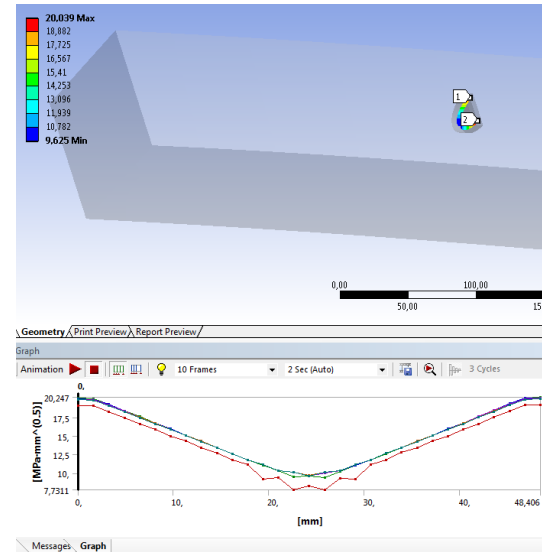
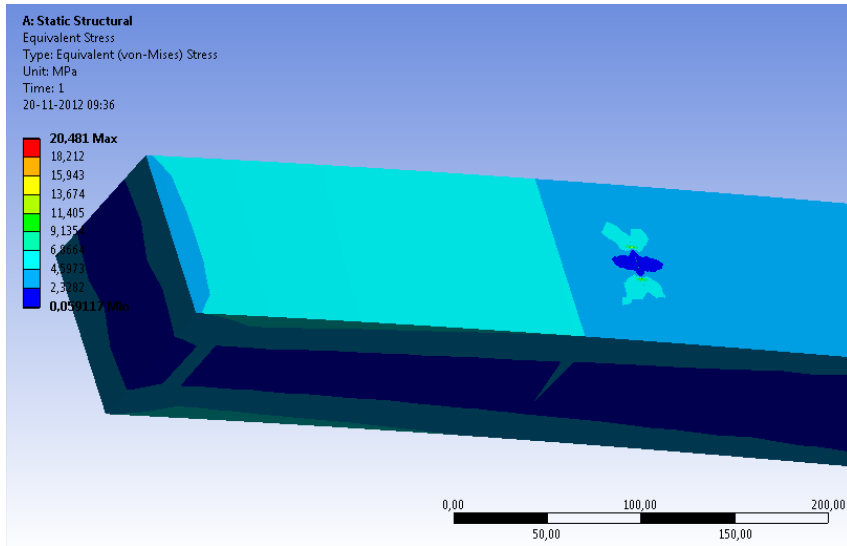
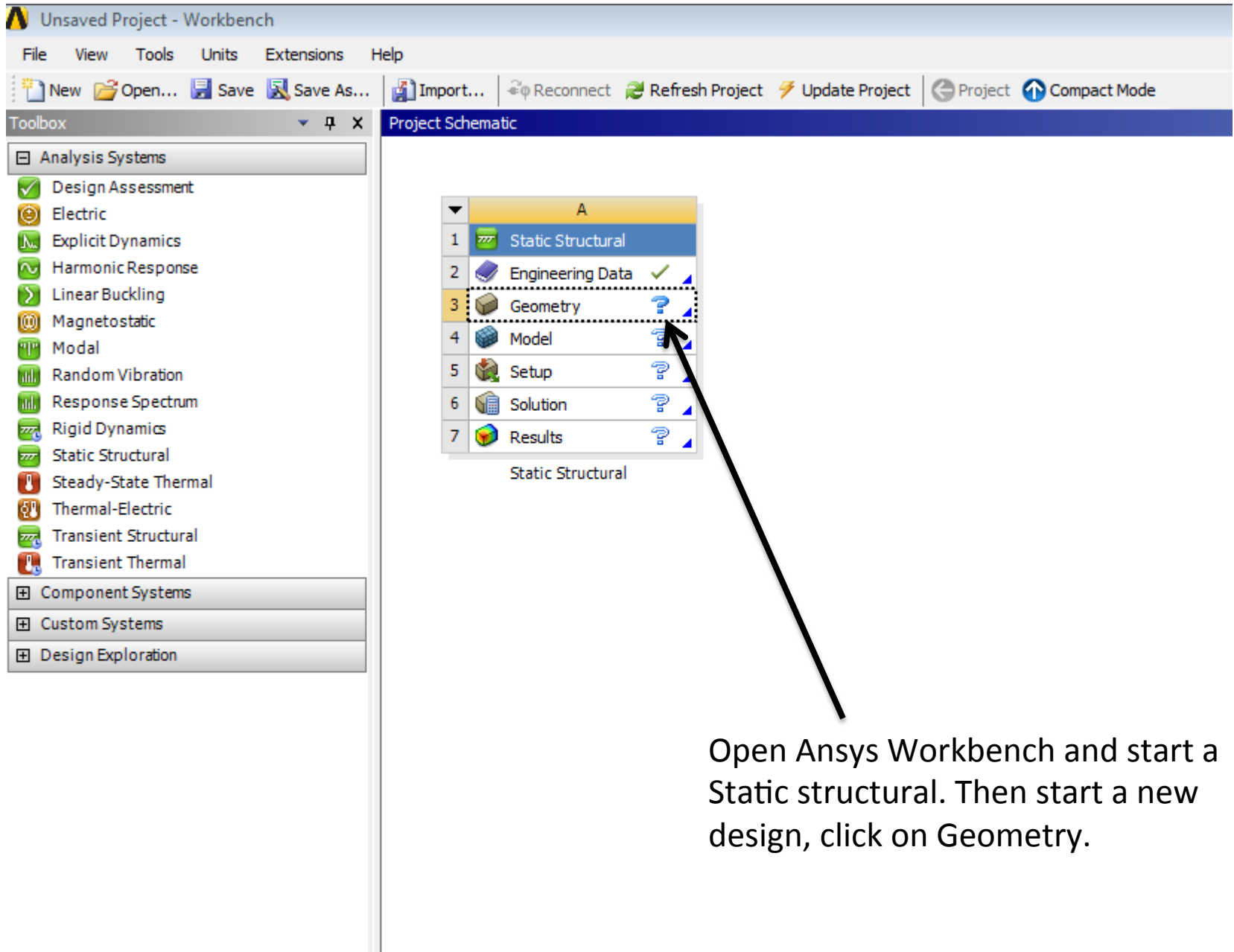


