

# DHI Vessel Hulls Catalogue

Data sheets for different vessels in  
MIKE 21 Mooring Analysis





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Vessel Hulls Catalogue  
Data sheets for different vessels

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# 1 Introduction

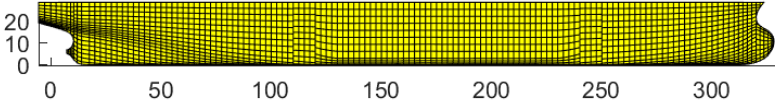
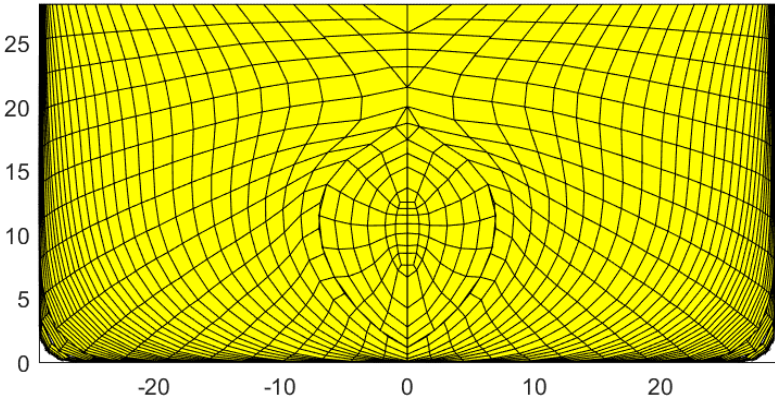
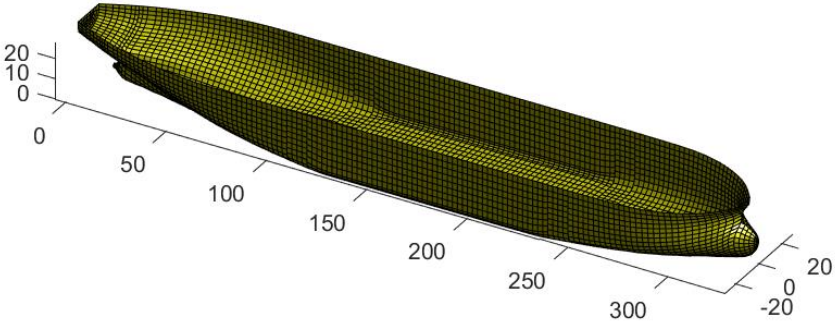
DHI provides a selection of 12 vessels of different sizes together with the installation of MIKE 21 Mooring Analysis (MA) for free. In addition, DHI obtains a comprehensive collection of additional vessels, which can be purchased from DHI and which cover different sizes and vessel classes.

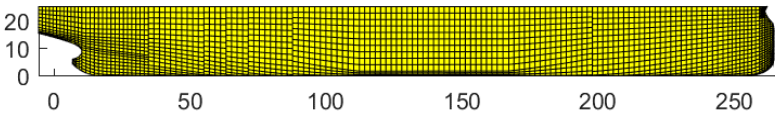
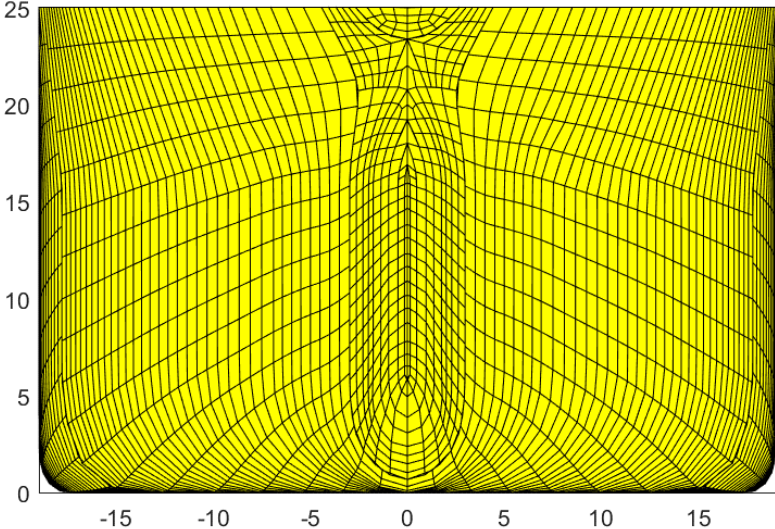
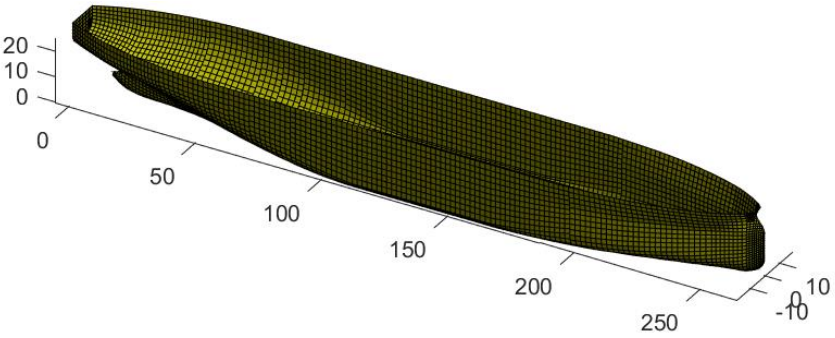
Chapter 2 in this document contains the data sheets of the free vessel hulls and Chapter 3 contains the data sheets for the vessel hulls that can be purchased.

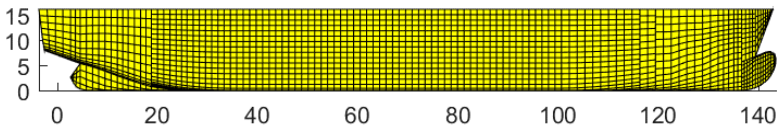
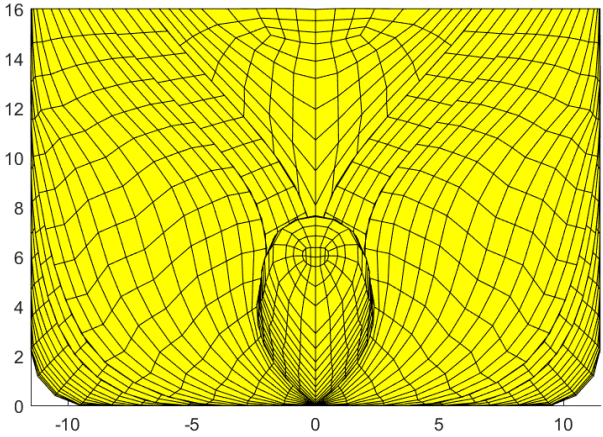
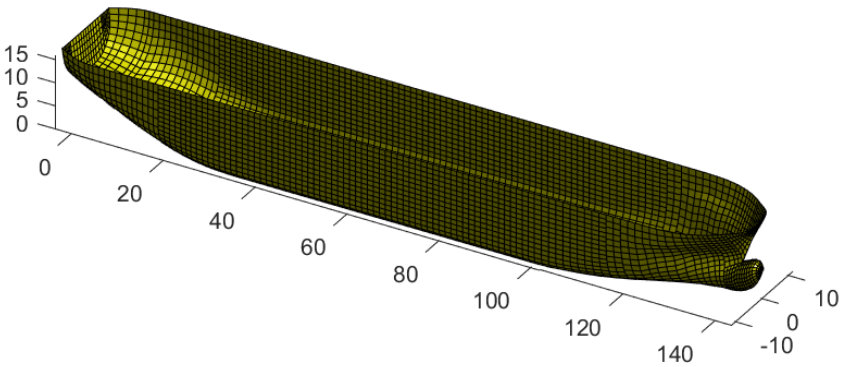


## 2 Free Vessel Hulls

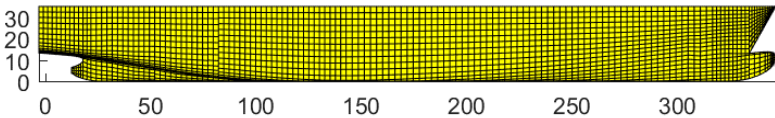
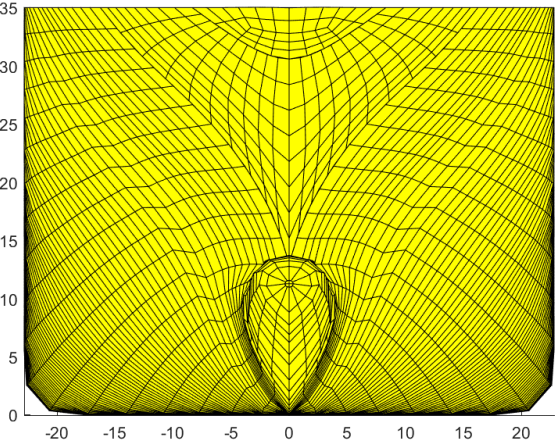
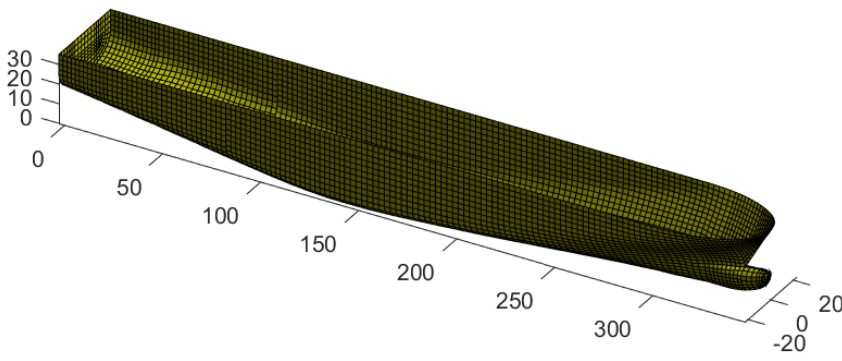
### 2.1 Bulk Carriers

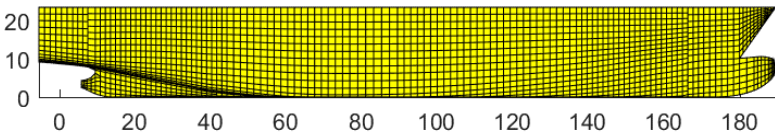
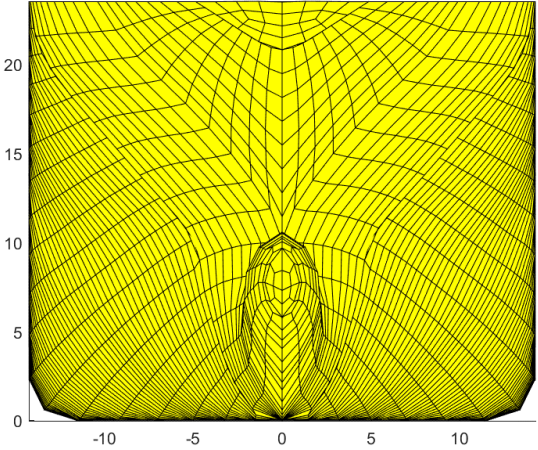
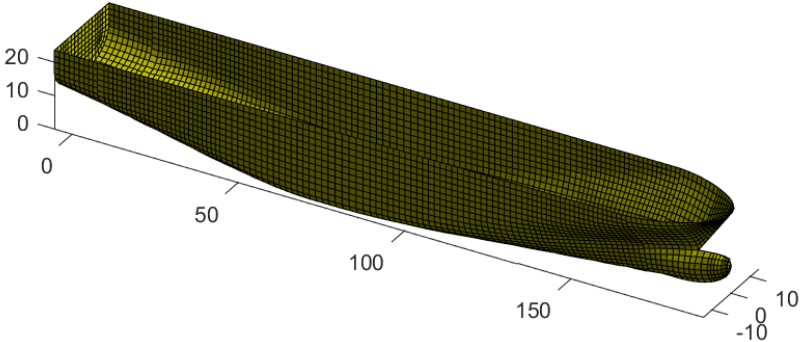
| Characterisation of Vessel for Wave Response Analysis |                                                                                      |
|-------------------------------------------------------|--------------------------------------------------------------------------------------|
| Vessel Characteristics                                | Bulk Carrier 1                                                                       |
| Hull Name                                             | Bulk Carrier 1                                                                       |
| Type                                                  | Bulk Carrier, Conventional Bow                                                       |
| LOA                                                   | 333.6m                                                                               |
| Beam                                                  | 58.1m                                                                                |
| Max Height                                            | 28m                                                                                  |
| Longitudinal Profile                                  |    |
| Lateral Profile                                       |  |
| 3D View                                               |  |
| Date                                                  | November 2016.                                                                       |

| Characterisation of Vessel for Wave Response Analysis |                                                                                      |
|-------------------------------------------------------|--------------------------------------------------------------------------------------|
| Vessel Characteristics                                | Bulk Carrier 2                                                                       |
| Hull Name                                             | Bulk Carrier 2                                                                       |
| Type                                                  | Bulk Carrier, Cylindrical Bow                                                        |
| LOA                                                   | 269.98m                                                                              |
| Beam                                                  | 38.01m                                                                               |
| Max Height                                            | 25.02m                                                                               |
| Longitudinal Profile                                  |    |
| Lateral Profile                                       |   |
| 3D View                                               |  |
| Date                                                  | November 2016.                                                                       |

| Characterisation of Vessel for Wave Response Analysis |                                                                                      |
|-------------------------------------------------------|--------------------------------------------------------------------------------------|
| Vessel Characteristics                                | Bulk Carrier 3                                                                       |
| Hull Name                                             | Bulk Carrier 3                                                                       |
| Type                                                  | Bulk Carrier, Conventional Bow                                                       |
| LOA                                                   | 147m                                                                                 |
| Beam                                                  | 23m                                                                                  |
| Max Height                                            | 16m                                                                                  |
| Longitudinal Profile                                  |    |
| Lateral Profile                                       |   |
| 3D View                                               |  |
| Date                                                  | November 2016.                                                                       |

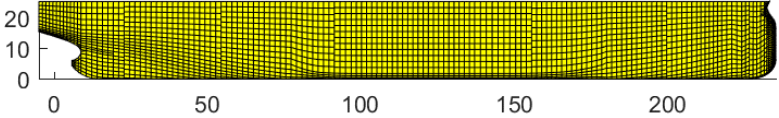
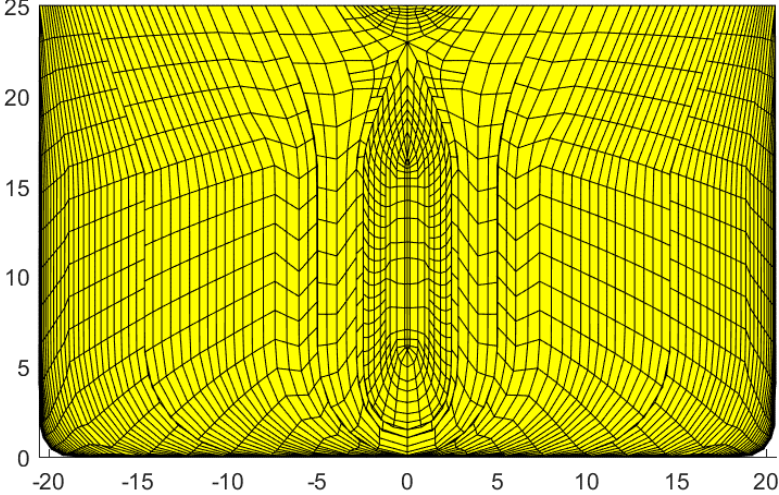
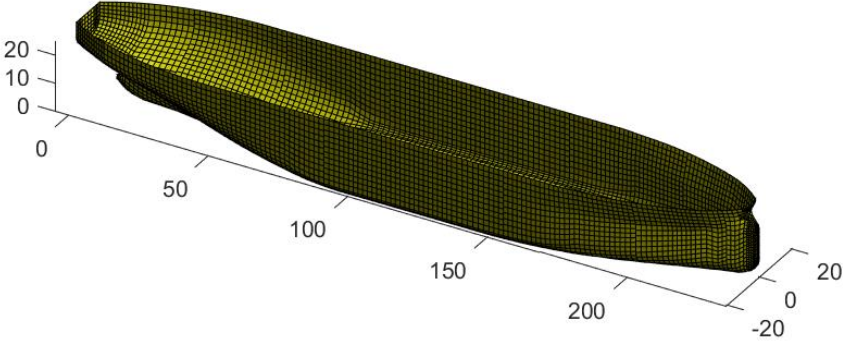
## 2.2 Container Carriers

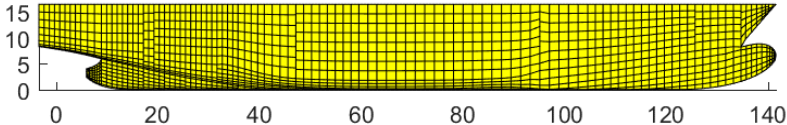
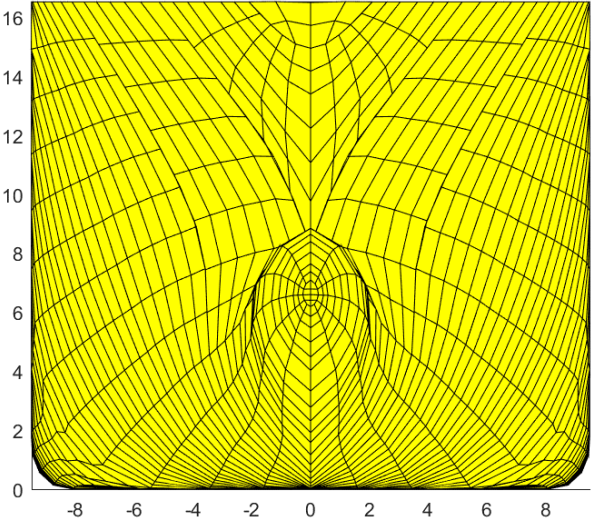
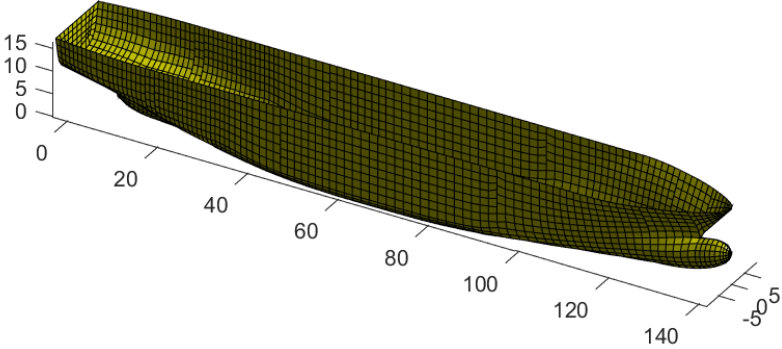
| Characterisation of Vessel for Wave Response Analysis |                                                                                      |
|-------------------------------------------------------|--------------------------------------------------------------------------------------|
| Vessel Characteristics                                | Container 1                                                                          |
| Hull Name                                             | Container 1                                                                          |
| Type                                                  | Container                                                                            |
| LOA                                                   | 349.6m                                                                               |
| Beam                                                  | 45.6m                                                                                |
| Moulded Depth                                         | 35.1m                                                                                |
| Longitudinal Profile                                  |    |
| Lateral Profile                                       |   |
| 3D View                                               |  |
| Date                                                  | November 2016.                                                                       |

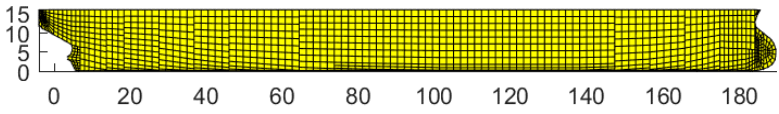
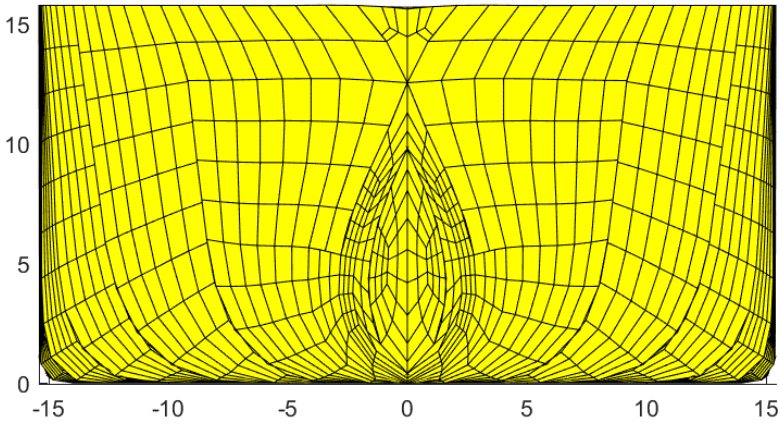
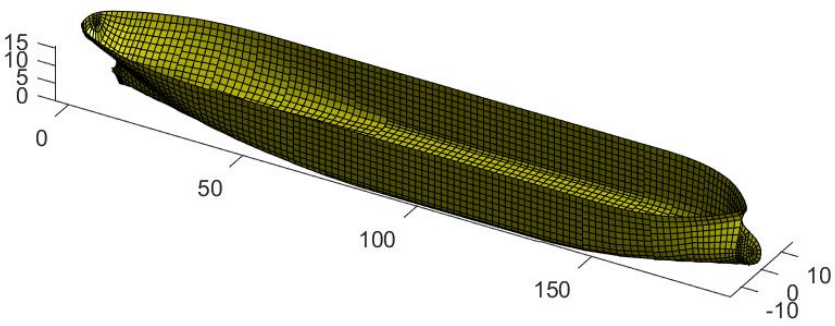
| Characterisation of Vessel for Wave Response Analysis |                                                                                      |
|-------------------------------------------------------|--------------------------------------------------------------------------------------|
| Vessel Characteristics                                | Container 2                                                                          |
| Hull Name                                             | Container 2                                                                          |
| Type                                                  | Container                                                                            |
| LOA                                                   | 195m                                                                                 |
| Beam                                                  | 28.5m                                                                                |
| Moulded Depth                                         | 23.5m                                                                                |
| Longitudinal Profile                                  |    |
| Lateral Profile                                       |   |
| 3D View                                               |  |
| Date                                                  | November 2016.                                                                       |



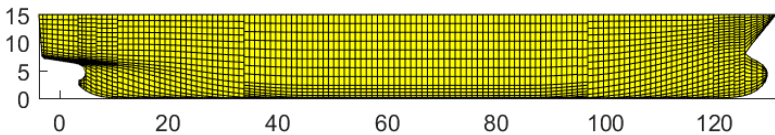
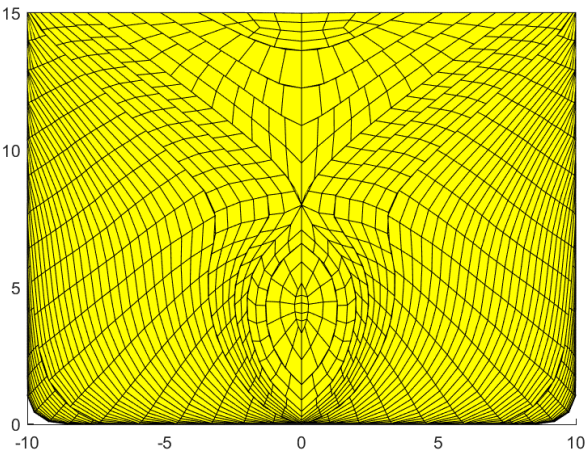
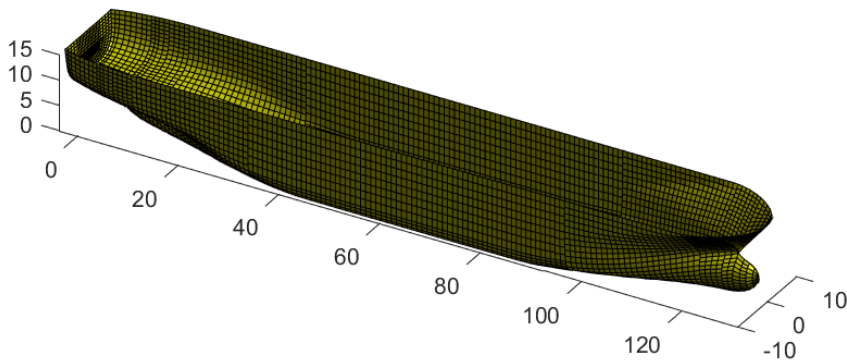
## 2.3 Tankers

| Characterisation of Vessel for Wave Response Analysis |                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vessel Characteristics                                | Tanker 1                                                                                                                                                                                                                                                                                                                                                                                                     |
| Hull Name                                             | Tanker 1                                                                                                                                                                                                                                                                                                                                                                                                     |
| Type                                                  | Tanker, Cylindrical Bow                                                                                                                                                                                                                                                                                                                                                                                      |
| LOA                                                   | 239.1m                                                                                                                                                                                                                                                                                                                                                                                                       |
| Beam                                                  | 41.06m                                                                                                                                                                                                                                                                                                                                                                                                       |
| Moulded Depth                                         | 25.02m                                                                                                                                                                                                                                                                                                                                                                                                       |
| Longitudinal Profile                                  |  <p>A 2D line plot showing the longitudinal profile of the hull. The x-axis represents the longitudinal position from 0 to 200 meters, and the y-axis represents the vertical position from 0 to 20 meters. The profile shows a smooth, curved hull shape with a slight rise at the bow and a slight dip at the stern.</p> |
| Lateral Profile                                       |  <p>A 2D line plot showing the lateral profile of the hull. The x-axis represents the lateral position from -20 to 20 meters, and the y-axis represents the vertical position from 0 to 25 meters. The profile shows a symmetrical, curved hull shape with a slight rise at the bow and a slight dip at the stern.</p>    |
| 3D View                                               |  <p>A 3D perspective view of the hull. The x-axis represents the longitudinal position from 0 to 200 meters, the y-axis represents the lateral position from -20 to 20 meters, and the z-axis represents the vertical position from 0 to 20 meters. The hull is shown as a dark, curved surface with a grid pattern.</p> |
| Date                                                  | November 2016.                                                                                                                                                                                                                                                                                                                                                                                               |

