

\*

( / / , / / , / / )

Msc Visual Nastran

22.5rpm

(

Week

Mehta .[ ]

Chen .[ ]

[ ]

Kang .

[ ]

Choi

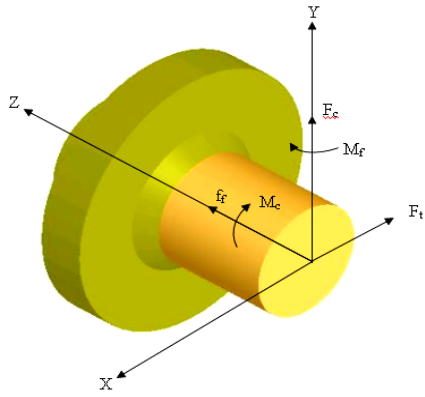
[ ]

100°C

[ ]

100000rpm )

[ ] (



[ ]

Visual Nastran

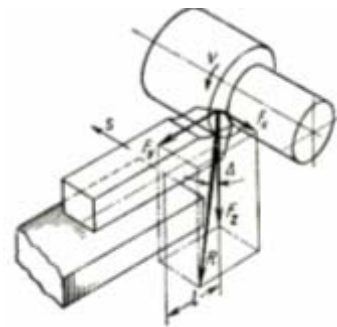
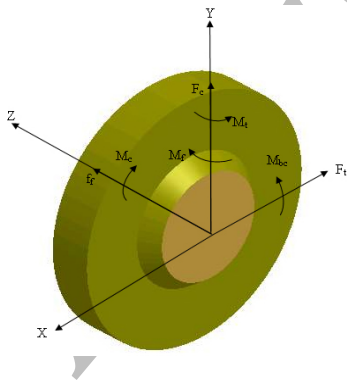
$$M_c = F_c \times \frac{D_2}{2}$$

( )

$$M_f = F_f \times \frac{D_2}{2}$$

( )

( )



$$M_t = F_t \cdot L$$

( )

$$M_{bc} = F_c \cdot L$$

( )

[ ]

L

:Fx

:Fz

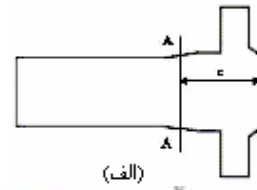
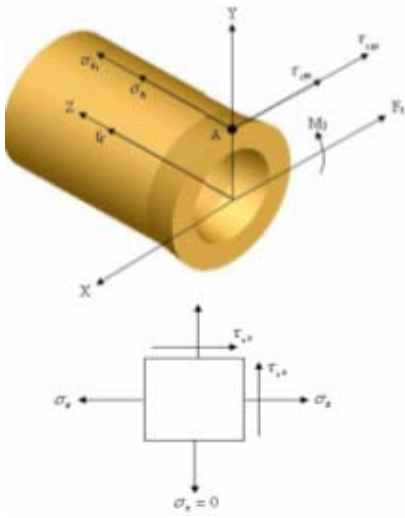
:Fy

:D

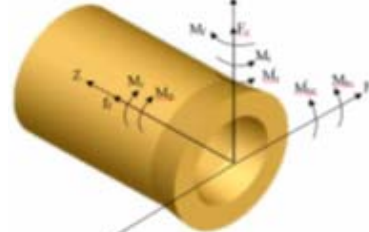
$M_\phi$

( )

: A



(الف)



( )

( ) ( ) A-A

:

$$\tau_{1zx} = \frac{4 F_c}{3 A}$$

$$M'_t = F_t \times C$$

( )

( )

$$\sigma_{z1} = \frac{f_f}{A}$$

$$M'_{bc} = F_c \times C$$

( )

( )

:C

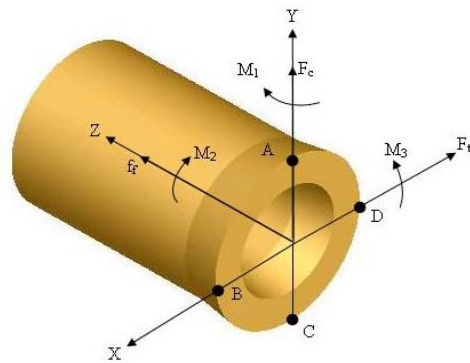
$$\sigma_{z2} = \frac{M_3 C}{I} = \frac{M_3 (\frac{d_o}{2})}{\frac{\pi}{64} (d_o^4 - d_i^4)}$$

