Analysis of 800 trench+Steel

Introduction

Do not accept or reject a design based solely on the data presented in this report. Evaluate designs by considering this information in conjunction with experimental test data and the practical experience of design engineers and analysts. A quality approach to engineering design usually mandates physical testing as the final means of validating structural integrity to a measured precision.

Geometry and Mesh

The Relevance setting listed below controlled the fineness of the mesh used in this analysis. For reference, a setting of -100 produces a coarse mesh, fast solutions and results that may include significant uncertainty. A setting of +100 generates a fine mesh, longer solution times and the least uncertainty in results. Zero is the default Relevance setting.

TABLE 1
800 trench+Steel.ipt Statistics

Bounding Box Dimensions	1220 mm 900.0 mm 54.0 mm
Part Mass	2.775e+004 kg
Part Volume	1.525e+007 mm³
Mesh Relevance Setting	0
Nodes	70300
Elements	37210

Bounding box dimensions represent lengths in the global X, Y and Z directions.

Material Data

The following material behavior assumptions apply to this analysis:

- Linear - stress is directly proportional to strain.
- Constant - all properties temperature-independent.
- Homogeneous - properties do not change throughout the volume of the part.
- Isotropic - material properties are identical in all directions.

TABLE 2
SMC - Killarney

Young's Modulus	1.e+004 MPa
Poisson's Ratio	0.38

Mass Density	1.82e-003 kg/mm³
Tensile Yield Strength	23.0 MPa
Tensile Ultimate Strength	25.5 MPa

Loads and Constraints

The following loads and constraints act on specific regions of the part. Regions were defined by selecting surfaces, cylinders, edges or vertices.

TABLE 3
Load and Constraint Definitions

Name	Type	Magnitude	Vector
Force 1	Surface Force	8000 N	0.0 N 0.0 N -8000 N
Frictionless Constraint 1	Surface Frictionless Constraint	N/A	N/A

TABLE 4
Constraint Reactions

Name	Force	Vector	Moment	Moment Vector
Frictionless Constraint 1	8000 N	0.0 N 0.0 N 8000 N	0.5949 N·mm	0.2658 N·mm 0.5322 N·mm 0.0 N·mm

Note: vector data corresponds to global X, Y and Z components.

Results

The table below lists all structural results generated by the analysis. The following section provides figures showing each result contoured over the surface of the part.

Safety factor was calculated by using the maximum equivalent stress failure theory for ductile materials. The stress limit was specified by the tensile yield strength of the material.

TABLE 5
Structural Results

Name	Minimum	Maximum
Equivalent Stress	4.433e-003 MPa	21.33 MPa
Maximum Principal Stress	-18.31 MPa	26.09 MPa
Minimum Principal Stress	-41.16 MPa	5.717 MPa
Deformation	4.062e-003 mm	2.148 mm
Safety Factor	1.078	N/A

