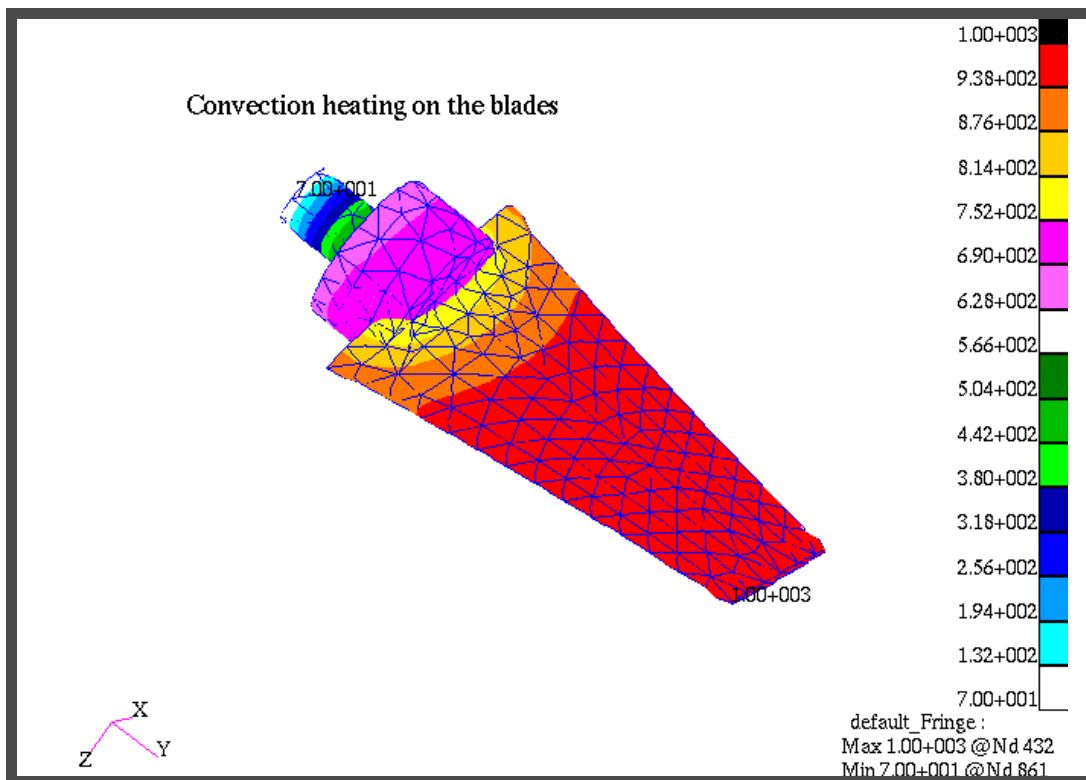


WORKSHOP 16

Importing IGES file and auto-tet mesh the model



Objectives:

- Importing IGES geometry, and create a B-Rep solid from all the surfaces
- Auto-Tet mesh the model with TETRA10
- Apply convection heating on the blade surfaces with $h=10$, and hot ambient temperature at 1000 F
- Apply a constant base temperature of 70 degree F
- Obtain a temperature contour



Suggested Exercise Steps:

- Create a new database and name it **fin.db**.
- Create a surface model of the cooling fin
- Generate the finite elements using mesh seeds
- Define material and element properties.
- Apply the convection conditions to the model.
- Submit the model to MSC.Nastran for analysis.
- Review results.



Exercise Procedure:

1. Open a new database called **fin.db**.

File/New...

New Database Name

prob16

OK

In the New Model Preferences form set the following:

New Model Preference

Tolerance

◆ Default

Analysis Code:

MSC/NASTRAN

Analysis Type:

Thermal

OK

Whenever possible click **Auto Execute** (turn off).

2. Import the IGES geometry

File/Import...

Source:

IGES

Import File

mblade.igs

Apply

Click **OK** when the IGES Import Summary appears

3. Create a B-Rep solid from all the surfaces

◆ **Geometry**

Action:

Create

Object:

Solid

Method:

B-rep

Surface List

Surface 1:34

(Select all the surfaces)

Apply

Switch the viewport to ISO2 view by click on the ISO 2 View icon on the Main Menu.



Iso 2 View

Also view the model in Smooth Shaded view.