( )

:( )

$$\tau_{2zx} = \frac{Tr}{j} = \frac{M_2 (\frac{d_o}{2})}{\frac{\pi}{32} (d_o^4 - d_i^4)}$$

( )



$\sigma_{z1}$

$\sigma_{z2}$

$\tau_{1zx}$

$\tau_{2zx}$

$$M_1 = M_f + M_t + M'_t$$

( )

$$M_2 = M_c + M_\phi$$

( )

$$M_3 = M_{bc} + M'_{bc}$$

( )

$$\sigma_{z(total)} = \frac{f_f}{A} + \frac{M_3 (\frac{d_o}{2})}{\frac{\pi}{64} (d_o^4 - d_i^4)}$$

( )

$$P = -AE\alpha\Delta T$$

( )

$$\Delta T$$

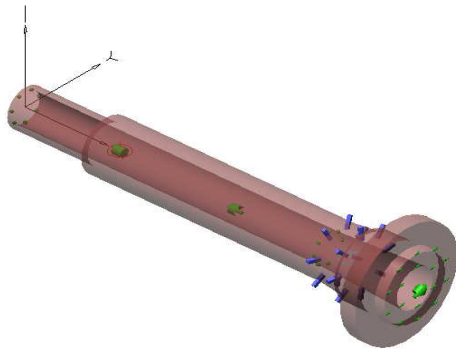
$$\sigma_T = \frac{P}{A} = -E\alpha\Delta T$$

( )

### Visual Nastran

### Solid Works

### Visual Nastran



ARC

$$\tau_{zx}(total) = \frac{4 F_t}{3 A} + \frac{M_2(\frac{d_o}{2})}{\frac{\pi}{32}(d_o^4 - d_i^4)}$$

( )

$$\sigma_{1,2} = \frac{\sigma_x + \sigma_z}{2} \pm \sqrt{(\frac{\sigma_x + \sigma_z}{2})^2 + (\tau_{zx})^2}$$

( )

$$\sigma_1 = \frac{\sigma_z}{2} + \sqrt{(\frac{\sigma_{zt}}{2})^2 + (\tau_{zxt})^2}$$

( )

$$\sigma_2 = \frac{\sigma_z}{2} - \sqrt{(\frac{\sigma_{zt}}{2})^2 + (\tau_{zxt})^2}$$

( )

:  $\sigma_1$

:  $\sigma_2$

(Z ) A  $M_3$   
 (Z ) B  
 B A  
 A B,C,D

$$\Delta T \quad L$$

$$\delta_T$$

$$: [ ] \quad \Delta T$$

$$\delta_T = \alpha(\Delta T)L$$

( )

$$\delta_T$$

$$\epsilon_T = \frac{\delta_T}{L}$$

$$\epsilon_T = \alpha \Delta T$$

( )

$$\delta = \delta_T + \delta_p = \alpha(\Delta T)L + \frac{PL}{AE} = 0$$

( )

$$(f_c, f_t, f_a)$$

$$(U_x, U_y, U_z)$$

( )

$$(M_1, M_2, M_3)$$

$$F_c = \frac{\tau_s A_c \cos(\beta - \gamma_{ne})}{\sin \phi \sin(\phi + \beta - \gamma_{ne})}$$

( )

$$F_t = F_c \tan(\beta - \gamma_{ne})$$

( )

$$F_a = \frac{P_f}{v}$$

( )

$\gamma_{ne}$

$F_c$

$\tau_s$

$F_t$

$P_f$

$F_a$

$v$

$\beta$

$\phi$

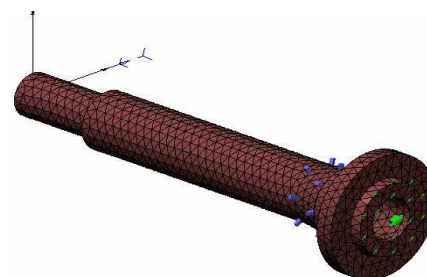
$A_c$

( )

