



## **STEP-BY-BY PICTORAL GUIDE:** for use with ANSYS 13

1. Preprocessor  $\rightarrow$  Modeling  $\rightarrow$  Create  $\rightarrow$  Areas  $\rightarrow$  Rectangle  $\rightarrow$  By Dimensions

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B Archive Model B Coupling / Ceqn B FLOTRAN Set Line					
Pick a menuitem or enter an ANSYS Command (PREF	7)	m	at=1 [t	ype=1 re	eal=1 csys=0

2. Preprocessor  $\rightarrow$  Modeling  $\rightarrow$  Create  $\rightarrow$  Areas  $\rightarrow$  Circle  $\rightarrow$  Solid Circle



3. Preprocessor  $\rightarrow$  Modeling  $\rightarrow$  Operate  $\rightarrow$  Booleans  $\rightarrow$  Subtract  $\rightarrow$  Areas

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ASBAL Dick or orter have areas from which to subtract	hnart real-1 rear
Propy Flox or enter pase areas from which to subfract [mat=1]	type-1 [real=1 [Csys=0

- a. Type "1" in the red box, as seen above, to select the first area (the rectangle) for the material that will be left behind and select "OK"
- b. Type "2" in the red box, as seen above, to select the second area (the circle) for the material that is to be removed and select "OK"
- 4. Preprocessor  $\rightarrow$  Modeling  $\rightarrow$  Operate  $\rightarrow$  Extrude  $\rightarrow$  Areas  $\rightarrow$  Along Normal Axis



▲ Extrude Area along Normal	C X
[VOFFST] Extrude Area along Normal	
NAREA Area to be extruded	3
DIST Length of extrusion	10
KINC Keypoint increment	
OK Apply Cancel	Help

- a. Type "3" in the box to select the third area (the result of the subtraction above) and select "OK"
- b. Type "10" in the red box, as seen above, to set the length (or depth) of extrusion and select "OK"

## 5. Preprocessor $\rightarrow$ Element Type $\rightarrow$ Add/Edit/Delete $\rightarrow$ Add

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4	_Add	Options	Delete	*2) 3 × *8
Pick a menu item or ent	er an ANSYS Command (PREP7)	mat=1	type=1 real=1	csys=0

- a. Select "Add"
- b. From this window, select "Solid" then "20node 186" and select "OK"
- 6. Preprocessor  $\rightarrow$  Material Props  $\rightarrow$  Material Models



- a. Select Structural  $\rightarrow$  Linear  $\rightarrow$  Elastic  $\rightarrow$  Isotropic, as seen in the picture above and to the left
- b. Input the appropriate values into the windows, as seen above: 'EX' is for the Modulus of Elasticity (120000) and 'PRXY' is for the Poisson's Ratio (.3).
- c. Close the "Define Material Model Behavior" window.

## 7. Preprocessor $\rightarrow$ Meshing $\rightarrow$ Mesh $\rightarrow$ Volumes $\rightarrow$ Free



Note: Select the volume by clicking on it and click "OK", the result should look like the picture above and to the right

8. Solution  $\rightarrow$  Define Loads  $\rightarrow$  Apply  $\rightarrow$  Structural  $\rightarrow$  Displacement  $\rightarrow$  On Areas



Apply U,ROT on Areas	
[DA] Apply Displacements (U,ROT) on Areas	
Lab2 DOFs to be constrained	AII DOF UX UY UZ
Apply as	All DOF
If Constant value then:	
VALUE Displacement value	0
OK Apply Cancel	Help

Note: The area can be selected by clicking on it and click "OK", select the DOFs to be "ALL DOF" in order to lock that side at that position and put the displacement value to "0"

9. Solution  $\rightarrow$  Define Loads  $\rightarrow$  Apply  $\rightarrow$  Structural  $\rightarrow$  Pressure  $\rightarrow$  On Areas

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occessor lon alysis Type fine Loads	[SFA] Apply PRES on areas as a Constant value	J
Settings Apply ® Structural © Displacement © Force/Moment © Pressure ©	If Constant value then: VALUE Load PRES value -200	
Pressure Pon Area Pon Nodes Apply PMS on Area G Exec Capics G Exec Capics Datagen Casel Capic Casel Capic Casel Capic Casel Capic Casel Capic Casel Capic Casel Case No. 4 G Exec Casel Case No. 4 Case No.	LKEY Load key, usually face no. 1 (required only for shell elements)	
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Note: The area can be selected by clicking on it and click "OK", set the pressure value to "-200" in order to model the uniform pressure distribution found on both sides of the plate.



10. Solution  $\rightarrow$  Solve  $\rightarrow$  Current LS

A ANSY Academic Teaching Introduction | Hitty Menu (Hole in Plate)

Note: Select "OK" in the box, seen above and to the left. The solution will then be solved. The solution has been successfully when, **and only when**, the window, as seen above and to the right, is displayed.

11. General Postproc  $\rightarrow$  Plot Results  $\rightarrow$  Deformed Shape



Note: Select "Def + undeformed" to see the effects of this applied load on the structure, as seen above and to the right. Look at the front view to see a clearer image of the deformation.



## You are now finished!!!