Smooth Shaded

4. Mesh the solid using TetMesh

◆ **Finite Element**

Action:

Create

Object:

Mesh

Type:

Solid

Mesher

◆ **TetMesh**

Element Topology

Tet10

Input List

Solid 1

Apply



5. Next, define a material using the specified thermal conductivity.

◆ **Materials**

<i>Action:</i>	Create
<i>Object:</i>	Isotropic
<i>Method:</i>	Manual Input
<i>Material Name:</i>	Titan
Input Properties	
<i>Thermal Conductivity</i>	10.8859
OK	
Apply	

6. Next, reference the material that was created in the previous step. Define the properties of the blade.

◆ **Properties**

<i>Action:</i>	Create
<i>Object:</i>	3D
<i>Type:</i>	Solid
<i>Property Set Name</i>	solid
Input Properties	
<i>Material Name</i>	m:Titan
OK	
<i>Select Members</i>	Solid 1
Add	
Apply	

7. Apply the constant temperature boundary conditions at the base.

◆ **Loads/BCs**

<i>Action:</i>	Create
<i>Object:</i>	Temp (Thermal)

Type:

New Set Name

Boundary Temperature

Geometry Filter

◆ Geometry

Select Geometry Entities

(Select the bottom 2 arcs)

Now assign the Convection boundary conditions on the surfaces of the blade.

◆ Loads/BCs

Action:

Object:

Type:

New Set Name

Target Element Type:

Convection Coefficient

Ambient Temperature

Geometry Filter

◆ Geometry

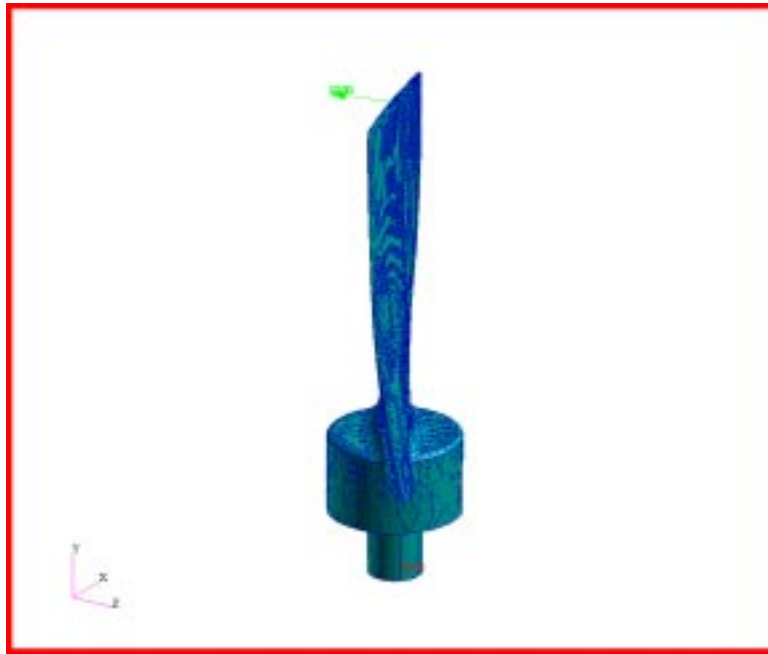
Select Solid Faces

(Click on the blade to select both faces)

Add

OK

Apply



8. Click on the **Analysis** radio button on the **Top Menu Bar** and complete the entries as shown here:

◆ **Analysis**

Action:

Analyze

Object:

Entire Model

Type:

Analysis Deck

Translation Parameters

Data Output:

XDB and Print

OK

Solution Type

Solution Type

◆ **STEADY STATE ANALYSIS**

OK

Apply

An MSC/NASTRAN input file called **prob16.bdf** will be generated. This process of translating your model into an input file is called the Forward Translation. The Forward Translation is complete when the Heartbeat turns green.

Submitting the Input File for Analysis:

9. Submit the input file to MSC/NASTRAN for analysis.
 - 9a. To submit the MSC/PATRAN **.bdf** file, find an available UNIX shell window. At the command prompt enter **nastran prob16.bdf scr=yes**. Monitor the run using the UNIX **ps** command.
 - 9b. To submit the MSC/NASTRAN **.dat** file, find an available UNIX shell window and at the command prompt enter **nastran prob16 scr=yes**. Monitor the run using the UNIX **ps** command.
10. When the run is completed, edit the **fin.f06** file and search for the word **FATAL**. If no matches exist, search for the word **WARNING**. Determine whether existing **WARNING** messages indicate modeling errors.

11. MSC/NASTRAN Users have finished this exercise. MSC/PATRAN Users should proceed to the next step.

12. Proceed with the Reverse Translation process, that is, attaching the **prob16.xdb** results file into MSC/PATRAN. To do this, return to the **Analysis** form and proceed as follows:

◆ **Analysis**

Action:

Attach XDB

Object:

Result Entities

Method:

Local

Select Results File

Select Results File

prob16.xdb

OK

Apply

13. When the translation is complete and the Heartbeat turns green, bring up the **Results** form.

Choose the **Default** result case, and plot the result by selecting **Temperature** in the Select Fringe Result.

◆ **Results**

Action:

Create

Object:

Quick Plot

Select Result Cases

Default, A1:Non-Linear:100.% Load

Select Fringe Result

Temperatures

Apply

