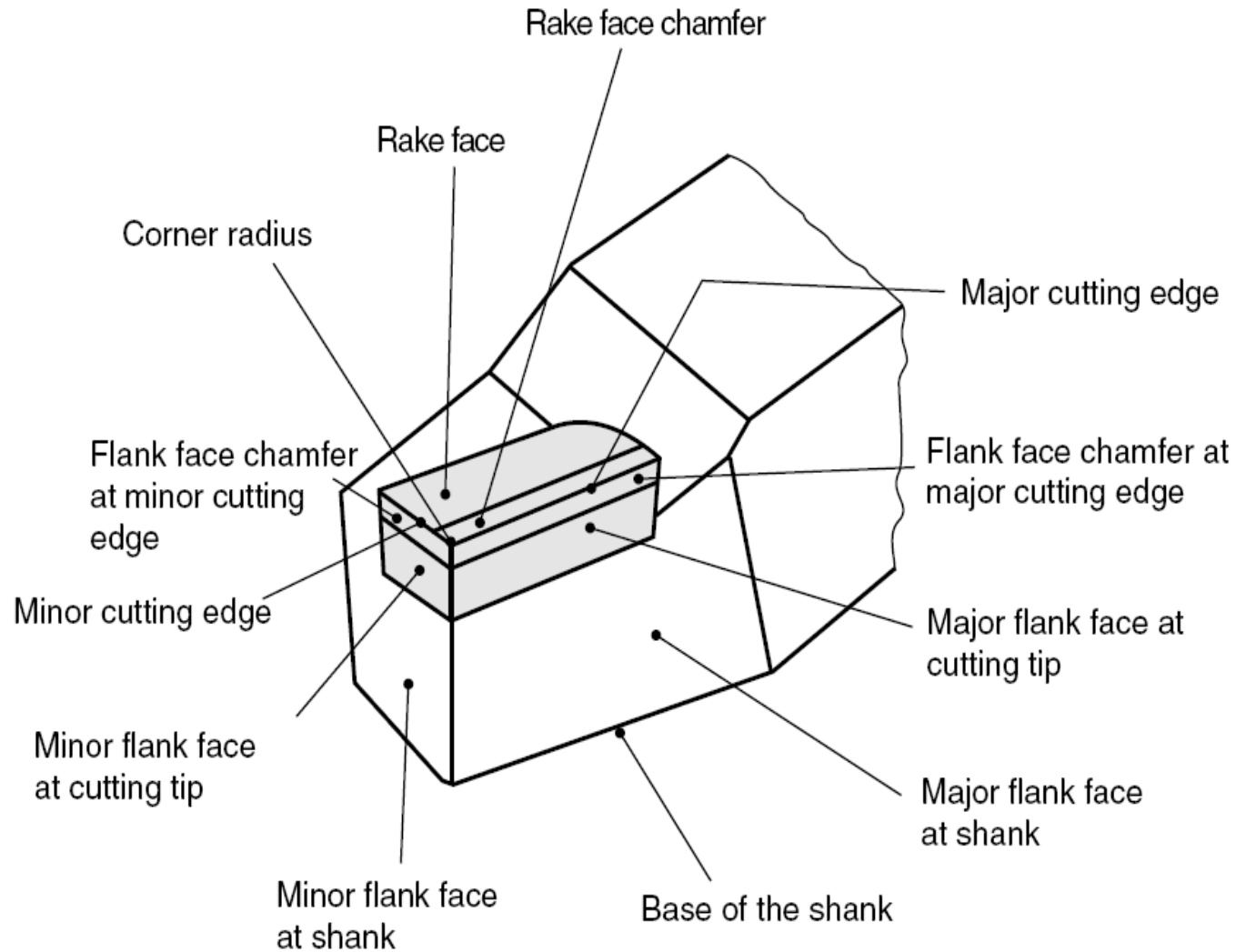


TOOLS WEAR & TOOLS LIFE

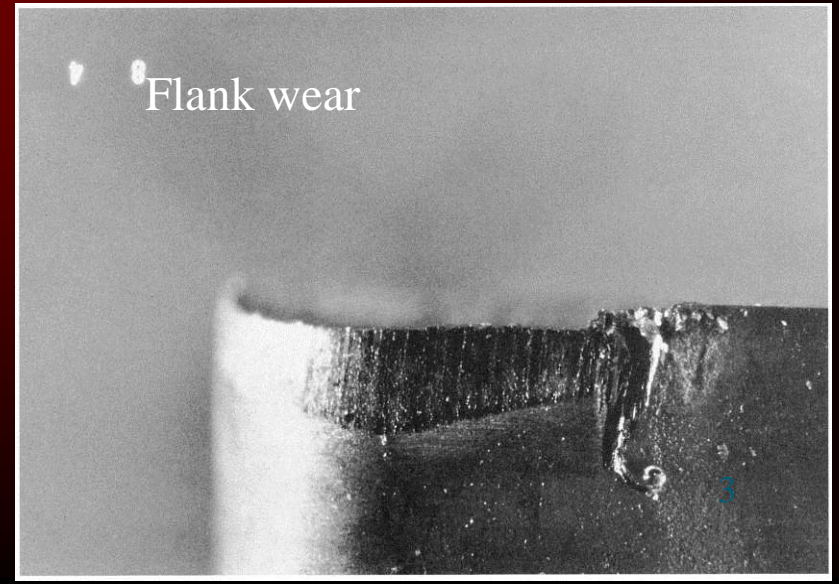