L=300mm

D=100mm

	Steel 4340	210 (Gpa)	$\nu=0.3$
n (rpm)	22.5 , 255 , 355 , 1000 , 2000		
(mm/rev)	0.2 , 0.3 , 0.4 , 0.5 , 0.6		
$a_p$ (mm)	1 , 2 , 3 , 4 , 5		



$$\delta T_2 \quad \delta T_1 \quad \text{rpm}$$

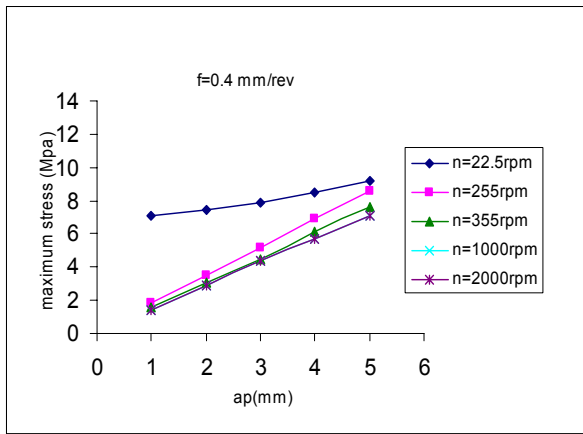
[ ]

$$\delta T_1 = -1.03 \times 10^{-9} \omega^3 + 9.25 \times 10^{-6} \omega^2 - 6.84 \times 10^{-3} \omega - 1.24 \times 10^{-1}$$

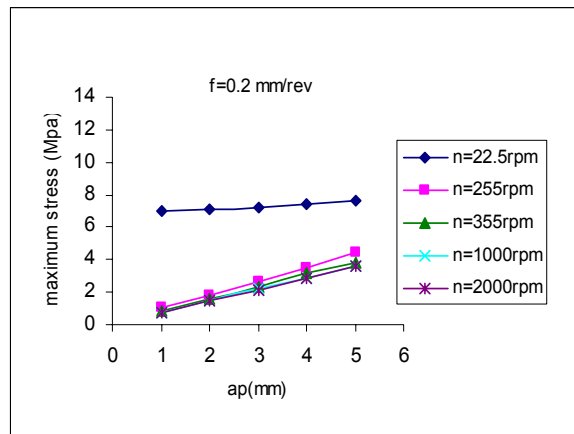
( )

$$\delta T_2 = -1.01 \times 10^{-9} \omega^3 + 6.01 \times 10^{-6} \omega^2 - 4.59 \times 10^{-3} \omega - 5.37 \times 10^{-2}$$

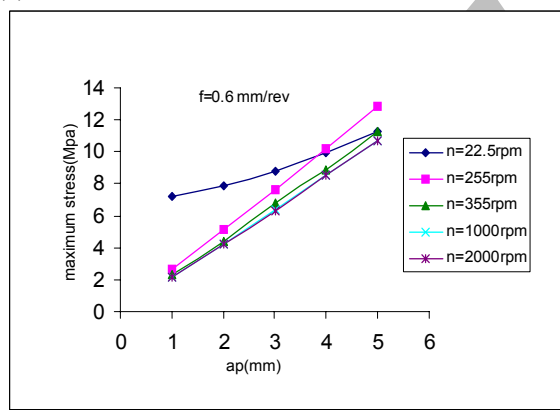
( )



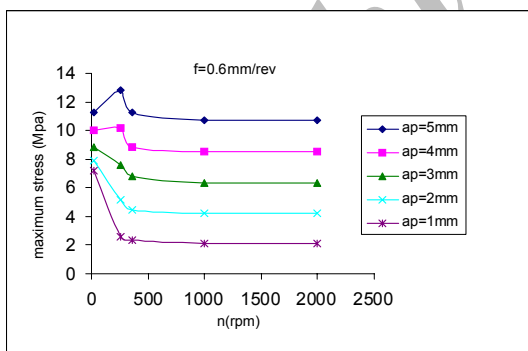
(b)



