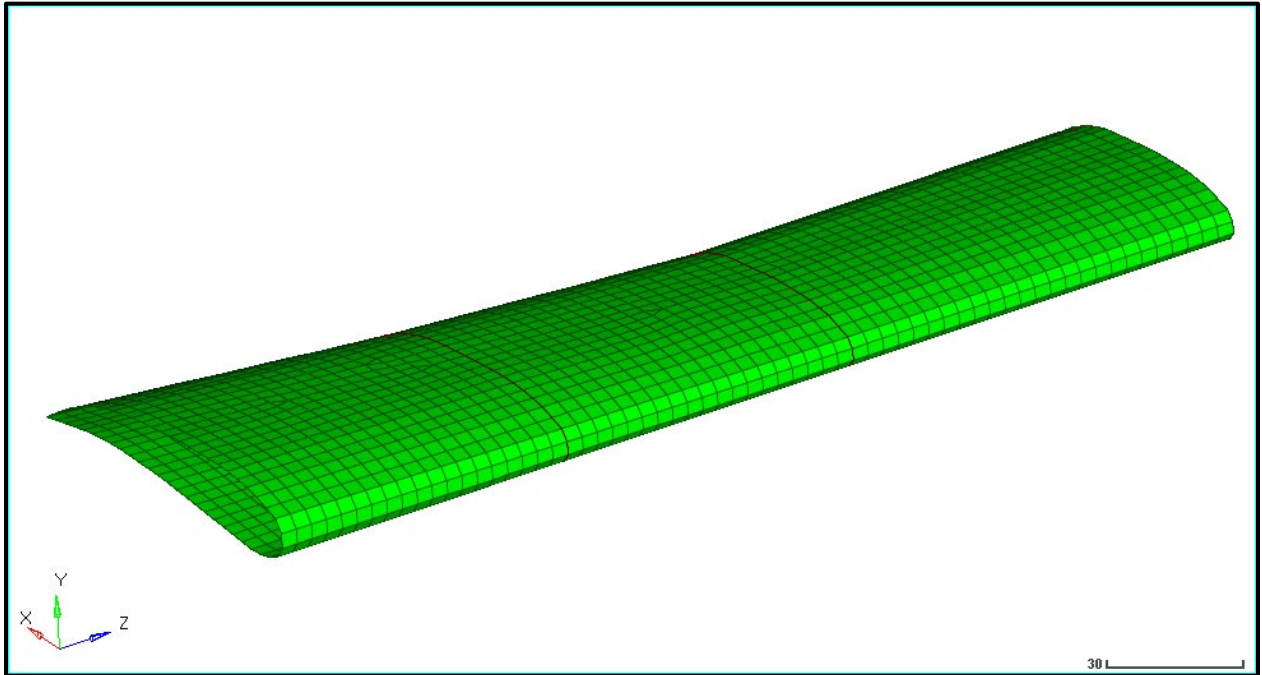


## Exercise 4B: Generating Failure Results from PCOMP

This exercise illustrates how to update composite models to generate failure data. The existing model is a wing structure modeled with PCOMP properties and three material types.





### Problem Setup

You should copy the file: `wing.hm`

**Step 1: Open the model in HyperMesh Desktop with the OptiStruct user profile**

**Step 2: Update the glass fabric and core materials in the model to include failure values**

Name	Value
Solver Keyword	MAT8
Name	Core
ID	1
Color	
Include	[Master Model]
Defined	<input checked="" type="checkbox"/>
Card Image	MAT8
User Comments	Hide In Menu/Export
E1	2000.0
E2	4000.0
NU12	0.1
G12	3000.0
G1Z	4000.0
G2Z	4000.0
RHO	0.001074
A1	
A2	
TREF	
Xt	500.0
Xc	500.0
Yt	500.0
Yc	500.0
S	150.0
GE	
F12	
STRN	
MATT8	<input type="checkbox"/>
MAT4	<input type="checkbox"/>
MAT5	<input type="checkbox"/>
MATF8	<input type="checkbox"/>
MATX...	<input type="checkbox"/>


