) Drilling



# 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