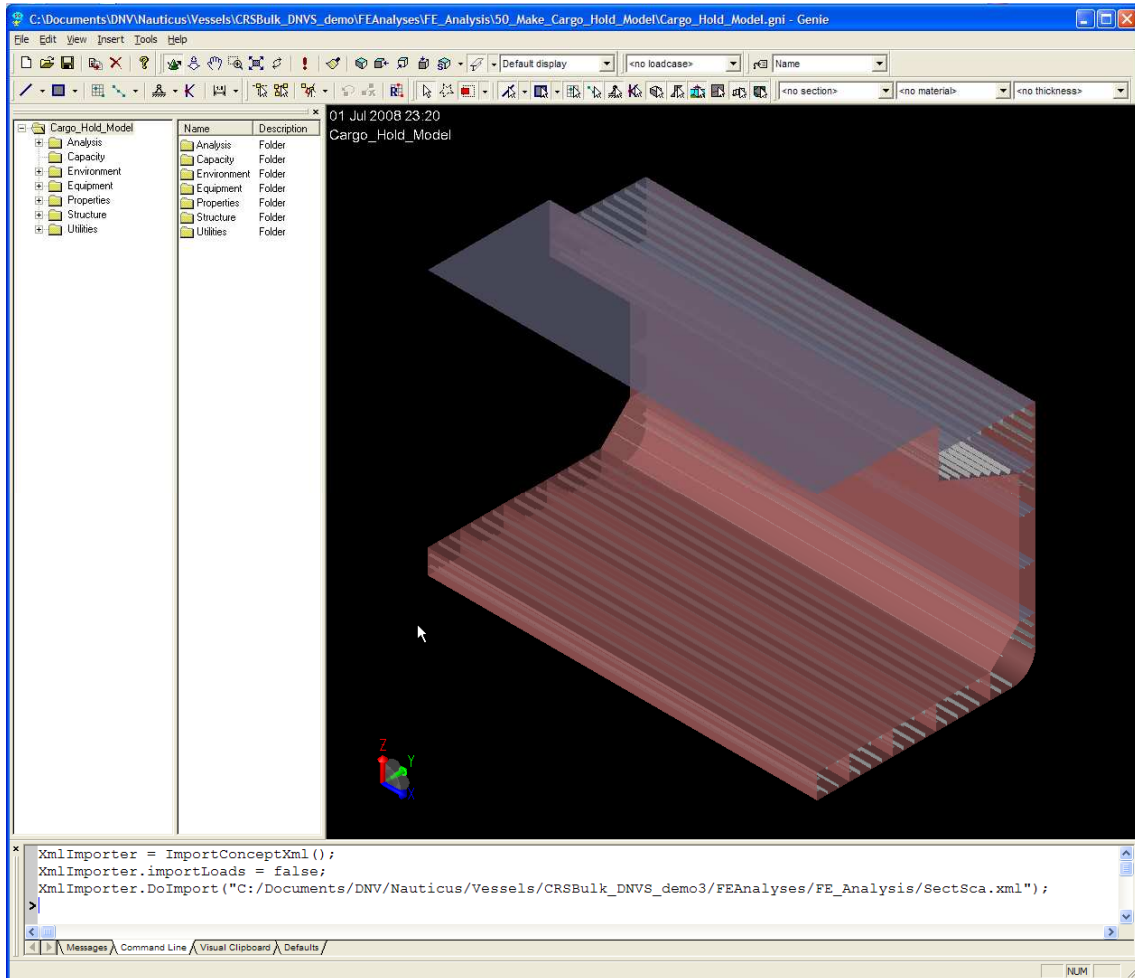


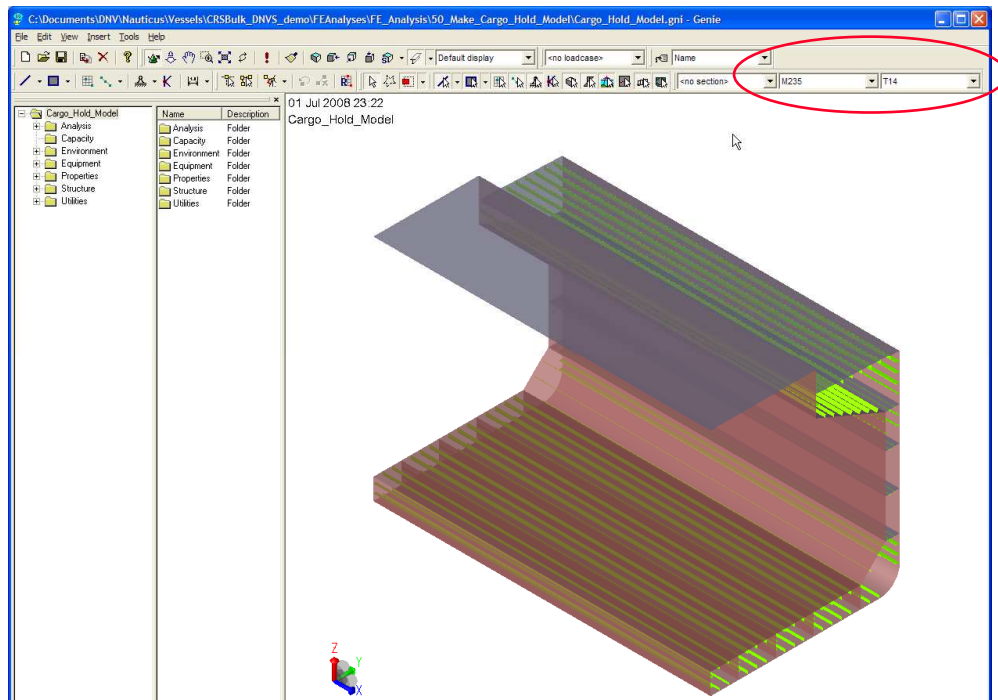


- Extruded cross section in GeniE



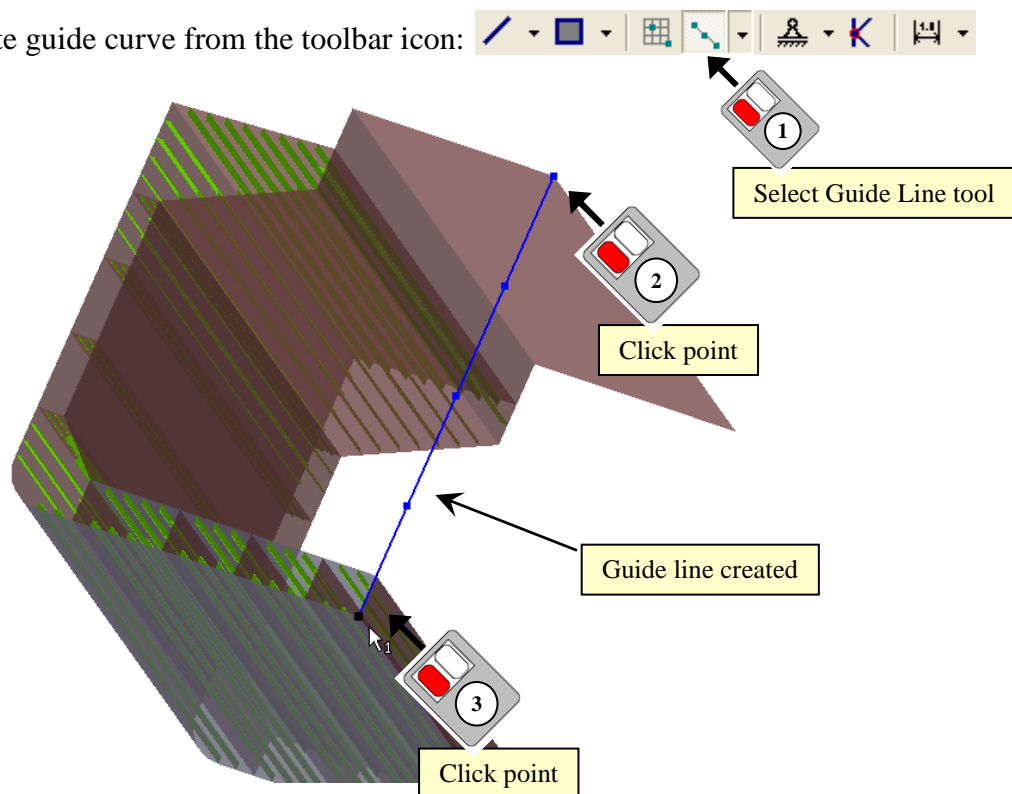
- Customize the view settings (View | Options or use ALT+O).
 - General tab
 - » Set Current Background = Paper
 - » Preview copy/move default
 - » Touched by rubberband
 - Settings tab
 - » Model | Structure | Beam Color = light green
 - Set default material and plate thickness to M235 and T14 in the dropdowns at the top right in the GUI.