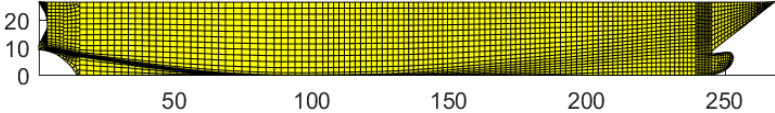
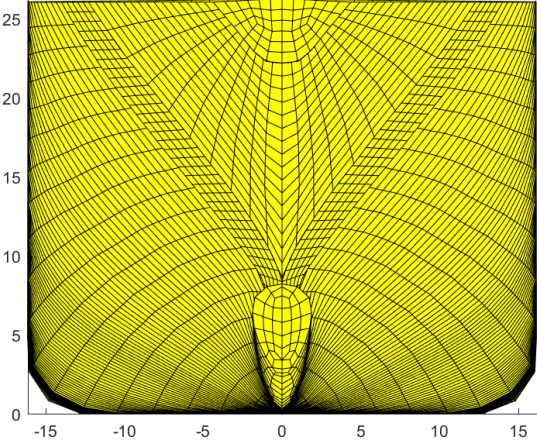
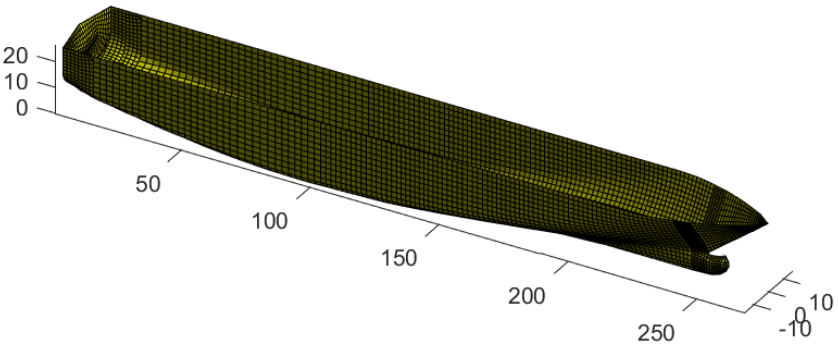
| Characterisation of Vessel for Wave Response Analysis |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vessel Characteristics                                | Tanker 2                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Hull Name                                             | Tanker 2                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Type                                                  | Tanker, Conventional Bow                                                                                                                                                                                                                                                                                                                                                                                                               |
| LOA                                                   | 144.1m                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Beam                                                  | 19.01m                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Moulded Depth                                         | 16.54m                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Longitudinal Profile                                  |  <p>A 2D line plot showing the longitudinal profile of the hull. The vertical axis represents height in meters, ranging from 0 to 15. The horizontal axis represents distance in meters, ranging from 0 to 140. The plot shows the hull's cross-section along its length, with a prominent bow at the left and a stern at the right.</p>             |
| Lateral Profile                                       |  <p>A 2D line plot showing the lateral profile of the hull. The vertical axis represents height in meters, ranging from 0 to 16. The horizontal axis represents distance in meters, ranging from -8 to 8. The plot shows the hull's cross-section along its width, with a central keel and a wide beam.</p>                                         |
| 3D View                                               |  <p>A 3D wireframe plot of the hull. The vertical axis represents height in meters, ranging from 0 to 15. The horizontal axis represents distance in meters, ranging from 0 to 140. The depth axis represents distance in meters, ranging from -5 to 5. The plot shows the hull's three-dimensional shape, including the bow, stern, and beam.</p> |
| Date                                                  | November 2016.                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Characterisation of Vessel for Wave Response Analysis |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vessel Characteristics                                | Tanker 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Hull Name                                             | Tanker 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Type                                                  | Tanker, Conventional Bow                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| LOA                                                   | 193.4m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Beam                                                  | 30.8m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Moulded Depth                                         | 15.8m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Longitudinal Profile                                  |  <p>A 2D longitudinal profile of the hull, showing the hull shape from the bow to the stern. The x-axis represents the longitudinal position from 0 to 180 meters, and the y-axis represents the vertical position from 0 to 15 meters. The hull is colored yellow with a black grid overlay.</p>                                                                                                         |
| Lateral Profile                                       |  <p>A 2D lateral profile of the hull, showing the hull shape from the starboard to the port side. The x-axis represents the lateral position from -15 to 15 meters, and the y-axis represents the vertical position from 0 to 15 meters. The hull is colored yellow with a black grid overlay.</p>                                                                                                       |
| 3D View                                               |  <p>A 3D perspective view of the hull, showing the hull shape from the bow to the stern and from the starboard to the port side. The x-axis represents the longitudinal position from 0 to 150 meters, the y-axis represents the lateral position from -10 to 10 meters, and the z-axis represents the vertical position from 0 to 15 meters. The hull is colored yellow with a black grid overlay.</p> |
| Date                                                  | November 2016.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

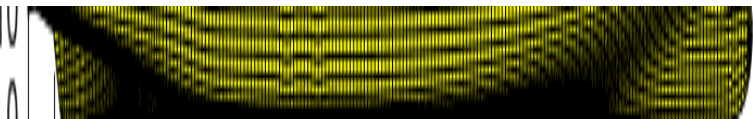
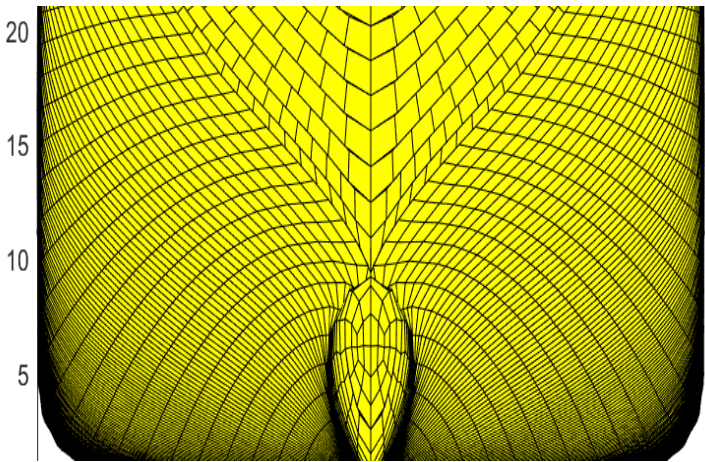
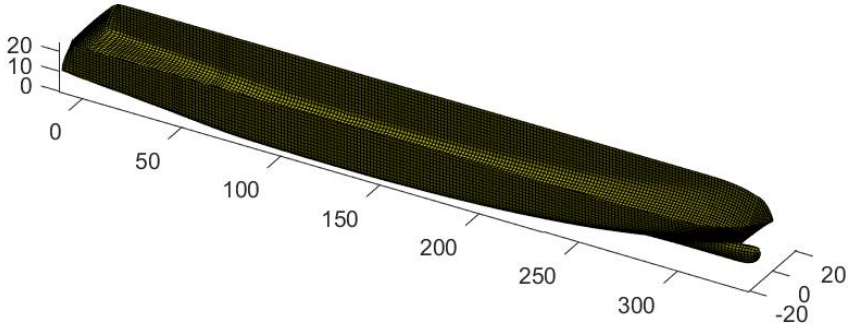
## 2.4 Gas Carrier

| Characterisation of Vessel for Wave Response Analysis |                                                                                      |
|-------------------------------------------------------|--------------------------------------------------------------------------------------|
| Vessel Characteristics                                | Gas Carrier 1                                                                        |
| Hull Name                                             | Gas Carrier 1                                                                        |
| Type                                                  | Gas Carrier, LPG                                                                     |
| LOA                                                   | 134.8m                                                                               |
| Beam                                                  | 20m                                                                                  |
| Moulded Depth                                         | 15m                                                                                  |
| Longitudinal Profile                                  |    |
| Lateral Profile                                       |   |
| 3D View                                               |  |
| Date                                                  | November 2016.                                                                       |

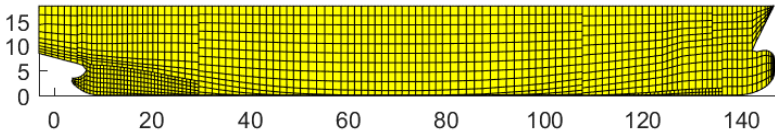
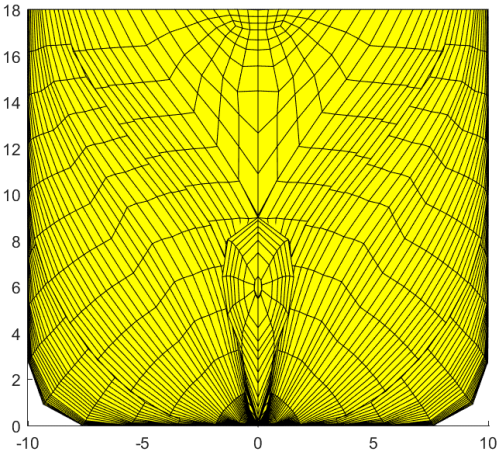
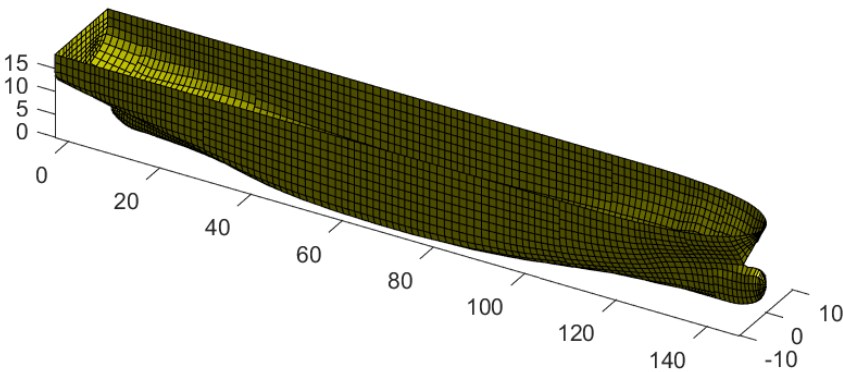
## 2.5 Passenger Vessels

| Characterisation of Vessel for Wave Response Analysis |                                                                                      |
|-------------------------------------------------------|--------------------------------------------------------------------------------------|
| Vessel Characteristics                                | Passenger Vessel 1                                                                   |
| Hull Name                                             | Passenger Vessel 1                                                                   |
| Type                                                  | Passenger Vessel                                                                     |
| LOA                                                   | 267.4m                                                                               |
| Beam                                                  | 32.3m                                                                                |
| Moulded Depth                                         | 26.3m                                                                                |
| Longitudinal Profile                                  |    |
| Lateral Profile                                       |   |
| 3D View                                               |  |
| Date                                                  | November 2016.                                                                       |



| Characterisation of Vessel for Wave Response Analysis |                                                                                      |
|-------------------------------------------------------|--------------------------------------------------------------------------------------|
| Vessel Characteristics                                | Passenger Vessel 2                                                                   |
| Hull Name                                             | Passenger Vessel 2                                                                   |
| Type                                                  | Passenger Vessel                                                                     |
| LOA                                                   | 347.8m                                                                               |
| Beam                                                  | 41.6m                                                                                |
| Moulded Depth                                         | 24.7m                                                                                |
| Longitudinal Profile                                  |    |
| Lateral Profile                                       |   |
| 3D View                                               |  |
| Date                                                  | November 2016.                                                                       |

## 2.6 General Cargo Vessel

| Characterisation of Vessel for Wave Response Analysis |                                                                                      |
|-------------------------------------------------------|--------------------------------------------------------------------------------------|
| Vessel Characteristics                                | General Cargo 1                                                                      |
| Hull Name                                             | General Cargo 1                                                                      |
| Type                                                  | General Cargo                                                                        |
| LOA                                                   | 150m                                                                                 |
| Beam                                                  | 20m                                                                                  |
| Moulded Depth                                         | 18m                                                                                  |
| Longitudinal Profile                                  |    |
| Lateral Profile                                       |   |
| 3D View                                               |  |
| Date                                                  | November 2016.                                                                       |

## 3 Vessel Hulls for Purchase

### 3.1 Bulk Carriers

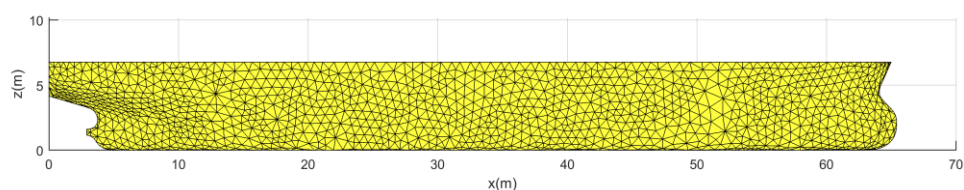
This section of Bulk Carrier represents the vessel characteristics for wave response analyses for 11 bulk carriers. The hulls represent modern ship design.

All bulkers are generated generically. They are adjusted to fit the main dimensions of the individual new buildings. The geometries are not representing a specific actual vessel.

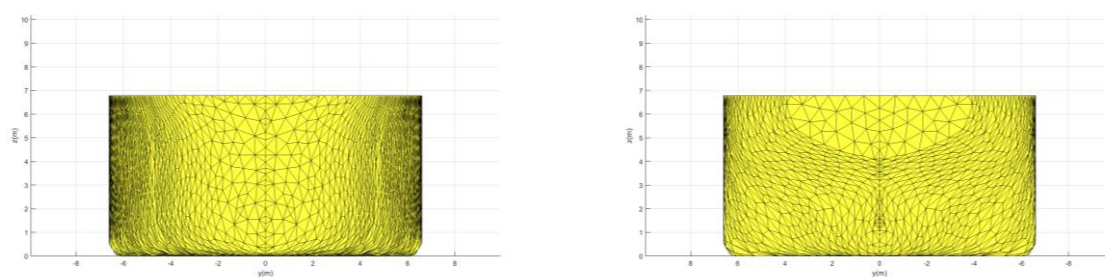
The hydrostatic characteristics such as the longitudinal Center of Buoyancy (LCB) and block coefficients ( $C_B$ ) have been selected based on /1/ and /2/, respectively.

| Vessel ID                                   | Bul-01b                  |
|---------------------------------------------|--------------------------|
| Hull file name                              | Bul-01_Bulker_2000t.hull |
| Vessel type                                 | Bulk carrier             |
| Length over all (LOA) [m]                   | 68.8                     |
| Length between perpendiculars (LPP) [m]     | 63.0                     |
| Breadth [m]                                 | 13.2                     |
| Design draught [m]                          | 4.5                      |
| Height [m]                                  | 6.0                      |
| Capacity (TEU) [-]                          | 2000                     |
| Hydrostatics for design draught             |                          |
| Volume [m <sup>3</sup> ]                    | 2975                     |
| Longitudinal Center of Buoyancy (LCB) [m]   | 33.8                     |
| Vertical Center of Buoyancy (VCB) [m]       | 2.36                     |
| Longitudinal Center of Floatation (LCF) [m] | 31.55                    |
| IT                                          | 9502.6                   |
| IL                                          | 204697                   |
| Block coefficient $c_B$ [-]                 | 0.79                     |

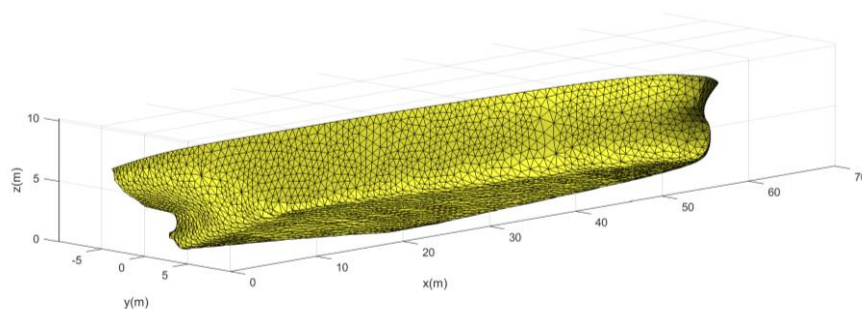
#### Longitudinal profile



#### Lateral profile



#### 3D view

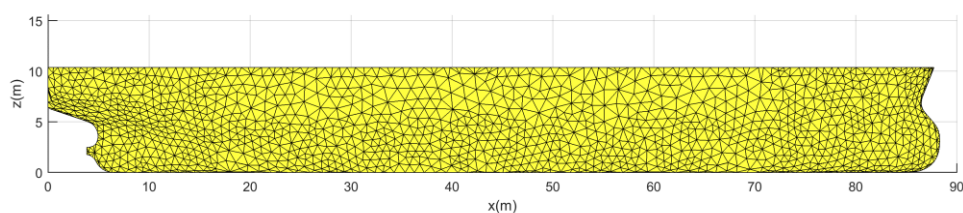


Date

February 2017

| Vessel ID                                                              | Bul-02                   |
|------------------------------------------------------------------------|--------------------------|
| Hull file name                                                         | Bul-02_Bulker_5000t.hull |
| Vessel type                                                            | Bulk carrier             |
| Length over all (LOA) [m]                                              | 90.0                     |
| Length between perpendiculars (LPP) [m]                                | 85.0                     |
| Breadth [m]                                                            | 14.8                     |
| Design draught [m]                                                     | 6.8                      |
| Height [m]                                                             | 10.4                     |
| Capacity (TEU) [-]                                                     | 5000                     |
| Hydrostatics for design draught                                        |                          |
| Volume [m <sup>3</sup> ]                                               | 6452                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 43.7                     |
| Vertical Center of Buoyancy (VCB) [m]                                  | 3.53                     |
| Longitudinal Center of Floatation (LCF) [m]                            | 40.34                    |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 15820.3                  |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 519502                   |
| Block coefficient $c_B$ [-]                                            | 0.76                     |

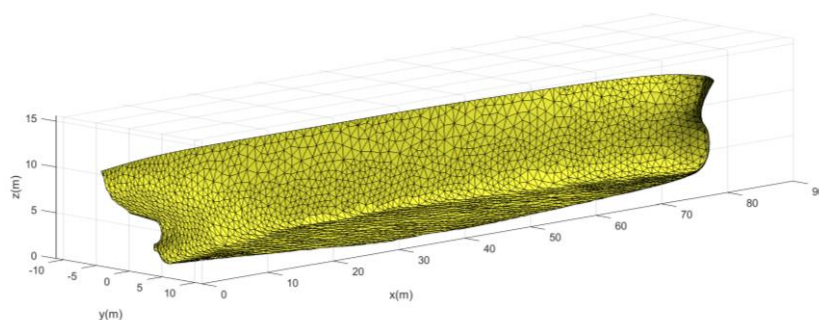
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



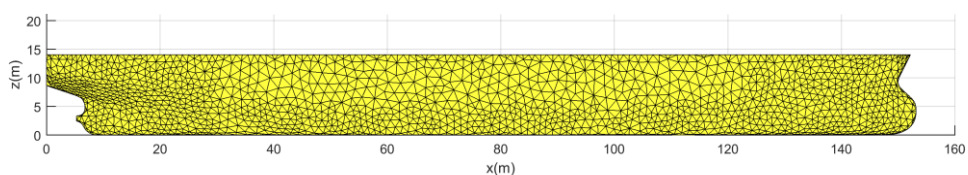
Date

February 2017

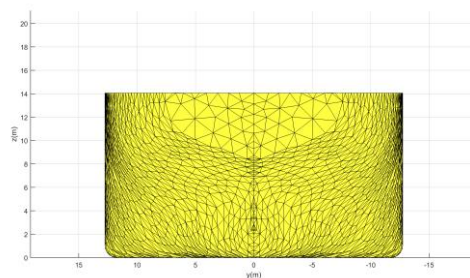
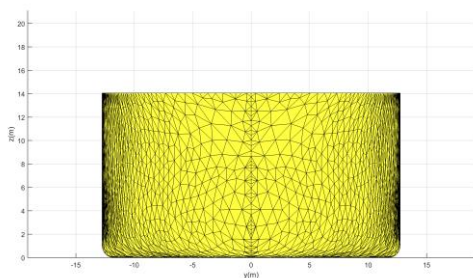


| Vessel ID                                                              | Bul-03                    |
|------------------------------------------------------------------------|---------------------------|
| Hull file name                                                         | Bul-03_Bulker_20000t.hull |
| Vessel type                                                            | Bulk carrier              |
| Length over all (LOA) [m]                                              | 157.0                     |
| Length between perpendiculars (LPP) [m]                                | 147.4                     |
| Breadth [m]                                                            | 25.5                      |
| Design draught [m]                                                     | 9.2                       |
| Height [m]                                                             | 14.0                      |
| Capacity (TEU) [-]                                                     | 20000                     |
| Hydrostatics for Design Draught                                        |                           |
| Volume [m <sup>3</sup> ]                                               | 28016                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 76.7                      |
| Vertical Center of Buoyancy (VCB) [m]                                  | 4.76                      |
| Longitudinal Center of Floatation (LCF) [m]                            | 71.29                     |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 158895                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 5147130                   |
| Block coefficient $c_B$ [-]                                            | 0.81                      |

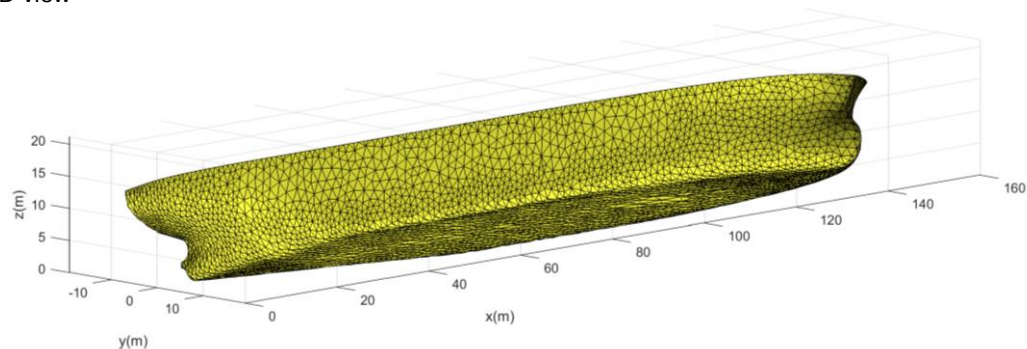
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

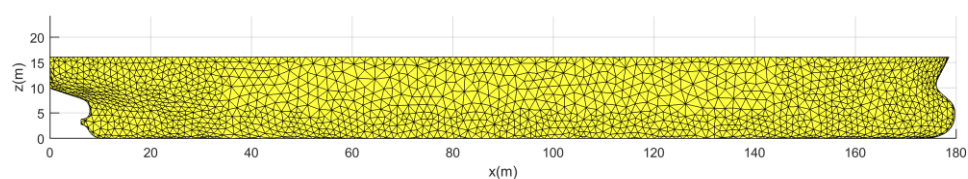


Date

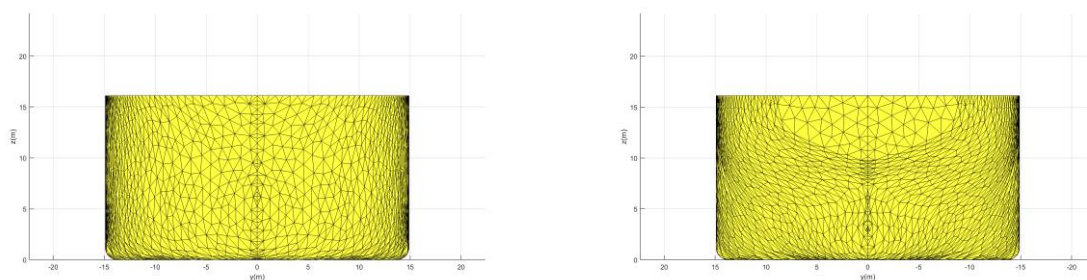
February 2017

| Vessel ID                                                              | Bul-04                    |
|------------------------------------------------------------------------|---------------------------|
| Hull file name                                                         | Bul-04_Bulker_37300t.hull |
| Vessel type                                                            | Bulk carrier, Large Handy |
| Length over all (LOA) [m]                                              | 180.0                     |
| Length between perpendiculars (LPP) [m]                                | 173.0                     |
| Breadth [m]                                                            | 29.8                      |
| Design draught [m]                                                     | 10.6                      |
| Height [m]                                                             | 16.1                      |
| Capacity (TEU) [-]                                                     | 37300                     |
| Hydrostatics for Design Draught                                        |                           |
| Volume [m <sup>3</sup> ]                                               | 45146                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 90.8                      |
| Vertical Center of Buoyancy (VCB) [m]                                  | 5.44                      |
| Longitudinal Center of Floatation (LCF) [m]                            | 84.65                     |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 310244                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 10048600                  |
| Block coefficient $c_B$ [-]                                            | 0.83                      |

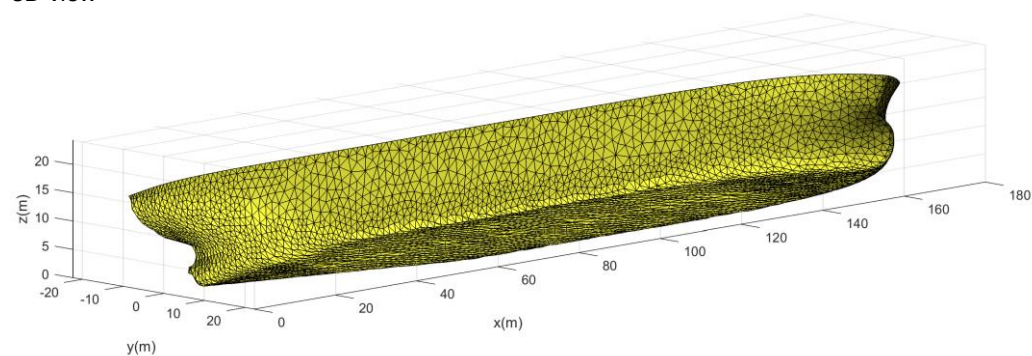
#### Longitudinal profile



#### Lateral profile (left: bow, right: aft)



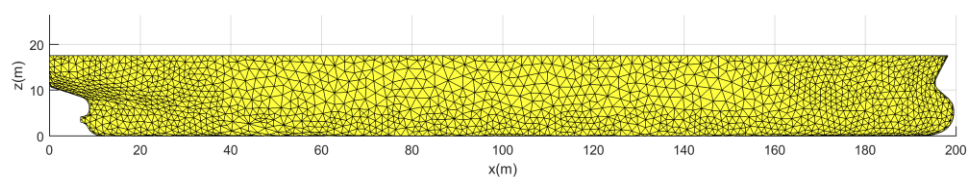
#### 3D view



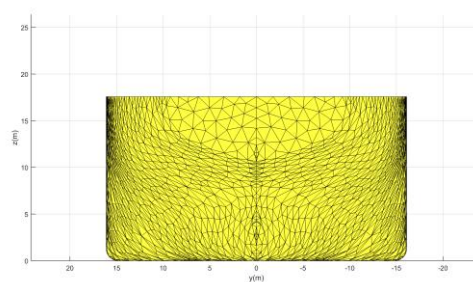
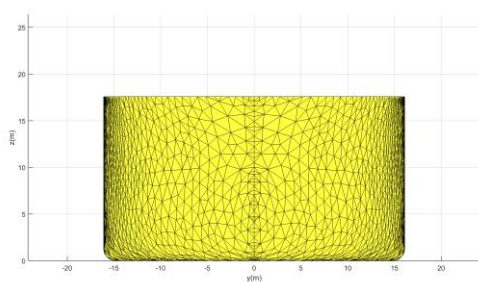
|      |               |
|------|---------------|
| Date | February 2017 |
|------|---------------|

| Vessel ID                                                              | Bul-05                    |
|------------------------------------------------------------------------|---------------------------|
| Hull file name                                                         | Bul-05_Bulker_49300t.hull |
| Vessel type                                                            | Bulk carrier              |
| Length over all (LOA) [m]                                              | 199.9                     |
| Length between perpendiculars (LPP) [m]                                | 192.0                     |
| Breadth [m]                                                            | 32.2                      |
| Design draught [m]                                                     | 11.5                      |
| Height [m]                                                             | 17.6                      |
| Capacity (TEU) [-]                                                     | 49350                     |
| Hydrostatics for Design Draught                                        |                           |
| Volume [m <sup>3</sup> ]                                               | 59015                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 101.3                     |
| Vertical Center of Buoyancy (VCB) [m]                                  | 5.93                      |
| Longitudinal Center of Floatation (LCF) [m]                            | 94.22                     |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 436330                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 14910000                  |
| Block coefficient $c_B$ [-]                                            | 0.83                      |

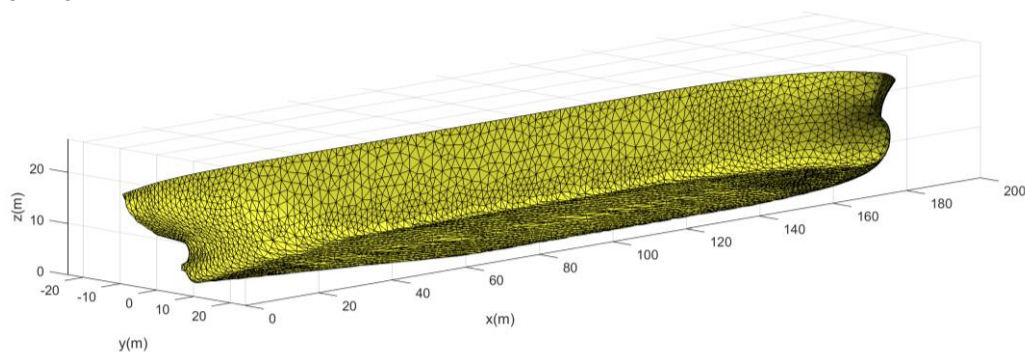
Longitudinal profile



Lateral profile (left: bow, right: aft)