# Aalborg University Esbjerg

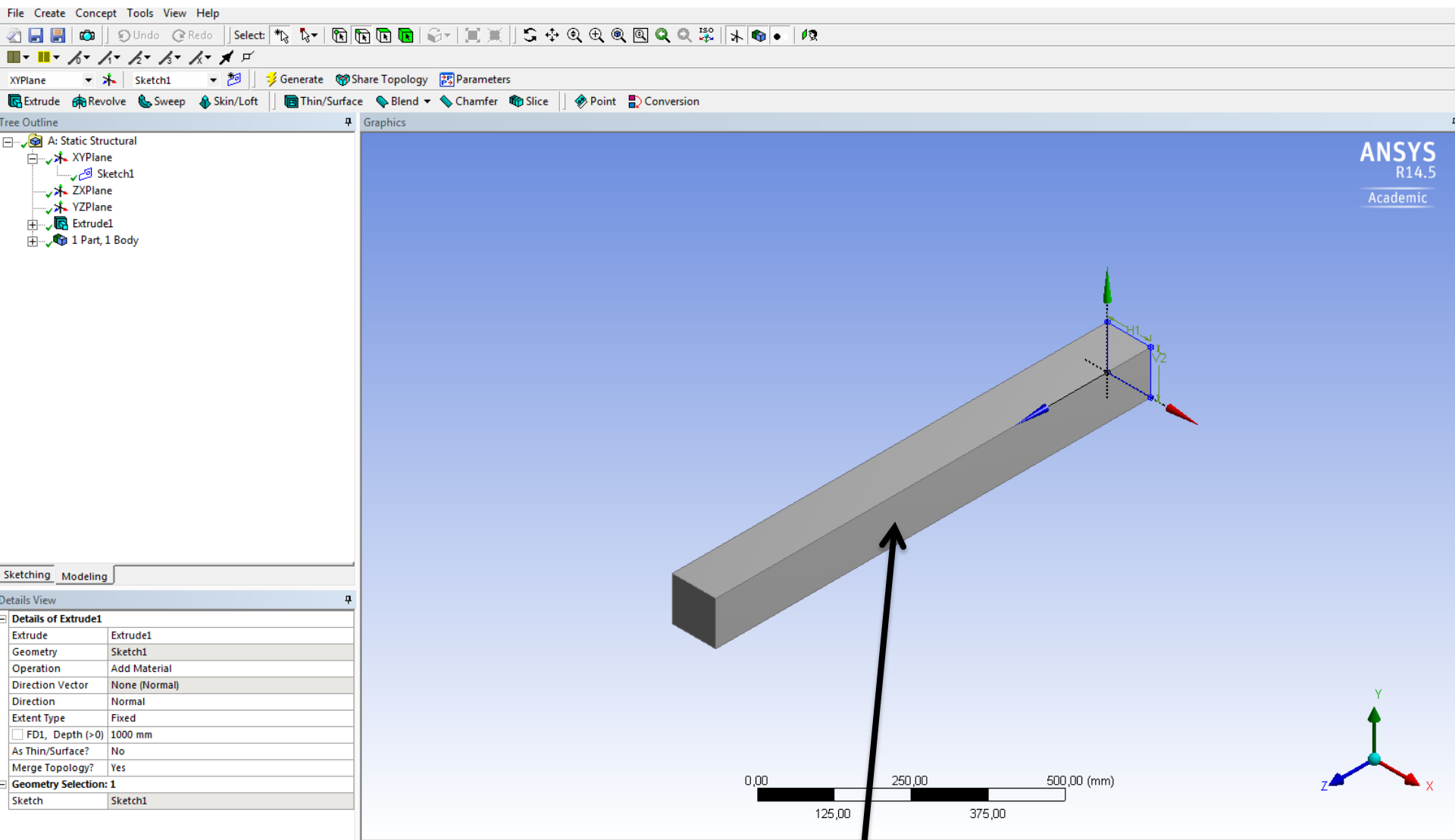
Søren Heide Lambertsen



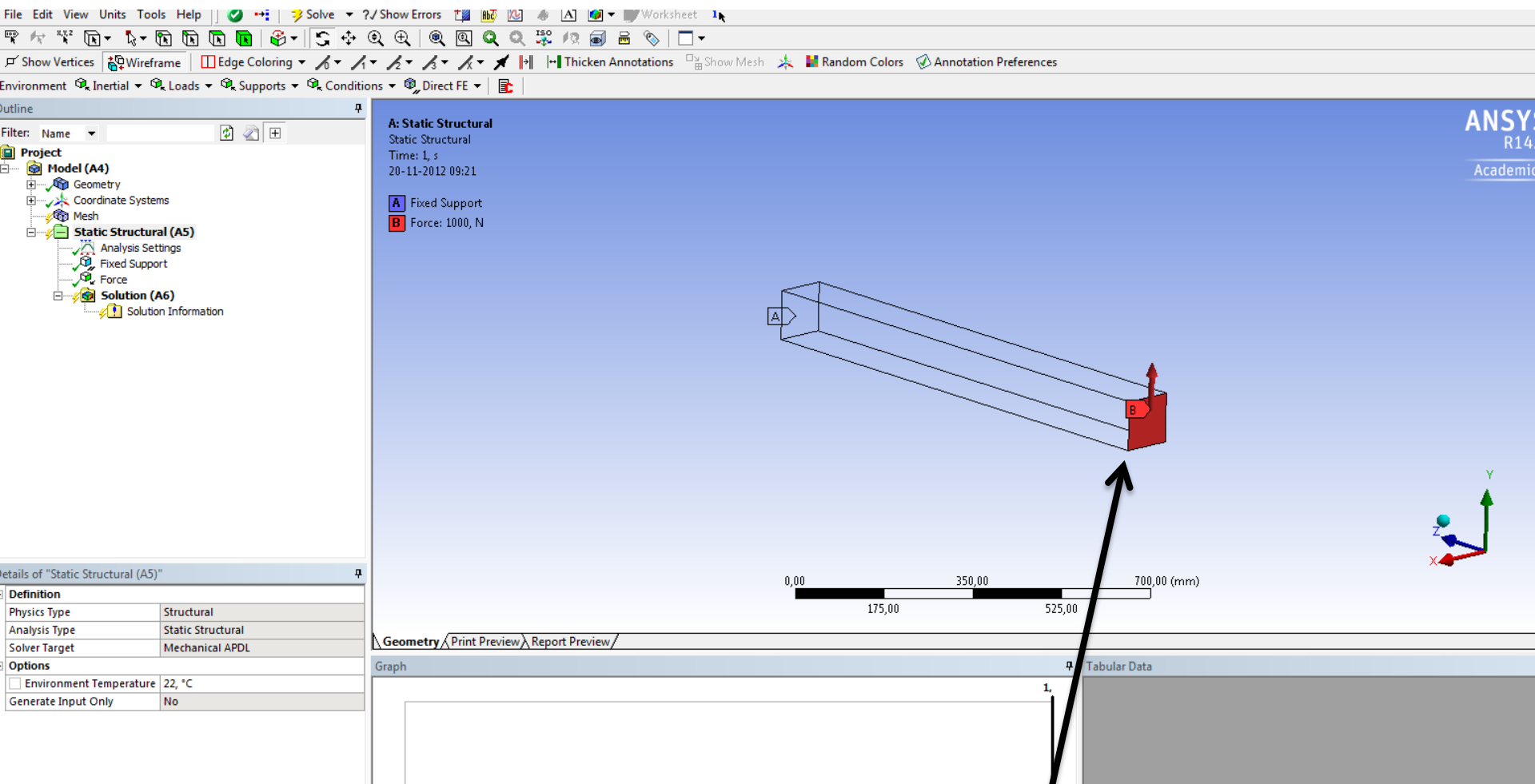
Calculate the stress intensity factor  
with Ansys Workbench 14.5



