

# **MACHINIST**

## **2nd YEAR**

### **TRANSPARENCIES**



**CIM** **CENTRAL INSTRUCTIONAL  
MEDIA INSTITUTE, MADRAS**  
AN INDO - GERMAN PROJECT



**Directorate General of Employment and Training, Ministry of Labour, Govt. of India.**

Developed by

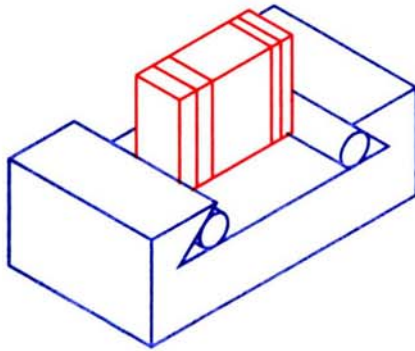
**CENTRAL INSTRUCTIONAL MEDIA INSTITUTE**

in collaboration with **Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Germany**  
P.O. Box 3142, CTI Campus, Guindy, Chennai - 600 032 Phone: 2233 4248, 2234 5257 Fax: (0091-44) 2234 2791

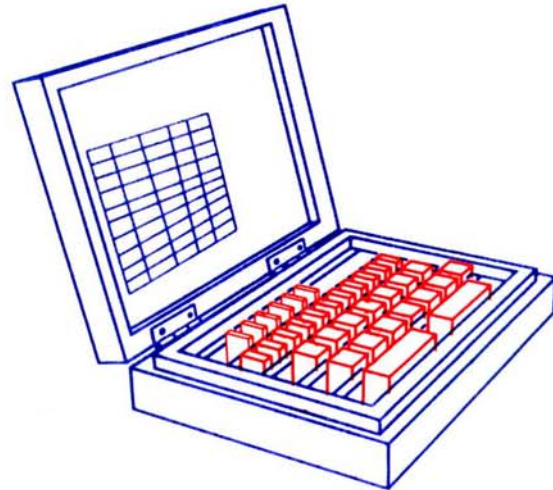


# SLIP GAUGES

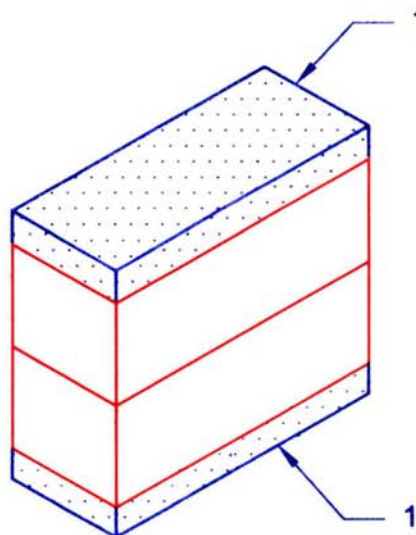
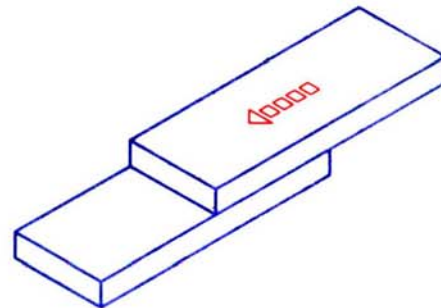
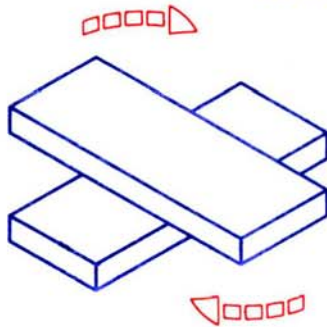
## PRECISION LENGTH MEASUREMENT



## AVAILABLE IN SETS



## WRINGING OF SLIP GAUGES

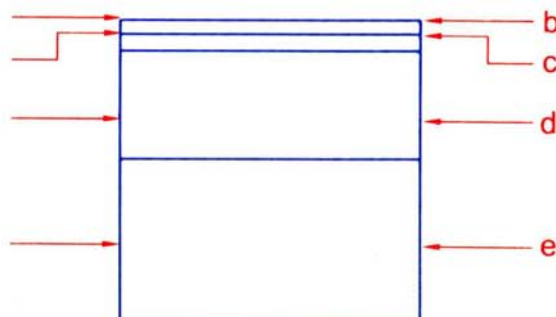




## DETERMINING SLIP GAUGE SIZE

PROCEDURE	SLIPS USED	CALCULATION
a) Write the required dimension		74.643
b) Select 1st series slip that has the same last digit	(Subtract)	<hr/> 73.640
c) Select 2nd series slip - same last figure & the remainder must be either 0.0 or 0.5	(Subtract)	<hr/> 72.500
d) Select a 3rd series slip - expected remainder must be a 4th series figure	(Subtract)	<hr/> 50.000
e) Select the 4th series slip - remainder must be zero	(Subtract)	<hr/> 0

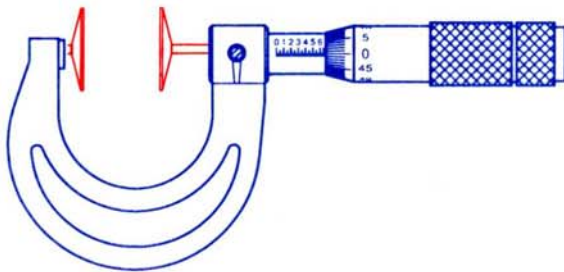
Range (mm)	Steps (mm)	No. of pieces
Special pieces 1.0005		1
1st Series 1.001 to 1.009	0.001	9
2nd series 1.01 to 1.49	0.01	49
3rd series 0.5 to 24.5	0.5	49
4th series 25.0 to 100.0	25.0	4
Total pieces		112



