ClutchPlateAnalysisFinal

MESH:

Entity	Size
Nodes	330463
Elements	1504059

ELEMENT TYPE:

Connectivity	Statistics
TE4	1504059 (100.00%)

ELEMENT QUALITY:

Criterion	Good	Poor	Bad	Worst	Average
Stretch	1504059 (100.00%)	0 (0.00%)	0 (0.00%)	0.324	0.659
Aspect Ratio	1481451 (98.50%)	22608 (1.50%)	0 (0.00%)	4.182	1.771

Materials.1

Material	Steel
Young's modulus	2e+011N_m2
Poisson's ratio	0.266
Density	7860kg_m3
Coefficient of thermal expansion	1.17e-005_Kdeg
Yield strength	2.5e+008N_m2

Static Case

Boundary Conditions

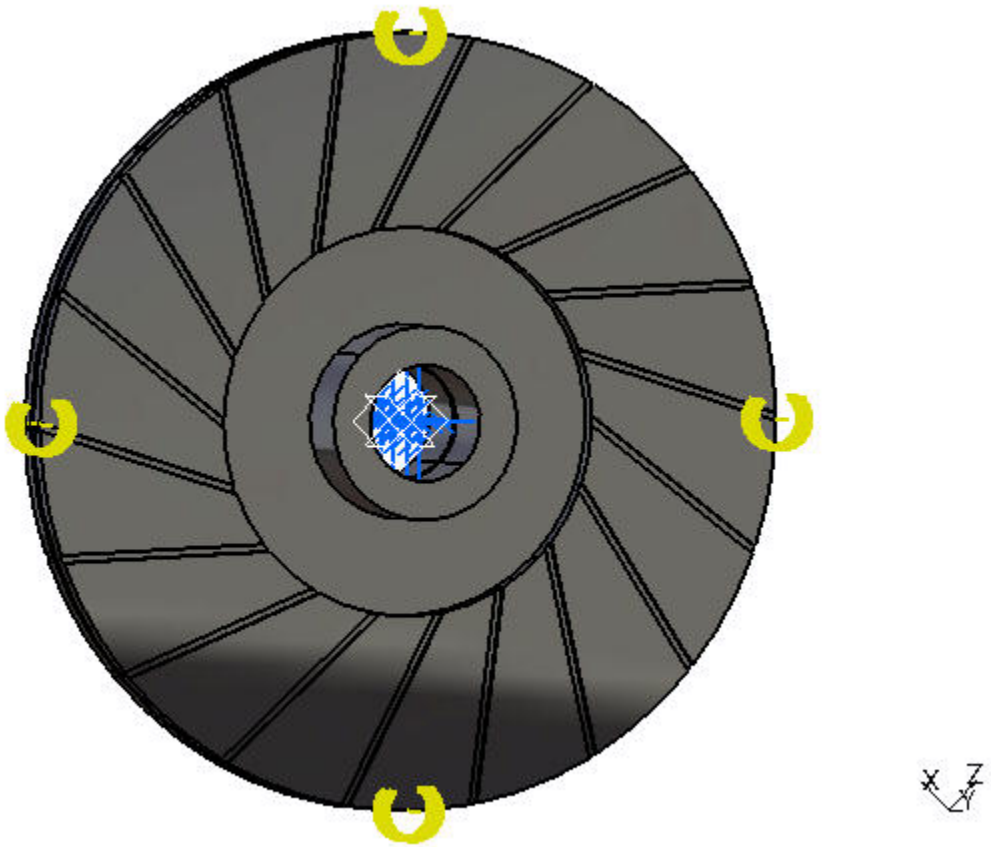

Figure 1

STRUCTURE Computation

Number of nodes	:	330463
Number of elements	:	1504059
Number of D.O.F.	:	991389
Number of Contact relations	:	0
Number of Kinematic relations	:	0

Linear tetrahedron : 1504059

RESTRAINT Computation

Name: Restraints.1

Number of S.P.C : 50127

LOAD Computation

Name: Loads.1

Applied load resultant :

Fx = 1 . 664e-007 N
Fy = -3 . 760e-012 N
Fz = -1 . 938e-007 N
Mx = 1 . 389e-009 Nxm
My = 1 . 000e+002 Nxm
Mz = -1 . 148e-010 Nxm