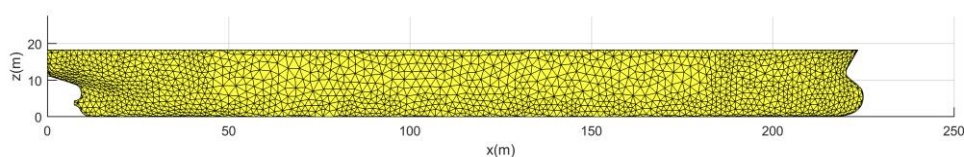
3D view



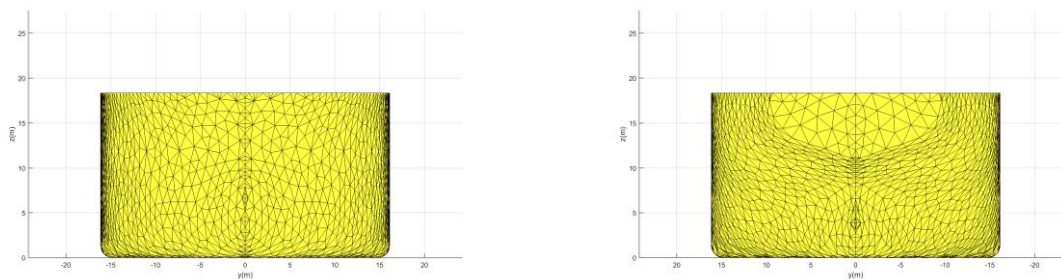
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|------|---------------|
| Date | February 2017 |
|------|---------------|

| Vessel ID                                                              | Bul-06                    |
|------------------------------------------------------------------------|---------------------------|
| Hull file name                                                         | Bul-06_Bulker_74000t.hull |
| Vessel type                                                            | Bulk carrier, PanaMax     |
| Length over all (LOA) [m]                                              | 225.0                     |
| Length between perpendiculars (LPP) [m]                                | 216.0                     |
| Breadth [m]                                                            | 32.3                      |
| Design draught [m]                                                     | 13.9                      |
| Height [m]                                                             | 18.3                      |
| Capacity (TEU) [-]                                                     | 74382                     |
| Hydrostatics for Design Draught                                        |                           |
| Volume [m <sup>3</sup> ]                                               | 84960                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 111.1                     |
| Vertical Center of Buoyancy (VCB) [m]                                  | 7.13                      |
| Longitudinal Center of Floatation (LCF) [m]                            | 104.71                    |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 526820                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 23325500                  |
| Block coefficient $C_B$ [-]                                            | 0.88                      |

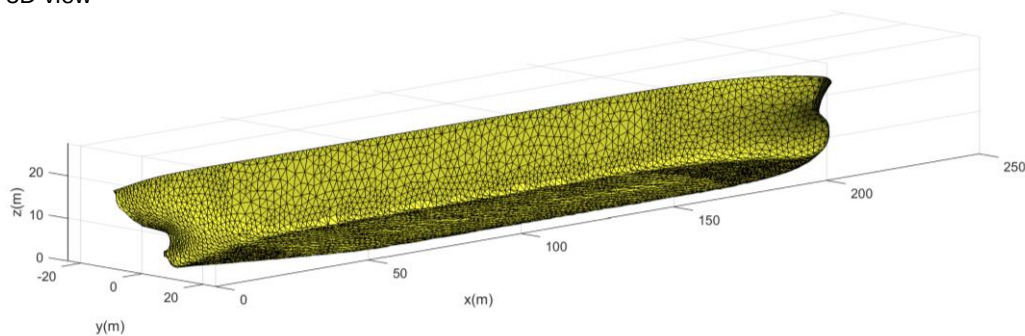
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

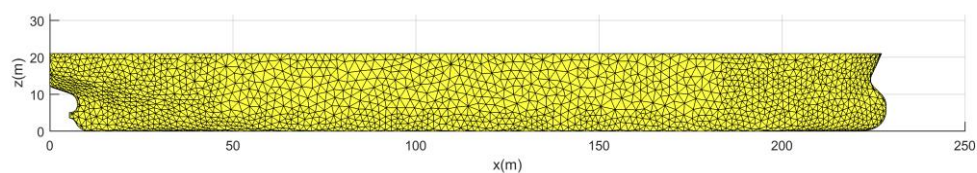


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|------|---------------|
| Date | February 2017 |
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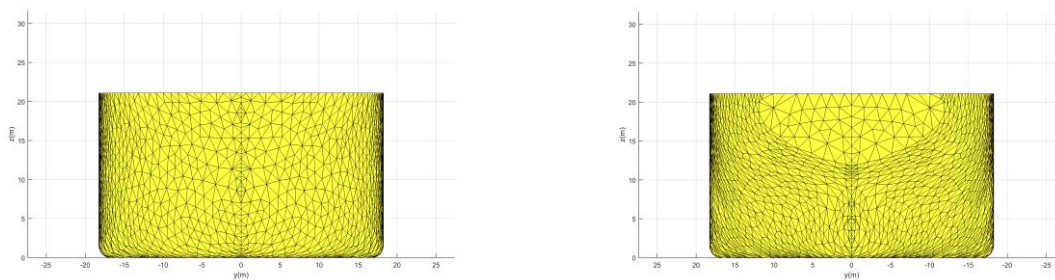


| Vessel ID                                                              | Bul-07                    |
|------------------------------------------------------------------------|---------------------------|
| Hull file name                                                         | Bul-07_Bulker_84000t.hull |
| Vessel type                                                            | Bulk carrier, Kamsarmax   |
| Length over all (LOA) [m]                                              | 228.5                     |
| Length between perpendiculars (LPP) [m]                                | 223.0                     |
| Breadth [m]                                                            | 36.5                      |
| Design draught [m]                                                     | 13.8                      |
| Height [m]                                                             | 21.0                      |
| Capacity (TEU) [-]                                                     | 84000                     |
| Hydrostatics for Design Draught                                        |                           |
| Volume [m <sup>3</sup> ]                                               | 95479                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 117.6                     |
| Vertical Center of Buoyancy (VCB) [m]                                  | 7.08                      |
| Longitudinal Center of Floatation (LCF) [m]                            | 110.42                    |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 761024                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 26920900                  |
| Block coefficient $c_B$ [-]                                            | 0.85                      |

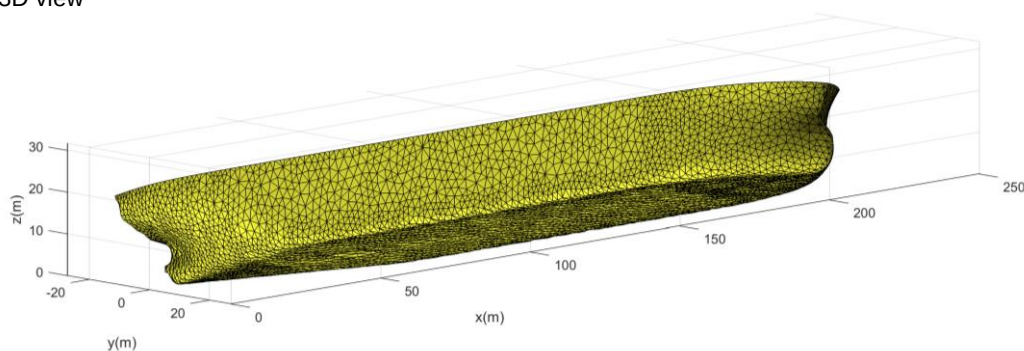
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



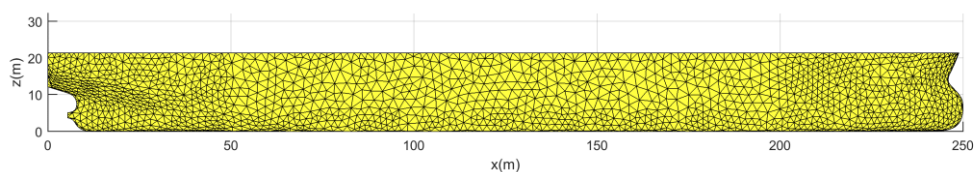
Date

February 2017

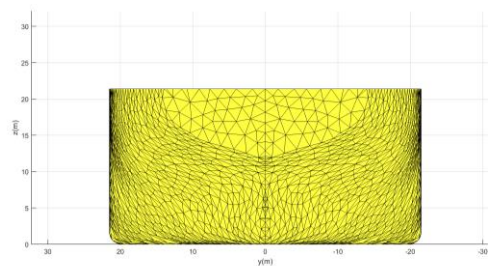
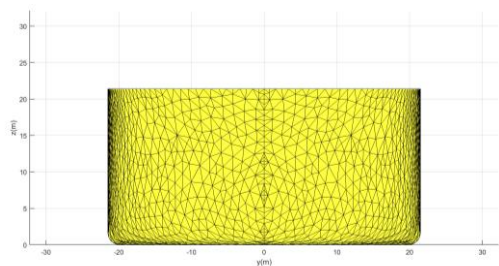


| Vessel ID                                                              | Bul-08                      |
|------------------------------------------------------------------------|-----------------------------|
| Hull file name                                                         | Bul-08_Bulker_105000t.hull  |
| Vessel type                                                            | Bulk carrier, Mini Capesize |
| Length over all (LOA) [m]                                              | 250.0                       |
| Length between perpendiculars (LPP) [m]                                | 245.0                       |
| Breadth [m]                                                            | 43.0                        |
| Design draught [m]                                                     | 14.0                        |
| Height [m]                                                             | 21.4                        |
| Capacity (TEU) [-]                                                     | 105000                      |
| Hydrostatics for Design Draught                                        |                             |
| Volume [m <sup>3</sup> ]                                               | 124632                      |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 129.2                       |
| Vertical Center of Buoyancy (VCB) [m]                                  | 7.19                        |
| Longitudinal Center of Floatation (LCF) [m]                            | 121.32                      |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 1356300                     |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 41519400                    |
| Block coefficient $c_B$ [-]                                            | 0.85                        |

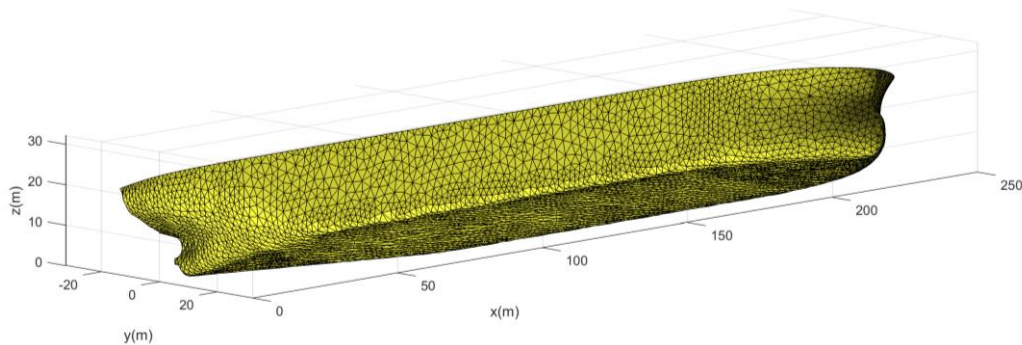
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

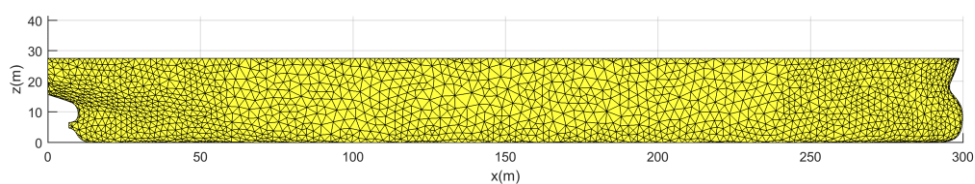


Date

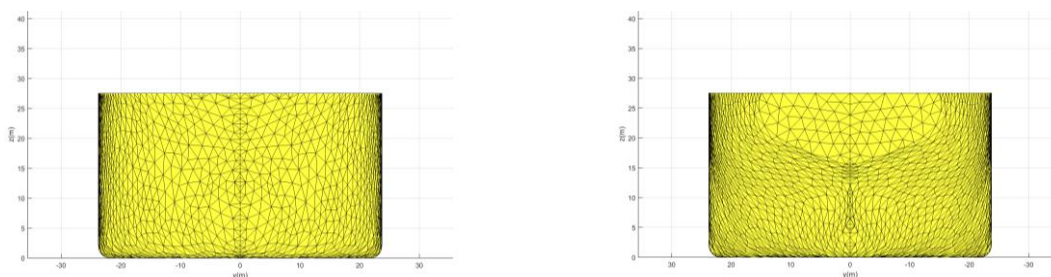
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| Vessel ID                                                              | Bul-09                     |
|------------------------------------------------------------------------|----------------------------|
| Hull file name                                                         | Bul-09_Bulker_187000t.hull |
| Vessel type                                                            | Bulk carrier, Capesize     |
| Length over all (LOA) [m]                                              | 299.9                      |
| Length between perpendiculars (LPP) [m]                                | 294.0                      |
| Breadth [m]                                                            | 47.5                       |
| Design draught [m]                                                     | 18.0                       |
| Height [m]                                                             | 27.5                       |
| Capacity (TEU) [-]                                                     | 187882                     |
| Hydrostatics for Design Draught                                        |                            |
| Volume [m <sup>3</sup> ]                                               | 213904                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 155.1                      |
| Vertical Center of Buoyancy (VCB) [m]                                  | 9.25                       |
| Longitudinal Center of Floatation (LCF) [m]                            | 145.74                     |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 2211730                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 80084700                   |
| Block coefficient $c_B$ [-]                                            | 0.85                       |

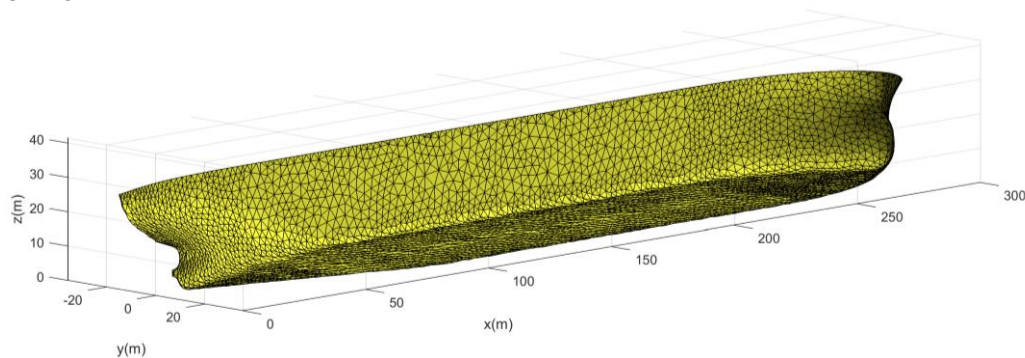
Longitudinal profile



Lateral profile (left: bow, right: aft)



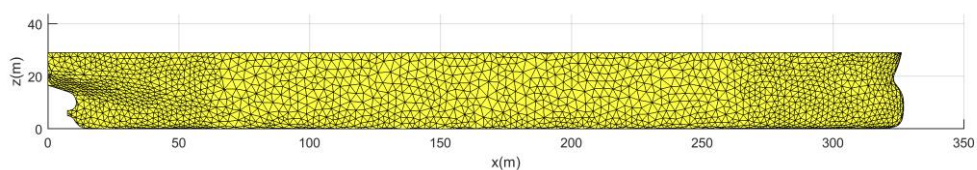
3D view



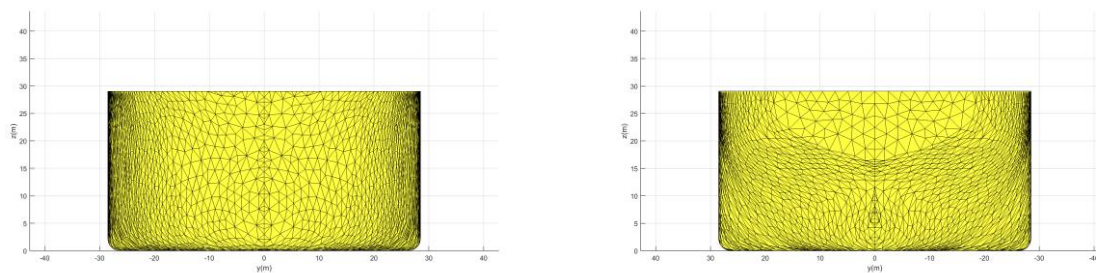
|      |               |
|------|---------------|
| Date | February 2017 |
|------|---------------|

| Vessel ID                                                              | Bul-10                     |
|------------------------------------------------------------------------|----------------------------|
| Hull file name                                                         | Bul-10_Bulker_250000t.hull |
| Vessel type                                                            | Bulk carrier, Capesize     |
| Length over all (LOA) [m]                                              | 327.0                      |
| Length between perpendiculars (LPP) [m]                                | 321.5                      |
| Breadth [m]                                                            | 57.0                       |
| Design draught [m]                                                     | 19.0                       |
| Height [m]                                                             | 29.0                       |
| Capacity (TEU) [-]                                                     | 250000                     |
| Hydrostatics for Design Draught                                        |                            |
| Volume [m <sup>3</sup> ]                                               | 282080                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 167.1                      |
| Vertical Center of Buoyancy (VCB) [m]                                  | 9.81                       |
| Longitudinal Center of Floatation (LCF) [m]                            | 156.05                     |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 3862650                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 117593000                  |
| Block coefficient $c_B$ [-]                                            | 0.81                       |

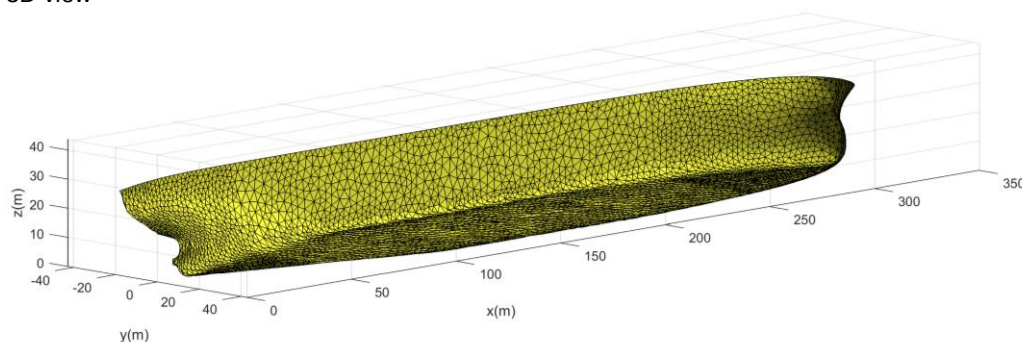
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

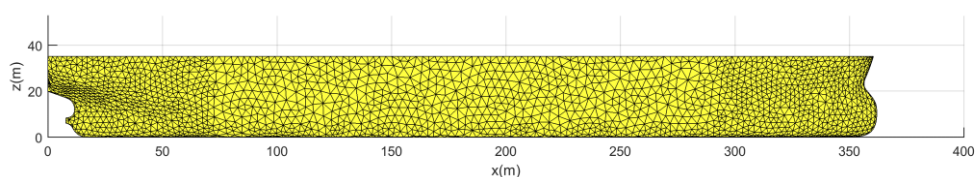


Date

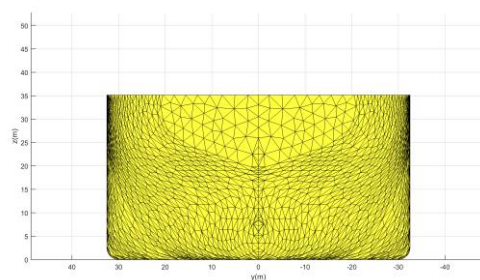
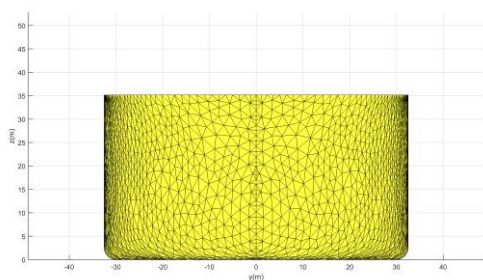
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| Vessel ID                                                              | Bul-11                     |
|------------------------------------------------------------------------|----------------------------|
| Hull file name                                                         | Bul-11_Bulker_400000t.hull |
| Vessel type                                                            | Bulk carrier, Capesize     |
| Length over all (LOA) [m]                                              | 362.0                      |
| Length between perpendiculars (LPP) [m]                                | 355.0                      |
| Breadth [m]                                                            | 65.0                       |
| Design draught [m]                                                     | 23.0                       |
| Height [m]                                                             | 35.0                       |
| Capacity (TEU) [-]                                                     | 400000                     |
| Hydrostatics for Design Draught                                        |                            |
| Volume [m <sup>3</sup> ]                                               | 440522                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 187.2                      |
| Vertical Center of Buoyancy (VCB) [m]                                  | 11.85                      |
| Longitudinal Center of Floatation (LCF) [m]                            | 174.98                     |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 6631150                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 187351000                  |
| Block coefficient $c_B$ [-]                                            | 0.83                       |

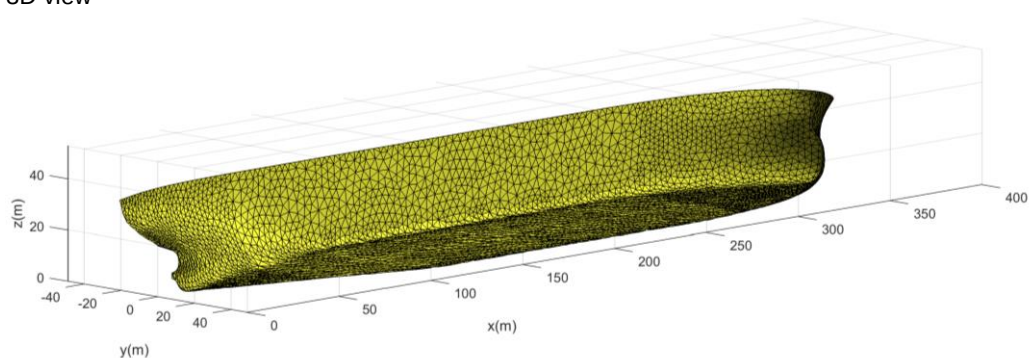
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



Date

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## 3.2 Container Carriers

This section represents the vessel characteristics for wave response analyses for 13 single screw container carriers of different size. They are clustered based on global scheduled container vessel new building projects within the next years and represent a variety of many container carrier ship types.

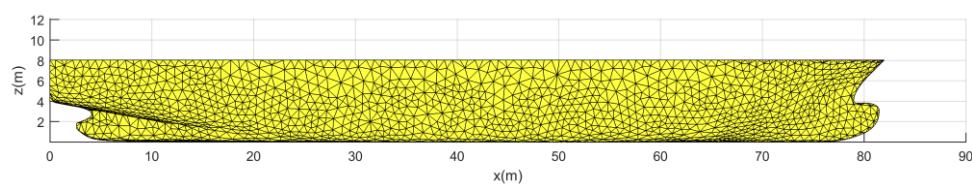
All container vessel geometries are generated generically based on the main dimensions chosen.

The hydrostatic characteristics such as the longitudinal Center of Buoyancy (LCB) and block coefficients ( $C_B$ ) have been selected based on  $1/1$  and  $1/3$ , respectively.

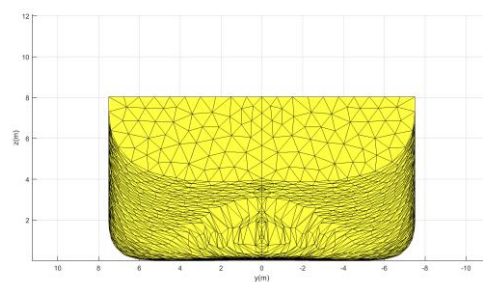
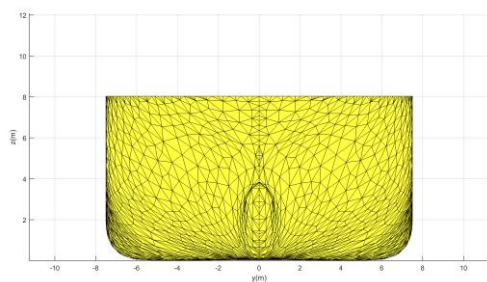


| Vessel ID                                                              | Con-01                          |
|------------------------------------------------------------------------|---------------------------------|
| Hull file name                                                         | Con-01_Panelfile_160TEU.hull    |
| Vessel type                                                            | Container carrier, Small Feeder |
| Length over all (LOA) [m]                                              | 82.0                            |
| Length between perpendiculars (LPP) [m]                                | 78.9                            |
| Breadth [m]                                                            | 15.0                            |
| Design draught [m]                                                     | 4.0                             |
| Height [m]                                                             | 8.0                             |
| Capacity (TEU) [-]                                                     | 160                             |
| Hydrostatics for Design Draught                                        |                                 |
| Volume [m <sup>3</sup> ]                                               | 3454                            |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 40.2                            |
| Vertical Center of Buoyancy (VCB) [m]                                  | 2.19                            |
| Longitudinal Center of Floatation (LCF) [m]                            | 37.56                           |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 18445                           |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 463373                          |
| Block coefficient $c_B$ [-]                                            | 0.73                            |

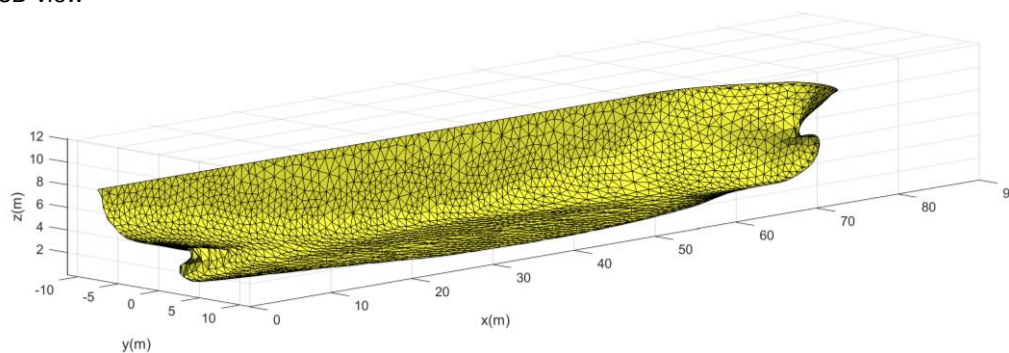
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

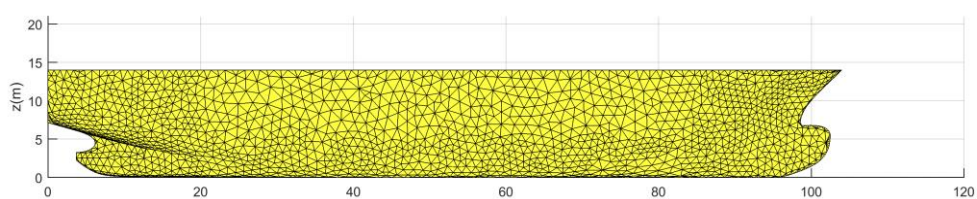


Date

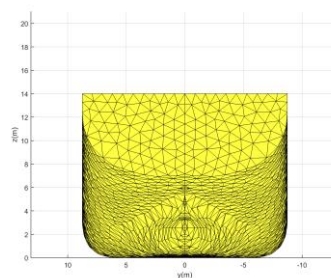
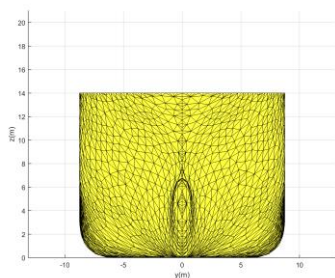
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| Vessel ID                                                              | Con-02                          |
|------------------------------------------------------------------------|---------------------------------|
| Hull file name                                                         | Con-02_Panelfile_250TEU.hull    |
| Vessel type                                                            | Container carrier, Small Feeder |
| Length over all (LOA) [m]                                              | 104.0                           |
| Length between perpendiculars (LPP) [m]                                | 98.0                            |
| Breadth [m]                                                            | 17.5                            |
| Design draught [m]                                                     | 7.2                             |
| Height [m]                                                             | 14.0                            |
| Capacity (TEU) [-]                                                     | 278                             |
| Hydrostatics for Design Draught                                        |                                 |
| Volume [m <sup>3</sup> ]                                               | 8822                            |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 49.5                            |
| Vertical Center of Buoyancy (VCB) [m]                                  | 3.92                            |
| Longitudinal Center of Floatation (LCF) [m]                            | 46.50                           |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 35985                           |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 1020000                         |
| Block coefficient $c_B$ [-]                                            | 0.72                            |

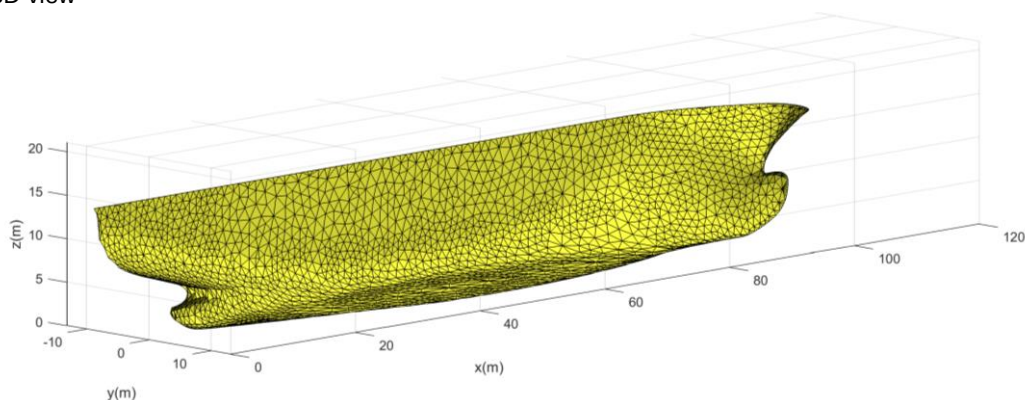
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

