

Study Report As Per ASTM E455 Standards

Analyzed File	floorFRameTest v3
Version	Autodesk Fusion 360 (2.0.1957)
Creation Date	2016-04-27, 06:27:53
Author	Pete
Summary	MgO Corp Diapham Test 450c Case 1 (far right): 150x50 floor frame LVL Load 2kN fail Case 2: As above MgO Sheet 18mm: 80kN pass. Case 3: As above MgO Sheet 20mm: 80kN pass. Case 4: As above MgO Sheet 23mm: 80kN pass.

☐ Project Properties

Title Studies

☐ floorFRameTest v3:1

☐ Study 1 - Static Stress

☐ Study Properties

Study Type	Static Stress
Last Modification Date	2016-04-27, 06:23:06

☐ Settings

☐ General

Contact Tolerance	0.1 mm
Remove Rigid Body Modes	No

☐ Mesh

Average Element Size (% of model size)	
Solids	5
Minimum Element Size (% of average size)	20
Maximum Turn Angle	60
Grading Factor	1.5
Create Curved Mesh Elements	No
Use Part Based Measure for Assembly Mesh	No

☐ Adaptive Mesh Refinement

Maximum Number of Mesh Refinements	6
Minimum Refinement Step Difference (%)	5
Portion of Elements to Refine (%)	40
Results for Baseline Accuracy	Displacement, Total

☐ Materials

Component	Material	Safety Factor
FloorFrame v2:1	Stud_LVL_13600	Yield Strength
Component5:1	Stud_LVL_13600	Yield Strength
FloorFrame v2:2	Stud_LVL_13600	Yield Strength
FloorFrame v2:3	Stud_LVL_13600	Yield Strength
FloorFrame v2:4	Stud_LVL_13600	Yield Strength
FloorFrame v2:5	Stud_LVL_13600	Yield Strength
FloorFrame v2:6	Stud_LVL_13600	Yield Strength
FloorFrame v2:7	Stud_LVL_13600	Yield Strength
FloorFrame v2:8	Stud_LVL_13600	Yield Strength
Component5:2	Stud_LVL_13600	Yield Strength
Component5:3	Stud_LVL_13600	Yield Strength
Component5:4	Stud_LVL_13600	Yield Strength
Component5:5	Stud_LVL_13600	Yield Strength
Component5:6	Stud_LVL_13600	Yield Strength
Component5:7	Stud_LVL_13600	Yield Strength
Component5:8	Stud_LVL_13600	Yield Strength
Component5:9	Stud_LVL_13600	Yield Strength
Component5:10	Stud_LVL_13600	Yield Strength
Component5:11	Stud_LVL_13600	Yield Strength
Component5:12	Stud_LVL_13600	Yield Strength
Component5:13	Stud_LVL_13600	Yield Strength

Component5:14	Stud_LVL_13600	Yield Strength
Component5:15	Stud_LVL_13600	Yield Strength
Component5:16	Stud_LVL_13600	Yield Strength
Component5:17	Stud_LVL_13600	Yield Strength
Component5:18	Stud_LVL_13600	Yield Strength
Component5:19	Stud_LVL_13600	Yield Strength
Component5:20	Stud_LVL_13600	Yield Strength
Component5:21	Stud_LVL_13600	Yield Strength
Component5:22	Stud_LVL_13600	Yield Strength
Component5:23	Stud_LVL_13600	Yield Strength
Component5:24	Stud_LVL_13600	Yield Strength
MgOSheet18mm:1	MgO_Ext7370MPa	Yield Strength
MgOSheet20mm:1	MgO_Ext7370MPa	Yield Strength
MgOSheet23mm:1	MgO_Ext7370MPa	Yield Strength

▣ **MgO_Ext7370MPa**

Density	9.5E-07 kg / mm ³
Young's Modulus	7370 MPa
Poisson's Ratio	0.3
Yield Strength	7 MPa
Ultimate Tensile Strength	8.1 MPa
Thermal Conductivity	0 W / (mm C)
Thermal Expansion Coefficient	0 / C
Specific Heat	0 J / (kg C)

▣ **Stud_LVL_13600**

Density	5.5E-07 kg / mm ³
Young's Modulus	14000 MPa
Poisson's Ratio	0.3
Yield Strength	50 MPa
Ultimate Tensile Strength	60 MPa
Thermal Conductivity	0.1385 W / (mm C)
Thermal Expansion Coefficient	2.376E-05 / C
Specific Heat	897 J / (kg C)

▣ **Constraints**

▣ **Fixed1**

Type	Fixed
Ux	Yes
Uy	Yes
Uz	Yes

▣ **Frictionless1**

Type	Frictionless
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▣ **Loads**

