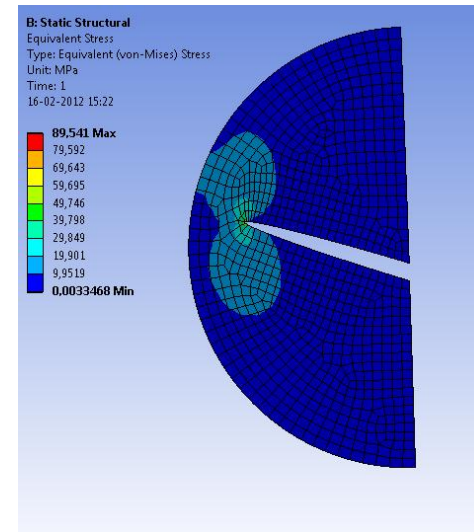
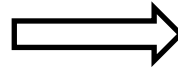
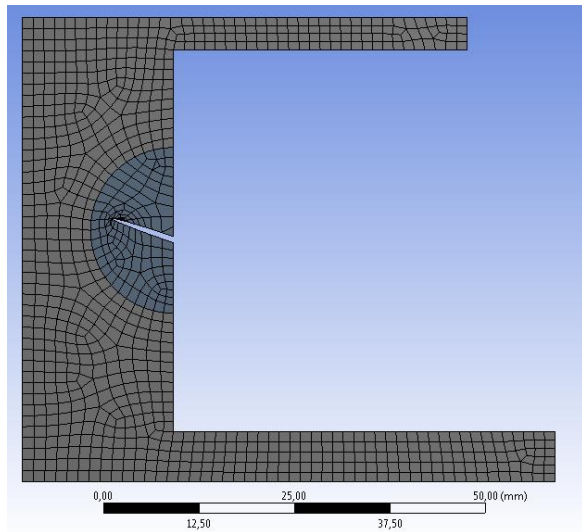


How to make a use submodeling Workbench 14.0



Aalborg Universitet esbjerg
Søren Heide Lambertsen
Thank to Medeso for the APDL commands

File Create Concept Tools View Help

Undo Redo Select Image Capture Generate Share Topology Parameters Extrude Revolve Sweep Skin/Loft Thin/Surface Blend Chamfer Point

Tree Outline
A: Static Structural
XYPlane
Sketch1
ZXPlane
YZPlane
Extrude1
1 Part, 1 Body

Graphics

ANSYS
Noncommercial use only

0,000 15,800 30,000 (mm)
7,500 22,500

Sketching Modeling

Details View

Details of Extrude1

Extrude	Extrude1
Geometry	Sketch1
Operation	Add Material
Direction Vector	None (Normal)
Direction	Normal
Extent Type	Fixed
<input type="checkbox"/> FDI, Depth (>0)	30 mm
As Thin/Surface?	No
Merge Topology?	Yes
Geometry Selection: 1	
Sketch	Sketch1

