



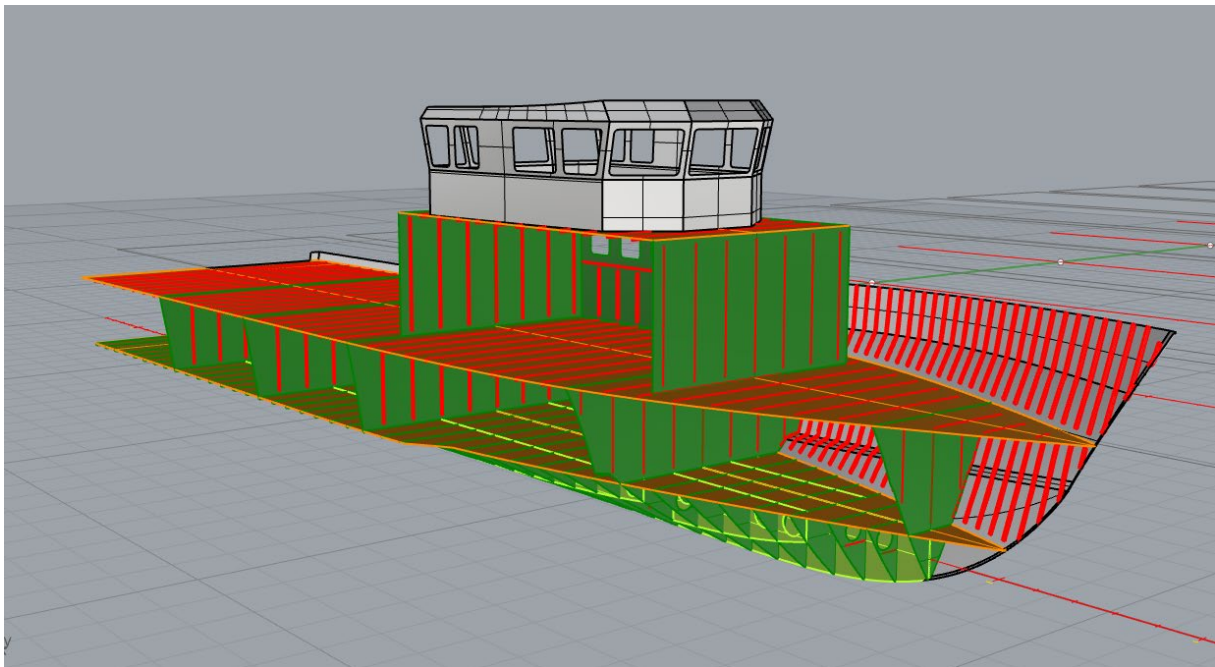
ExpressMarine
Structural Modelling plug-in for Rhino3D



TUTORIAL 2

ExpressMarine – Small Craft Tutorial

Version 1 – April 2022



ExpressMarine

Small Craft Tutorial

To begin this tutorial, please download the [Tutorial2_Practice_Files.zip](#) available at [Resources and Learning | expressmarine \(expressmarine3d.com\)](#).

Basic knowledge of Rhino is required.

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1. Create Port Side hull

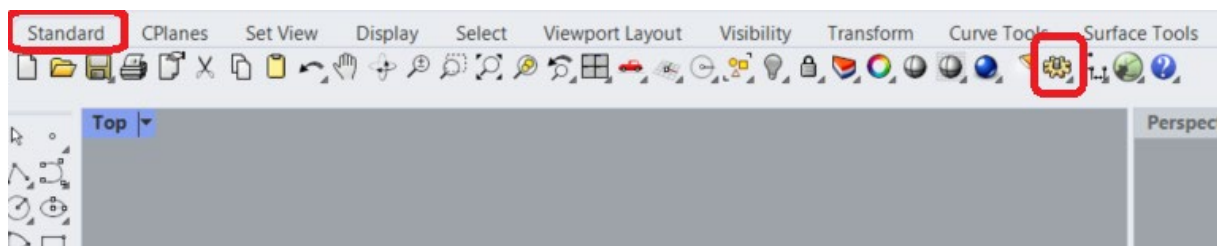
Change units and origin for the vessel in the file boat1. Delete all parts of the vessel that are not the shell, close all holes, and divide it in two and save the port side of the hull.

Hint: Settings can change units

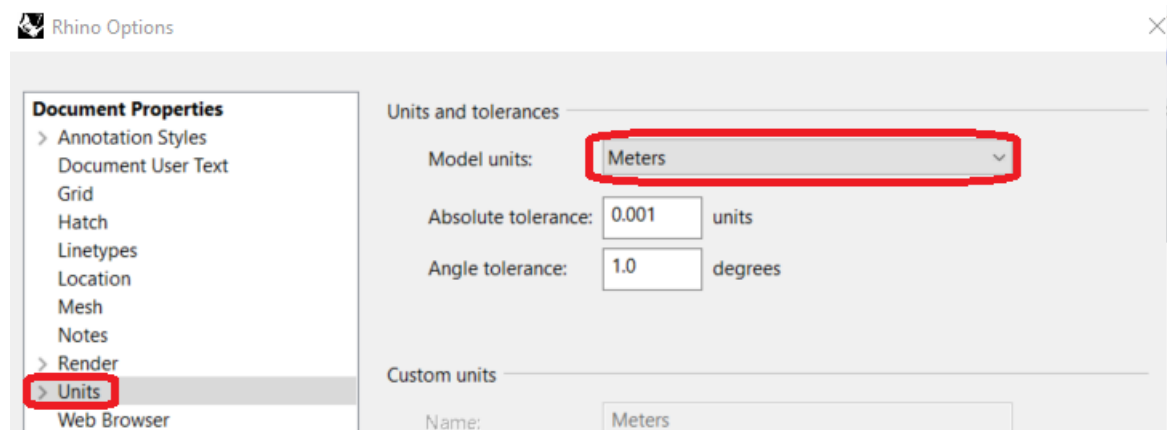
useful Rhino functions: move, untrim, join, split, surface creation: Rectangular Plane

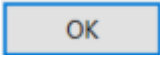
Step by step explanation:

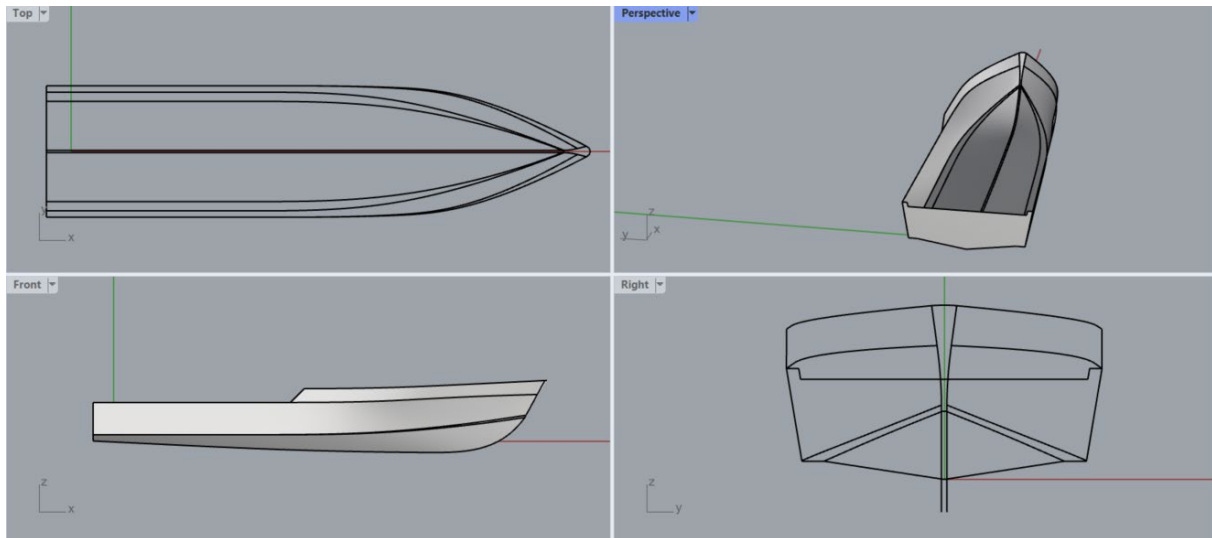
- Open the vessel boat1 as downloaded.
- Save the file as ShellPS.
- Change the units to be meters. Click  in the Standard View



- Go to Units and change the Model units to the units you use.



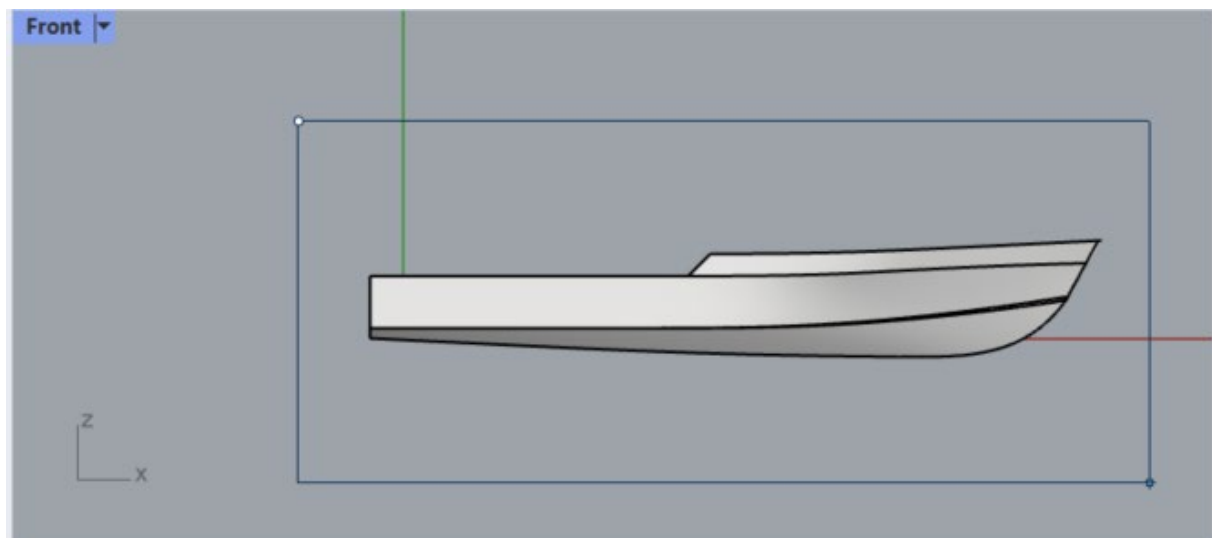
- Click 
- Use move command to move the hull so that the world origin is at AP for the hull
- Delete everything that is not shell
- Use untrim to remove the holes in the shell
- Use Join to join all the shell parts.

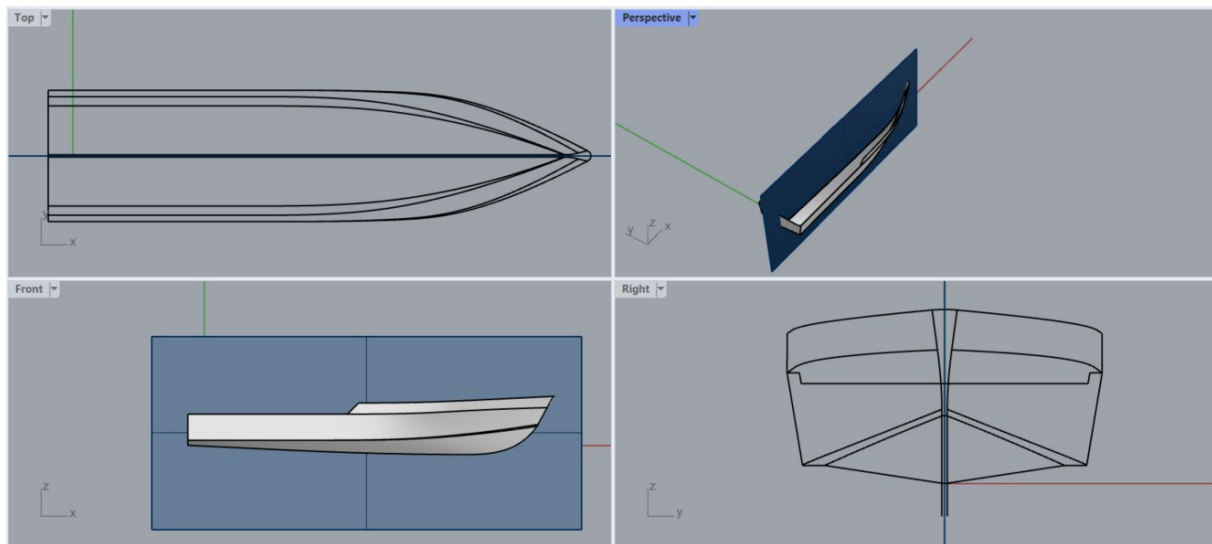


- Create a Rectangular plane: corner to corner on the center line of the hull.

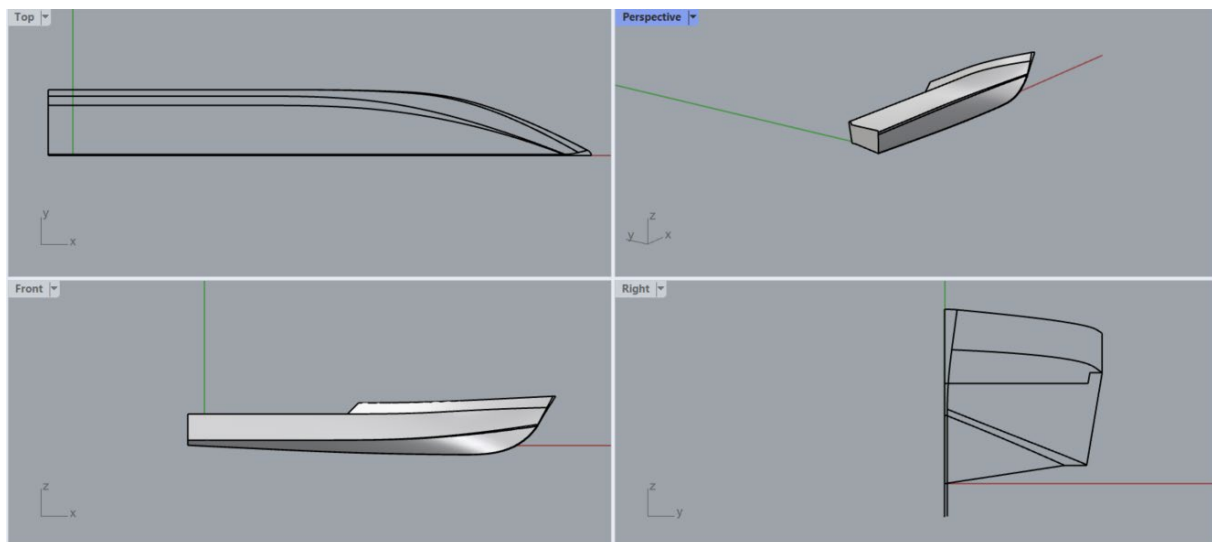


- Use the front view to create the rectangular plane and check that it is in the center line





- Use split to divide the shell into ps and sb, delete the sb part of the shell and the rectangular plane in the center line.
- Save the shell of the hull



2. Create a new project.

Create a regular rhino project, use template with meters, then create a new ExpressMarine project. Enter in main particulars.

Step by step explanation:

- Open Rhino to create a regular Rhino project.
- Use a template that matches the units preference for the port side hull, already created.
- Use the Rhino command Save and give a suggestive name, like ExpressMarine-SmallCraft.3dm
- Select **ExpressMarine** and **New Project** from the top menu.
Or type *ExpressMarineCreateProject* in the **Rhino Command bar** and hit Enter.
- The **Main Parameters** window will pop-up.

- Fill in the main parameters. See picture.

ExpressMarine

Main parameters

Project name:

Length unit:

Thickness unit:

Weight unit:

Density unit:

Volume unit:

LOA: m

LPP: m

Beam: m

Draught: m

Main deck height: m

Maximum height: m

Number of decks:


Default material:

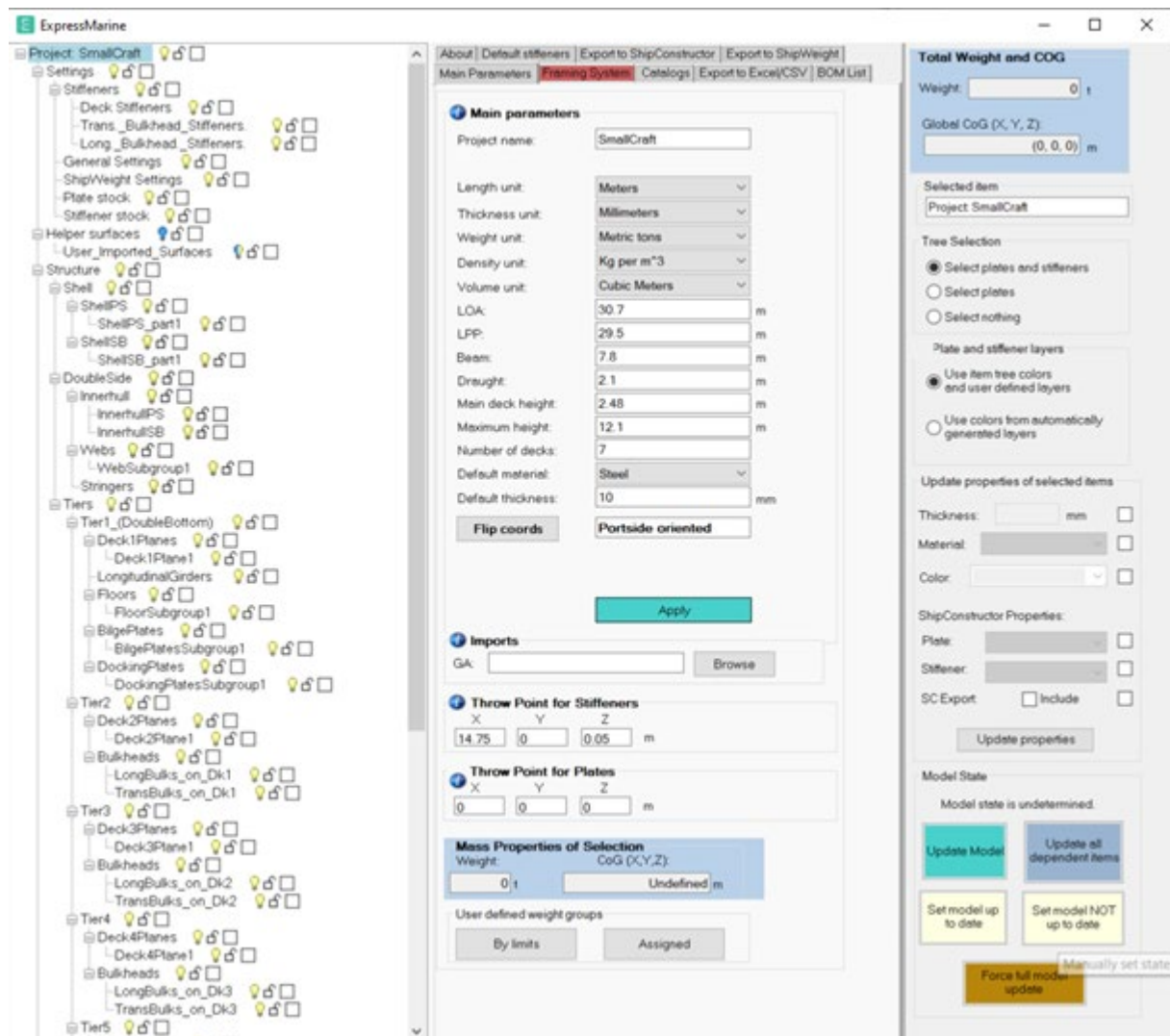
Default thickness: mm

Flip coords

Project template:

Apply

- Press  and the ExpressMarine project will be initiated.



Note: Notice the **Throw Point** pre-defined at **X= Lpp/2, Y=0 m, and Z=0.05 m**.

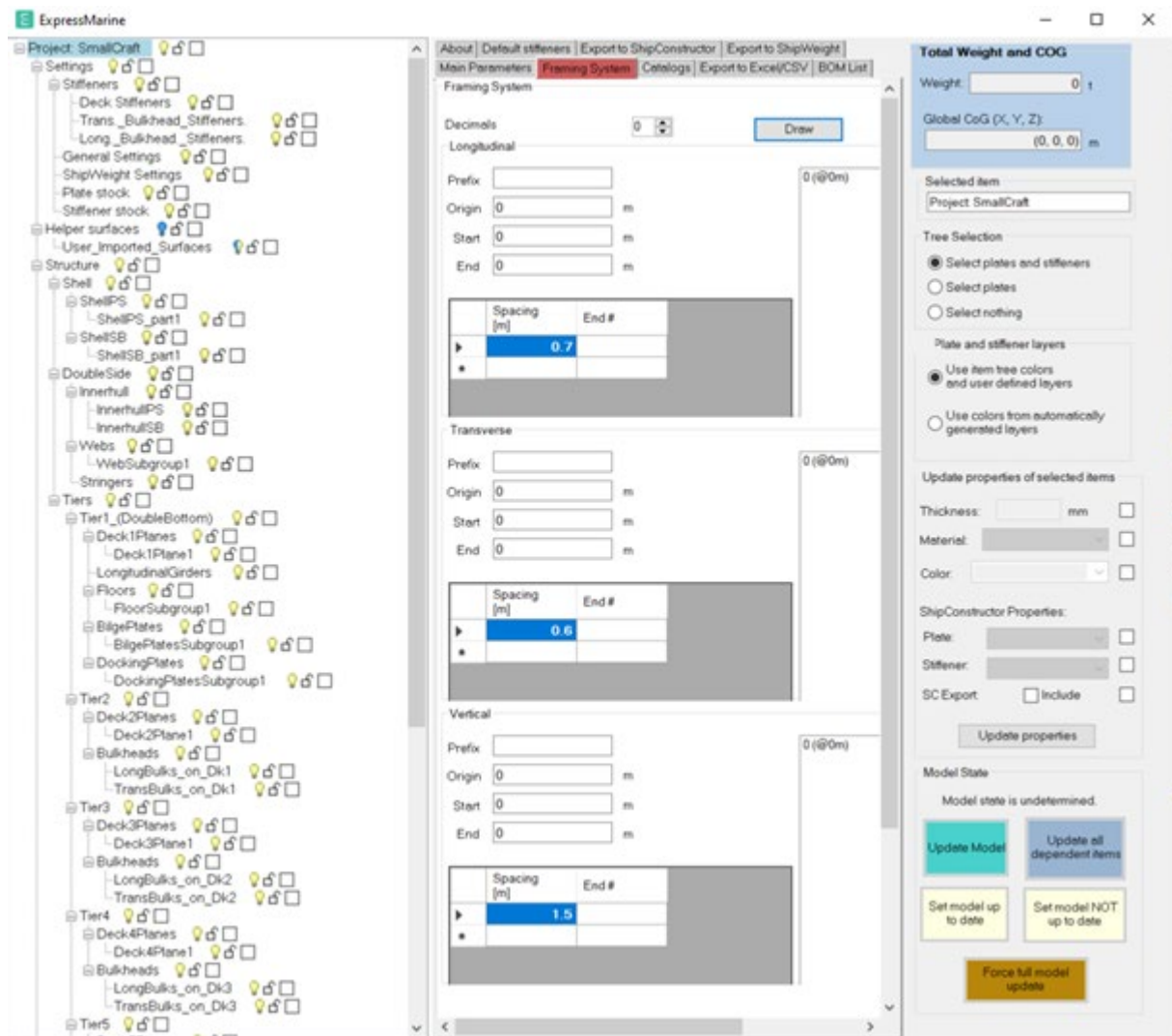
This will determine the side of the plate onto which the stiffeners will be generated and the orientation of the stiffeners' flange.

3. Update the Framing system

Update the framing system in ExpressMarine with the framing systems of the vessel.

Step by step explanation:

- Open the Framing system tab, marked red.



- Set start and stop and origin for each axis.