 - Set default input unit to mm in Edit | Rules | Units | Input Units.
 - Try out the different display configurations in the dropdown, e.g. to Default Display, Modelling – All etc.

- The display should now look like this after customization of the view settings.



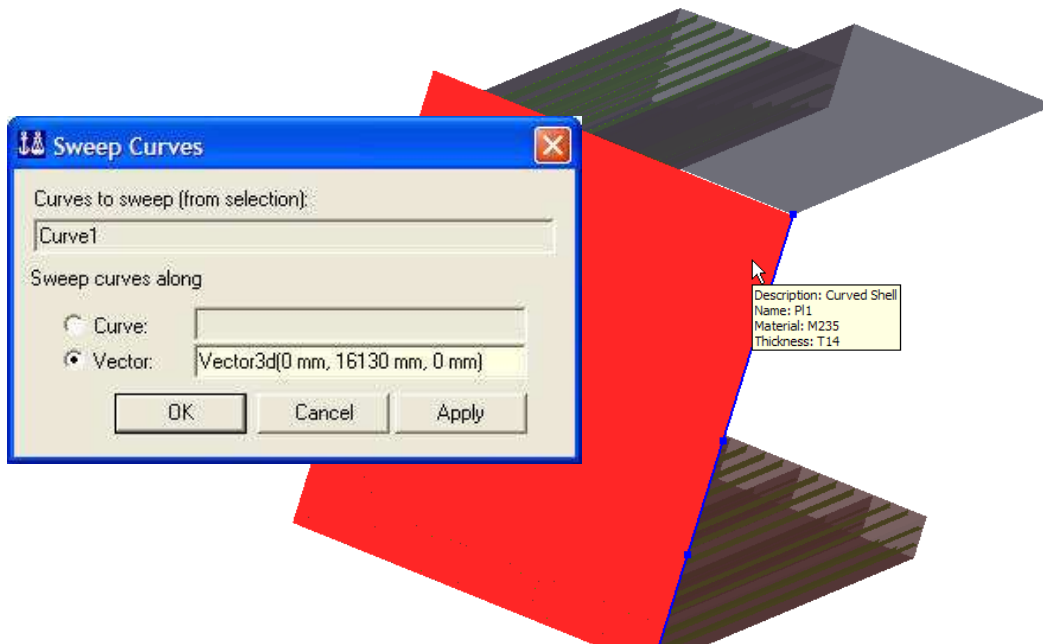
- Cover the end of the model by sweeping a guide curve into a plate and then divide and delete.

- Create guide curve from the toolbar icon:

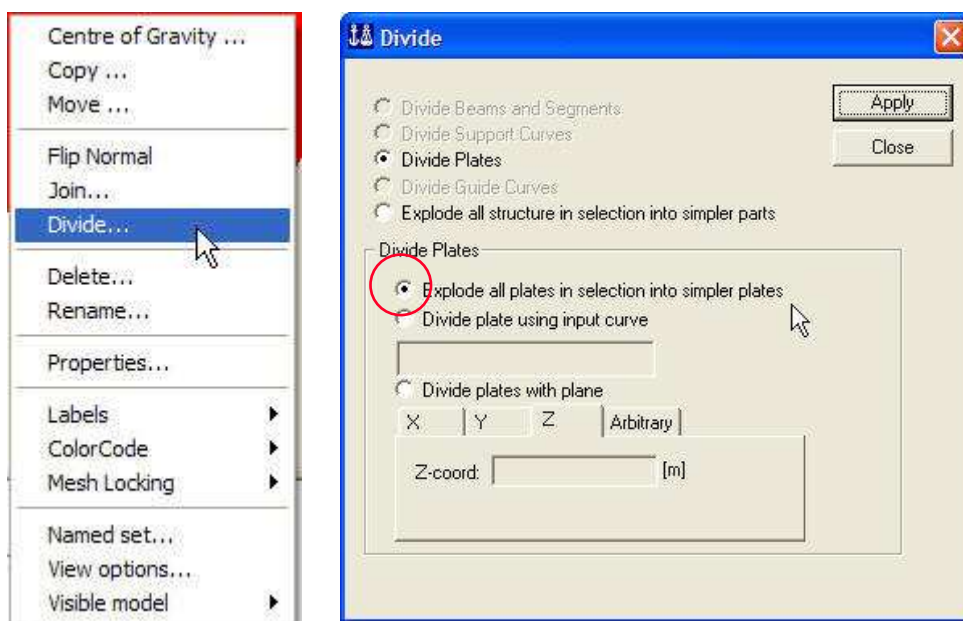




- Create plate using Sweep Curves Dialog
 - Select the guide curve by LMB-clicking on it
 - Select tool Insert | Plate | Sweep Curves Dialog
 - Define sweep vector and press Apply. (Hint: Click in vector field. Then click two points in the model giving full width of model. Edit the z-coordinate to 0.)

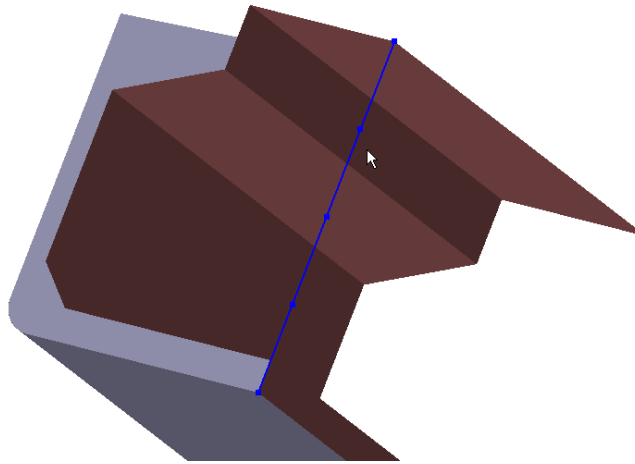


- Select plate (LMB-click) and RMB-click on plate. Select Divide. Hit Apply to Explode into simpler plates.

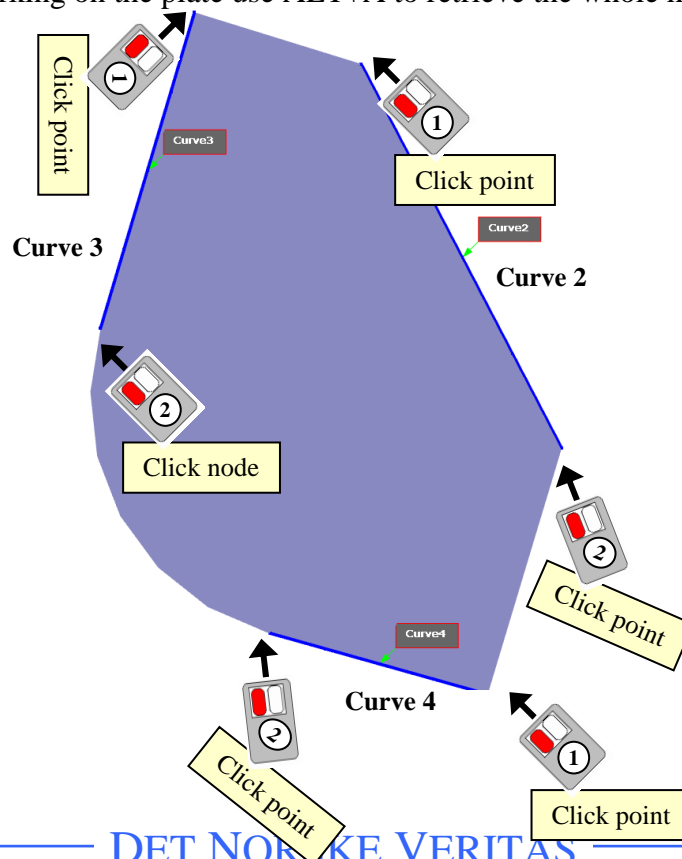




- Delete plates not needed as shown in the picture.
 - LMB-click on a plate to select it and RMB-click on it and select Delete (alternatively press Delete key on keyboard). Multiple plates can be selected by pressing the shift key simultaneously.

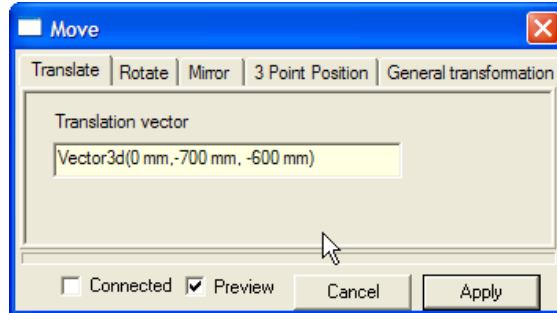


- Create cut-out
 - Create 3 Guide lines as shown on picture below. The plates and longitudinal stiffeners will give snap points. Make sure that you create Model Curves!
 - » Hint: Select the plate and Use ALT+S to view that plate only. When finished working on the plate use ALT+A to retrieve the whole model.