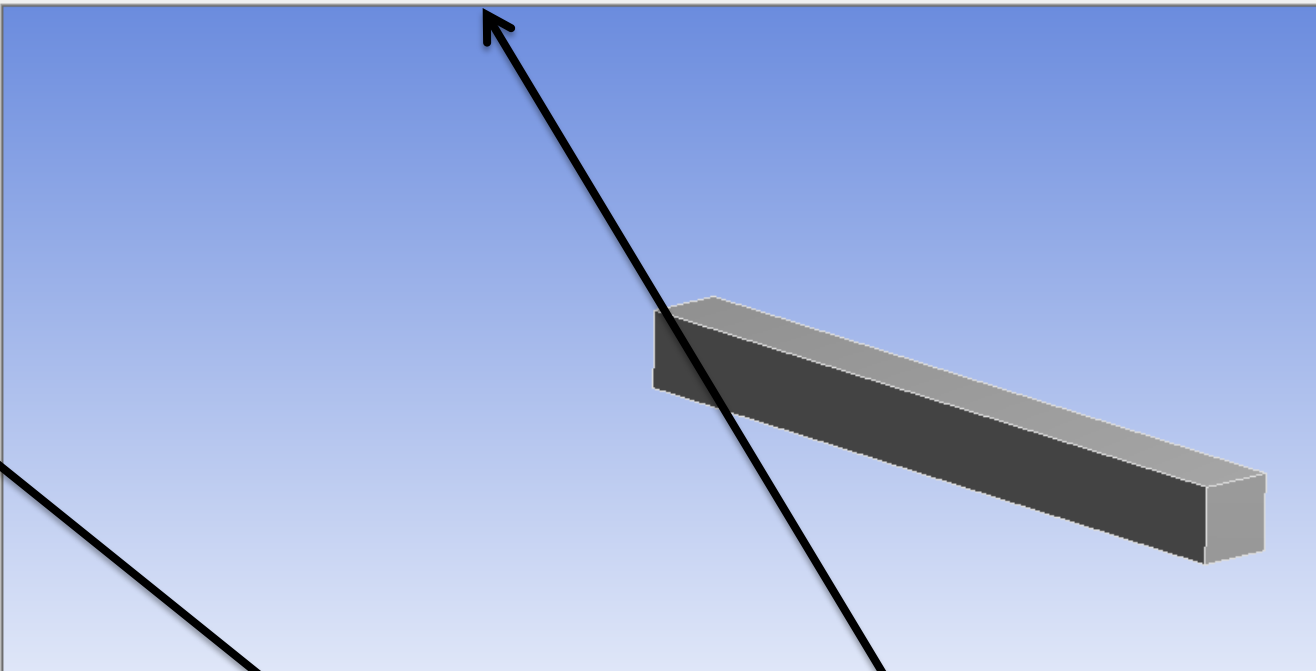
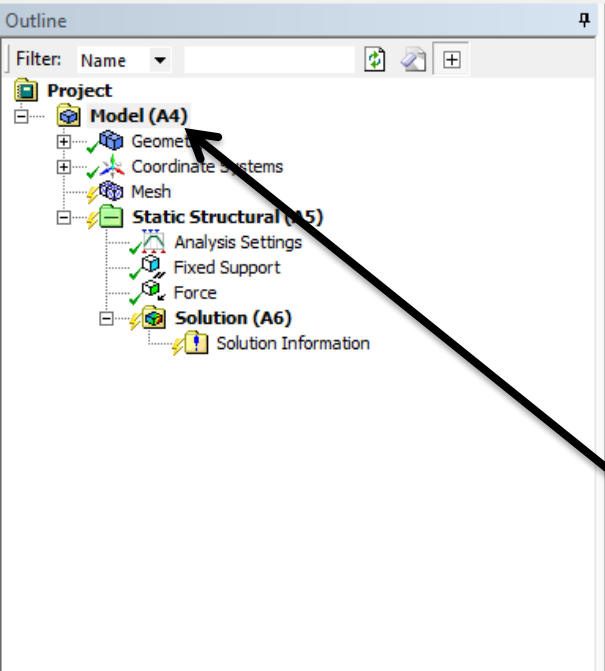
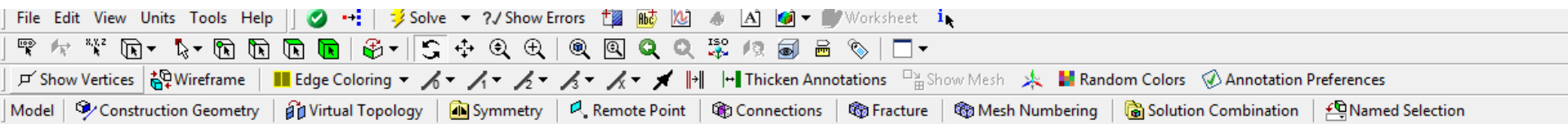
Open Ansys Workbench and start a Static structural. Then start a new design, click on Geometry.



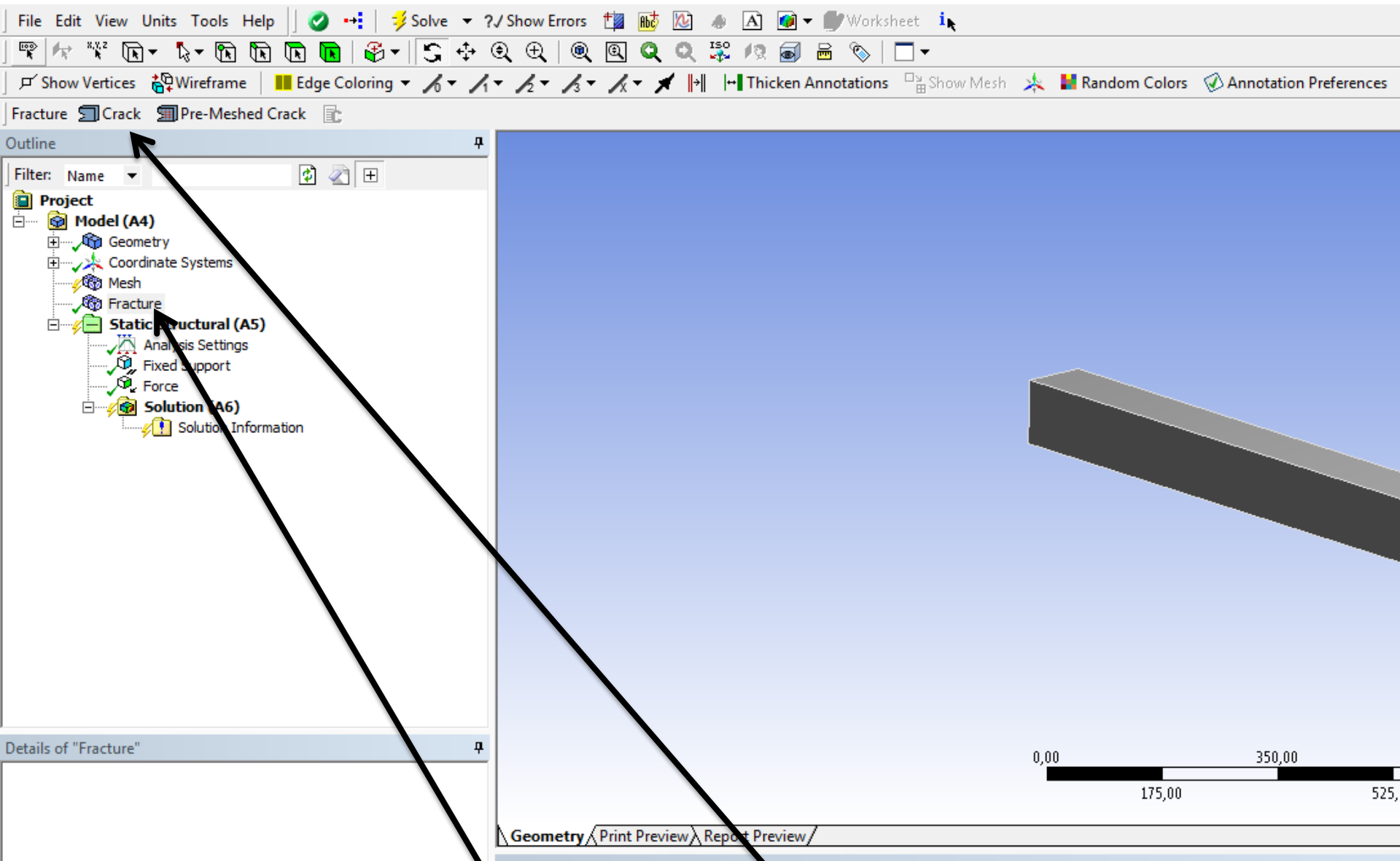
Make a 3D model with the dimension 1000X100X100 then close the window.