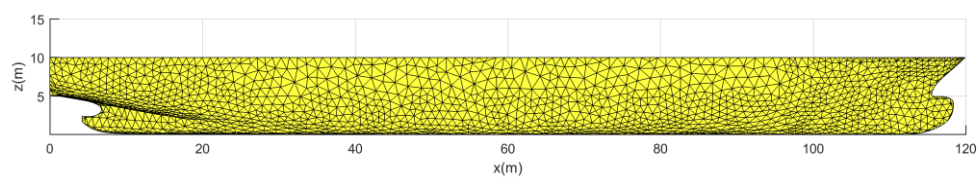


Date

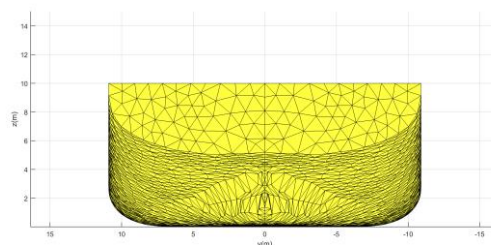
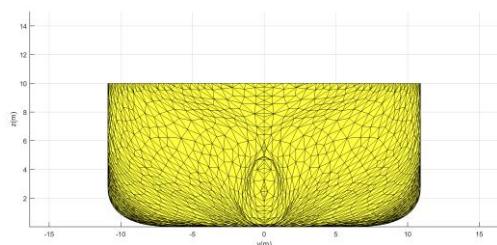
February 2017

| Vessel ID                                                              | Con-03                          |
|------------------------------------------------------------------------|---------------------------------|
| Hull file name                                                         | Con-03_Panelfile_500TEU.hull    |
| Vessel type                                                            | Container carrier, Small Feeder |
| Length over all (LOA) [m]                                              | 119.9                           |
| Length between perpendiculars (LPP) [m]                                | 115.0                           |
| Breadth [m]                                                            | 21.8                            |
| Design draught [m]                                                     | 5.2                             |
| Height [m]                                                             | 10.0                            |
| Capacity (TEU) [-]                                                     | 558                             |
| Hydrostatics for Design Draught                                        |                                 |
| Volume [m <sup>3</sup> ]                                               | 9259                            |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 57.5                            |
| Vertical Center of Buoyancy (VCB) [m]                                  | 2.87                            |
| Longitudinal Center of Floatation (LCF) [m]                            | 54.33                           |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 81157.1                         |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 2020000                         |
| Block coefficient $c_B$ [-]                                            | 0.71                            |

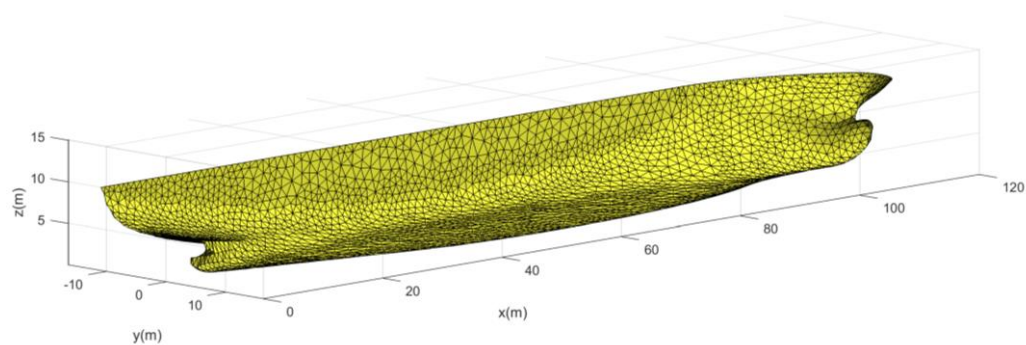
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

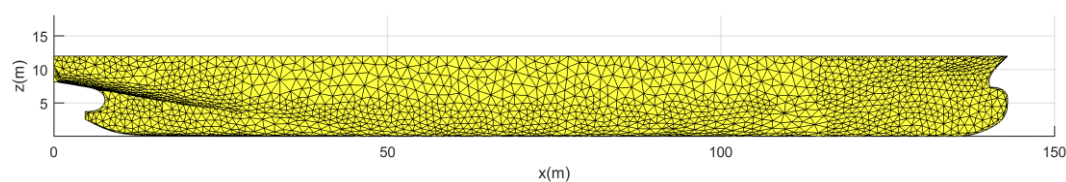


Date

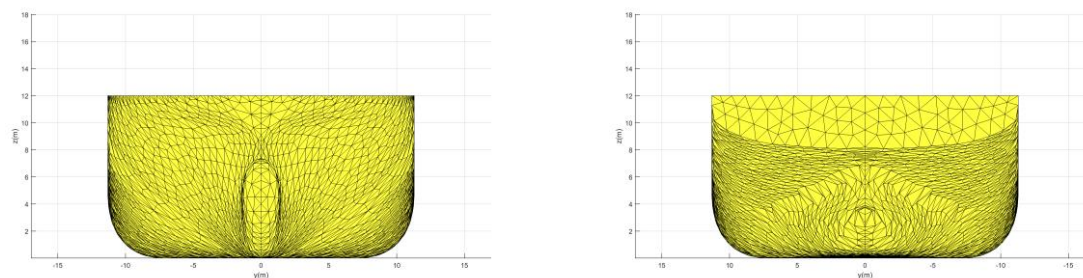
February 2017

| Vessel ID                                                              | Con-04                             |
|------------------------------------------------------------------------|------------------------------------|
| Hull file name                                                         | Con-04_Panelfile_1000TEU.hull      |
| Vessel type                                                            | Container carrier, Regional Feeder |
| Length over all (LOA) [m]                                              | 143.0                              |
| Length between perpendiculars (LPP) [m]                                | 140.0                              |
| Breadth [m]                                                            | 22.6                               |
| Design draught [m]                                                     | 8.2                                |
| Height [m]                                                             | 12.0                               |
| Capacity (TEU) [-]                                                     | 1020                               |
| Hydrostatics for Design Draught                                        |                                    |
| Volume [m <sup>3</sup> ]                                               | 17503                              |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 69.4                               |
| Vertical Center of Buoyancy (VCB) [m]                                  | 4.57                               |
| Longitudinal Center of Floatation (LCF) [m]                            | 65.19                              |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 109447                             |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 3680000                            |
| Block coefficient $c_B$ [-]                                            | 0.67                               |

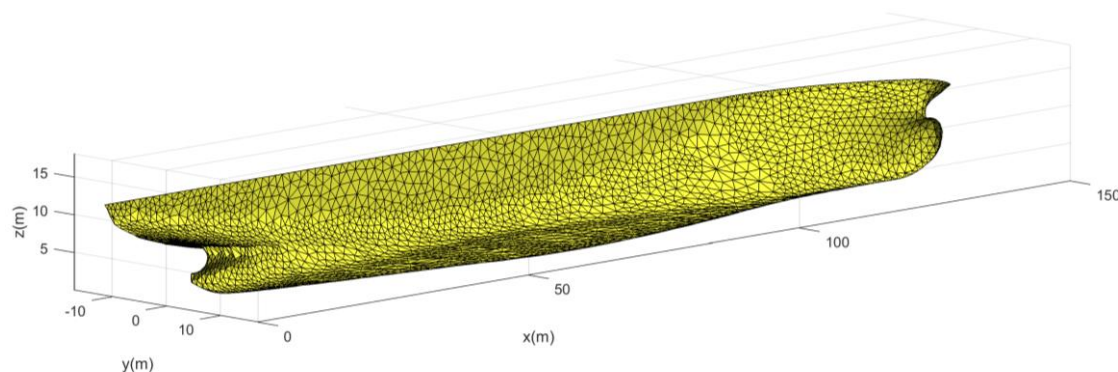
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



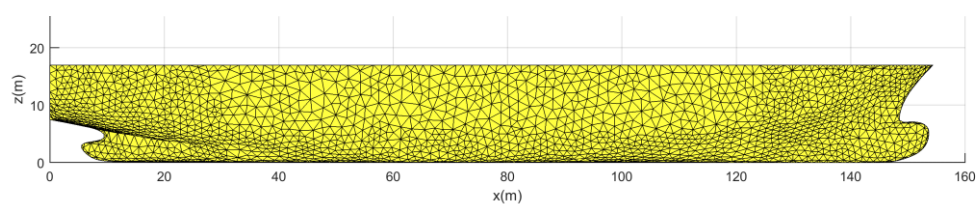
Date

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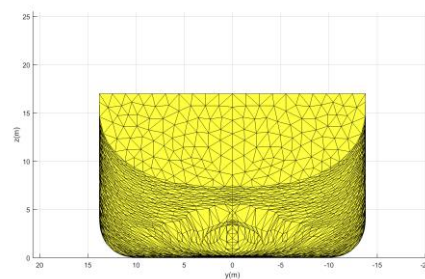
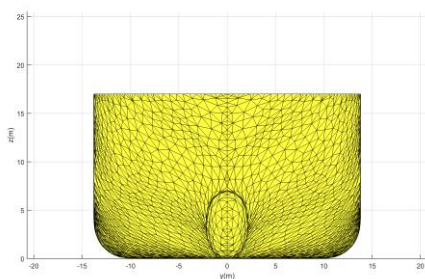


| Vessel ID                                                              | Con-05                             |
|------------------------------------------------------------------------|------------------------------------|
| Hull file name                                                         | Con-05_Panelfile_1400TEU.hull      |
| Vessel type                                                            | Container carrier, Regional Feeder |
| Length over all (LOA) [m]                                              | 153.7                              |
| Length between perpendiculars (LPP) [m]                                | 148.0                              |
| Breadth [m]                                                            | 27.6                               |
| Design draught [m]                                                     | 7.4                                |
| Height [m]                                                             | 17.0                               |
| Capacity (TEU) [-]                                                     | 1400                               |
| Hydrostatics for Design Draught                                        |                                    |
| Volume [m <sup>3</sup> ]                                               | 20208                              |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 73.3                               |
| Vertical Center of Buoyancy (VCB) [m]                                  | 4.11                               |
| Longitudinal Center of Floatation (LCF) [m]                            | 70.75                              |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 198747                             |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 4980000                            |
| Block coefficient $c_B$ [-]                                            | 0.67                               |

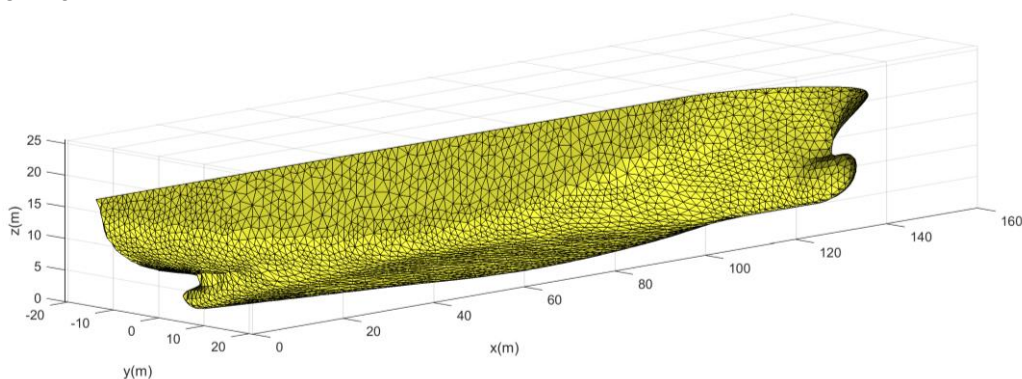
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



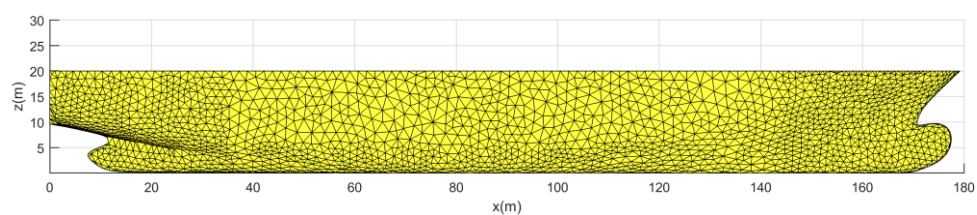
Date

February 2017

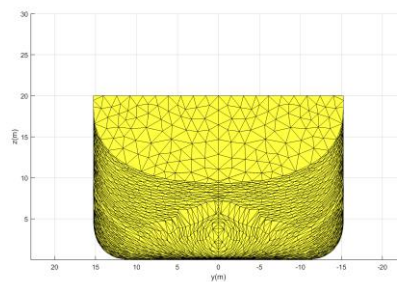
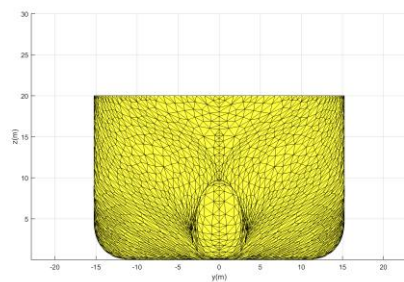


| Vessel ID                                                              | Con-06                        |
|------------------------------------------------------------------------|-------------------------------|
| Hull file name                                                         | Con-06_Panelfile_1900TEU.hull |
| Vessel type                                                            | Container carrier             |
| Length over all (LOA) [m]                                              | 177.5                         |
| Length between perpendiculars (LPP) [m]                                | 169.0                         |
| Breadth [m]                                                            | 30.5                          |
| Design draught [m]                                                     | 9.5                           |
| Height [m]                                                             | 20.0                          |
| Capacity (TEU) [-]                                                     | 1924                          |
| Hydrostatics for Design Draught                                        |                               |
| Volume [m <sup>3</sup> ]                                               | 31836                         |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 82.2                          |
| Vertical Center of Buoyancy (VCB) [m]                                  | 5.35                          |
| Longitudinal Center of Floatation (LCF) [m]                            | 78.98                         |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 305336                        |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 8130000                       |
| Block coefficient $c_B$ [-]                                            | 0.65                          |

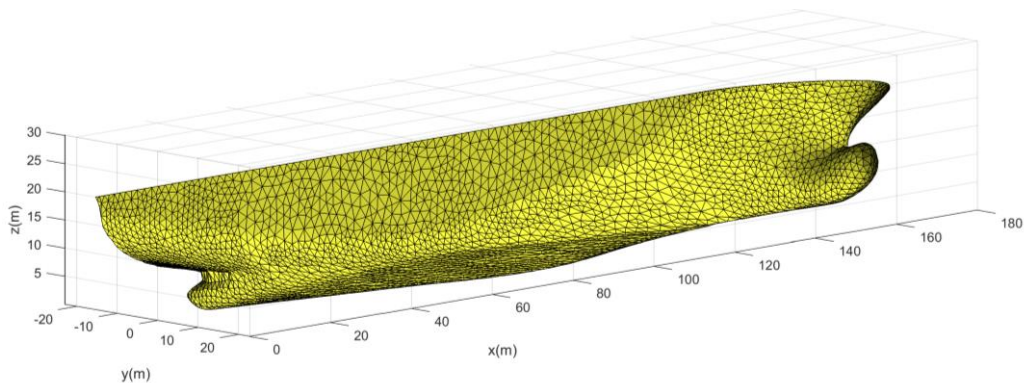
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

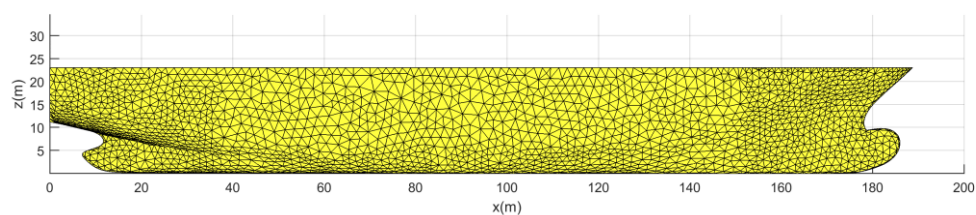


Date

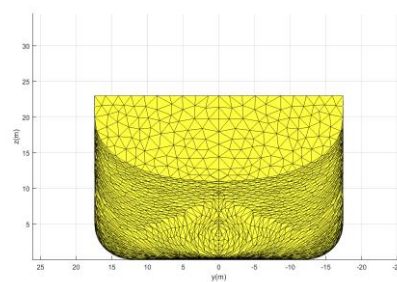
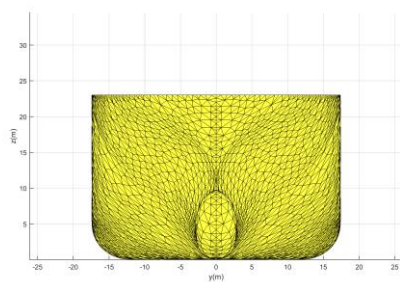
February 2017

| Vessel ID                                                              | Con-07                        |
|------------------------------------------------------------------------|-------------------------------|
| Hull file name                                                         | Con-07_Panelfile_2700TEU.hull |
| Vessel type                                                            | Container carrier, Feedermax  |
| Length over all (LOA) [m]                                              | 186.0                         |
| Length between perpendiculars (LPP) [m]                                | 177.0                         |
| Breadth [m]                                                            | 34.8                          |
| Design draught [m]                                                     | 11.0                          |
| Height [m]                                                             | 23.0                          |
| Capacity (TEU) [-]                                                     | 2708                          |
| Hydrostatics for Design Draught                                        |                               |
| Volume [m <sup>3</sup> ]                                               | 43513                         |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 86.4                          |
| Vertical Center of Buoyancy (VCB) [m]                                  | 6.16                          |
| Longitudinal Center of Floatation (LCF) [m]                            | 82.12                         |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 460418                        |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 10000000                      |
| Block coefficient $C_B$ [-]                                            | 0.64                          |

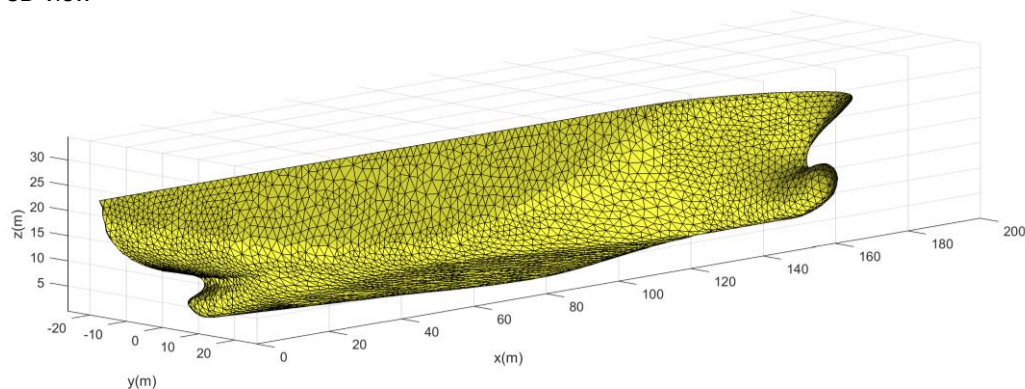
#### Longitudinal profile



#### Lateral profile (left: bow, right: aft)



#### 3D view

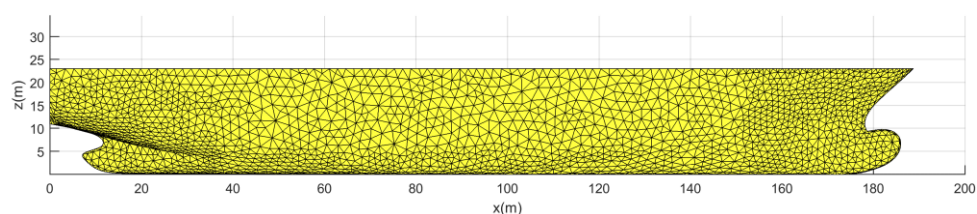


Date

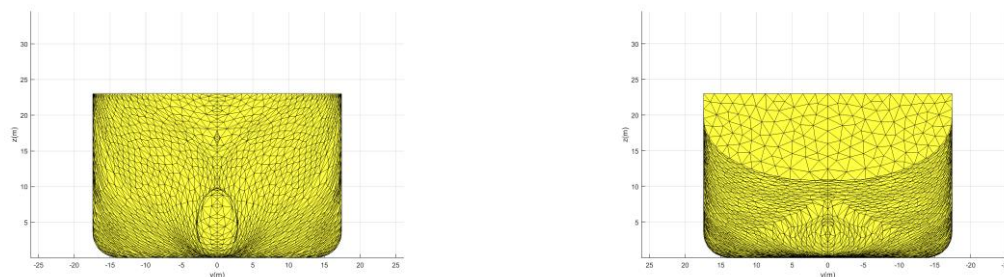
February 2017

| Vessel ID                                                              | Con-07b                          |
|------------------------------------------------------------------------|----------------------------------|
| Hull file name                                                         | Con-07b_Panelfile_2700TEU_b.hull |
| Vessel type                                                            | Container carrier, Feedermax     |
| Length over all (LOA) [m]                                              | 186.0                            |
| Length between perpendiculars (LPP) [m]                                | 177.0                            |
| Breadth [m]                                                            | 34.8                             |
| Design draught [m]                                                     | 11.0                             |
| Height [m]                                                             | 23.0                             |
| Capacity (TEU) [-]                                                     | 2708                             |
| Hydrostatics for Design Draught                                        |                                  |
| Volume [m <sup>3</sup> ]                                               | 45945                            |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 87.5                             |
| Vertical Center of Buoyancy (VCB) [m]                                  | 6.09                             |
| Longitudinal Center of Floatation (LCF) [m]                            | 82.79                            |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 476543                           |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 10700000                         |
| Block coefficient $c_B$ [-]                                            | 0.68                             |

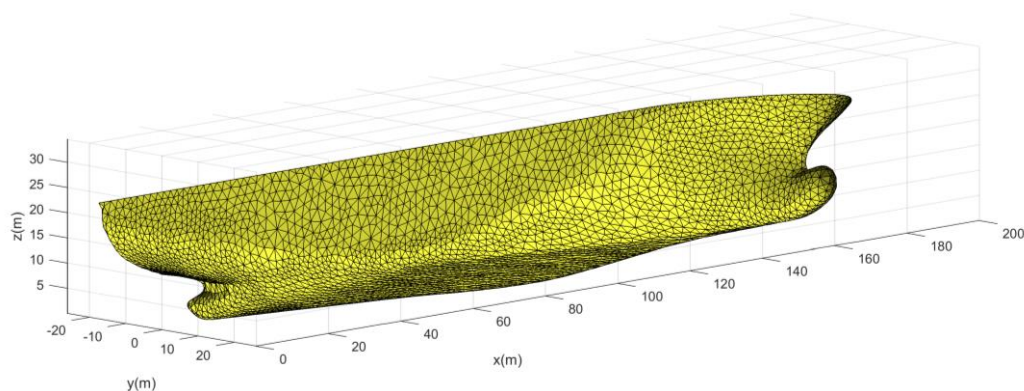
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

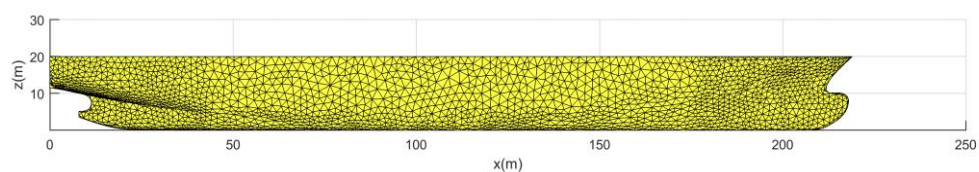


Date

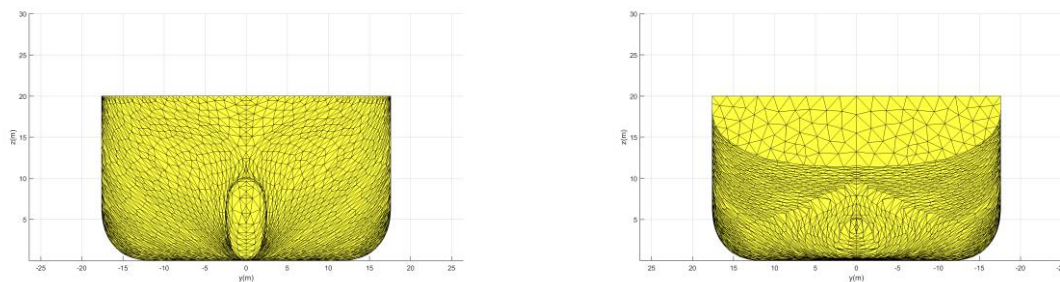
December 2017

| Vessel ID                                                              | Con-08                               |
|------------------------------------------------------------------------|--------------------------------------|
| Hull file name                                                         | Con-08_panelfile_3300TEU.hull        |
| Vessel type                                                            | Container carrier, Baby Post-Panamax |
| Length over all (LOA) [m]                                              | 219.0                                |
| Length between perpendiculars (LPP) [m]                                | 210.0                                |
| Breadth [m]                                                            | 35.2                                 |
| Design draught [m]                                                     | 11.0                                 |
| Height [m]                                                             | 20.0                                 |
| Capacity (TEU) [-]                                                     | 3300                                 |
| Hydrostatics for Design Draught                                        |                                      |
| Volume [m <sup>3</sup> ]                                               | 53297                                |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 102.9                                |
| Vertical Center of Buoyancy (VCB) [m]                                  | 6.17                                 |
| Longitudinal Center of Floatation (LCF) [m]                            | 99.05                                |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 594374                               |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 18100000                             |
| Block coefficient $c_B$ [-]                                            | 0.66                                 |

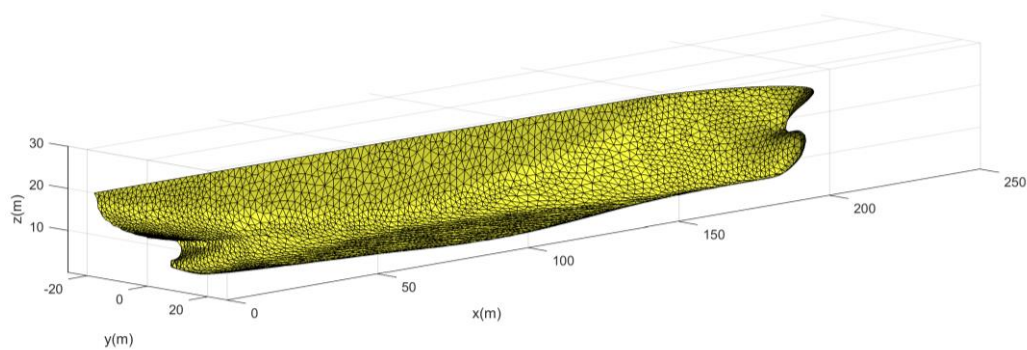
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

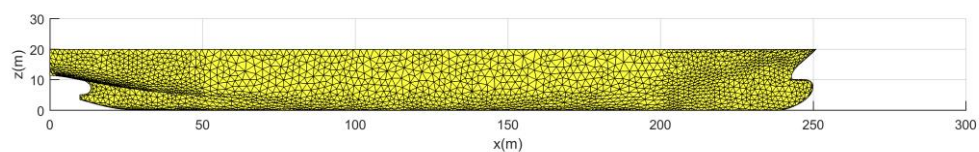


Date February 2017

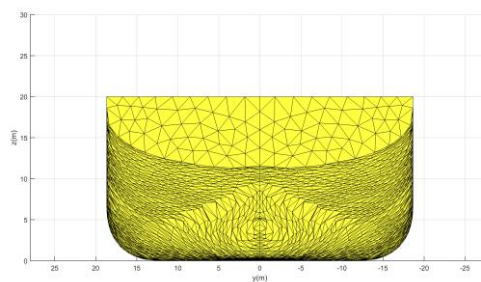
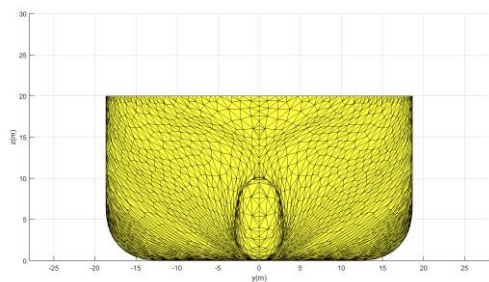


| Vessel ID                                                              | Con-09                               |
|------------------------------------------------------------------------|--------------------------------------|
| Hull file name                                                         | Con-09_Panelfile_4700TEU.hull        |
| Vessel type                                                            | Container carrier, Baby Post-Panamax |
| Length over all (LOA) [m]                                              | 251.0                                |
| Length between perpendiculars (LPP) [m]                                | 240.0                                |
| Breadth [m]                                                            | 37.3                                 |
| Design draught [m]                                                     | 11.0                                 |
| Height [m]                                                             | 20.0                                 |
| Capacity (TEU) [-]                                                     | 4700                                 |
| Hydrostatics for Design Draught                                        |                                      |
| Volume [m <sup>3</sup> ]                                               | 65968                                |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 118.8                                |
| Vertical Center of Buoyancy (VCB) [m]                                  | 6.14                                 |
| Longitudinal Center of Floatation (LCF) [m]                            | 113.67                               |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 819234                               |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 29300000                             |
| Block coefficient $c_B$ [-]                                            | 0.67                                 |