Export to ShipConstructor | Export to ShipWeight | Export to XML

Main Parameters | Framing System | Catalogs | Export to Excel/CSV | BOM List | About | Default stiffeners

Framing System

Decimals

Longitudinal

Prefix

Origin m

Start m

End m

	Spacing [m]	End #
	0.7	
▶*		

- 14 (@-10m)
- 13 (@-9m)
- 12 (@-8m)
- 11 (@-8m)
- 10 (@-7m)
- 9 (@-6m)
- 8 (@-6m)
- 7 (@-5m)
- 6 (@-4m)
- 5 (@-4m)
- 4 (@-3m)
- 3 (@-2m)
- 2 (@-1m)
- 1 (@-1m)
- 0 (@0m)
- 1 (@1m)
- 2 (@1m)

Transverse

Prefix

Origin m

Start m

End m

	Spacing [m]	End #
	0.6	
▶*		

- 17 (@-10m)
- 16 (@-10m)
- 15 (@-9m)
- 14 (@-8m)
- 13 (@-8m)
- 12 (@-7m)
- 11 (@-7m)
- 10 (@-6m)
- 9 (@-5m)
- 8 (@-5m)
- 7 (@-4m)
- 6 (@-4m)
- 5 (@-3m)
- 4 (@-2m)
- 3 (@-2m)
- 2 (@-1m)
- 1 (@-1m)

Vertical

Prefix

Origin m

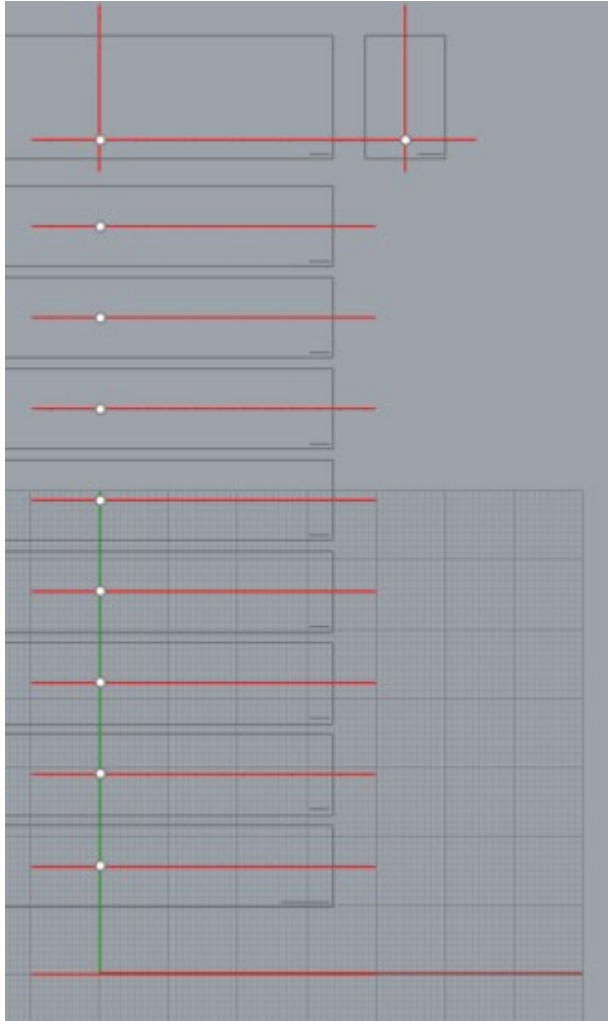
Start m

End m

	Spacing [m]	End #
	1.5	
▶*		

- 3 (@-5m)
- 2 (@-3m)
- 1 (@-2m)
- 0 (@0m)
- 1 (@2m)
- 2 (@3m)
- 3 (@5m)
- 4 (@6m)
- 5 (@8m)
- 6 (@9m)
- 7 (@11m)
- 8 (@12m)
- 9 (@14m)
- 10 (@15m)
- 11 (@17m)
- 12 (@18m)
- 13 (@20m)

- Click draw to update the geometry

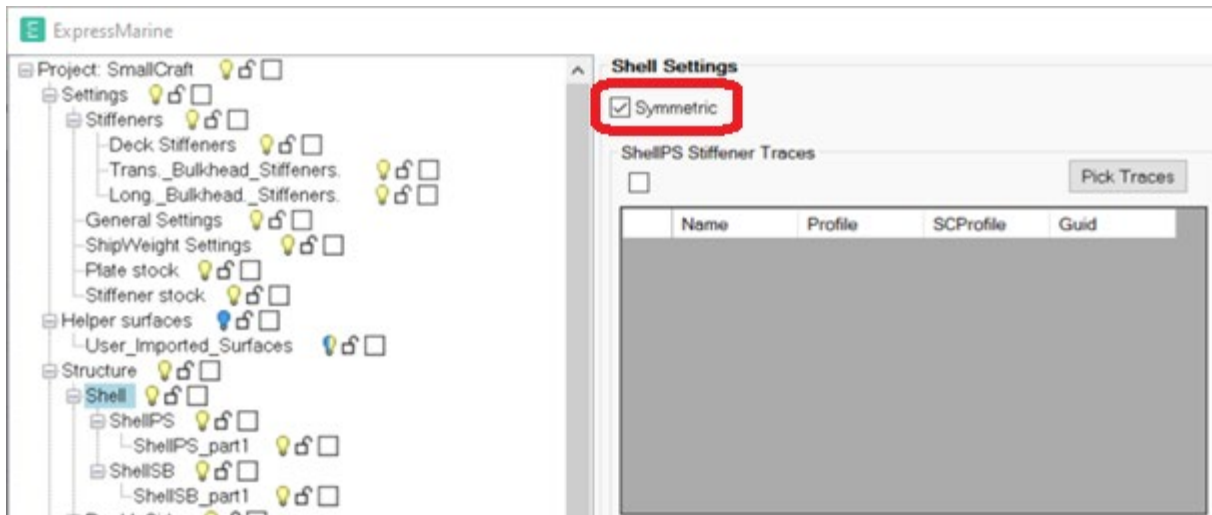


4. Add the Shell

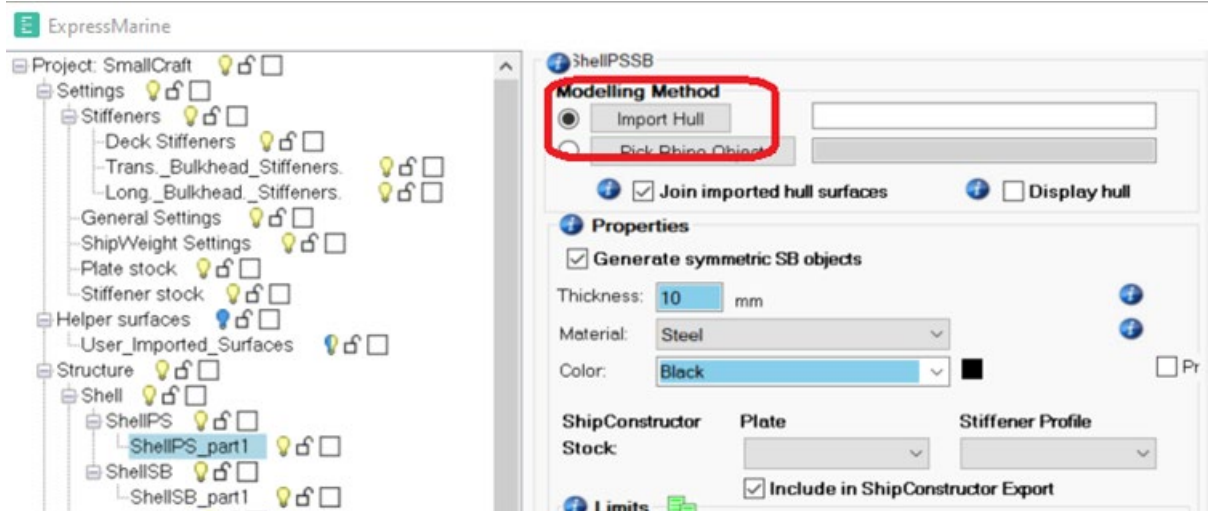
Set the shell to be symmetric, import the ShellIPS created earlier.

Step by step explanation:

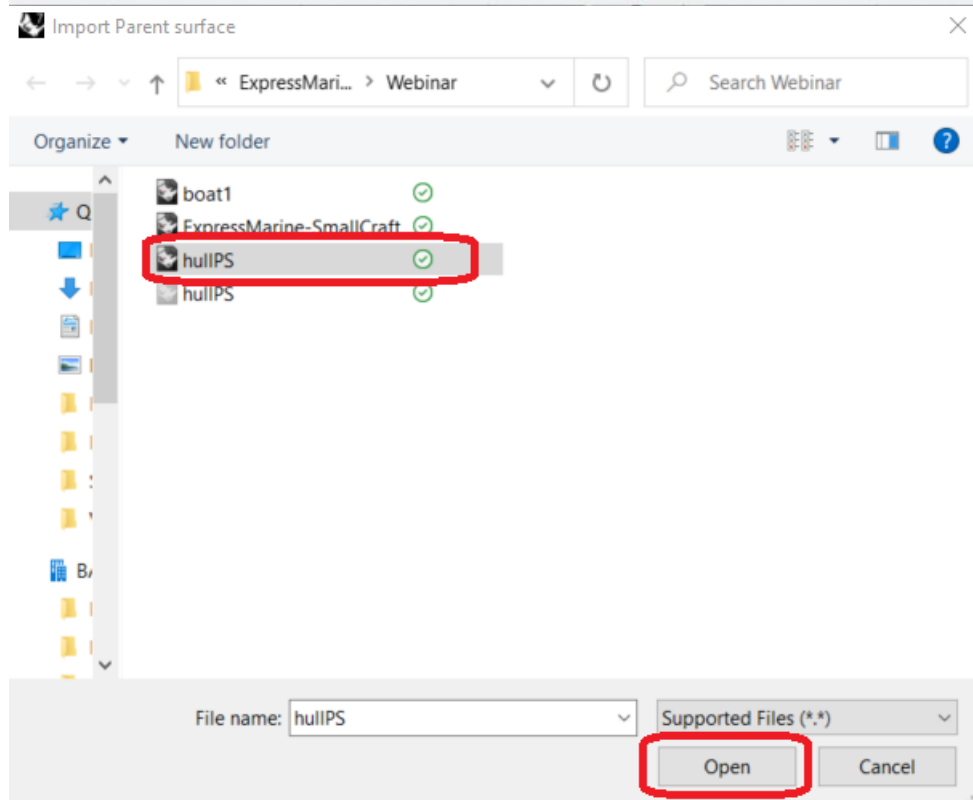
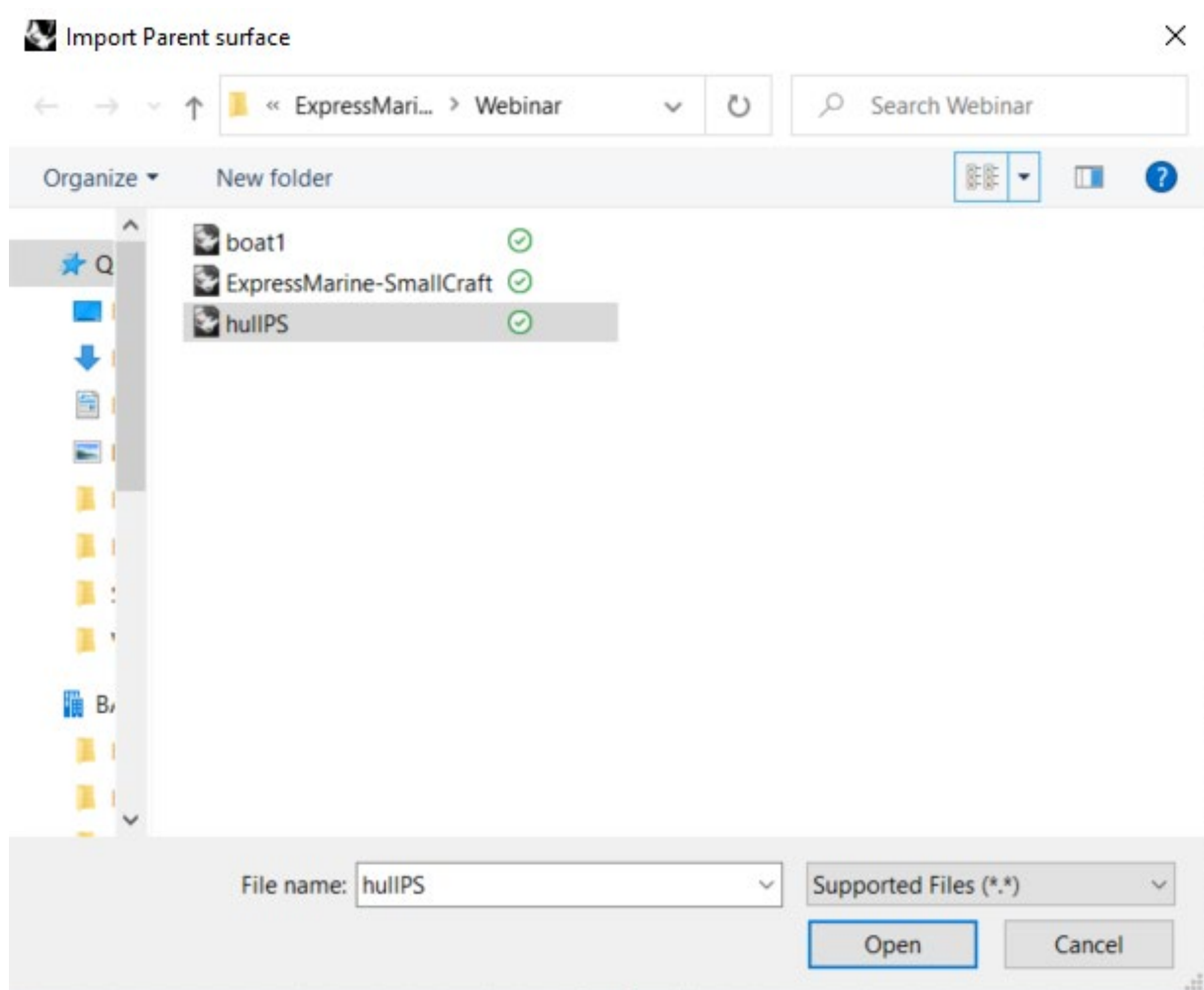
- Click on the **Shell** node in the tree view to confirm that **Symmetric** is checked.



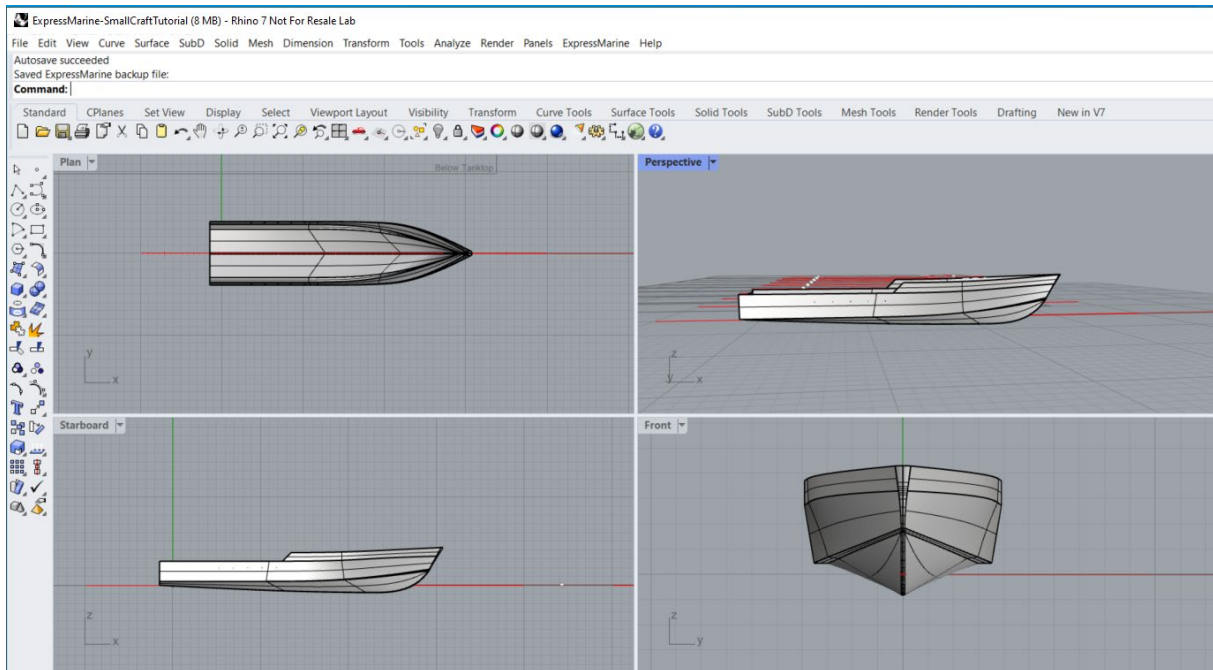
- Go to **ShellPS_part1** node and click **Import Hull** button:



- The **Import Parent surface** window will appear, select the port side hull created at the start of this tutorial and click open.



- Hull_PS parent surface will be imported in the graphics. Set the View option to Shaded to see the imported shell as below.

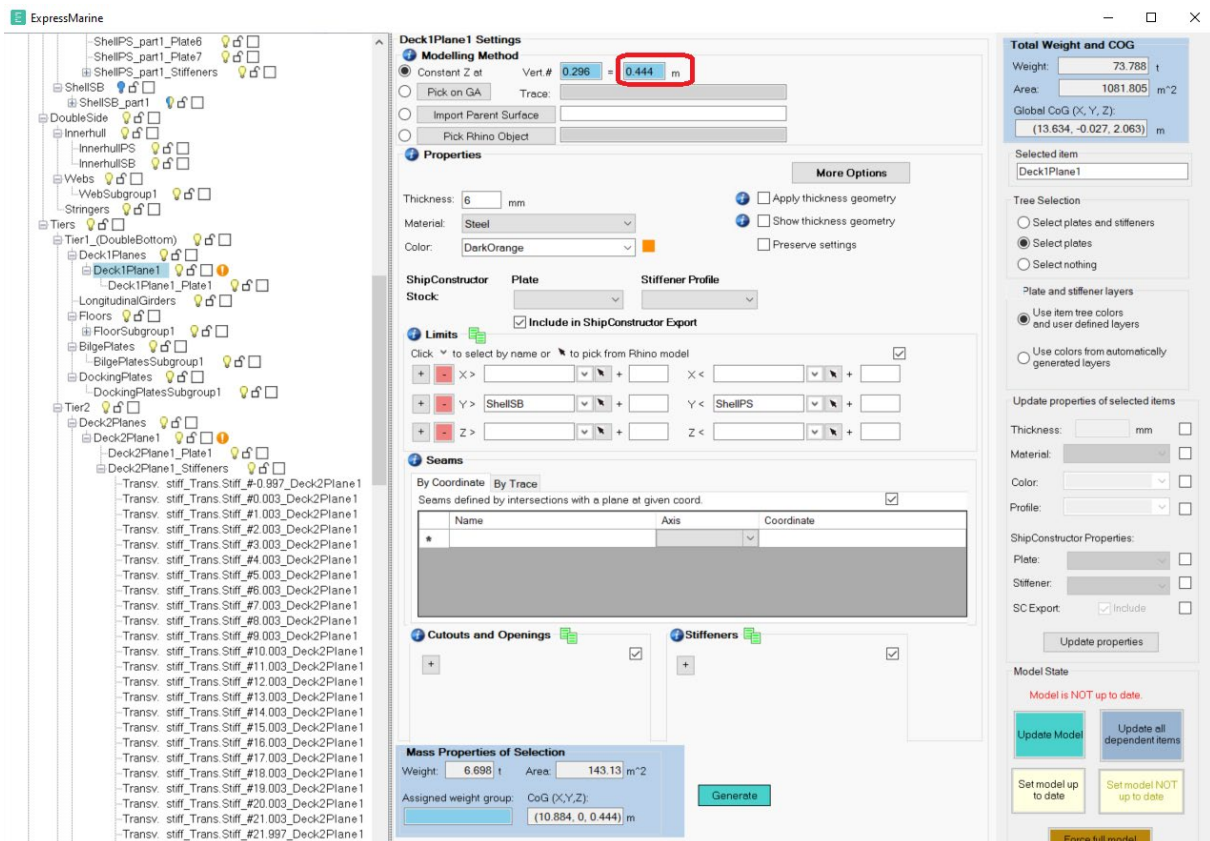


5. Create the DoubleBottom deck

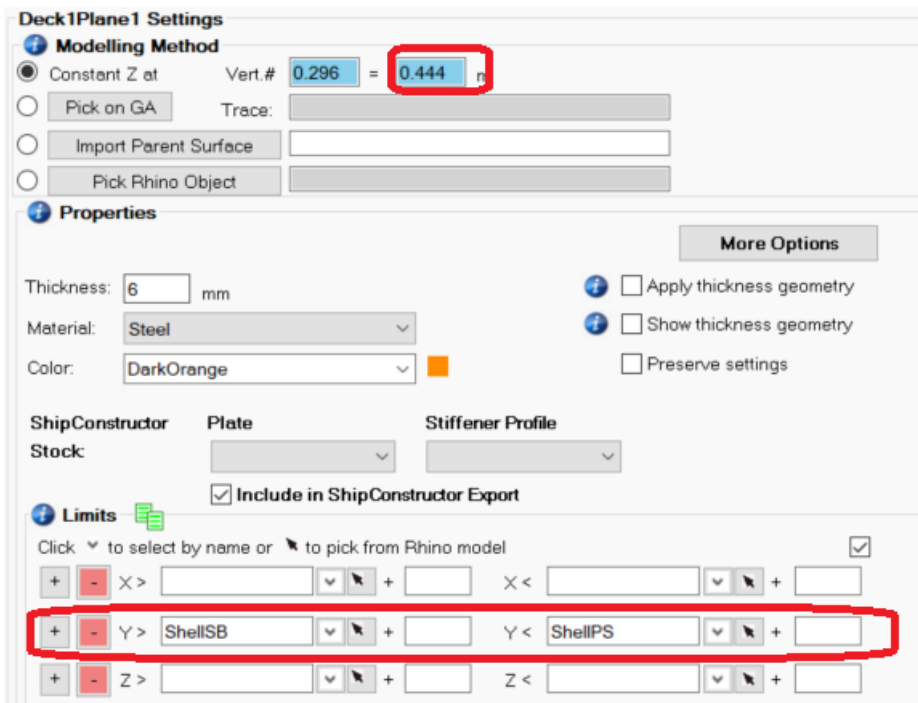
In Tier1_(DoubleBottom) create the double bottom deck.

Step by step explanation:

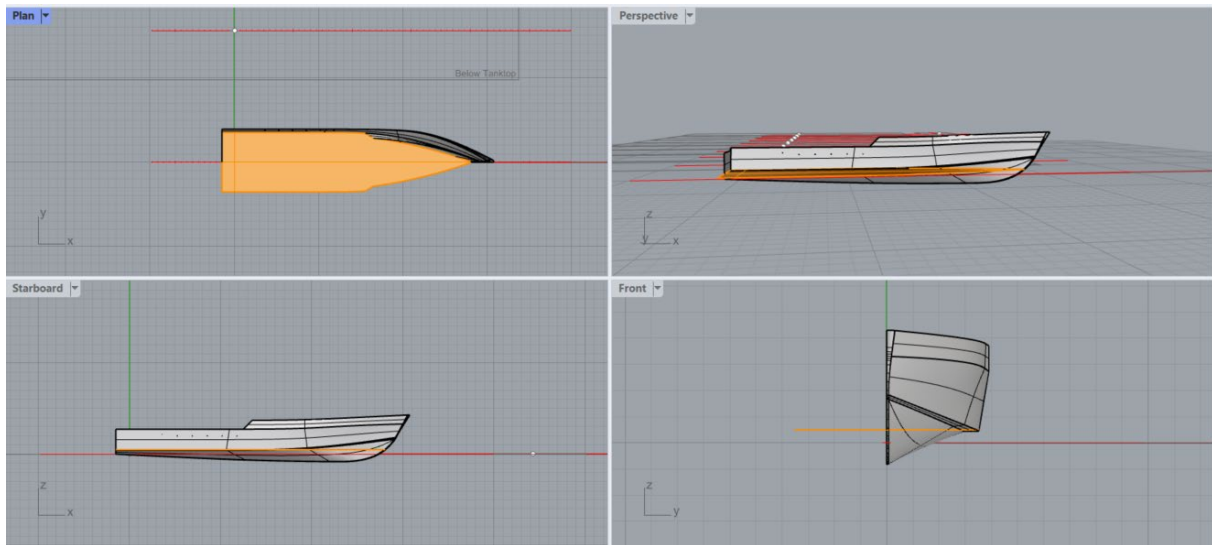
- Measure the double bottom height.
- Go to Deck1Plane1 node under Tiers – Tier1_(DoubleBottom).
- Select method constant Z, insert the measured value.