STIFFNESS Computation

Number of lines	:	991389
Number of coefficients	:	19691691
Number of blocks	:	40
Maximum number of coefficients per bloc	:	500000
Total matrix size	:	229 . 14 Mb

SINGULARITY Computation

Restraint: Restraints.1

Number of local singularities	:	0
Number of singularities in translation	:	0
Number of singularities in rotation	:	0
Generated constraint type	:	MPC

CONSTRAINT Computation

Restraint: Restraints.1

Number of constraints	:	50127
Number of coefficients	:	0

Number of factorized constraints : 50127
Number of coefficients : 0
Number of deferred constraints : 0

FACTORIZED Computation

Method : SPARSE
Number of factorized degrees : 941262
Number of supernodes : 14151
Number of overhead indices : 3142776
Number of coefficients : 490418520
Maximum front width : 5475
Maximum front size : 14990550
Size of the factorized matrix (Mb) : 3741 . 6
Number of blocks : 246
Number of Mflops for factorization : 8 . 806e+005
Number of Mflops for solve : 1 . 966e+003
Minimum relative pivot : 8 . 817e-003

Minimum and maximum pivot

Value	Dof	Node	x (mm)	y (mm)	z (mm)
2.0542e+006	Ty	330462	1.2671e+001	-1.4432e+001	-8.7302e+000
2.2810e+009	Ty	29192	-1.3509e+001	1.6858e+001	2.1036e+001

Minimum pivot

Value	Dof	Node	x (mm)	y (mm)	z (mm)
6.5995e+006	Ty	330447	-3.6513e+001	-2.6961e+000	3.5499e+001
6.8658e+006	Ty	330463	1.2651e+001	-1.5437e+001	-8.7313e+000
7.6480e+006	Ty	329225	5.4563e+000	-1.8657e+001	-1.4922e+001
8.2481e+006	Ty	171735	-1.8185e+001	9.3918e+000	1.6282e+001
9.1633e+006	Ty	250586	-1.2078e+001	-4.9653e+000	-6.0013e+001
1.2272e+007	Ty	328737	-9.3536e+001	-2.3580e+000	-3.0847e+001
1.2391e+007	Ty	127166	1.9924e+001	-2.0000e+001	-1.2026e+001
1.2436e+007	Ty	171724	-1.9910e+001	6.9277e+000	1.4045e+001

1.2496e+007	Ty	171286	-2.2126e+001	-4.9754e+000	4.8057e+001

Translational pivot distribution

Value	Percentage
10.E6 --> 10.E7	6.3744e-004
10.E7 --> 10.E8	2.6263e-001
10.E8 --> 10.E9	9.7579e+001
10.E9 --> 10.E10	2.1574e+000

DIRECT METHOD Computation

Name: Static Case Solution.1

Restraint: Restraints.1

Load: Loads.1

Strain Energy : 4.125e-003 J

Equilibrium

Components	Applied Forces	Reactions	Residual	Relative Magnitude Error
Fx (N)	1.6639e-007	-1.6592e-007	4.6276e-010	1.5261e-010
Fy (N)	-3.7601e-012	-1.8181e-011	-2.1941e-011	7.2356e-012
Fz (N)	-1.9381e-007	1.9381e-007	5.9621e-012	1.9662e-012
Mx (Nxm)	1.3895e-009	-1.3901e-009	-5.8600e-013	1.9325e-012
My (Nxm)	1.0000e+002	-1.0000e+002	2.6134e-011	8.6184e-011
Mz (Nxm)	-1.1484e-010	9.6754e-011	-1.8084e-011	5.9638e-011

