

# **Working with FEA Assemblies in ANSYS R15**

**Mallett Technology, Inc.**

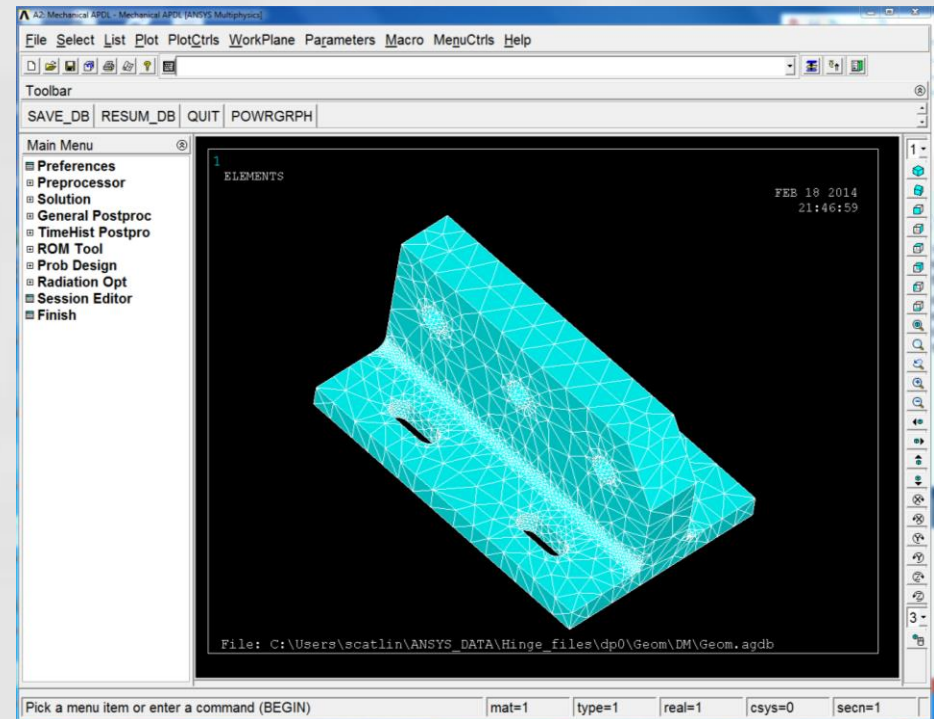
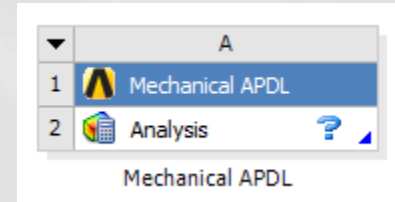
**Over 30 Years  
of Setting Standards and Exceeding Expectations**