- Make sure the Limits for Y are set to ShellPS and ShellSB.



- Click **Generate** to generate this deck
- The deckplane will now appear something like this.



6. Create Floors

Add floors to the doublebottom DeckPlane. Lock the watertight floor compartments to avoid inheriting the holes and stiffeners from the FloorSubgroup or separate the watertight floor compartments in a separate floorgroup for watertight floor compartments. For the Step-by-Step explanation below, to avoid inheriting the holes and stiffeners from the FloorSubgroup the watertight floor compartments will be locked.

Try to think about this before you move forward:

Check your hull, how many floor groups do you need? The stiffeners and holes/cut outs will be for the whole floor group. Try to plan the different types of stiffeners and holes/cut outs for the different sections. E.g. Aft, mid and fore. Based upon the stiffeners and cut outs and openings. Would you like to lock the watertight floor compartments inside the different floorgroups or would you like to put them in a separate floorgroup?

Step by step explanation:

- Add extra floor groups for the Floor node in the navigation tree by right-clicking Floors and selecting add Floor groups. Add 5 floor groups.
- Start with the FloorSubgroup1 Node in the navigation tree.
- In the Modelling location for floorSubgroup1 set the floors to be every 1 frame, Start Fr. #-2 to Fr.#6
- In the properties set Thickness to 6
- The limits should be set by the software.

FloorSubgroup1

Modelling Location

☐ Every WebFrame from Fr.# 0 to Fr.# 0

☒ Every 1 frames Start Fr.# -2 to Fr.# 6

☐ Every 1 m X Start 0 m X End 0 m

Exceptions:

Additions:

Properties

Thickness: 6 mm

Material: Steel

Color: Green

☐ Apply thickness geometry

☐ Show thickness geometry

☐ Preserve settings

ShipConstructor

Plate:

Stiffener Profile:

Stock:

☒ Include in ShipConstructor Export

Limits

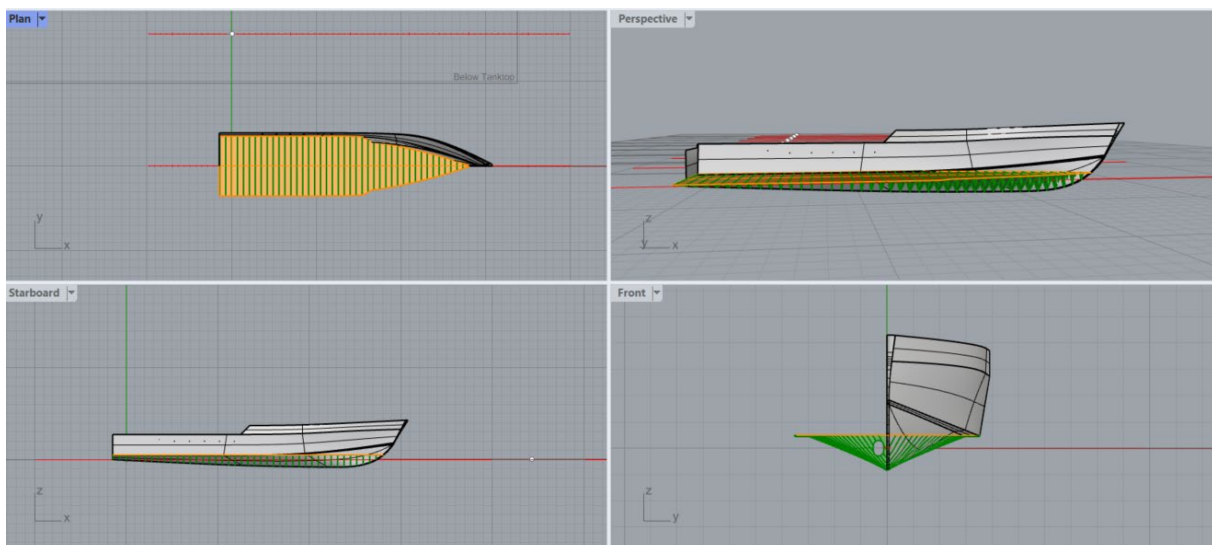
Click to select by name or to pick from Finite model


X > X <



Y > ShellSB Y < ShellPS

Z > Z < Deck1Plane1

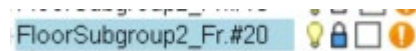
- Click **Generate** to generate the floors.



- Continue with FloorSubgroup 2-5.
- Limits are: #-2-#6, #7-#11, #12-#31, #32-35, #36-#38
- The watertight floors need to be locked so they don't inherit the holes and stiffener definitions for the FloorSubgroup.
- The watertight floors are at #6, #13, #20, #30, #35, #38
- Under the floorSubgroupX there are FloorSubgroupX_Fr#y
- Go to the correct FloorSubgroupX and find FloorSubgroupX_Fr#y and lock it by clicking  next to the name of the node in the navigation tree.

FloorSubgroup2_Fr.#20  

- Now that node will look like this:



The changes higher up in the tree will then not affect this node.

7. Create Longitudinal Girders

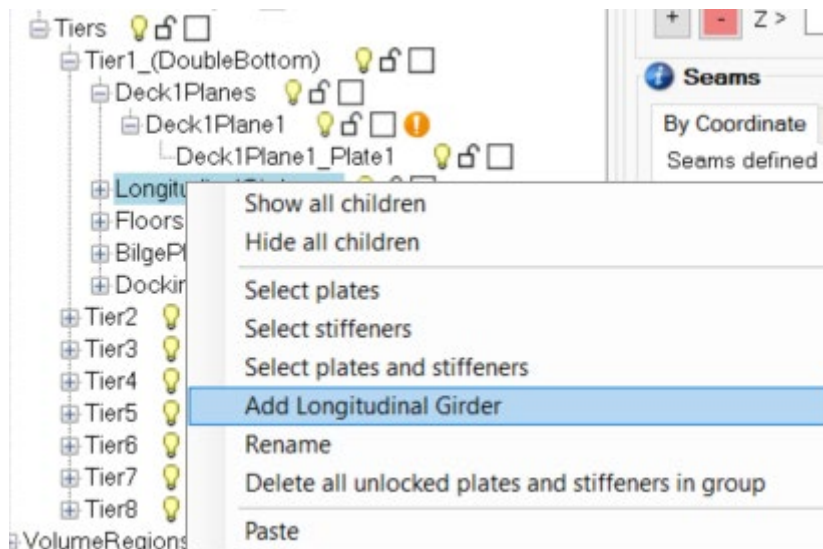
Create the longitudinal girders underneath the main deck.

Try to think about this before you move forward:

Where will the girders be? How many?

Step by step explanation:

- Go to Tier1_(DoubleBottom) – and right click LongitudinalGirders and add Longitudinal Girder.
- Add 7 longitudinal girders.



- Go to LongGlrder1
- The first girder is on the center line
- Select Modelling Method to be: On constant Y
- Set Constant Y = 0.
- Set the X limits: $X > -3$ and $X < 38$.
- The Z- limits are set by ExpressMarine.

LongGirder1

Modelling Method

☒ On constant Y = Long.# = m

☐ Pick on GA Trace:

☐ Import Parent Surface

☐ Pick Rhino Object

☐ Symmetric

Properties

Thickness: mm

Material:

Color:

☐ Apply thickness geometry

☐ Show thickness geometry

☒ Preserve settings

More Options

ShipConstructor Plate Stiffener Profile

Stock:

☒ Include in ShipConstructor Export

Limits

Click to select by name or to pick from Rhino model ☒

+ X > + X < +

+ Y > + Y < +

+ Z > + Z < +

Seams

By Coordinate By Trace

Seams defined by intersections with a plane at given coord. ☒

	Name	Axis	Coordinate
*		<input type="button" value="v"/>	

Cutouts and Openings ☒

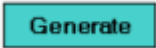
Stiffeners ☒

Mass Properties of Selection

Weight: t Area: m²

Assigned weight group: CoG (X,Y,Z): m

Generate

- Click 
- Do this for all the girders.
- The other girders have the settings:
 - LongGrider2: Const Y = 0,75m, X>#30 and X<#35
 - LongGirder3: Const Y = -0,75m, X>#30 and X<#35
 - LongGirder4: Const Y = 1,5m, X>#6 and X>#30
 - LongGirder5: Const Y = -1,5m, X>#6 and X>#30
 - LongGrider6: Const Y = 0,75m, X>#-1 and X<#6
 - LongGirder7: Const Y = -0,75m, X>#-1 and X<#6


8. Add holes in longitudinal girders

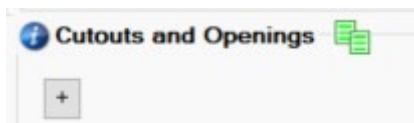
The longitudinal girders need some holes/cut outs. Add the hole definition for the holes.

Try to think about this before you move forward:

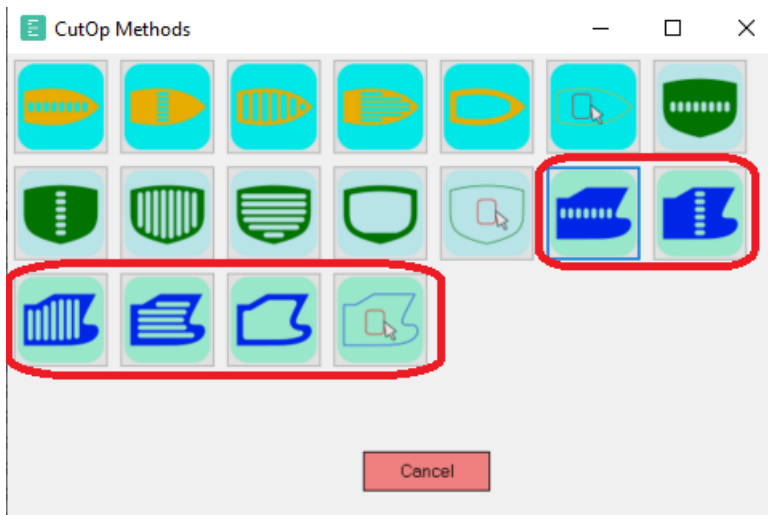
- Decide where the holes should be and the dimension for the holes.

Step by step explanation:

- Go to LongGirder1
- Click  underneath the Cutouts and Opening



- Now the CutOp Methods window appear



- One of the methods marked with red can be used.
- Select Regular Series Cutout Y-object Longitudinal



- Set the name to be opening 900x400
- Set X Start = #13,5, Spacing = #1 and X End = #19,5
- Select Opening to be 900x400.
- Set the Z coordinate of Opening center to be 0.

Regular Series Cutout Y-object Longitudinal

NAME:

X Start: Spacing [mm]: X End:

Z Coordinate of Opening Center: [m]

Opening Height (H) [mm]:

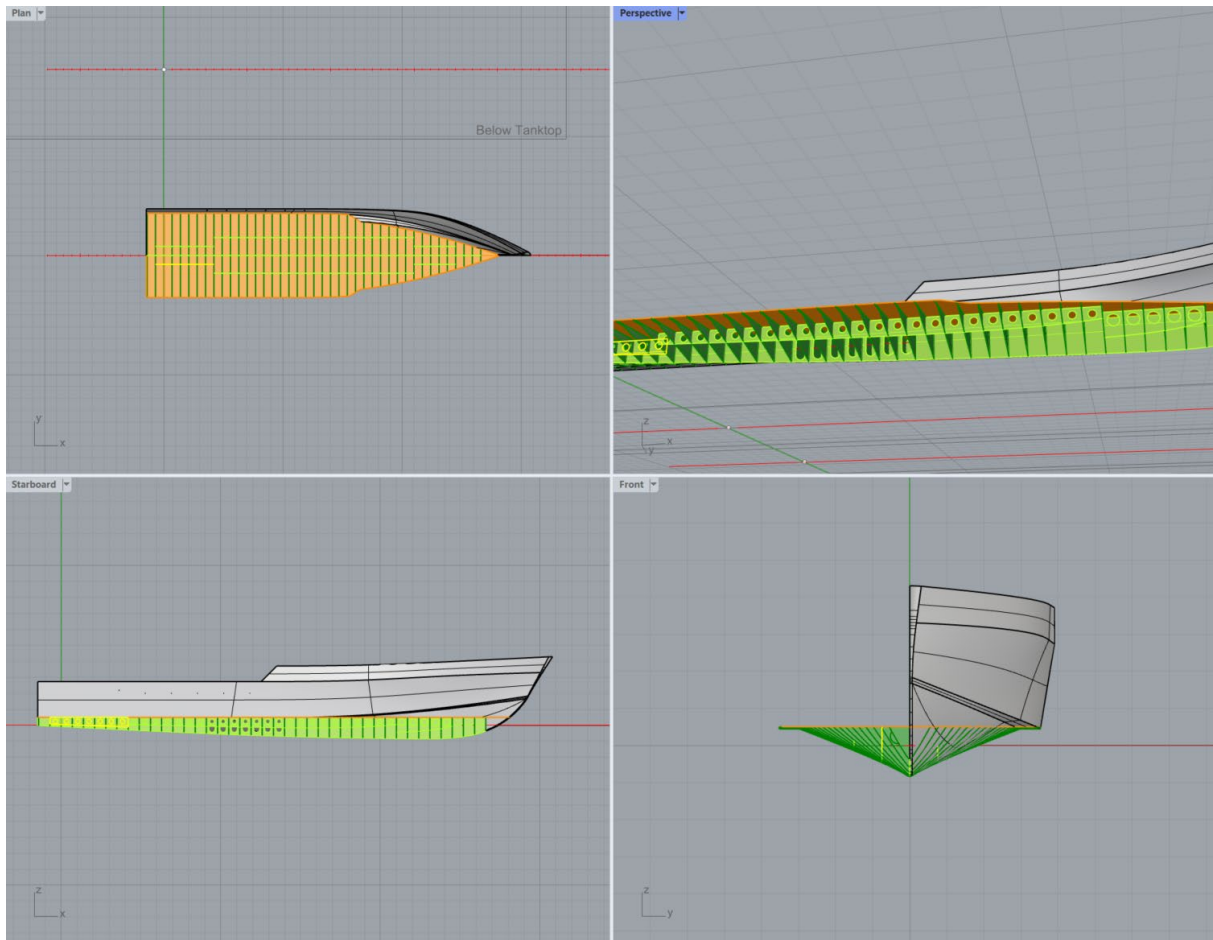
Opening Width (W) [mm]:

Opening: [mm]

Exceptions:

Additions:

- Click
- Click
- Do this for all holes in the Girders.
- The other openings for the girders have the settings:
- Spacing = #1
 - LongGirder2&3: Name: Opening D450, XStart = #30,5, XEnd = #34.5, Z coord = 0,2, Opening: D450
 - LongGirder4&5: Name: Opening R150, XStart = #6,5, XEnd = #29.5, Z coord = 0,25, Opening: R150
 - LongGirder6&7: Name: Opening R150, XStart = #-1,5, XEnd = #5,5, Z coord = 0,25, Opening: R150





9. Add stiffeners to the floors.

Time to get some stiffeners on the floors.

Try to think about this before you move forward:

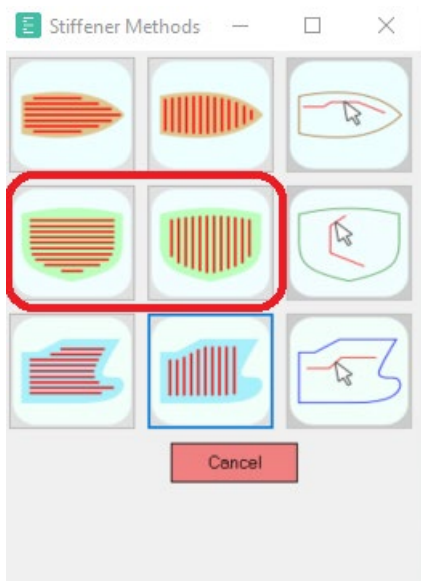
Which FloorGroup will have stiffeners?

Step by Step explanation:

- Since FloorSubgroup1 don't need extra stiffeners in addition to the girders go to FloorSubgroup2 in the navigation tree.
- For information about the input for the stiffeners' definitions click 
- Click on the  underneath the stiffener header.



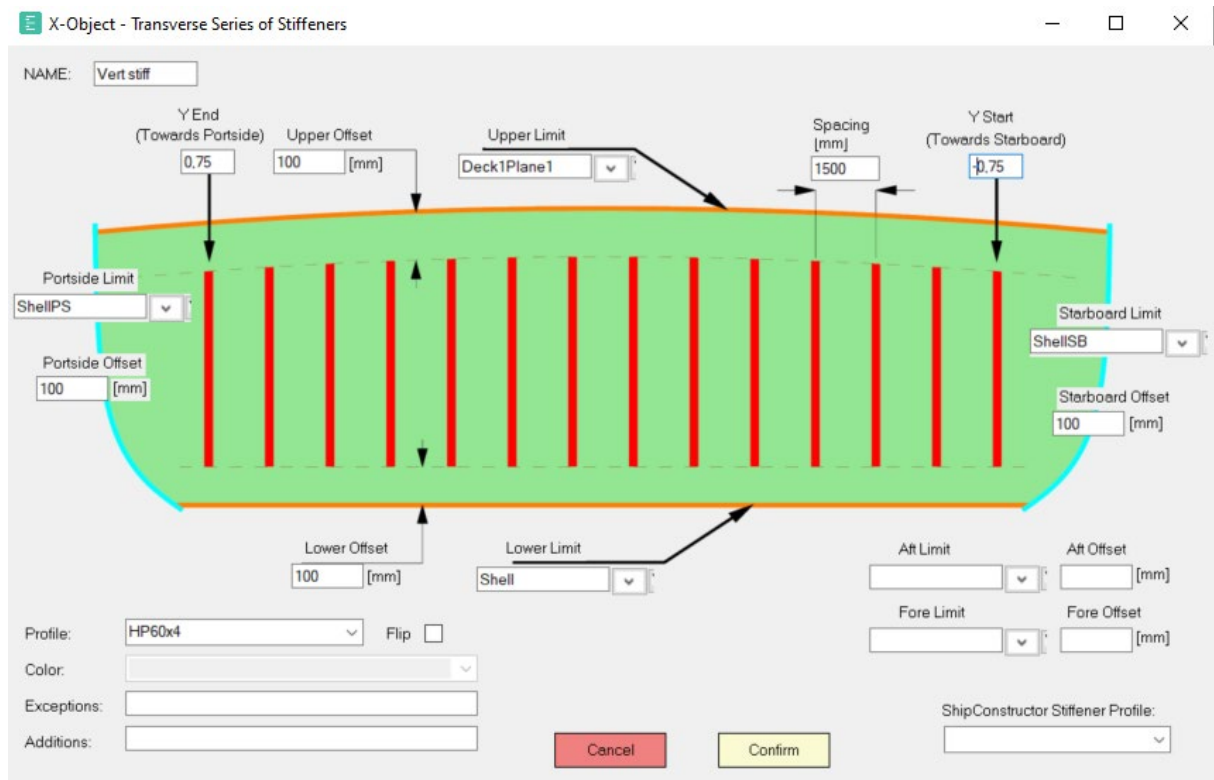
- The Stiffener Methods window now open.




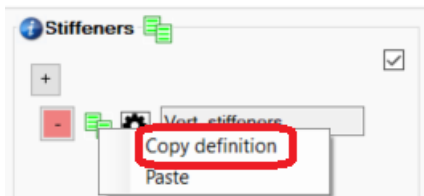
- It is possible to select X-object – Vertical Series of Stiffeners and X-object Transvers series of stiffeners.
- Select the X-object Transvers series of stiffeners.
- Click




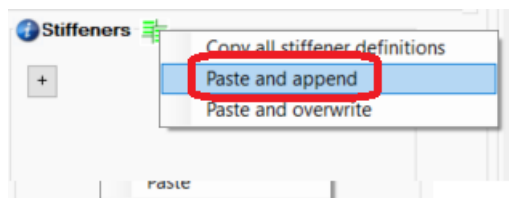
- The window for X-object Transverse series of stiffeners will now open.
- Give name to the stiffeners group, Name: vert stiff.
- Set YEnd = 0,75, Spacing = 1500 and Y Start = -0,75.
- Set Upper Limit = Deck1Plane1, Starboard Limit = ShellSB, Portside Limit = ShellPS and Lower Limit = Shell.
- Set all the offsets to be 100mm
- Set the profile to be HP60x4.




- Click **Confirm** when the setup is correct.
- Click **Generate** to generate stiffeners.
- Copy the stiffener definition to FloorSubGroup3.
- Right click  and copy the definition.



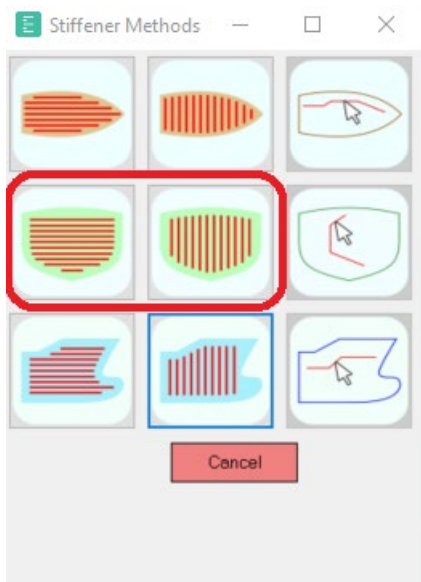
- Then go to FloorSubgroup3 and right click  and select paste and append. To append the definition to FloorSubgroup3.



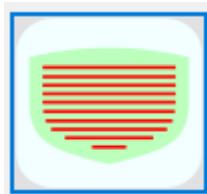
- The Click **Generate**
- Go to FloorSubGroup5
- Click on the  underneath the stiffener header.



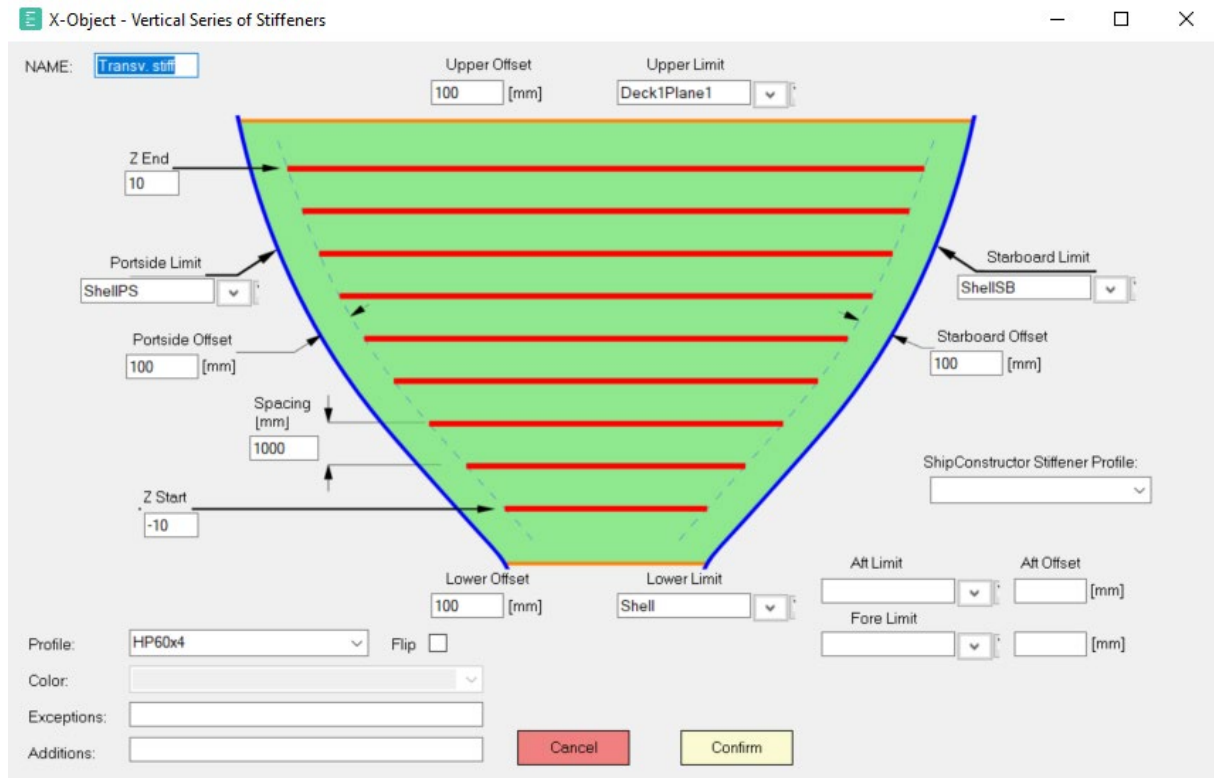
- The Stiffener Methods window is now open.