Ready

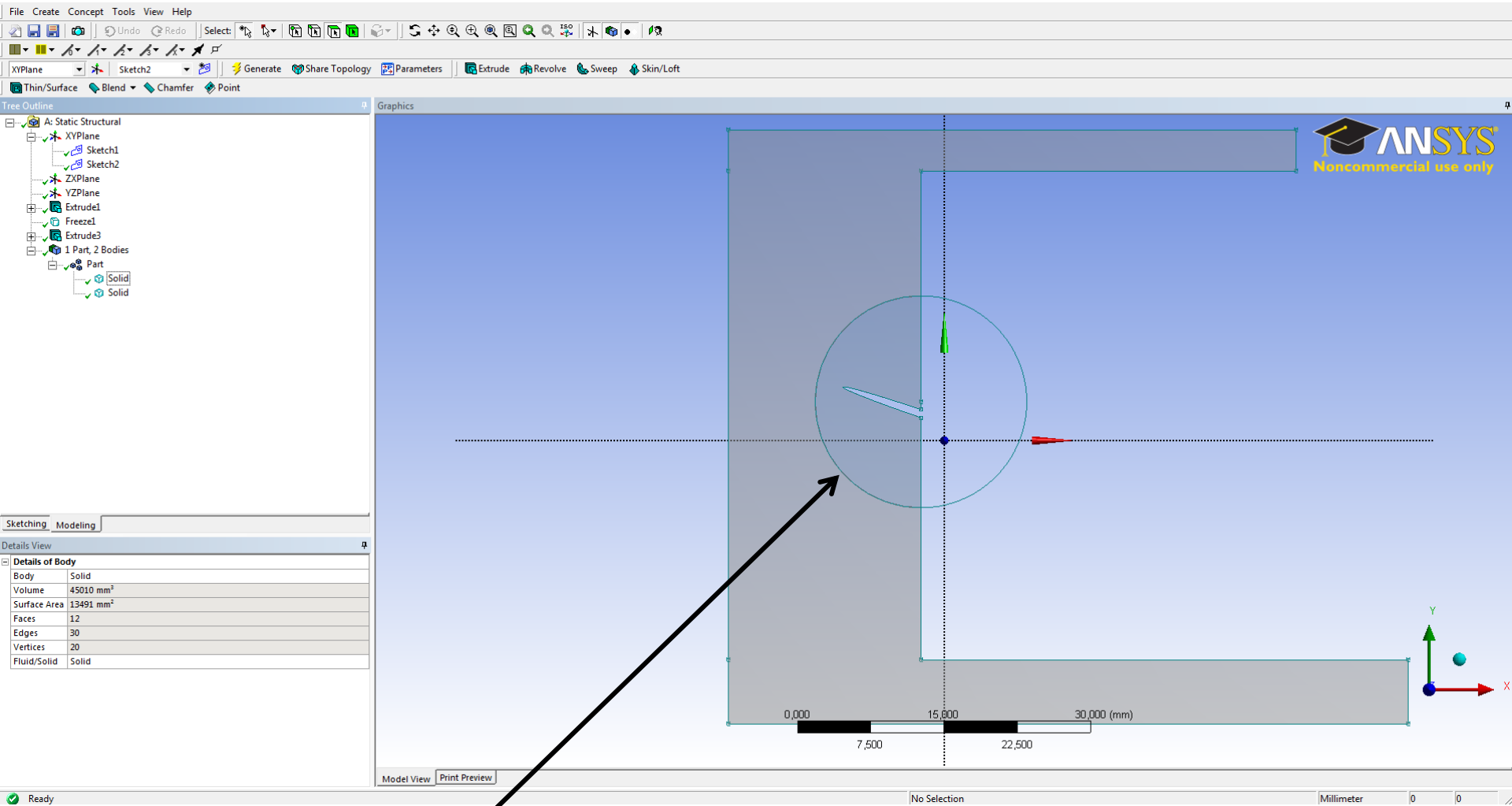
Model View Print Preview

No Selection

Millimeter

0 0

Make the global model



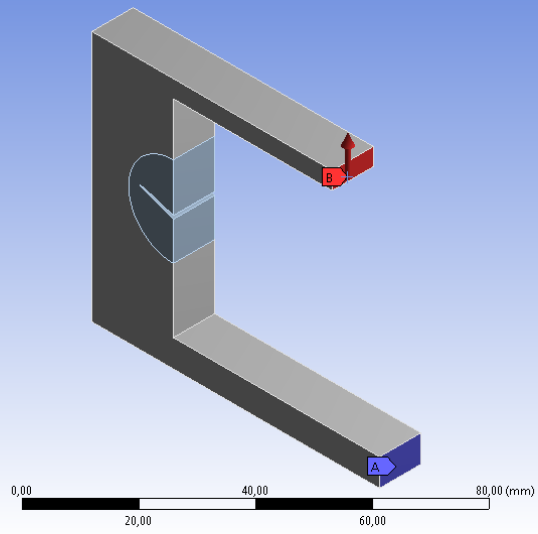
Slice the area you want to sub model

Outline

- Project
 - Model (A4)
 - Geometry
 - Coordinate Systems
 - Connections
 - Mesh
 - Static Structural (A5)
 - Analysis Settings
 - Fixed Support
 - Force
 - Solution (A6)
 - Solution Information

A: Static Structural
Static Structural
Time: 1 s
16-02-2012 14:45

- A Fixed Support
- B Force: 100, N



Details of "Static Structural (A5)"

Definition	
Physics Type	Structural
Analysis Type	Static Structural
Solver Target	Mechanical APDL

Options

Environment Temperature	22, °C
Generate Input Only	No

Geometry | Print Preview | Report Preview

Graph

1.

Messages Graph

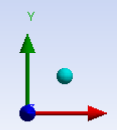
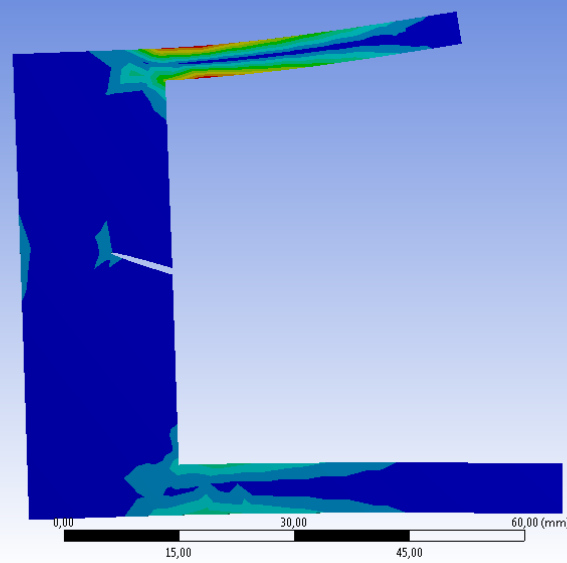
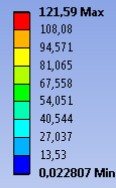
Tabular Data

