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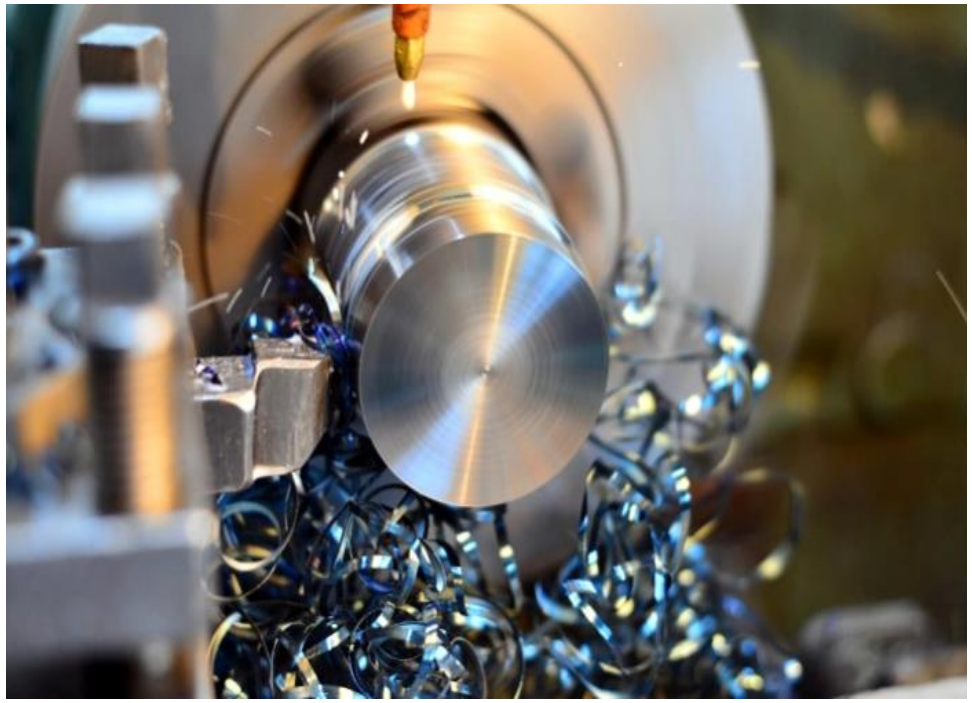
TOOL LIFE

- The length of the period for which a tool can be used or cut satisfactory is called its tool life.

- A tool that no longer performs the desired function is said to have failed and hence reached the end of its useful life.

- During machining ,the cutting edge of the tool gradually wear out and it does not perform satisfactorily. when wear reaches certain stages it is said that the tool has lost its utility and its life is over.it must be reground or replace by a new tool if machining is to be continued.



The common method for the measurement of tool life ,quantitatively are given below

(1) Machine time : it is the elapsed time operation of the machine tool.

(2) Length of work cut to failure per tool edge.

(3) Volume of metal removed to failure per tool edge.

(4) Number of components produced per cutting edge.

TOOL LIFE EQUATION

- Taylor thought that there is an optimum cutting speed for maximum productivity.

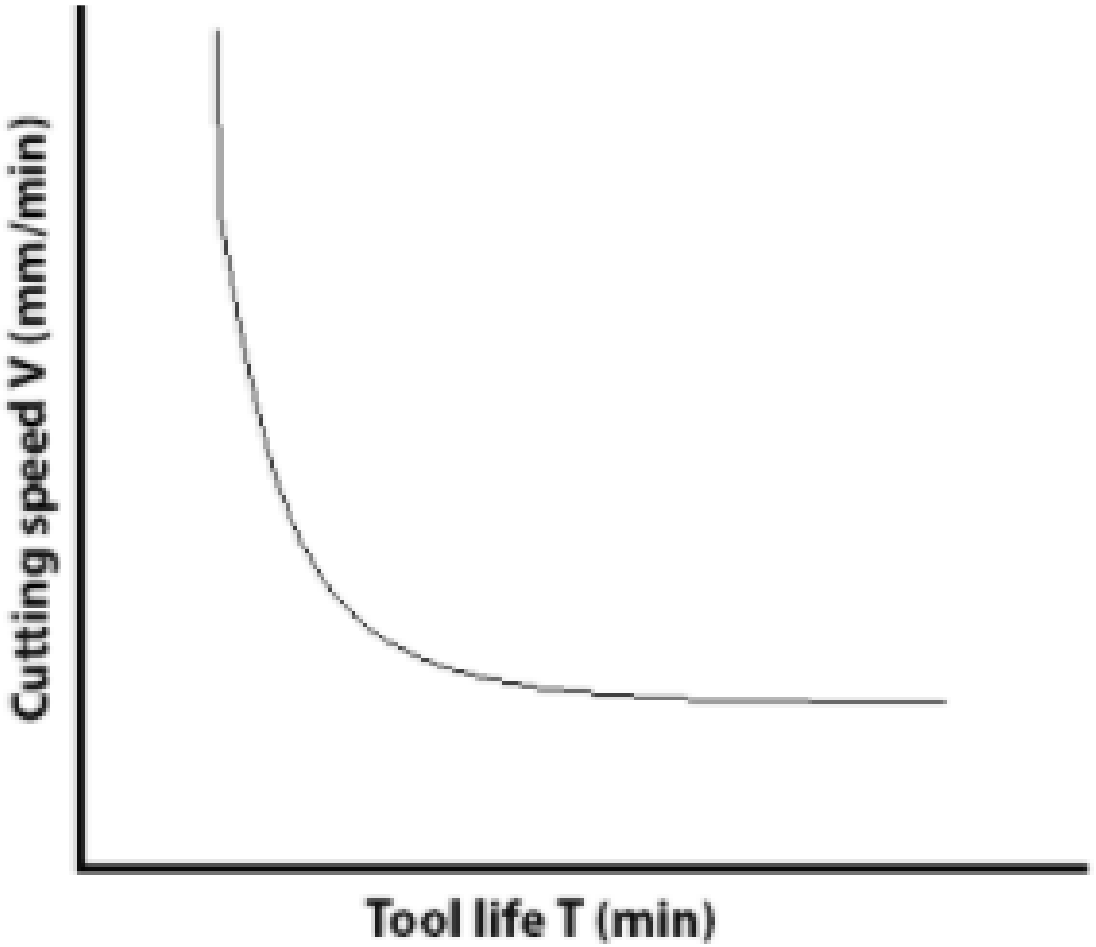
- He reasoned this from the fact that at low cutting speed, the tool have higher life but productivity is low, and at higher speed the ,the tool have lower life but productivity is high .

- This inspired him to check the relationship between tool life and the cutting speed. Based on his experimental work he proposed the formula for tool life.

$$VT^n = C$$

Here, ... **(A)**

V = cutting speed (m/min)
T=Tool life (minutes)
C=Machining constant
n = tool life exponent (depend only on tool material)


Cutting speed V (mm/min)
Tool life T (min)

Cutting speed has been found to be the most significant process variable in tool life, depth of cut and feed rate also important thus equation (A) can be modified as

$$VT^n d^x f^y = C$$

..... **(B)**

Here ,

d = Depth of cut

f = feed rate (mm/rev) in turning

X,y=Exponents

C= Constant

THANKYOU