▣ **Gravity**

Type	Gravity
Magnitude	9.807 m / s ²

X Value	0 m / s ²
Y Value	-9.807 m / s ²
Z Value	0 m / s ²

☐ Force1

Type	Force
Magnitude	2000 N
X Value	0 N
Y Value	0 N
Z Value	2000 N

☐ Force2

Type	Force
Magnitude	80000 N
X Value	0 N
Y Value	0 N
Z Value	80000 N

☐ Force3

Type	Force
Magnitude	80000 N
X Value	0 N
Y Value	0 N
Z Value	80000 N

☐ Force4

Type	Force
Magnitude	80000 N
X Value	0 N
Y Value	0 N
Z Value	80000 N

☐ Contacts

☐ Bonded

Name
Bonded1 [Component5:23 MgOSheet23mm:1]
Bonded2 [Component5:22 MgOSheet23mm:1]
Bonded3 [Component5:21 MgOSheet23mm:1]
Bonded4 [Component5:20 MgOSheet23mm:1]
Bonded5 [Component5:19 MgOSheet23mm:1]
Bonded6 [Component5:17 MgOSheet20mm:1]
Bonded7 [Component5:16 MgOSheet20mm:1]
Bonded8 [Component5:15 MgOSheet20mm:1]
Bonded9 [Component5:14 MgOSheet20mm:1]
Bonded10 [Component5:13 MgOSheet20mm:1]
Bonded11 [Component5:11 MgOSheet18mm:1]
Bonded12 [Component5:10 MgOSheet18mm:1]
Bonded13 [Component5:9 MgOSheet18mm:1]
Bonded14 [Component5:8 MgOSheet18mm:1]
Bonded15 [Component5:7 MgOSheet18mm:1]



Bonded16 [FloorFrame v2:8 MgOSheet23mm:1]
Bonded17 [FloorFrame v2:8 Component5:23]
Bonded18 [FloorFrame v2:8 Component5:22]
Bonded19 [FloorFrame v2:8 Component5:21]
Bonded20 [FloorFrame v2:8 Component5:20]
Bonded21 [FloorFrame v2:8 Component5:19]
Bonded22 [FloorFrame v2:7 MgOSheet23mm:1]
Bonded23 [FloorFrame v2:7 Component5:23]
Bonded24 [FloorFrame v2:7 Component5:22]
Bonded25 [FloorFrame v2:7 Component5:21]
Bonded26 [FloorFrame v2:7 Component5:20]
Bonded27 [FloorFrame v2:7 Component5:19]
Bonded28 [FloorFrame v2:6 MgOSheet20mm:1]
Bonded29 [FloorFrame v2:6 Component5:17]
Bonded30 [FloorFrame v2:6 Component5:16]
Bonded31 [FloorFrame v2:6 Component5:15]
Bonded32 [FloorFrame v2:6 Component5:14]
Bonded33 [FloorFrame v2:6 Component5:13]
Bonded34 [FloorFrame v2:5 MgOSheet20mm:1]
Bonded35 [FloorFrame v2:5 Component5:17]
Bonded36 [FloorFrame v2:5 Component5:16]
Bonded37 [FloorFrame v2:5 Component5:15]
Bonded38 [FloorFrame v2:5 Component5:14]
Bonded39 [FloorFrame v2:5 Component5:13]
Bonded40 [FloorFrame v2:4 MgOSheet18mm:1]
Bonded41 [FloorFrame v2:4 Component5:11]
Bonded42 [FloorFrame v2:4 Component5:10]
Bonded43 [FloorFrame v2:4 Component5:9]
Bonded44 [FloorFrame v2:4 Component5:8]
Bonded45 [FloorFrame v2:4 Component5:7]
Bonded46 [FloorFrame v2:3 Component5:11]
Bonded47 [FloorFrame v2:3 Component5:10]
Bonded48 [FloorFrame v2:3 Component5:9]
Bonded49 [FloorFrame v2:3 Component5:8]
Bonded50 [FloorFrame v2:3 Component5:7]
Bonded51 [FloorFrame v2:2 Component5:5]
Bonded52 [FloorFrame v2:2 Component5:4]
Bonded53 [FloorFrame v2:2 Component5:3]
Bonded54 [FloorFrame v2:2 Component5:2]
Bonded55 [Component5:1 FloorFrame v2:2]
Bonded56 [FloorFrame v2:1 Component5:5]
Bonded57 [FloorFrame v2:1 Component5:4]
Bonded58 [FloorFrame v2:1 Component5:3]
Bonded59 [FloorFrame v2:1 Component5:2]
Bonded60 [FloorFrame v2:1 Component5:1]
Bonded61 [Component5:24 MgOSheet23mm:1]
Bonded62 [Component5:18 MgOSheet20mm:1]
Bonded63 [Component5:12 MgOSheet18mm:1]
Bonded64 [FloorFrame v2:8 Component5:24]
Bonded65 [FloorFrame v2:7 Component5:24]
Bonded66 [FloorFrame v2:6 Component5:18]
Bonded67 [FloorFrame v2:5 Component5:18]
Bonded68 [FloorFrame v2:4 Component5:12]
Bonded69 [FloorFrame v2:3 Component5:12]