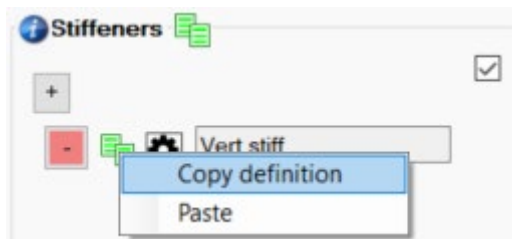
- Select the X-object – Vertical Series of Stiffeners.
- Click




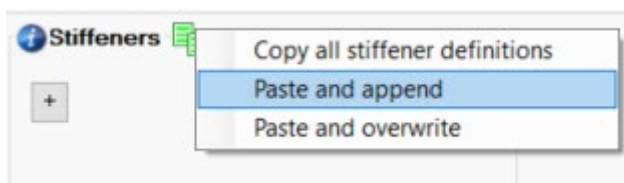
- The window for X-object Transverse series of stiffeners will now open.
- Give name to the stiffeners group, Name: Transv. stiff.
- Set Z End = 10, Spacing = 1000 and Y Start = -10.
- Set Upper Limit = Deck1Plane1, Starboard Limit = ShellISB, Portside Limit = ShellPS and Lower Limit = Shell.
- Set all the offsets to be 100mm
- Set the profile to be HP60x4.





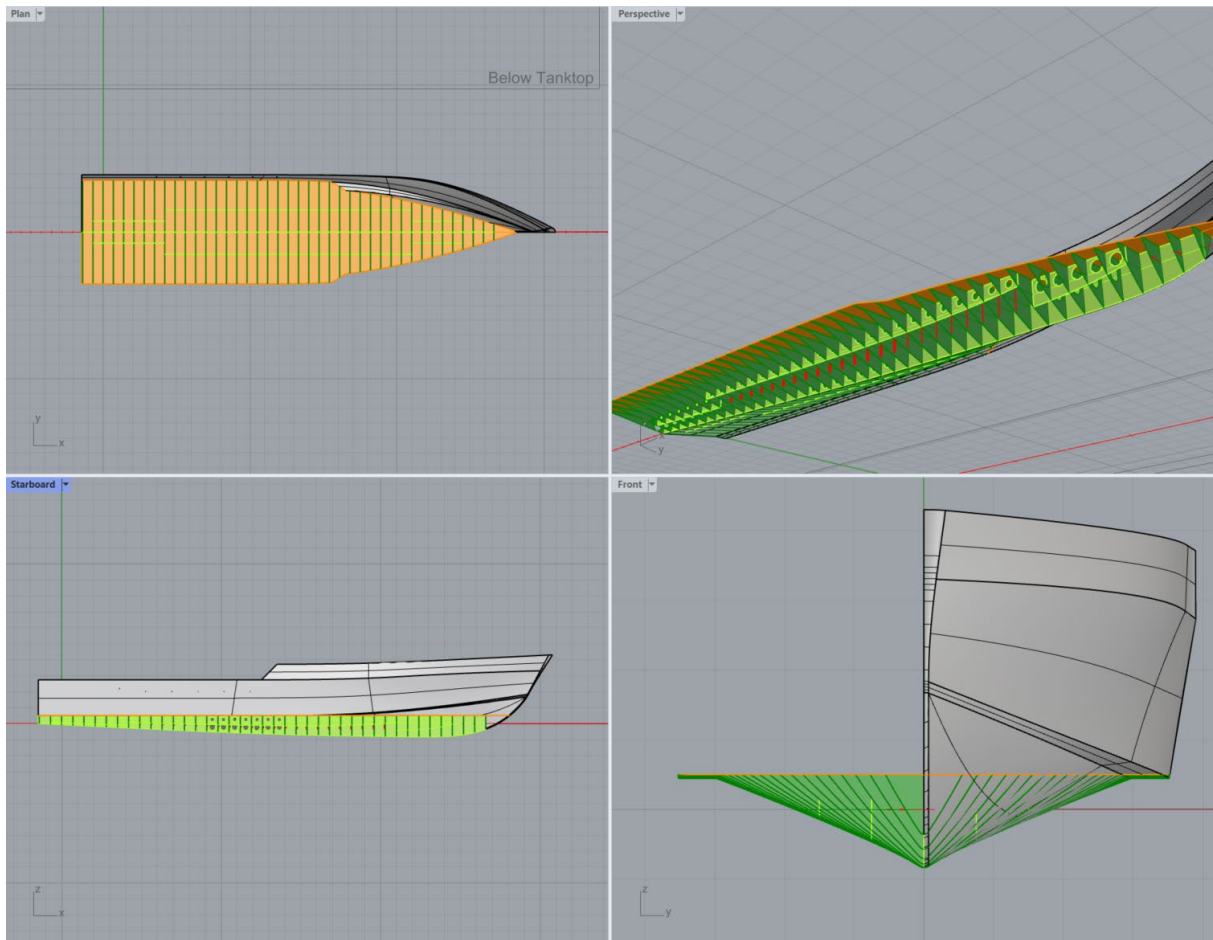
- Copy the vert stiff definition from FloorSubgroup3_Fr.#14 by right clicking  and selecting Copy definition.



- For the watertight floor at FloorSubgroup3_Fr.#13, unlock the floor by clicking  then right click Paste and append.



- Click 
- Lock the watertight floor again by clicking 





10. Add openings in the floors

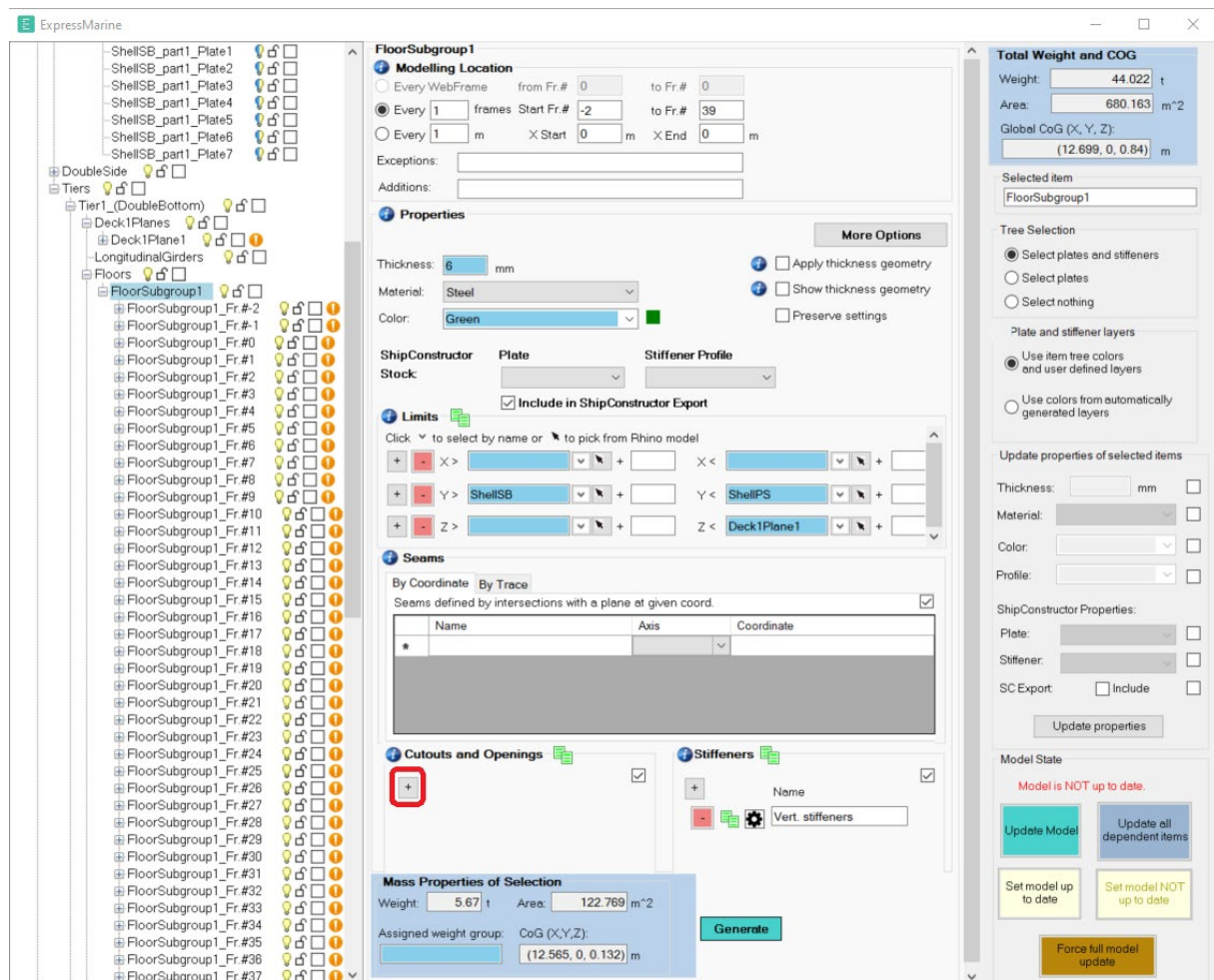
The floors need some holes/cut outs. Add the hole definition for the holes.

Try to think about this before you move forward:

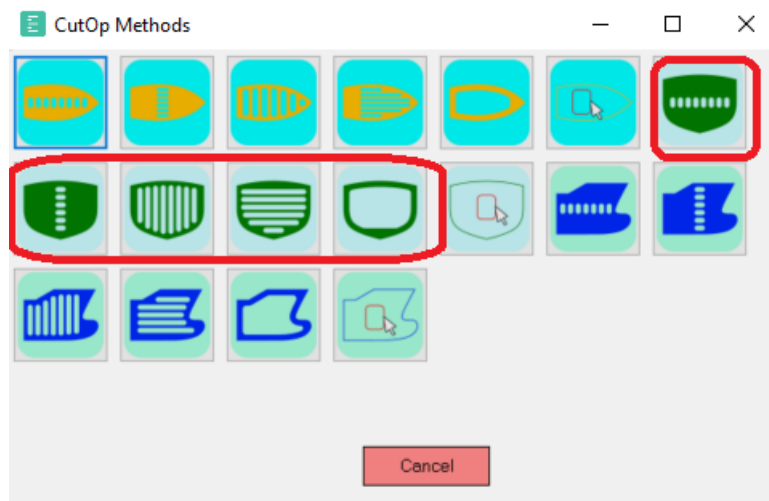
- Decide where the holes should be and the dimension for the holes.

Step by step explanation:

- Go to the FloorSubgroup1 Node in the navigation tree.
- Click on  before Cutouts and Openings to read about the different settings.
- Click on the  underneath the Cutout and Openings header.



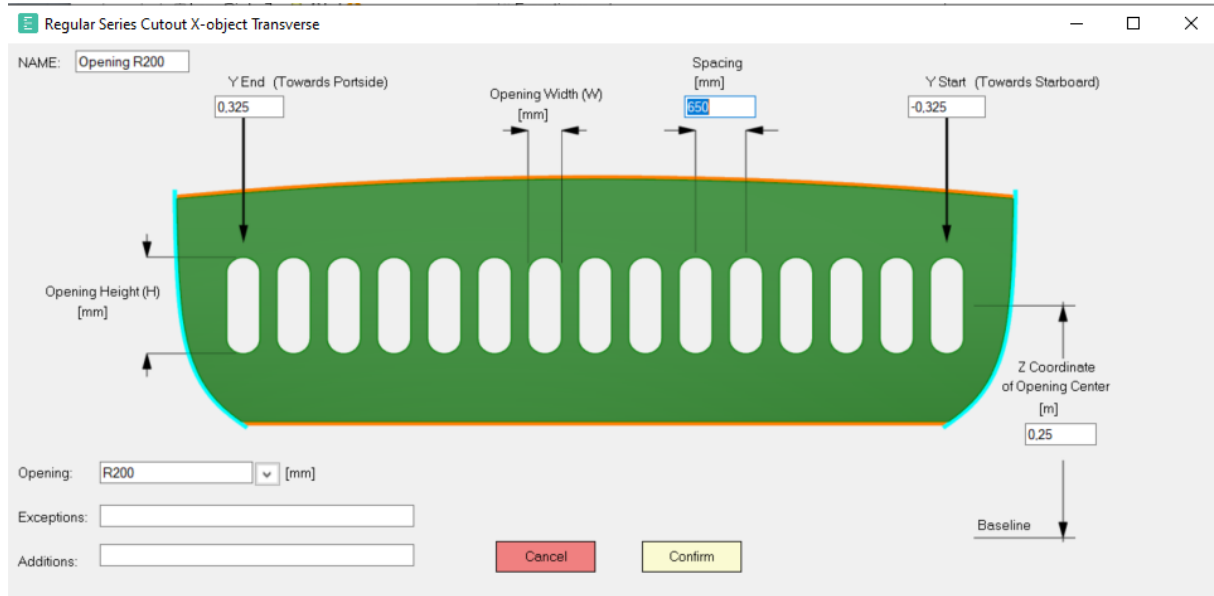
- Then the CutOp Methods window appears.



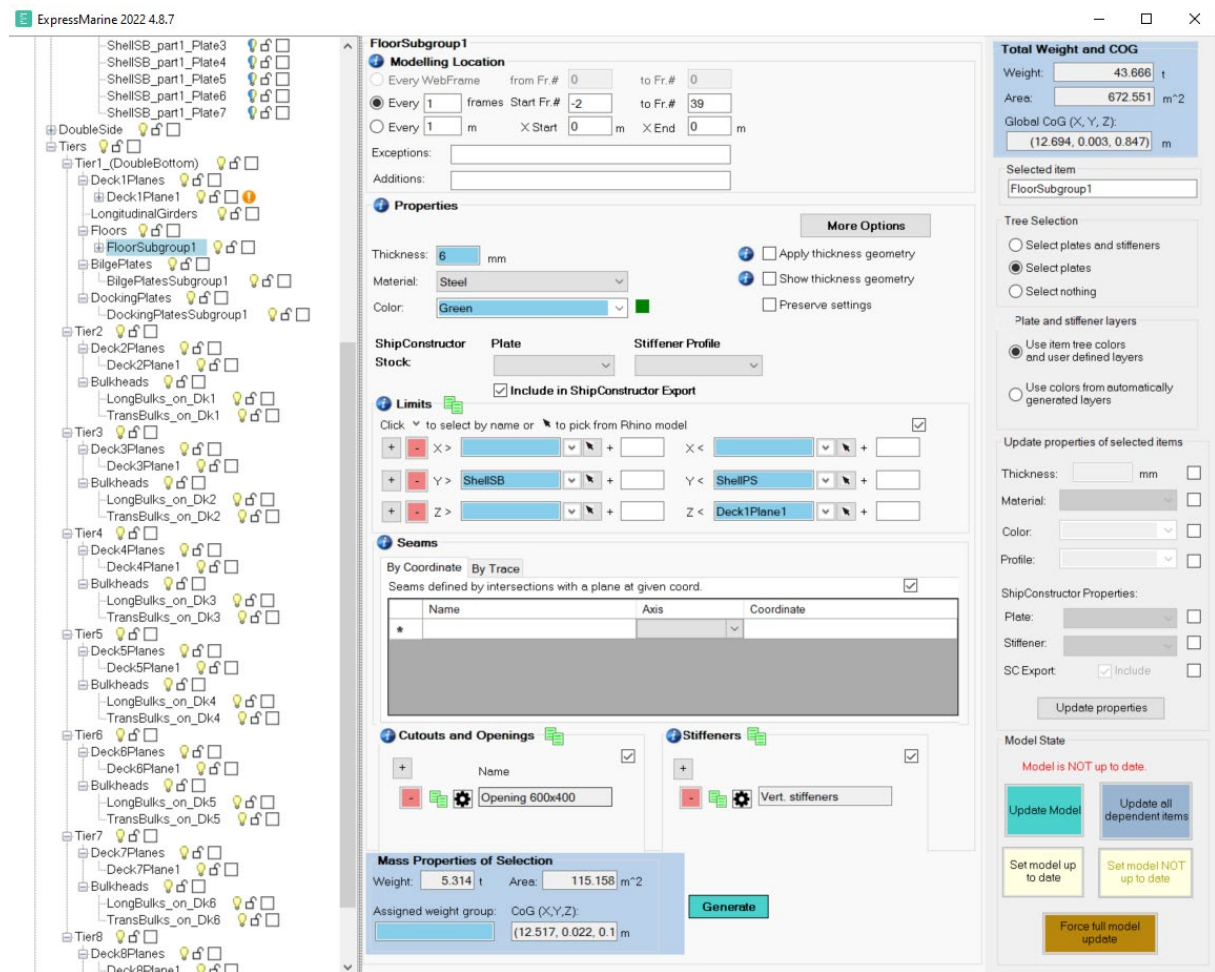
- The methods marked with red can be selected.
- Select the Regular Series CutOut X-object Transverse



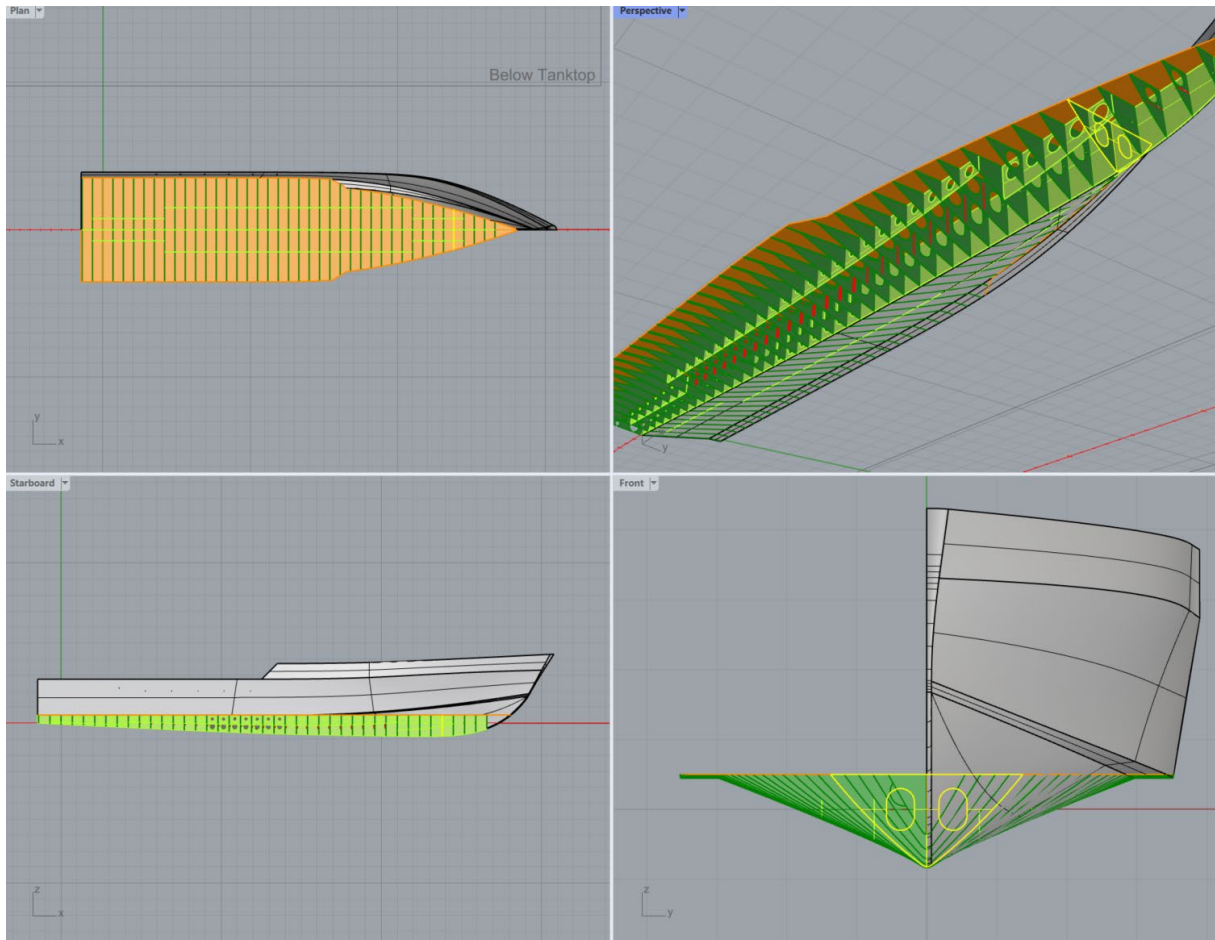
- Give name to the opening: Opening R200
- Set Y End = 0,325 and Y Start = -0,325
- Set the spacing between the center of the holes to be 650mm.
- Set the Z- coordinate = 0,25.
- Select the opening to be R200.



- Click 



- Click **Generate**
- Remember hole definitions can be copied to another FloorGroup.
- Set up the holes for the rest of the floors
 - FloorSubGroup1 opening nr 2.: Name: Opening R100, YEnd = 1,025, YStart = -1,025, Spacing 2050, Z-coord= 0,25, Opening: R100
 - FloorSubGroup2 opening nr1: Name: Opening D450, YEnd = 1,075, YStart = -1,075, Spacing 2150, Z-coord=0,2, Opening: D450, Additions: 1,075, -1,075
 - FloorSubGroup3 opening nr 1.: Name: Opening 600x400, YEnd = 0,375, YStart = -0,375, Spacing 750, Z-coord= 0, Opening: 600x400
 - FloorSubGroup3 opening nr 2.: Name: Opening D450, YEnd = 1,075, YStart = -1,075, Spacing 2150, Z-coord= 0,2, Opening: D450
 - FloorSubGroup4 opening nr 1.: Name: Opening 600x400, YEnd = 0,375, YStart = -0,375, Spacing 750, Z-coord= 0, Opening: 600x400
 - FloorSubGroup5 opening nr 1.: Name: Opening D400, YEnd = 0,325, YStart = -0,325, Spacing 650, Z-coord= 0,25, Opening: D400



11. Create the main deck

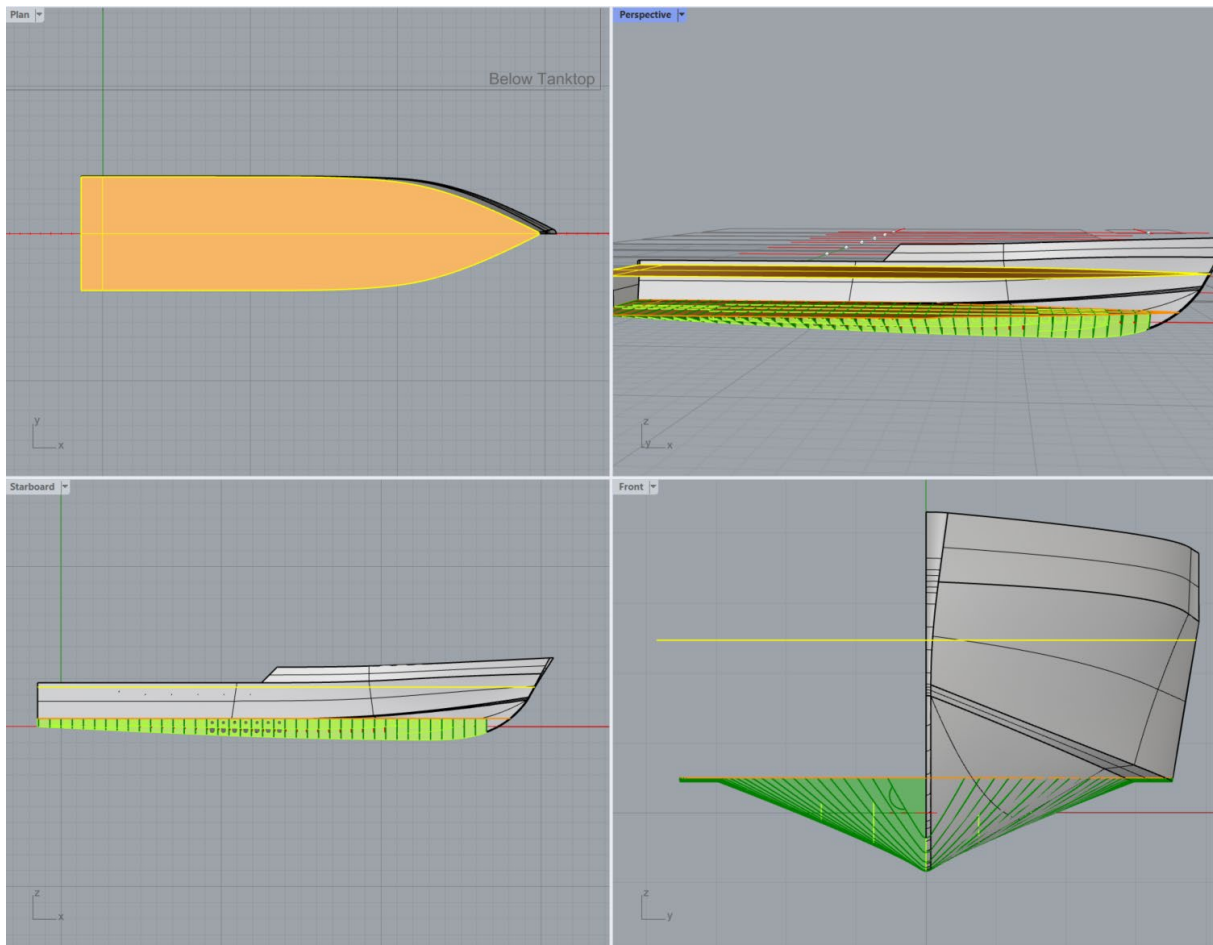
Let us add a main deck to the model.