Setup the global load and supports

Outline

- Project
 - Model (A4)
 - Geometry
 - Coordinate Systems
 - Connections
 - Mesh
 - Static Structural (A5)
 - Analysis Settings
 - Fixed Support
 - Force
 - Solution (A6)
 - Solution Information
 - Equivalent Stress

A: Static Structural
 Equivalent Stress
 Type: Equivalent (von-Mises) Stress
 Unit: MPa
 Time: 1
 16-02-2012 14:45



Details of "Equivalent Stress"

Scope	
Scoping Method	Geometry Selection
Geometry	All Bodies
Definition	
Type	Equivalent (von-Mises) Stress
By	Time
Display Time	Last
Calculate Time History	Yes
Identifier	
Suppressed	No
Integration Point Results	
Display Option	Averaged
Results	
<input type="checkbox"/> Minimum	2,2807e-002 MPa
<input type="checkbox"/> Maximum	121,59 MPa
Minimum Occurs On	Solid
Maximum Occurs On	Solid
Information	

Geometry | Print Preview | Report Preview

Graph

Animation | 10 Frames | 2 Sec (Auto) | 3 Cycles

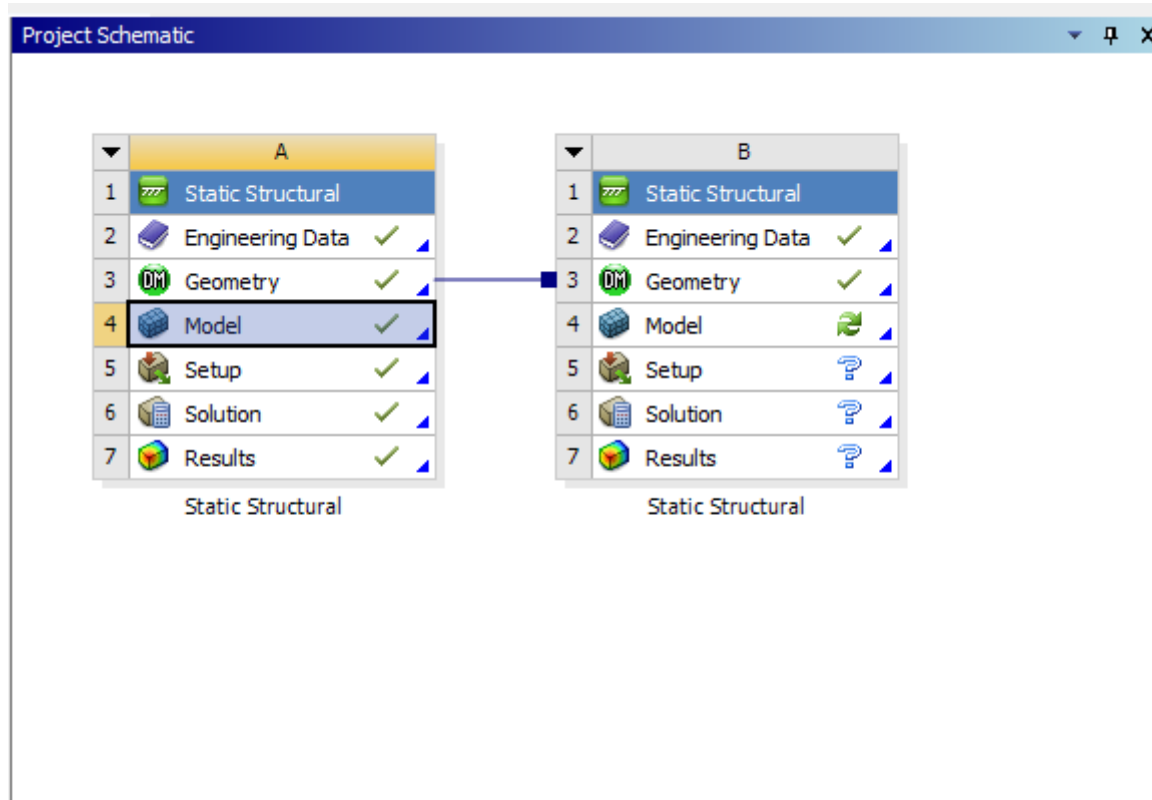
0, 1,

Messages | Graph

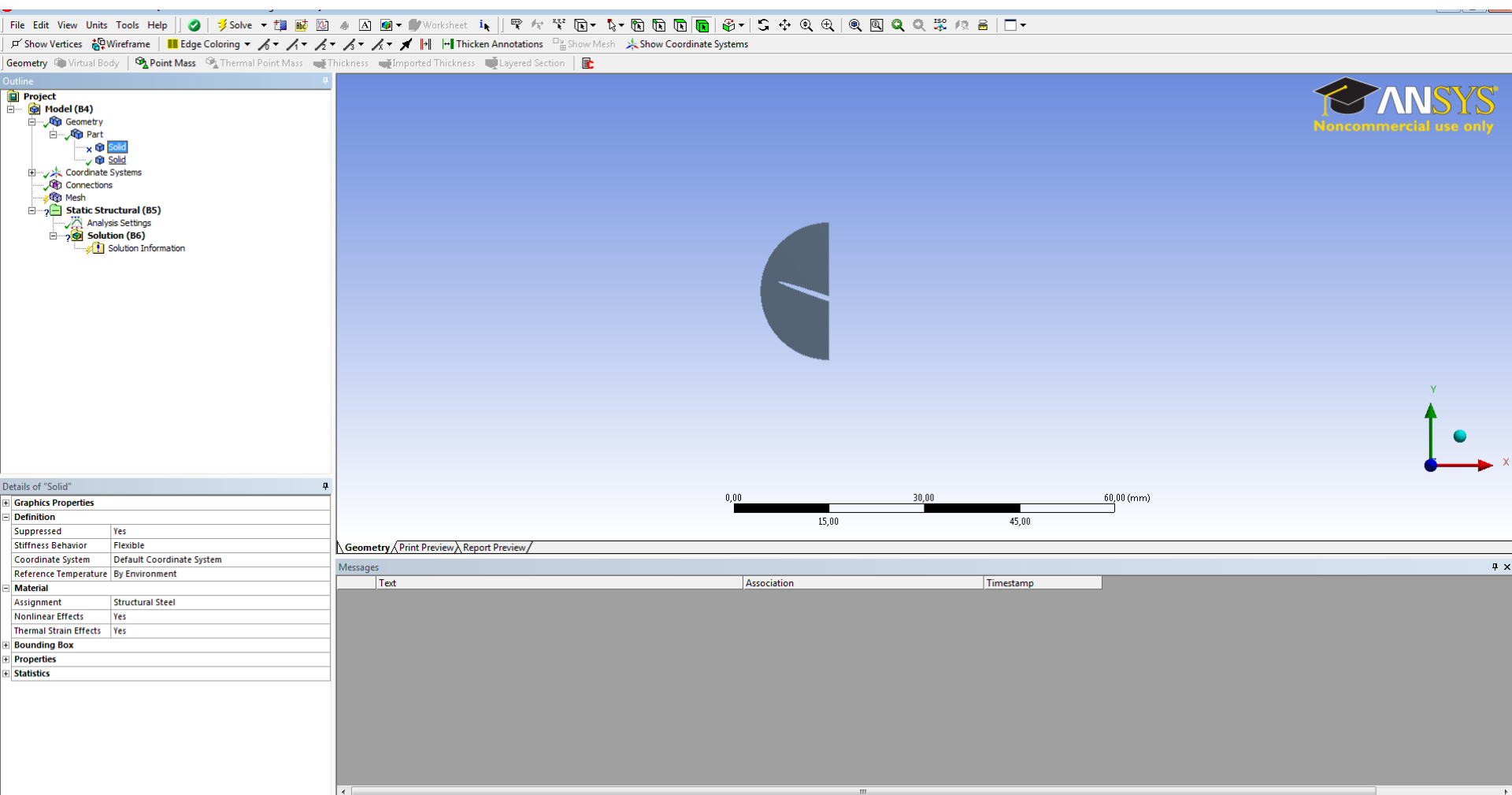
Tabular Data

--

Solve the model



Make a new static structural and use the same geometry.



Details of "Solid"

Graphics Properties	
Definition	
Suppressed	Yes
Stiffness Behavior	Flexible
Coordinate System	Default Coordinate System
Reference Temperature	By Environment
Material	
Assignment	Structural Steel
Nonlinear Effects	Yes
Thermal Strain Effects	Yes
Bounding Box	
Properties	
Statistics	