Bonded70 [FloorFrame v2:2||Component5:6]
 Bonded71 [FloorFrame v2:1||Component5:6]

Results

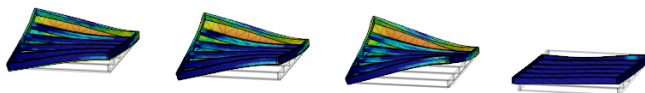
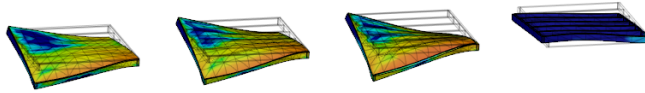
Result Summary

Name	Minimum	Maximum
Safety Factor		
Per Body	0.5655	15
Stress		
Von Mises	0.03243 MPa	63.59 MPa
1st Principal	-4.722 MPa	84.81 MPa
3rd Principal	-22.86 MPa	20.36 MPa
Normal XX	-19.15 MPa	61.17 MPa
Normal YY	-7.799 MPa	28.93 MPa
Normal ZZ	-18.61 MPa	42.89 MPa
Shear XY	-11.94 MPa	12.58 MPa
Shear XZ	-4.359 MPa	30.18 MPa
Shear YZ	-10.76 MPa	9.983 MPa
Displacement		
Total	0 mm	13.63 mm
X	-0.6627 mm	0.6951 mm
Y	-13.14 mm	1.354 mm
Z	-0.1919 mm	7.901 mm
Strain		
Equivalent	2.096E-06	0.004294
1st Principal	7.325E-07	0.005148
3rd Principal	-0.001639	9.368E-06
Normal XX	-0.001357	0.003875
Normal YY	-0.001075	4.716E-04
Normal ZZ	-0.001284	0.001811
Shear XY	-0.001109	0.001168
Shear XZ	-6.36E-04	0.002802
Shear YZ	-9.994E-04	9.27E-04
Contact Pressure		
Total	0 MPa	118.9 MPa
X	-108.7 MPa	55.27 MPa
Y	-16.9 MPa	12.25 MPa
Z	-88.21 MPa	40.35 MPa

Safety Factor


Per Body

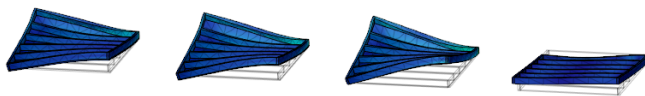
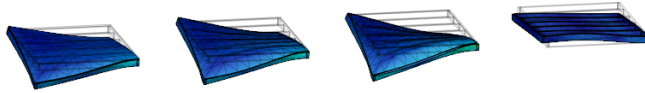
0  15



Stress

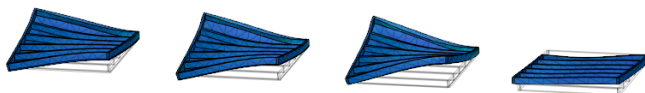
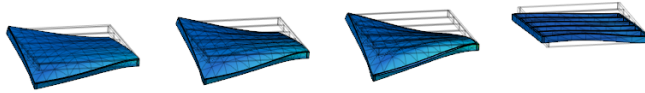
Von Mises

[MPa] 0.03  63.59



☐ **1st Principal**

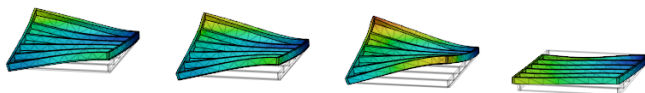
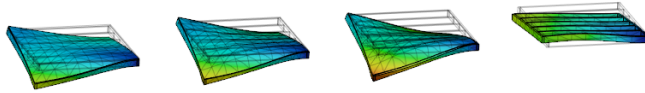
[MPa] -4.72  84.81



Displacement

Total

[mm] 0  13.63



Strain

Equivalent

0.000002  0.004294