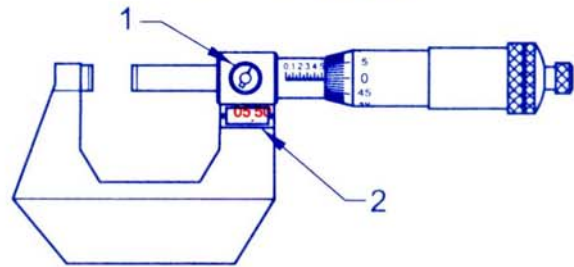


## SPECIAL MICROMETERS

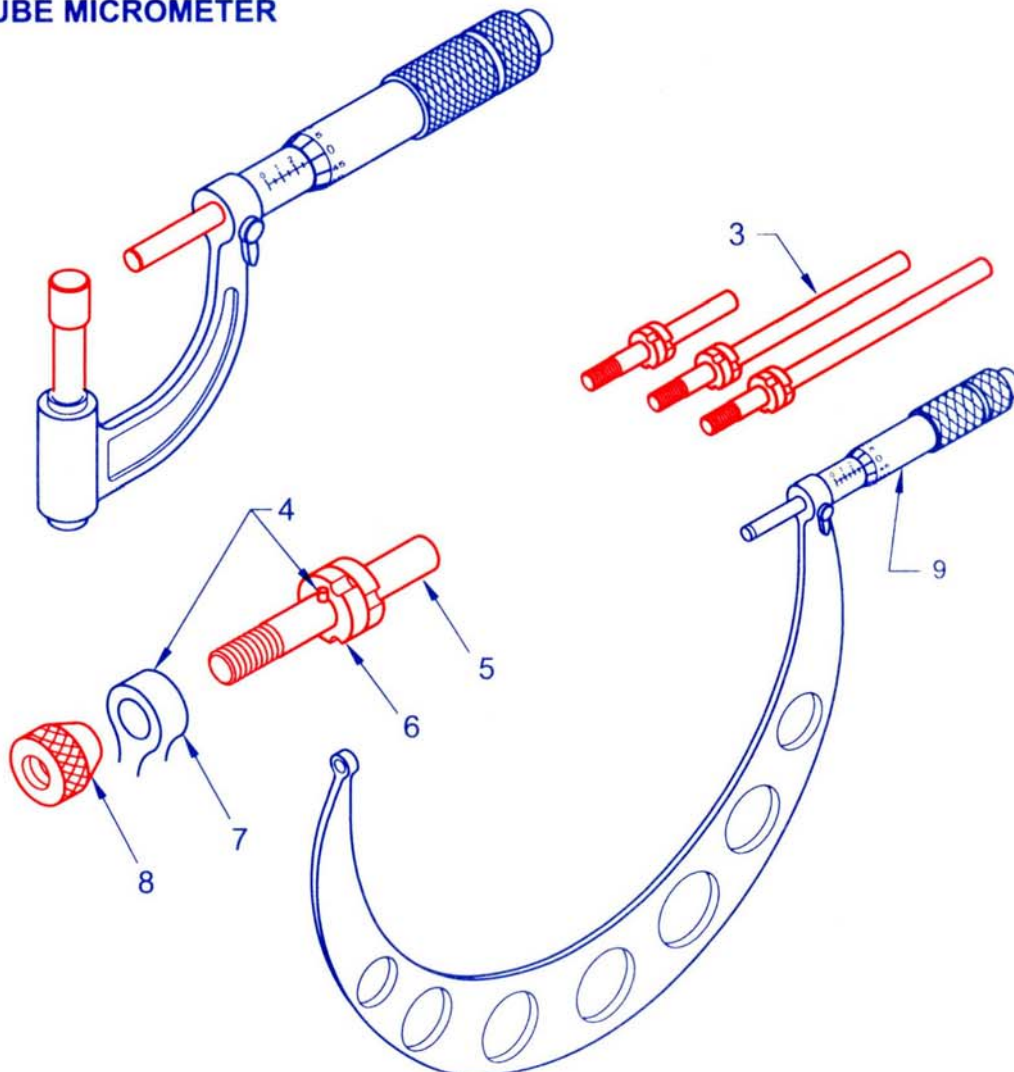
**FLANGE MICROMETER**



**DIGITAL MICROMETER**



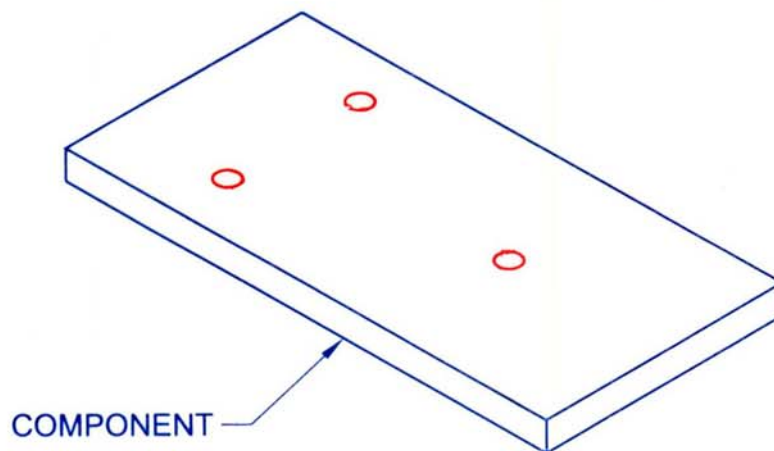
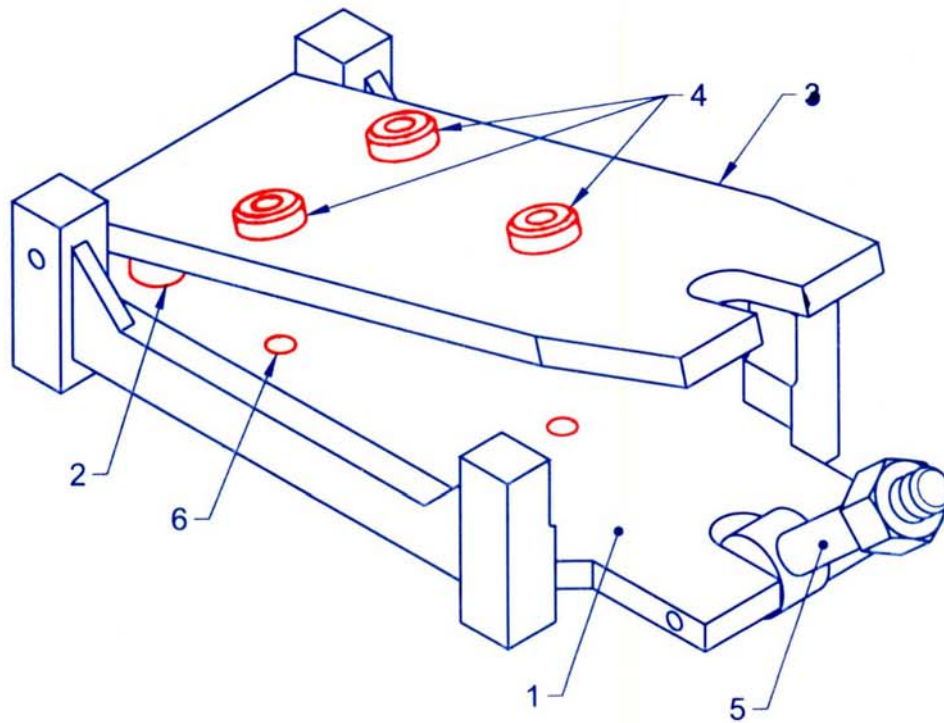
**TUBE MICROMETER**