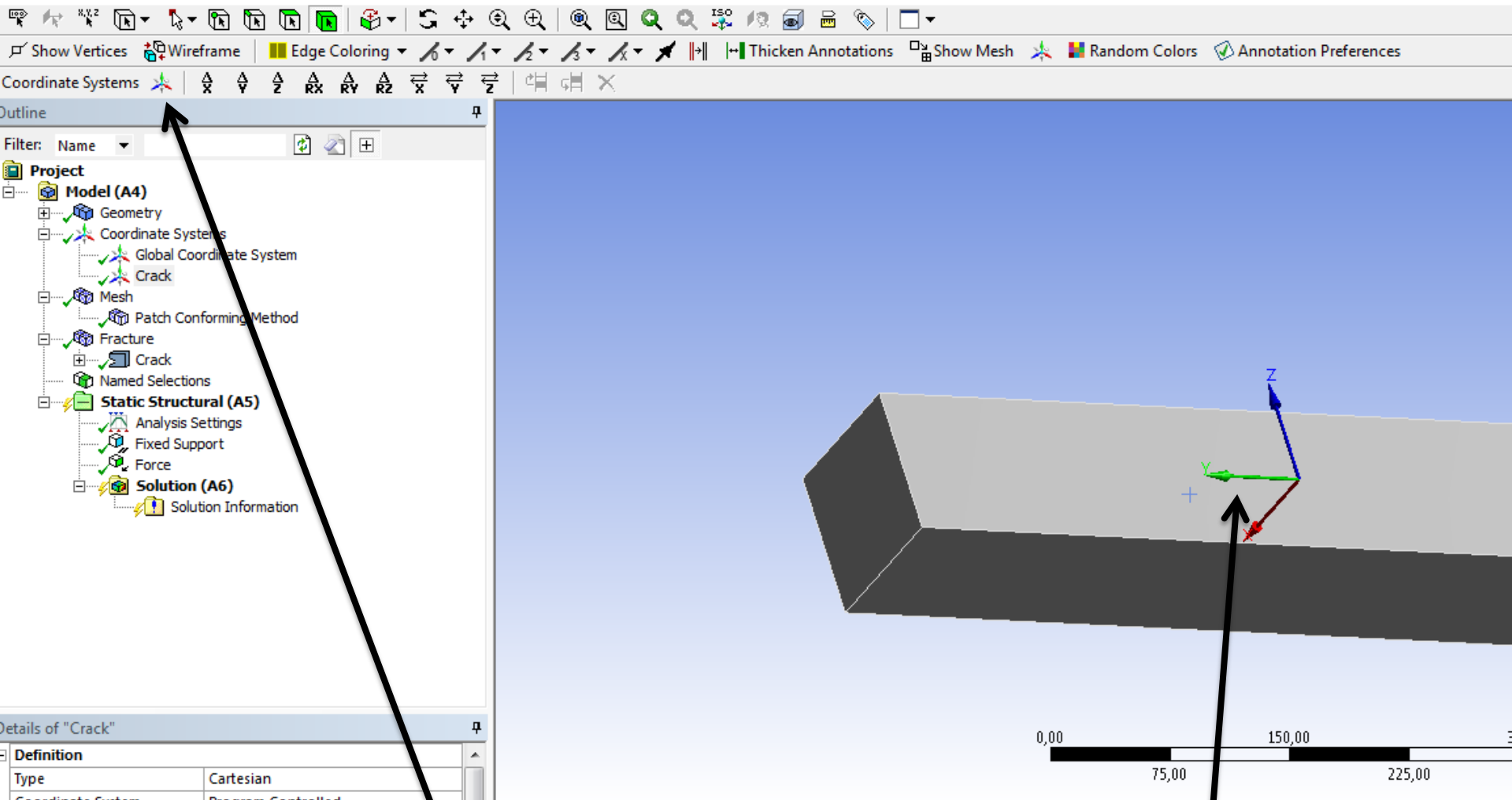
Then add the a fixed support and add a force.



Click on Model and then click on Fracture



Click on Fracture and click on crack.



Add a new coordinate system and place the coordinate system at the center of the crack

Mesh Update Mesh Mesh Control Metric Graph

Outline

Filter: Name

- Project
  - Model (A4)
    - Geometry
    - Coordinate Systems
      - Global Coordinate System
      - Crack
    - Mesh
      - Patch Conforming Method
    - Fracture
      - Crack
    - Named Selections
    - Static Structural (A5)
      - Analysis Settings
      - Fixed Support
      - Force
    - Solution (A6)
      - Solution Information

Patch Conforming Method  
20-11-2012 09:27

Patch Conforming Method

0,00 125,00

Geometry Print Preview Report Preview

Messages

	Text	Association
Warning	Mesher has reduced contour radius and modified FAZ to generate valid crack template	Project>Mod
Warning	Mesher has aligned X-axis to the anchor face normal direction. Please orient the crack c	Project>Mod

Details of "Patch Conforming Method" - Method

Scope	
Scoping Method	Geometry Selection
Geometry	1 Body
Definition	
Suppressed	No
Method	Tetrahedrons
Algorithm	Patch Conforming
Element Midside Nodes	Use Global Setting

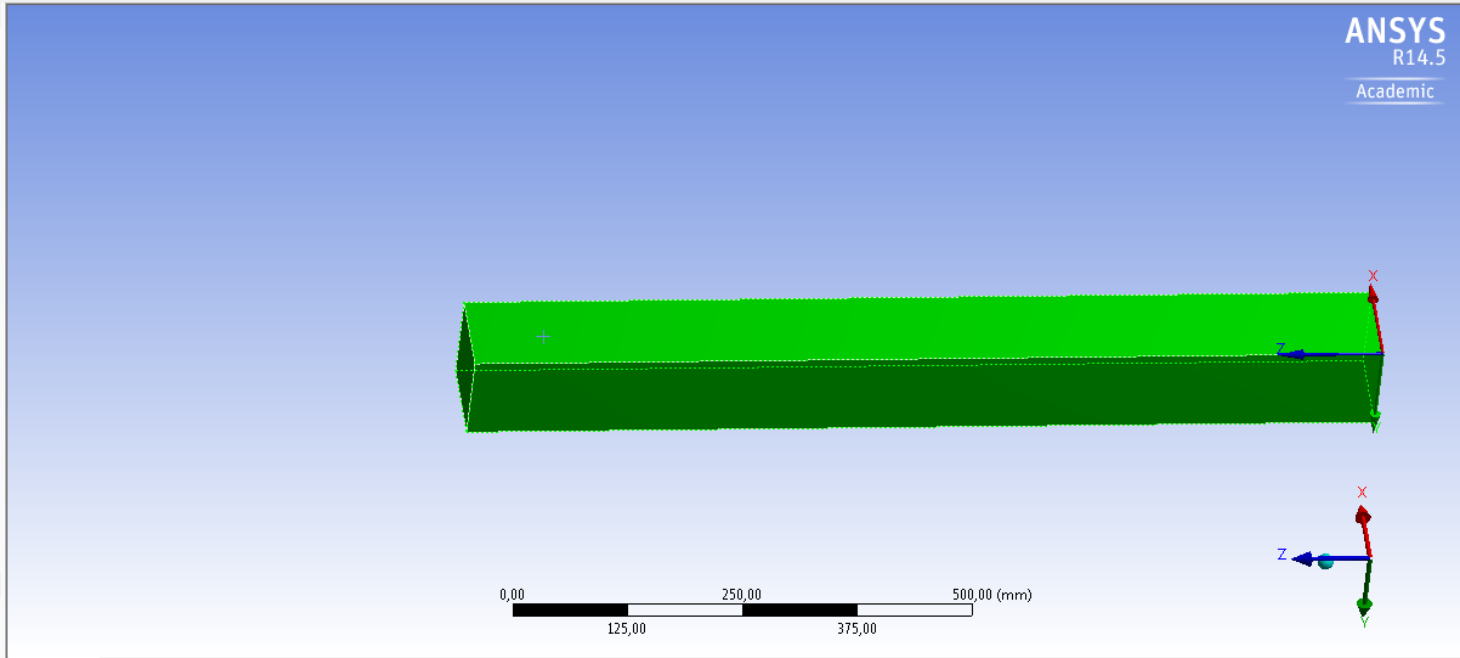
Change the mesh method and change the method to Tetrahedrons



