CrankAnalysis

MESH:

Entity	Size
Nodes	487953
Elements	2331986

ELEMENT TYPE:

Connectivity	Statistics
TE4	2331986 (100.00%)

ELEMENT QUALITY:

Criterion	Good	Poor	Bad	Worst	Average
Stretch	2331986 (100.00%)	0 (0.00%)	0 (0.00%)	0.347	0.652
Aspect Ratio	2294145 (98.38%)	37841 (1.62%)	0 (0.00%)	4.261	1.810

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

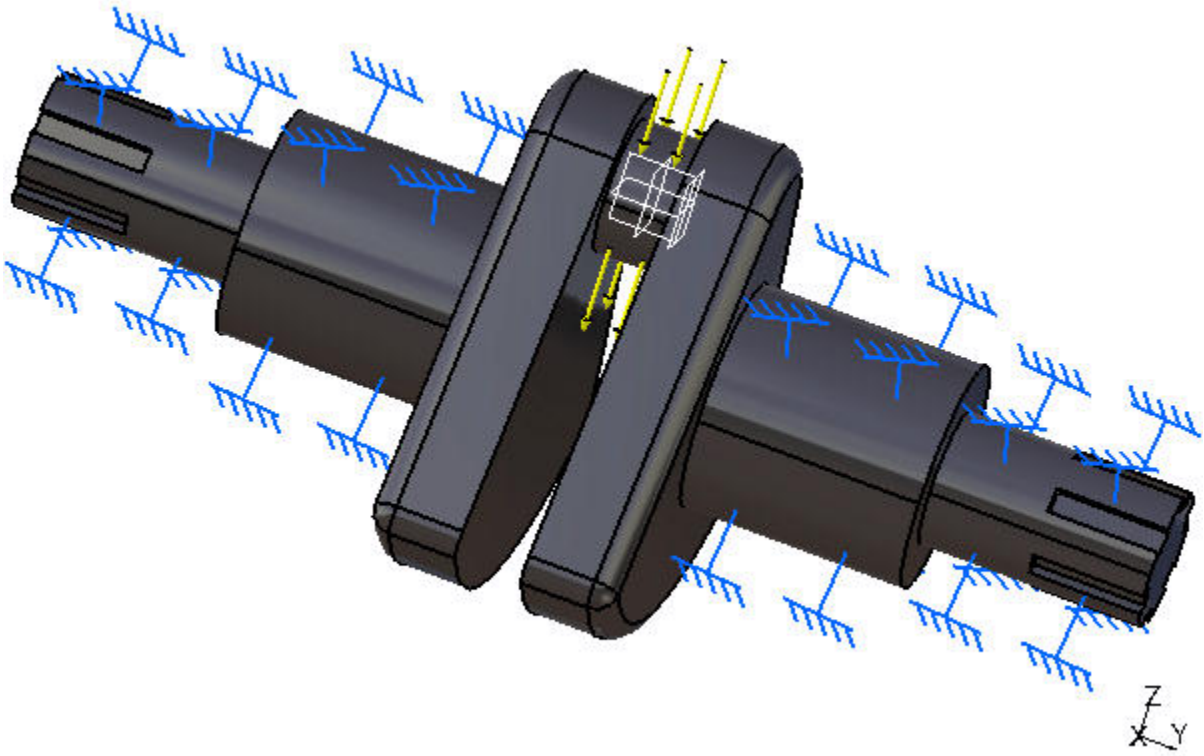

Figure 1

STRUCTURE Computation

Number of nodes	:	487953
Number of elements	:	2331986
Number of D.O.F.	:	1463859
Number of Contact relations	:	0
Number of Kinematic relations	:	0

Linear tetrahedron : 2331986

RESTRAINT Computation

Name: Restraints.1

Number of S.P.C : 328569

LOAD Computation

Name: Loads.1

Applied load resultant :

Fx = 8 . 848e-009 N
Fy = -7 . 357e-010 N
Fz = -5 . 000e+003 N
Mx = 3 . 580e-009 Nxm
My = -2 . 366e-008 Nxm
Mz = 7 . 984e-011 Nxm