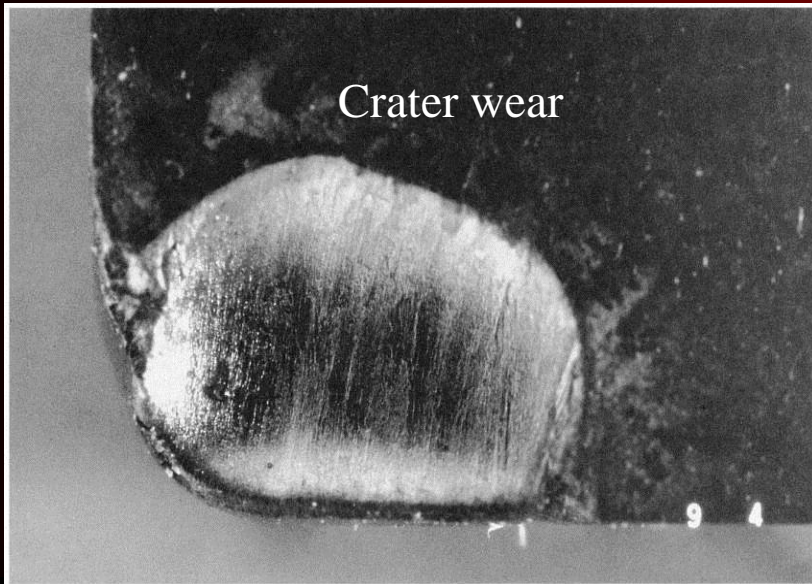
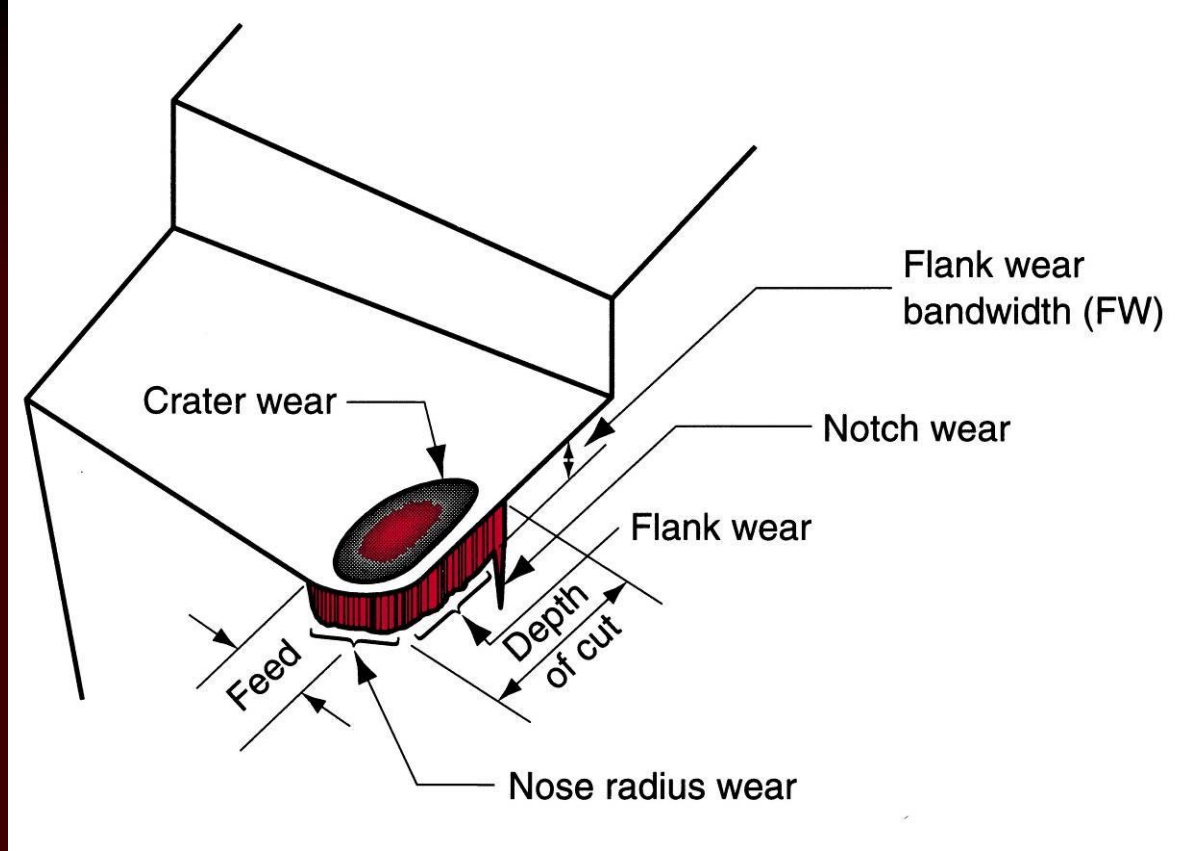
“KEAUSAN PAHAT”