**Shawn Catlin**

**Senior Technical Sales Engineer**

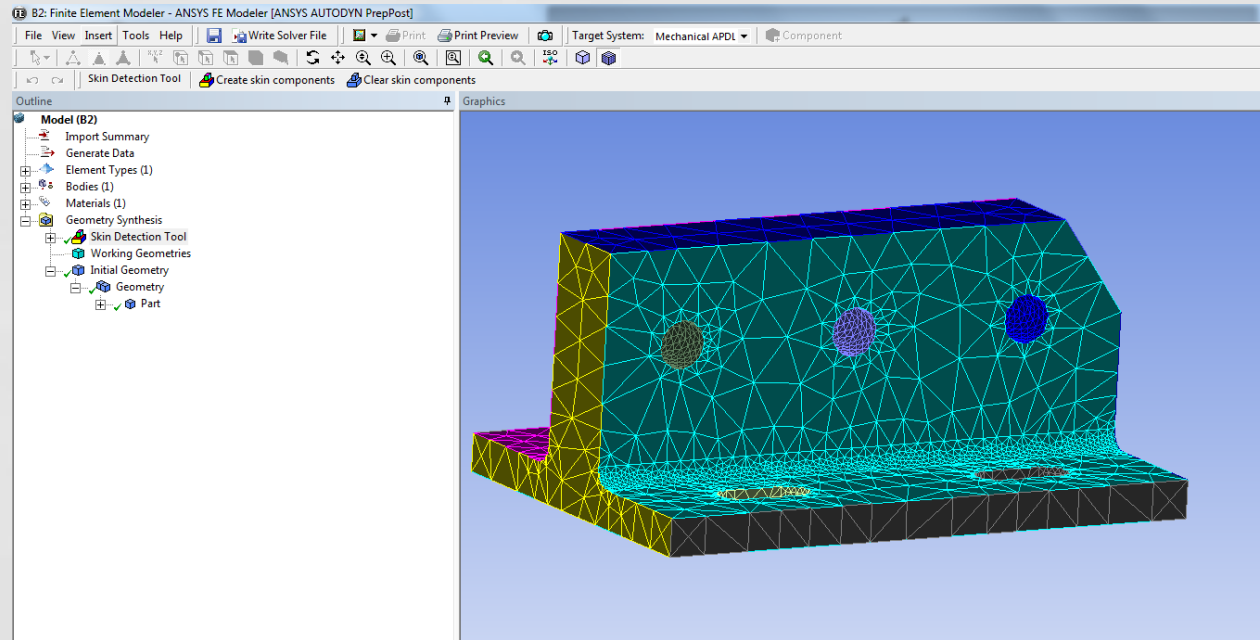
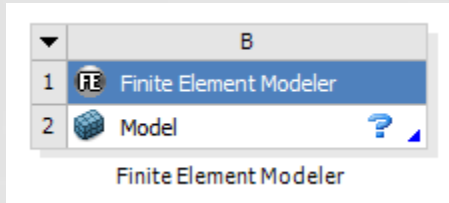
# What can I do with a .db file?

- A .db can be a reference file for a Mechanical APDL object.
- A Mechanical APDL object is used to open the Traditional ANSYS interface from the project schematic.

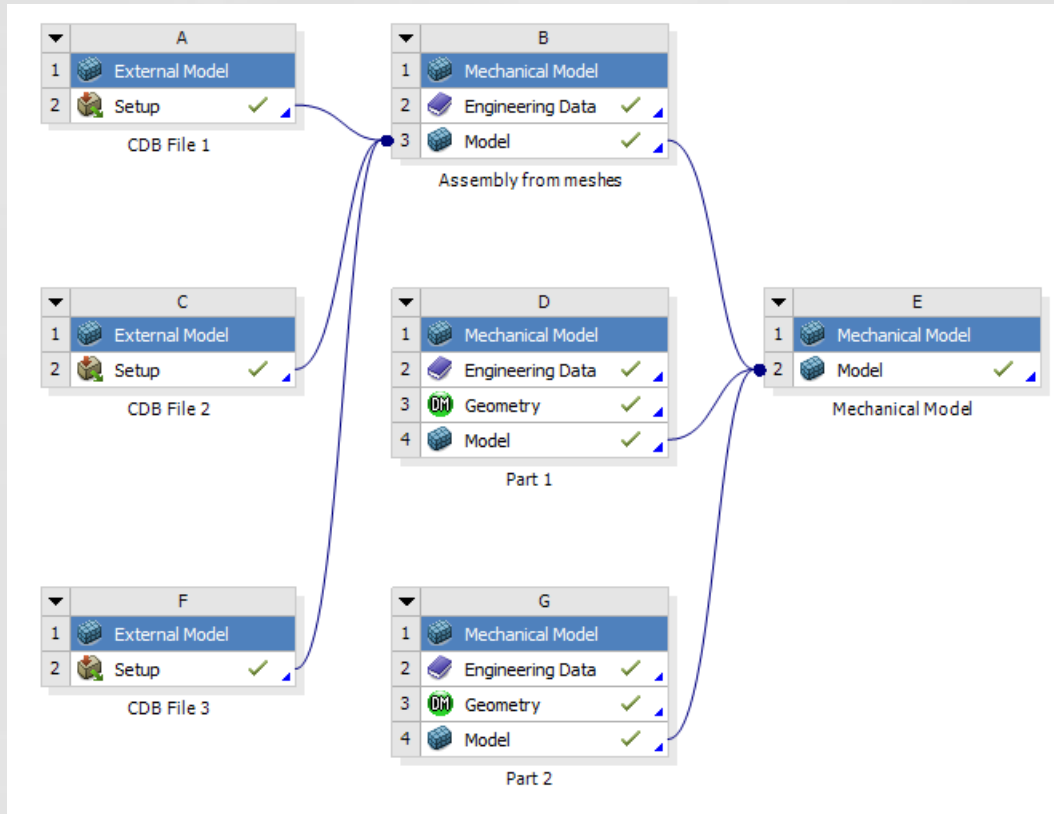


# What can I do with a .cbd file?

- You can open a .cbd file with Finite Element Modeler
  - Finite Element Modeler can be used to investigate the model and convert the model to a ANSYS Mechanical model.
  - Finite Element Modeler can be used to parametise an input mesh