Outline

Filter: Name

- Project
  - Model (A4)
    - Geometry
    - Coordinate Systems
      - Global Coordinate System
    - Crack
    - Mesh
    - Patch Conforming Method
    - Fracture
      - Crack
    - Named Selections
    - Static Structures (A5)
      - Analysis Settings
      - Fixed Support
      - Force
    - Solution (A6)
      - Solution Information



Details of "Crack"

Scope	Crack
Scoping Method	Geometry Selection
Geometry	Apply Cancel
Definition	
Coordinate System	Global Coordinate System
Crack Shape	Semi-Elliptical
--Major Radius	0, mm
--Minor Radius	0, mm
Fracture Affected Zone	Program Controlled
Fracture Affected Zone Height	0, mm
Largest Contour Radius	0, mm
Circumferential Divisions	8
Mesh Contours	6
Crack Front Divisions	15
Solution Contours	Match Mesh Contours
Suppressed	No

Geometry Print Preview Report Preview

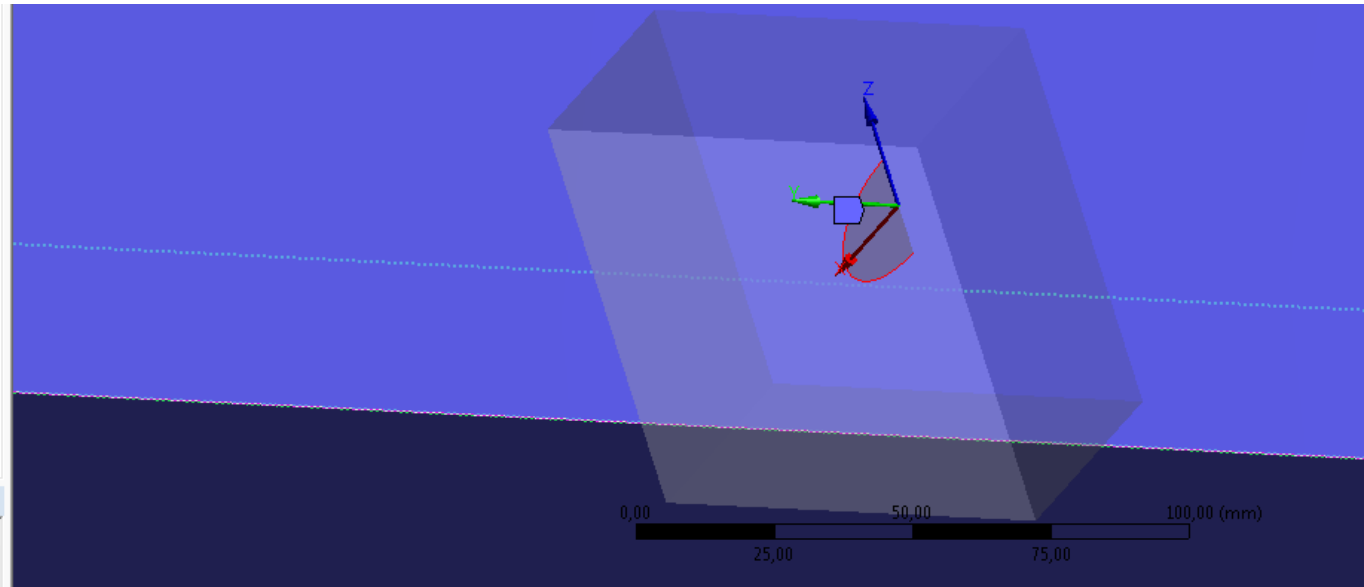
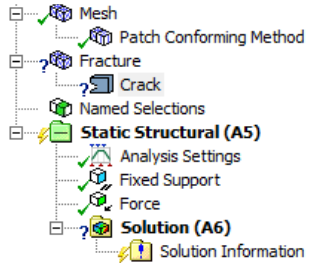
Graph

Tabular Data

Then click on Crack and selected the geometry there include the crack and click apply

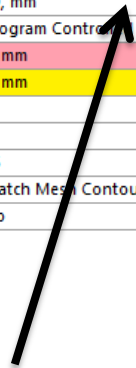
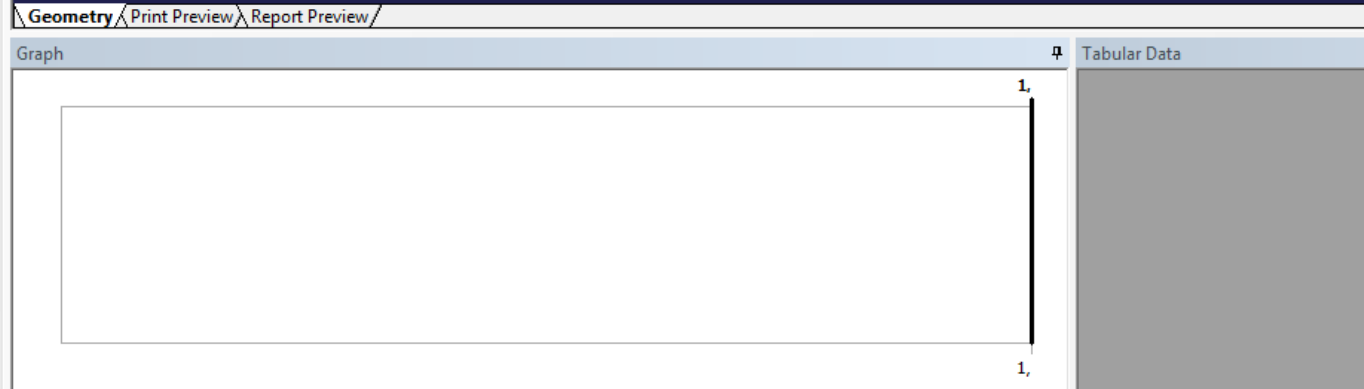
Details of "Crack"	
<b>Scope</b>	
Source	Crack
Scoping Method	Geometry Selection
Geometry	1 Body
<b>Definition</b>	
Coordinate System	Crack
Crack Shape	Semi-Elliptical
<input type="checkbox"/> --Major Radius	0, mm
<input type="checkbox"/> --Minor Radius	0, mm
Fracture Affected Zone	Program Controlled
Fracture Affected Zone Height	0, mm
<input type="checkbox"/> Largest Contour Radius	0, mm
<input type="checkbox"/> Circumferential Divisions	8
<input type="checkbox"/> Mesh Contours	6
<input type="checkbox"/> Crack Front Divisions	15
<input type="checkbox"/> Solution Contours	Match Mesh Contours
Suppressed	No

Then changes the coordinate system to Crack.