**A SINGLE EXTERNAL MICROMETER  
WITH INTERCHANGEABLE ANVIL**

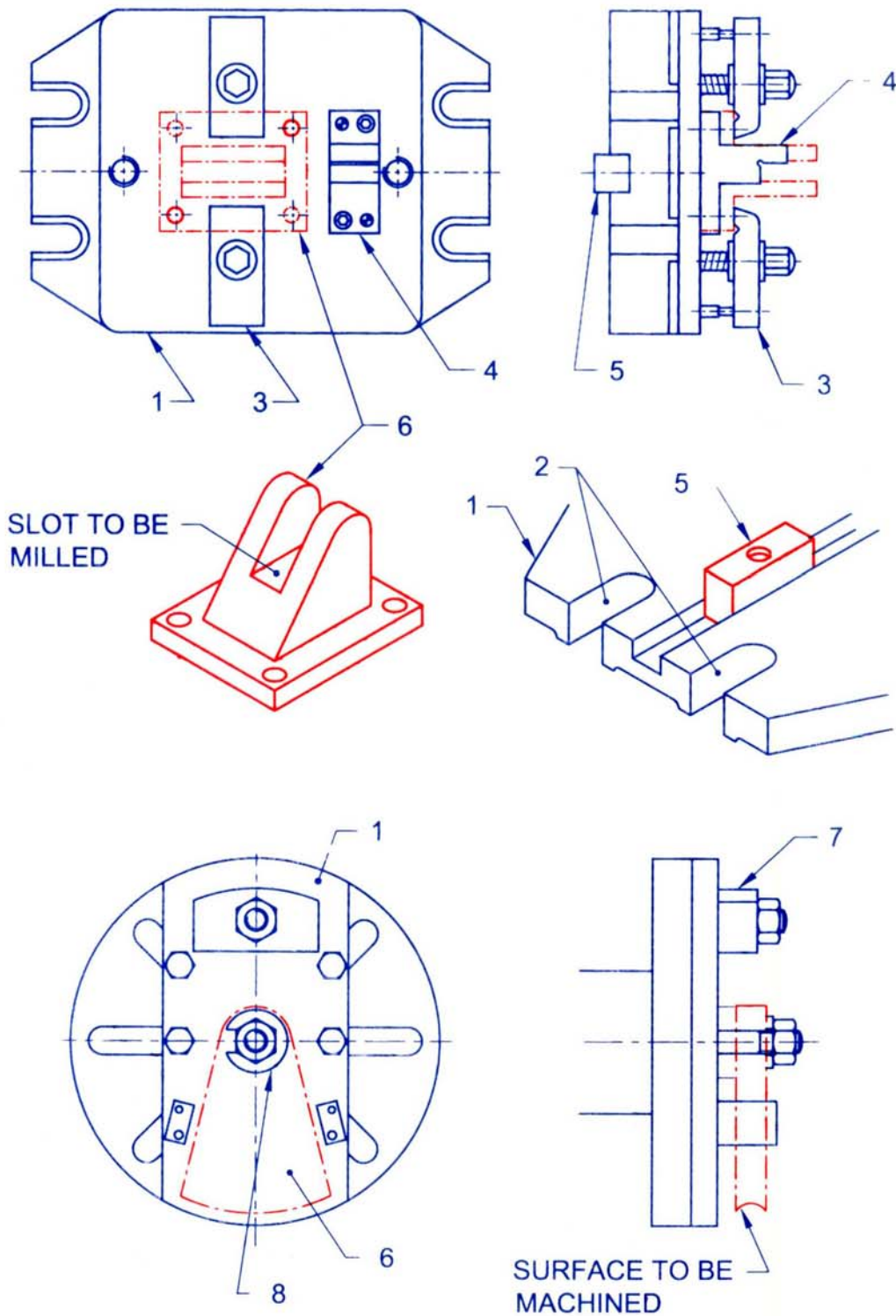


# DRILL JIG





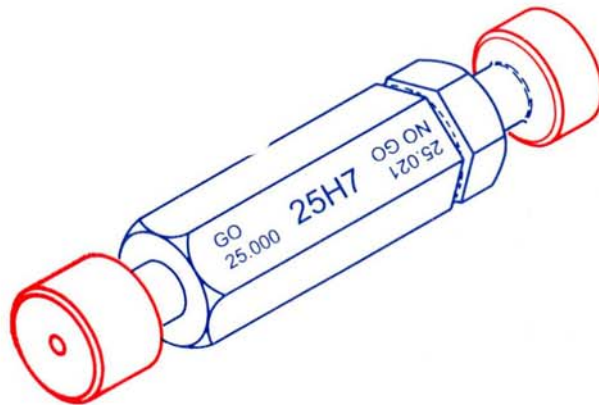
# FIXTURES



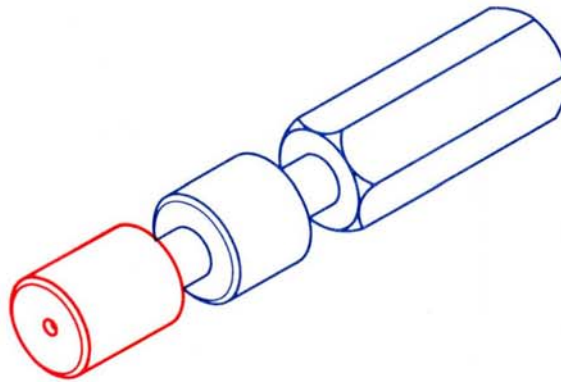


# LIMIT PLUG GAUGES

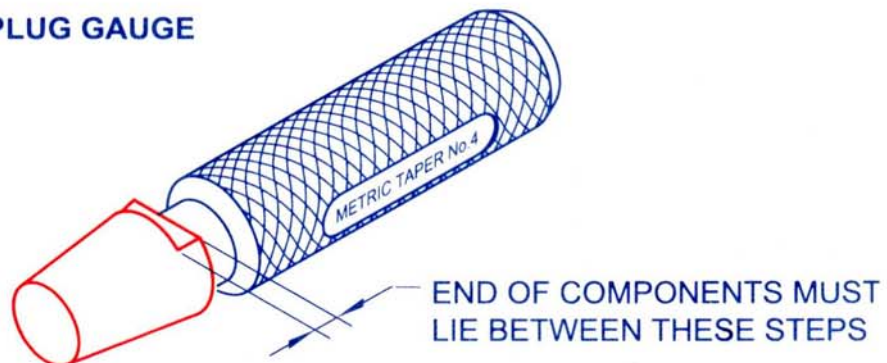
## DOUBLE ENDED PLUG GAUGE



## PROGRESSIVE PLUG GAUGE



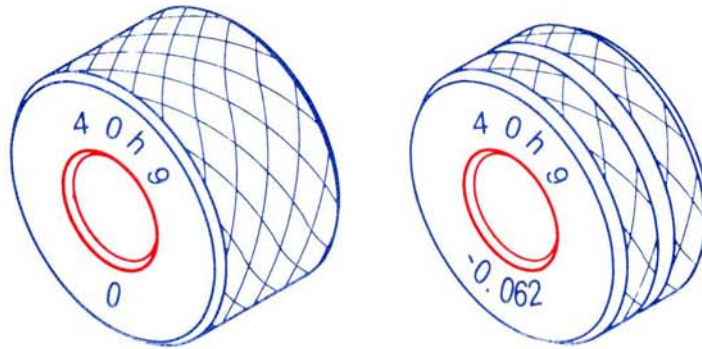
## TAPER PLUG GAUGE



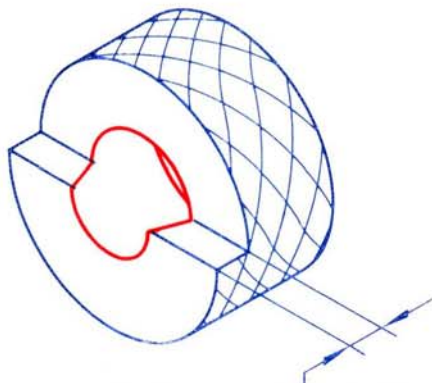


# LIMIT RING AND SNAP GAUGES

## LIMIT RING GAUGE

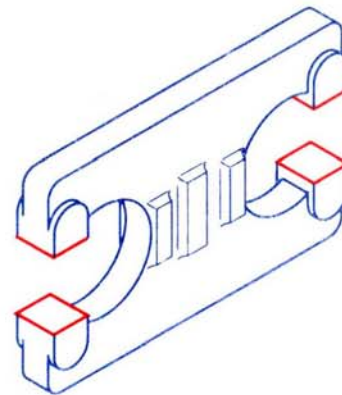


## TAPER RING GAUGE

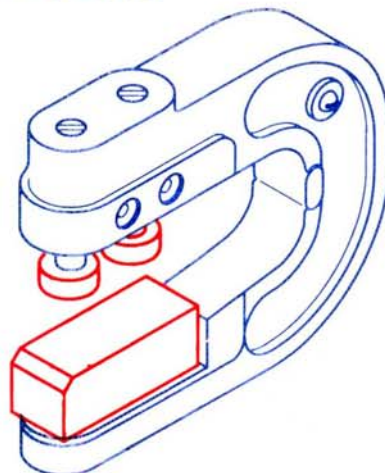


END OF COMPONENTS MUST  
LIE BETWEEN THESE STEPS

## SNAP GAUGE



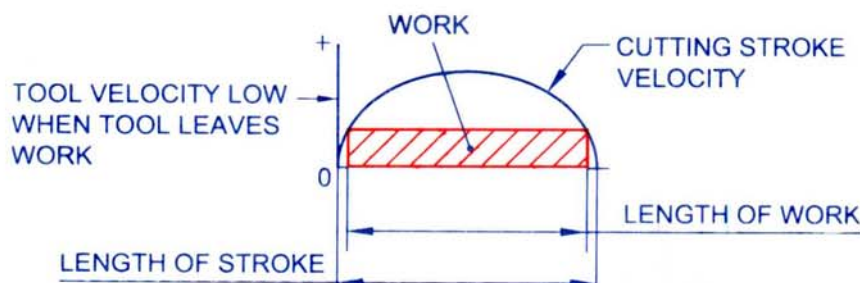
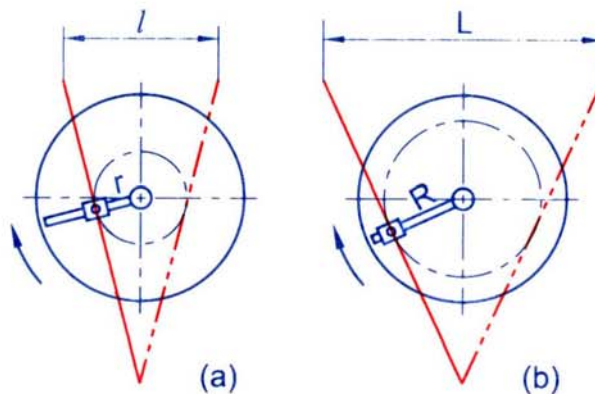
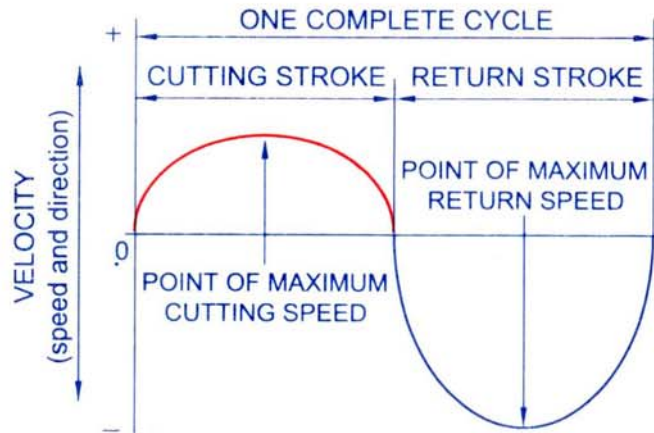
## ADJUSTABLE SNAP GAUGE