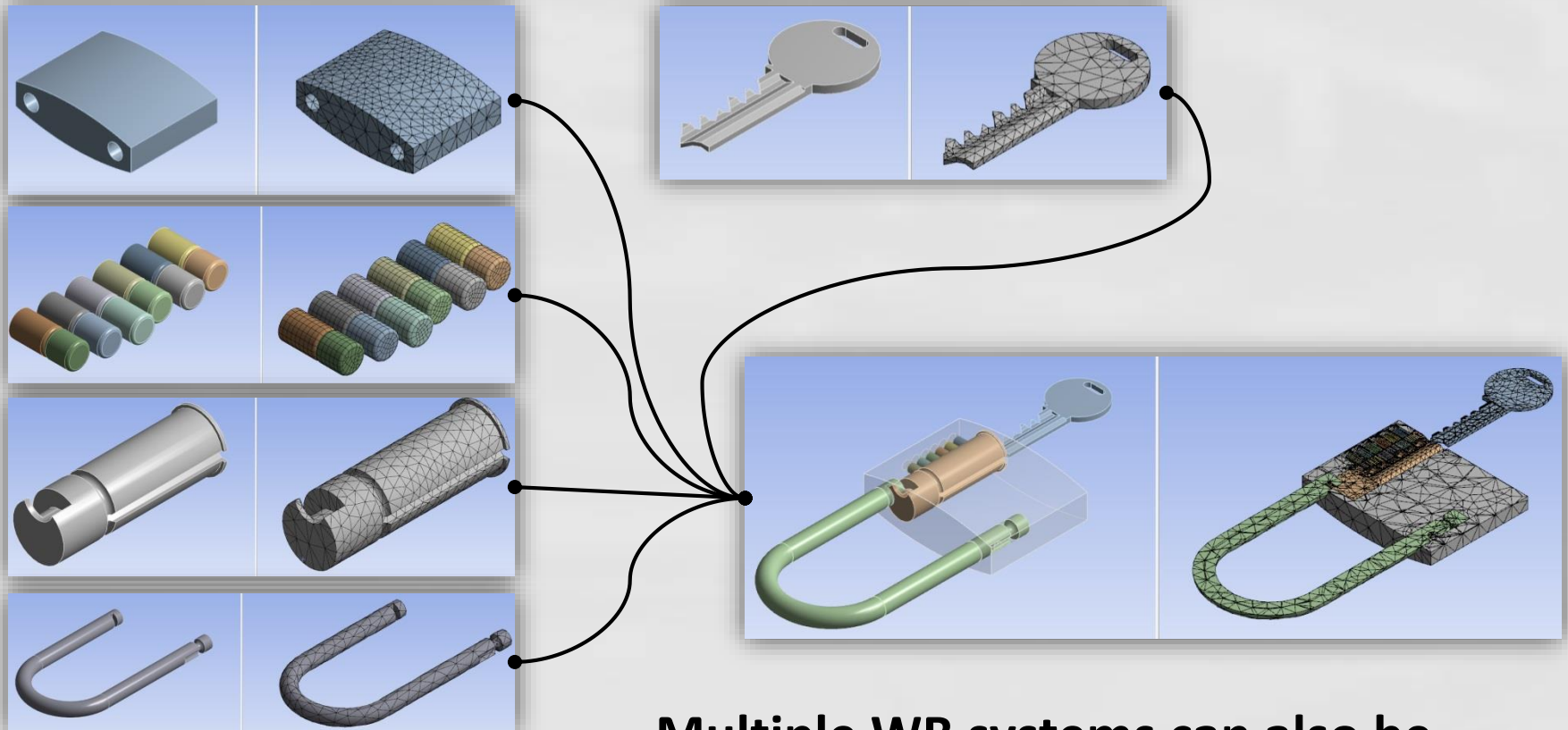
# MODEL ASSEMBLY



**Geometry is not only the starting point of a Workbench based structural simulation.**

**Multiple finite element models can be assembled and leverage all Mechanical functionalities, including contact detection.**