Geometry | Print Preview | Report Preview

Messages

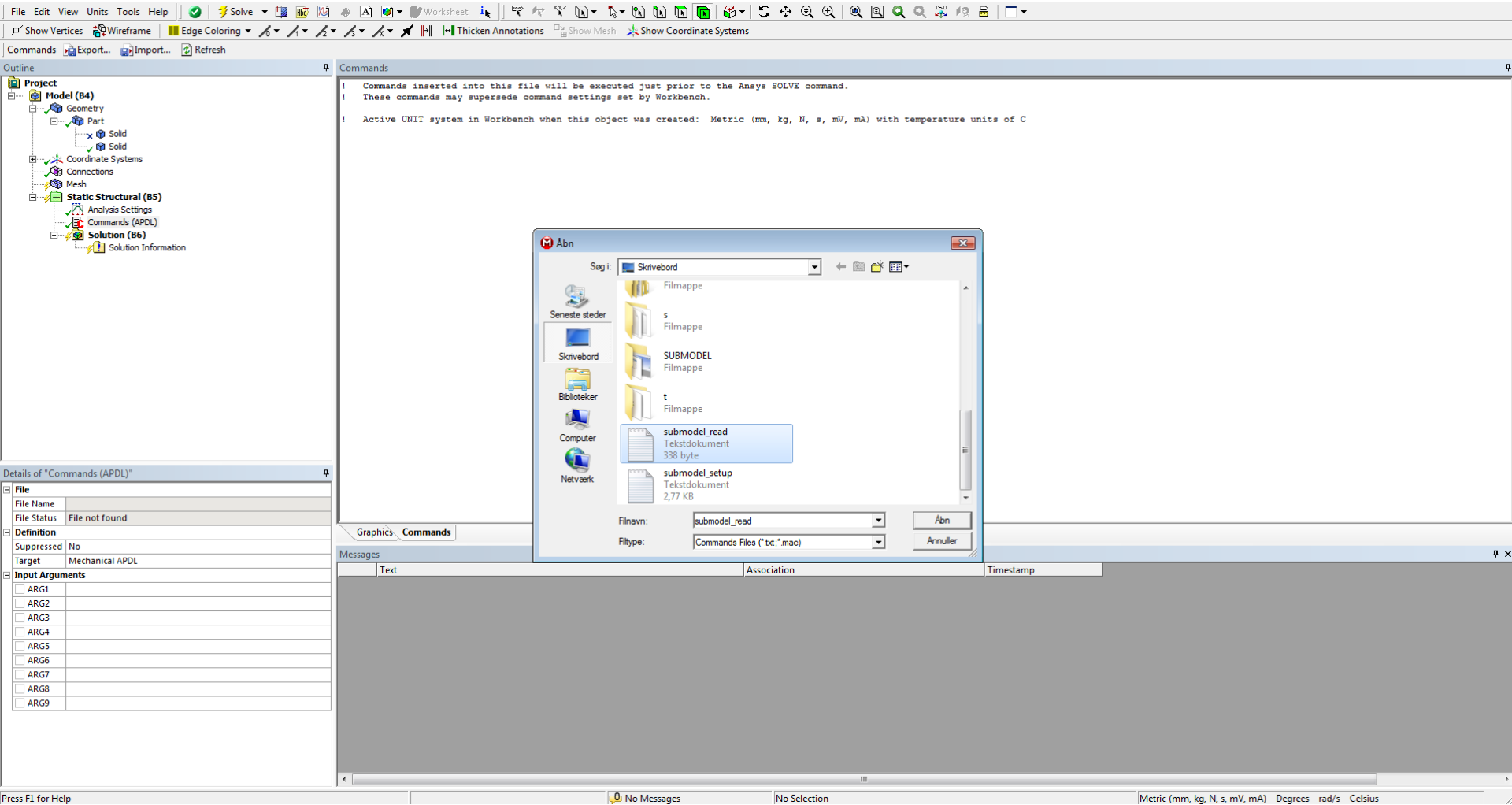
Text	Association	Timestamp

Suppress the model part you not will use

The screenshot displays the ANSYS Workbench interface. A 'Gem som' (Save As) dialog box is open, showing the file name 'modelsyb' and the file type 'Workbench Project Files (*.wbpj)'. The dialog is set to save the file on the local disk (C:) in the directory 'wb'. In the background, the 'Outline of Schematic B4: Model' is visible, showing a tree structure with 'Model' selected. The 'Properties of Schematic B4: Model' table is also shown, detailing the component's configuration.

Properties of Schematic B4: Model	
A	B
Property	Value
General	
Component ID	Model 1
Directory Name	SYS-1
System Information	
Physics	Structural
Analysis	Static Structural
Solver	Mechanical APDL

