

دراسة تأثير تغير شكل الأسنان للتروس العدلة على الإجهادات والتشوهات باستخدام طريقة العناصر المحددة

(JL ANALYZER 2008)

(FEM)

(25) (Pressure Angle)

(d)

(14)

Abstract

The study of the effect of change a pressure angle and the number of gear teeth in the change of tooth dimension has been carried by Finite Element Method with analysis program (JL ANALYZER 2008) . The result of the research shown that the minimum value about of stress and deformation happen when pressure angle equal (25^0) and the number of teeth equal (14) when the pitch circle diameter constant. The comparison between the results obtained from study with the stander tables obtained from theoretical studies and The study results can ensure good recommendation for the effect of the shape and volume teeth on stresses and deformation.

-1

Computer Aided)

(Design

CAD

Finite)

(Element Method

Partheymuller etal,) .

(2000

(Spure Gear)

(FEM)

3D

Ø14.5,)

(Wilcox and Coleman ,1973) .(14,16,18)

(Ø 20, Ø 25

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(

David & Handschuh 2001

(David and Handschuh ,2001)

.Ansys

(connect stress)

Zepin Wei 2004

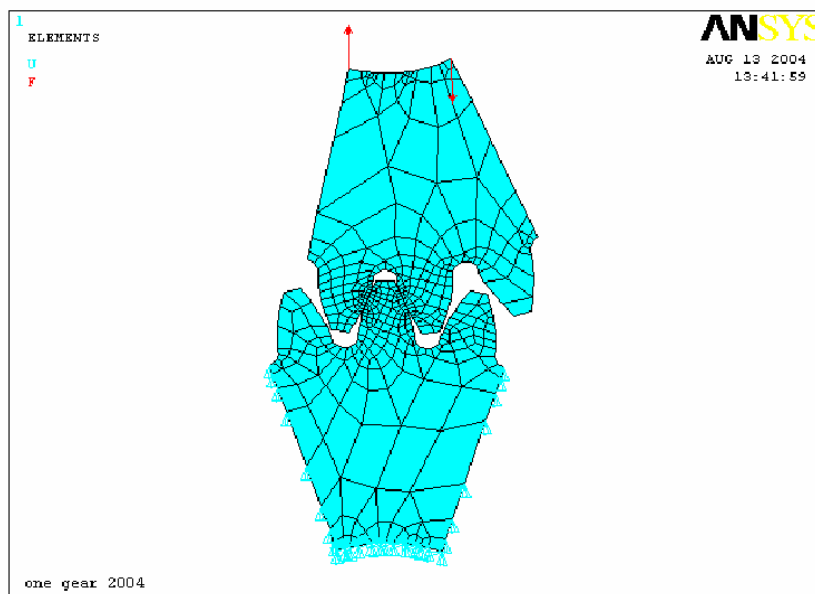
Ansys

(Bending stress)

(Hertz)

(Zepin Wei,2004) .(1)

(Lewis)



(Wei,2004)

: (1)

-2

(Spur Gear)

-3

-1-3

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-1 -:

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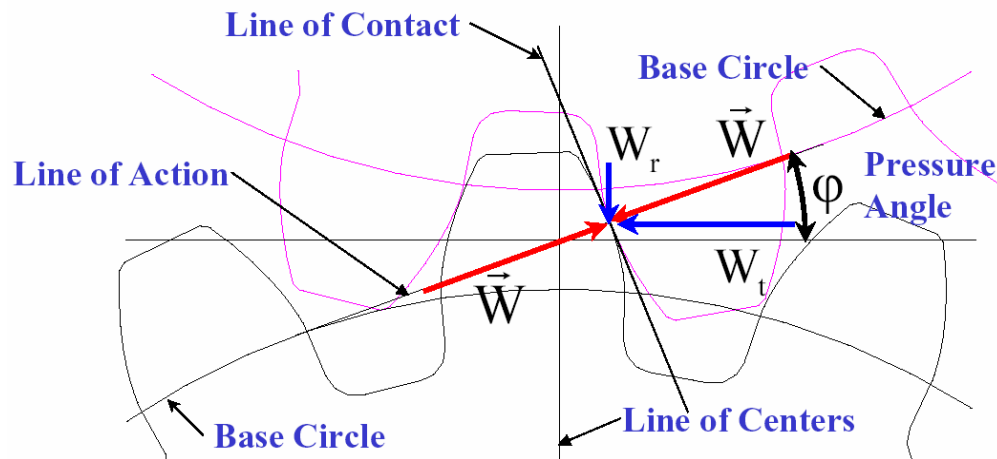
-2 -:

flank

-:Scaring -

(Richard eatl,2002).