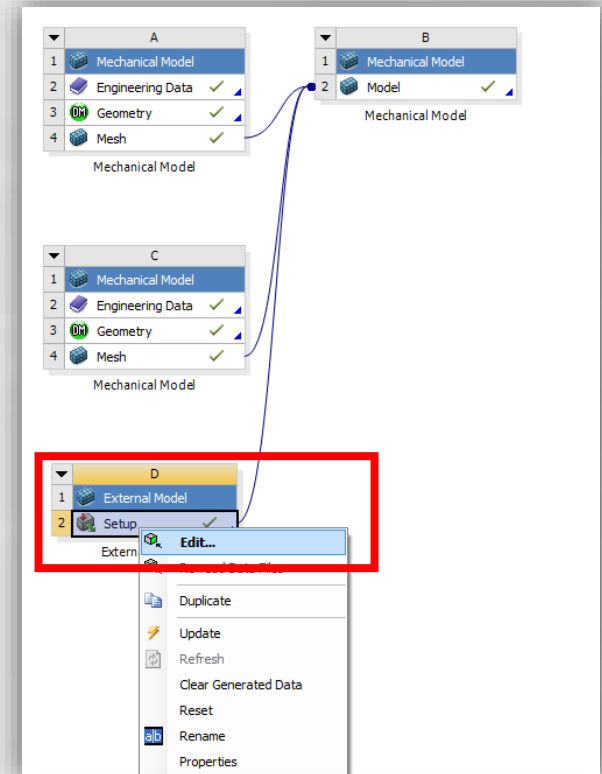
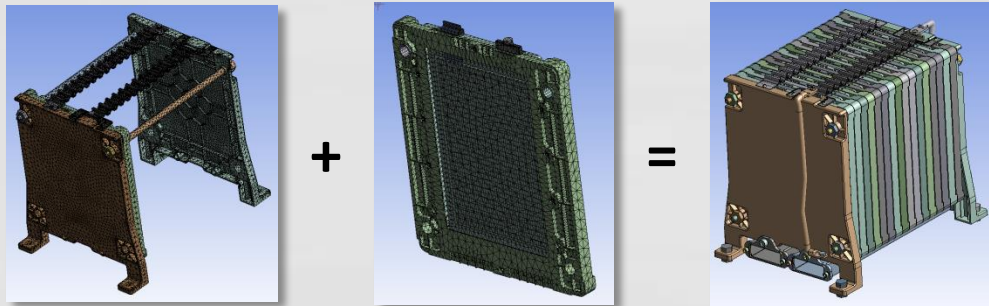
# ...MODEL ASSEMBLY



**Multiple WB systems can also be combined. Geometry, Mesh and Named Selections are retrieved.**

# Model Assembly

- Combine pre-existing models, meshes, and geometries
- Update connections, define loads, solve in Mechanical
- Define transformations and copies in the assembly



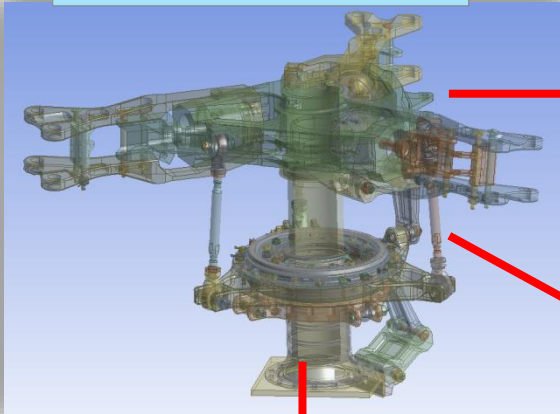
Rigid Transformation for Pack (Component ID: Model)		
Number of Copies	15	
Transform the Original	<input type="checkbox"/>	
Origin X	0.65	in
Origin Y	0	m
Origin Z	0	m
Theta XY	0	radian
Theta YZ	0	radian
Theta ZX	60	degree