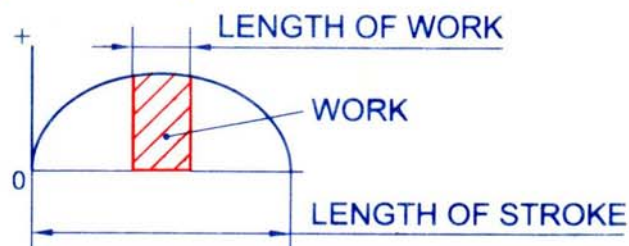




# SHAPER STROKE LENGTH & CUTTING SPEED



Correct setting of stroke length matched to the length of work

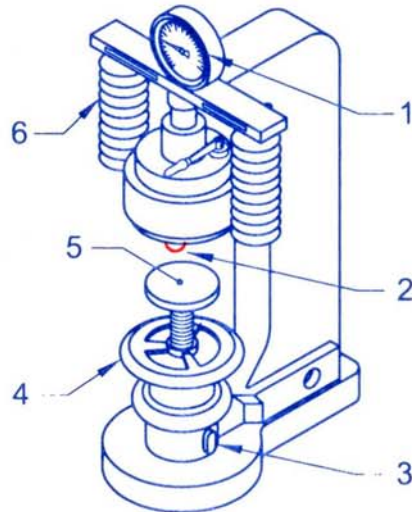


Incorrect setting of stroke length much longer than the length of work

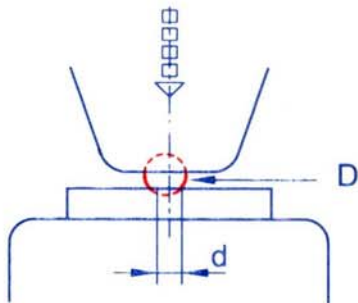


# HARDNESS TESTING -BRINELL

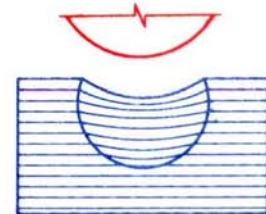
## BRINELL HARDNESS TESTER



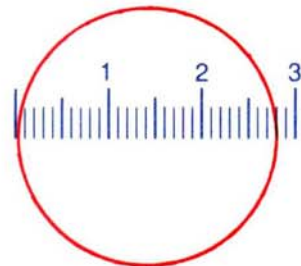
### A. APPLY LOAD



### B. MAKE IMPRESSION



### C. MEASURE MEAN DIAMETER OF IMPRESSION

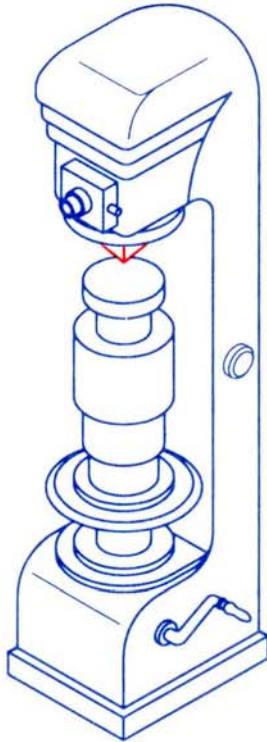


### D. APPLY FORMULA AND GET VALUE

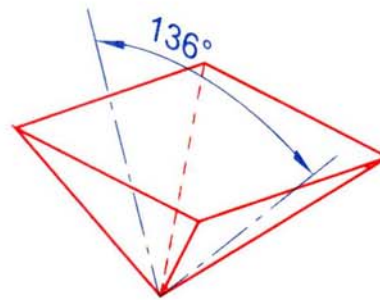


# HARDNESS TESTING - VICKER

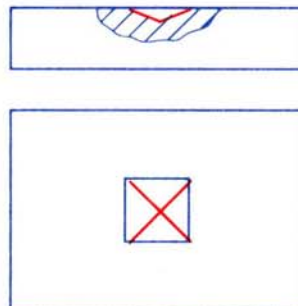
## VICKER'S HARDNESS TESTER



### INDENTING TOOL



- APPLY LOAD
- MAKE DIAMOND SHAPED IMPRESSION



- MEASURE MEAN DIAGONAL OF IMPRESSION
- USE FORMULA AND GET HARDNESS VALUE



# HARDNESS TESTING - ROCKWELL

## ROCKWELL HARDNESS TESTER

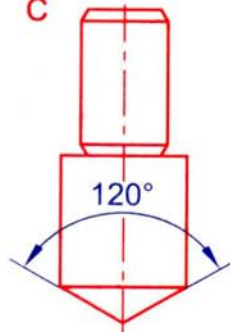


### INDENTING TOOL BALL OR DIAMOND TOOL

B

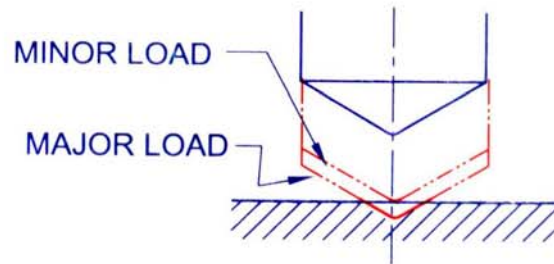


C



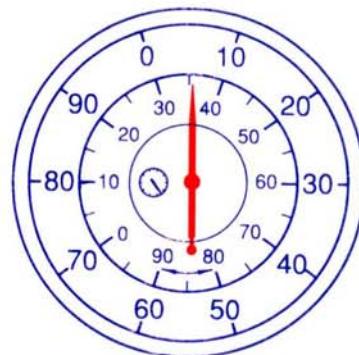