Try to think about this before you move forward:

- At what height should the main deck be?

Step by step explanation:

- Go to Tier2 and select the Deck2Plane1 in the navigation tree.
- Set the Constant $Z = 2.47\text{m}$.
- Set thickness of the deck plate to 6mm.
- Set the limits $Y > \text{ShellSB}$ and $Y < \text{ShellPS}$.
- Click Generate to generate the deckplate.



12. Add transverse bulkheads below main deck

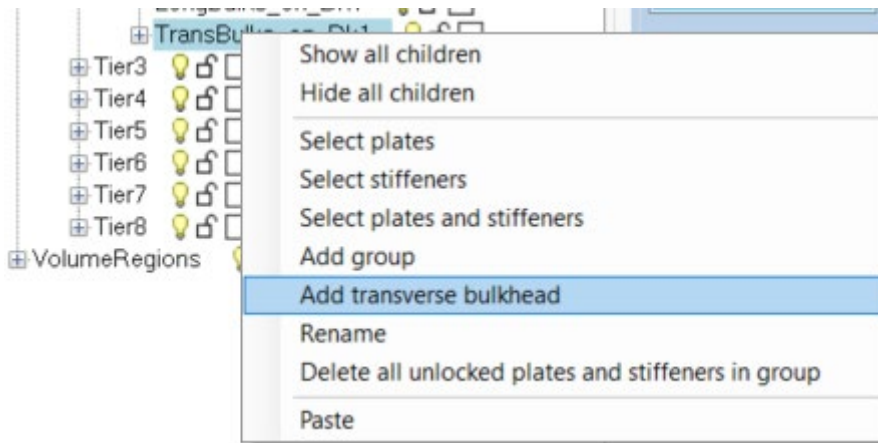
Below the main deck there needs to be some watertight transverse bulkheads.

Try to think about this before you move forward:

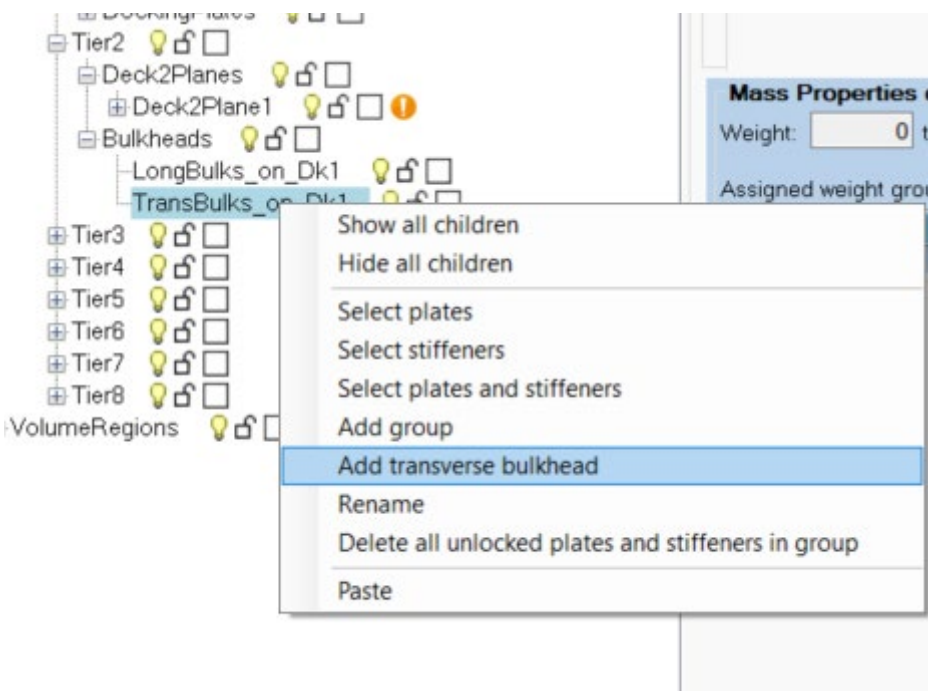
- What is the rule length for the compartments? Where are the watertight bulkheads, and how many are there?

Step by step explanation:

- Go to Tier2 – Bulkheads
- Right click TransvBulks_on_Dk1 and select add transverse bulkheads.



- Add 5 transverse bulkheads. Repeat this 5 times.



- Go to TB1Dk1
- Set constant X = #38
- Set thickness = 6mm
- Set limits to be Y>ShellSB, Y<ShellPS, Z>DeckPlane1 and Z<Deck2Plane1

TB1Dk1

Modelling Method

☒ Constant X at Fr.# = m

☐ Pick on GA Trace:

☐ Import Parent Surface

☐ Pick Rhino Object

Reflect ☐ Symmetric

Properties

Thickness: mm

Material:

Color:

More Options

☐ Apply thickness geometry

☐ Show thickness geometry

☒ Preserve settings

ShipConstructor Stock:

Plate

Stiffener Profile

☒ Include in ShipConstructor Export

Limits

Click to select by name or to pick from Rhino model

X > X <

Y > Y <

Z > Z <

Seams

By Coordinate ☒ By Trace ☐

Seams defined by intersections with a plane at given coord. ☒

Name	Axis	Coordinate
*		

Cutouts and Openings

Stiffeners

Mass Properties of Selection

Weight: t Area: m²

Assigned weight group:

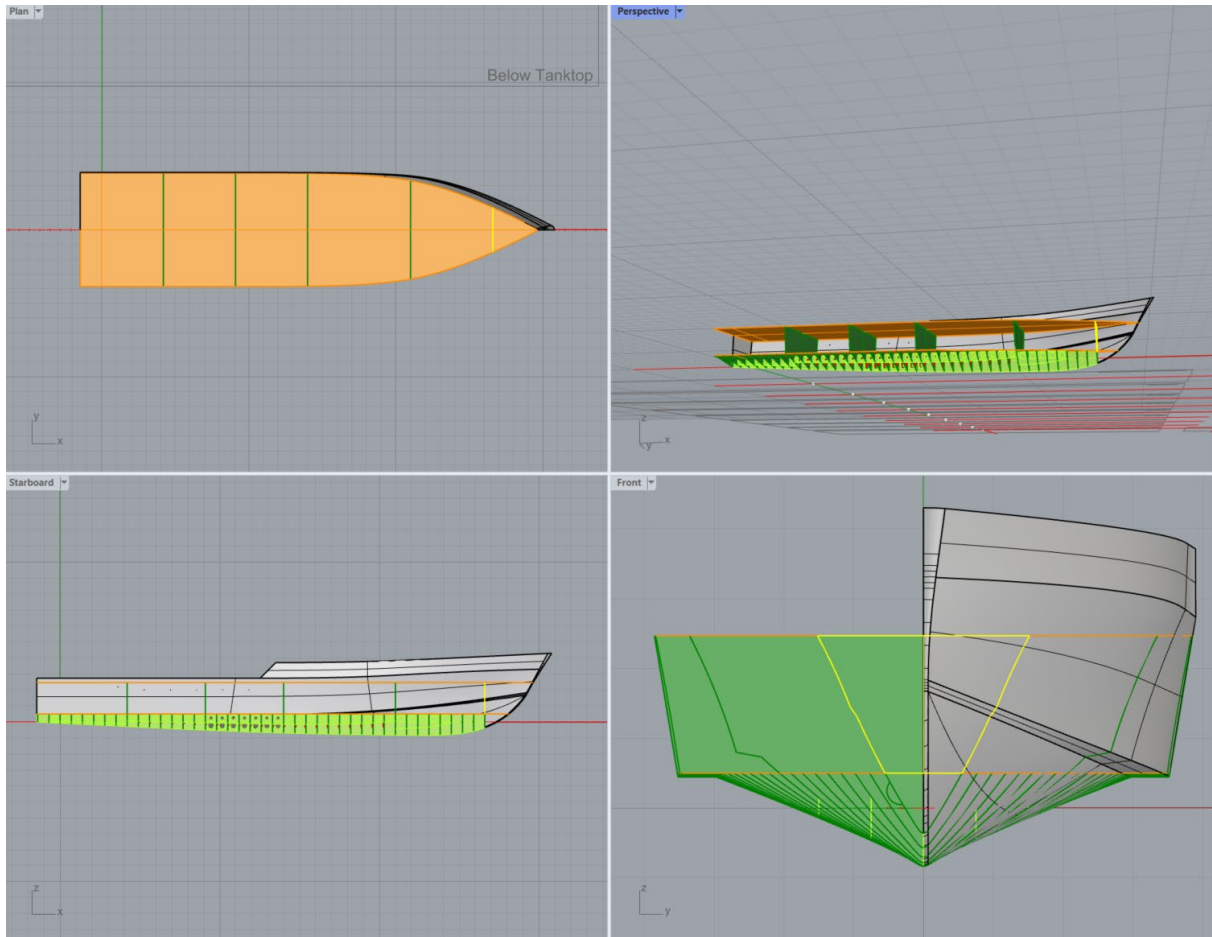
CoG (X,Y,Z): m

Generate

- Click **Generate**
- Do the same for the other transverse bulkheads.

Limits and Thickness as above

- TB2Dk1: Constant X = #30
- TB3Dk1: Constant X = #20
- TB4Dk1: Constant X = #13
- TB5Dk1: Constant X = #6



13. Add stiffeners to transverse bulkheads below main deck.

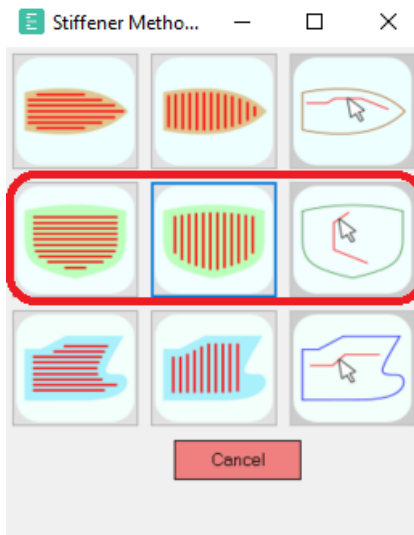
Then add stiffeners to the transverse bulkheads below main deck.

Try to think about this before you move forward:

- What is the distance between the stiffeners? What profile would be the best solution here?

Step by step explanation:

- Go to TB1DK1
- Click **+** to open the stiffener methods
- Select X-Object – Transverse Series of Stiffeners from the available bulkhead stiffener methods inside the red rectangle.



- To select X-Object – Transverse Series of Stiffeners click



NAME:

Y End (Towards Portside): Upper Offset: [mm] Upper Limit: Spacing [mm]: Y Start (Towards Starboard):

Portside Limit: Portside Offset: [mm] Starboard Limit: Starboard Offset: [mm]


Lower Offset: [mm] Lower Limit: Aft Limit: Aft Offset: [mm]

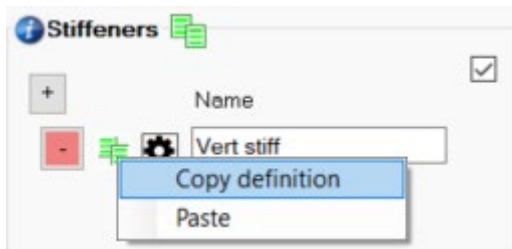
Fore Limit: Fore Offset: [mm]

Profile: Flip ☐ Color: Exceptions: Additions:

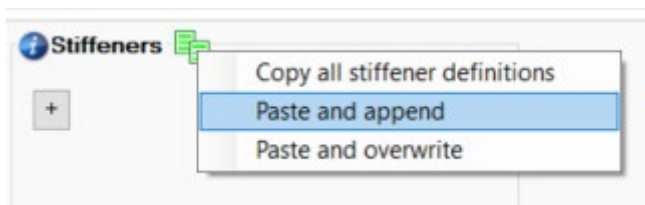
ShipConstructor Stiffener Profile:

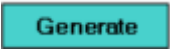
- Name the stiffeners: Vert stiff
- Set Y End = 7,5, YStart = -7,5, Spacing = 750
- Set limits and offsets:
 - Offsets: 100mm

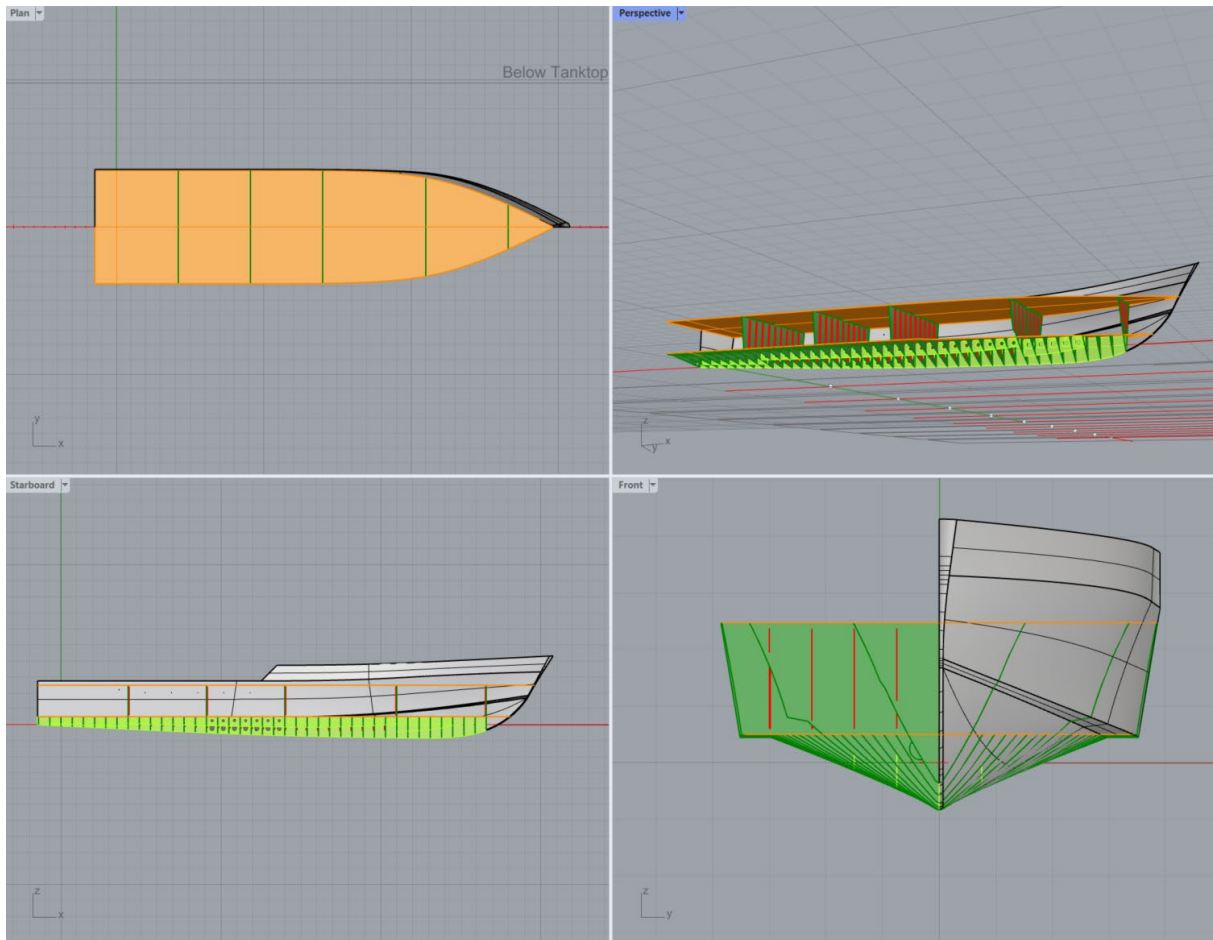
- Portside Limit: ShellPS
- Starboard Limit: ShellSB
- Upper Limit: Deck2Plane1
- Lower Limit: Deck1Plane1
-
- Select profile = HP60x4.
- Copy definition to the other transverse bulkheads or do the same procedure.
- To copy definition right click  and select copy definition



- Go to TB2Dk1 and click  and select paste and append to paste definition



- Click 
- Do this for all transverse bulkheads below main deck.




14. Add stiffeners to the main deck

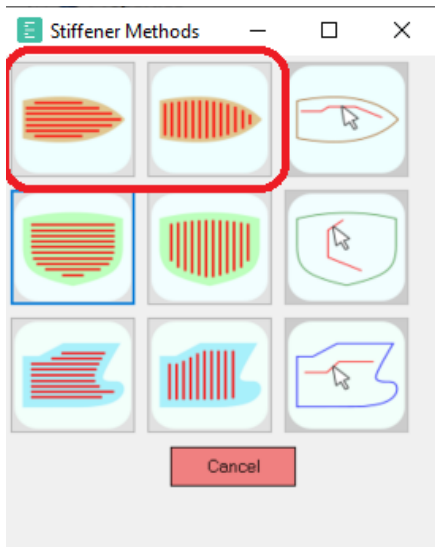
Then add stiffeners to the main deck.

Try to think about this before you move forward:

- What is the distance between the stiffeners? What profile would be the best solution here?

Step by step explanation:

- Stay in Deck2Plane1.
- Click  underneath the stiffeners
- Select Z-Object – Longitudinal Series of Stiffeners or Z-Object – Transverse Series of Stiffeners.



- To select Z-Object Longitudinal Series of Stiffeners click



- Give name to the stiffeners: Transv. Stiff.
- Set X Start = -#3 and X End = #50.
- Set spacing between stiffeners = 700mm.
- Set limits and offsets:
 - Aft/Fore offset = 700
 - Portside/Starboard offset = 100
 - Aft limit= Shell
 - Fore limit = Shell
 - Starboard limit = ShellSB
 - Portside limit = ShellPS
- Select Profile = HP60x4
- Set exceptions for the transverse bulkheads = #6, #13, #20, #30, #38

Z-Object - Longitudinal Series of Stiffeners

NAME: Transv. stiff

X Start: #3

Spacing [mm]: 700

Portside Limit: ShellPS

Portside Offset: 100 [mm]

X End: #50

Aft Limit: Shell

Aft Offset: 700 [mm]

Fore Limit: Shell

Fore Offset: 700 [mm]

Starboard Limit: ShellSB

Starboard Offset: 100 [mm]

ShipConstructor Stiffener Profile:

Profile: HP60x4 Flip ☐

Color:

Exceptions: #6, #13, #20, #30, #38

Additions:

Upper Limit: Upper Offset: 0 [mm]

Lower Limit: Lower Offset: 0 [mm]