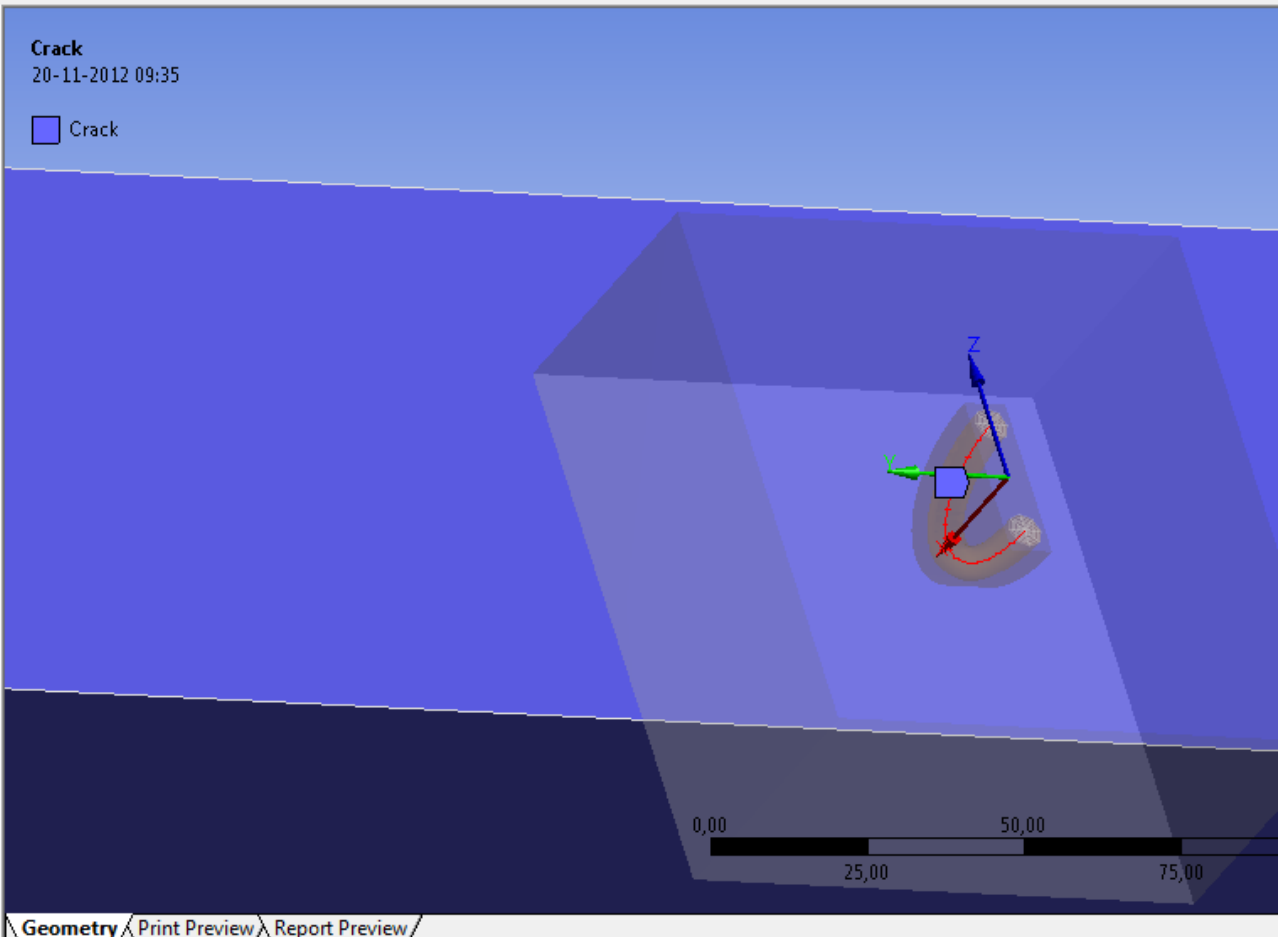
Details of "Crack"

Scope	
Source	Crack
Scoping Method	Geometry Selection
Geometry	1 Body
Definition	
Coordinate System	Crack
Crack Shape	Semi-Elliptical
<input type="checkbox"/> --Major Radius	10, mm
<input checked="" type="checkbox"/> --Minor Radius	20, mm
Fracture Affected Zone	Program Control
Fracture Affected Zone Height	0, mm
<input checked="" type="checkbox"/> Largest Contour Radius	0, mm
<input type="checkbox"/> Circumferential Divisions	8
<input type="checkbox"/> Mesh Contours	6
<input type="checkbox"/> Crack Front Divisions	15
<input type="checkbox"/> Solution Contours	Match Mesh Contours
Suppressed	No



Now add the dimension of the crack front by changes the major radius wishes are the width of the crack and the Minor is the depth of the crack.

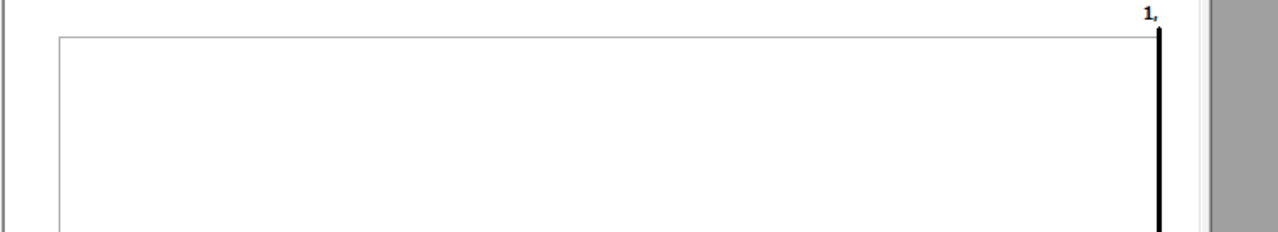
- Filter: Name
- Project
    - Model (A4)
      - Geometry
        - Coordinate Systems
          - Global Coordinate System
          - Crack
      - Mesh
        - Patch Conforming Method
      - Fracture
        - Crack
      - Named Selections
      - Static Structural (A5)
        - Analysis Settings
        - Fixed Support
        - Force
      - Solution (A6)
        - Solution Information