Figures

FIGURE 1
Equivalent Stress

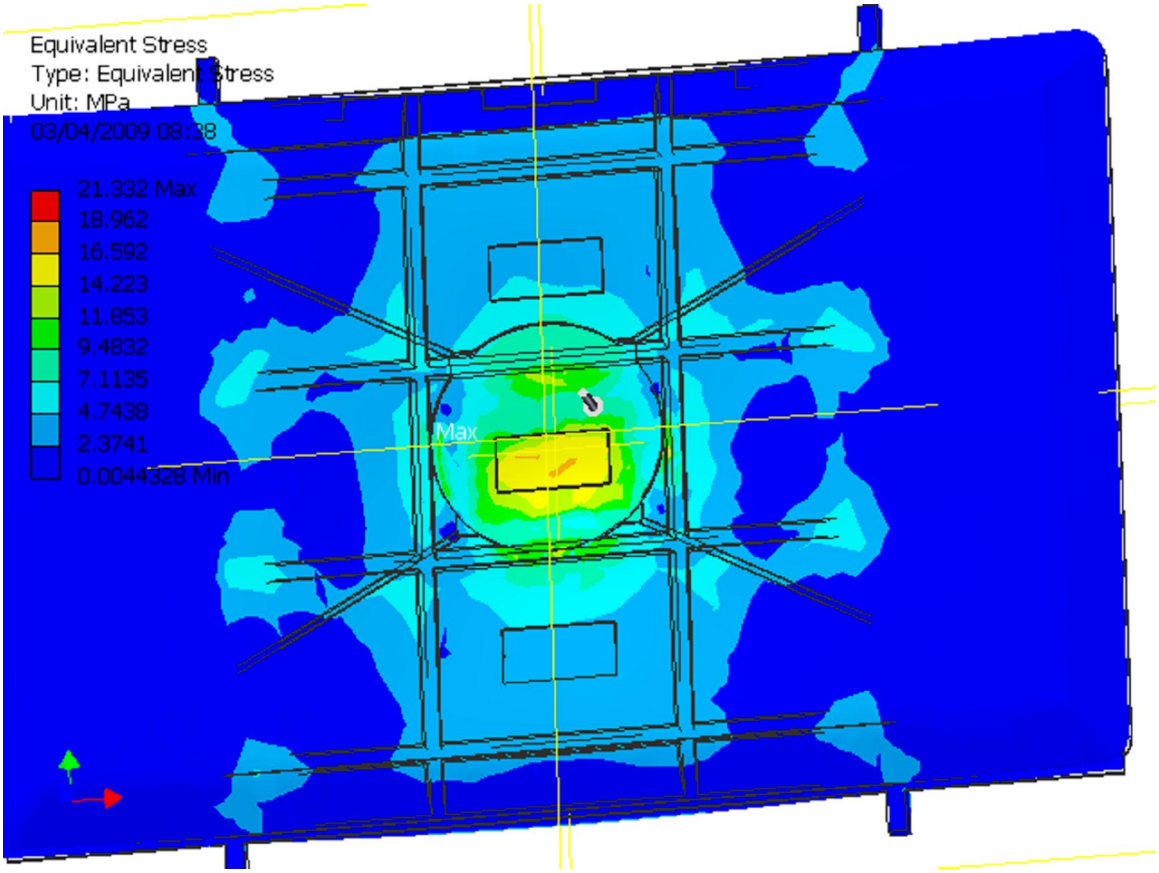

FIGURE 2
Maximum Principal Stress