STIFFNESS Computation

Number of lines	:	1463859
Number of coefficients	:	29851596
Number of blocks	:	60
Maximum number of coefficients per bloc	:	500000
Total matrix size	:	347 . 21 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	:	328569
Number of coefficients	:	0

Number of factorized constraints : 328569
Number of coefficients : 0
Number of deferred constraints : 0

FACTORIZED Computation

Method : SPARSE
Number of factorized degrees : 1135290
Number of supernodes : 14831
Number of overhead indices : 3485169
Number of coefficients : 581972151
Maximum front width : 6618
Maximum front size : 21902271
Size of the factorized matrix (Mb) : 4440 . 1
Number of blocks : 291
Number of Mflops for factorization : 1 . 051e+006
Number of Mflops for solve : 2 . 334e+003
Minimum relative pivot : 2 . 588e-001

Minimum and maximum pivot

Value	Dof	Node	x (mm)	y (mm)	z (mm)
5.7115e+007	Tz	48766	-3.5039e+001	-7.5000e+000	-4.1149e+001
5.2596e+009	Tx	140026	-5.0726e+001	2.0502e+001	-4.7860e+001

Minimum pivot

Value	Dof	Node	x (mm)	y (mm)	z (mm)
6.0126e+007	Ty	47737	-4.2176e+001	-7.5000e+000	-7.9221e+001
6.0924e+007	Tz	9576	-1.4385e+001	-7.7500e+001	-5.4078e+001
6.1908e+007	Tz	412520	-1.0571e+000	7.5524e+001	-5.8987e+001
6.2070e+007	Tz	315852	-2.3884e+001	-7.0547e+001	-4.0636e+001
6.2646e+007	Tz	210406	-1.3695e+001	7.6516e+001	-5.5504e+001
6.2717e+007	Ty	212381	-2.1327e+001	6.1167e+001	-2.5077e+001
6.2809e+007	Tz	221452	-8.3784e+000	-2.2482e+001	1.2878e+001
6.3389e+007	Ty	48766	-3.5039e+001	-7.5000e+000	-4.1149e+001

6.4611e+007	Tz	271492	-3.0072e+001	-2.6758e+001	-3.8103e+001

Translational pivot distribution

Value	Percentage
10.E7 --> 10.E8	1.1653e-001
10.E8 --> 10.E9	9.2307e+001
10.E9 --> 10.E10	7.5767e+000

DIRECT METHOD Computation

Name: Static Case Solution.1

Restraint: Restraints.1

Load: Loads.1

Strain Energy : 2.328e-003 J

Equilibrium

Components	Applied Forces	Reactions	Residual	Relative Magnitude Error
Fx (N)	8.8476e-009	-8.8433e-009	4.2182e-012	3.7816e-013
Fy (N)	-7.3572e-010	7.3450e-010	-1.2267e-012	1.0997e-013
Fz (N)	-5.0000e+003	5.0000e+003	-7.3669e-011	6.6043e-012
Mx (Nxm)	3.5804e-009	-3.5808e-009	-4.4552e-013	3.1325e-013
My (Nxm)	-2.3664e-008	2.3664e-008	1.4588e-013	1.0257e-013
Mz (Nxm)	7.9842e-011	-8.0064e-011	-2.2197e-013	1.5607e-013