Static Case Solution.1 - Deformed mesh.1

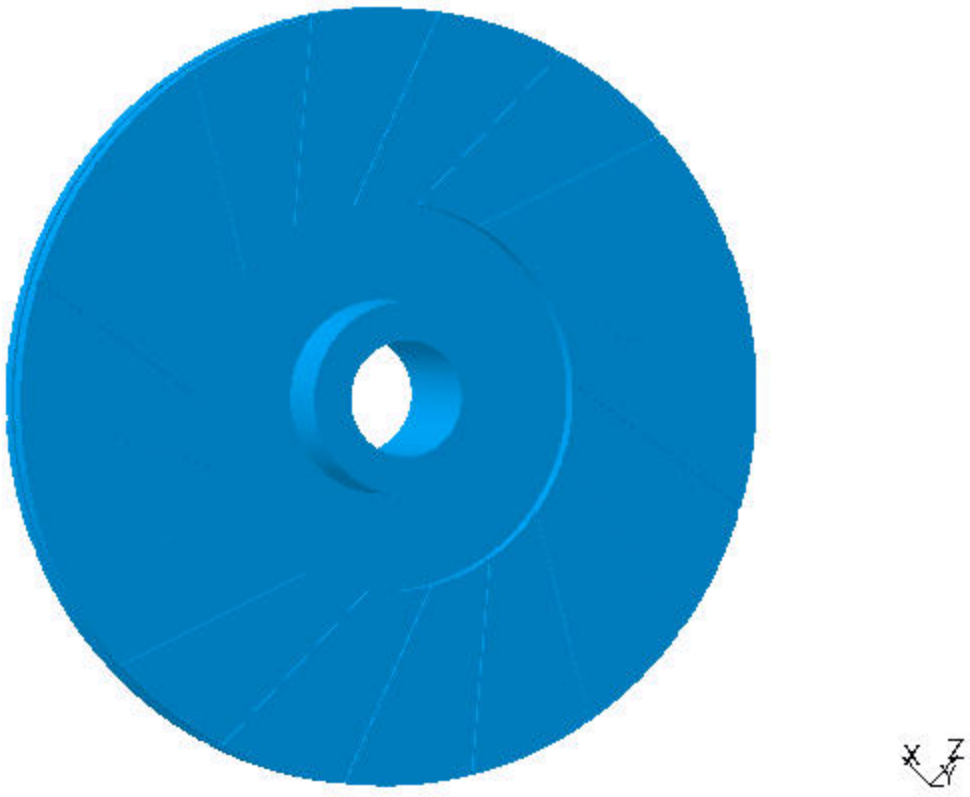

Figure 2

On deformed mesh ---- On boundary ---- Over all the model

Static Case Solution.1 - Von Mises stress (nodal values).2

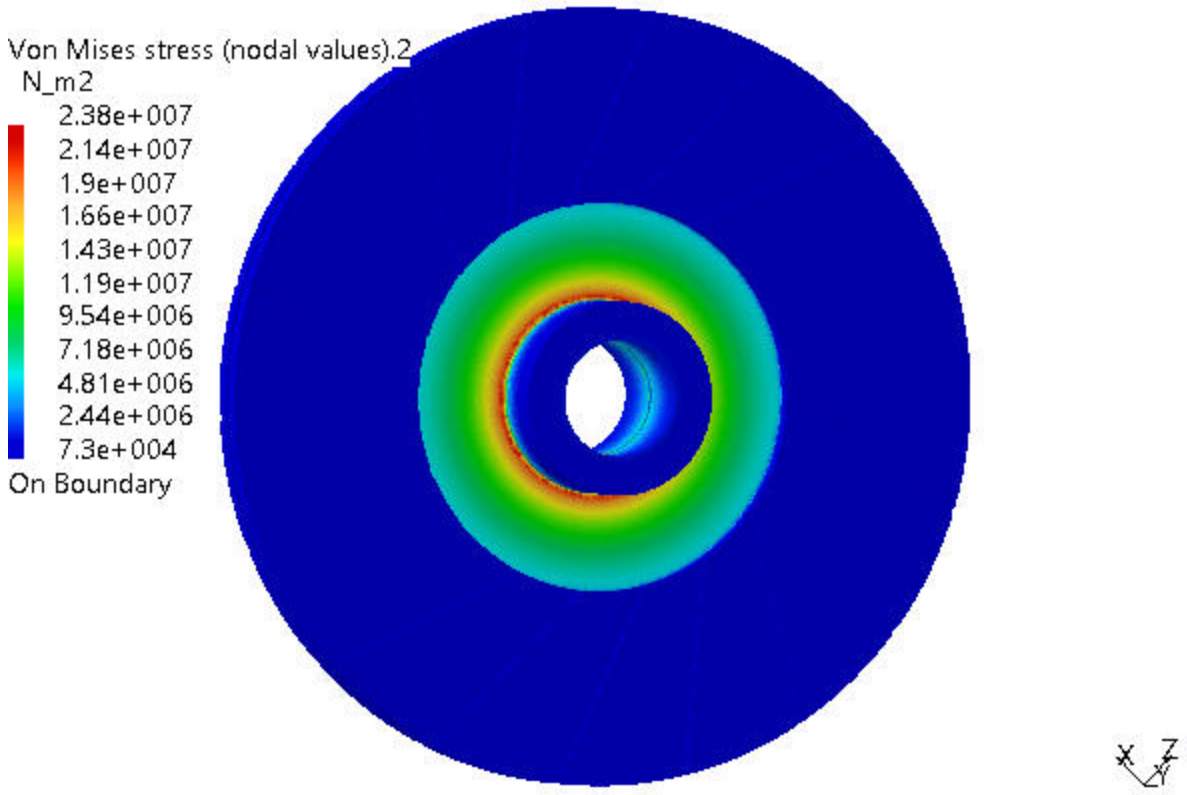

Figure 3

3D elements: : Components: : All