SUTOPO
PENDIDIKAN TEKNIK MESIN
FT-UNIVERSITAS NEGERI YOGYAKARTA
MARET 2012

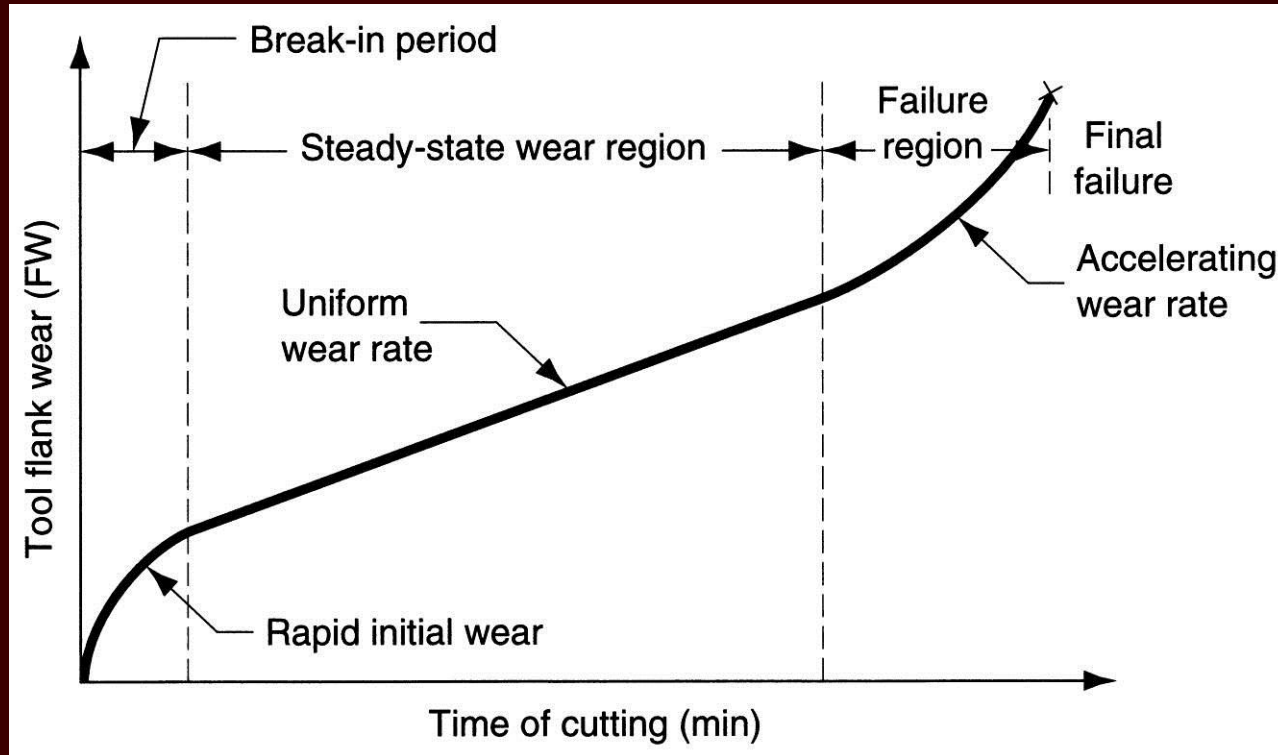
Nomenclature of Turning tool (DIN 6581)