Save the model. In this eksempel we save at C:\wb\modelsyb.wbpj

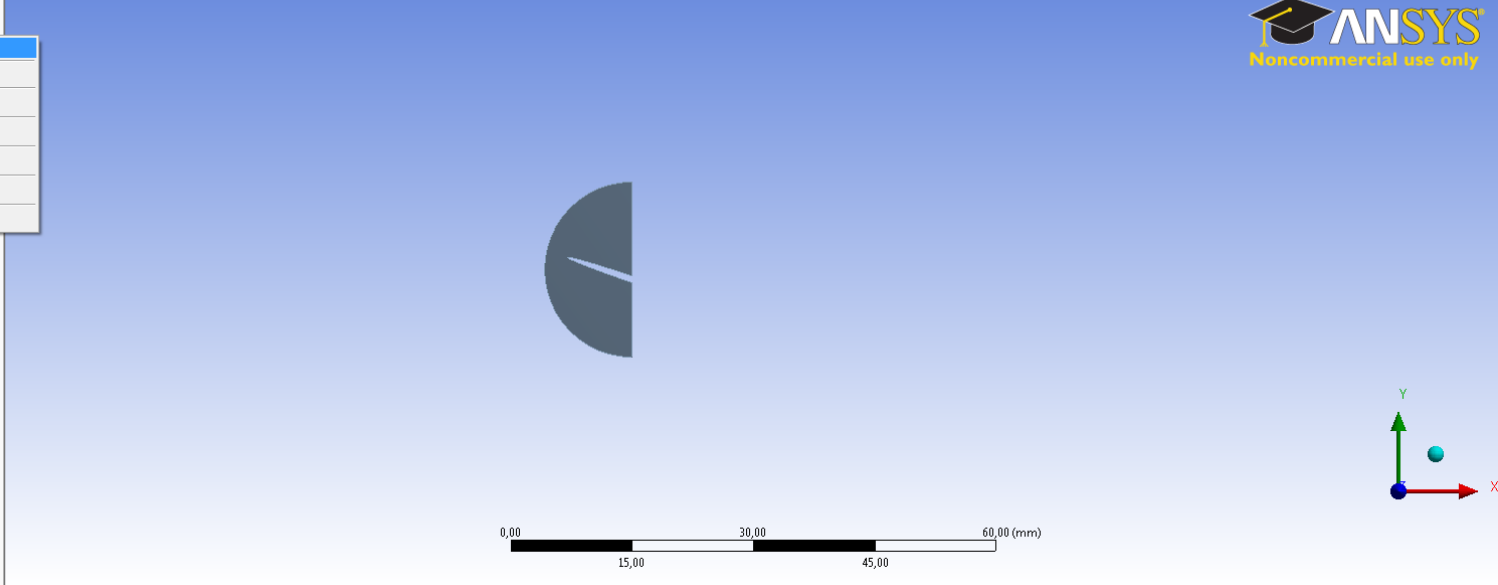


Start at commands (APDL) and import the submodel_setup. Then start a new commands (APDL) again and add submodel_read



Project Outline

- Model
 - Insert
 - Named Selection
 - Construction Geometry
 - Virtual Topology
 - Symmetry
 - Remote Point
 - Mesh Numbering
 - Solution Combination
 - Solve
 - Clear Generated Data
 - Rename
 - Disable Filter
 - Refresh Materials
 - Refresh Geometry
 - Commands (APDL) 2
 - Solution (B6)
 - Solution Information



Details of "Model (B4)"

- Filter Options
 - Control Enabled
- Lighting
 - Ambient 0,1
 - Diffuse 0,6
 - Specular 1
 - Color