### METHOD OF APPLYING LOAD

D



### READING AND CONVERSION

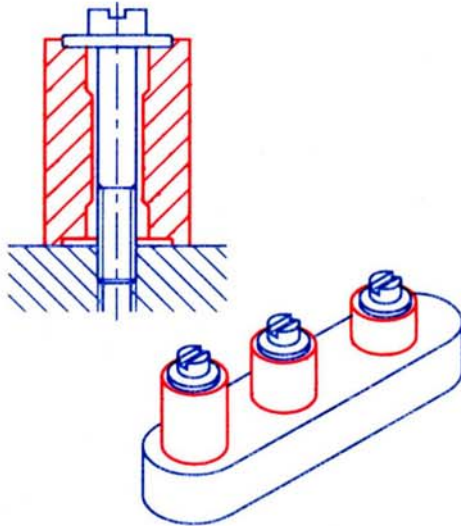
E



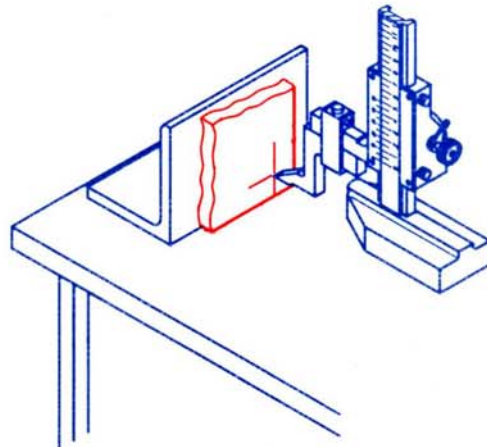


# TOOL MAKER'S BUTTON

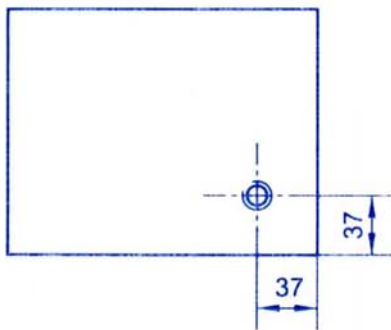
**SET OF BUTTONS**



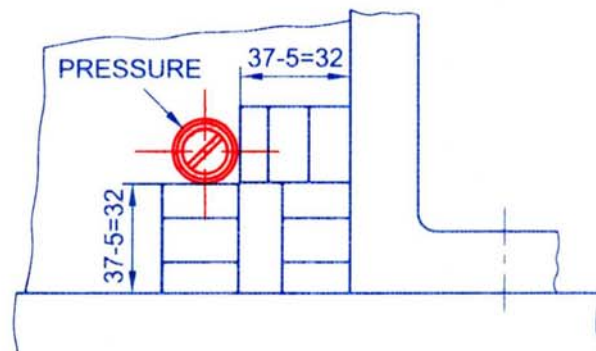
**MARK HOLE POSITION**



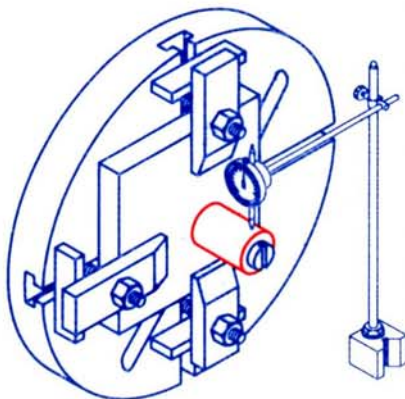
**DRILL & TAP**



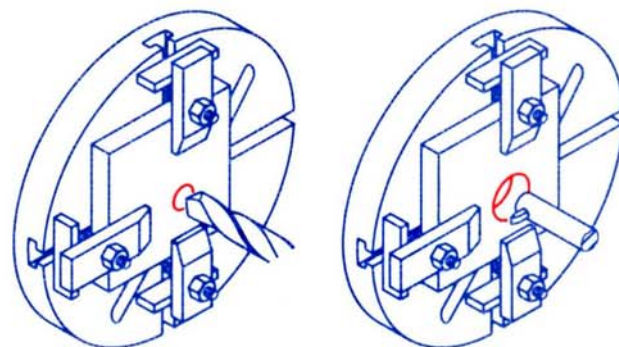
**SET BUTTONS**



**POSITION THE WORK**



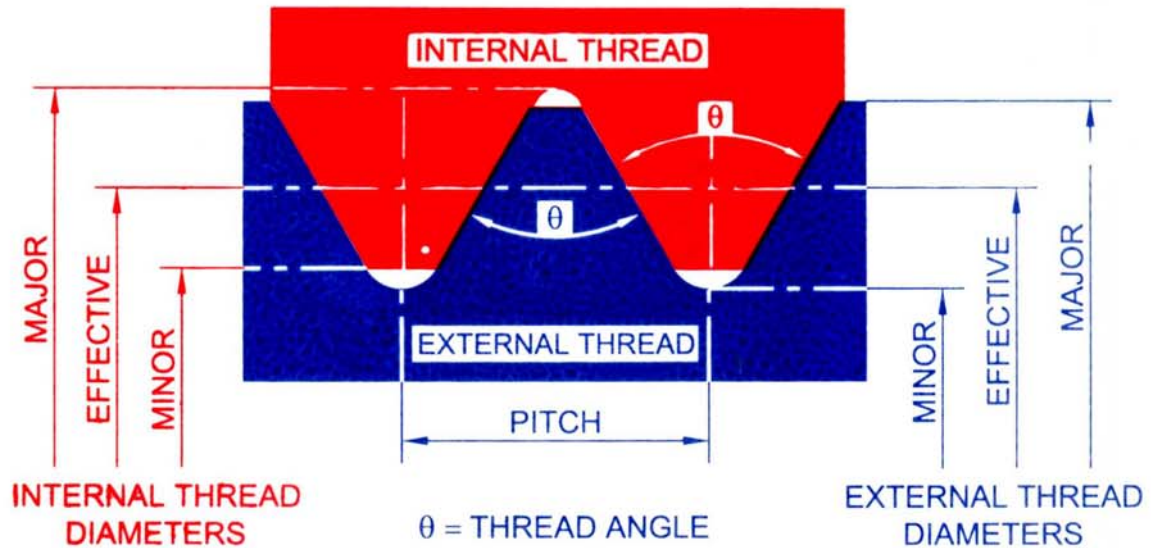
**DRILL & BORE**



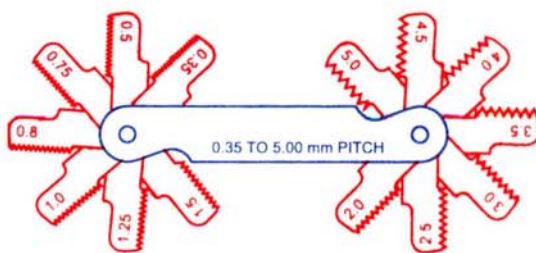


# MEASUREMENT OF SCREW THREAD ELEMENTS - I

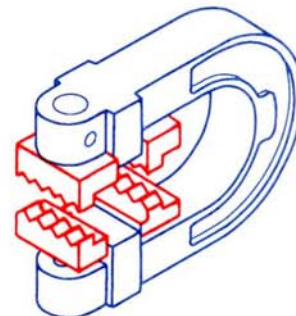
## ELEMENTS FOR MEASUREMENT



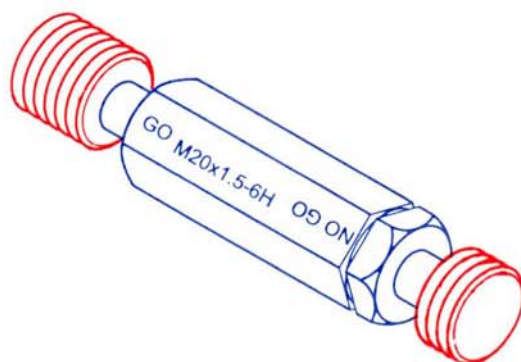
## SCREW PITCH GAUGE



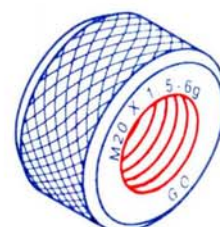
## SCREW THREAD CALIPER GAUGE



## SCREW THREAD PLUG GAUGE



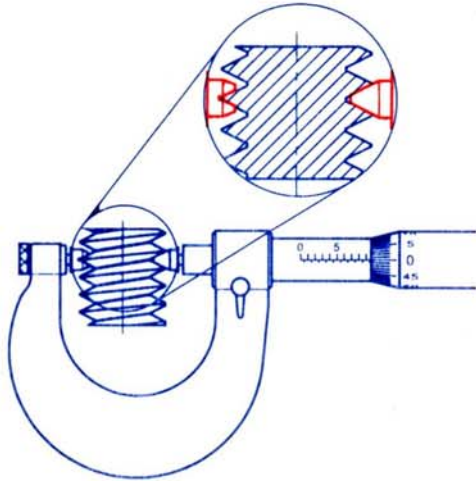
## SCREW THREAD RING GAUGE



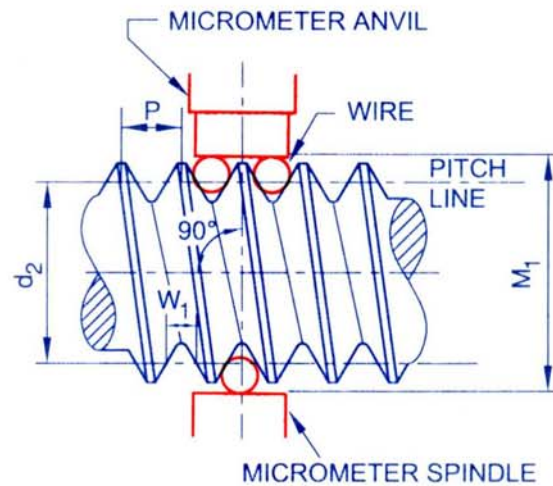


# MEASUREMENT OF SCREW THREAD ELEMENTS - II

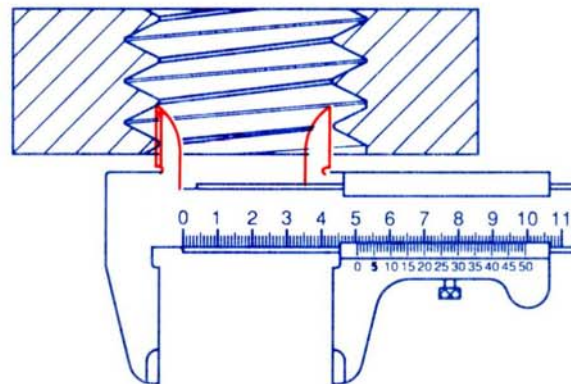
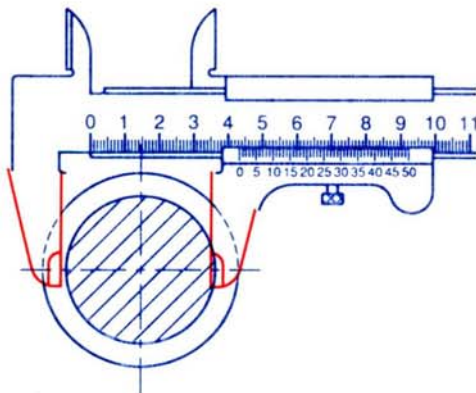
### SCREW THREAD MICROMETER