Name	Value
Solver Keyword	MAT8
Name	Glass_fabric
ID	2
Color	
Include	[Master Model]
Defined	<input checked="" type="checkbox"/>
Card Image	MAT8
User Comments	Hide In Menu/Export
E1	4000000.0
E2	6000000.0
NU12	0.1
G12	800000.0
G1Z	800000.0
G2Z	800000.0
RHO	0.07
A1	
A2	
TREF	
Xt	35000.0
Xc	35000.0
Yt	35000.0
Yc	35000.0
S	4000.0
GE	
F12	
STRN	
MAT8	<input type="checkbox"/>
MAT4	<input type="checkbox"/>
MAT5	<input type="checkbox"/>
MATF8	<input type="checkbox"/>
MATX...	<input type="checkbox"/>

**Step 3: Set the stress output (SOUT) option to YES on the Laminate PCOMP property**



Number\_of\_Plies =

	MID	T	THETA	SOUT
1	(2) Glass_fabric	0.25	90.0	YES
2	(1) Core	0.5	45.0	YES
3	(2) Glass_fabric	0.25	0.0	YES
4	(1) Core	0.5	45.0	YES
5	(2) Glass_fabric	0.25	90.0	YES

Close

**Tip:** Use the **Data Table Editor**  to access the SOUT property for the PCOMP card

**Step 4: Set the failure theory (FT) of the Laminate property to HILL and the allowable inter-lamina shear stress value SB to 11 . 6**

Name	Value
Solver Keyword	PCOMP
Name	Laminate
ID	2
Color	
Include	[Master Model]
Defined	<input checked="" type="checkbox"/>
Card Image	PCOMP
User Comments	Hide In Menu/Export
<input checked="" type="checkbox"/> Z0 OPTIONS	REAL
Z0	
NSM	
SB	
FT	
TREF	
<input checked="" type="checkbox"/> GE_USEMAT	<input type="checkbox"/>
GE	
LAM	
<input checked="" type="checkbox"/> Number_of_Plies =	5
Data: MID, ...	
NRPT	
PCOMPX	<input type="checkbox"/>
<input checked="" type="checkbox"/> Metadata Values	
StackType	Symmetric-Midlayer

### Step 5: Add output request control cards and parameters

1. Set the CFAILURE, CSTRAIN, and CSTRESS output requests in the model as shown below.

Name	Value
Include	[Master Model]
Status	<input checked="" type="checkbox"/>
ACCELERATION	<input type="checkbox"/>
<input checked="" type="checkbox"/> CFAILURE	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> CFAILURE_NUM =	1
<input checked="" type="checkbox"/> GLOBAL_OUTPUT_RE...	
FORMAT	H3D
NDIV	1
OPTION	ALL
CMDE	<input type="checkbox"/>
CMKE	<input type="checkbox"/>
CMSE	<input type="checkbox"/>
CONTF	<input type="checkbox"/>
<input checked="" type="checkbox"/> CSTRAIN	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> CSTRAIN_NUM =	1
<input checked="" type="checkbox"/> GLOBAL_OUTPUT_RE...	
FORMAT	H3D
TYPE	ALL
EXTRA	
NDIV	1
OPTION	ALL
<input checked="" type="checkbox"/> CSTRESS	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> CSTRESS_NUM =	1
<input checked="" type="checkbox"/> GLOBAL_OUTPUT_RE...	
FORMAT	H3D
TYPE	ALL
NDIV	1
OPTION	ALL
DAMAGE	<input type="checkbox"/>
DISPLACEMENT	<input type="checkbox"/>
DRESPONSE	<input type="checkbox"/>
DSA	<input type="checkbox"/>