Geometry Print Preview Report Preview

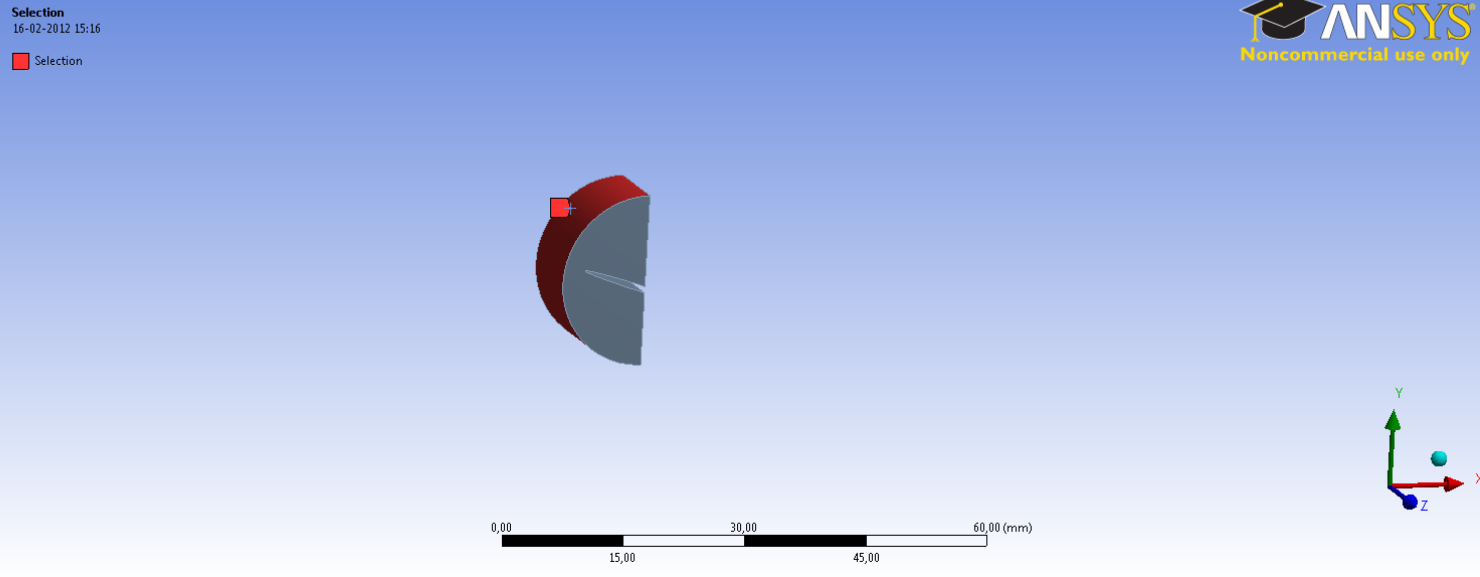
Messages

	Text	Association	Timestamp
Error	An unknown error occurred during solution. Check the Solver Output on the Solution I	Project>Model>Static Structural>Solution	2/16/2012 3:14:18 PM
Warning	One or more bodies may be underconstrained and experiencing rigid body motion. We	Project>Model>Static Structural>Solution	2/16/2012 3:14:18 PM

Add a Named Selection

Outline

- Project
 - Model (B4)
 - Geometry
 - Part
 - Solid
 - Solid
 - Coordinate Systems
 - Connections
 - Mesh
 - Named Selections
 - Cut_boundary
 - Static Structural (B5)
 - Analysis Settings
 - Commands (APDL)
 - Commands (APDL) 2
 - Solution (B6)
 - Solution Information



Details of "Selection"

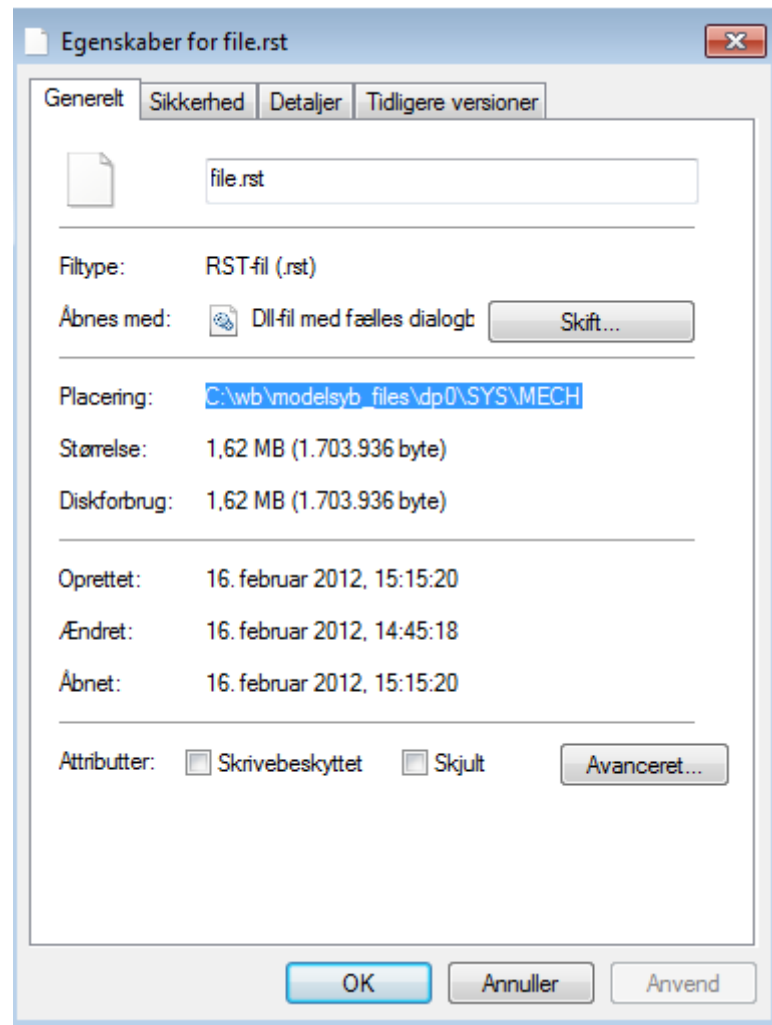
Scope	
Scoping Method	Geometry Selection
Geometry	1 Face
Definition	
Send to Solver	Yes
Visible	Yes
Program Controlled Inflation	Exclude
Statistics	
Type	Manual
Total Selection	1 Face
Suppressed	0
Used by Mesh Worksheet	No