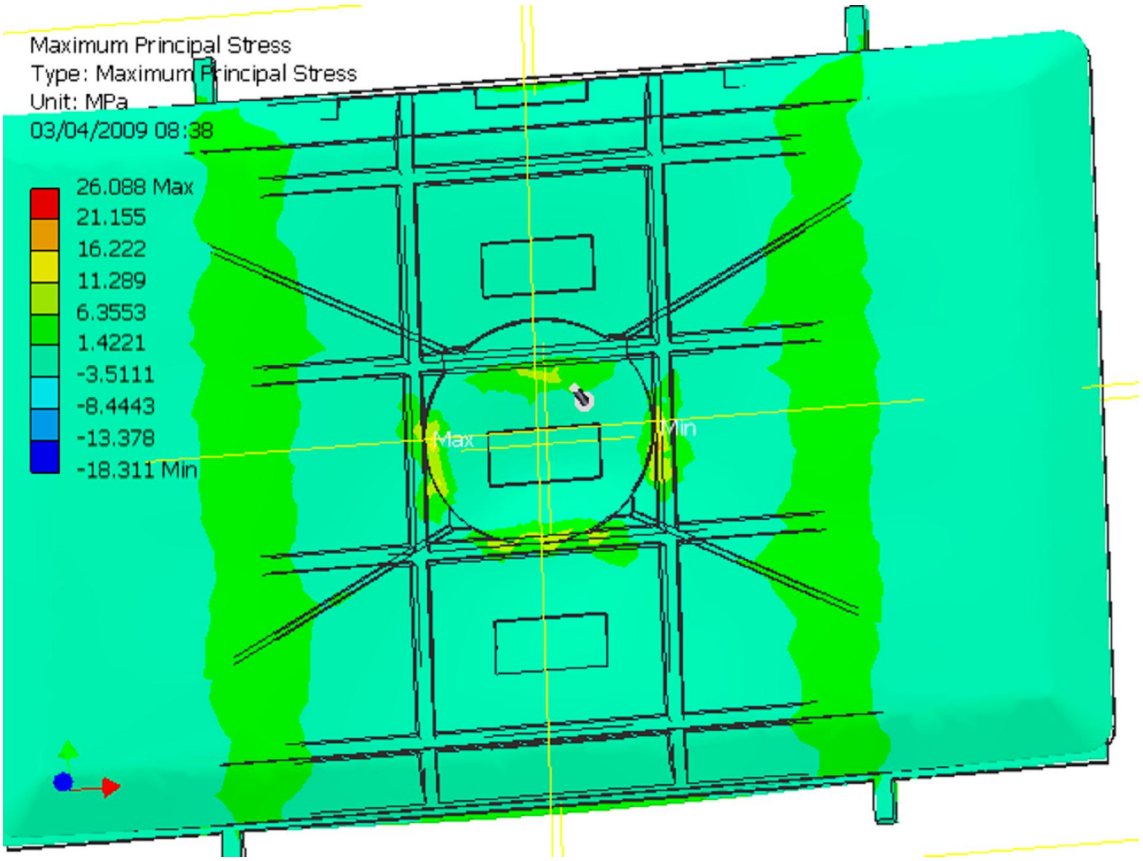

FIGURE 3
Minimum Principal Stress

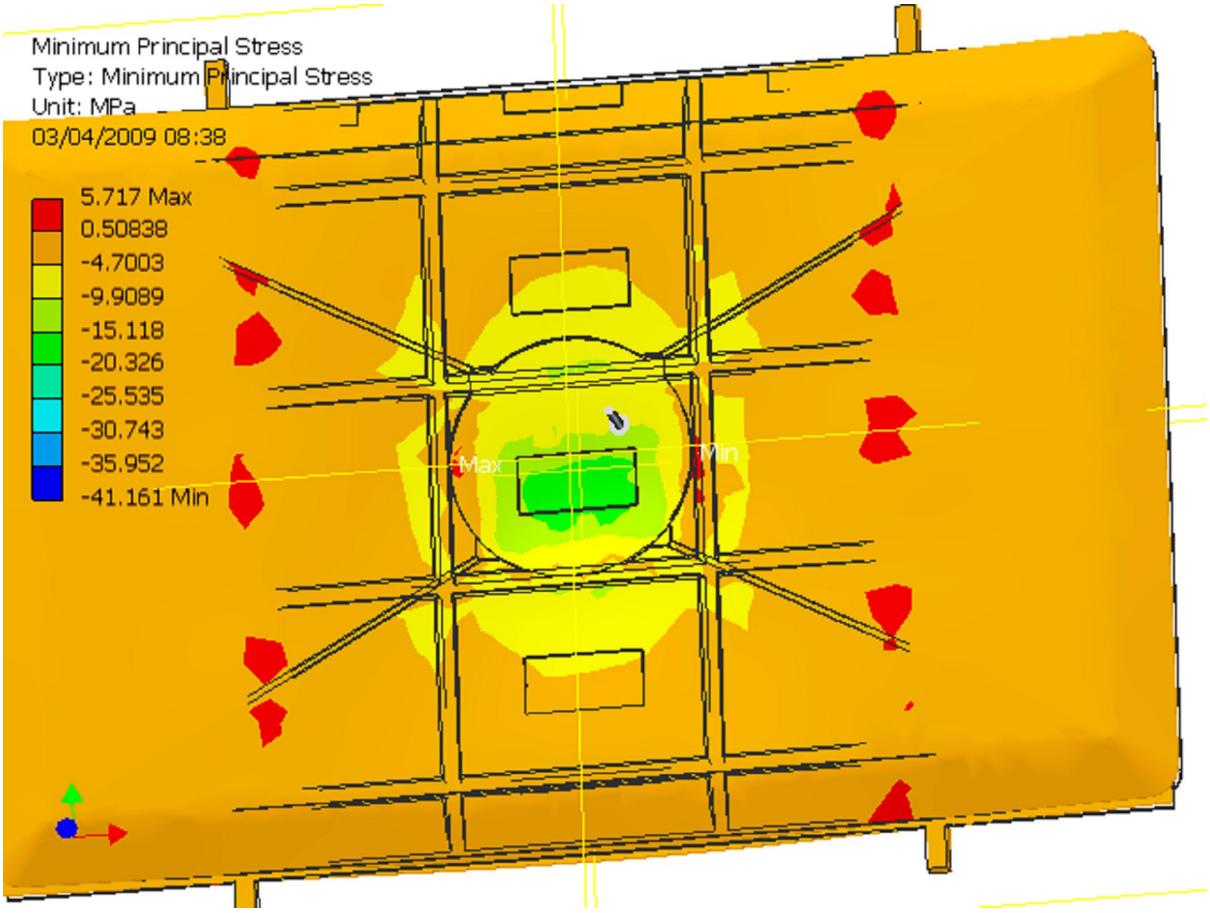