(Norton,2000) **(AGMA BENDING STRESS EQUATION)** -2-3



$$\sigma_b = \frac{W_t p_d K_a K_m}{F J K_v} K_s K_B K_I \dots \dots \dots 1$$

$$\sigma_b = \frac{W_t K_a K_m}{F m J K_v} K_s K_B K_I \dots \dots \dots 2$$

(2)

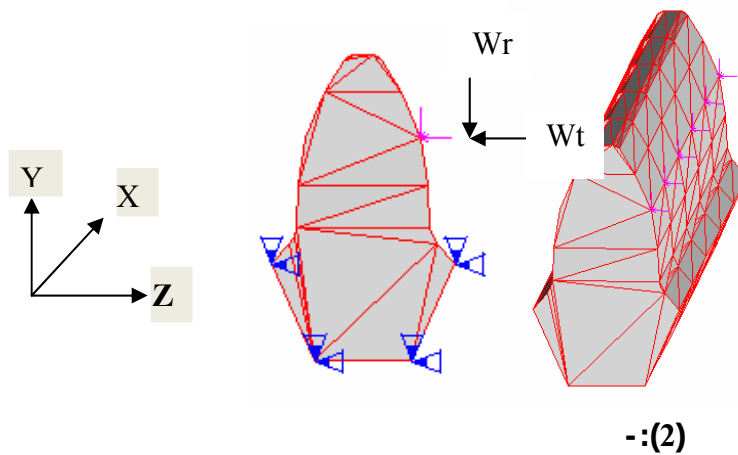
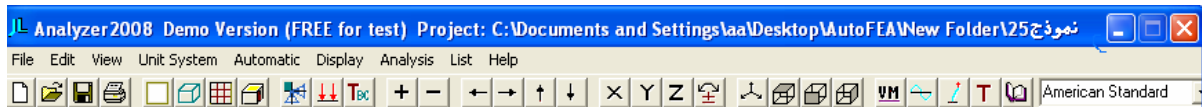
Y lb	X lb	Filet 12/P _d	R	T(in)	F(in)	Dedenum	Addenum	Ø	Pd(in)	d(in)	N	lb- in(T)
201.4	432	0.05	0.413	0.261	2	0.2083	0.1666	25	6	2.33	14	504
157.2	432	0.05	0.416	0.261	2	0.2083	0.1666	20	6	2.33	14	504
111.7	432	0.05	0.418	0.261	2	0.2083	0.1666	14.5	6	2.33	14	504
201.4	432	0.043	0.395	0.228	1.74	0.182	0.1456	25	6.86	2.33	16	504
201.4	432	0.038	0.385	0.203	1.55	0.1618	0.1294	25	7.72	2.33	18	504

مواصفات المعدن المستخدم جدول رقم (2) (Steel)

Property	Symbol	Value	Unit
Young's Modulus	EX	2.900000e+007	psi
Poisson's Ratio	NUXY	3.200000e-001	
Thermal Expansion Coef.	ALPX	6.500000e-006	/Fahrenheit
Mass Density	DENS	7.300000e-004	lb*s*s/in^4
Thermal Conductivity	KX	4.000000e-004	BTU/inch/s/F
Thermal Capacity	C	4.600000e+001	BTU*inch/lb/s^2/F

-4

(pinion) (gear) (Three dimension)
(Tetra4 Element) ($\bar{w}$)
JL) (1)
(Wr) Y (Wt) X (Analyzer 2008
(Steel) (1)
Z-) (axis
(2).