Geometry | Print Preview | Report Preview

Messages

Text	Association	Timestamp
Error	An unknown error occurred during solution. Check the Solver Output on the Solution 1	Project>Model>Static Structural>Solution 2/16/2012 3:14:18 PM
Warning	One or more bodies may be underconstrained and experiencing rigid body motion. We	Project>Model>Static Structural>Solution 2/16/2012 3:14:18 PM

Select the interface between the submodel and global model and name the selection Cut_boundary

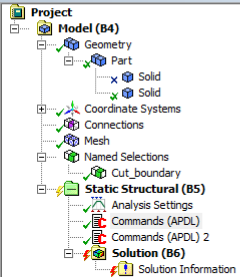


Find the location of the file.rst fil

File Edit View Units Tools Help | Solve | Worksheet | Thicken Annotations | Show Mesh | Show Coordinate Systems

Commands | Export... | Import... | Refresh

Outline



Commands

```
! Write Cut_boundary if it exists, otherwise write entire external region.
*get,ge_par,COMP,Cut_boundary,TYPE
*if,ge_par,eq,1,then
  cmsel,s,Cut_boundary
*else
  nsel,s,ext
*endif

*if,ge_par,ne,1,then
  *msg,WARN,
  Region Cut_boundary not specified -- entire exterior used.
*endif

csys,0
nrotat,all ! Rotate all these nodes to global coordinates (important!)
nwrite ! Create the file
nset,all

! Step 2. Save the current model.
SAVE ! SAVE SUBMODEL DATA
PARSAV,SCALAR ! save parameters on file, they are needed later

! Step 3. Read in results from global model
FINISH
/CLEAR
/POST1

! Edit the following line to point to the desired result file:
FILE,'C:\wb\modelsyb_files\dp0\SYS\MRCH\Fild',rst ! DEFINE RESULT FILE NAME

PARRES,CHANGE ! read parameters from file

! Step 4: Perform cut boundary interpolation with cbdof command. It uses the
! current results (read in at step 3) and the file.node file created in step 1
! and creates a file file.cbdo containing boundary conditions.

! Loop over all stored steps. More detailed control over which steps to use
! or using time variable instead is up the user to script.

/delete,file,cbdo ! delete old cut boundary file
```

Details of "Commands (APDL)"

File	
File Name	C:\Users\SHL\Desktop\submodel_setup.txt
File Status	All data current
Definition	
Suppressed	No
Target	Mechanical APDL
Input Arguments	
<input type="checkbox"/> ARG1	
<input type="checkbox"/> ARG2	
<input type="checkbox"/> ARG3	
<input type="checkbox"/> ARG4	
<input type="checkbox"/> ARG5	
<input type="checkbox"/> ARG6	
<input type="checkbox"/> ARG7	
<input type="checkbox"/> ARG8	
<input type="checkbox"/> ARG9	

Graphics | Commands

Messages

	Text	Association	Timestamp
Error	An unknown error occurred during solution. Check the Solver Output on the Solution I	Project>Model>Static Structural>Solution	2/16/2012 3:14:18 PM
Warning	One or more bodies may be underconstrained and experiencing rigid body motion. We	Project>Model>Static Structural>Solution	2/16/2012 3:14:18 PM

Inset the location of file.rst in the APDL command

File Edit View Units Tools Help || Solve || Worksheet ||

Show Vertices Wireframe Edge Coloring Thicken Annotations Show Mesh Show Coordinate Systems

Result 18 (Auto Scale) Probe

Outline

- Project
 - Model (B4)
 - Geometry
 - Part
 - Solid
 - Solid
 - Coordinate Systems
 - Connections
 - Mesh
 - Named Selections
 - Cut_boundary
 - Static Structural (B5)
 - Analysis Settings
 - Commands (APDL)
 - Commands (APDL) 2
 - Solution (B6)
 - Solution Information
 - Equivalent Stress

B: Static Structural
 Equivalent Stress
 Type: Equivalent (von-Mises) Stress
 Unit: MPa
 Time: 1
 16-02-2012 15:18

69,434 Max
 61,735
 54,036
 46,338
 38,639
 30,94
 23,241
 15,543
 7,849
 0,14523 Min

0,00 12,50 25,00 37,50 50,00 (mm)

Geometry Print Preview Report Preview

Graph

Animation 10 Frames 2 Sec (Auto) 3 Cycles

Tabular Data

Details of "Equivalent Stress"

Scope	
Scoping Method	Geometry Selection
Geometry	All Bodies
Definition	
Type	Equivalent (von-Mises) Stress
By	Time
Display Time	Last
Calculate Time History	Yes
Identifier	
Suppressed	No
Integration Point Results	
Display Option	Averaged
Results	
Minimum	0,14523 MPa
Maximum	69,434 MPa
Information	

Press F1 for Help

1 Message No Selection Metric (mm, kg, N, s, mV, mA) Degrees rad/s Celsius

And solve. Now you can make fine mesh at the local model.