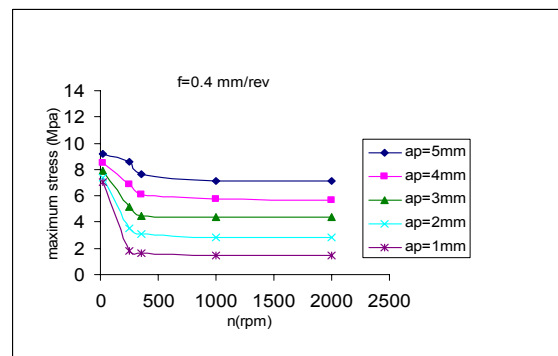
(a)



(c)



(b)



(a)

( a )

( b )

( )

( )

( b )

( a )

n=255rpm

f=0.6mm/rev

(n=255rpm )

(n=255rpm )

,300mm

,1500mm

900mm ,500mm

,600mm ,1200mm

)

)

( a,b,c

( a,b )

( a,b,c )

n=255rpm

n=255rpm

( )

( )

n = 22.5 rpm

( )

( )

( a )

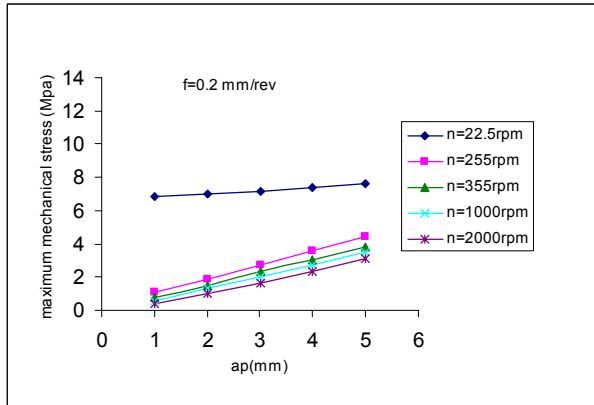
( b )

(255,355,1000,2000)

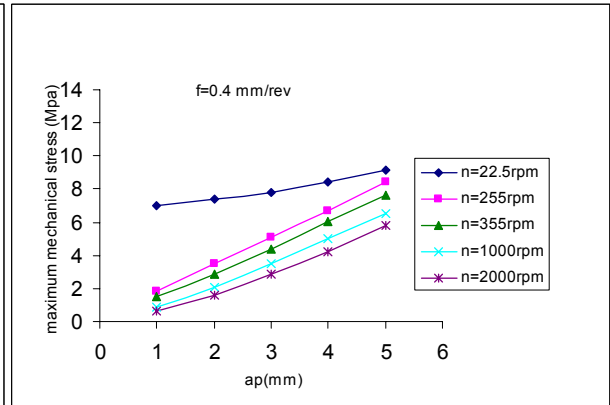
$n = 255rpm$

22.5 rpm

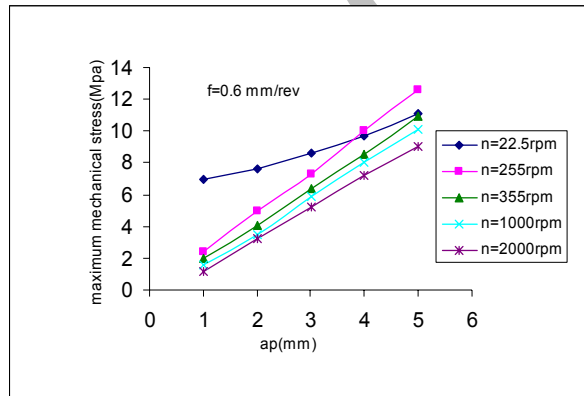
(1000,2000 rpm)



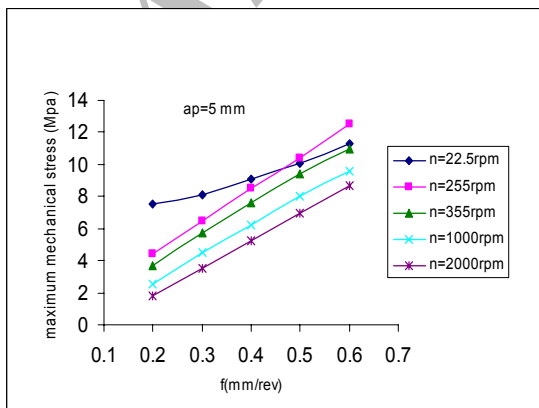
(a)