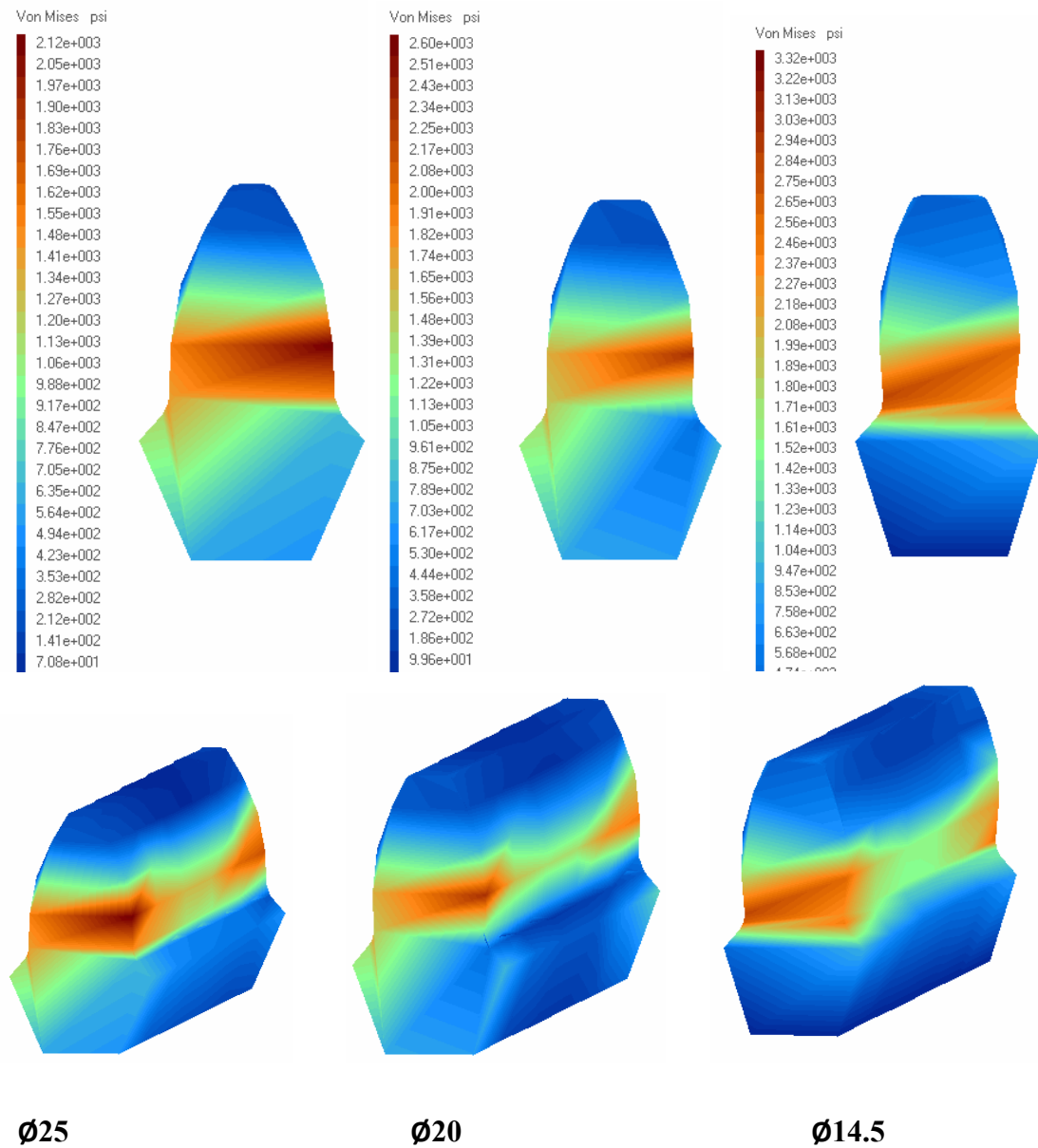


-1-4

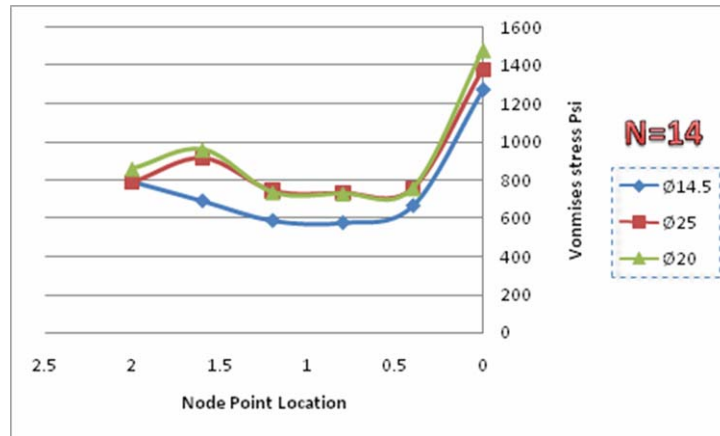
(Static Analysis)
(displacement) (Vonmises stress)