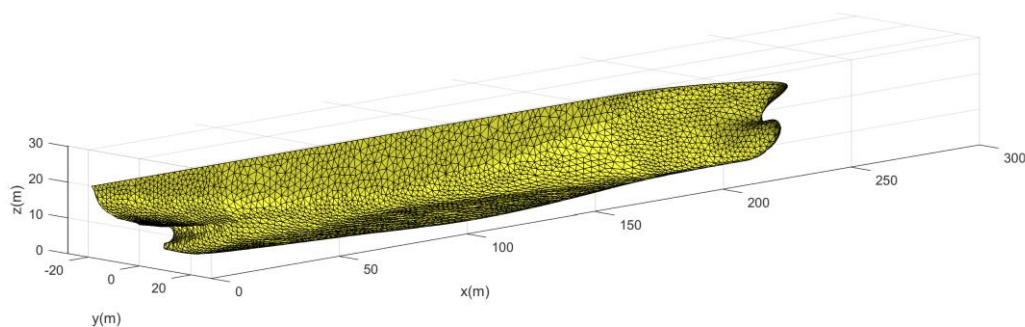
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



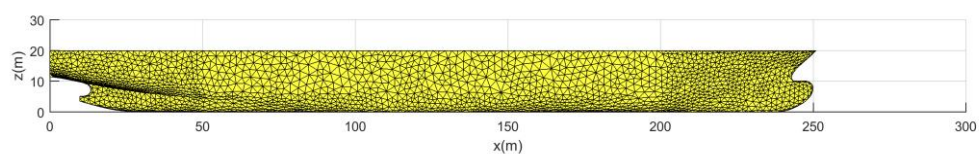
Date

February 2017

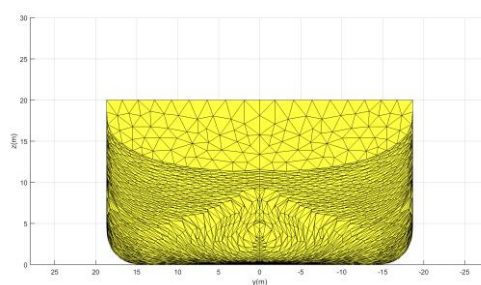
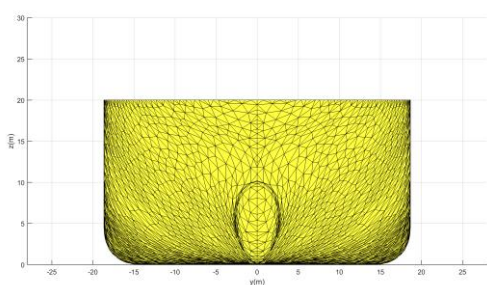


| Vessel ID                                                              | Con-09b                              |
|------------------------------------------------------------------------|--------------------------------------|
| Hull file name                                                         | Con-09_Panelfile_4700TEU.hull        |
| Vessel type                                                            | Container carrier, Baby Post-Panamax |
| Length over all (LOA) [m]                                              | 251.0                                |
| Length between perpendiculars (LPP) [m]                                | 240.0                                |
| Breadth [m]                                                            | 37.3                                 |
| Design draught [m]                                                     | 11.0                                 |
| Height [m]                                                             | 20.0                                 |
| Capacity (TEU) [-]                                                     | 4700                                 |
| Hydrostatics for Design Draught                                        |                                      |
| Volume [m <sup>3</sup> ]                                               | 69011                                |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 120.0                                |
| Vertical Center of Buoyancy (VCB) [m]                                  | 6.08                                 |
| Longitudinal Center of Floatation (LCF) [m]                            | 114.38                               |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 833778                               |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 30900000                             |
| Block coefficient $c_B$ [-]                                            | 0.70                                 |

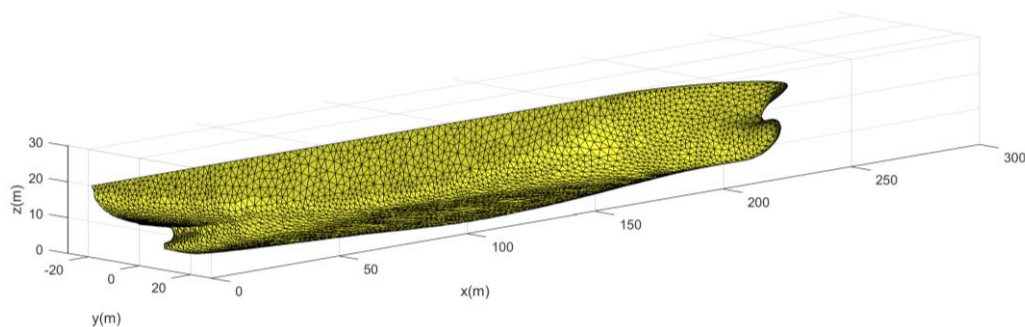
Longitudinal profile



Lateral profile (left: bow, right: aft)



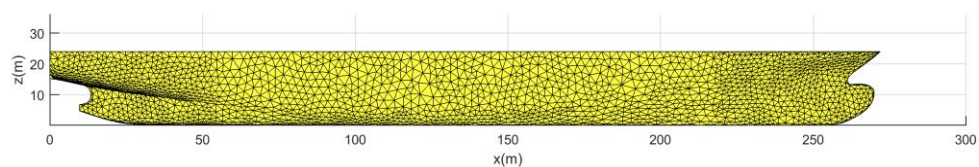
3D view



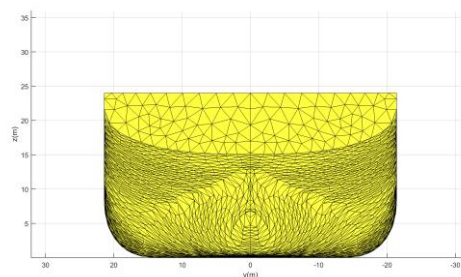
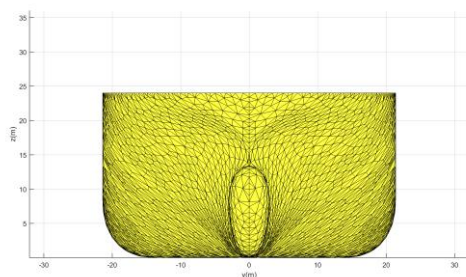
|      |               |
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| Date | December 2017 |
|------|---------------|

| Vessel ID                                                              | Con-10                          |
|------------------------------------------------------------------------|---------------------------------|
| Hull file name                                                         | Con-10_Panelfile_6900TEU.hull   |
| Vessel type                                                            | Container carrier, Post-Panamax |
| Length over all (LOA) [m]                                              | 270.0                           |
| Length between perpendiculars (LPP) [m]                                | 259.0                           |
| Breadth [m]                                                            | 42.8                            |
| Design draught [m]                                                     | 14.5                            |
| Height [m]                                                             | 24.0                            |
| Capacity (TEU) [-]                                                     | 6865                            |
| Hydrostatics for Design Draught                                        |                                 |
| Volume [m <sup>3</sup> ]                                               | 103003                          |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 126.0                           |
| Vertical Center of Buoyancy (VCB) [m]                                  | 8.18                            |
| Longitudinal Center of Floatation (LCF) [m]                            | 121.25                          |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 1320000                         |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 41400000                        |
| Block coefficient $c_B$ [-]                                            | 0.64                            |

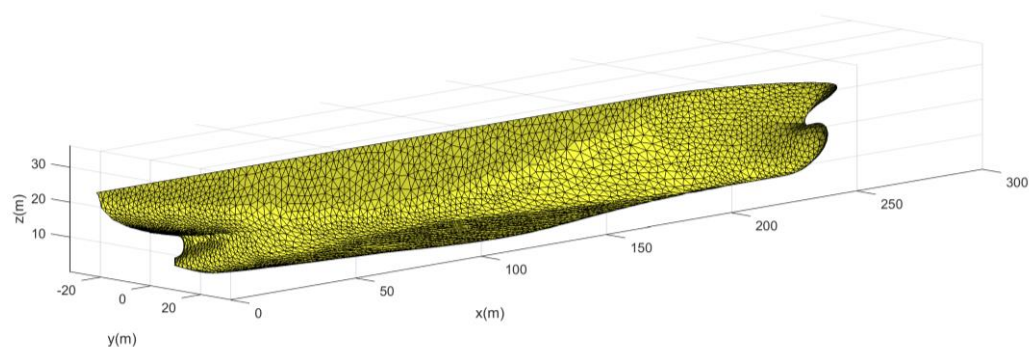
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

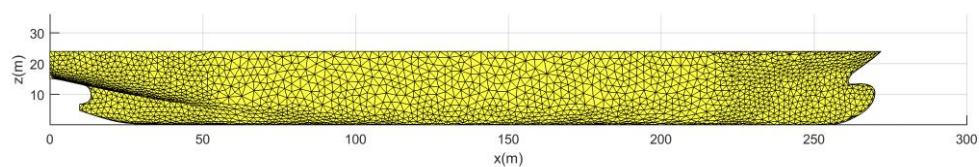


Date

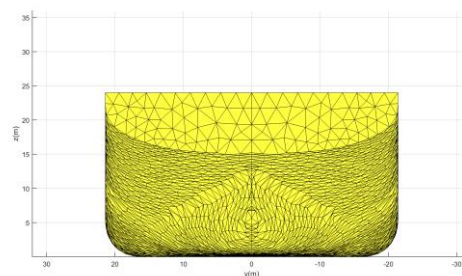
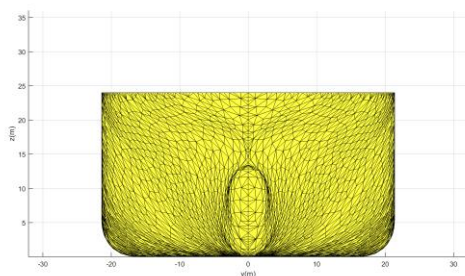
February 2017

| Vessel ID                                                              | Con-10b                          |
|------------------------------------------------------------------------|----------------------------------|
| Hull file name                                                         | Con-10b_Panelfile_6900TEU_b.hull |
| Vessel type                                                            | Container carrier, Post-Panamax  |
| Length over all (LOA) [m]                                              | 270.0                            |
| Length between perpendiculars (LPP) [m]                                | 259.0                            |
| Breadth [m]                                                            | 42.8                             |
| Design draught [m]                                                     | 14.5                             |
| Height [m]                                                             | 24.0                             |
| Capacity (TEU) [-]                                                     | 6865                             |
| Hydrostatics for Design Draught                                        |                                  |
| Volume [m <sup>3</sup> ]                                               | 111805                           |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 129.0                            |
| Vertical Center of Buoyancy (VCB) [m]                                  | 7.96                             |
| Longitudinal Center of Floatation (LCF) [m]                            | 121.32                           |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 1330000                          |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 42300000                         |
| Block coefficient $c_B$ [-]                                            | 0.70                             |

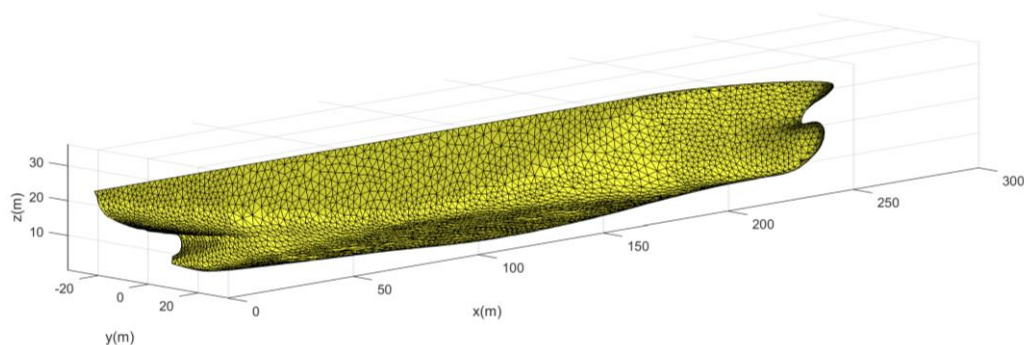
Longitudinal profile



Lateral profile (left: bow, right: aft)



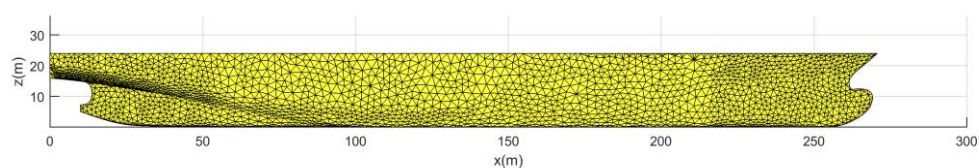
3D view



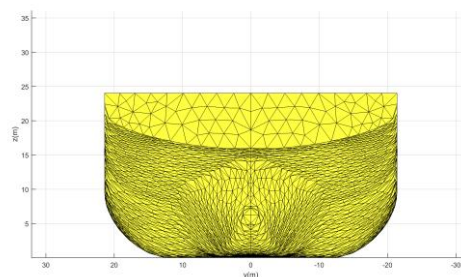
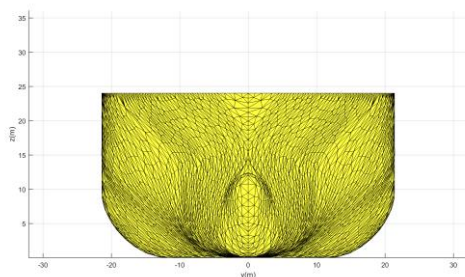
|      |               |
|------|---------------|
| Date | December 2017 |
|------|---------------|

| Vessel ID                                                              | Con-10c                          |
|------------------------------------------------------------------------|----------------------------------|
| Hull file name                                                         | Con-10c_Panelfile_6900TEU_c.hull |
| Vessel type                                                            | Container carrier, Post-Panamax  |
| Length over all (LOA) [m]                                              | 270.0                            |
| Length between perpendiculars (LPP) [m]                                | 259.0                            |
| Breadth [m]                                                            | 42.8                             |
| Design draught [m]                                                     | 14.5                             |
| Height [m]                                                             | 24.0                             |
| Capacity (TEU) [-]                                                     | 6865                             |
| Hydrostatics for Design Draught                                        |                                  |
| Volume [m <sup>3</sup> ]                                               | 90240                            |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 127.2                            |
| Vertical Center of Buoyancy (VCB) [m]                                  | 8.22                             |
| Longitudinal Center of Floatation (LCF) [m]                            | 117.91                           |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 1070000                          |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 29600000                         |
| Block coefficient $c_B$ [-]                                            | 0.56                             |

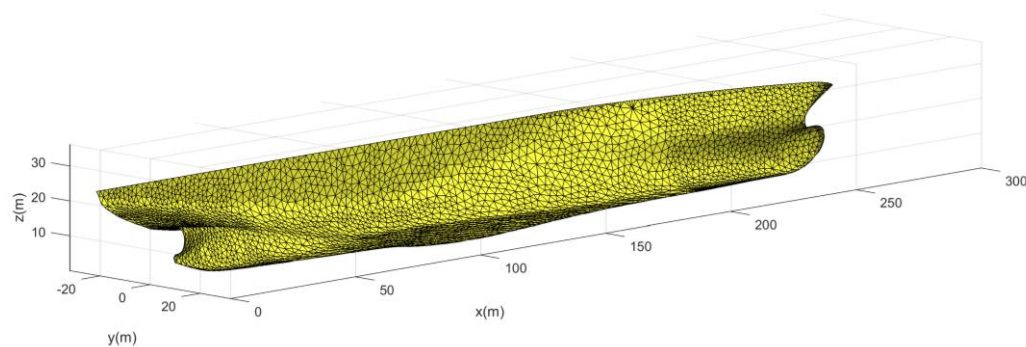
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

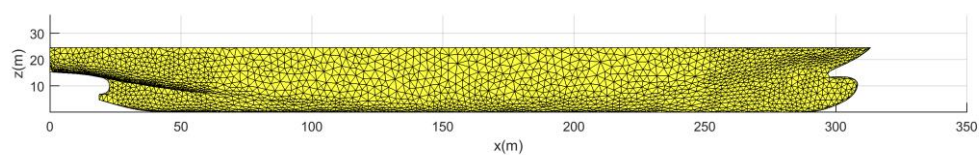


|      |               |
|------|---------------|
| Date | December 2017 |
|------|---------------|

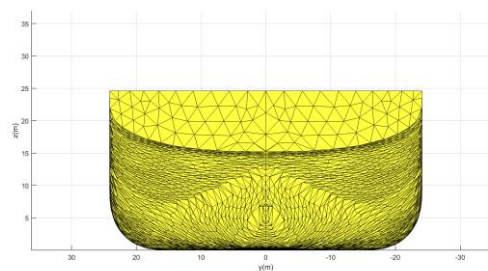
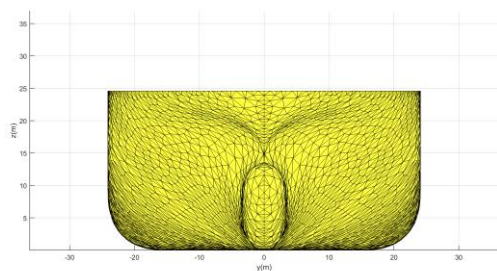


| Vessel ID                                                              | Con-11                         |
|------------------------------------------------------------------------|--------------------------------|
| Hull file name                                                         | Con-11_Panelfile_10800TEU.hull |
| Vessel type                                                            | Container carrier, ULCS        |
| Length over all (LOA) [m]                                              | 314.4                          |
| Length between perpendiculars (LPP) [m]                                | 286.4                          |
| Breadth [m]                                                            | 48.2                           |
| Design draught [m]                                                     | 14.6                           |
| Height [m]                                                             | 24.6                           |
| Capacity (TEU) [-]                                                     | 10800                          |
| Hydrostatics for Design Draught                                        |                                |
| Volume [m <sup>3</sup> ]                                               | 134854                         |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 141.7                          |
| Vertical Center of Buoyancy (VCB) [m]                                  | 8.18                           |
| Longitudinal Center of Floatation (LCF) [m]                            | 134.78                         |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 2150000                        |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 61600000                       |
| Block coefficient $c_B$ [-]                                            | 0.67                           |

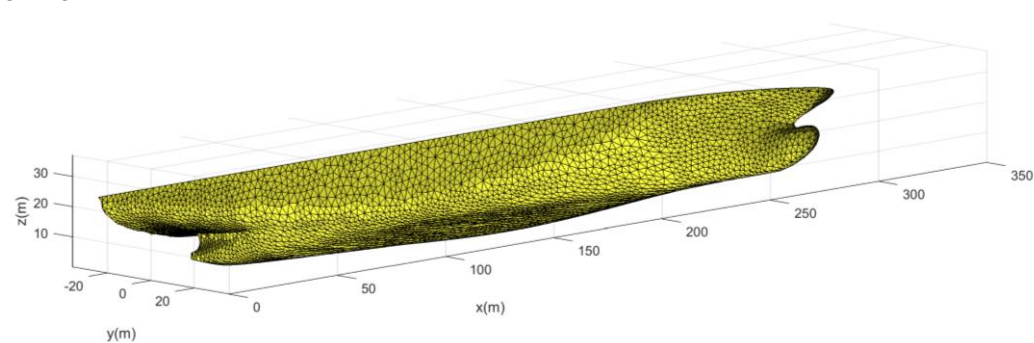
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



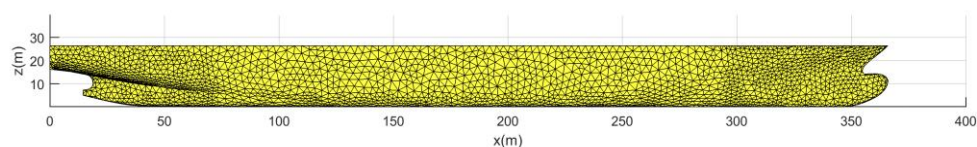
Date

February 2017

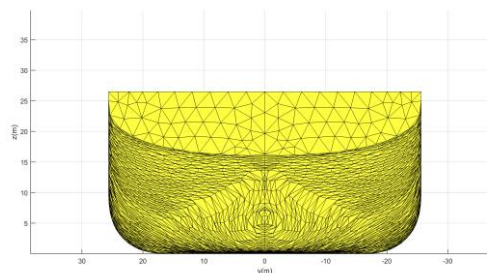
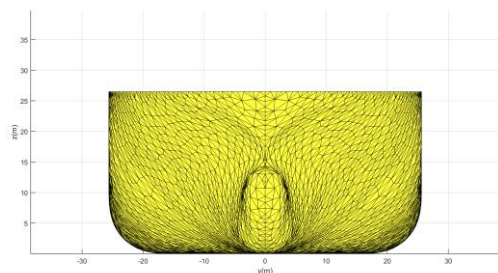


| Vessel ID                                                              | Con-12                         |
|------------------------------------------------------------------------|--------------------------------|
| Hull file name                                                         | Con-12_Panelfile_14500TEU.hull |
| Vessel type                                                            | Container carrier, ULCS        |
| Length over all (LOA) [m]                                              | 366.0                          |
| Length between perpendiculars (LPP) [m]                                | 350.5                          |
| Breadth [m]                                                            | 51.2                           |
| Design draught [m]                                                     | 15.5                           |
| Height [m]                                                             | 26.5                           |
| Capacity (TEU) [-]                                                     | 14500                          |
| Hydrostatics for Design Draught                                        |                                |
| Volume [m <sup>3</sup> ]                                               | 189119                         |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 174.3                          |
| Vertical Center of Buoyancy (VCB) [m]                                  | 8.60                           |
| Longitudinal Center of Floatation (LCF) [m]                            | 164.71                         |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 3080000                        |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 122000000                      |
| Block coefficient $c_B$ [-]                                            | 0.68                           |

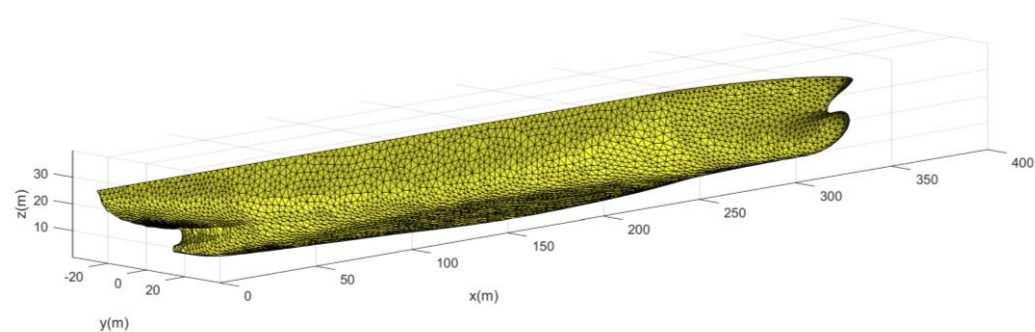
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

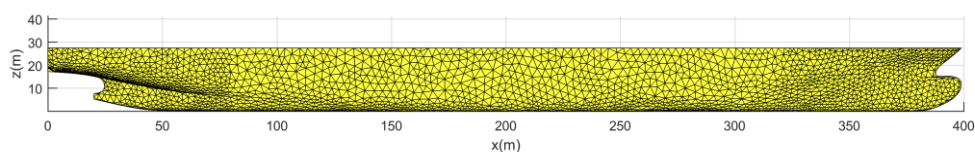


Date

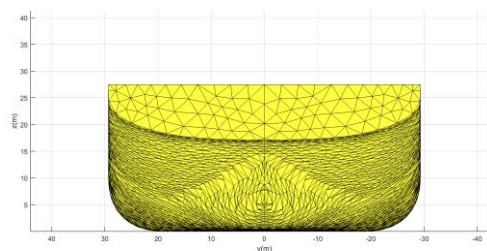
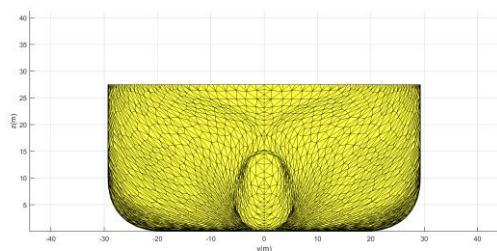
February 2017

| Vessel ID                                                              | Con-13                         |
|------------------------------------------------------------------------|--------------------------------|
| Hull file name                                                         | Con-13_Panelfile_20000TEU.hull |
| Vessel type                                                            | Container carrier, ULCS        |
| Length over all (LOA) [m]                                              | 399.0                          |
| Length between perpendiculars (LPP) [m]                                | 378.5                          |
| Breadth [m]                                                            | 58.6                           |
| Design draught [m]                                                     | 16.5                           |
| Height [m]                                                             | 27.5                           |
| Capacity (TEU) [-]                                                     | 19630                          |
| Hydrostatics for Design Draught                                        |                                |
| Volume [m <sup>3</sup> ]                                               | 252455                         |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 188.7                          |
| Vertical Center of Buoyancy (VCB) [m]                                  | 9.18                           |
| Longitudinal Center of Floatation (LCF) [m]                            | 178.78                         |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 5140000                        |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 186000000                      |
| Block coefficient $c_B$ [-]                                            | 0.69                           |

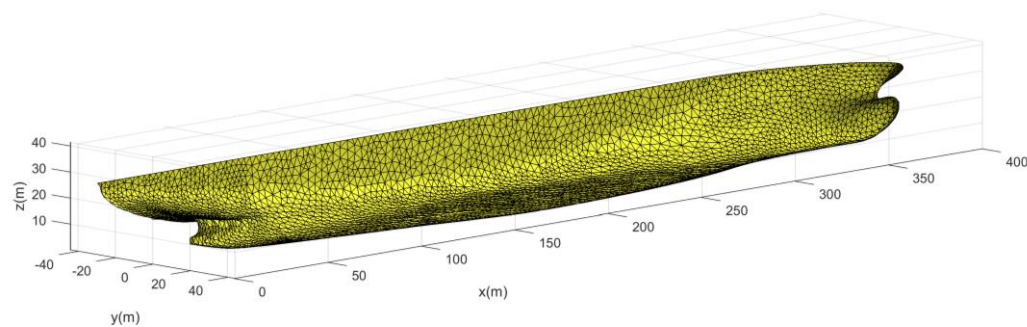
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

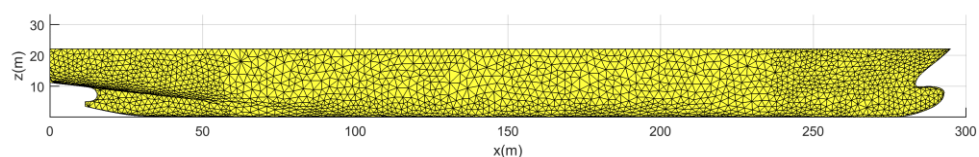


Date

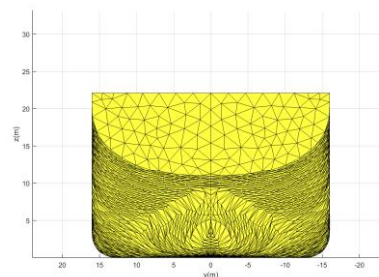
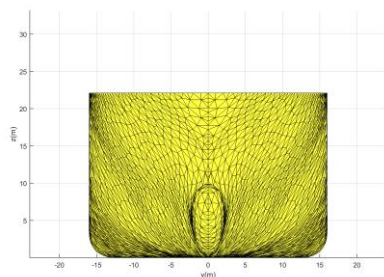
February 2017

| Vessel ID                                                              | Con-14                        |
|------------------------------------------------------------------------|-------------------------------|
| Hull file name                                                         | Con-14_Panelfile_5040TEU.hull |
| Vessel type                                                            | Container carrier, Panamax    |
| Length over all (LOA) [m]                                              | 294.0                         |
| Length between perpendiculars (LPP) [m]                                | 280.0                         |
| Breadth [m]                                                            | 32.0                          |
| Design draught [m]                                                     | 10.7                          |
| Height [m]                                                             | 22.1                          |
| Capacity (TEU) [-]                                                     | 5040                          |
| Hydrostatics for Design Draught                                        |                               |
| Volume [m <sup>3</sup> ]                                               | 65063                         |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 139.3                         |
| Vertical Center of Buoyancy (VCB) [m]                                  | 5.87                          |
| Longitudinal Center of Floatation (LCF) [m]                            | 132.0                         |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 573000                        |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 38400000                      |
| Block coefficient $c_B$ [-]                                            | 0.68                          |