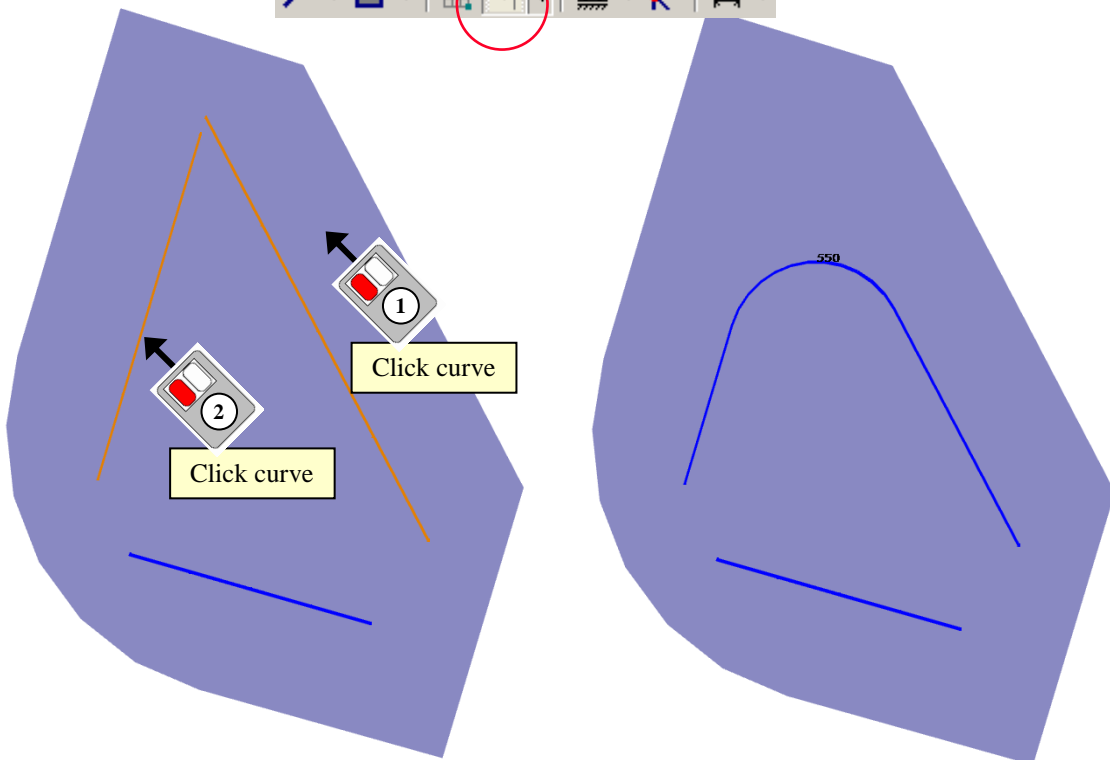




- Create cut-out (continued)
 - First move the outer guiding curves as follows by selecting one and RMB to Move:
 - » Curve3: Vector3d(0 mm,-700 mm,-600 mm)
 - » Curve4: Vector3d(0 mm,700 mm,700 mm)

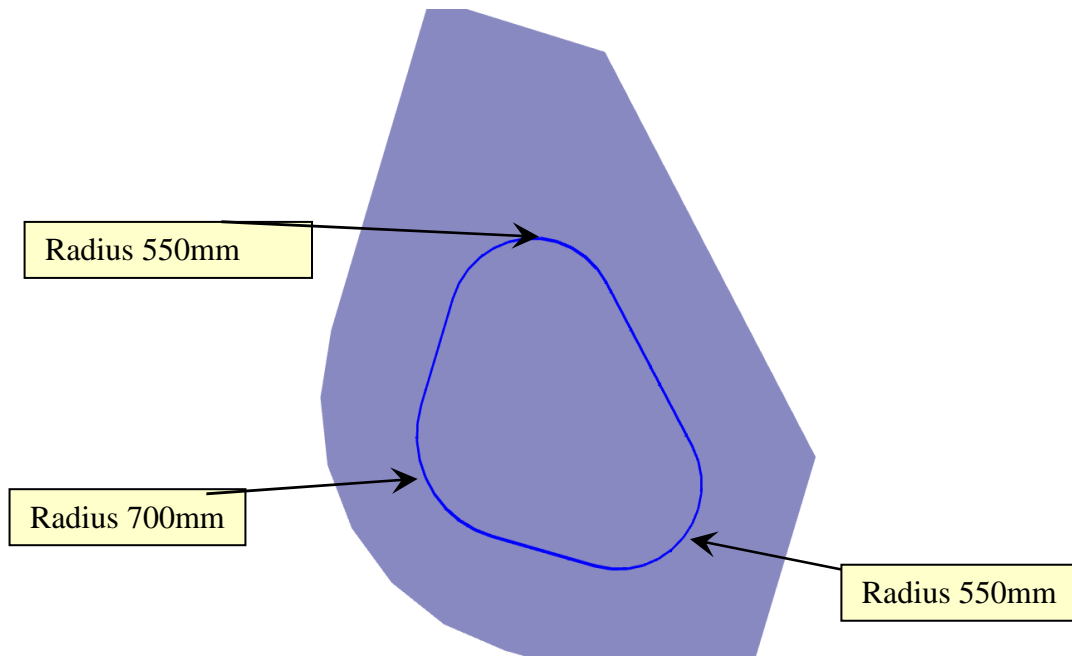


- » To offset the last curve create first a helping curve by copying -1m in y-direction. Then use the Snap Perpendicular toolbar icon (F11) to define a move vector and then modify it to normalise to unit length and multiply by a given length:
 $\text{Vector3d}(0 \text{ mm}, 504.6727952 \text{ mm}, -499.9781645 \text{ mm}).\text{normalise()} * 700$
 - » Finally delete the helping curve.
 - Use Fillet curve tool to join curves and add radius. To change the suggested radius, simply type in the radius after selecting the two guide curves. See details on next page.

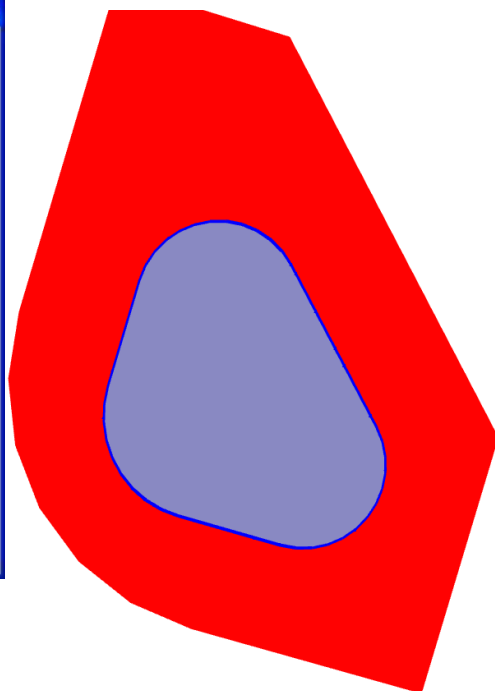
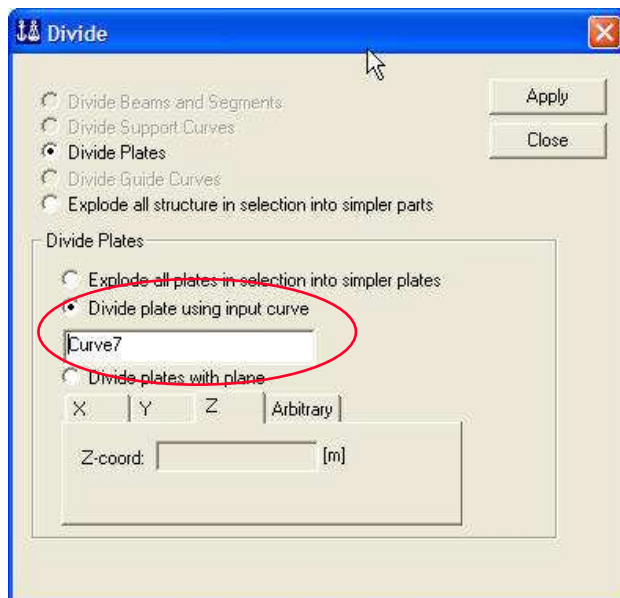