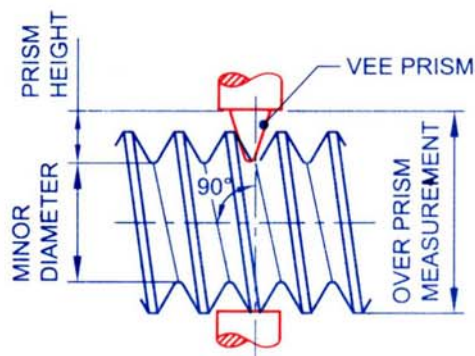
### THREE WIRE METHOD



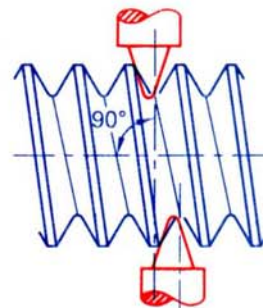
### VERNIER CALIPER



### OUTSIDE MICROMETER AND VEE PRISM



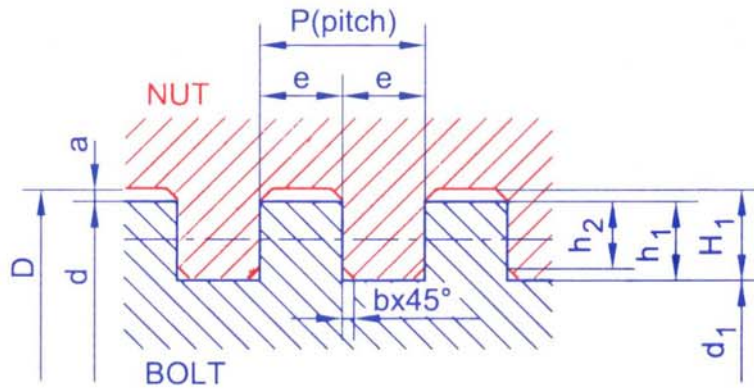
### SPECIAL MICROMETER



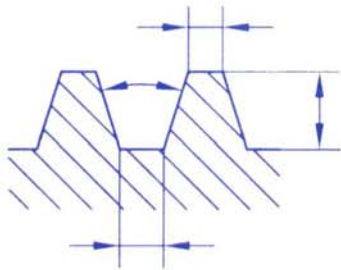


# TYPES OF SCREW THREAD

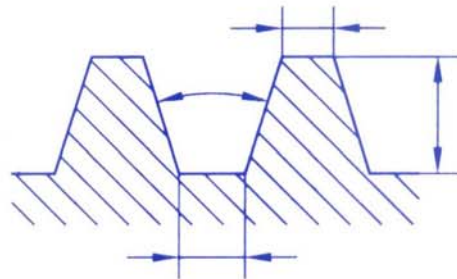
## SQUARE THREAD



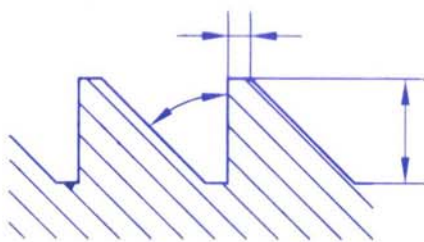
## BRITISH ACME THREAD



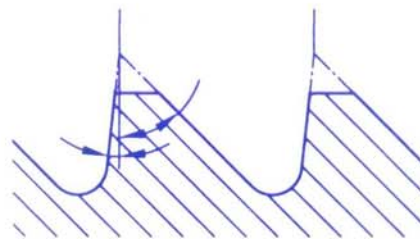
## WORM THREAD



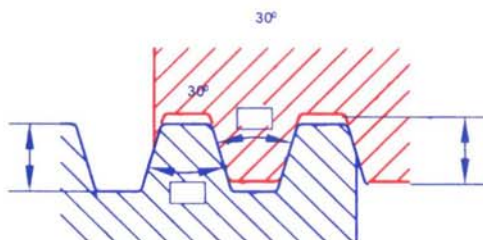
## BUTRESS THREAD



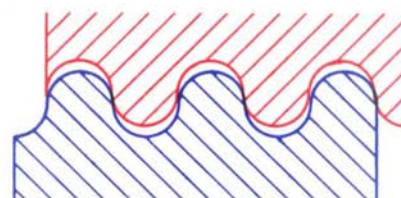
## MODIFIED BUTRESS THREAD



## METRIC ACME THREAD



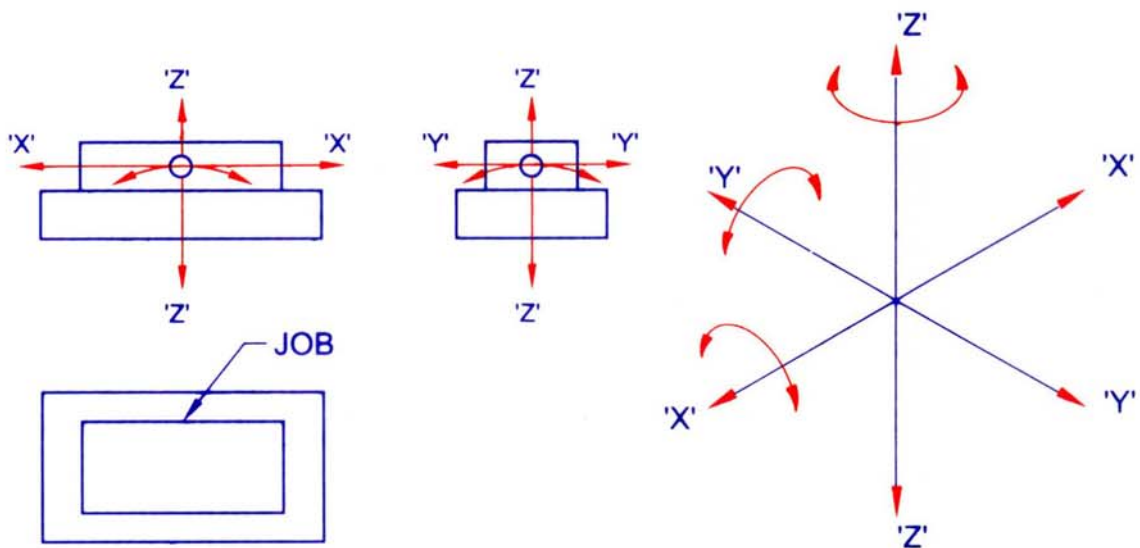
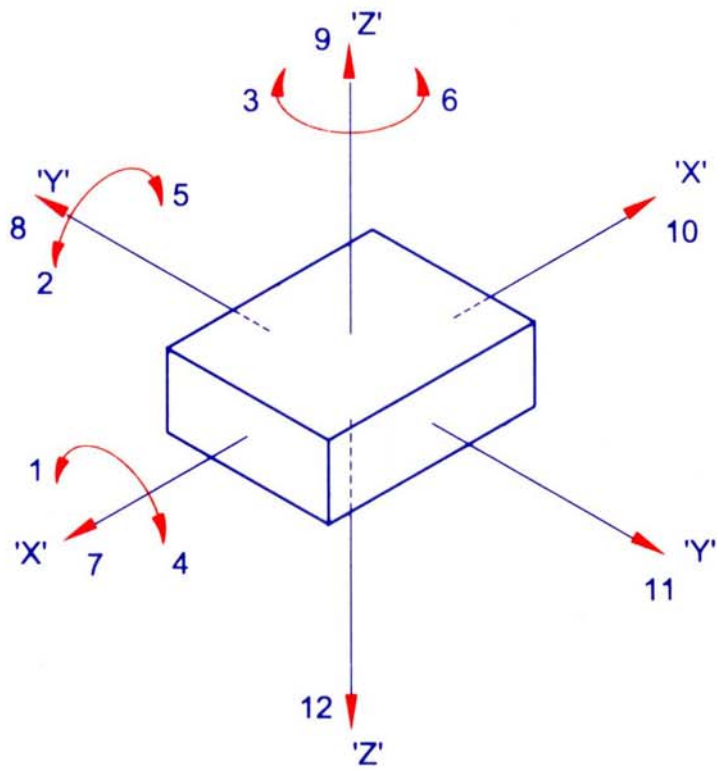
## KNUCLE THREAD





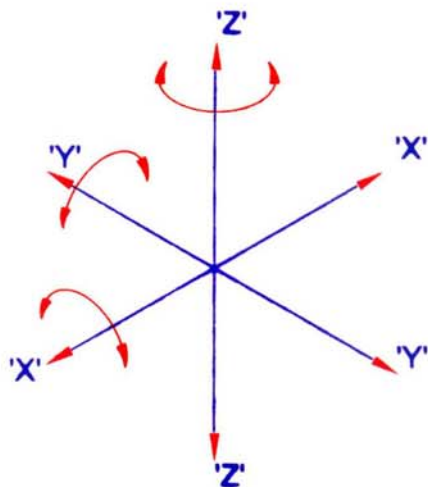
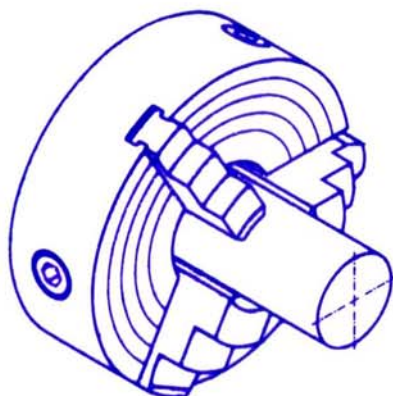
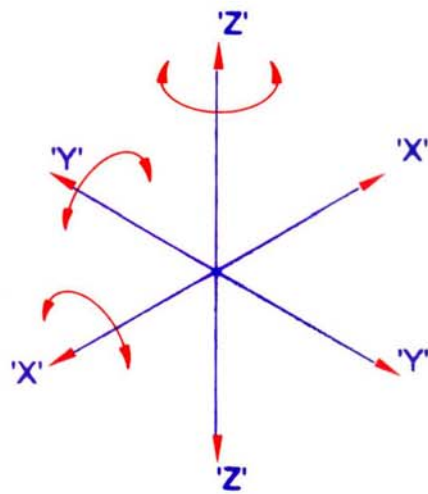
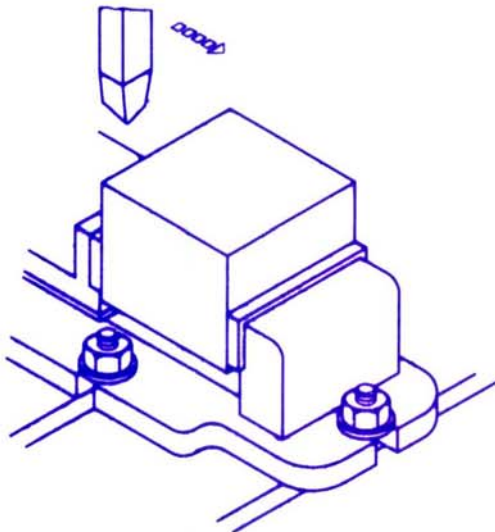
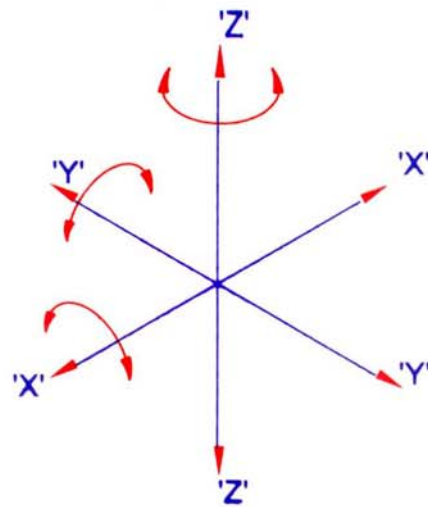
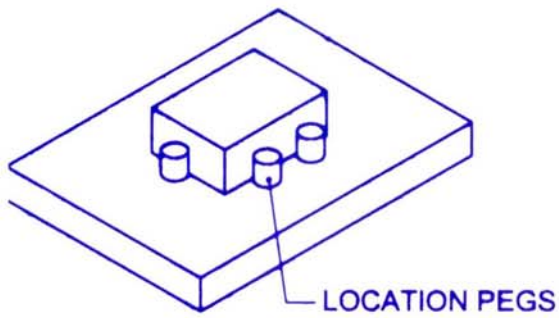