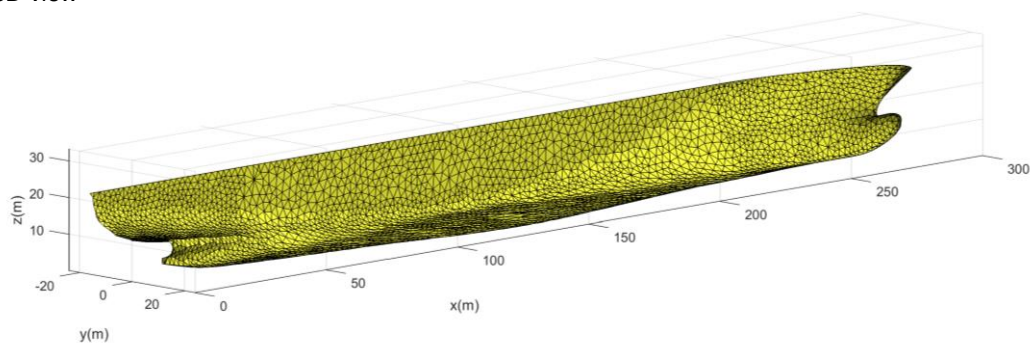
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

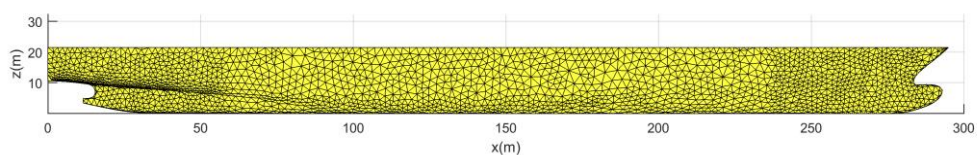


Date

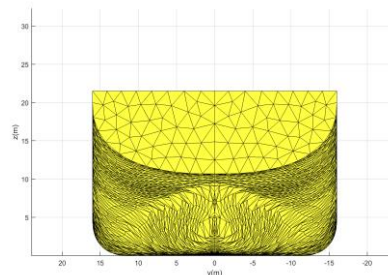
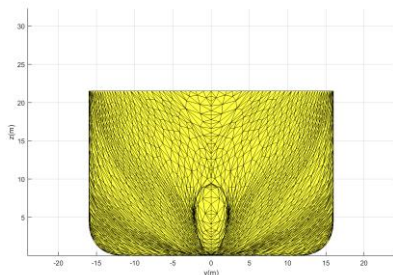
December 2017

| Vessel ID                                                              | Con-14b                        |
|------------------------------------------------------------------------|--------------------------------|
| Hull file name                                                         | Con-14b_Panelfile_5040TEU.hull |
| Vessel type                                                            | Container carrier, ULCS        |
| Length over all (LOA) [m]                                              | 294.0                          |
| Length between perpendiculars (LPP) [m]                                | 280.0                          |
| Breadth [m]                                                            | 32.0                           |
| Design draught [m]                                                     | 10.2                           |
| Height [m]                                                             | 21.5                           |
| Capacity (TEU) [-]                                                     | 5040                           |
| Hydrostatics for Design Draught                                        |                                |
| Volume [m <sup>3</sup> ]                                               | 57664                          |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 138.0                          |
| Vertical Center of Buoyancy (VCB) [m]                                  | 5.68                           |
| Longitudinal Center of Floatation (LCF) [m]                            | 133.23                         |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 547000                         |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 35800000                       |
| Block coefficient $c_B$ [-]                                            | 0.63                           |

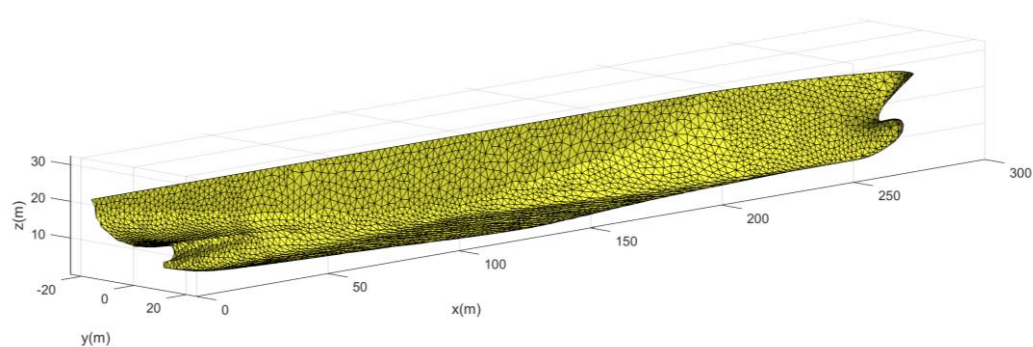
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



Date

December 2017

### 3.3 Cruise Ships

This section represents the vessel characteristics for wave response analyses for the two largest classes in operation.

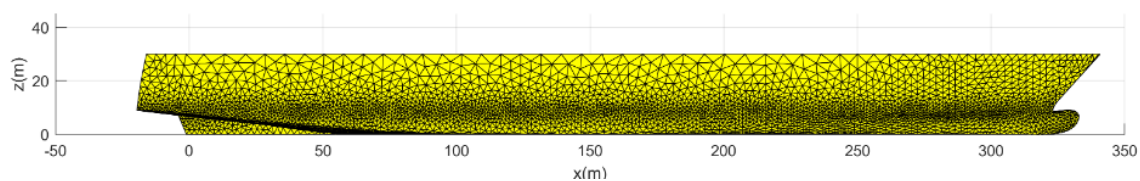
All cruise hulls are generated generically. They are adjusted to fit the main dimensions of the actual classes in operation. The corresponding FORCE Technology project with project number 119-30960 was initiated.

The displacement was selected to cover the most probable range. LCB has been selected based on inhouse data.

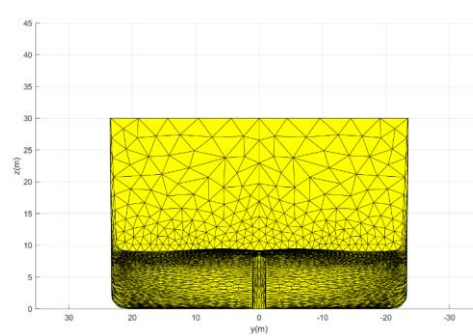
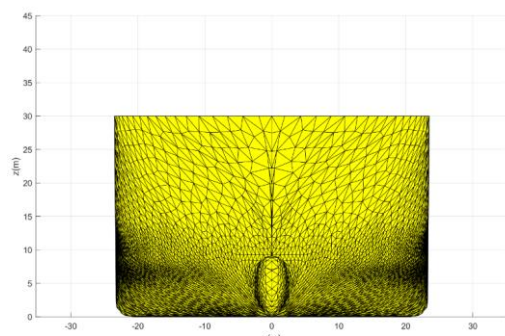


| Vessel ID                                                              | CR-01                |
|------------------------------------------------------------------------|----------------------|
| Hull file name                                                         | 01Cruise.hull        |
| Vessel type                                                            | Oasis class          |
| Length over all (LOA) [m]                                              | 356.8                |
| Length between perpendiculars (LPP) [m]                                | 323.1                |
| Breadth [m]                                                            | 47.0                 |
| Design draught [m]                                                     | 9.3                  |
| Height [m]                                                             | 30.0                 |
| Capacity (TEU) [-]                                                     |                      |
| Hydrostatics for Design Draught                                        |                      |
| Volume [m <sup>3</sup> ]                                               | 106194               |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 148.6                |
| Vertical Center of Buoyancy (VCB) [m]                                  | 5.16                 |
| Longitudinal Center of Floatation (LCF) [m]                            | 138.13               |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | $2.468 \cdot 10^6$   |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | $121.966 \cdot 10^6$ |
| Block coefficient $c_B$ [-]                                            | 0.40                 |

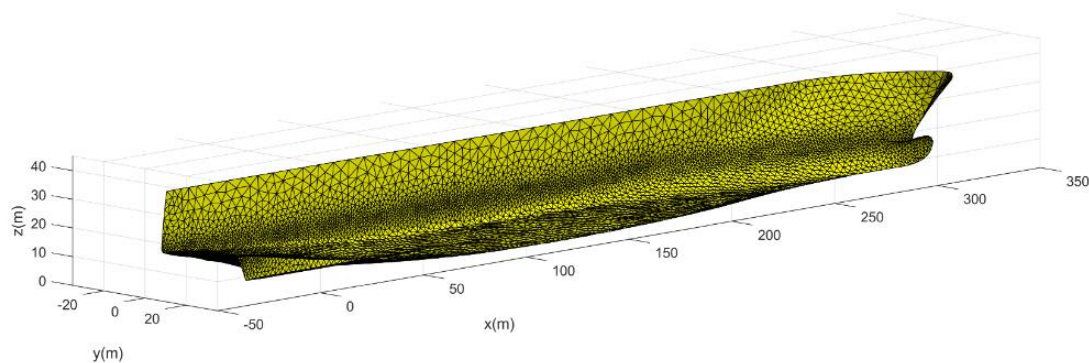
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

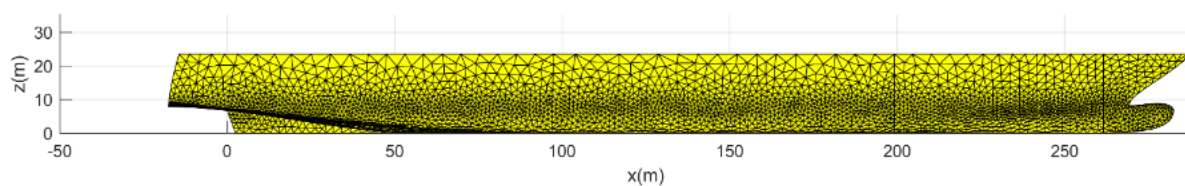


Date

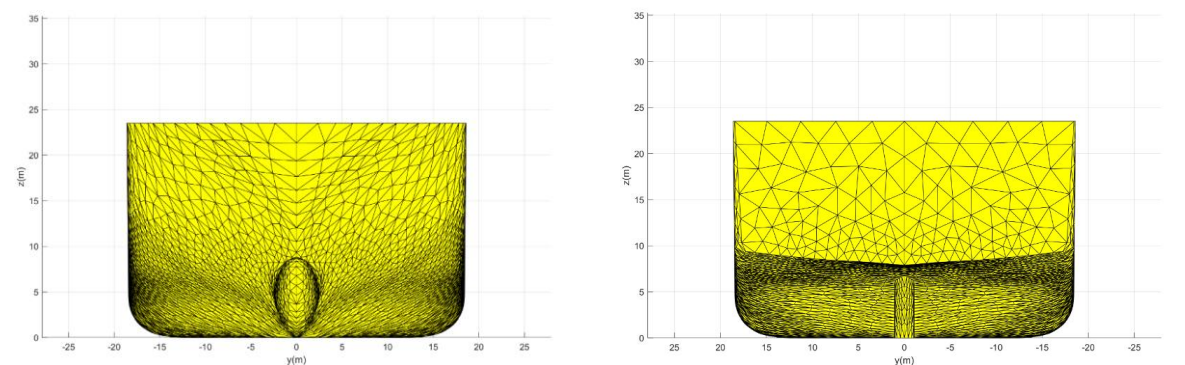
April 2021

| Vessel ID                                                              | CR-02                  |
|------------------------------------------------------------------------|------------------------|
| Hull file name                                                         | 02Cruise.hull          |
| Vessel type                                                            | Dream class            |
| Length over all (LOA) [m]                                              | 302.1                  |
| Length between perpendiculars (LPP) [m]                                | 269.2                  |
| Breadth [m]                                                            | 37.2                   |
| Design draught [m]                                                     | 8.2                    |
| Height [m]                                                             | 23.5                   |
| Capacity (TEU) [-]                                                     |                        |
| Hydrostatics for Design Draught                                        |                        |
| Volume [m <sup>3</sup> ]                                               | 61225                  |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 130.0                  |
| Vertical Center of Buoyancy (VCB) [m]                                  | 5.59                   |
| Longitudinal Center of Floatation (LCF) [m]                            | 118.99                 |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 1.041·10 <sup>6</sup>  |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 57.481·10 <sup>6</sup> |
| Block coefficient c <sub>B</sub> [-]                                   |                        |

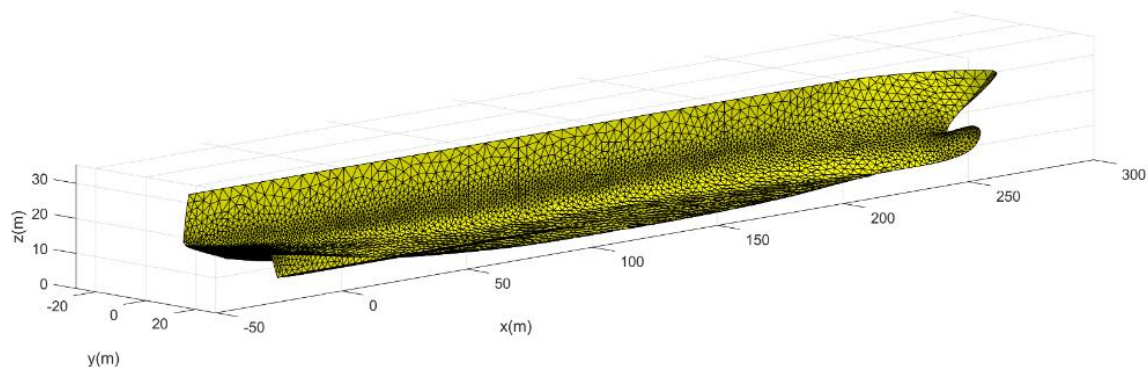
#### Longitudinal profile



#### Lateral profile (left: bow, right: aft)



#### 3D view



Date

April 2021

## 3.4 LNG Carriers

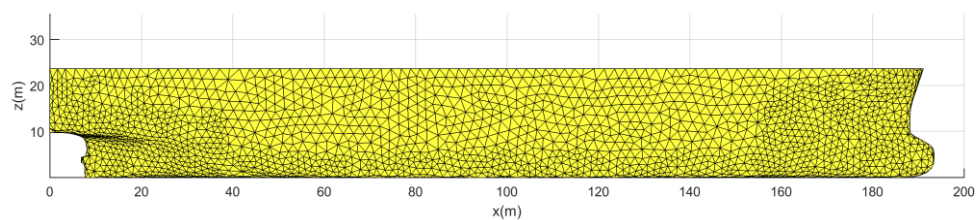
This section represents the vessel characteristics for wave response analyses for 7 single screw LNG carrier new buildings of the next years.

All vessels are generated generically. They are adjusted to fit the main dimensions of the individual new buildings.

The hydrostatic characteristics such as the longitudinal Center of Buoyancy (LCB) and block coefficients (cB) have been selected based on /1/ and /2/, respectively.

| Vessel ID                                                              | LNG-01      |
|------------------------------------------------------------------------|-------------|
| Hull file name                                                         | LNG-01.hull |
| Vessel type                                                            | LNG Tanker  |
| Length over all (LOA) [m]                                              | 195.2       |
| Length between perpendiculars (LPP) [m]                                | 184.8       |
| Breadth [m]                                                            | 30.0        |
| Design draught [m]                                                     | 10.3        |
| Height [m]                                                             | 23.5        |
| Hydrostatics for Design Draught                                        |             |
| Volume [m <sup>3</sup> ]                                               | 44873       |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 92.4        |
| Vertical Center of Buoyancy (VCB) [m]                                  | 5.33        |
| Longitudinal Center of Floatation (LCF) [m]                            | 85.86       |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 316000      |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 10800000    |
| Block coefficient $C_B$ [-]                                            | 0.79        |

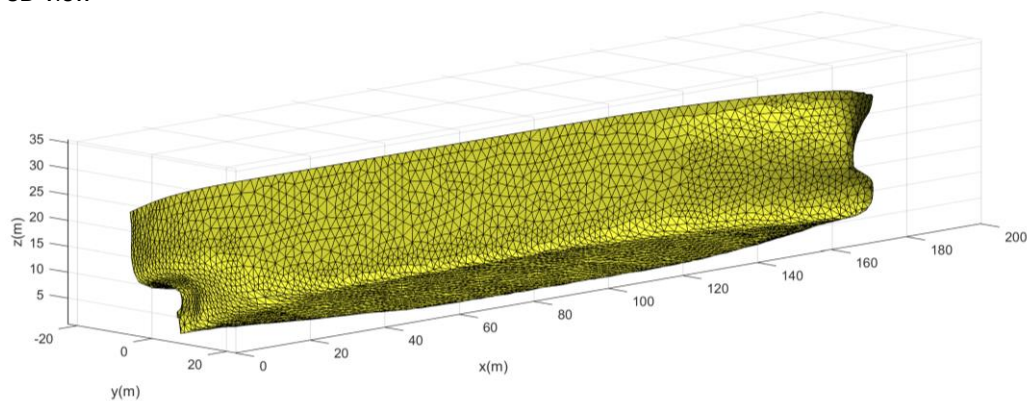
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

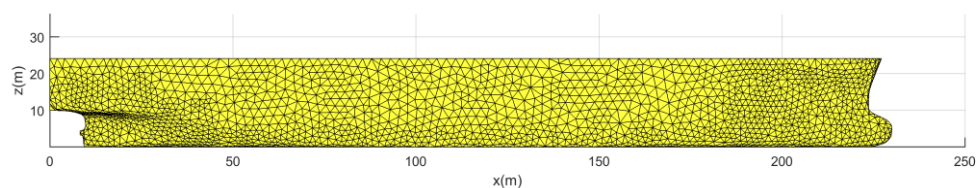


Date

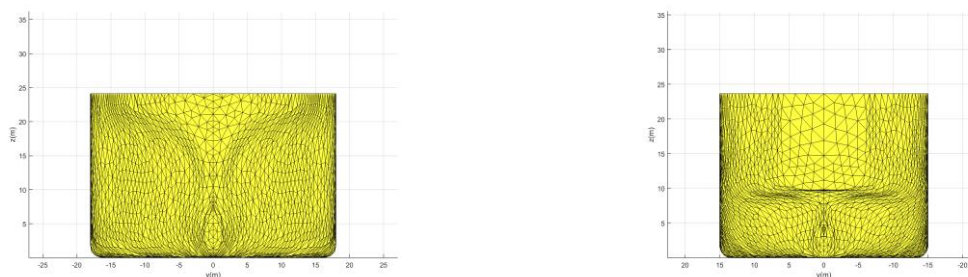
January 2018

| Vessel ID                                                              | LNG-02      |
|------------------------------------------------------------------------|-------------|
| Hull file name                                                         | LNG-02.hull |
| Vessel type                                                            | LNG Tanker  |
| Length over all (LOA) [m]                                              | 230.0       |
| Length between perpendiculars (LPP) [m]                                | 219.7       |
| Breadth [m]                                                            | 36.0        |
| Design draught [m]                                                     | 10.5        |
| Height [m]                                                             | 24.0        |
| Hydrostatics for Design Draught                                        |             |
| Volume [m <sup>3</sup> ]                                               | 64292       |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 110.0       |
| Vertical Center of Buoyancy (VCB) [m]                                  | 5.44        |
| Longitudinal Center of Floatation (LCF) [m]                            | 101.56      |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 640000      |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 21300000    |
| Block coefficient $C_B$ [-]                                            | 0.77        |

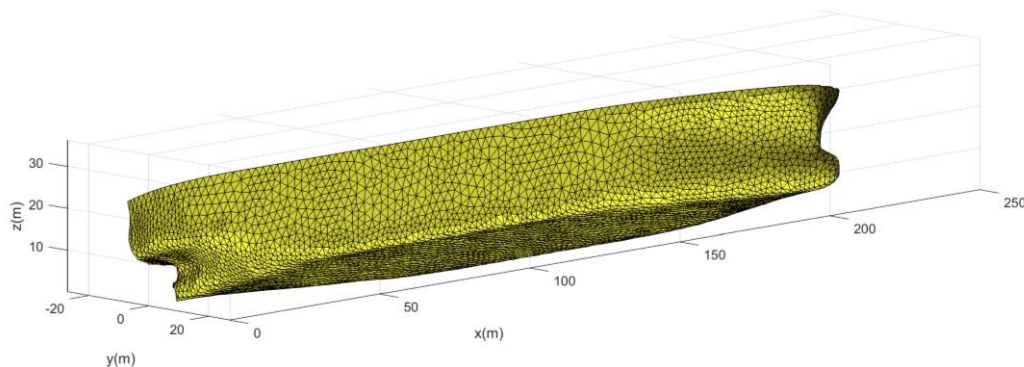
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



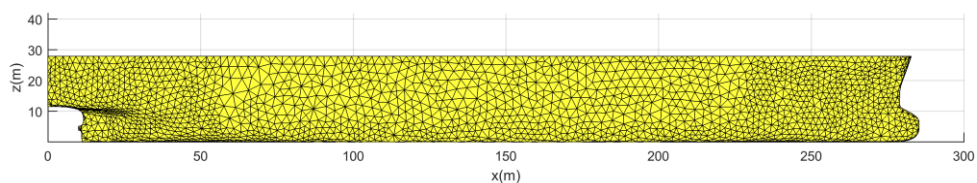
Date

January 2018

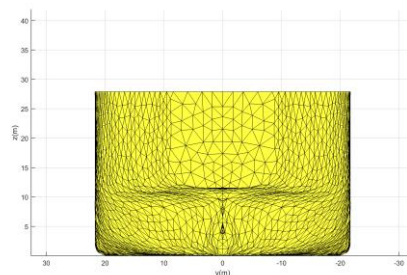
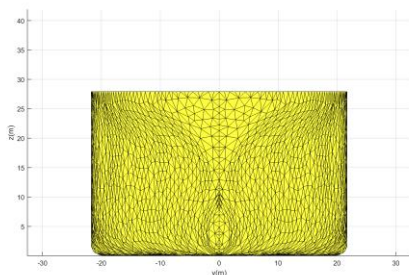


| Vessel ID                                                              | LNG-03      |
|------------------------------------------------------------------------|-------------|
| Hull file name                                                         | LNG-03.hull |
| Vessel type                                                            | LNG Tanker  |
| Length over all (LOA) [m]                                              | 285.4       |
| Length between perpendiculars (LPP) [m]                                | 274.0       |
| Breadth [m]                                                            | 43.4        |
| Design draught [m]                                                     | 12.2        |
| Height [m]                                                             | 28.0        |
| Hydrostatics for Design Draught                                        |             |
| Volume [m <sup>3</sup> ]                                               | 115717      |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 135.9       |
| Vertical Center of Buoyancy (VCB) [m]                                  | 6.26        |
| Longitudinal Center of Floatation (LCF) [m]                            | 127.24      |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 1440000     |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 51900000    |
| Block coefficient $C_B$ [-]                                            | 0.80        |

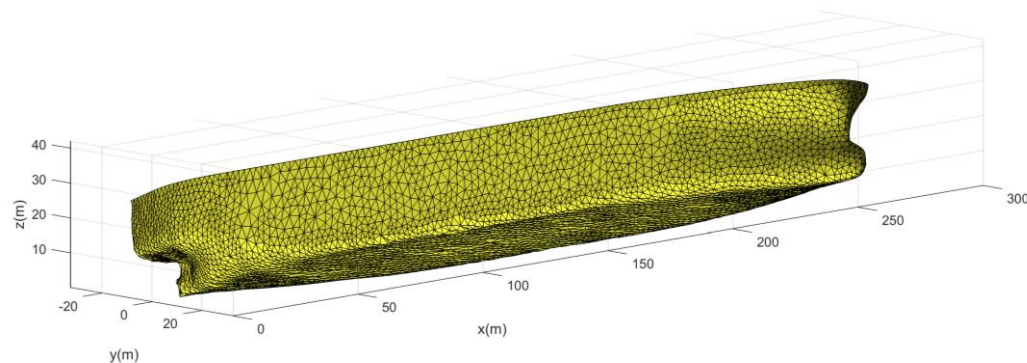
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

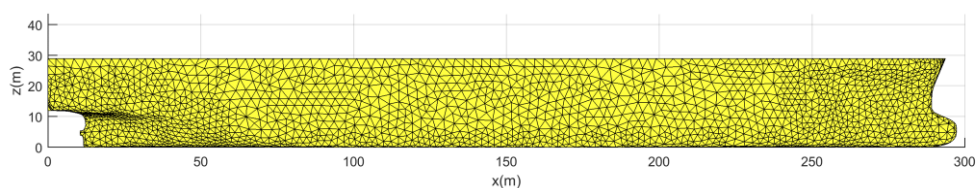


Date

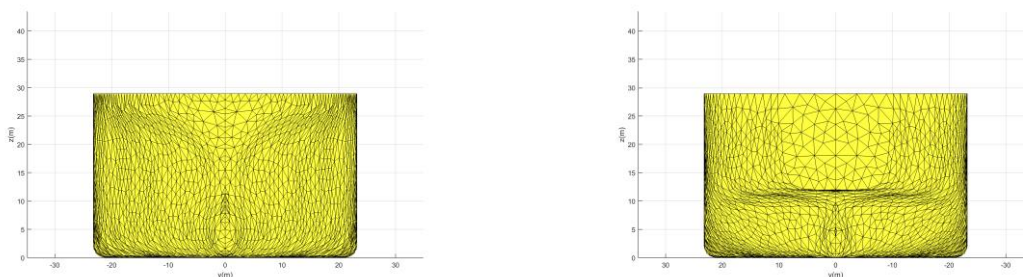
January 2018

| Vessel ID                                                              | LNG-04      |
|------------------------------------------------------------------------|-------------|
| Hull file name                                                         | LNG-04.hull |
| Vessel type                                                            | LNG Tanker  |
| Length over all (LOA) [m]                                              | 297.3       |
| Length between perpendiculars (LPP) [m]                                | 284.0       |
| Breadth [m]                                                            | 46.4        |
| Design draught [m]                                                     | 12.6        |
| Height [m]                                                             | 29.0        |
| Hydrostatics for Design Draught                                        |             |
| Volume [m <sup>3</sup> ]                                               | 131623      |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 141.2       |
| Vertical Center of Buoyancy (VCB) [m]                                  | 6.50        |
| Longitudinal Center of Floatation (LCF) [m]                            | 131.74      |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 1810000     |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 60700000    |
| Block coefficient $C_B$ [-]                                            | 0.79        |