(14)

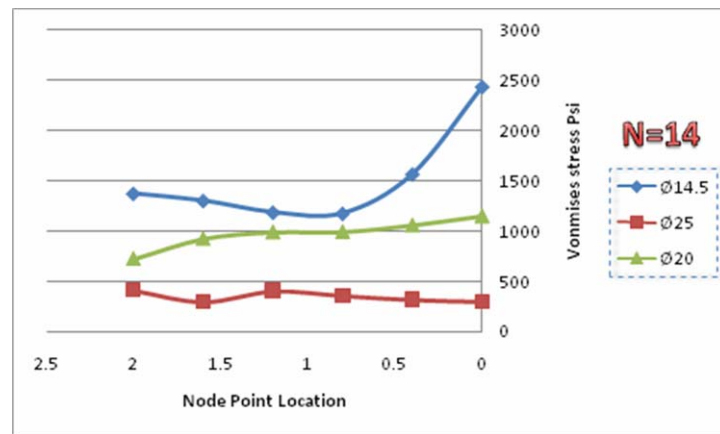
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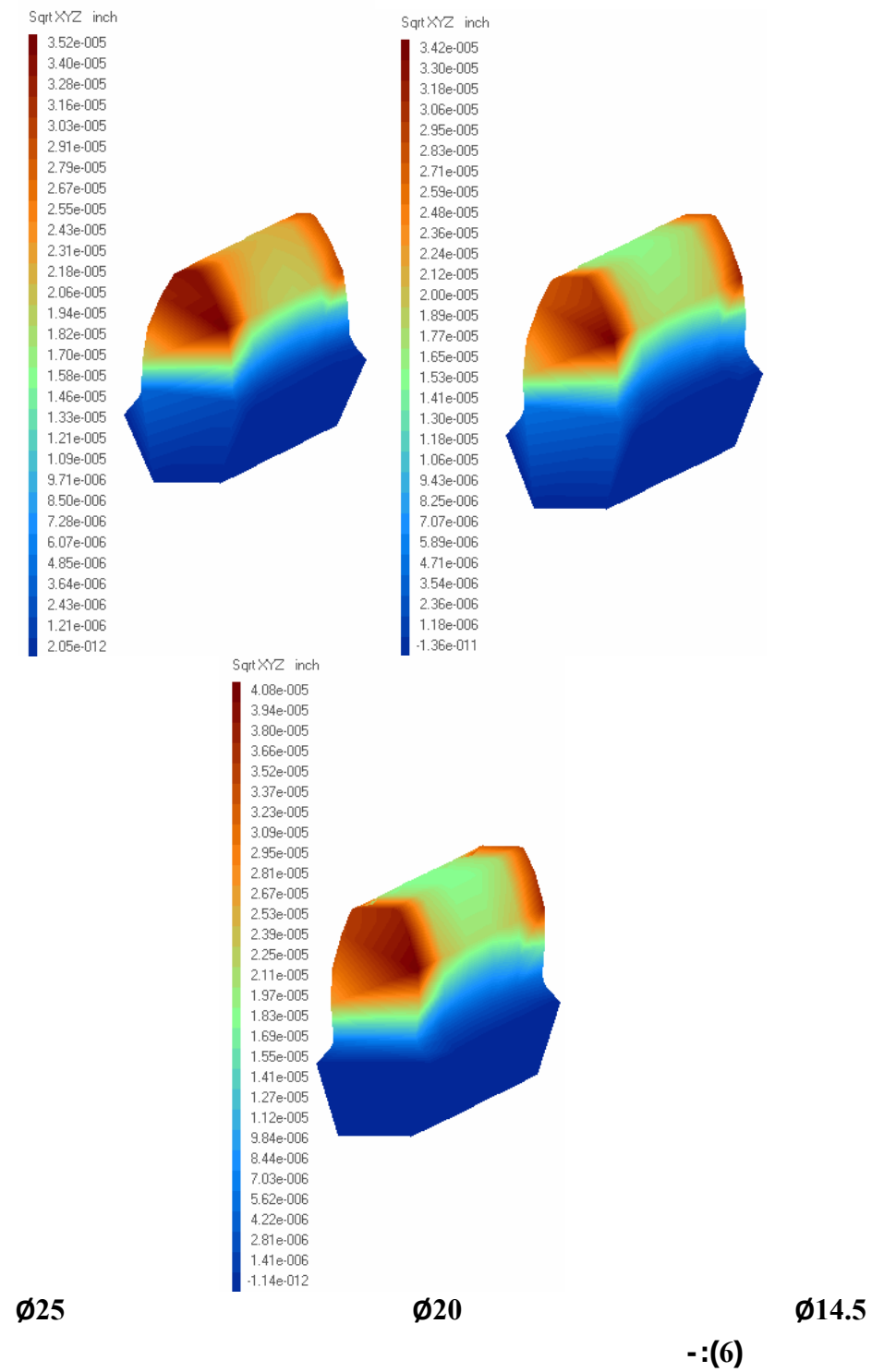
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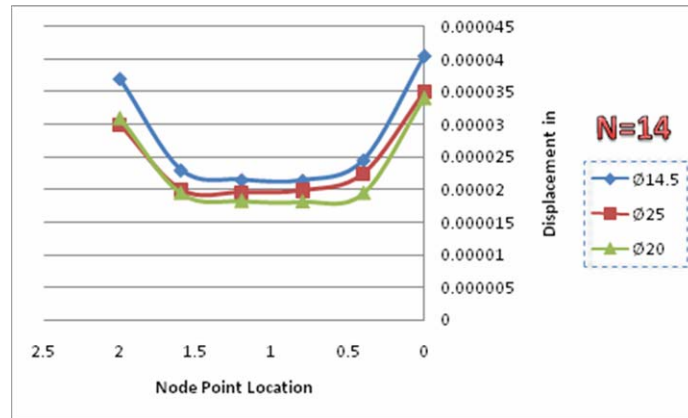