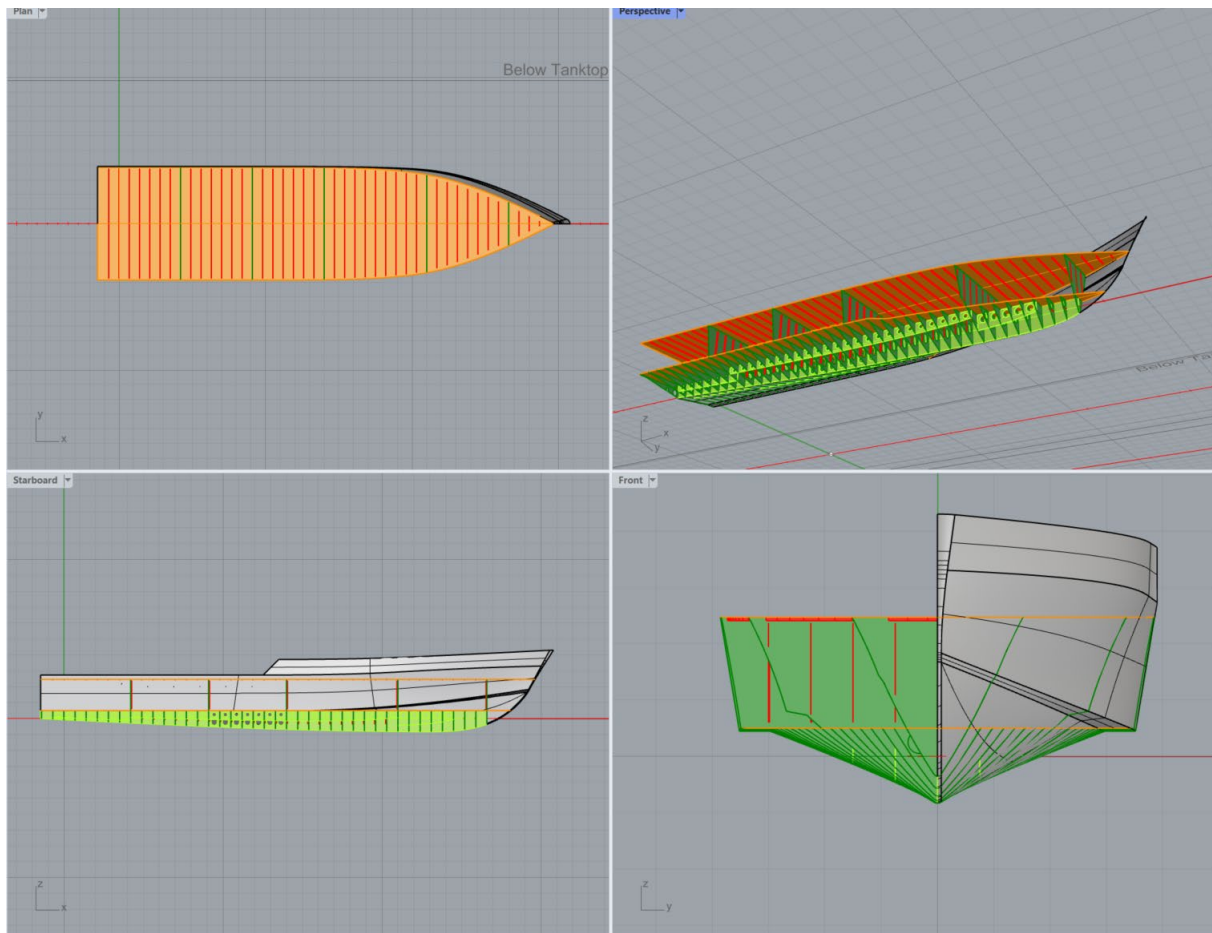
Cancel Confirm

- Click

Confirm

- Click

Generate




15. Create Stiffeners for the shell

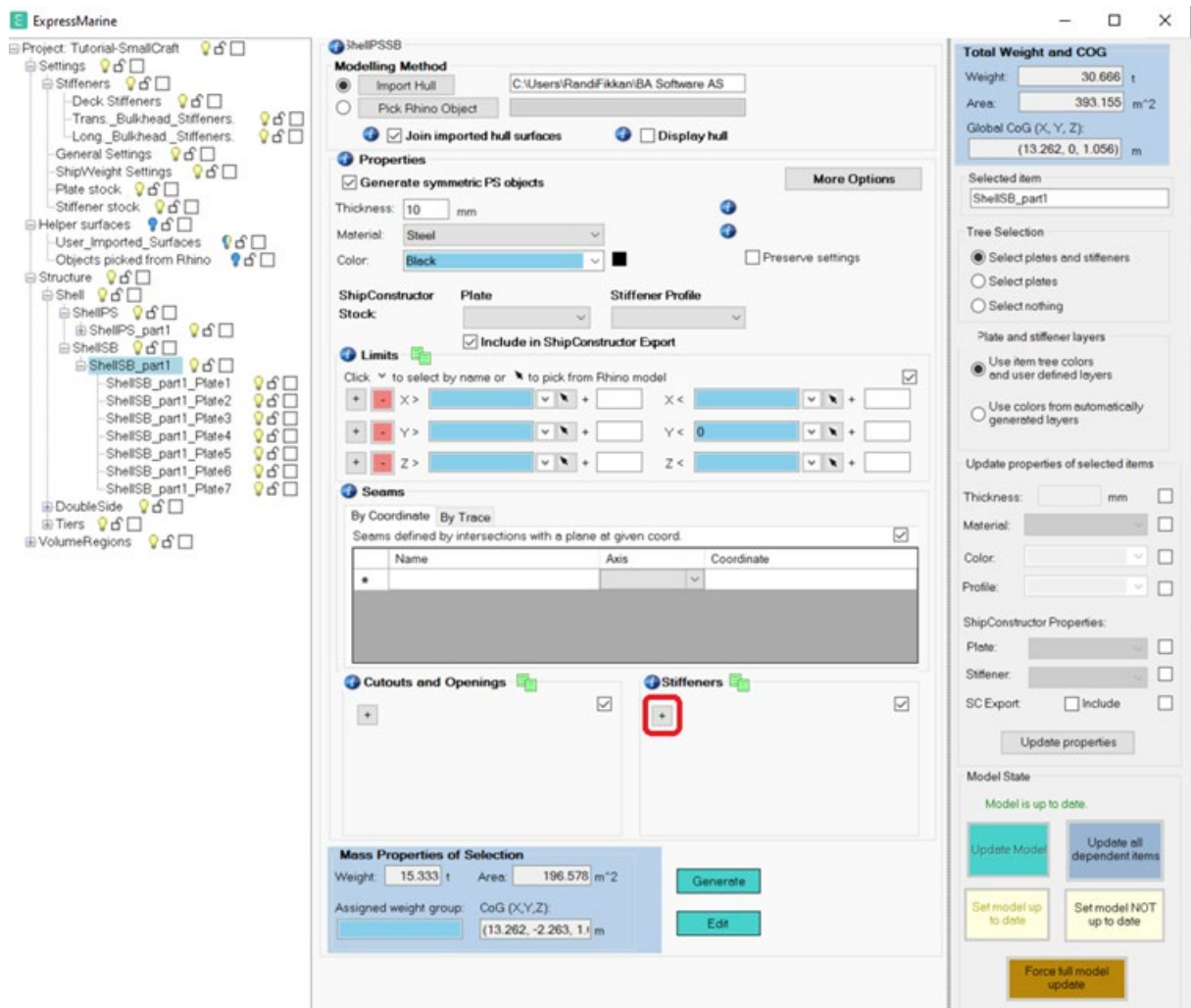
Now we are able to create stiffeners for the shell. Create the stiffeners for the shell.

Try to think about this before you move forward:

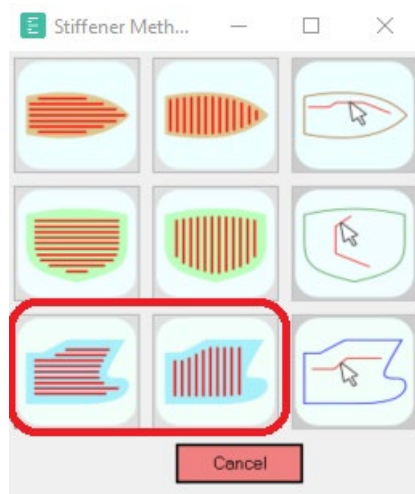
- Where should the stiffeners go? Should there be stiffeners below main deck and above main deck? Should the stiffeners in the bow be closer together?

Step by step explanation:

- Go to **ShellPS_part1** node to create the stiffeners.
- Click on  underneath **Stiffeners**.



- In the Stiffener Method Window- the Y-Object – Longitudinal Series of Stiffeners should be selected from the Y-objects marked in red.



- To select Y-Object – Longitudinal Series of Stiffeners click



- Give name to the stiffeners: Vert stiff.
- Set XStart = #-10 and XEnd = #30
- Define the spacing in-between the stiffeners to be #1
- Set limits and offset:
 - Aft/Fore Offset = 700
 - Lower/Upper offset = 100
 - Aft limit = #-10
 - Fore limit = #30
 - Upper Limit = Deck2Plane1
 - Lower Limit = Deck1Plane1
- Select profile: HP60x4

Y-Object - Longitudinal Series of Stiffeners

NAME: Vert stiff

X Start: #-10 Spacing [mm]: #1 Upper Limit: Deck2Plane1 Upper Offset: 100 [mm] X End: #30

Aft Limit: #-10 Fore Limit: #30

Aft Offset: 700 [mm] Fore Offset: 700 [mm]

Lower Limit: Deck1Plane1 Lower Offset: 100 [mm]

Portside Limit: Portside Offset: 0 [mm]

Sterboard Limit: Sterboard Offset: 0 [mm]

Profile: HP60x4 Flip ☐

Color:

Exceptions:

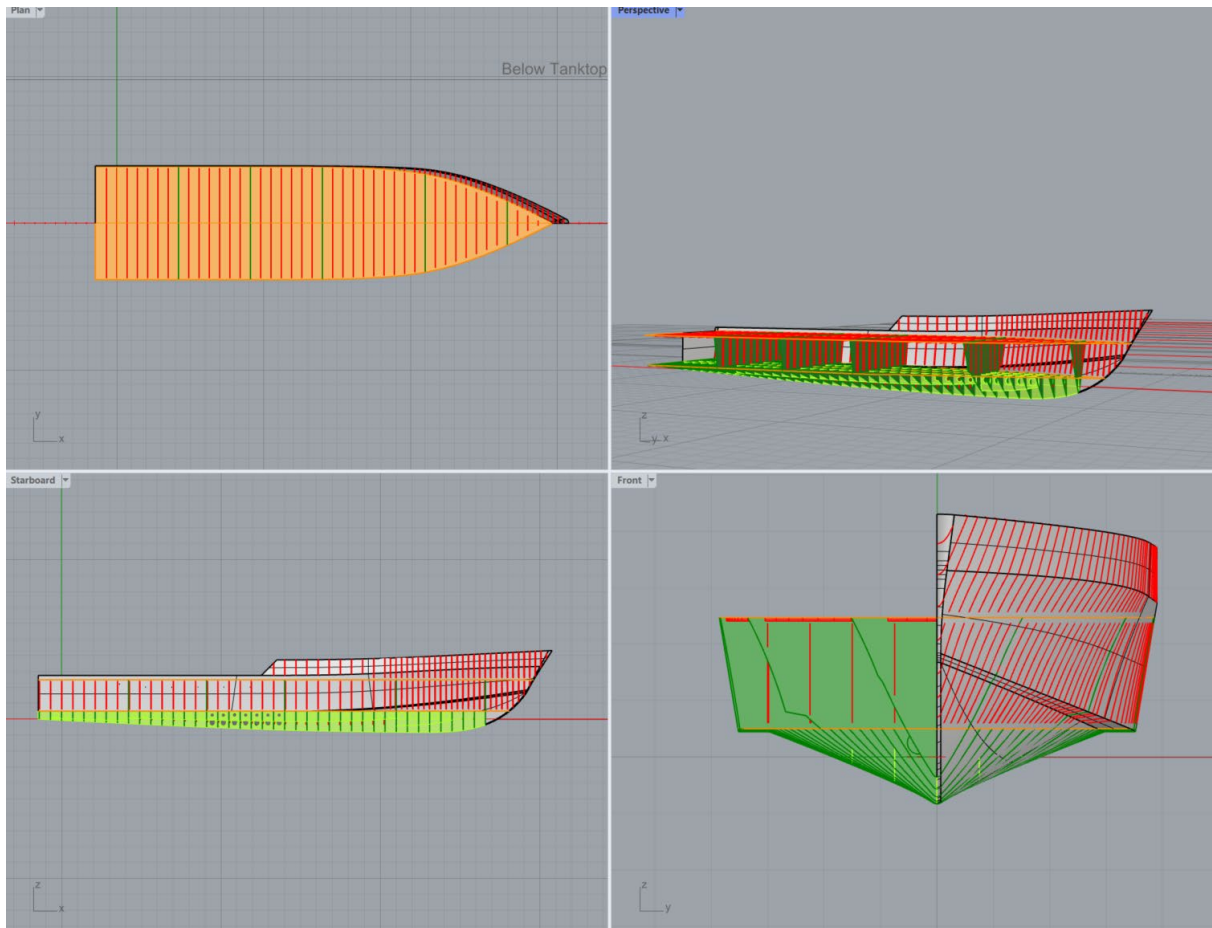
Additions:

Cancel Confirm

ShipConstructor Stiffener Profile:

- Click
- Click
- Repeat the method for the stiffeners planned or copy and edit.
 - Vert stiff frwd: Name: Vert stiff frwd, XStart = #29, XEnd = #45, Spacing= #0,5, Aft offset #0,5, Fore offset: 700, Upper/Lower offset = 100, Aft limit= #29. Fore Limit= #45, Upper limit = Deck2Plane1, Lower Limit= Deck1Plane1, Profile= HP60x4.

- Vert stiff upper: Name: vert stiff upper, XStart = #-10, XEnd = #30, Spacing= #1, Aft/Fore offset: 700, Upper/Lower offset = 100, Aft limit= #-10. Fore Limit= #30, Upper limit =10, Lower Limit= Deck2Plane1, Profile= HP60x4.
- Vert stiff upper frwd: Name: vert stiff upper frwd, XStart = #29, XEnd = #45, Spacing= #0,5, Aft offset= #0,5 Fore offset: 700, Upper/Lower offset = 100, Aft limit= #29. Fore Limit= #45, Upper limit =10, Lower Limit= Deck2Plane1, Profile= HP60x4.



16. Create Accommodation deckplane

Now the main hull is finished. Let us add accommodation and wheelhouse for the small craft.

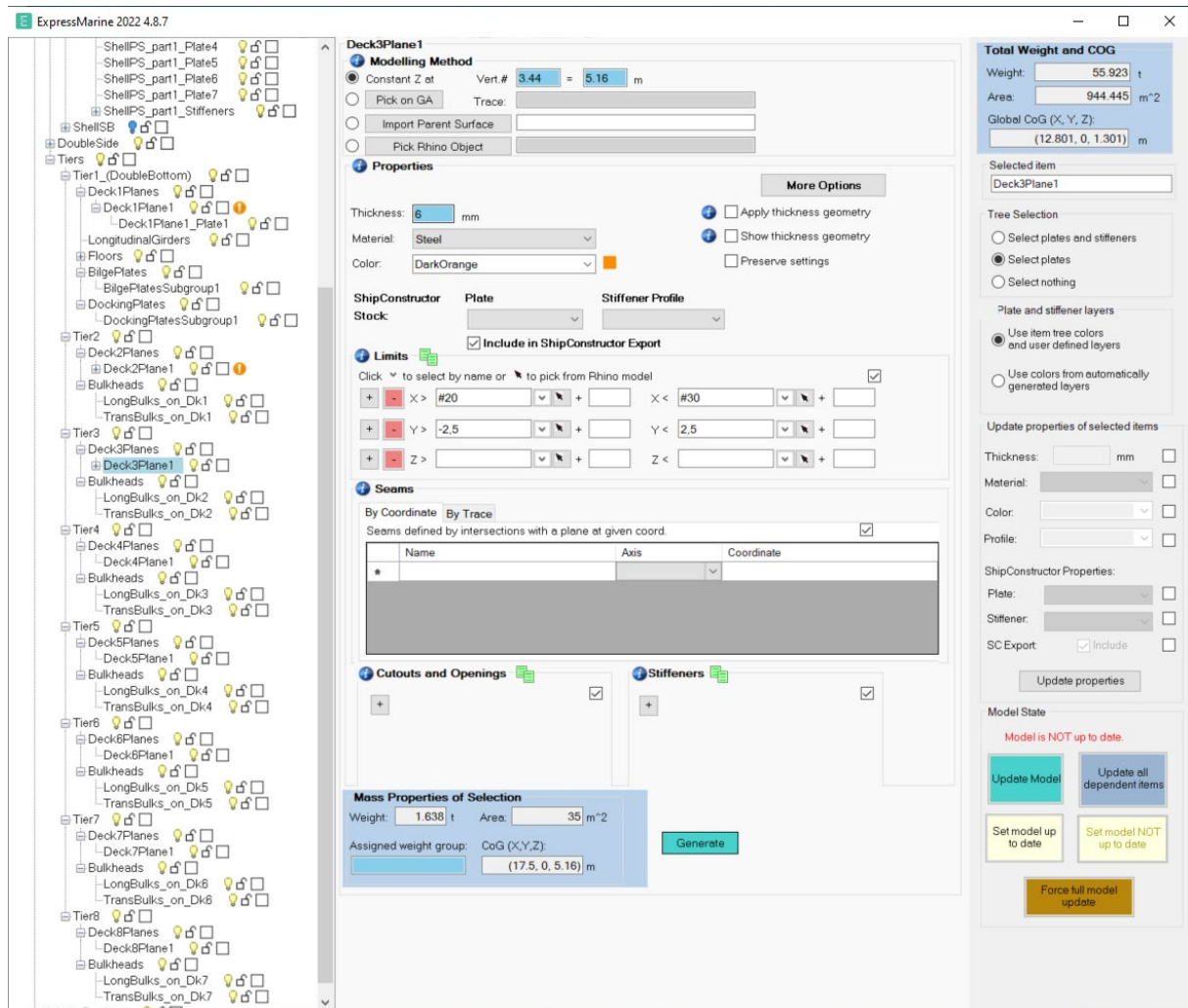
Start by creating the accommodation deckplane.

Try to think about this before you move forward:

- What height should the accommodation be?

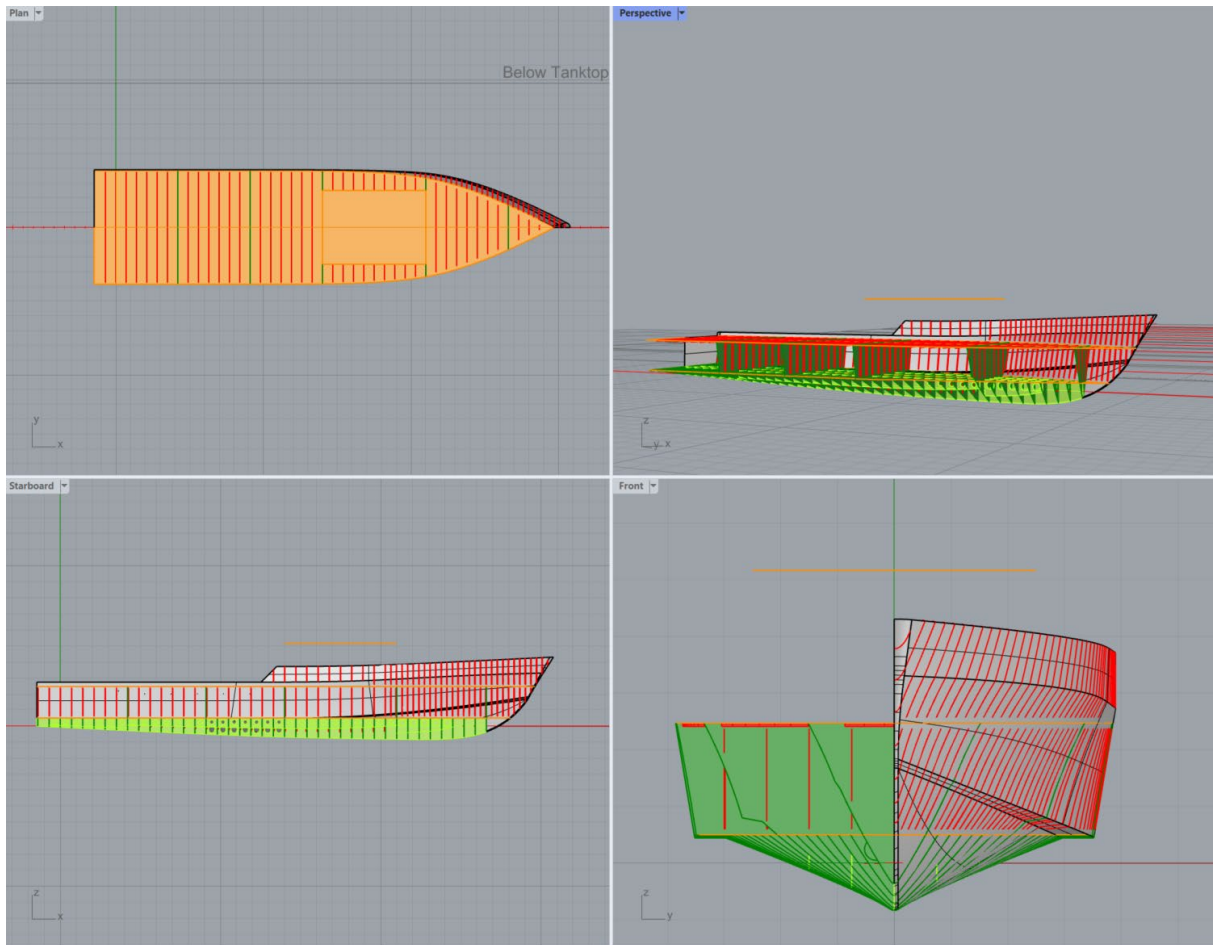
Step by step explanation:

- Go to Tier3 Deck3Plan1 to make the deckplane for the accommodation.
- Set the constant Z = 5,173m
- Set thickness = 6mm
- Set limits to be X>#20, X<#32, Y>-2,5 and Y<2,5



- Click

Generate




17. Create Stiffeners for Accommodation deckplane.

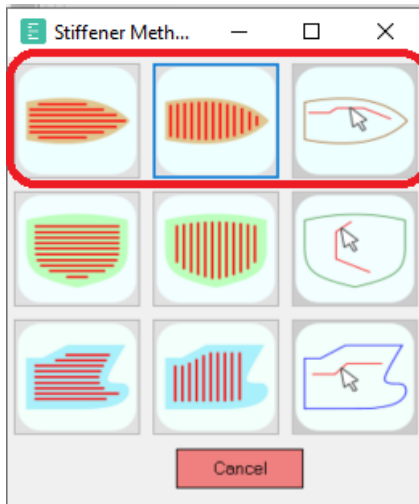
Create the stiffeners for the accommodation deckplane.

Try to think about this before you move forward:

- What should the distance between the stiffeners be? What profile should the stiffeners have? Should the stiffeners be longitudinal or transverse?

Step by step explanation:

- Add stiffeners by clicking  underneath the Stiffeners headline.
- Select stiffener method in the window.



- Select the Z-object – Longitudinal Series of Stiffeners by clicking



- Select name: Tranv. stiff
- Set X Start = #20 and X End= #32
- Set Spacing = #1
- Set limits and offset
 - Aft/Fore offset = #1
 - Starboard/portside offset = 100
 - Aft limit= #20
 - Fore limit=#32
 - Portside limit= 2,5
 - Starboard limit= -2,5
- Select Profile: HP60x4

Z-Object - Longitudinal Series of Stiffeners

NAME: Transv. stiff

X Start: #20

Spacing [mm]: #1

Portside Limit: 2.5

Portside Offset: 100 [mm]

X End: #30

Aft Limit: #20

Aft Offset: #1 [mm]

Fore Limit: #30

Fore Offset: #1 [mm]

Starboard Limit: -2.5

Starboard Offset: 100 [mm]

ShipConstructor Stiffener Profile:

Profile: HP60x4 Flip ☐

Color:

Exceptions:

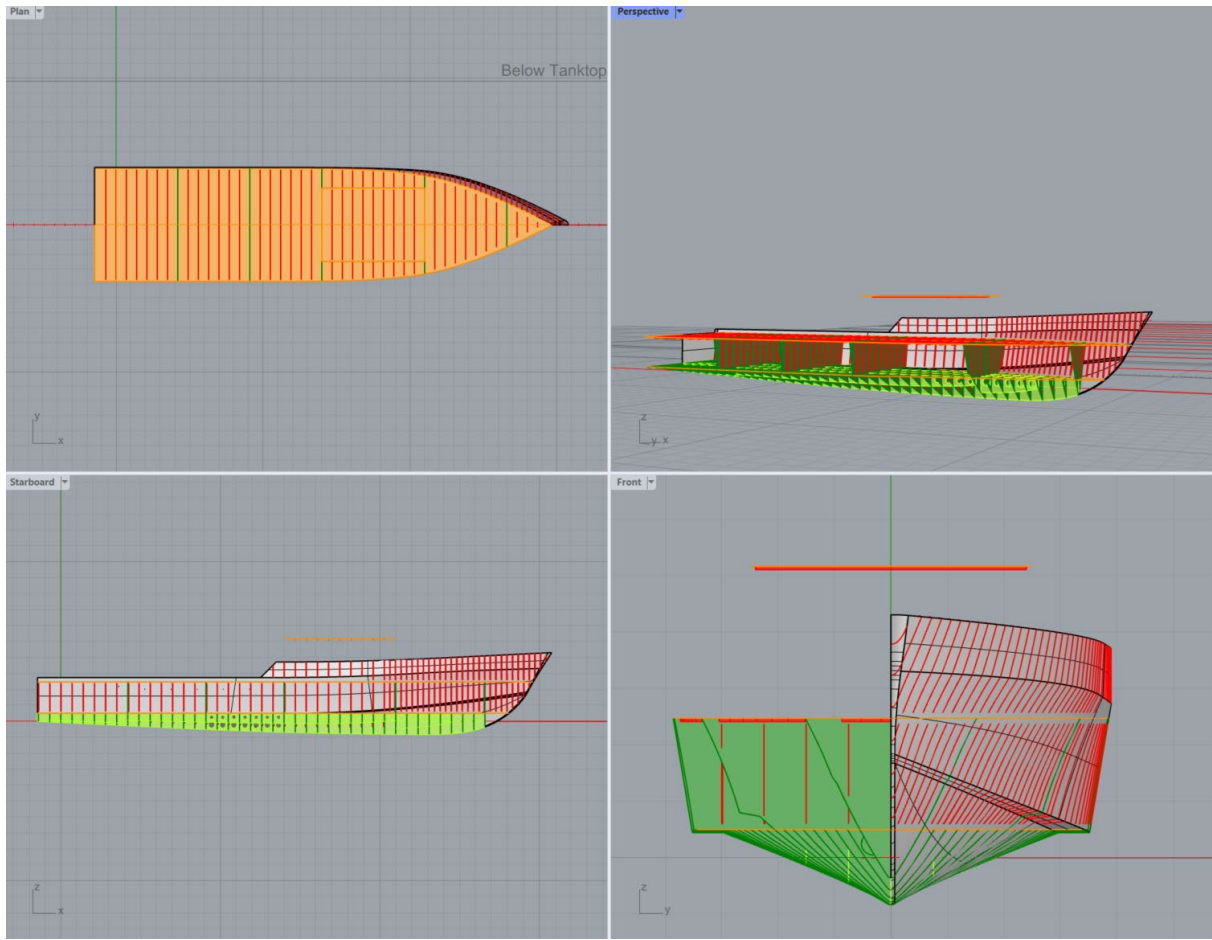
Additions:

Upper Limit: Upper Offset: [mm]

Lower Limit: Lower Offset: [mm]

Cancel Confirm

- Click **Confirm**
- Click **Generate**

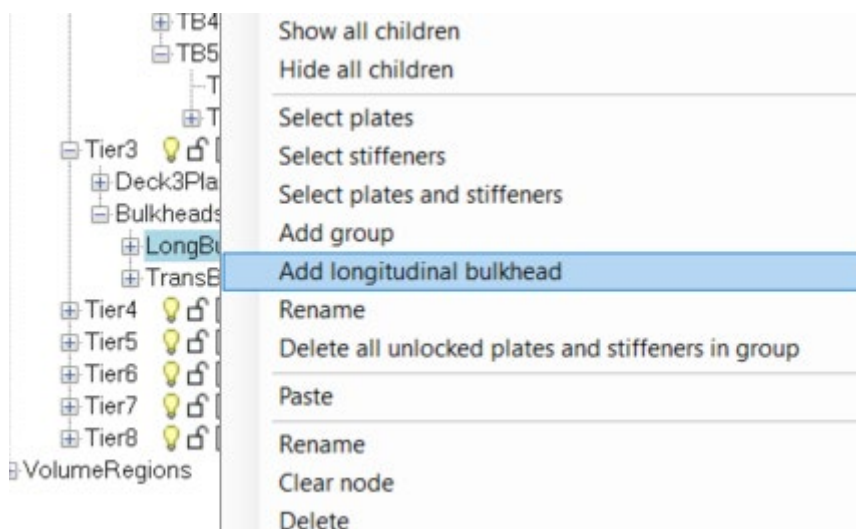


18. Create LongBulkheads for sides.

Create the longitudinal bulkheads that will be the sides of the accommodation.