- Complete joining curves using Fillet Curves

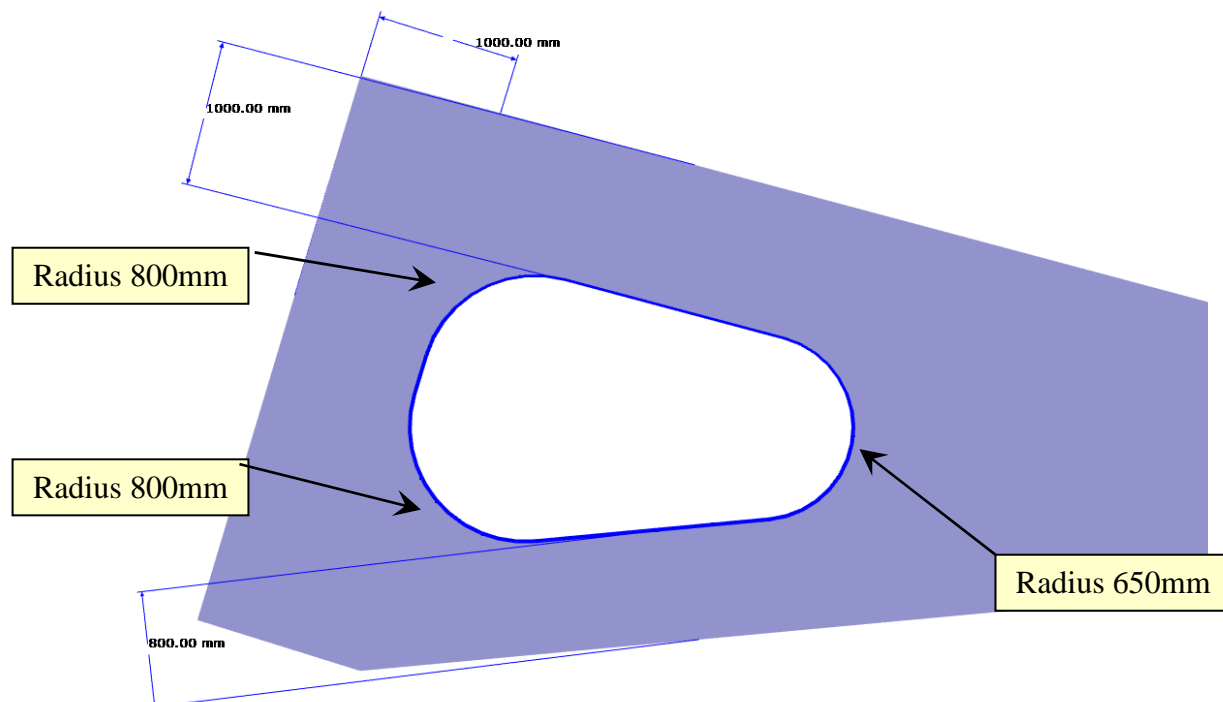


- Make hole in plate using Guide Curve
 - Select plate and RMB-click on plate to Divide. Use the newly created guiding curve as input to the Divide plate using input curve option and hit Apply.



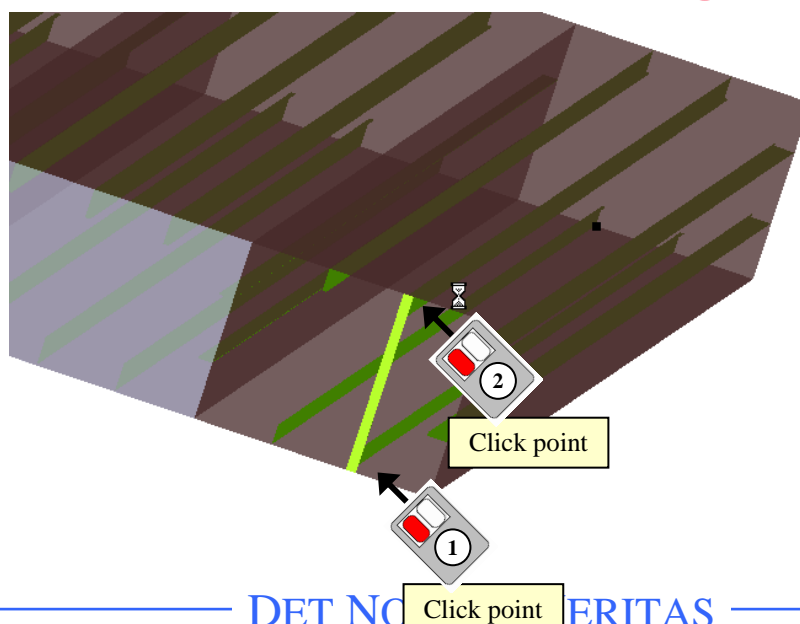
- Delete the inner plate

- Create hole in wing tank in the same way as for the hopper tank.