On deformed mesh ---- On boundary ---- Over all the model

Static Case Solution.1 - Von Mises stress (nodal values).1

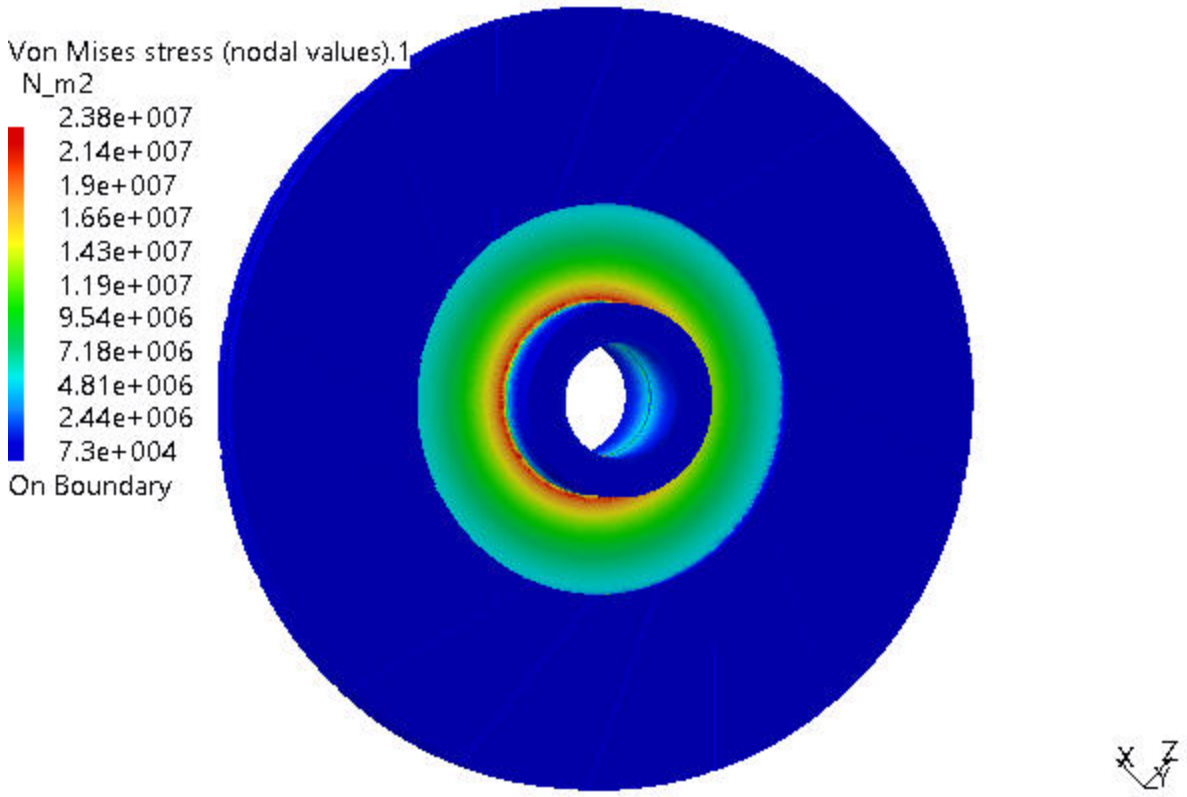

Figure 4

3D elements: : Components: : All

On deformed mesh ---- On boundary ---- Over all the model

Global Sensors

Sensor Name	Sensor Value
Energy	0.004J