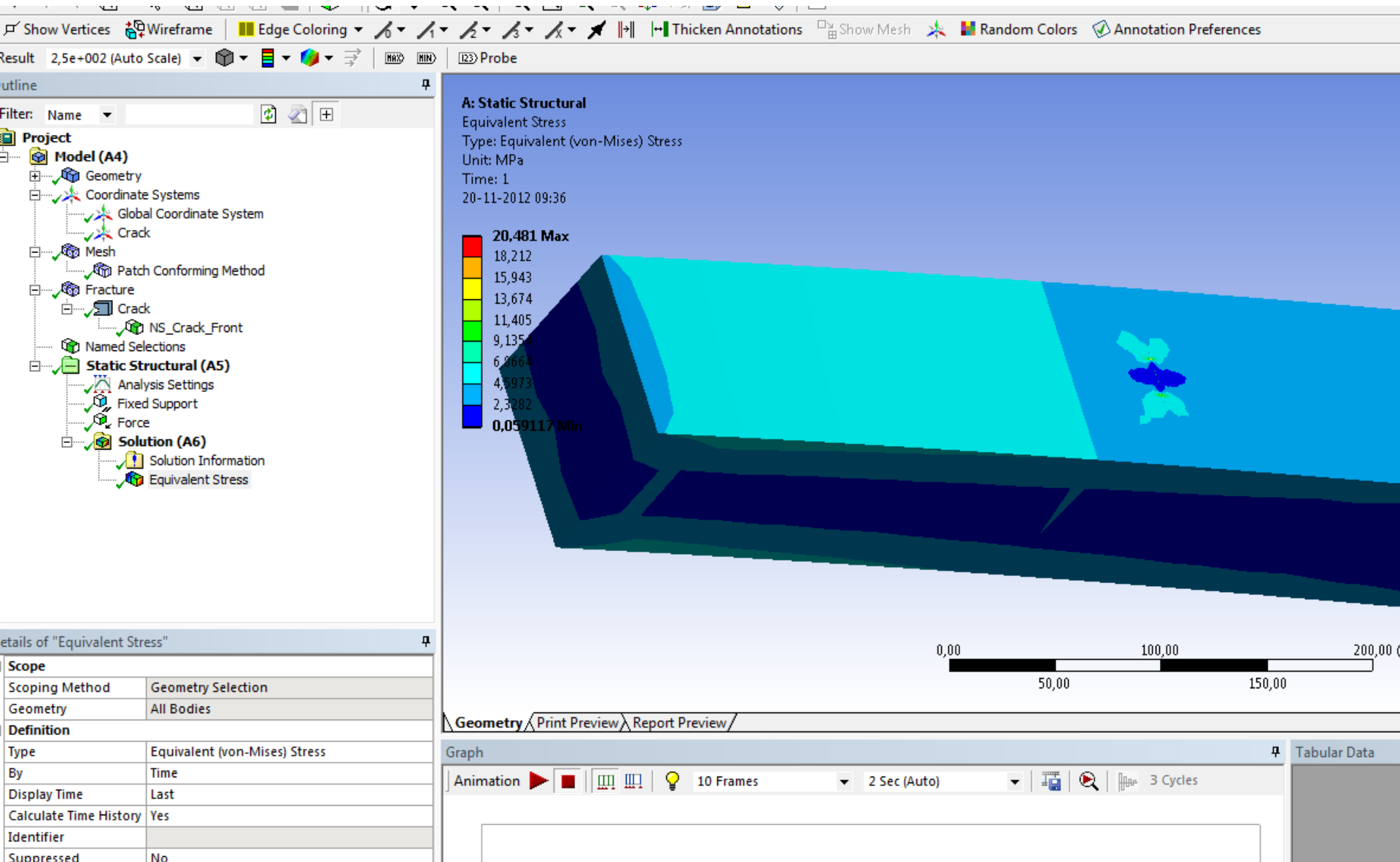


Scope	
Source	Crack
Scoping Method	Geometry Selection
Geometry	1 Body
Definition	
Coordinate System	Crack
Crack Shape	Semi-Elliptical
<input type="checkbox"/> --Major Radius	10, mm
<input type="checkbox"/> --Minor Radius	20, mm
Fracture Affected Zone	Program Controlled
Fracture Affected Zone Height	7,8042 mm
<input checked="" type="checkbox"/> Largest Contour Radius	3, mm
<input type="checkbox"/> Circumferential Divisions	8

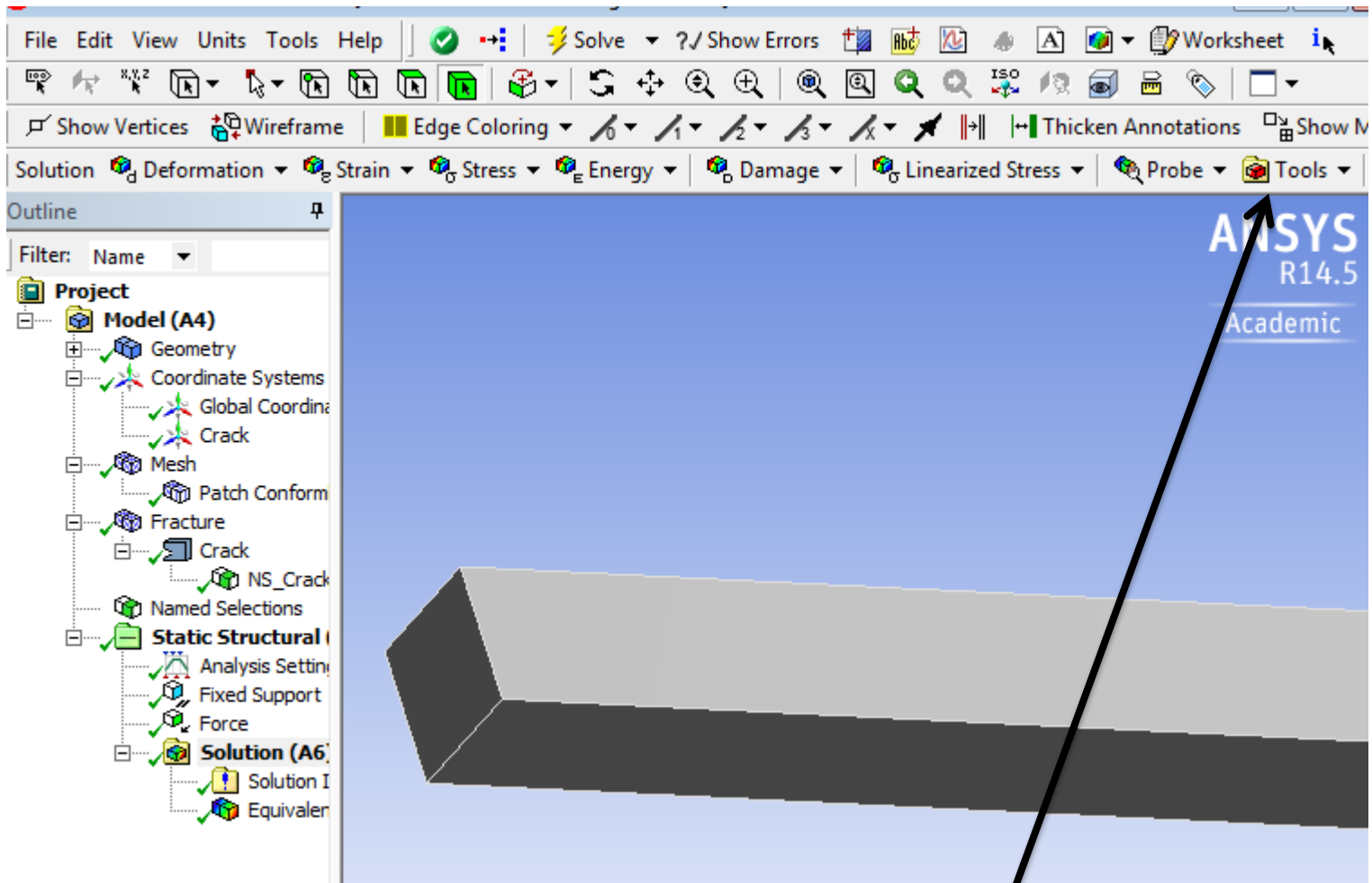


Then enter the ring mesh size.