Static Case Solution.1 - Deformed mesh.1

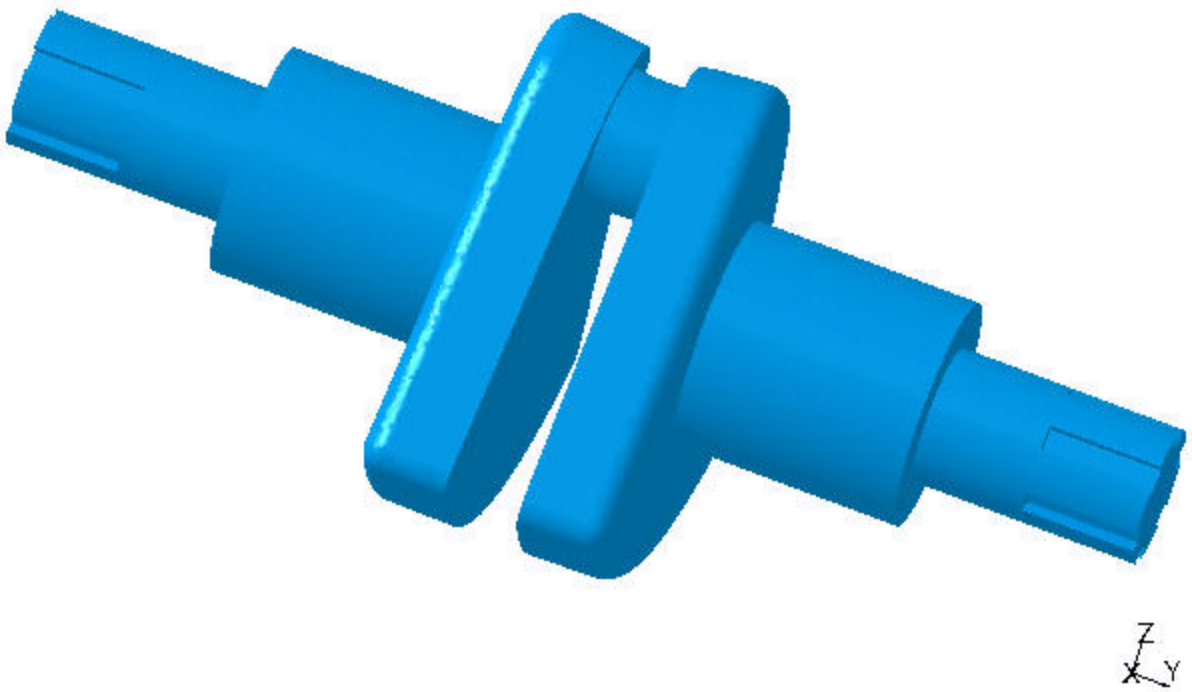

Figure 2

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

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

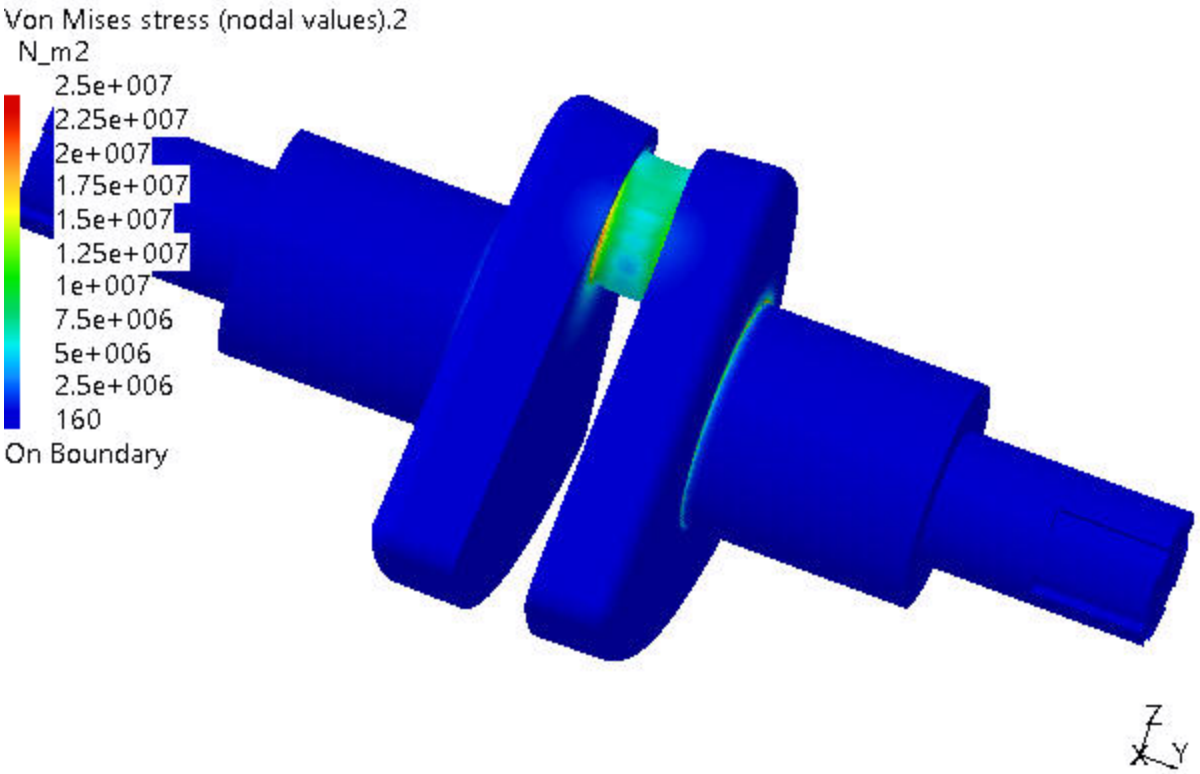

Figure 3

3D elements: : Components: : All