Step by step explanation:

- Under Tier3 – Bulkheads right click on LongBulks_on_Dk2 and add longitudinal bulkheads for the sides of our accommodation.



- Do this twice to get both sides of the accommodation.
- Go to LB1Dk2 and set Constant Y= 2,5 and check that the Limits for Z is set to Deck2Plane1 and Deck3Plane1 and the limits in the X-direction is set to be the same as for the deckplane X>#20 and X<#32.

LB1Dk2

Modelling Method

☒ Constant Y at Long.# = m

☐ Pick on GA Trace:

☐ Import Parent Surface

☐ Pick Rhino Object

Reflect ☐ Symmetric

Properties

Thickness: mm

Material:

Color:

☐ Apply thickness geometry

☐ Show thickness geometry

☒ Preserve settings

More Options

ShipConstructor Plate Stiffener Profile

Stock:

☒ Include in ShipConstructor Export

Limits

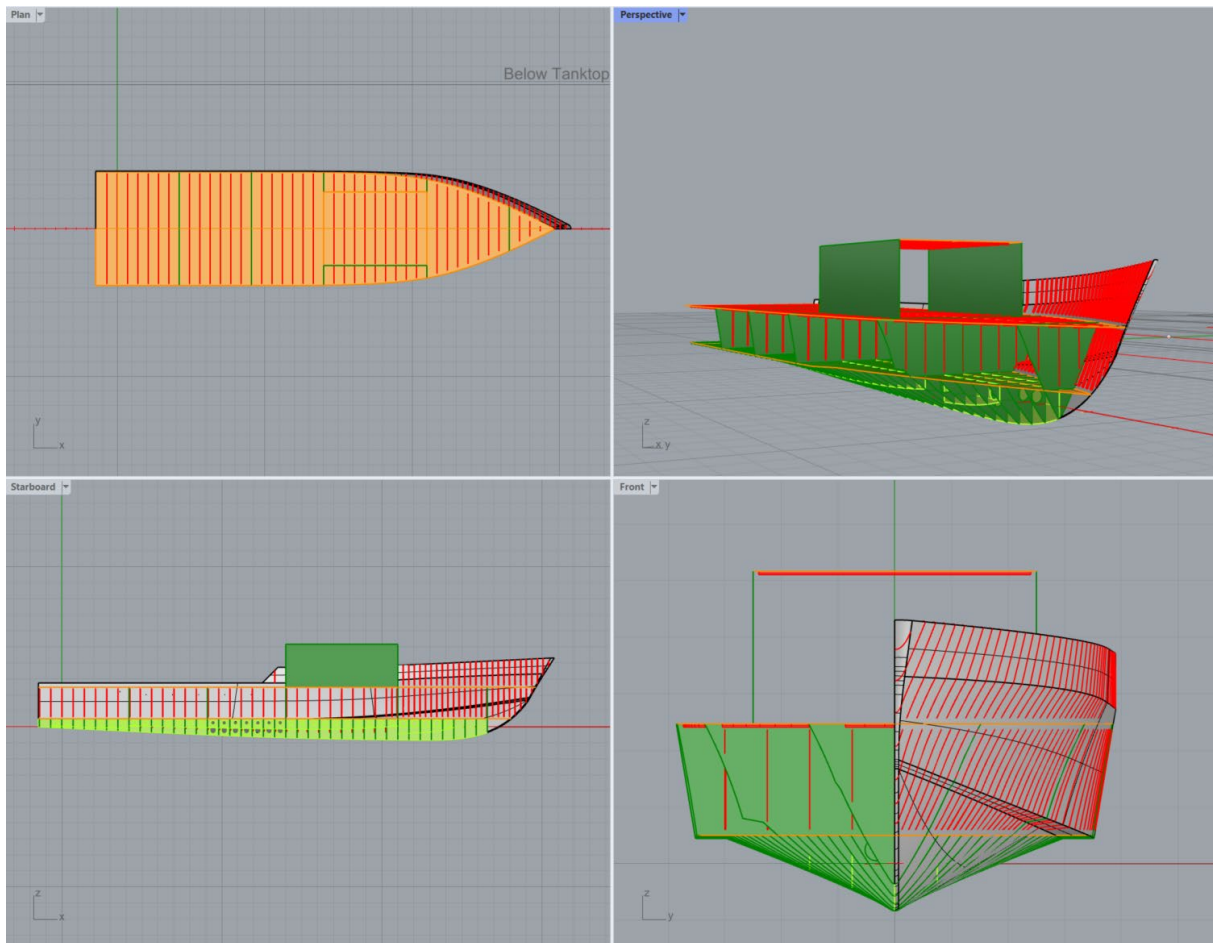
Click to select by name or to pick from Rhino model

X > + X < +

Y > + Y < +

Z > + Z < +


- Click
- Do the same for Starboard side in LB2Dk2, but remember that Constant Y = -2,5.

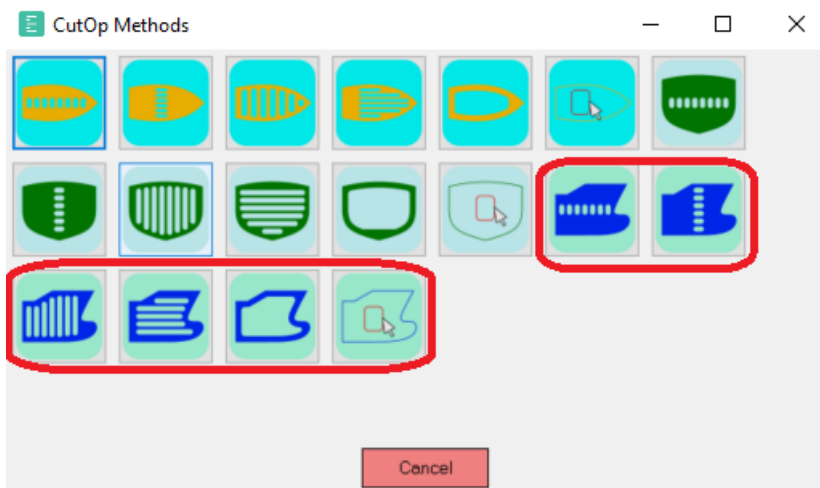


19. Create holes for accommodation windows in the side plate.

Create cutout and opening for the windows.

Step by step explanation:

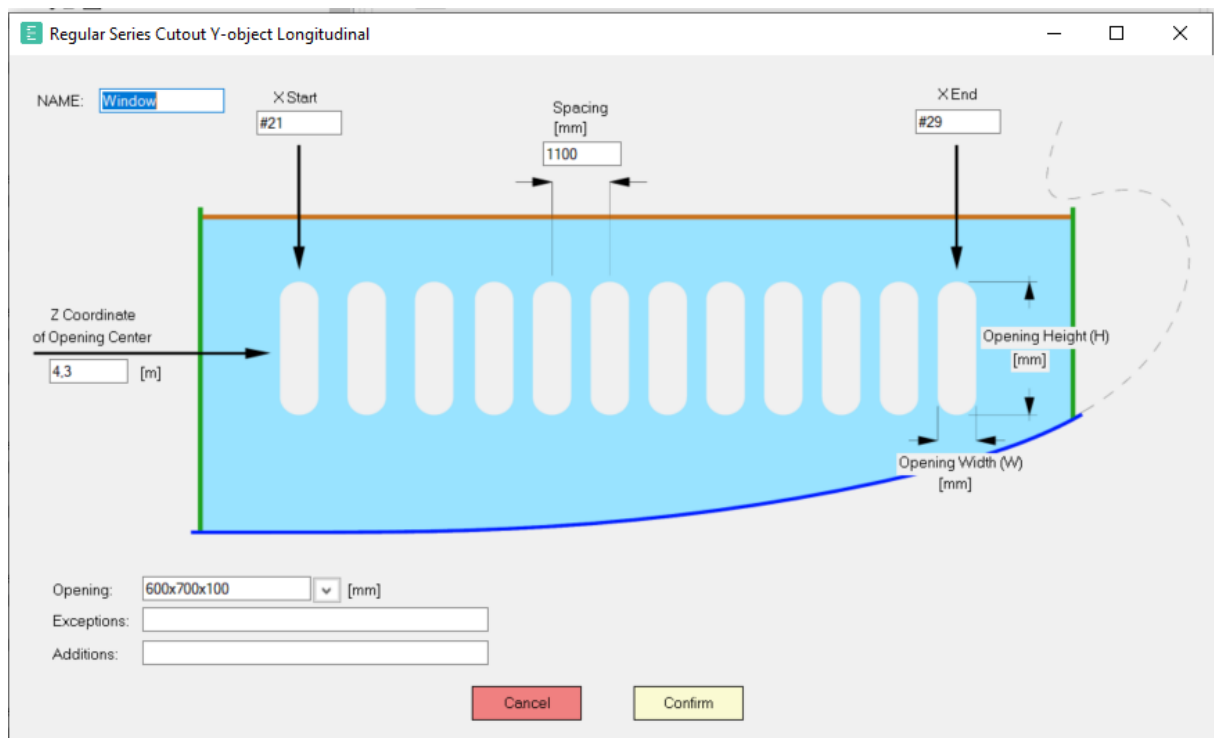
- Go to LB1Dk2
- Click  underneath Cutouts and Openings
- From the Regular Series Cutout Y-object marked with red select Regular Series Cutout Y-object Longitudinal.

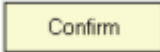




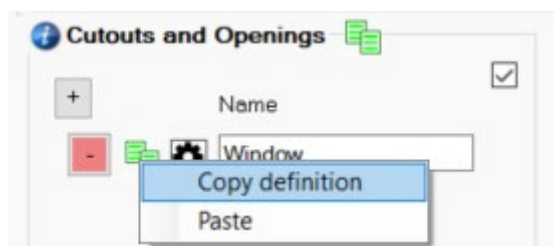
- To select Regular Series Cutout Y-object Longitudinal click



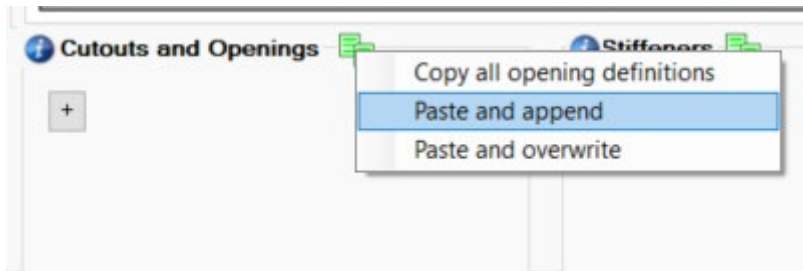
- Give the cutout name: Window
- Set Xstart = #21 and XEnd = #29
- Set Spacing= 1100
- Set Z coordinate of opening center = 4,3.
- Select opening: 600x700x100.



- Click 
- Click 
- Right click  and select copy definition

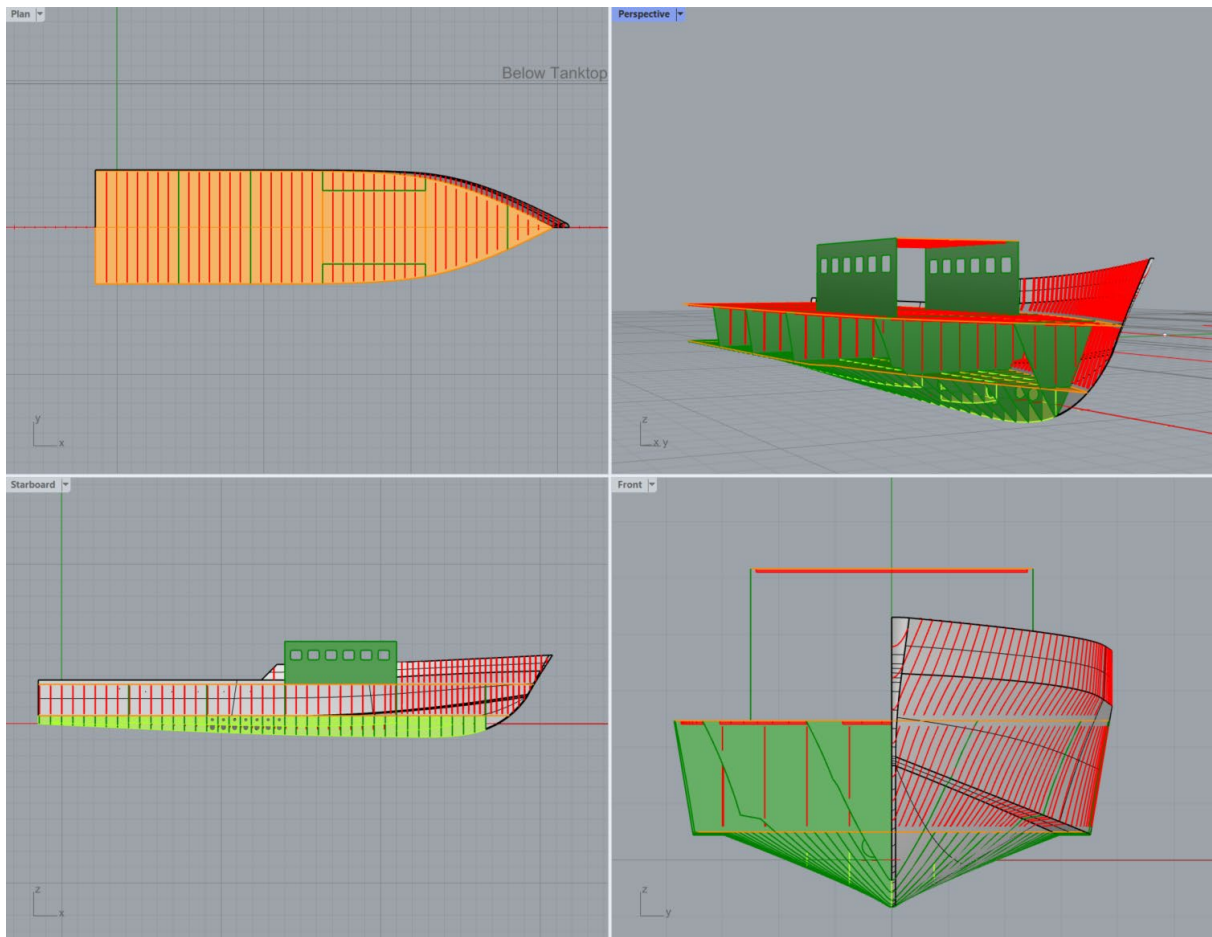


- Go to LB2Dk2 and right click  and select Past and append




- Click

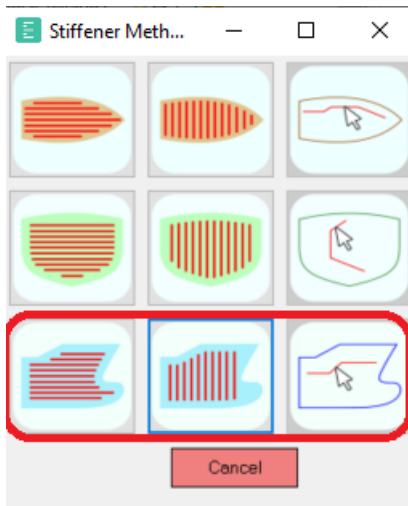
Generate



20. Add stiffeners to the Longitudinal bulkheads for accommodation.

Time to create stiffeners for the longitudinal bulkheads for accommodation.

- Go to LB1Dk2
- Since we have windows in the accommodation there will be a combination of longitudinal and vertical stiffeners.
- Click  underneath Stiffeners
- From the Y-object stiffeners available marked with red, select Y-object – Vertical Series of Stiffeners.



- Select Y-object – Vertical Series of Stiffeners by clicking



- Set name: Long stiff
- Set Z Start: 3,8 and Z End: 4,9
- Set Spacing: 1100
- Set limits and offsets:
 - Aft/fore offset = 100
 - Upper/lower offset = 0
 - Aft Limit: #20
 - Fore Limit: #32
 - Upper Limit: 5,1
 - Lower Limit: 3,8
- Select Profile: HP60x4

Y-Object - Vertical Series of Stiffeners

NAME:

Upper Limit: Upper Offset: [mm]

Z End:

Aft Limit: Fore Limit:

Aft Offset: [mm] Fore Offset: [mm]

Spacing [mm]:

Z Start:

Lower Limit: Lower Offset: [mm]

ShipConstructor Stiffener Profile:

Profile: Flip ☐

Color:

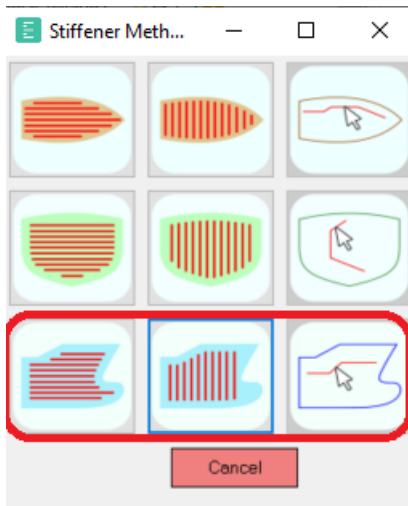
Exceptions:

Additions:

- Click

- Click

- For the next set of stiffeners Click underneath Stiffeners.
- From the Y-object stiffeners available marked with red, select Y-object – Longitudinal Series of Stiffeners.



- Select Y-object – Longitudinal Series of Stiffeners by clicking



- Set name: Vert stiff
- Set X Start: #20 and X End: #32
- Set Spacing: #1
- Set limits and offsets:
 - Aft/fore offset = #1
 - Upper/lower offset = 100
 - Aft Limit: #20
 - Fore Limit: #32
 - Upper Limit: 3,8
 - Lower Limit: Deck2Plane1
- Select Profile: HP60x4

Y-Object - Longitudinal Series of Stiffeners

NAME: Vert. stiff

X Start: #20

Spacing (mm): #1

Upper Limit: 3.8

Upper Offset: 100 (mm)

X End: #32

Aft Limit: #20

Aft Offset: #1 (mm)

Fore Limit: #32

Fore Offset: #1 (mm)

Lower Limit: Deck2Plane1

Lower Offset: 100 (mm)

Portside Limit:

Portside Offset: 0 (mm)

Starboard Limit:

Starboard Offset: 0 (mm)

Profile: HP60x4

Flip: ☐

Color:

Exceptions:

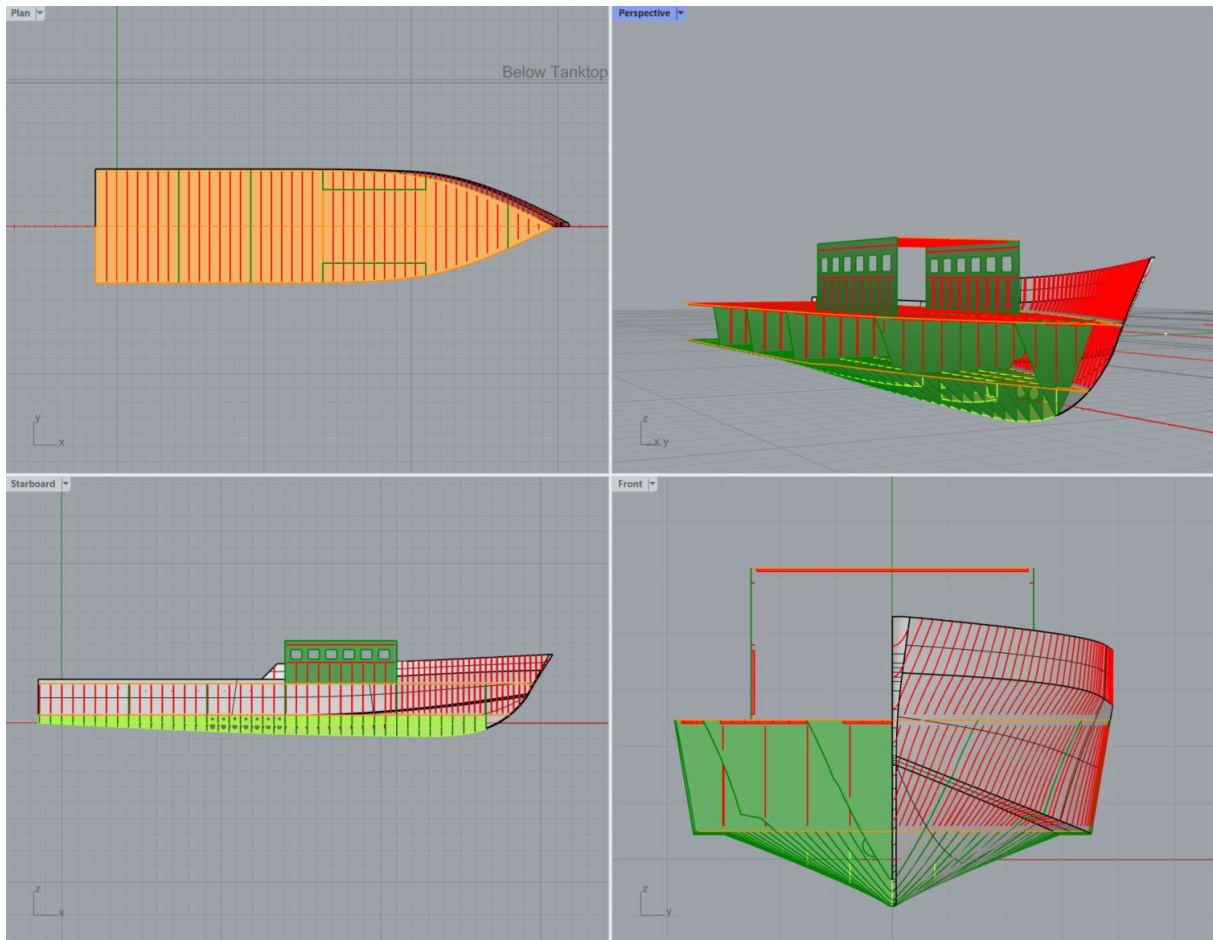
Additions:

Cancel

Confirm

ShipConstructor Stiffener Profile:

- Click **Confirm**
- Click **Generate**

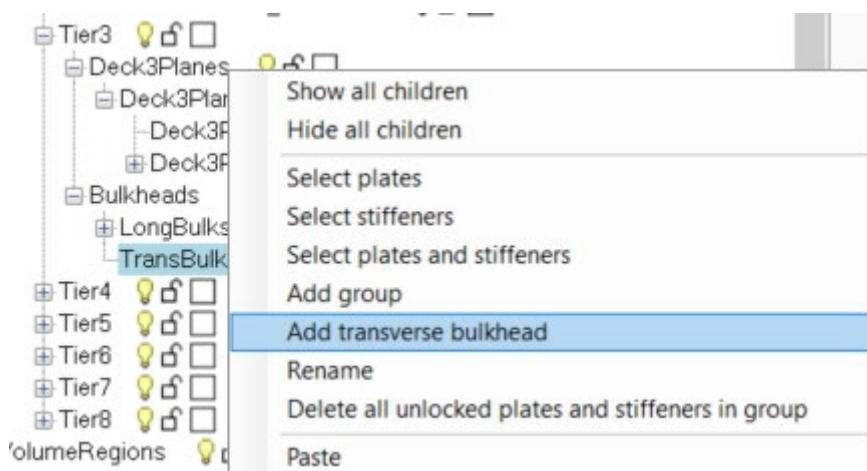



21. Create transverse bulkheads for accommodation front and aft plates

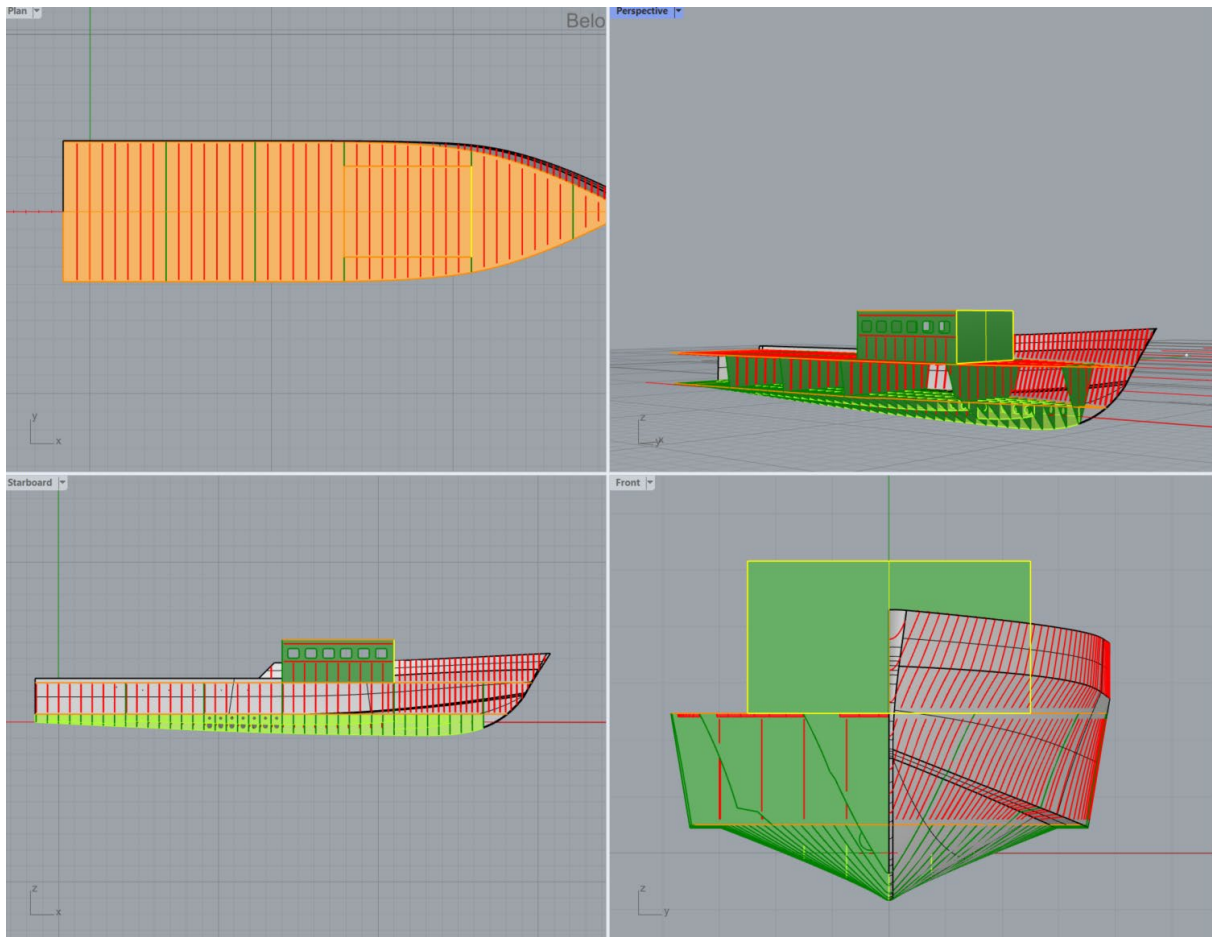
Time to create the front and aft plates for the accommodation.

Step by step explanation:

- Go to Tier3
- Right click on TransBulks_on_Dk2 and select Add transverse bulkhead.




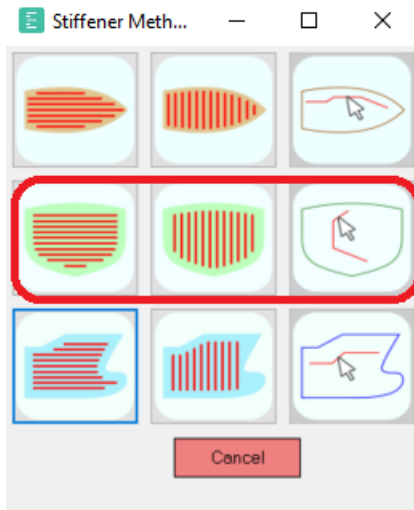
- Do this twice.
- Go to TB1Dk2 and set Constant X= #32
- Set the Thickness = 6
- Change the limits to be the longitudinal bulkheads created above.
 - $Y > -2,5$, $Y < 2,5$, $Z > \text{Deck2Plane1}$ and $Z < \text{Deck3Plane1}$.
- Click 
- Do the same for the aft bulkhead of the accommodation at TB2Dk2, now with constant X = #20



22. Create stiffeners to the transverse bulkheads of the accommodation

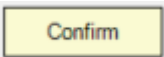
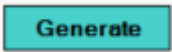

Add some stiffeners for the transverse bulkheads of the accommodation.

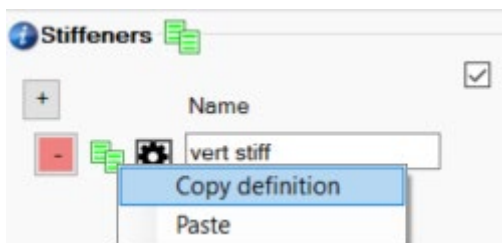
- Go to TB1DK2
- Click  below Stiffeners.
- Select the X-object – Transverse Series of Stiffeners from the available stiffeners methods marked with red.



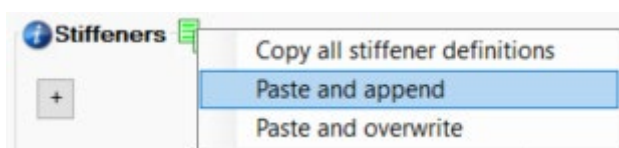
- To open the X-object – Transverse Series of Stiffeners click



- Give name to stiffeners: vert. stiff
- Set YEnd = 7,5 YStart= -7,5, and set Spacing = 750
- Set limits and offsets
 - Portside/StarboardLower/Upper offset = 100
 - Portside limit = LB1Dk2
 - Starboard Limit = LB2Dk2
 - Upper Limit = Deck3Plane1
 - Lower limit = Deck2Plane1
- Select profile from list of profiles = HP60x4.
- Click 
- Click 
- Right click  and select Copy definition

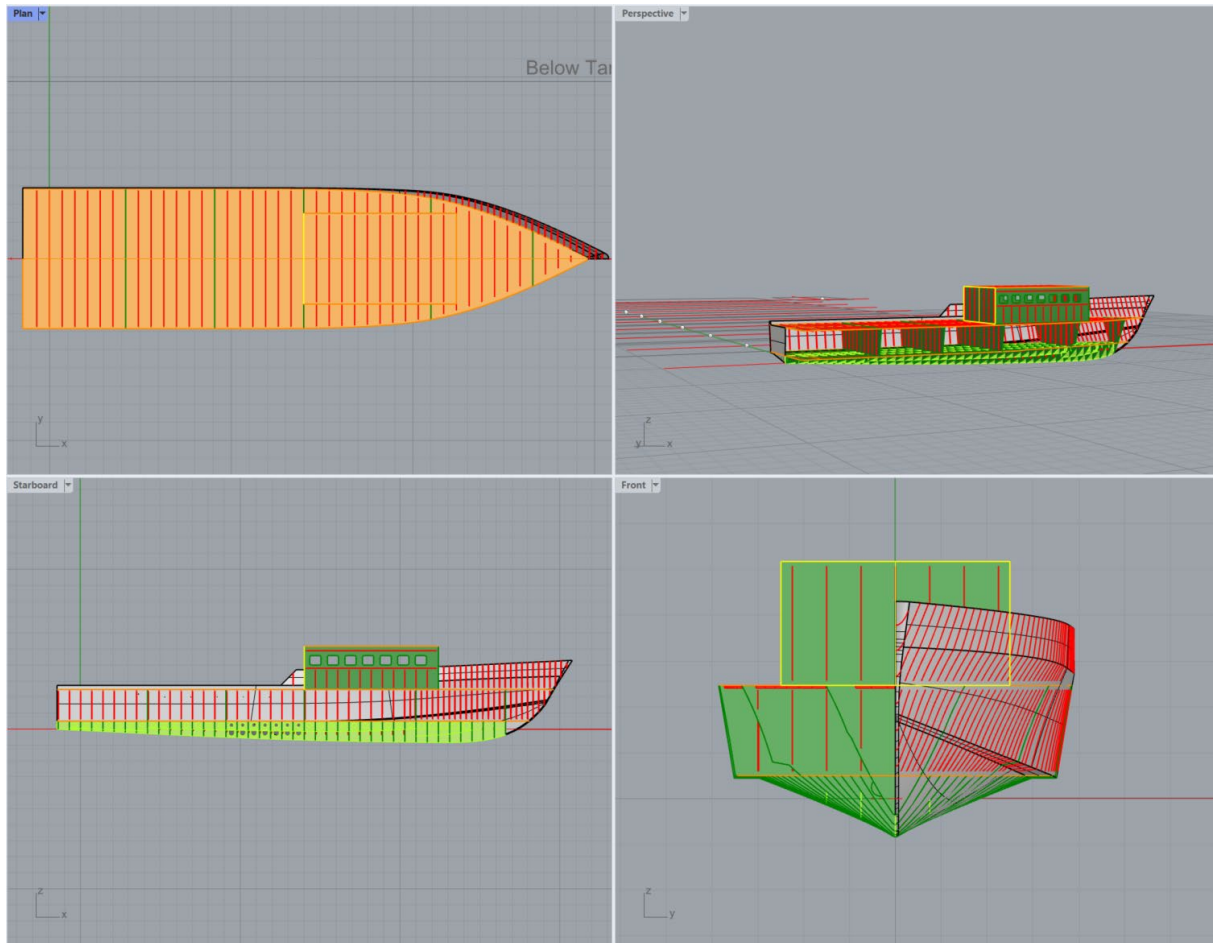


- Go to TB2Dk2 and right click  aft of Stiffeners header and select paste and append



- Click

Generate



23. Import Rhino surfaces for the Wheelhouse

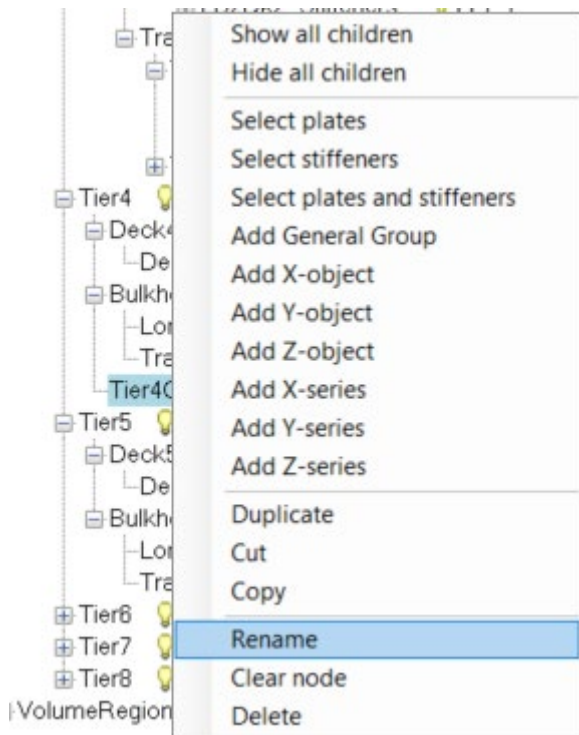
Then the last part is to import Rhino surfaces for the wheelhouse.

Step by step explanation:

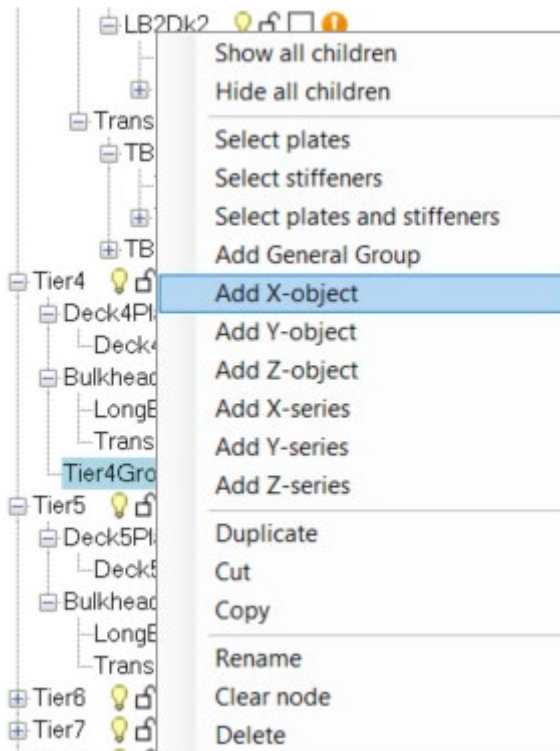
- Find the model we started with before we removed everything, this model contains a nice wheelhouse. Now it's time to import this wheelhouse.
- First make sure that the two models have the same coordinate systems so that the pieces land in the correct place on our model when copy pasted from the rhino model to our model.
- Right click Tier4 and select Add Custom Group.



- Right click Tier4Group1 and select Rename

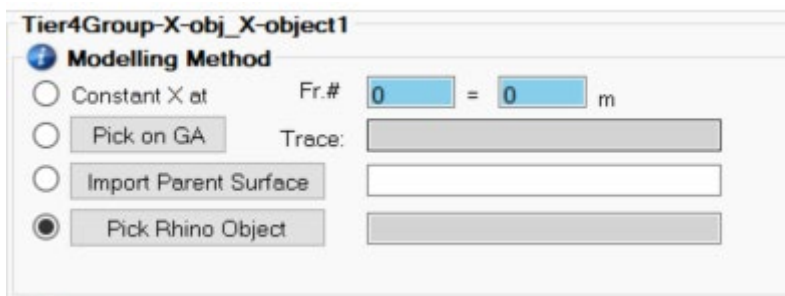


- This group will be a container for the X-objects of the wheelhouse, rename the group to Tier4Group – X-obj.
- Remove the Limits in Y-direction for the Tier4Group – X-obj.
- Right Click Tier4Group-X-obj and select Add X-object.

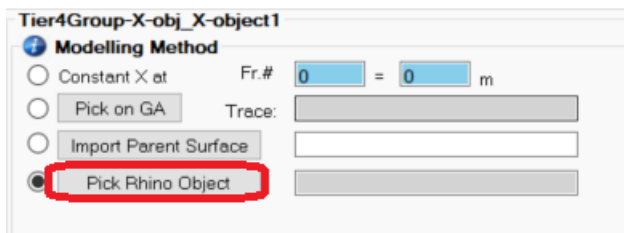


- Add 18 X-object, this is the number of surfaces for X-objects in the Rhino model of the wheelhouse.
- Go to Tier4Group-X-obj_X-object1

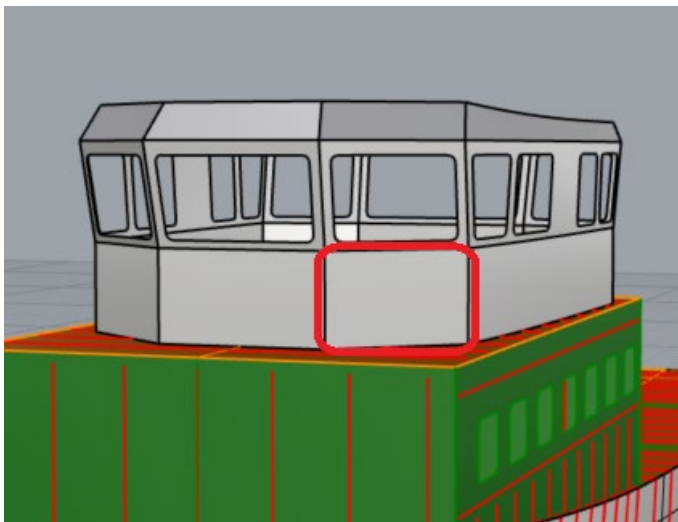
- Select the Pick Rhino Object as Modelling Method



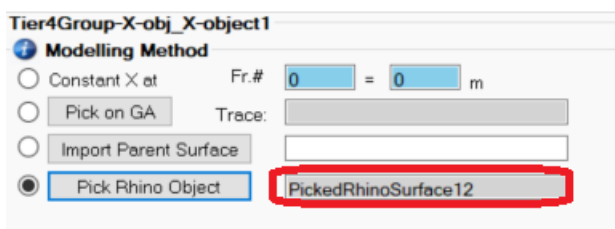
- Click Pick Rhino Object



- Click on the first of the X-object in the Rhino model of the wheelhouse.



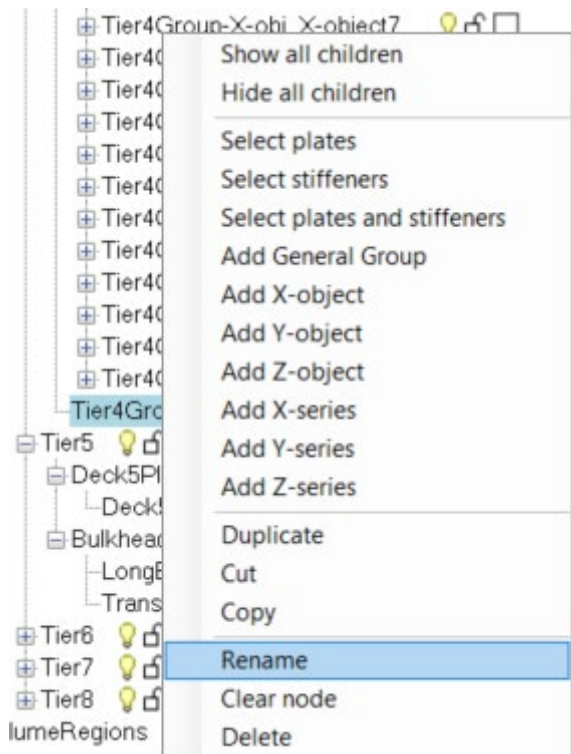
- Now the name of the Picked object will be shown after the box Pick Rhino Object



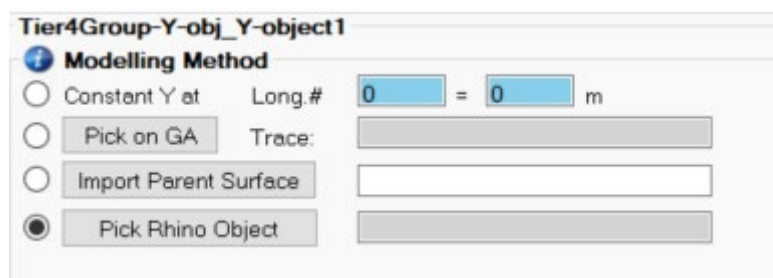
- Click **Generate**
- Repeat for all X-objects of the wheelhouse
- Then right click Tier4 select Add Custom Group



- Right Click Tier4Goup1 and select Rename

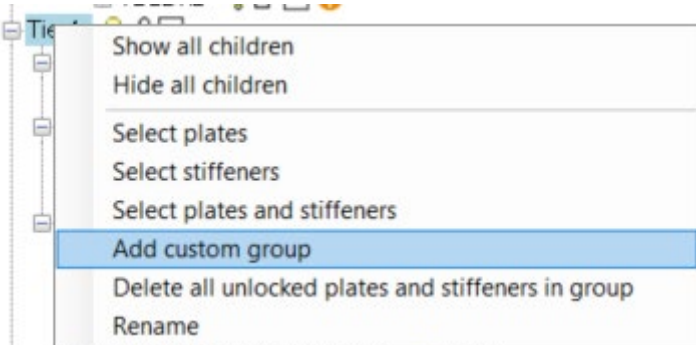


- The group will contain the Y-object of the wheelhouse model made in Rhino. Rename the Tier4Group1 to Tier4Group-Y-Obj.
- Remove the Limits in the Y-direction.
- Right Click Tier4Group-Y-obj and select Add Y-object.
- Add 6 Y-objects, for the 6 Y-surfaces in the Rhino wheelhouse model.
- Go to Tier4Group-Y-obj_Y_object1
- Select the Modelling Method to be Pick Rhino Object.

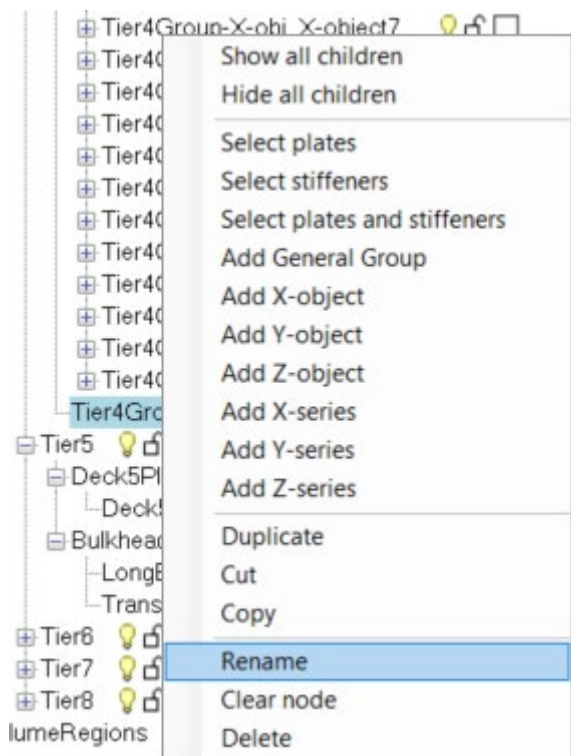


- Click Pick Rhino Object

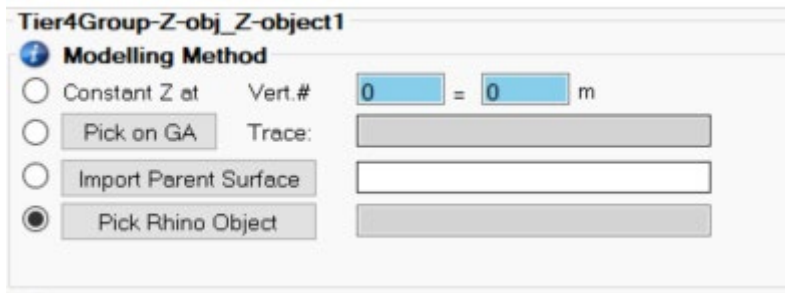
- Select the first Rhino Y-object of the Y-objects in the wheelhouse.
- Click **Generate**
- Repeat for all Y-objects of the wheelhouse.
- Right click Tier4 select Add Custom Group



- Right Click Tier4Goup1 and select Rename



- The group will contain the Z-object of the wheelhouse model made in Rhino. Rename the Tier4Group1 to Tier4Group-Z-Obj.
- Remove the Limits in the Y-direction.
- Right Click Tier4Group-Z-obj and select Add Z-object.
- Add 3 Z-objects, for the 3 Z-surfaces in the Rhino wheelhouse model.
- Go to Tier4Group-Z-obj_Z_object1
- Select the Modelling Method to be Pick Rhino Object.



- Click Pick Rhino Object
- Select the first Rhino Z-object of the Z-objects in the wheelhouse.
- Click **Generate**
- Repeat for all Z-objects of the wheelhouse.

24. For adding more details.

Check out the webinar held March 22, 2022, for adding more details to the model.

Link: [ExpressMarine Webinar March 2022 - YouTube](#)