Tool wear

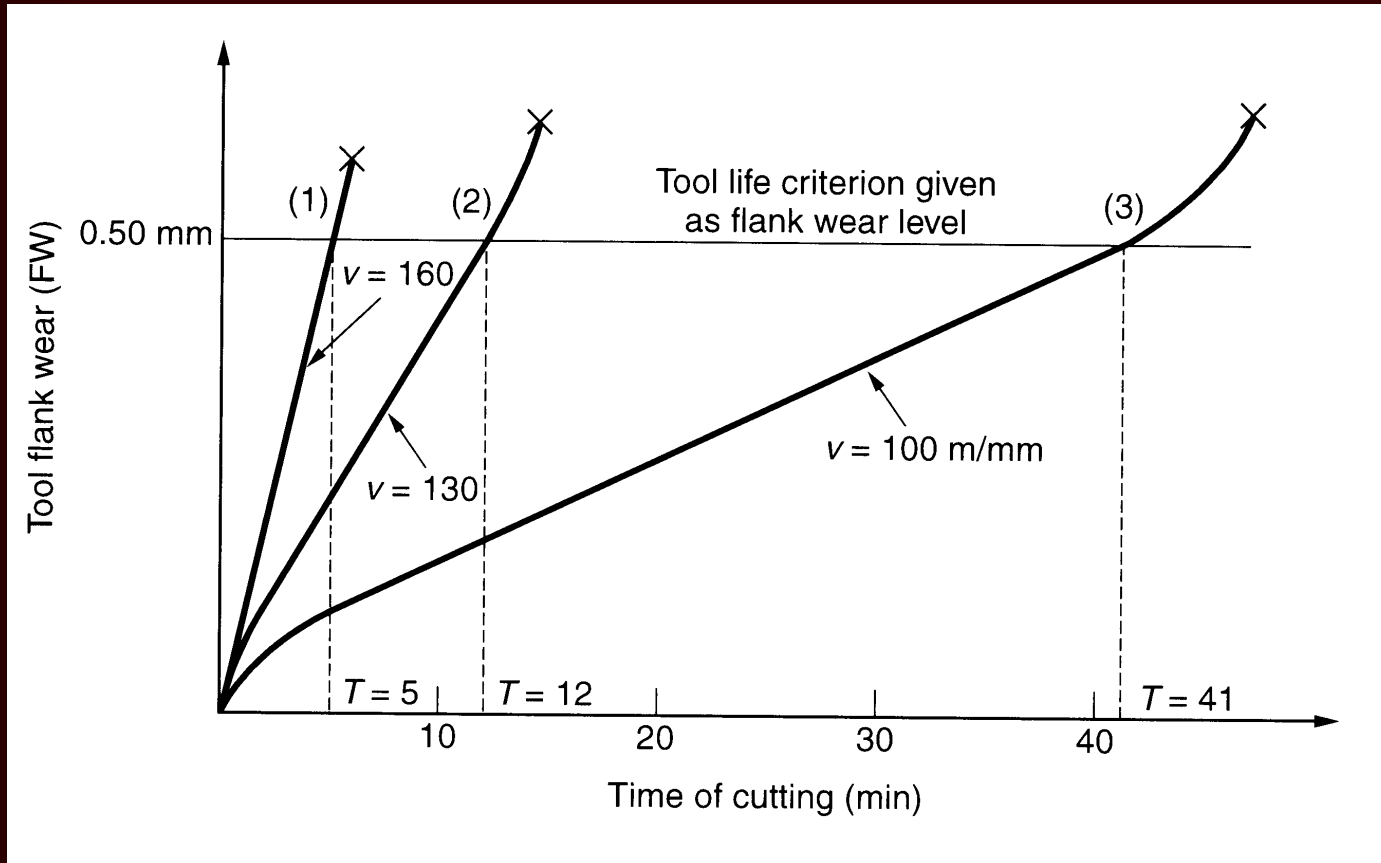


Tool Wear vs. Time



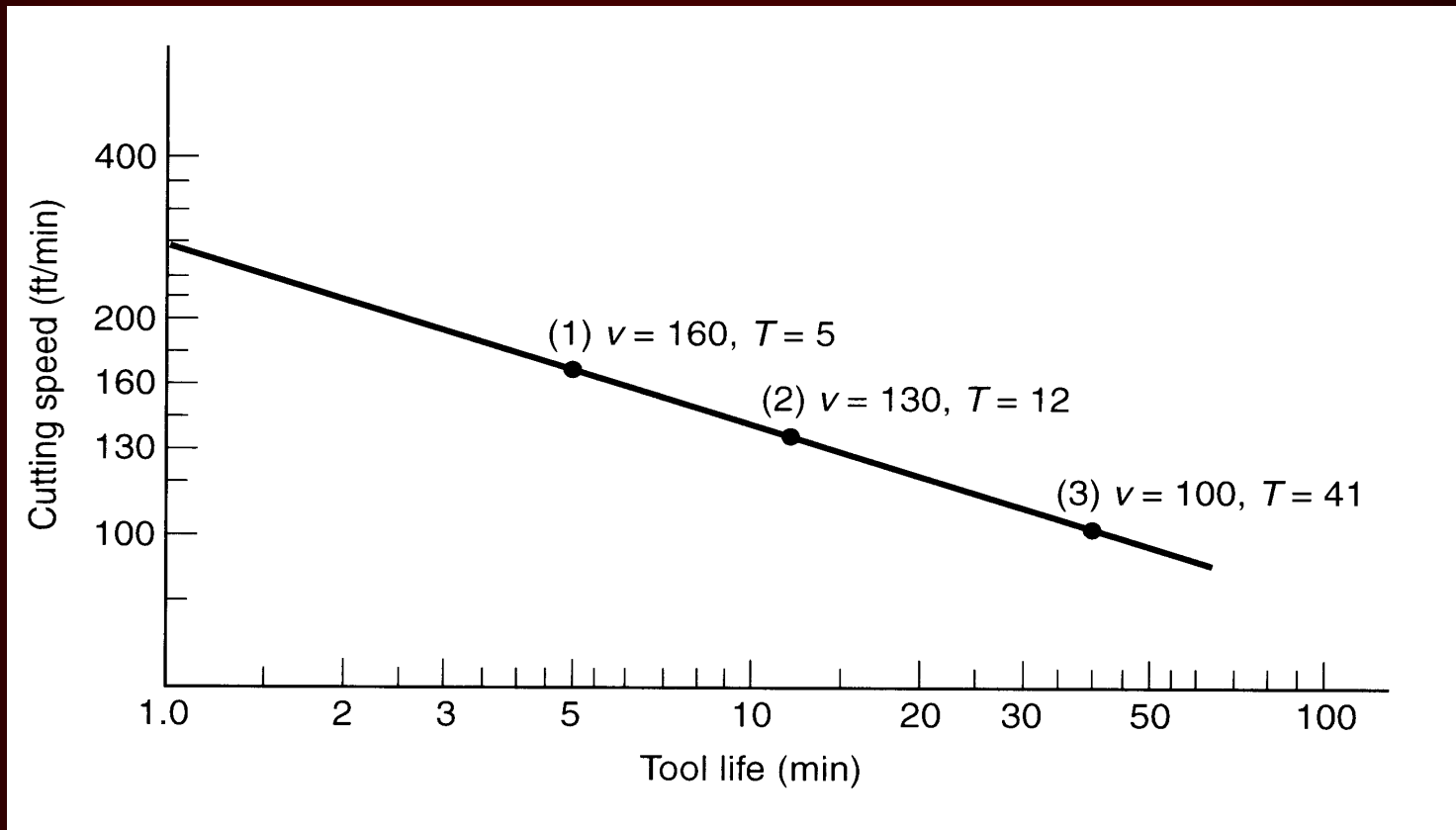
Tool wear as a function of cutting time. Flank wear (FW) is used here as the measure of tool wear.