-(4)-

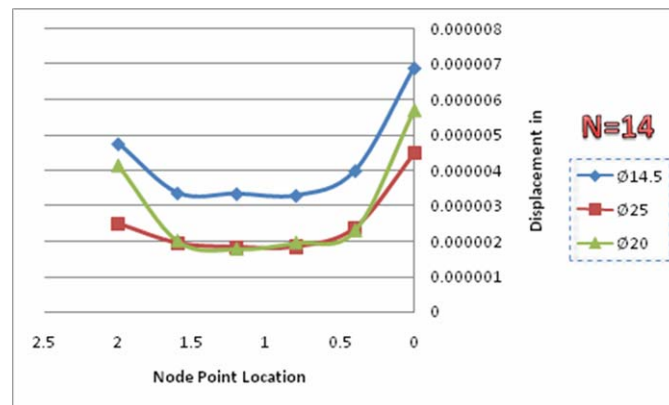


-(5)-





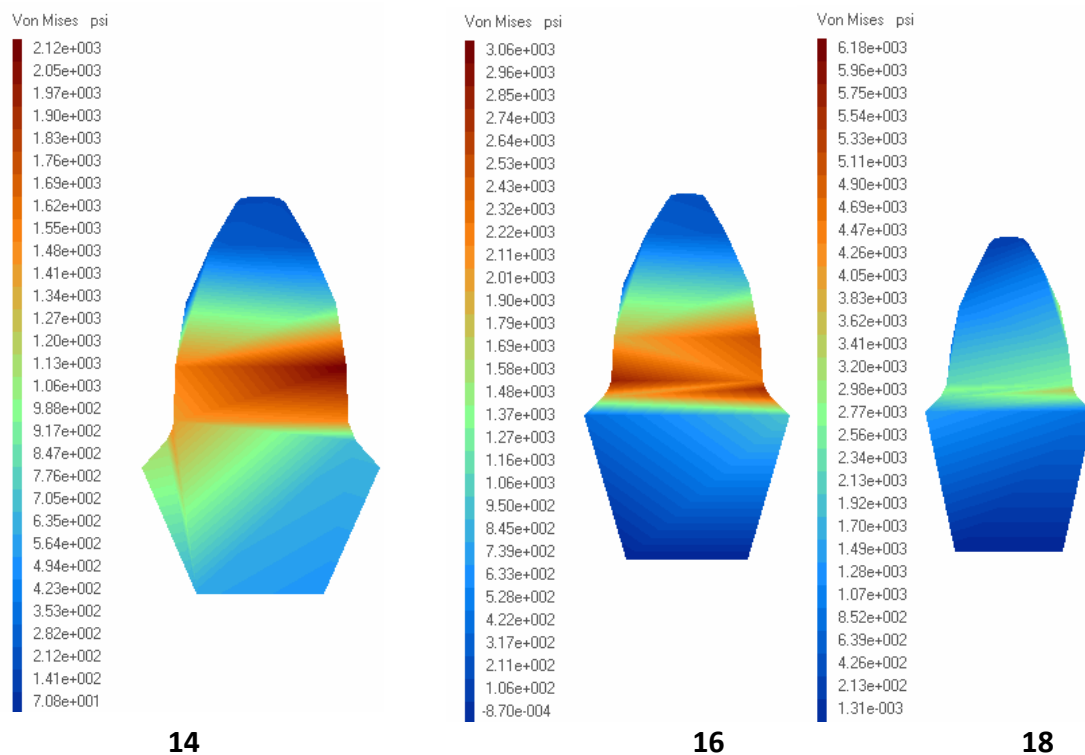
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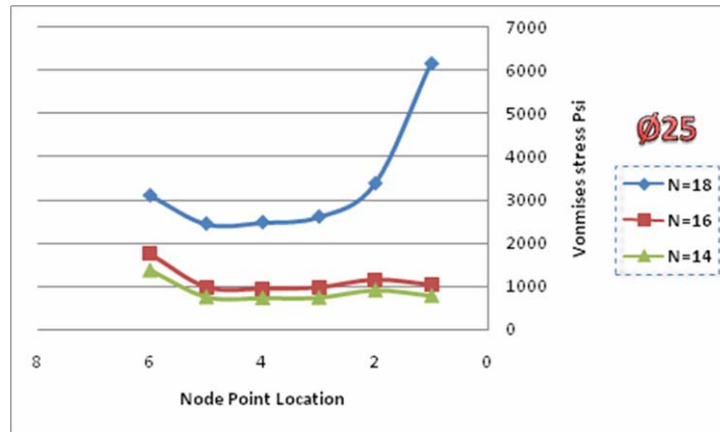
-(8)

(Ø25)