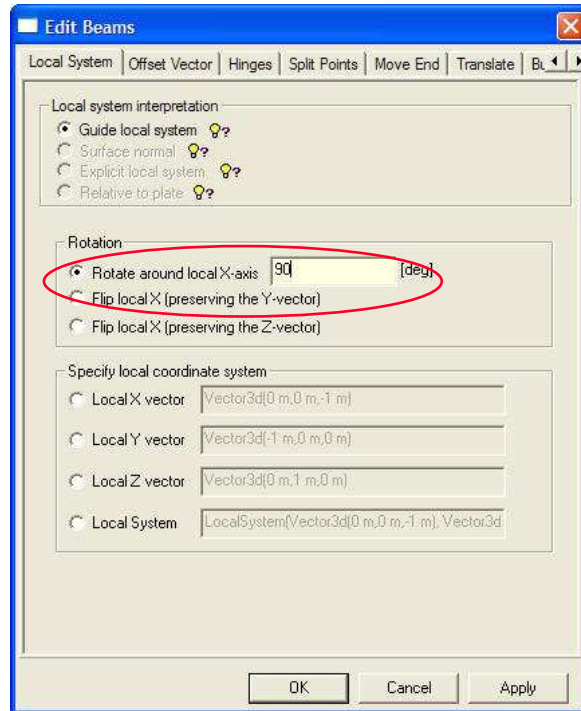
- Add buckling stiffeners (on floors)

- Set Default profile type to:
- Activate Beam tool
- Define beam by LMB-click on points defined by longitudinal stiffeners

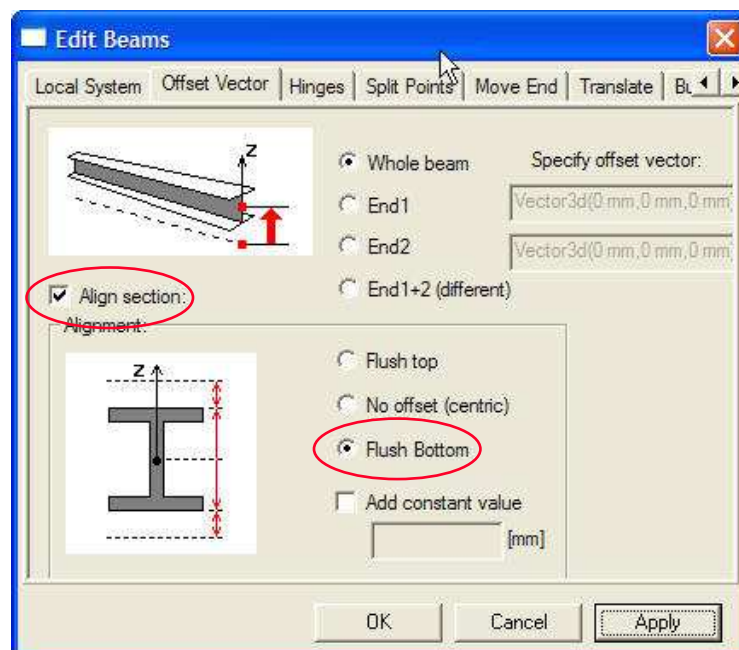




- Set beam orientation and eccentricity
 - Select beam and RMB-click on beam. Select Edit Beams tab. Set Rotate around local X-axis to 90 deg and press Apply. Verify visually that the orientation is correct.

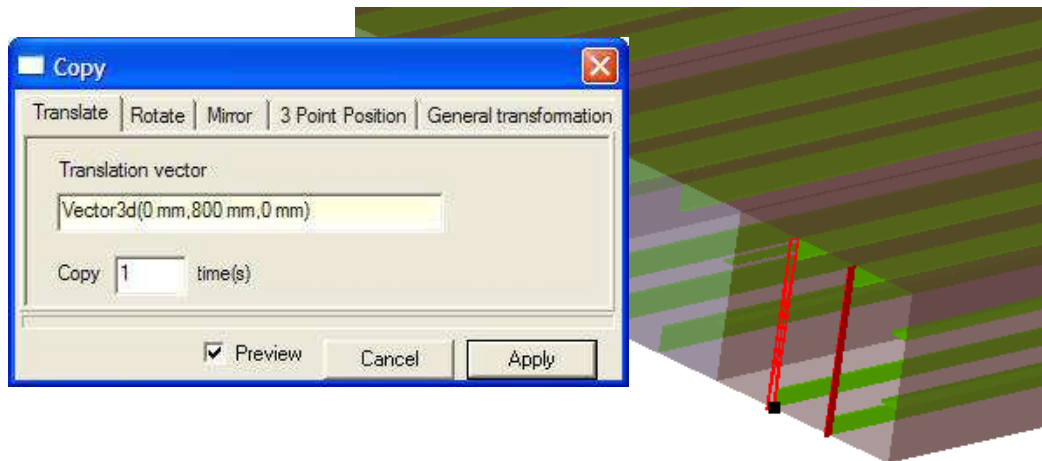


- Select Offset Vector tab in Edit Beams dialog. Select the Align section and Flush Bottom options. Verify that offset is correct. Exit dialog. If you have oriented differently than in the previous step, you may have to flush differently.

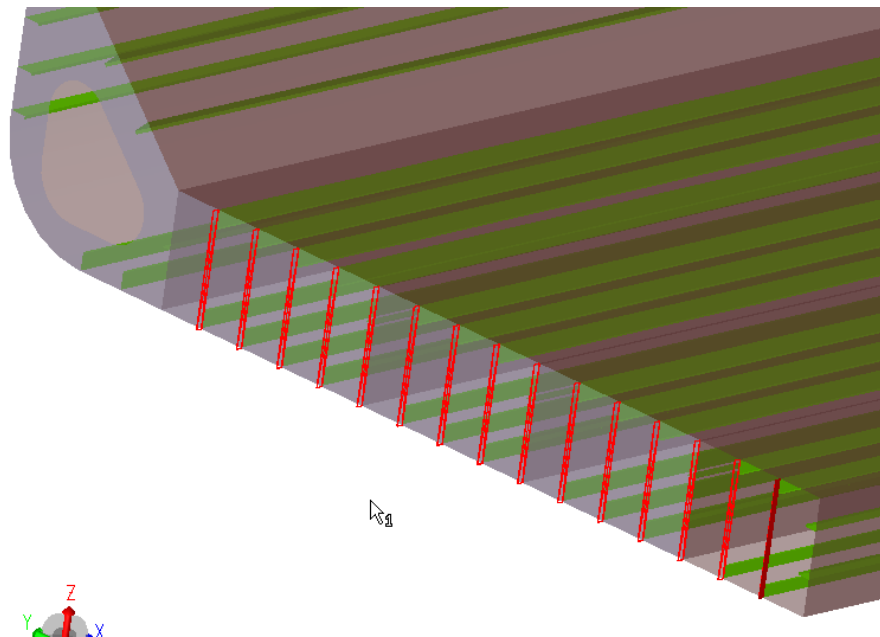




- Copy beam along floor.
 - Select beam and RMB-click on beam. Select Copy .
 - Calculate copy vector by clicking ends of longitudinal stiffeners