Pengaruh Cutting Speed



Effect of cutting speed on tool flank wear (FW) for three cutting speeds, using a tool life criterion of 0.50 mm flank wear.

Tool Life vs. Cutting Speed



Natural log-log plot of cutting speed vs tool life.

Taylor Tool Life Equation

$$vT^n = C$$

where v = cutting speed; T = tool life; and n and C are parameters that depend on feed, depth of cut, work material, tooling material, and the tool life criterion used

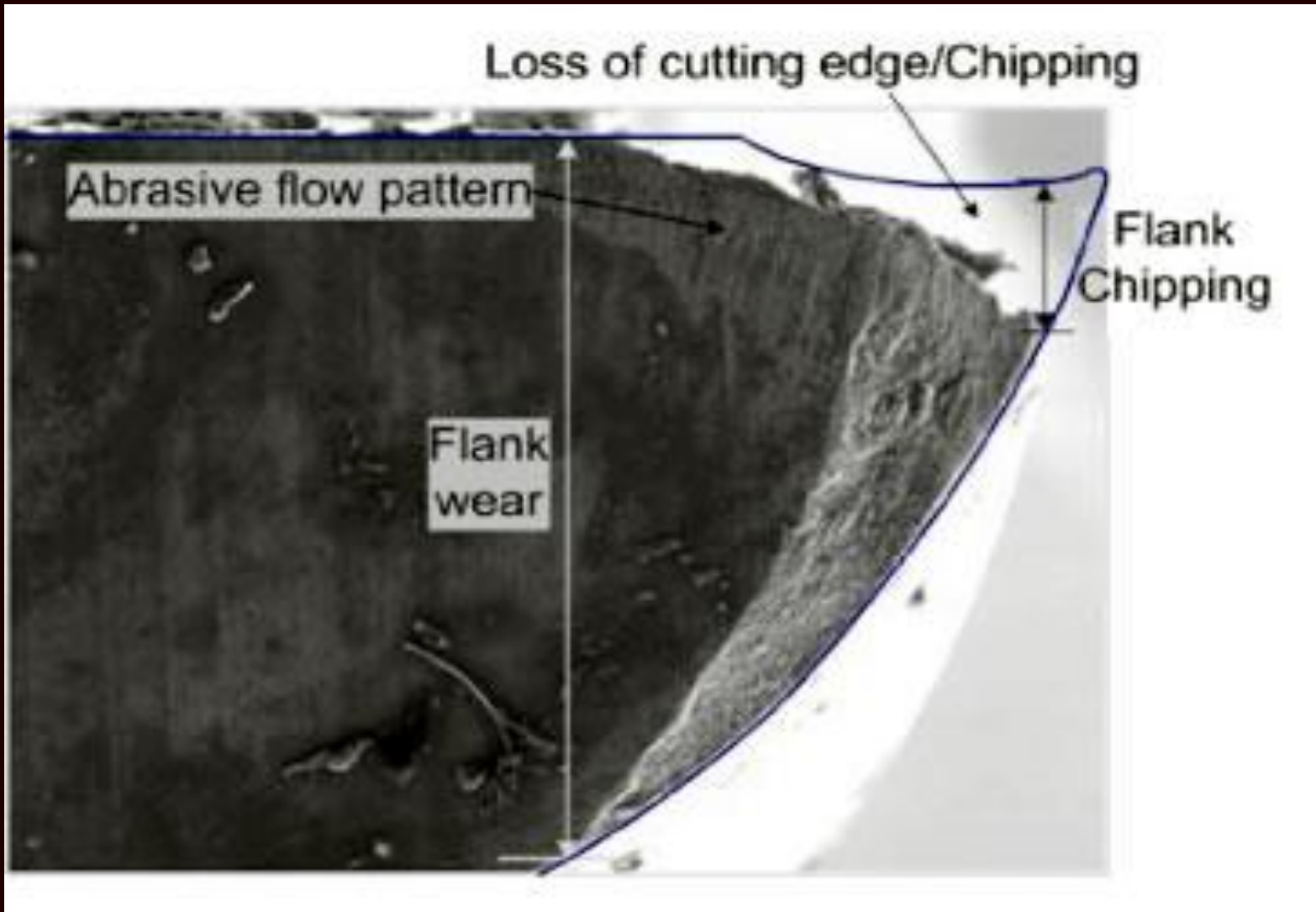
- n is the slope of the plot
- C is the intercept on the speed axis at one minute tool life