# MOVEMENTS & RESTRAINTS OF WORK - I





# MOVEMENTS & RESTRAINTS OF WORK - II

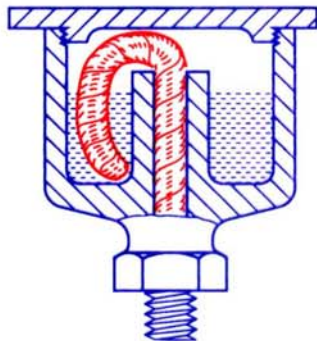




# METHODS OF APPLYING LUBRICANT

## GRAVITY FEED METHOD

WICK FEED LUBRICATOR

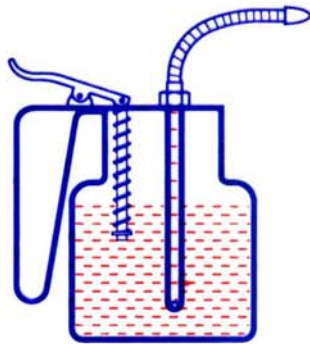


OIL CUP

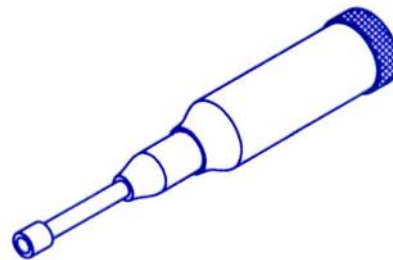


## FORCE FEED METHOD

OIL CAN

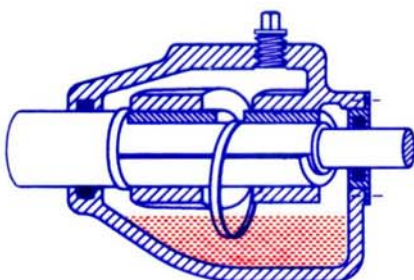


GREASE GUN

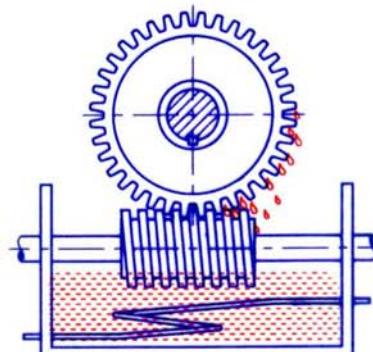


## SPLASH METHOD

RING OILING

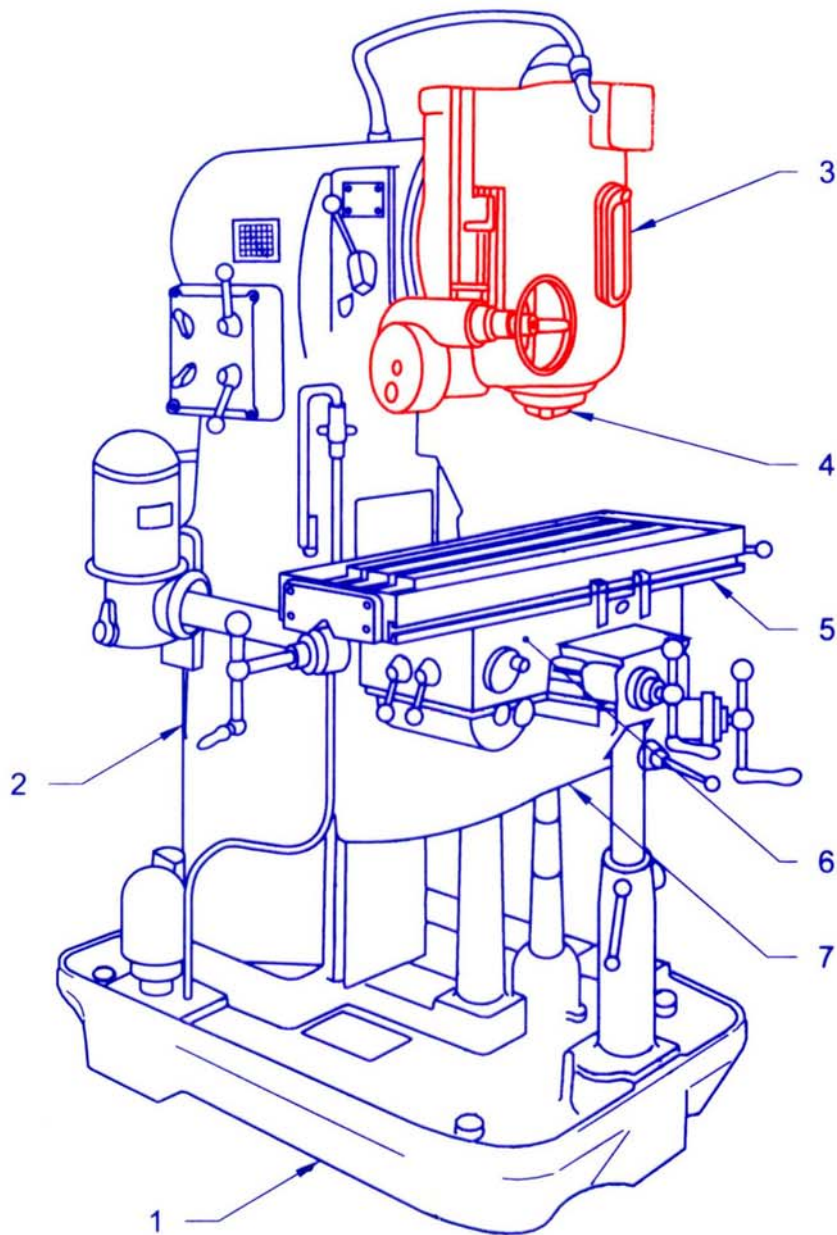


WORM - GEAR BATH OILER





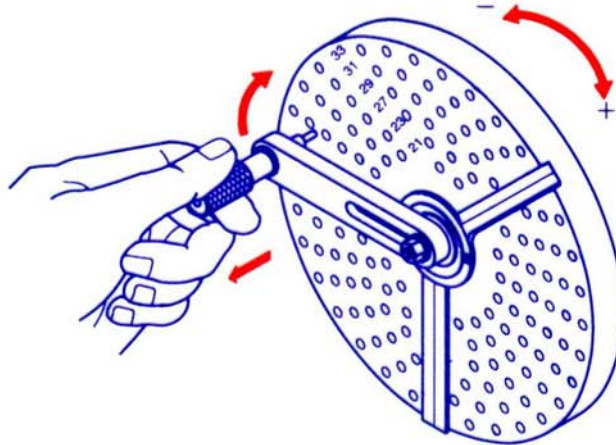
# VERTICAL MILLING MACHINE



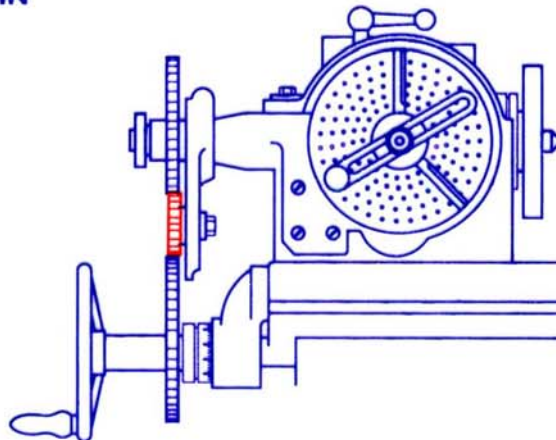


# DIFFERENTIAL INDEXING - I

## COMBINED MOTION OF INDEX PLATE AND CRANK

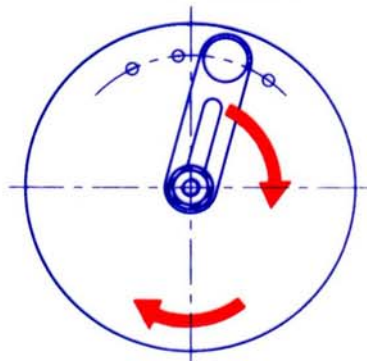


## BY GEAR TRAIN

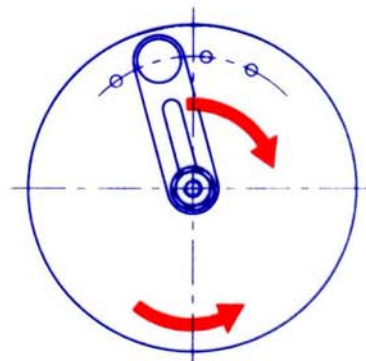


## INDEX PLATE ROTATION

### WITH CRANK



### AGAINST CRANK

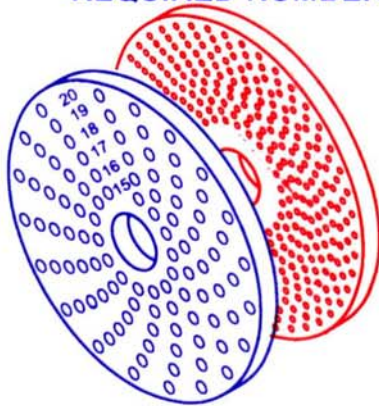


BASED ON THE NUMBER OF IDLER GEAR/GEARS IN THE GEAR TRAIN



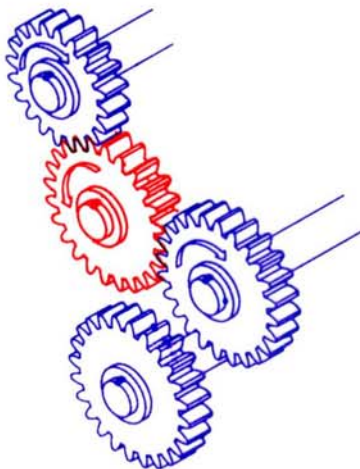
## DIFFERENTIAL INDEXING - II

REQUIRED NUMBER (N) OF DIVISIONS TO BE INDEXED IS 57.

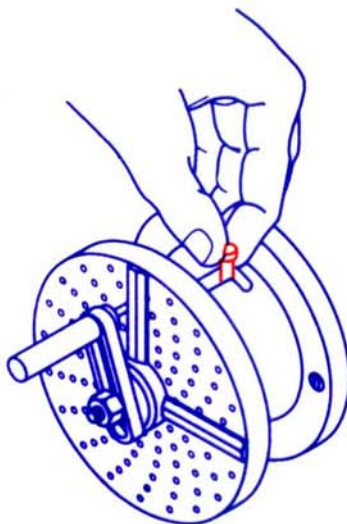


### PROCEDURE:

- SELECT ASSUMED NUMBER OF DIVISIONS (A)
- SELECT INDEX PLATE AND SPACING FOR THE ASSUMED NUMBER
  - USE SIMPLE INDEXING.



- SELECT DRIVER AND DRIVEN GEARS
- DESIDE THE DIRECTION OF ROTATION OF INDEX PLATE.
- ACCORDING TO THE ROTATION OF INDEX PLATE ENGAGE/CONNECT IDLER GEAR/ GEARS.