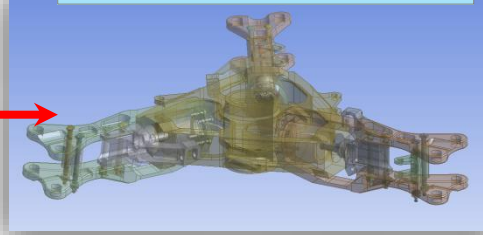
# Model Assembly

Allows user to split then later re-assemble model

Original Assembly

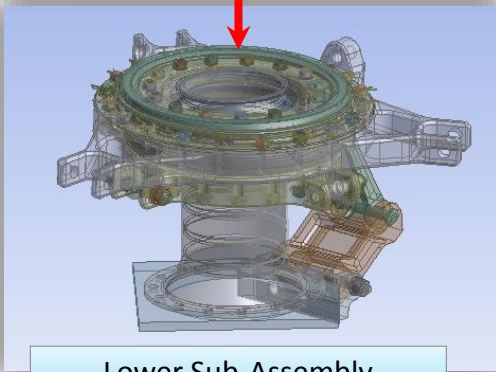


Upper Sub-Assembly



Shaft/Connector Sub-Assembly

Lower Sub-Assembly



Sub-Assembly models can be worked on independently, and later assembled

A	
1	Mechanical Model
2	Engineering Data ✓
3	Geometry ✓
4	Model ✓
Upper	

B	
1	Mechanical Model
2	Model ✓
Mechanical Model	

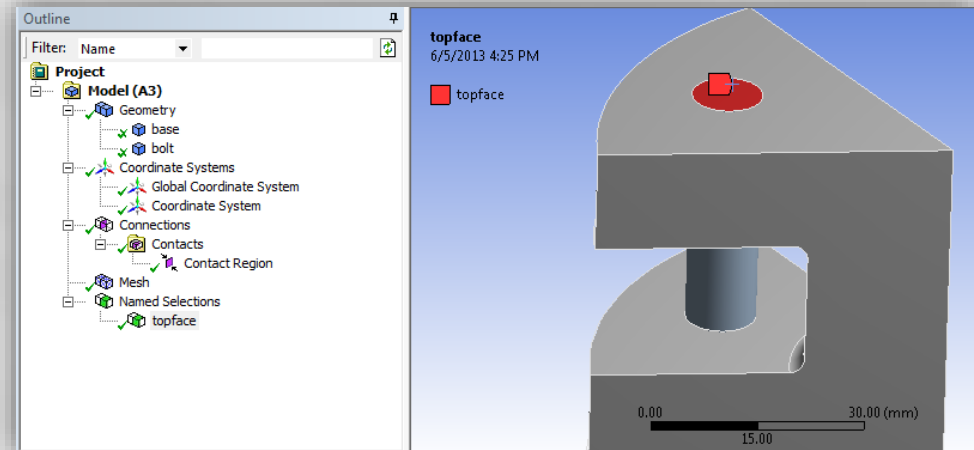
C	
1	Mechanical Model
2	Engineering Data ✓
3	Geometry ✓
4	Model ✓
Lower	

D	
1	Mechanical Model
2	Engineering Data ✓
3	Geometry ✓
4	Model ✓
Shaft_and_Connectors	

Sub-Assembly models are updated separately at project level

# Example: Single sector

- Base model has geometry, mesh, and named selections
- Specify No. of Copies = 2
- Specify Rotation