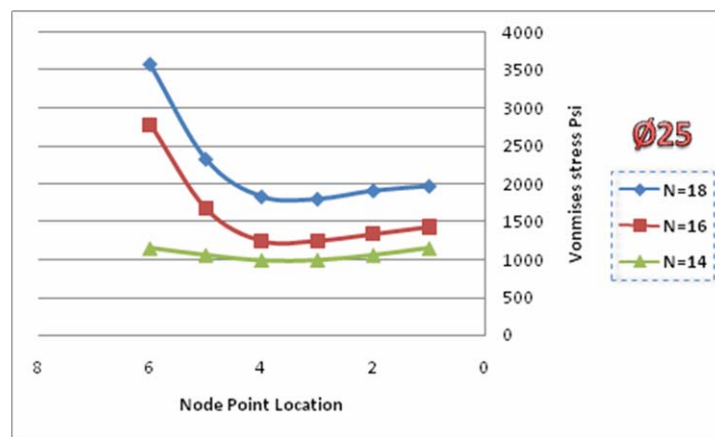
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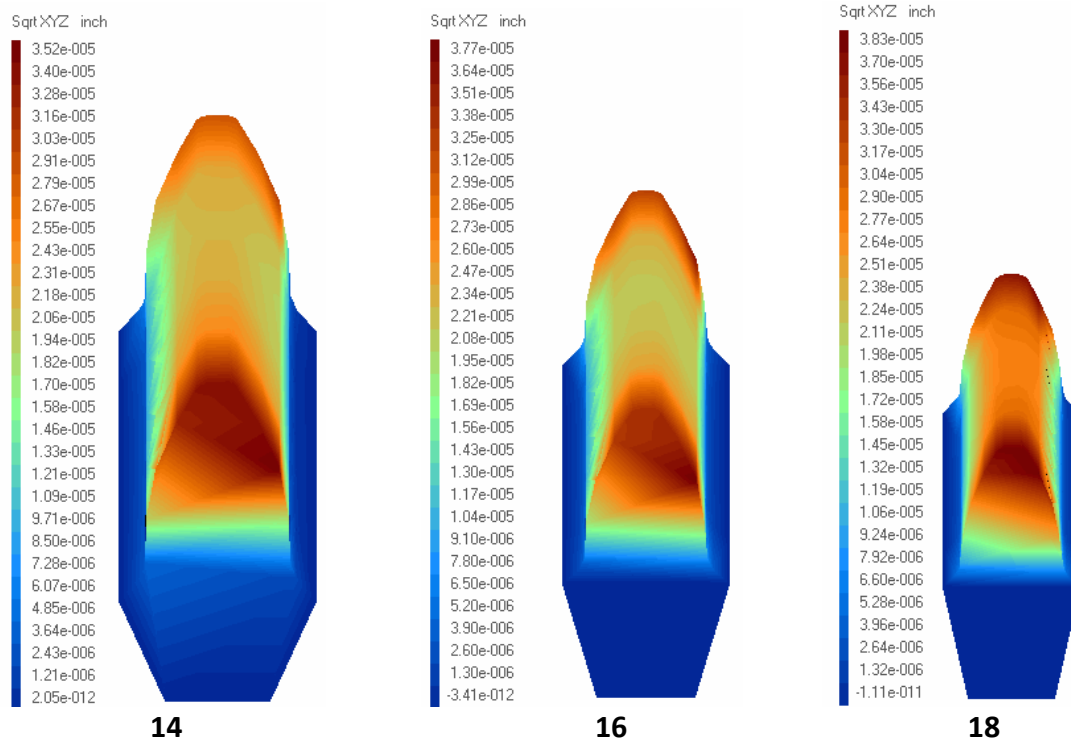
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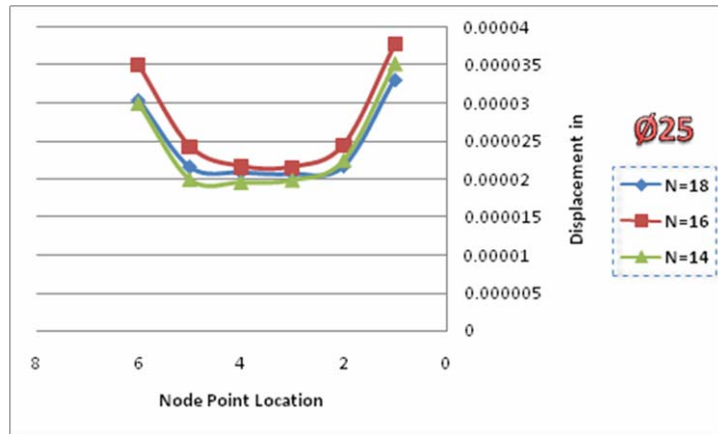
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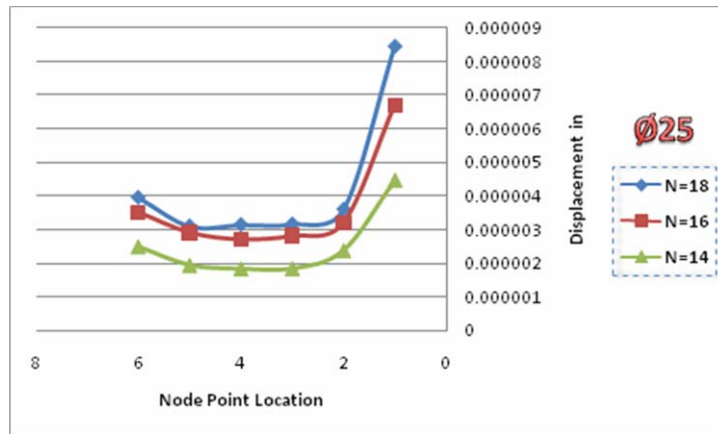
-(11)-



-(12)-



-(13)



-(14)

-5

(y)

(d)

(R)

(1)

(6) (3)

20

14.5

(5) (4)

25

)

(8) (7)

(x,y,z

.

(d)

(1)

(x,y)

(12) (9)

(18)

(11 10)

.(14 13)

-6

-1

(pressure angle)

-2

(14)

(25)

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