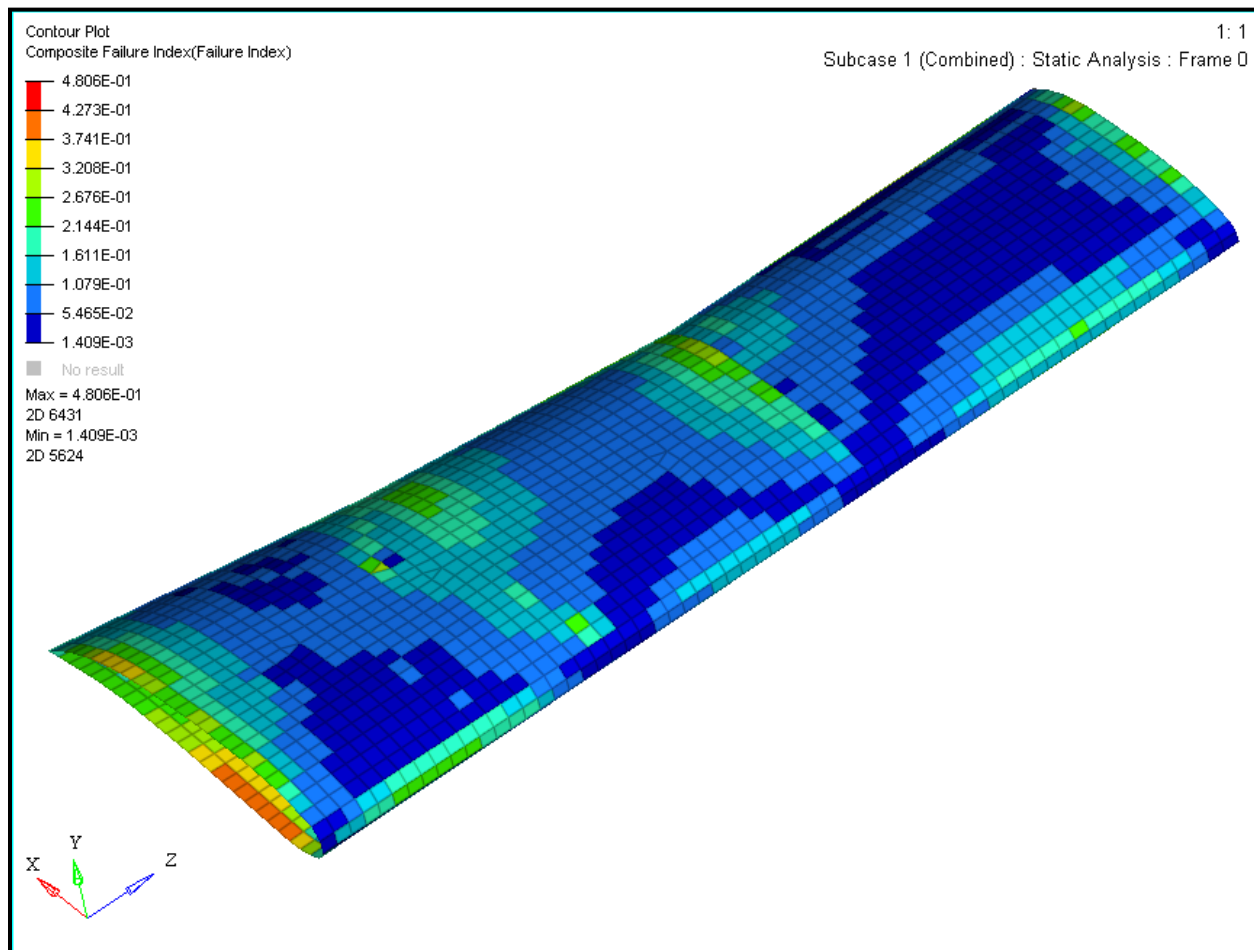
2. Activate the control card for **PARAM**.
3. In the **Entity Editor**, check the box for **SRCOMPS** and set **VALUE** to YES.

Name	Value
SHELOS11	<input type="checkbox"/>
SHL2MEM	<input type="checkbox"/>
SHPBCKOR	<input type="checkbox"/>
SIMPACK	<input type="checkbox"/>
SMDISP	<input type="checkbox"/>
SNAPTHRU	<input type="checkbox"/>
SORTCON	<input type="checkbox"/>
SPLC	<input type="checkbox"/>
SPLFAC	<input type="checkbox"/>
SPLREFDB	<input type="checkbox"/>
SPLRHO	<input type="checkbox"/>
<input checked="" type="checkbox"/> SRCOMPS	<input checked="" type="checkbox"/>
VALUE	YES
SS2GCR	<input type="checkbox"/>
STRTHR	<input type="checkbox"/>
THCNTPEN	<input type="checkbox"/>
TOLRSC	<input type="checkbox"/>
TRAKMETH	<input type="checkbox"/>
TRAKMTX	<input type="checkbox"/>
TPS	<input type="checkbox"/>

**Step 6: Save the model as `wing_failure_output.hm`**

**Step 7: Run the model in OptiStruct**

## Step 8: Use HyperView to contour the Composite Failure Index (s) results



## EXERCISE RESULTS: wing\_failure\_output.hm