FIGURE 4
Deformation

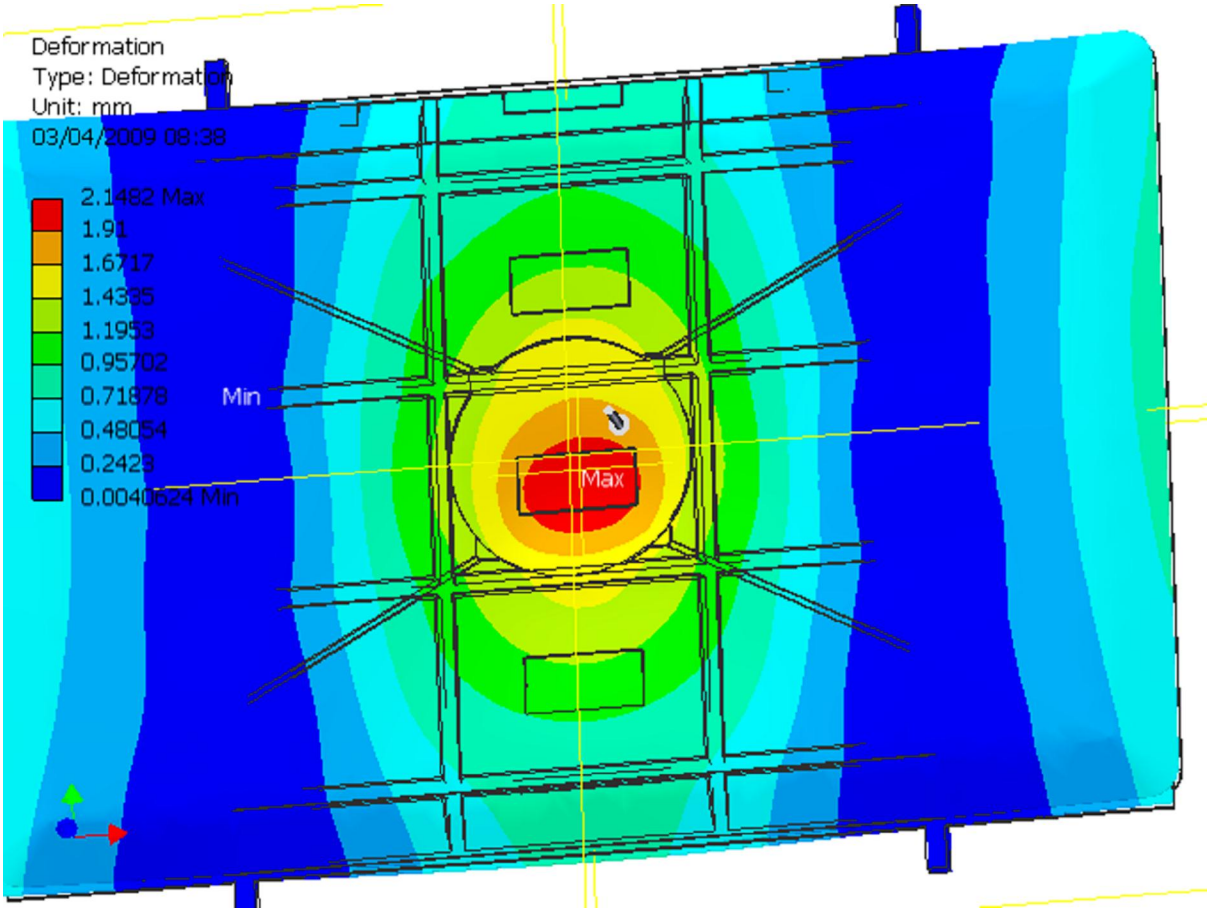

FIGURE 5
Safety Factor