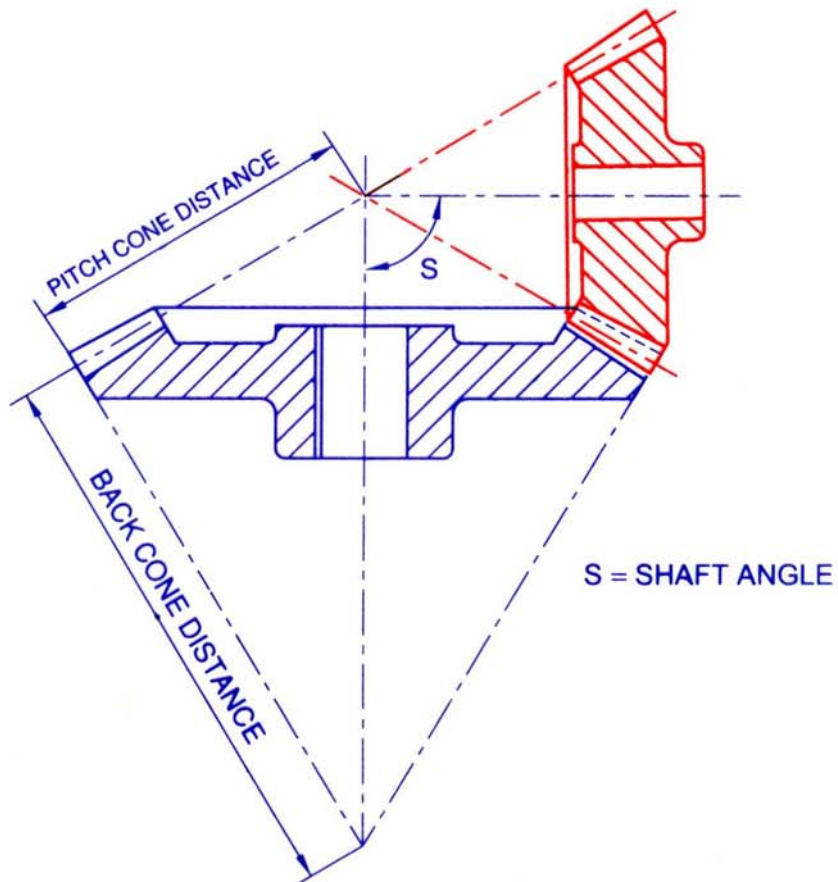
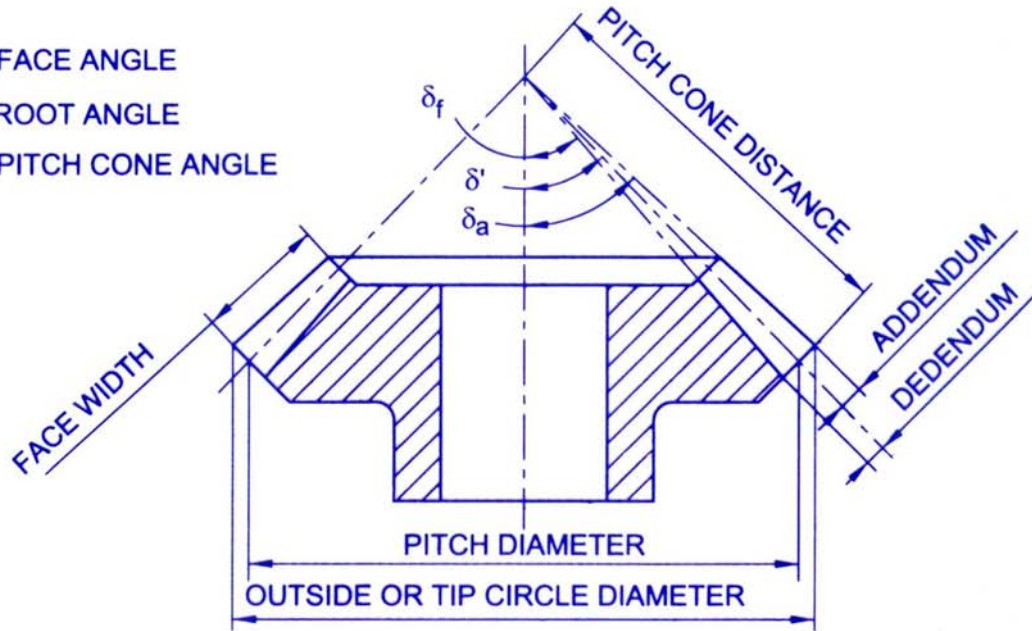


PRIOR TO INDEXING DISENGAGE THE BACK STOP PIN TO PERMIT THE ROTATING OF THE INDEX PLATE



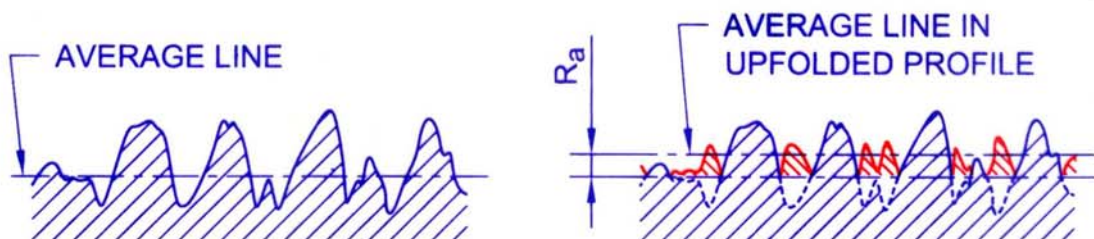
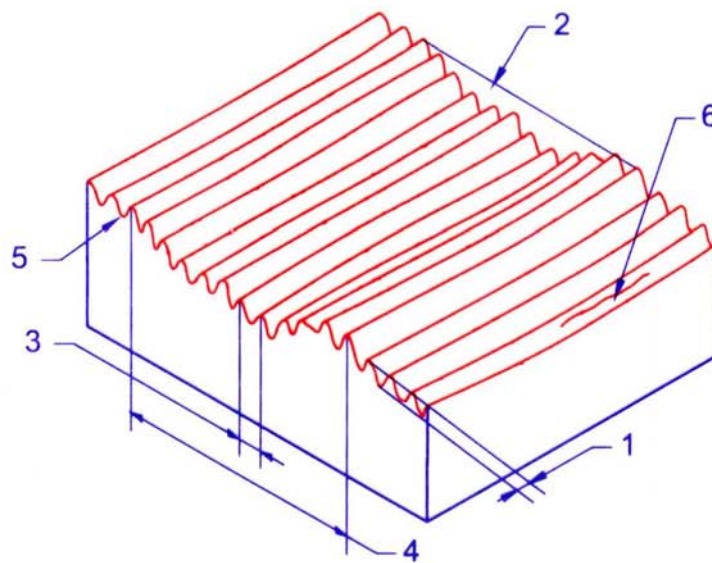
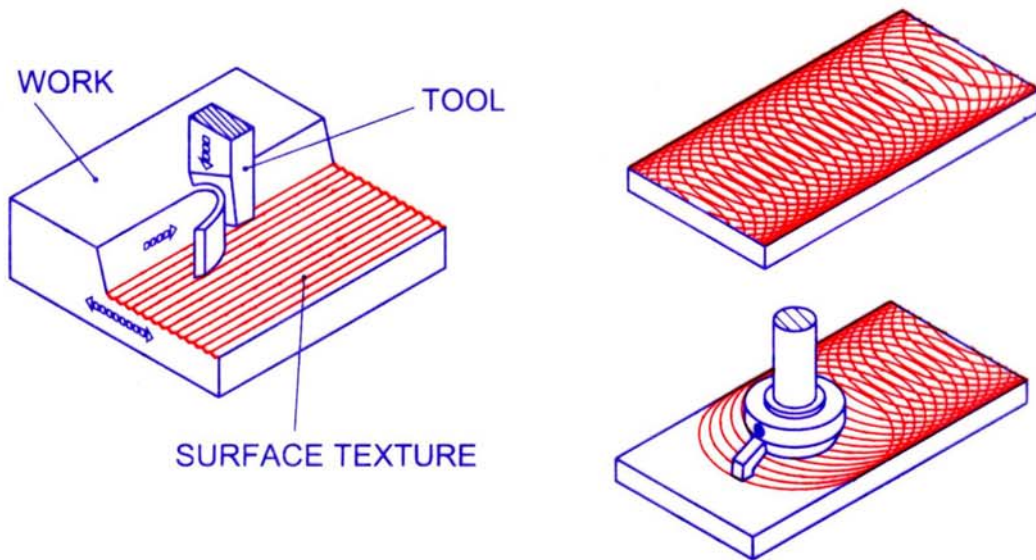
## ELEMENTS OF A STRAIGHT BEVEL GEAR

- $\delta_a$  = FACE ANGLE
- $\delta_f$  = ROOT ANGLE
- $\delta'$  = PITCH CONE ANGLE





# SURFACE TEXTURE MEASUREMENT







# METHODS OF INDICATING SURFACE ROUGHNESS

METHODS OF INDICATING SURFACE ROUGHNESS

MA2C10L1

<p>6.3 or N9</p>	
<p>3.2 or N8</p> <p>1A</p>	
<p>0.2 or N4</p>	



# WORM AND WORM WHEEL

