

CLAY FREEMAN

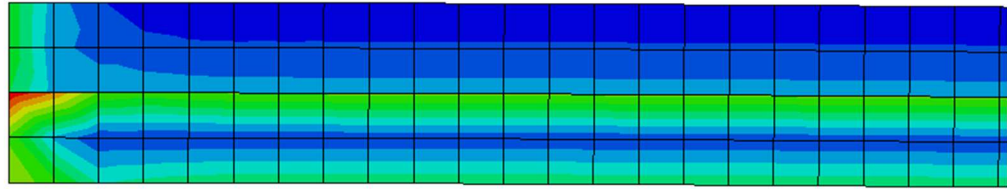
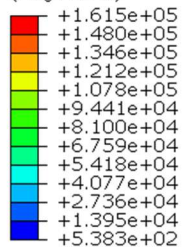
ME 486 : FINITE ELEMENT ANALYSIS

J. MAHONEY – FALL 2018

FEM 006 BIMETALLIC STRIP

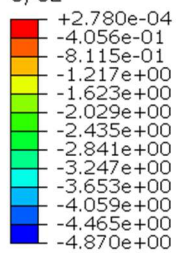
22 OCTOBER, 2018

S, Mises
(Avg: 75%)



Y Bimetallic Strip Evaluation
ODB: 2ndTry.odb Abaqus/Standard 3DEXPERIENCE R2018x Sat Oct 20 09:39:39 Central Daylight Time 2018
Step: Final, Thermal Loading Evaluation on Bimetallic Strip
Increment 1: Step Time = 1.000
Primary Var: S, Mises

U, U2



Y Bimetallic Strip Evaluation
ODB: 2ndTry.odb Abaqus/Standard 3DEXPERIENCE R2018x Sat Oct 20 09:39:39 Central Daylight Time 2018
Step: Final, Thermal Loading Evaluation on Bimetallic Strip
Increment 1: Step Time = 1.000
Primary Var: U, U2

U, Magnitude

+8.335e-02
+7.640e-02
+6.946e-02
+6.251e-02
+5.557e-02
+4.862e-02
+4.168e-02
+3.473e-02
+2.778e-02
+2.084e-02
+1.389e-02
+6.946e-03
+0.000e+00



Y Verification of solid aluminum test strip
ODB: bimetallic/Verify.odb Abaqus/Standard 3DEXPERIENCE R2018x Sat Oct 20 10:13:35 Central Daylight Time
Step: Final, Thermal Loading Evaluation on Bimetallic Strip
Increment 1: Step Time = 1.000
Primary Var: U, Magnitude
Deformed Var: U Deformation Scale Factor: +6.440e+01

U, Magnitude

+1.909e-02
+1.750e-02
+1.591e-02
+1.432e-02
+1.273e-02
+1.114e-02
+9.544e-03
+7.954e-03
+6.363e-03
+4.772e-03
+3.181e-03
+1.591e-03
+0.000e+00



Y Molybdenum Solid Bar Verification
ODB: bimetallic/VerifyMo.odb Abaqus/Standard 3DEXPERIENCE R2018x Sat Oct 20 10:34:36 Central Daylight Time 2018
Step: Final, Thermal Loading Evaluation on Bimetallic Strip
Increment 1: Step Time = 1.000
Primary Var: U, Magnitude
Deformed Var: U Deformation Scale Factor: +6.286e+01

```
>>> t_0 = 70
>>> t_f = 600
>>> a_Mo = 3.0e-6
>>> a_Al = 13.1e-6
>>> E_Mo = 48.0e6
>>> E_Al = 10.0e6
>>> v_Mo = 0.34
>>> v_Al = 0.30
>>> dL = a_Al*(t_f - t_0)*12
>>> dL
0.083316
>>> area_bar = (0.1*1) # Area of moly bar
>>> dL_Mo = a_Mo*(t_f - t_0)*12
>>> dL_Mo
0.01908
>>> p_bar = area_bar*E_Mo*dL_Mo
>>> p_bar
91584.0
```