Penyebab kerusakan pahat

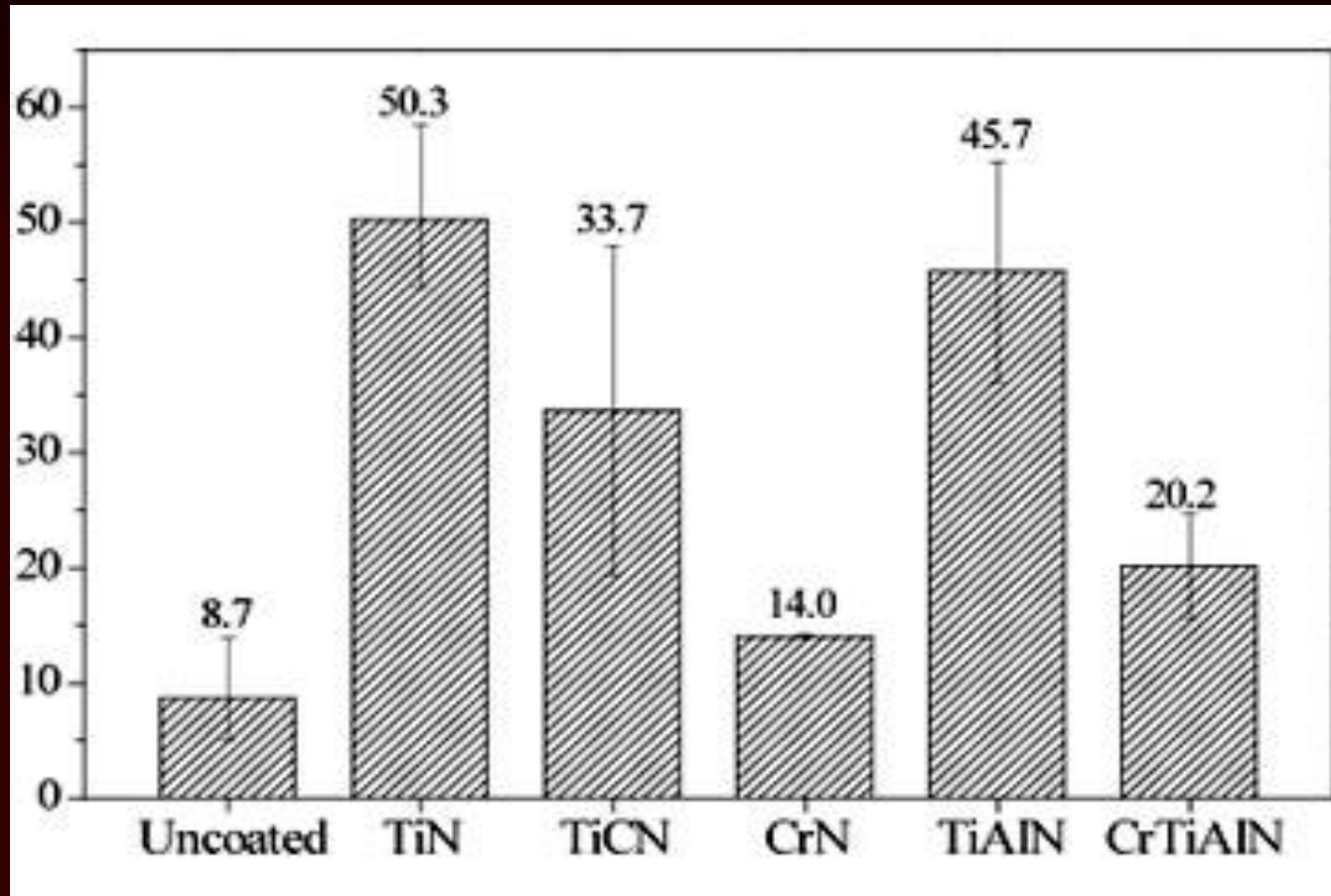
Keausan yg tumbuh membesar

Retak yg menjalar hingga muncul patahan
pada mata potong

Deformasi plastik yg mengubah
bentu/geometri



Tool wear modes

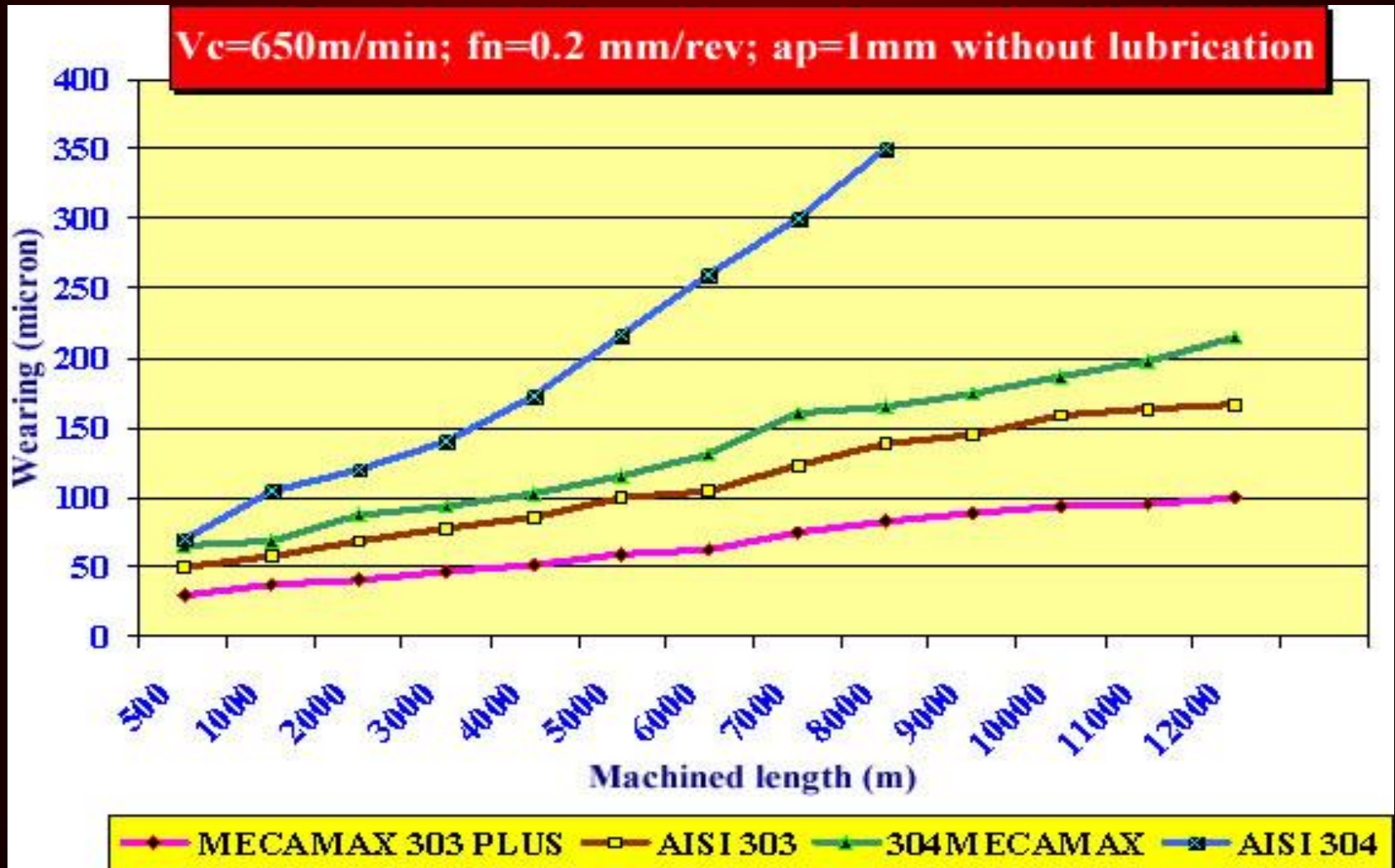


Tool life of coated and uncoated tools in micro milling of hardened tool steels

Mekanisme kerusakan dan keausan pahat

- Proses abrasif
- Proses kimiawi
- Proses adhesi
- Proses difusi
- Proses oksidasi
- Proses deformasi plastik
- Proses keretakan dan kelelahan