Project Schematic

Single Sector

Static Structural

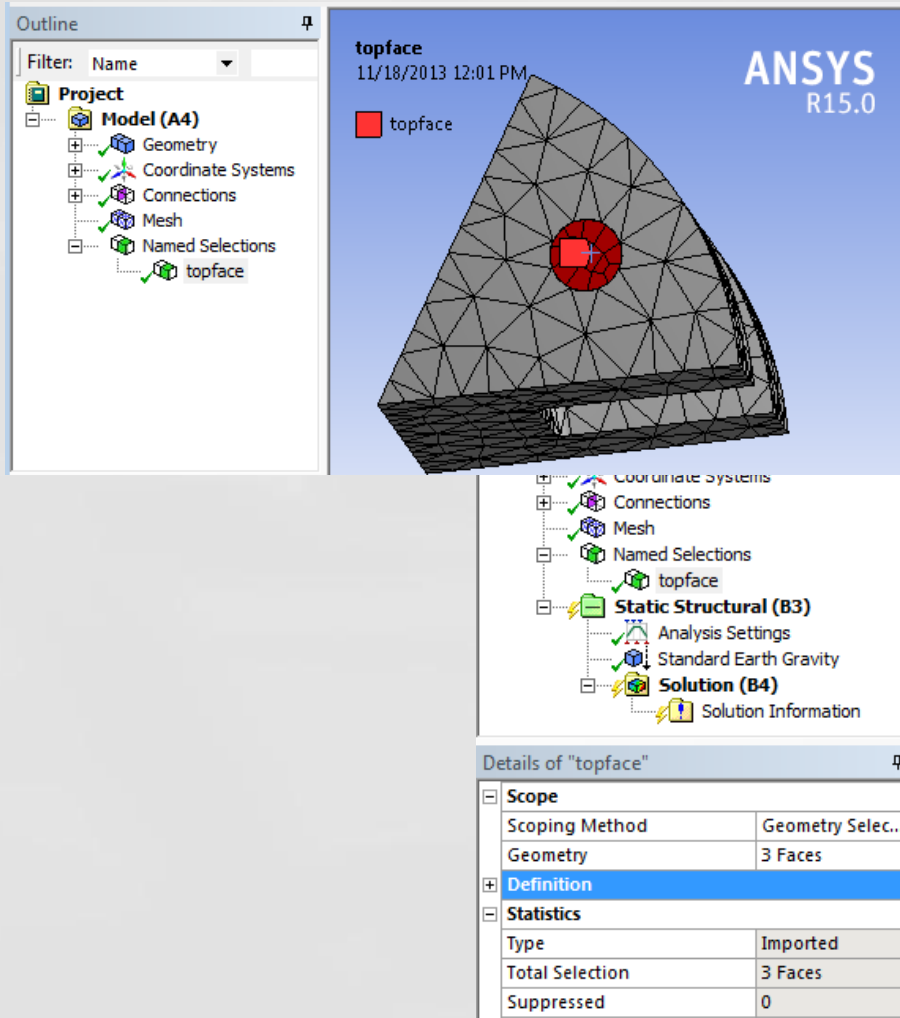
Properties of Schematic B2: Model

	A	B	C
1	Property	Value	Unit
2	General		
3	Component ID	Model 1	
4	Directory Name	SYS-1	
5	Notes		
7	Used Licenses		
9	System Information		
13	General Model Assembly Properties		
14	Length Unit	m	
15	Rigid Transformation for Single Sector (Component ID: Model)		
16	Number of Copies	2	
17	Transform the Original	<input type="checkbox"/>	
18	Origin X	0	m
19	Origin Y	0	m
20	Origin Z	0	m
21	Theta XY	0	radian
22	Theta YZ	0	radian
23	Theta ZX	60	degree