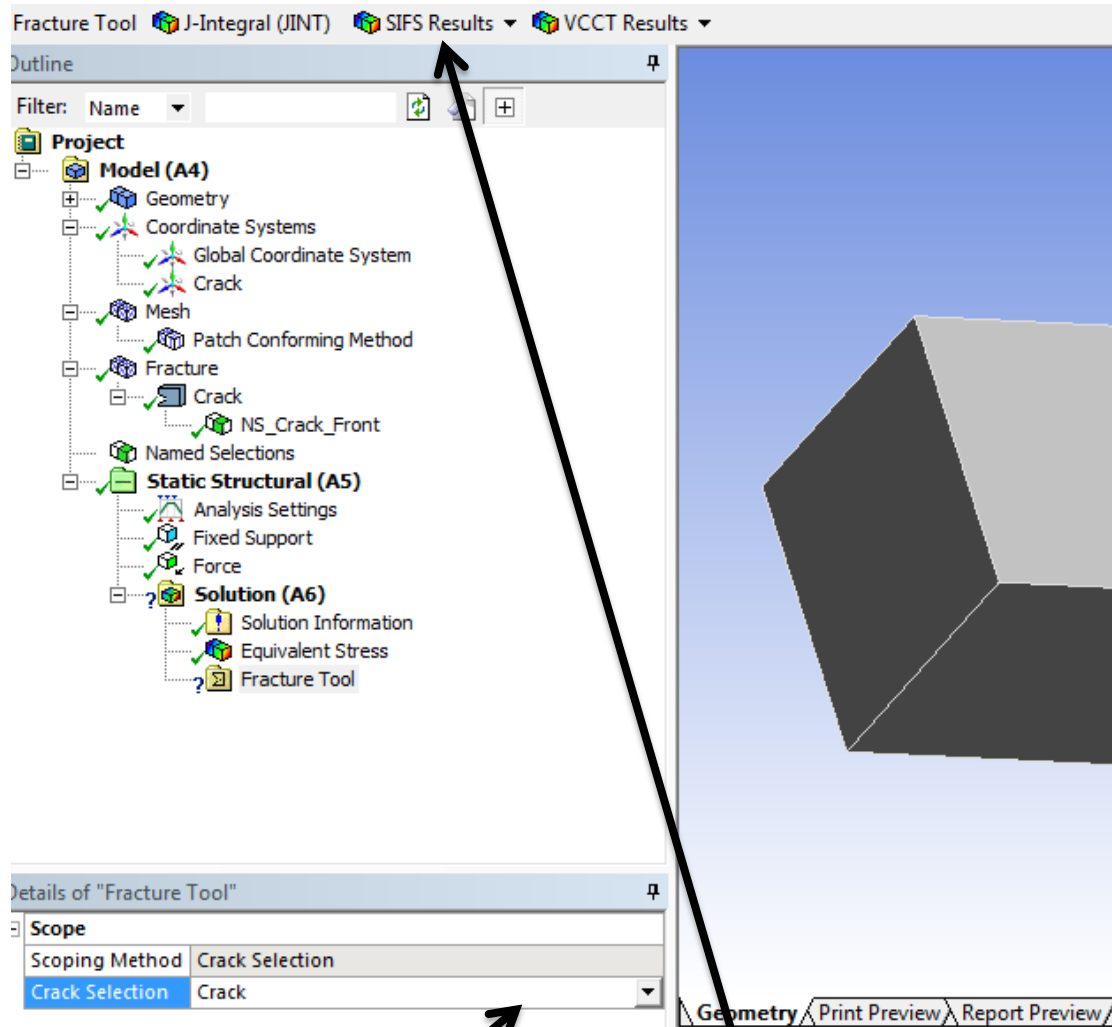




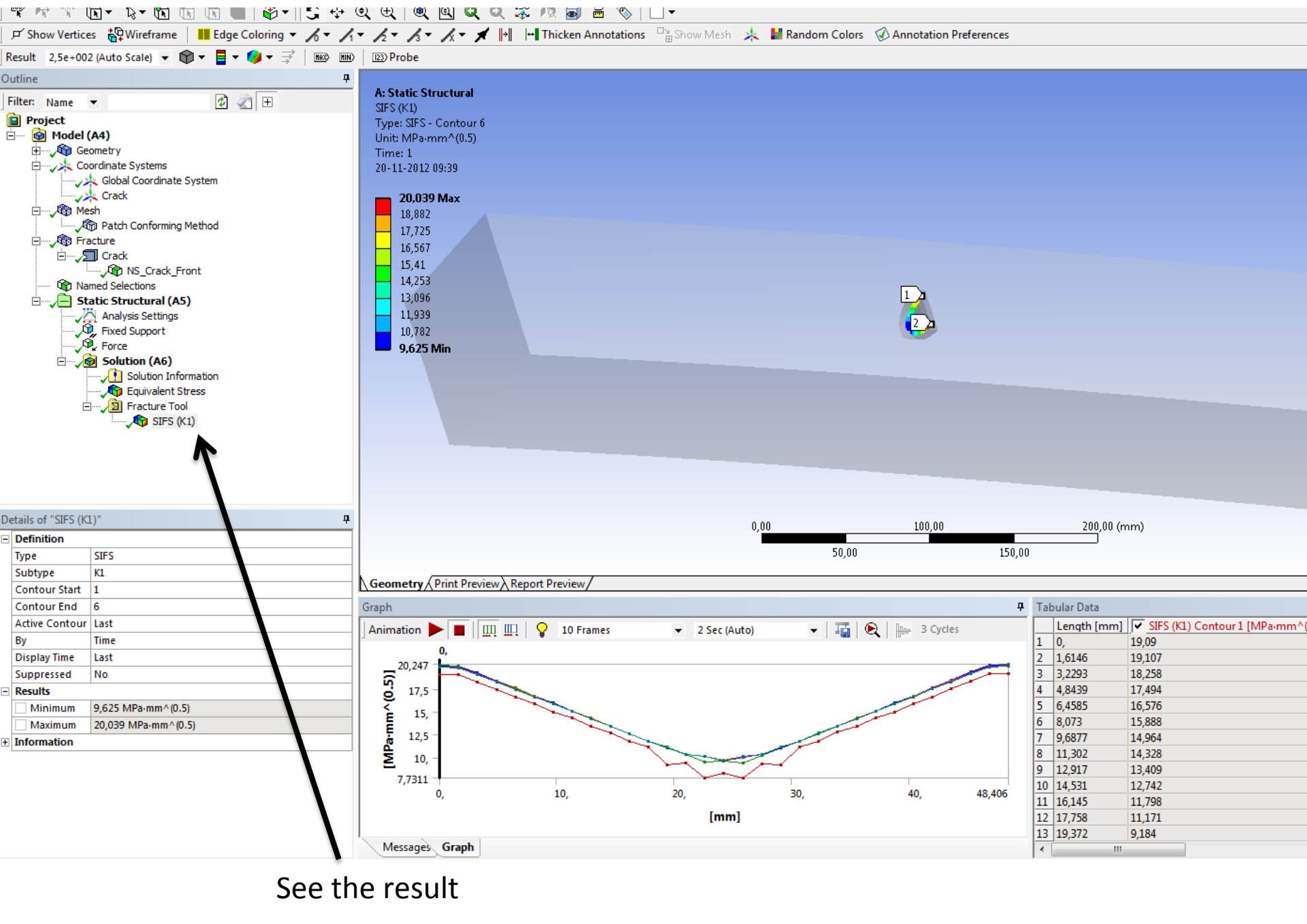
Then solve the model.



Click on Tools and add Fracture tool



In the Crack selection click Crack. Then add a SIFS K1



See the result