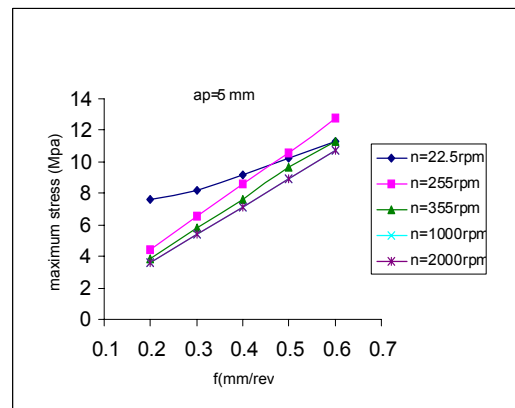
(b)



(c)



(b)

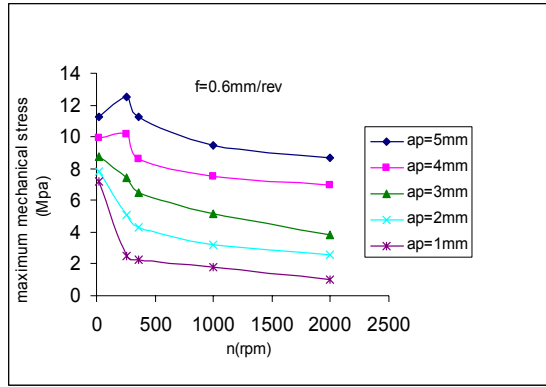


(a)

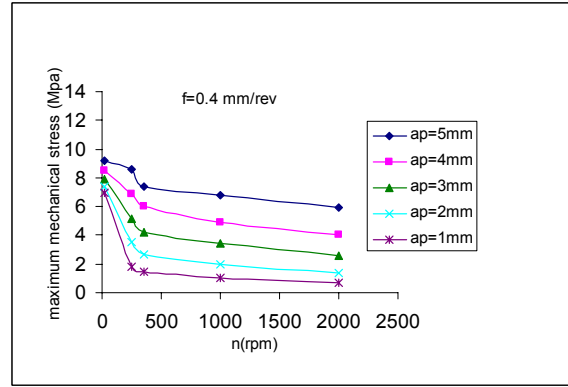
(b)

(a)

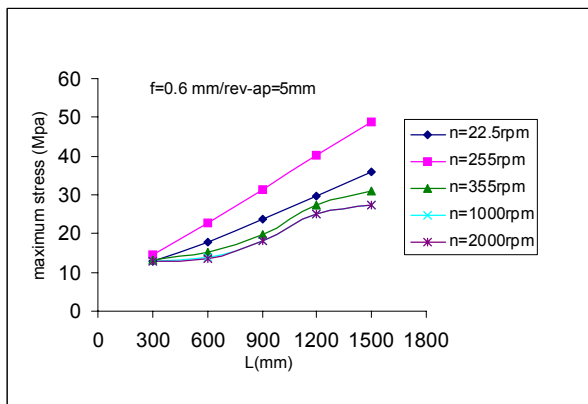




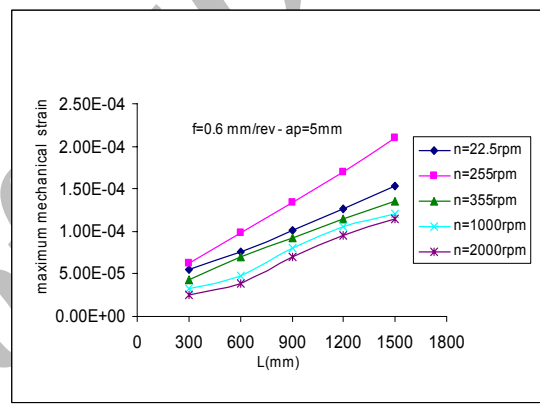
(b)



(a)



(b)



(a)

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