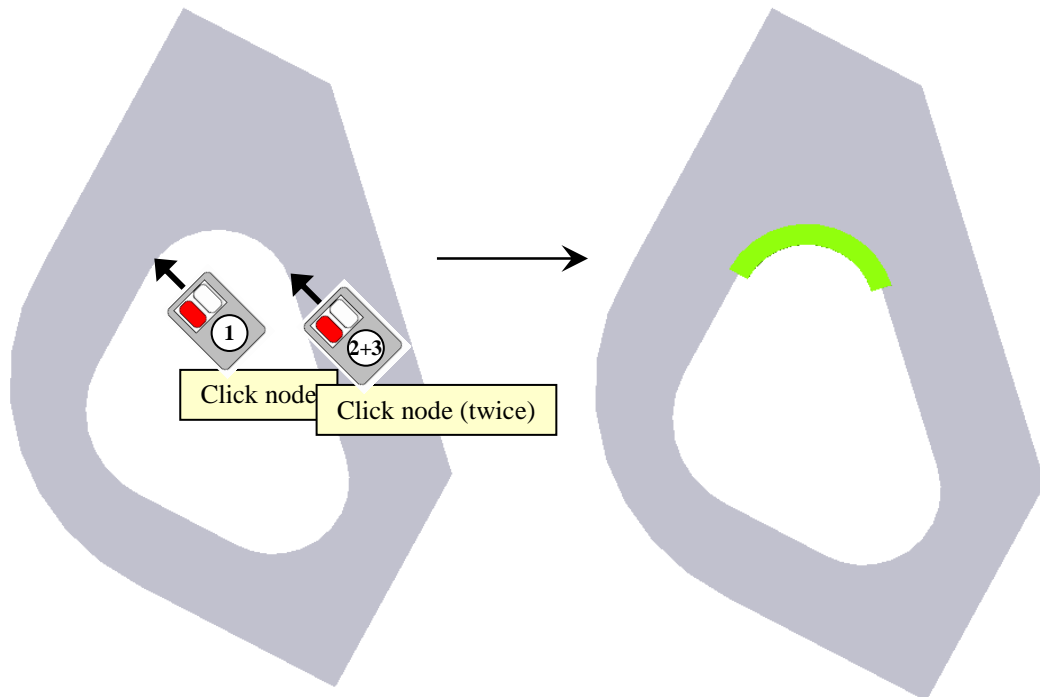
- Continue copy beams to complete all buckling stiffeners on floor as shown below



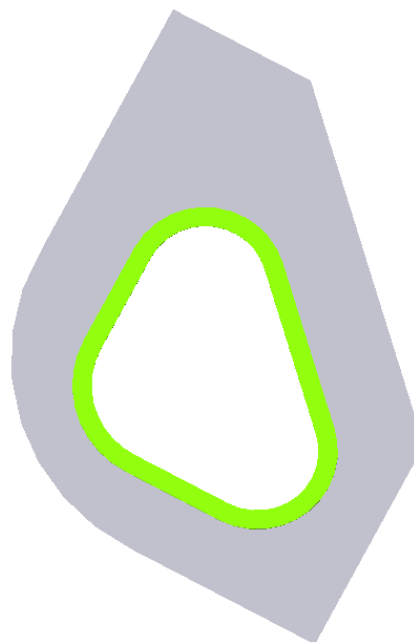
- Hint: Multiple select beams and copy “n” times with Preview option checked.
- Then delete the new beams at the longitudinal girders.



- Add ring stiffener (Fbar150x12)
 - Show only plate with hole (Select plate – press ALT + S)
 - Activate the curved beam tool: 
 - LMB-click on nodes of hole. To complete task: 3rd click on same node as 2nd click

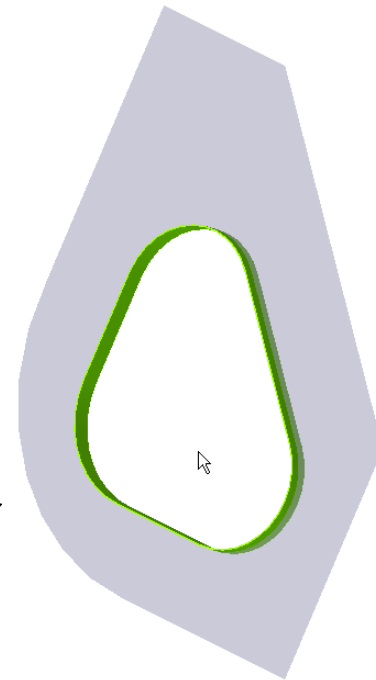
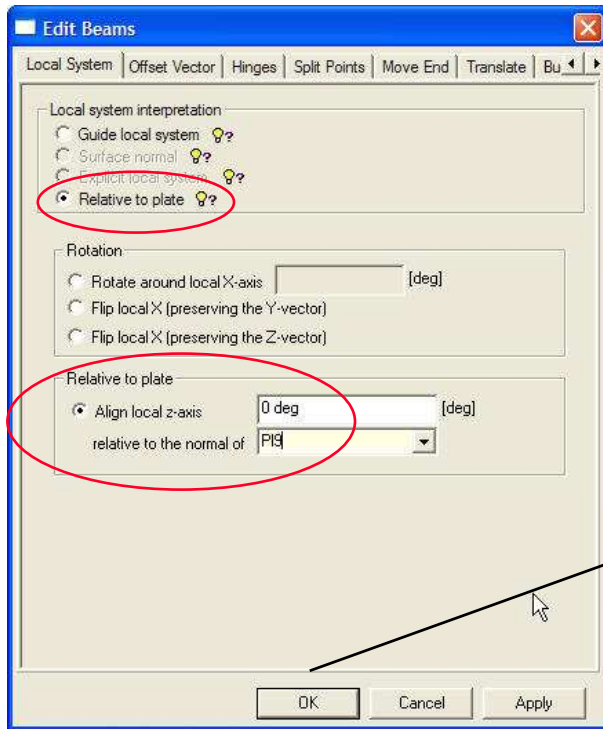