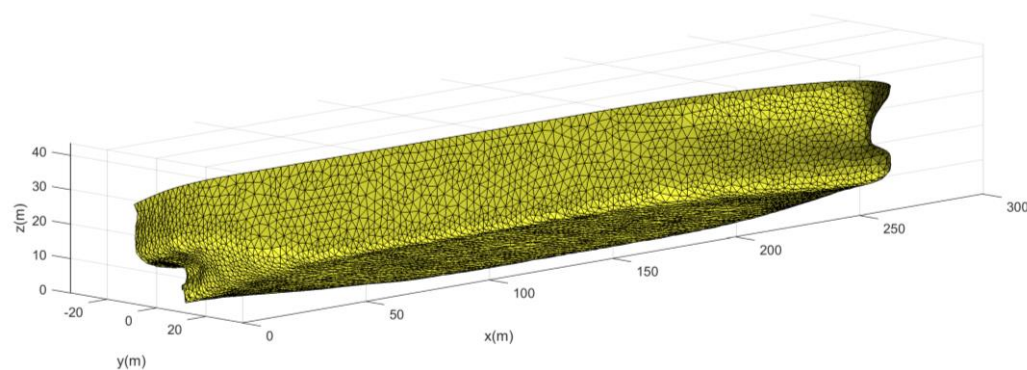
#### Longitudinal profile



#### Lateral profile (left: bow, right: aft)



#### 3D view

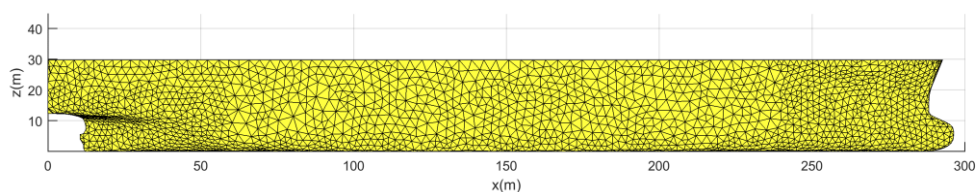


Date

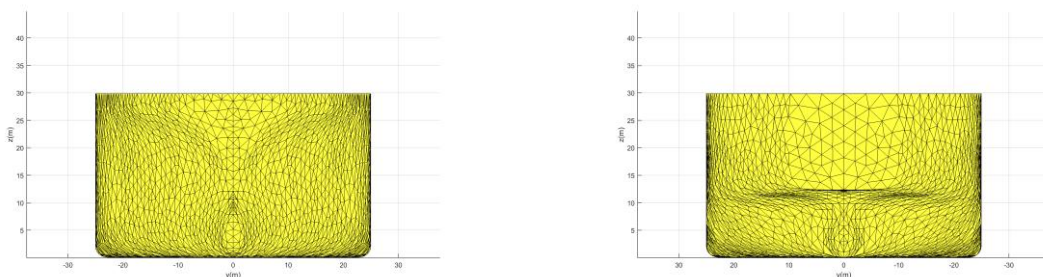
January 2018

| Vessel ID                                                              | LNG-05      |
|------------------------------------------------------------------------|-------------|
| Hull file name                                                         | LNG-05.hull |
| Vessel type                                                            | LNG Tanker  |
| Length over all (LOA) [m]                                              | 295.5       |
| Length between perpendiculars (LPP) [m]                                | 283.1       |
| Breadth [m]                                                            | 50.0        |
| Design draught [m]                                                     | 13.0        |
| Height [m]                                                             | 30.0        |
| Hydrostatics for Design Draught                                        |             |
| Volume [m <sup>3</sup> ]                                               | 145028      |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 141.5       |
| Vertical Center of Buoyancy (VCB) [m]                                  | 6.72        |
| Longitudinal Center of Floatation (LCF) [m]                            | 131.63      |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 2250000     |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 64800000    |
| Block coefficient $C_B$ [-]                                            | 0.79        |

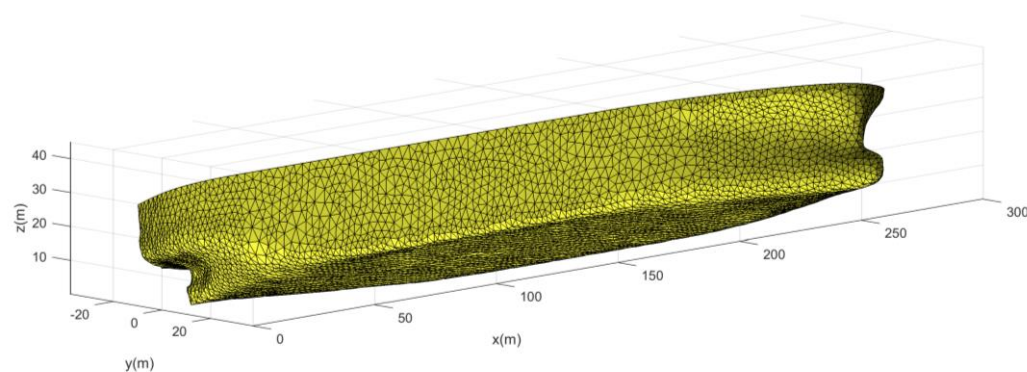
#### Longitudinal profile



#### Lateral profile (left: bow, right: aft)



#### 3D view

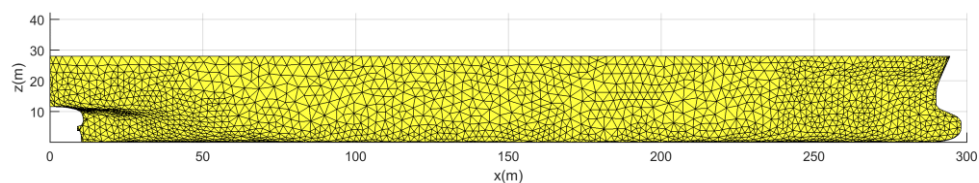


Date

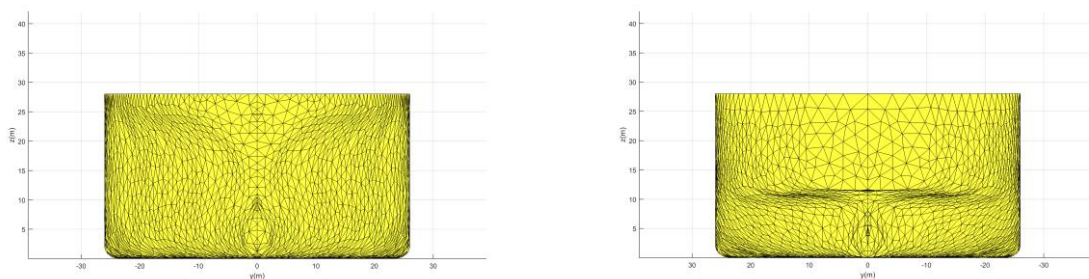
January 2018

| Vessel ID                                                              | LNG-06      |
|------------------------------------------------------------------------|-------------|
| Hull file name                                                         | LNG-06.hull |
| Vessel type                                                            | LNG Tanker  |
| Length over all (LOA) [m]                                              | 298.2       |
| Length between perpendiculars (LPP) [m]                                | 286.5       |
| Breadth [m]                                                            | 52.0        |
| Design draught [m]                                                     | 12.2        |
| Height [m]                                                             | 28.0        |
| Hydrostatics for Design Draught                                        |             |
| Volume [m <sup>3</sup> ]                                               | 142086      |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 143.0       |
| Vertical Center of Buoyancy (VCB) [m]                                  | 6.30        |
| Longitudinal Center of Floatation (LCF) [m]                            | 133.22      |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 2530000     |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 68000000    |
| Block coefficient $C_B$ [-]                                            | 0.78        |

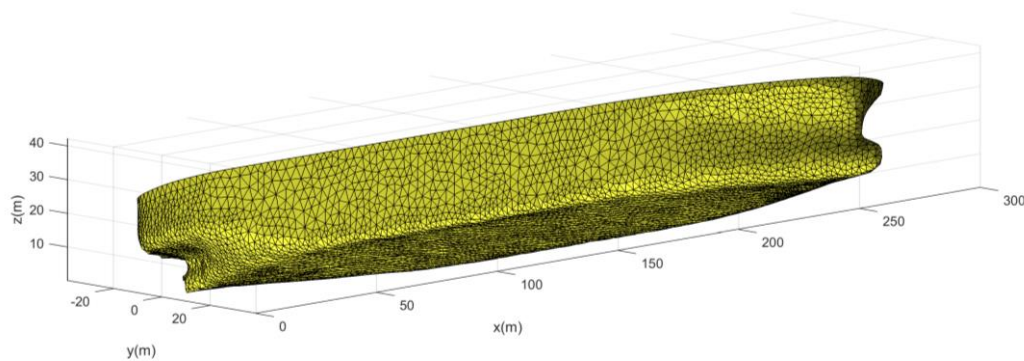
#### Longitudinal profile



#### Lateral profile (left: bow, right: aft)



#### 3D view



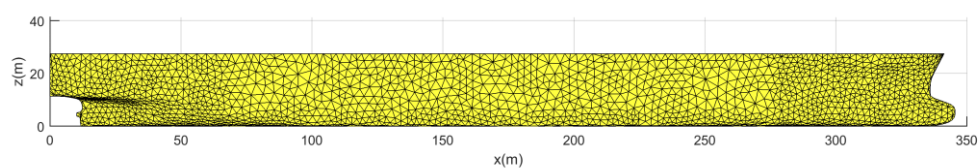
Date

January 2018

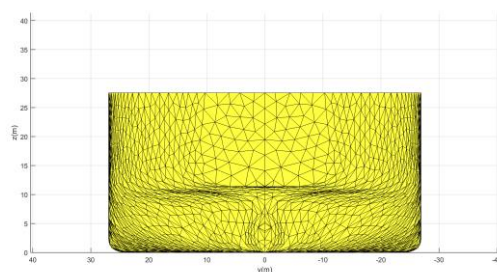
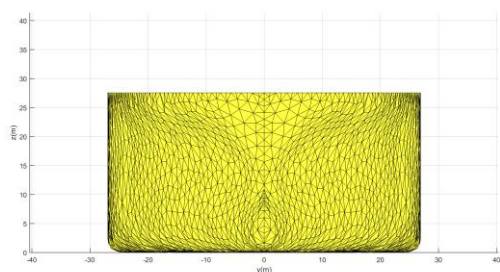


| Vessel ID                                                              | LNG-07      |
|------------------------------------------------------------------------|-------------|
| Hull file name                                                         | LNG-07.hull |
| Vessel type                                                            | LNG Tanker  |
| Length over all (LOA) [m]                                              | 345.0       |
| Length between perpendiculars (LPP) [m]                                | 332.0       |
| Breadth [m]                                                            | 53.8        |
| Design draught [m]                                                     | 12.0        |
| Height [m]                                                             | 27.0        |
| Hydrostatics for Design Draught                                        |             |
| Volume [m <sup>3</sup> ]                                               | 170755      |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 165.7       |
| Vertical Center of Buoyancy (VCB) [m]                                  | 6.19        |
| Longitudinal Center of Floatation (LCF) [m]                            | 154.84      |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 3320000     |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 113000000   |
| Block coefficient $c_B$ [-]                                            | 0.80        |

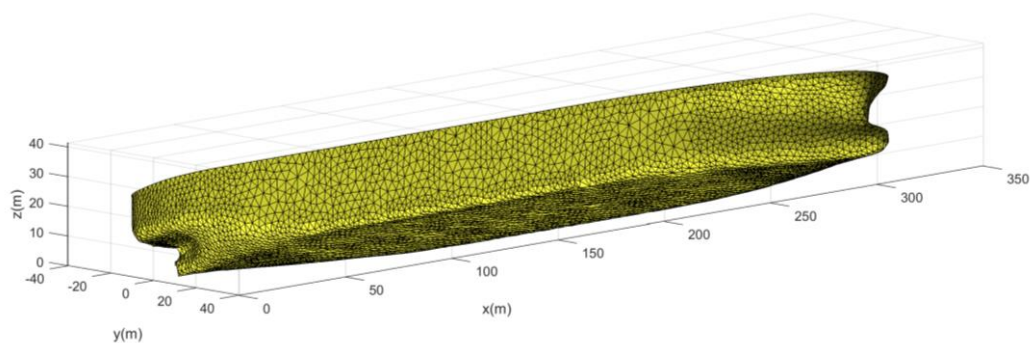
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



Date

January 2018



## 3.5 Super Yachts

The following list of super yachts represents 5 representative super yachts.

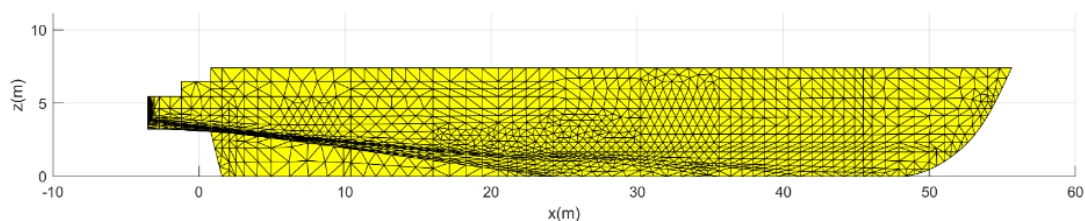
All yachts are generated generically. They are adjusted to fit the main dimensions of a list defined by DHI and Applied Technology and Management, Inc. (Dubai Branch).

The corresponding FORCE Technology project with project number 119-30960 was initiated.

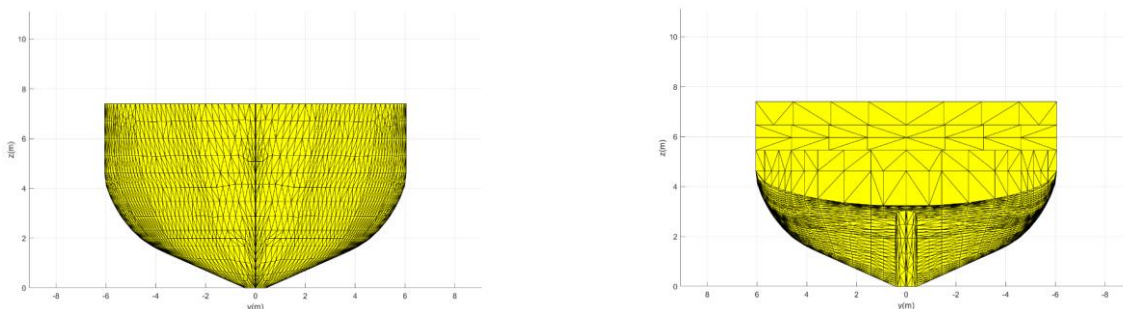
The displacement was selected by the Client. LCB has been selected based on inhouse data.

| Vessel ID                                                                 | SYA-01      |
|---------------------------------------------------------------------------|-------------|
| Hull file name                                                            | 01SYA.hull  |
| Vessel type                                                               | Super Yacht |
| Length over all (LOA) [m]                                                 | 60.0        |
| Length between perpendiculars (LPP) [m]                                   | 54.0        |
| Breadth [m]                                                               | 12.1        |
| Design draught [m]                                                        | 3.7         |
| Height [m]                                                                | 7.4         |
| Capacity (TEU) [-]                                                        |             |
| Hydrostatics for Design Draught                                           |             |
| Volume [m <sup>3</sup> ]                                                  | 977         |
| Longitudinal Center of Buoyancy (LCB) [m]                                 | 24.7        |
| Vertical Center of Buoyancy (VCB) [m]                                     | 2.43        |
| Longitudinal Center of Floatation (LCF) [m]                               | 19.93       |
| Transversal moment of inertia of waterplane area $I_T$ [m <sup>4</sup> ]  | 4.84E+03    |
| Longitudinal moment of inertia of waterplane area $I_L$ [m <sup>4</sup> ] | 9.94E+04    |
| Block coefficient $C_B$ [-]                                               | 0.40        |

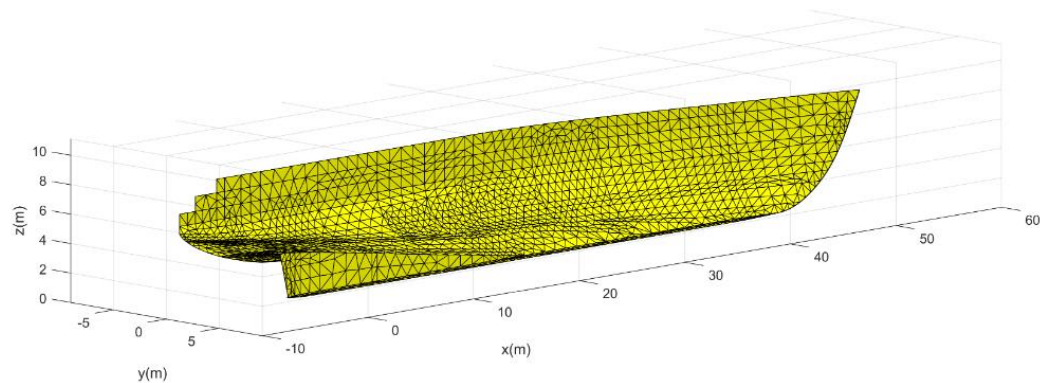
#### Longitudinal profile



#### Lateral profile (left: bow, right: aft)



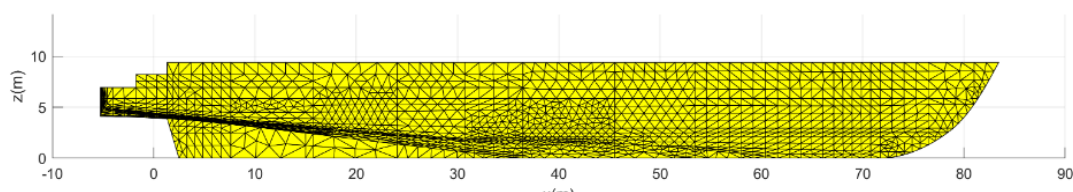
#### 3D view



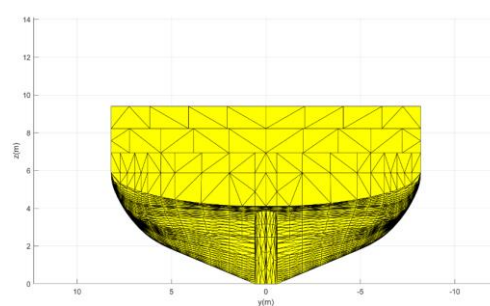
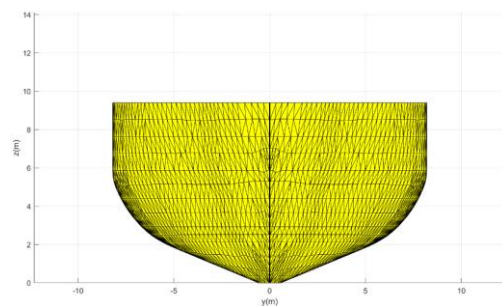
|      |            |
|------|------------|
| Date | April 2021 |
|------|------------|

| Vessel ID                                                              | SYA-02      |
|------------------------------------------------------------------------|-------------|
| Hull file name                                                         | 02SYA.hull  |
| Vessel type                                                            | Super Yacht |
| Length over all (LOA) [m]                                              | 90.0        |
| Length between perpendiculars (LPP) [m]                                | 81.0        |
| Breadth [m]                                                            | 16.4        |
| Design draught [m]                                                     | 4.7         |
| Height [m]                                                             | 9.4         |
| Capacity (TEU) [-]                                                     |             |
| Hydrostatics for Design Draught                                        |             |
| Volume [m <sup>3</sup> ]                                               | 2517        |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 37.0        |
| Vertical Center of Buoyancy (VCB) [m]                                  | 3.09        |
| Longitudinal Center of Floatation (LCF) [m]                            | 29.96       |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 1.81E+04    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 4.50E+04    |
| Block coefficient $c_B$ [-]                                            | 0.40        |

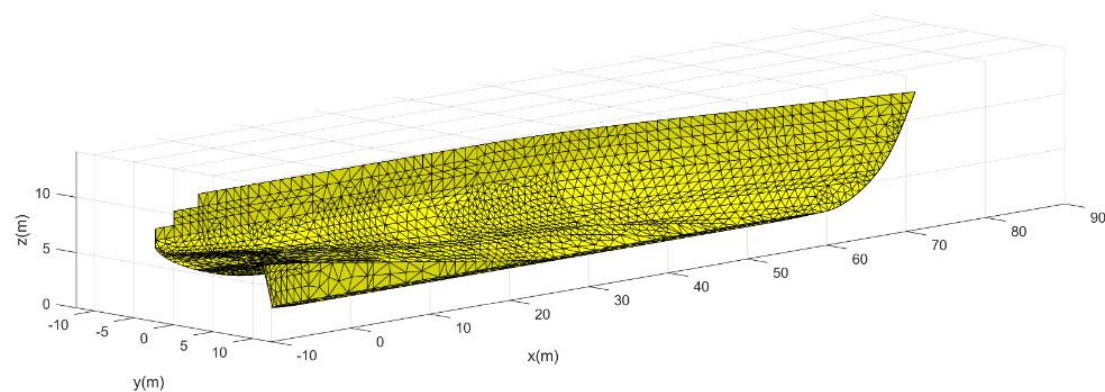
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

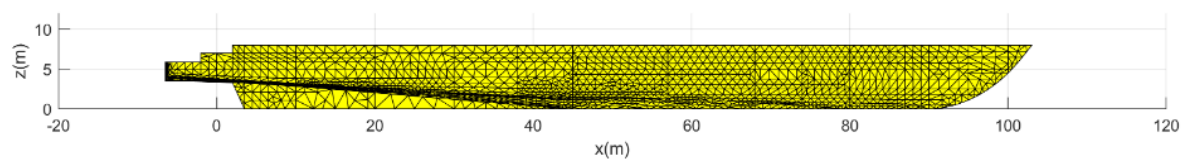


Date

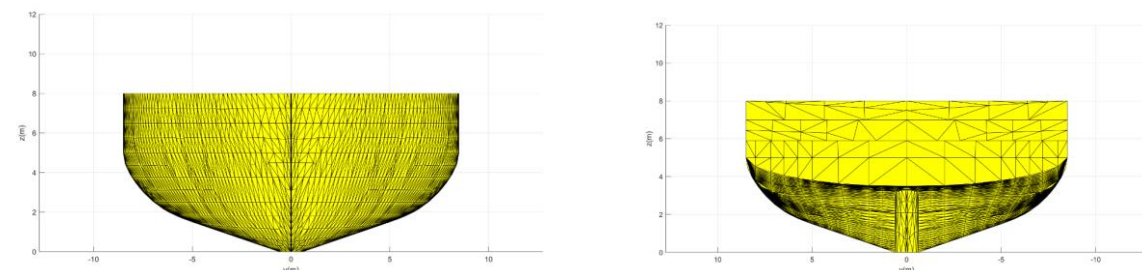
April 2021

| Vessel ID                                                              | SYA-03      |
|------------------------------------------------------------------------|-------------|
| Hull file name                                                         | 03SYA.hull  |
| Vessel type                                                            | Super Yacht |
| Length over all (LOA) [m]                                              | 110.0       |
| Length between perpendiculars (LPP) [m]                                | 100.0       |
| Breadth [m]                                                            | 17.0        |
| Design draught [m]                                                     | 4.5         |
| Height [m]                                                             | 8.0         |
| Capacity (TEU) [-]                                                     |             |
| Hydrostatics for Design Draught                                        |             |
| Volume [m <sup>3</sup> ]                                               | 3500        |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 45.0        |
| Vertical Center of Buoyancy (VCB) [m]                                  | 2.74        |
| Longitudinal Center of Floatation (LCF) [m]                            | 38.38       |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 3.07E+04    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 1.04E+06    |
| Block coefficient $c_B$ [-]                                            |             |

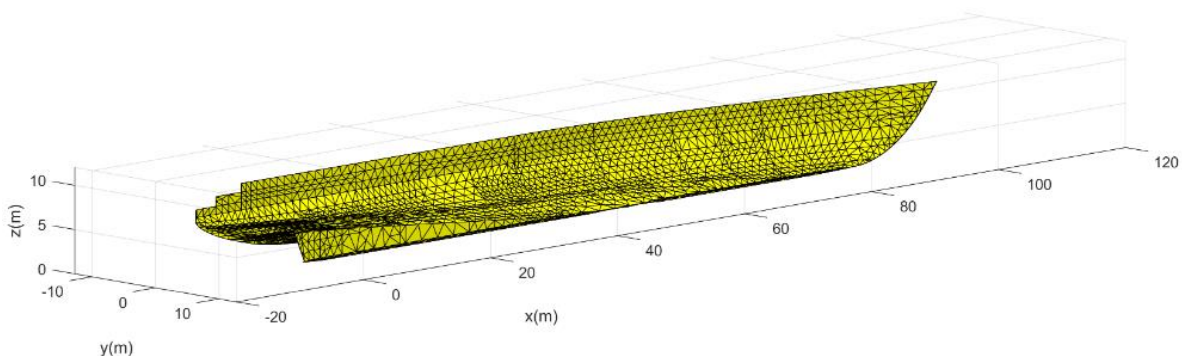
#### Longitudinal profile



#### Lateral profile (left: bow, right: aft)



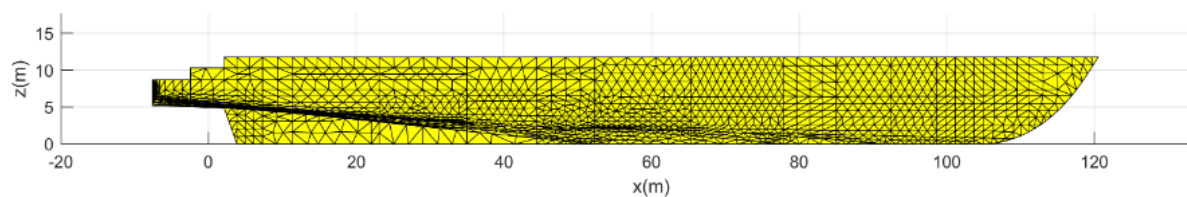
#### 3D view



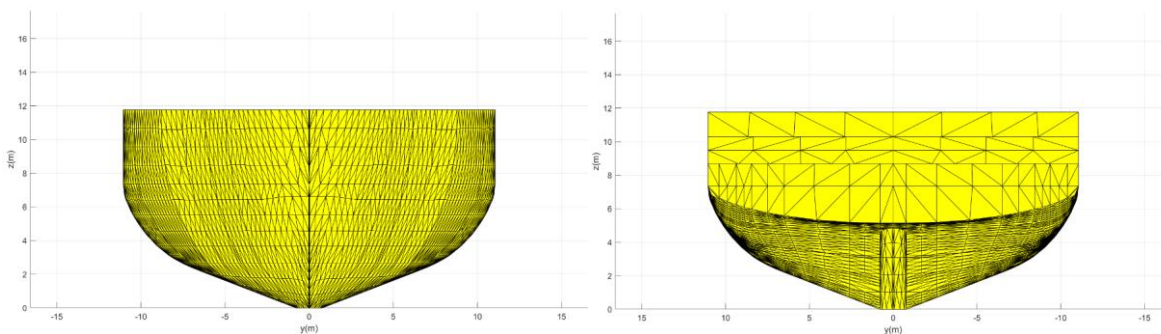
|      |            |
|------|------------|
| Date | April 2021 |
|------|------------|

| Vessel ID                                                              | SYA-04      |
|------------------------------------------------------------------------|-------------|
| Hull file name                                                         | 04SYA.hull  |
| Vessel type                                                            | Super Yacht |
| Length over all (LOA) [m]                                              | 130.0       |
| Length between perpendiculars (LPP) [m]                                | 117.0       |
| Breadth [m]                                                            | 22.1        |
| Design draught [m]                                                     | 6.0         |
| Height [m]                                                             | 12.0        |
| Capacity (TEU) [-]                                                     |             |
| Hydrostatics for Design Draught                                        |             |
| Volume [m <sup>3</sup> ]                                               | 6283        |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 53.3        |
| Vertical Center of Buoyancy (VCB) [m]                                  | 4.00        |
| Longitudinal Center of Floatation (LCF) [m]                            | 45.58       |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 6.58E+04    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 1.9E+06     |
| Block coefficient $c_B$ [-]                                            | 0.4         |

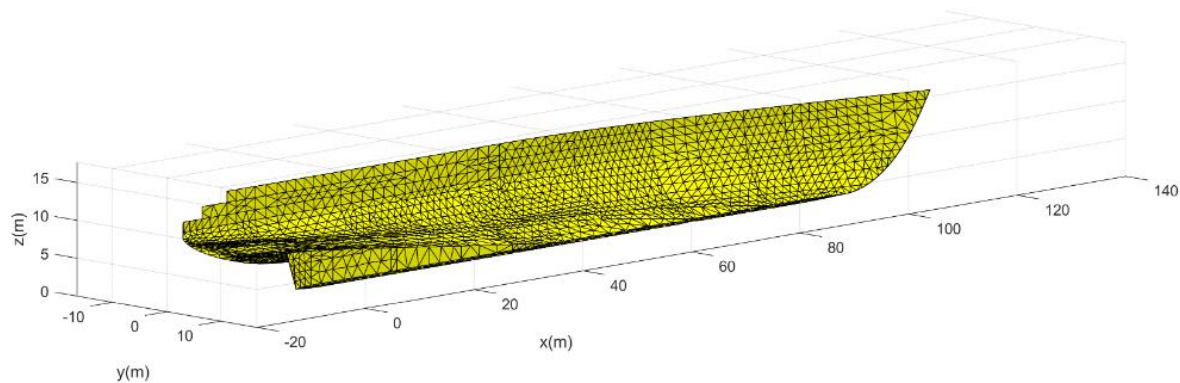
#### Longitudinal profile



#### Lateral profile (left: bow, right: aft)



#### 3D view

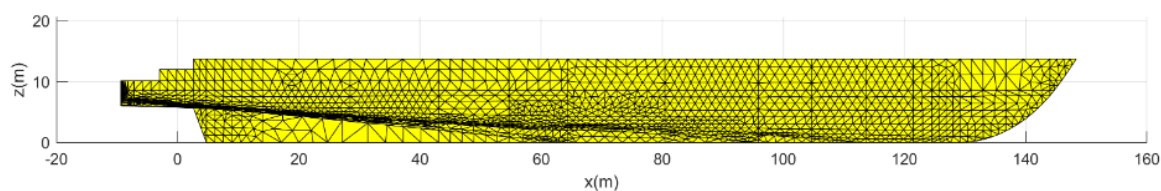


|      |            |
|------|------------|
| Date | April 2021 |
|------|------------|