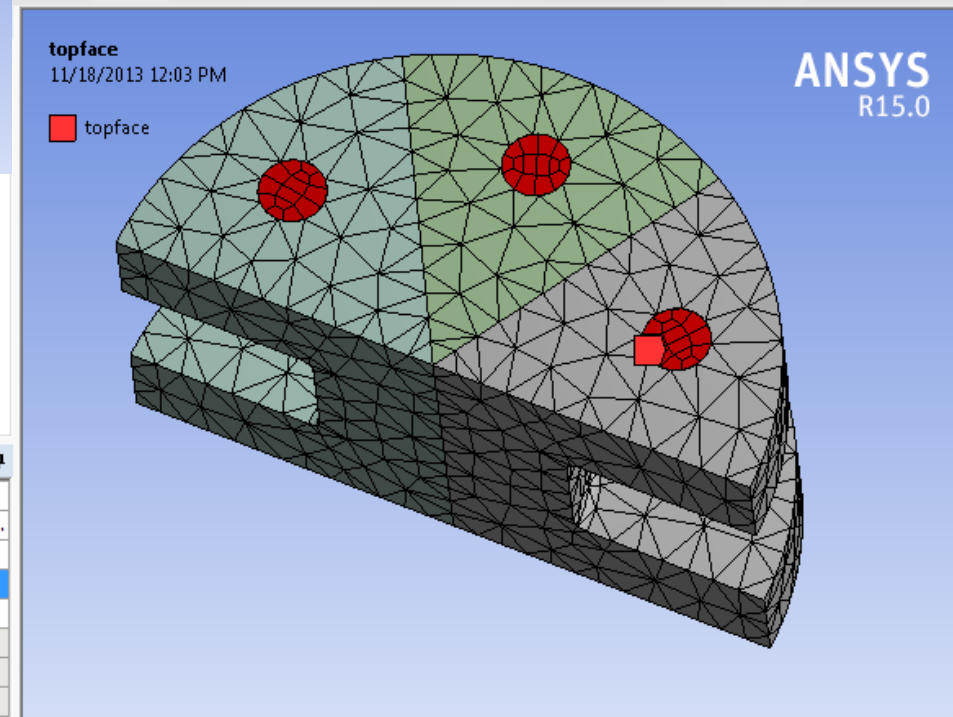
# Example: Resulting Mesh

## Base System



Mesh and Geometry are exact copies in the combined system

## Combined Mesh



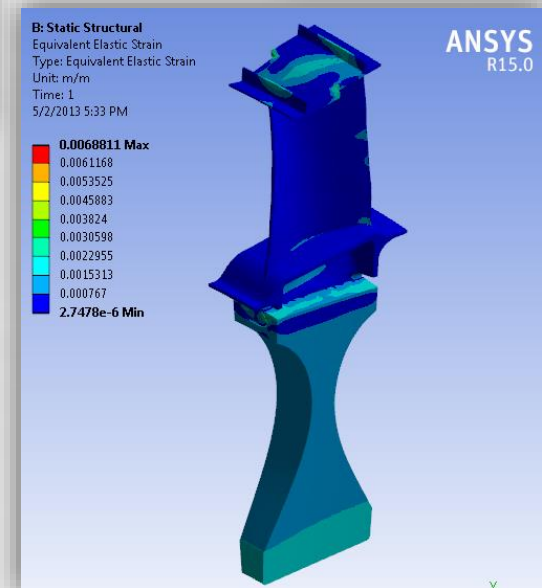
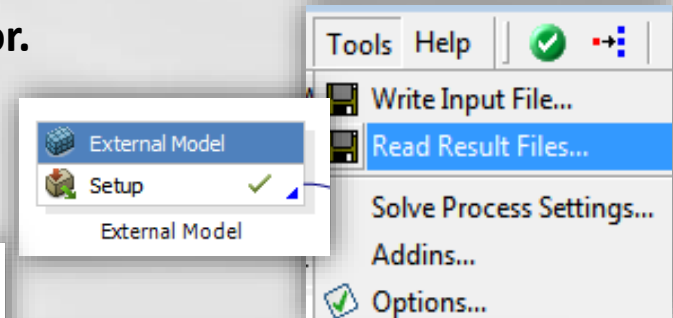
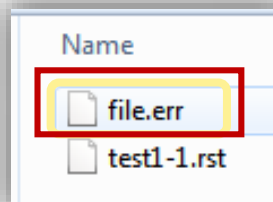
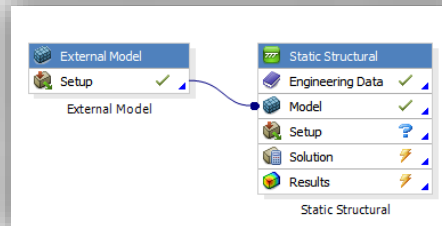
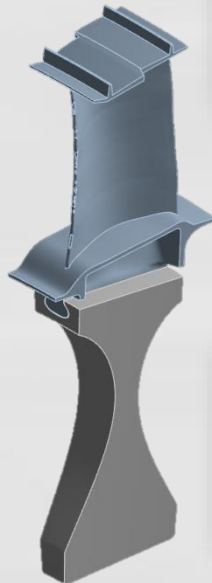
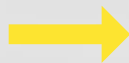
# Import Mesh

• You can use Mechanical as a standalone post-processor.

- Combine External Model with Mechanical.
- Use Mechanical Tools > Read Result Files



test-1.cdb



# Q & A