- Complete around hole (6 beams)

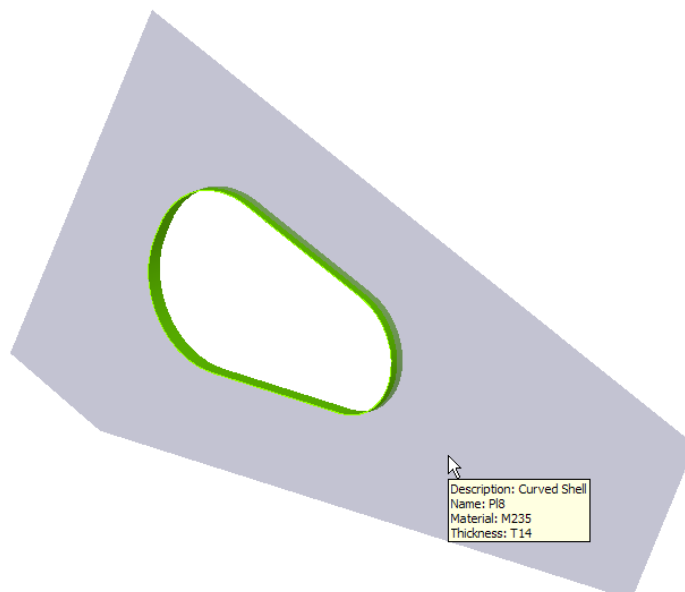




- Set orientation of ring stiffener
 - Select all beams (ring stiffeners) and RBM-click on beams. Select Edit Beams
 - Select Relative to plate option. Click on plate that ring stiffener is connected to. Click OK.



- Repeat operation for creating ring stiffener on frame in wing tank
 - Hint: 6 curved beams around hole

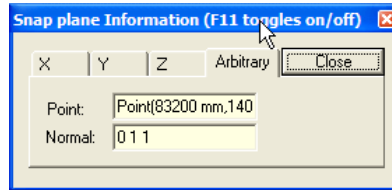


Description: Curved Shell
Name: P18
Material: M235
Thickness: T14

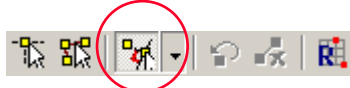


- Complete modelling of buckling stiffeners on frame (Fbar150x12) such that the frame looks like the figure (stiffeners in black).

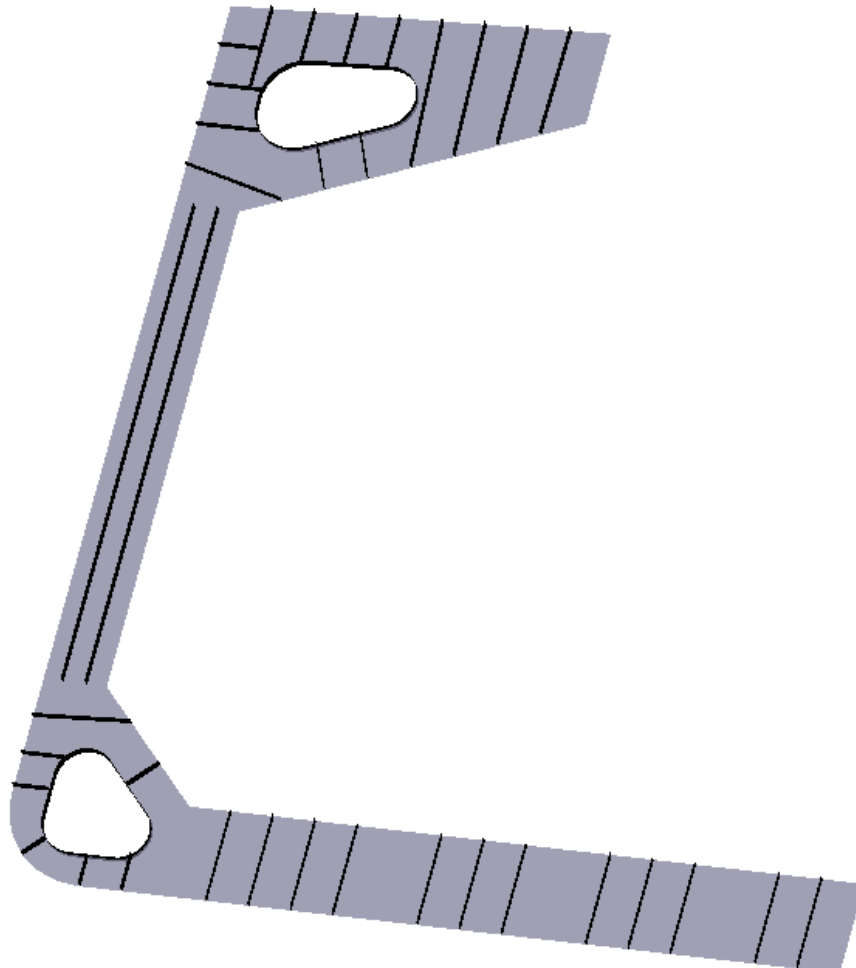
- Hint: Use snap planes (F11) to create horizontal and vertical stiffeners.



- Hint: Also use Snap Perpendicular to create stiffeners which ends are perpendicular to the ring stiffeners.



- Hint: To flush multiple beams in one operation, you may have to reorient them since local coordinate systems vary with how the beam was created. Define for instance a local system such that the local Z vector is aligned with global X axis.
- Hint: Use arbitrary snap plane to create stiffener in the middle of the bulge.



- Check the model by running Tools | Structure | Verify! Please ask the instructor if there are problems.
 - When the model is OK remember to save the workspace.



- Apply Non-Watertight property to plates.
 - Compartments will be created later, after the structural is complete. GeniE creates a compartment for each closed volume in the model. To join two adjacent volumes into a single larger compartment, permeability properties must be assigned to the plate dividing the two volumes.
 - Define a Permeability property called Non_watertight by RMB-clicking on the Properties | Permeability folder in the browser and select New Permeability. Select all plates that should be non-watertight and RMB-click to apply permeability to the selection.
 - To visualise the the non-watertight plates select the permeability set under Properties in the browser and RMB-click to select ColorCode Property.
 - Click the Color Code “brush” toolbar icon to switch off the color coding.