Contoh grafik pengujian keausan pahat



Tool Life/ Umur Pahat

- Batas waktu kemampuan pahat untuk dapat melakukan pemotongan secara efektif
- Seiring tumbuh dan berkembangnya keausan sejalan dengan waktu pemotongan, maka batas waktu penggunaan pahat secara efektif telah habis

Kriteria umur pahat

- Semakin besar keausan/kerusakan, kondisi pahat akan semakin kritis
- Apa yang terjadi jika pahat tetap difungsikan?
 - *Gaya pemotongan akan sangat tinggi dan dapat menyebabkan kerusakan tool secara keseluruhan, benda kerja, mesin dan membahayakan keselamatan operator*

Pengaruh keausan pahat

- increased cutting forces....
- increased cutting temperatures
- poor surface finish
- decreased accuracy of finished part

Perlu kriteria umur pahat

Berdasarkan:

- Keausan flank ($VB = 0,3 \text{ mm}$)
- Atau rasio keausan kawah
($K = KT/KM$)

Kriteria umur pahat

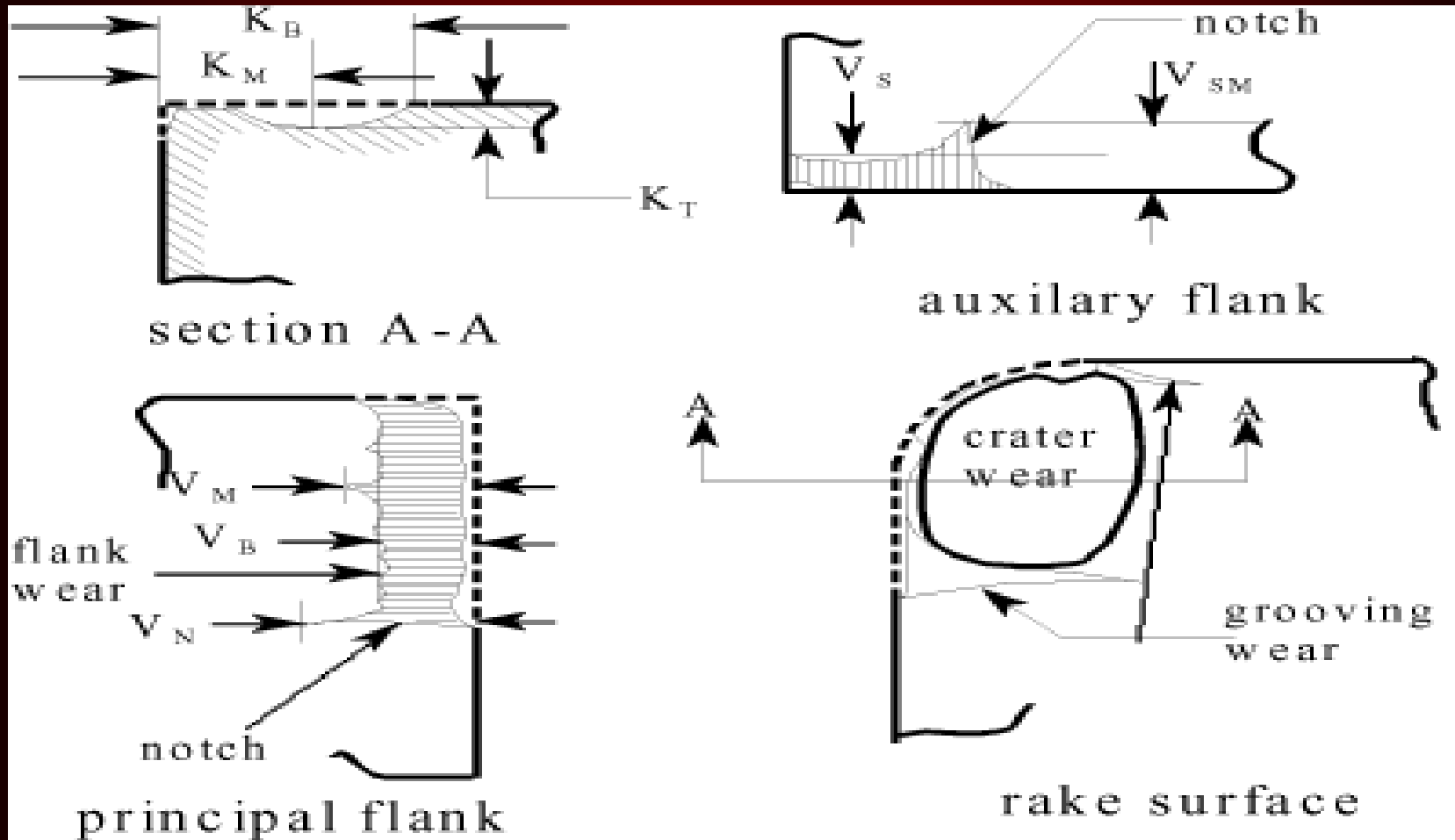


Figure 2. Geometry and major features of wear of turning tools.