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

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

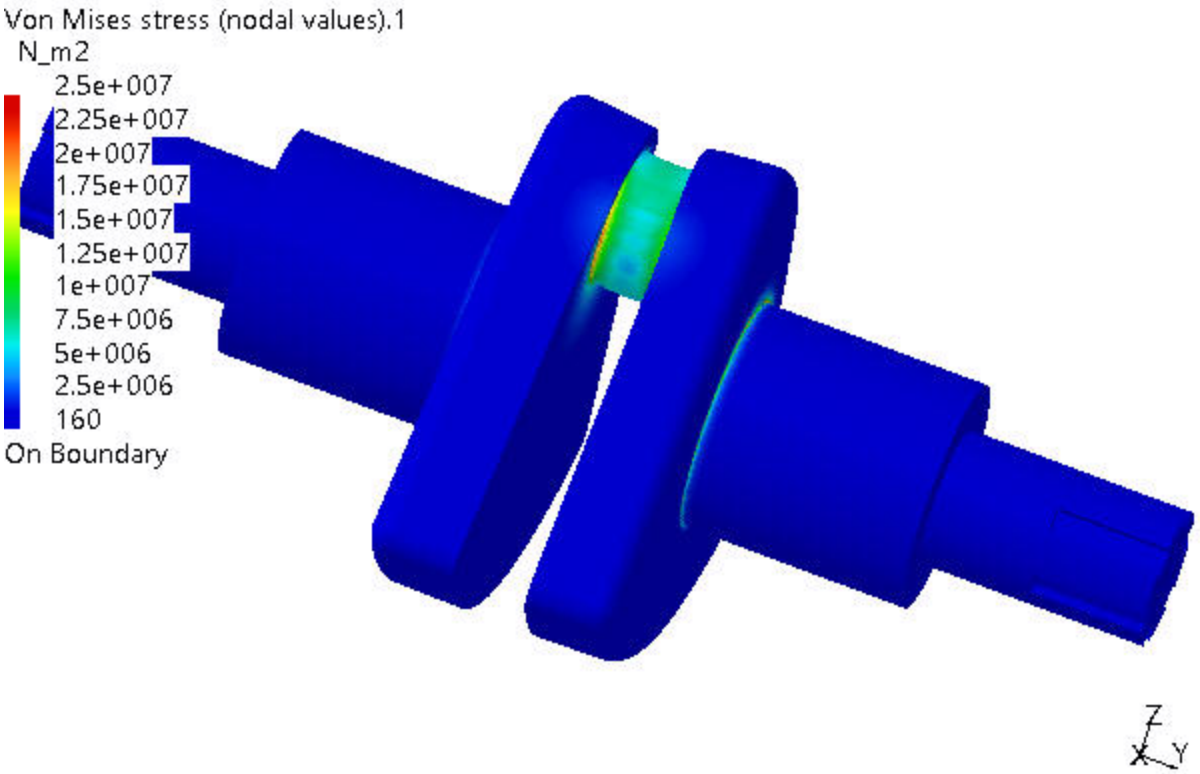

Figure 4

3D elements: : Components: : All

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

Global Sensors

Sensor Name	Sensor Value
Energy	0.002J