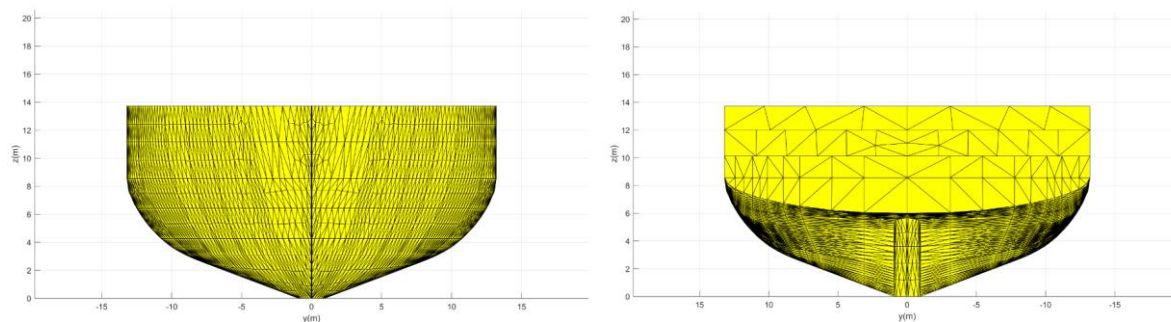


| Vessel ID                                                              | SYA-05      |
|------------------------------------------------------------------------|-------------|
| Hull file name                                                         | 05SYA.hull  |
| Vessel type                                                            | Super Yacht |
| Length over all (LOA) [m]                                              | 160.0       |
| Length between perpendiculars (LPP) [m]                                | 144.0       |
| Breadth [m]                                                            | 26.4        |
| Design draught [m]                                                     | 7.0         |
| Height [m]                                                             | 14.0        |
| Capacity (TEU) [-]                                                     |             |
| Hydrostatics for Design Draught                                        |             |
| Volume [m <sup>3</sup> ]                                               | 10743       |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 65.5        |
| Vertical Center of Buoyancy (VCB) [m]                                  | 0.72        |
| Longitudinal Center of Floatation (LCF) [m]                            | 53.56       |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 1.38E+05    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 4.26E+06    |
| Block coefficient $c_B$ [-]                                            | 0.40        |

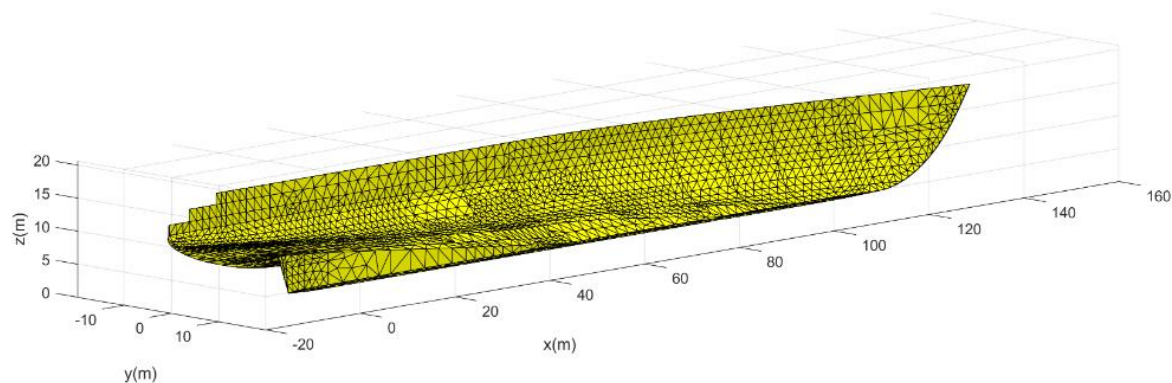
#### Longitudinal profile



#### Lateral profile (left: bow, right: aft)



#### 3D view



Date

April 2021

## 3.6 Tankers

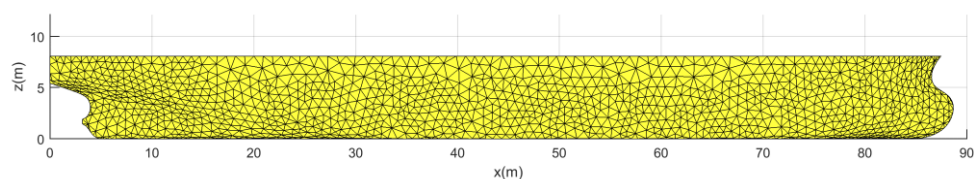
This section represents the vessel characteristics for wave response analyses for 9 representative scheduled tanker new buildings of the next years.

All tankers are generated generically. They are adjusted to fit the main dimensions of the individual new buildings.

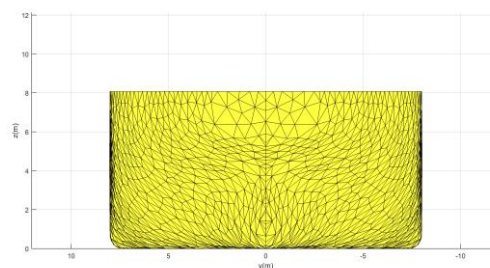
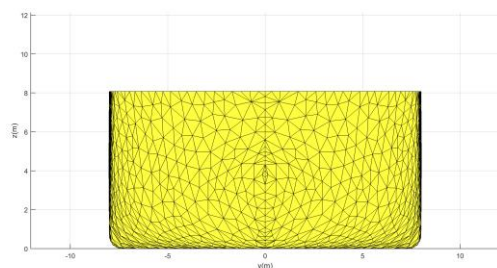
The hydrostatic characteristics such as the longitudinal Center of Buoyancy (LCB) and block coefficients ( $C_B$ ) have been selected based on /1/ and /2/, respectively.

| Vessel ID                                                              | Tan-01                   |
|------------------------------------------------------------------------|--------------------------|
| Hull file name                                                         | Tan-01_Tanker_4500t.hull |
| Vessel type                                                            | Tanker, Small            |
| Length over all (LOA) [m]                                              | 90.0                     |
| Length between perpendiculars (LPP) [m]                                | 85.0                     |
| Breadth [m]                                                            | 16.0                     |
| Design draught [m]                                                     | 6.0                      |
| Height [m]                                                             | 8.1                      |
| Capacity (TEU) [-]                                                     | 4500                     |
| Hydrostatics for Design Draught                                        |                          |
| Volume [m <sup>3</sup> ]                                               | 6775                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 45.5                     |
| Vertical Center of Buoyancy (VCB) [m]                                  | 3.12                     |
| Longitudinal Center of Floatation (LCF) [m]                            | 42.64                    |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 21458                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 647587                   |
| Block coefficient cB [-]                                               | 0.83                     |

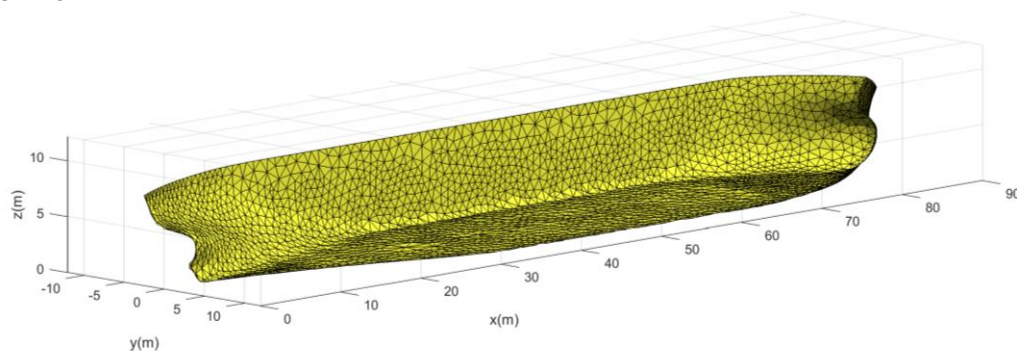
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

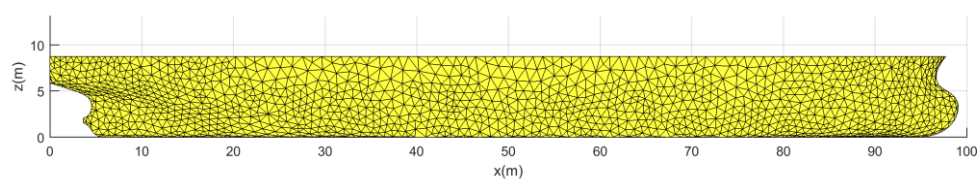


Date

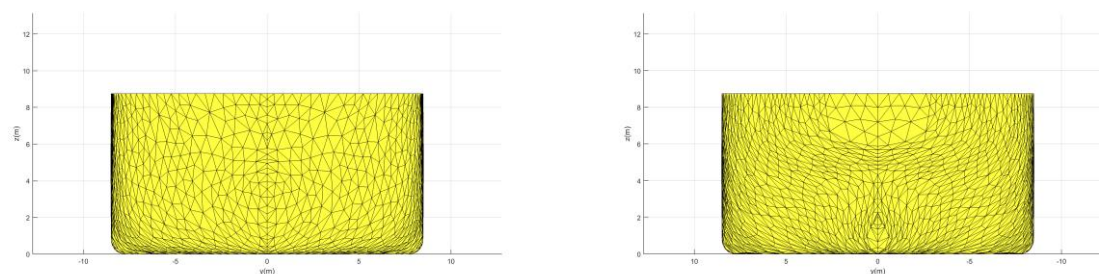
March 2017

| Vessel ID                                                              | Tan-02                   |
|------------------------------------------------------------------------|--------------------------|
| Hull file name                                                         | Tan-02_Tanker_6200t.hull |
| Vessel type                                                            | Tanker, Small            |
| Length over all (LOA) [m]                                              | 100.0                    |
| Length between perpendiculars (LPP) [m]                                | 95.0                     |
| Breadth [m]                                                            | 17.0                     |
| Design draught [m]                                                     | 6.5                      |
| Height [m]                                                             | 8.8                      |
| Capacity (TEU) [-]                                                     | 6200                     |
| Hydrostatics for Design Draught                                        |                          |
| Volume [m <sup>3</sup> ]                                               | 8586                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 50.8                     |
| Vertical Center of Buoyancy (VCB) [m]                                  | 3.39                     |
| Longitudinal Center of Floatation (LCF) [m]                            | 47.60                    |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 31750                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 941860                   |
| Block coefficient $c_B$ [-]                                            | 0.82                     |

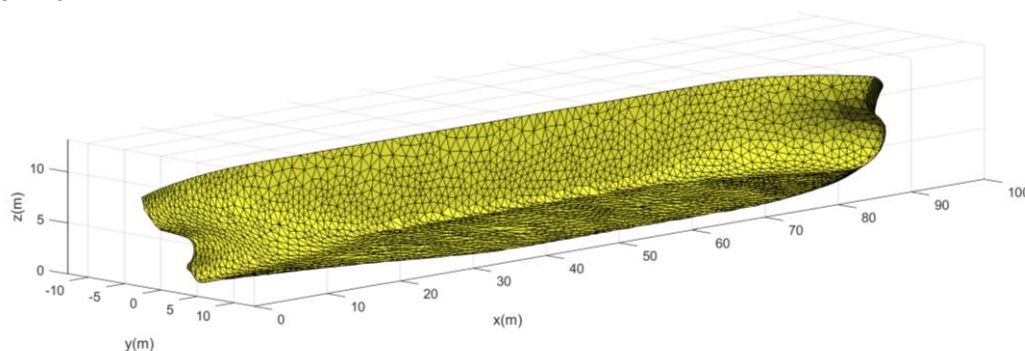
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

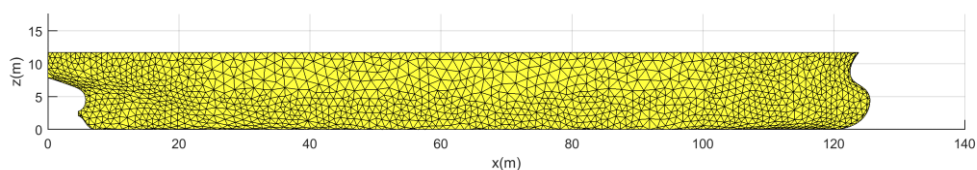


Date

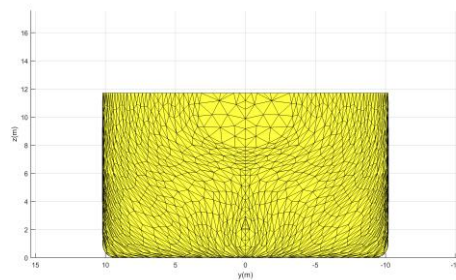
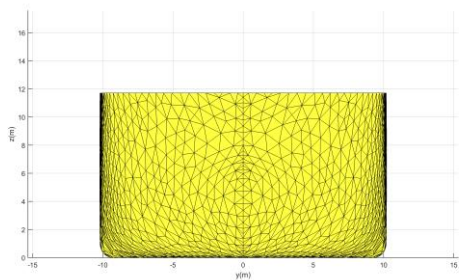
March 2017

| Vessel ID                                                              | Tan-03                    |
|------------------------------------------------------------------------|---------------------------|
| Hull file name                                                         | Tan-03_Tanker_13100t.hull |
| Vessel type                                                            | Tanker, Handy             |
| Length over all (LOA) [m]                                              | 128.6                     |
| Length between perpendiculars (LPP) [m]                                | 120.4                     |
| Breadth [m]                                                            | 20.4                      |
| Design draught [m]                                                     | 8.7                       |
| Height [m]                                                             | 11.7                      |
| Capacity (TEU) [-]                                                     | 13100                     |
| Hydrostatics for Design Draught                                        |                           |
| Volume [m <sup>3</sup> ]                                               | 17524                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 64.4                      |
| Vertical Center of Buoyancy (VCB) [m]                                  | 4.54                      |
| Longitudinal Center of Floatation (LCF) [m]                            | 60.31                     |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 69770                     |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 2304440                   |
| Block coefficient $c_B$ [-]                                            | 0.82                      |

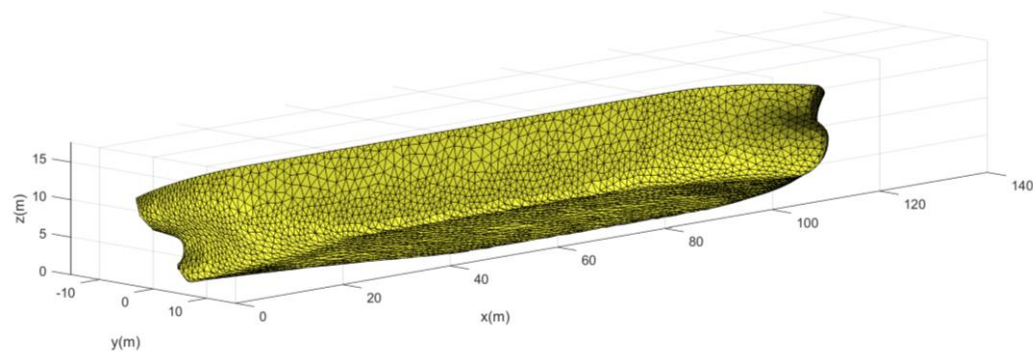
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



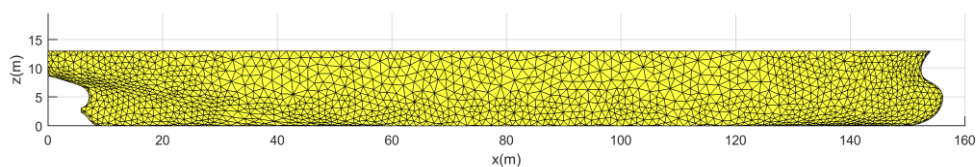
Date

March 2017

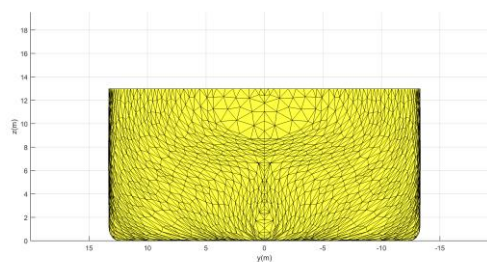
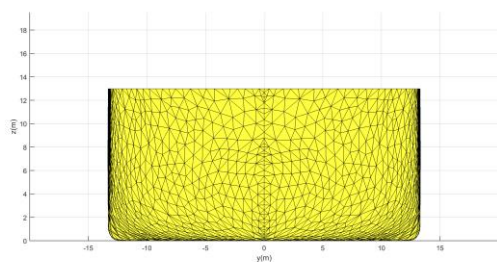


| Vessel ID                                                              | Tan-04                    |
|------------------------------------------------------------------------|---------------------------|
| Hull file name                                                         | Tan-04_Tanker_25000t.hull |
| Vessel type                                                            | Tanker, Handy             |
| Length over all (LOA) [m]                                              | 158.8                     |
| Length between perpendiculars (LPP) [m]                                | 149.8                     |
| Breadth [m]                                                            | 26.6                      |
| Design draught [m]                                                     | 9.7                       |
| Height [m]                                                             | 13.0                      |
| Capacity (TEU) [-]                                                     | 25000                     |
| Hydrostatics for Design Draught                                        |                           |
| Volume [m <sup>3</sup> ]                                               | 31535                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 80.2                      |
| Vertical Center of Buoyancy (VCB) [m]                                  | 5.03                      |
| Longitudinal Center of Floatation (LCF) [m]                            | 74.99                     |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 192757                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 5778850                   |
| Block coefficient $c_B$ [-]                                            | 0.82                      |

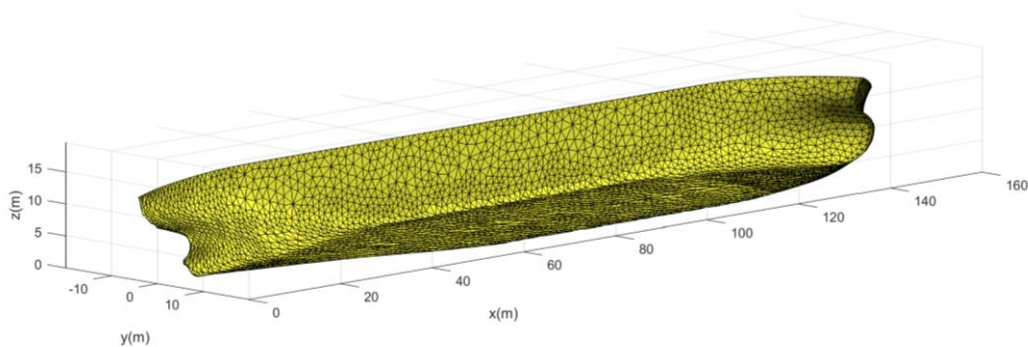
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

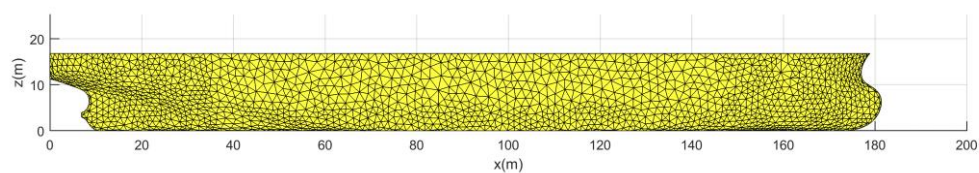


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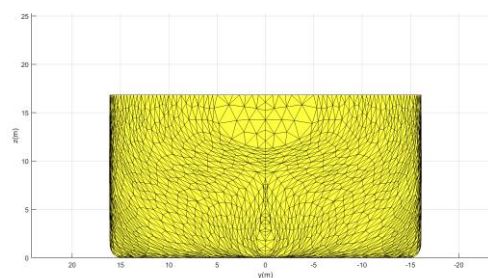
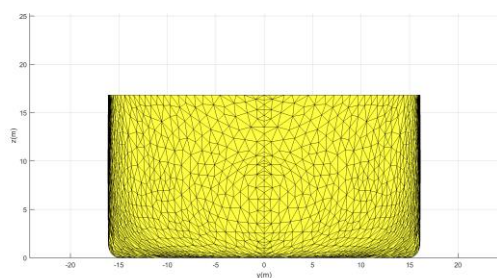
March 2017

| Vessel ID                                                              | Tan-05                    |
|------------------------------------------------------------------------|---------------------------|
| Hull file name                                                         | Tan-05_Tanker_47000t.hull |
| Vessel type                                                            | Tanker, MR2               |
| Length over all (LOA) [m]                                              | 182.9                     |
| Length between perpendiculars (LPP) [m]                                | 174.0                     |
| Breadth [m]                                                            | 32.2                      |
| Design draught [m]                                                     | 12.5                      |
| Height [m]                                                             | 16.8                      |
| Capacity (TEU) [-]                                                     | 47000                     |
| Hydrostatics for Design Draught                                        |                           |
| Volume [m <sup>3</sup> ]                                               | 56725                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 92.9                      |
| Vertical Center of Buoyancy (VCB) [m]                                  | 6.54                      |
| Longitudinal Center of Floatation (LCF) [m]                            | 86.89                     |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 390871                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 10799300                  |
| Block coefficient $c_B$ [-]                                            | 0.81                      |

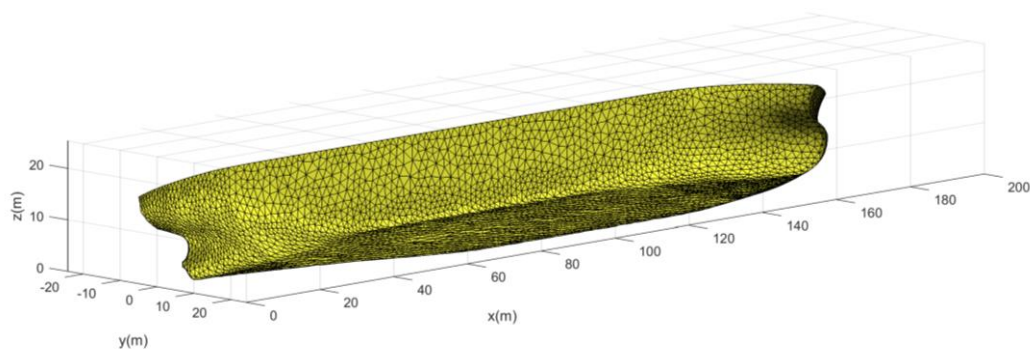
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

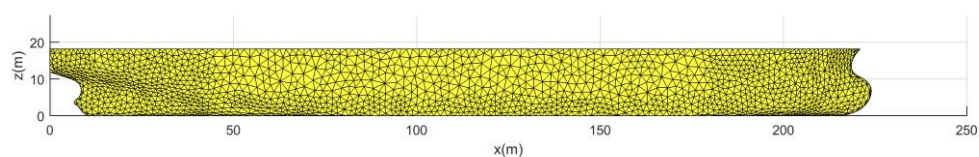


Date

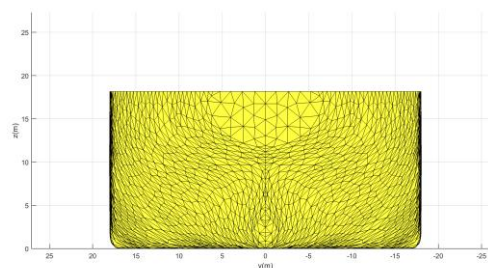
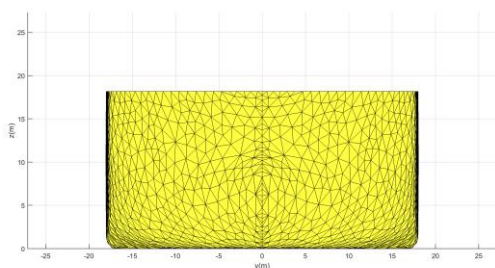
March 2017

| Vessel ID                                                              | Tan-06                    |
|------------------------------------------------------------------------|---------------------------|
| Hull file name                                                         | Tan-06_Tanker_71600t.hull |
| Vessel type                                                            | Tanker, Panamax           |
| Length over all (LOA) [m]                                              | 224.0                     |
| Length between perpendiculars (LPP) [m]                                | 216.0                     |
| Breadth [m]                                                            | 36.0                      |
| Design draught [m]                                                     | 13.5                      |
| Height [m]                                                             | 18.2                      |
| Capacity (TEU) [-]                                                     | 71600                     |
| Hydrostatics for Design Draught                                        |                           |
| Volume [m <sup>3</sup> ]                                               | 88110                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 115.8                     |
| Vertical Center of Buoyancy (VCB) [m]                                  | 7.01                      |
| Longitudinal Center of Floatation (LCF) [m]                            | 108.77                    |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 710347                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 24213100                  |
| Block coefficient $c_B$ [-]                                            | 0.84                      |

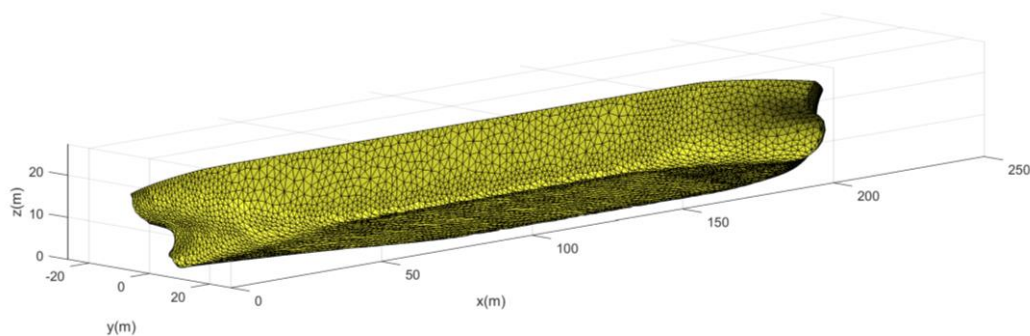
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

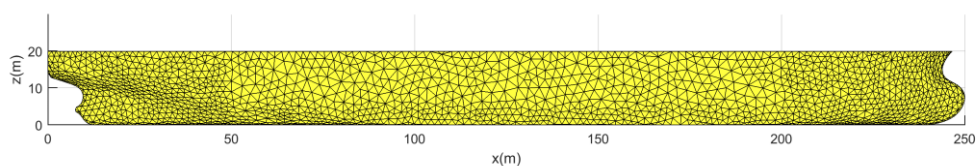


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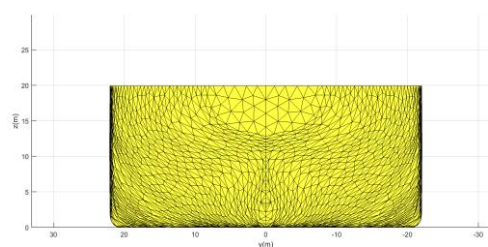
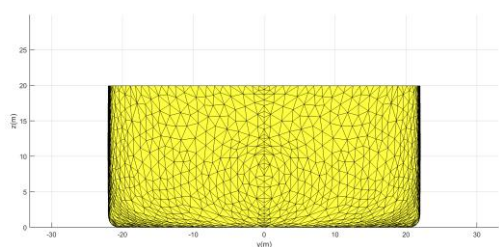
March 2017

| Vessel ID                                                              | Tan-07                     |
|------------------------------------------------------------------------|----------------------------|
| Hull file name                                                         | Tan-07_Tanker_114600t.hull |
| Vessel type                                                            | Tanker, Aframax            |
| Length over all (LOA) [m]                                              | 250.0                      |
| Length between perpendiculars (LPP) [m]                                | 241.0                      |
| Breadth [m]                                                            | 44.0                       |
| Design draught [m]                                                     | 14.8                       |
| Height [m]                                                             | 19.9                       |
| Capacity (TEU) [-]                                                     | 114600                     |
| Hydrostatics for Design Draught                                        |                            |
| Volume [m <sup>3</sup> ]                                               | 131818                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 129.2                      |
| Vertical Center of Buoyancy (VCB) [m]                                  | 7.68                       |
| Longitudinal Center of Floatation (LCF) [m]                            | 121.38                     |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 1446500                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 41024700                   |
| Block coefficient $c_B$ [-]                                            | 0.84                       |

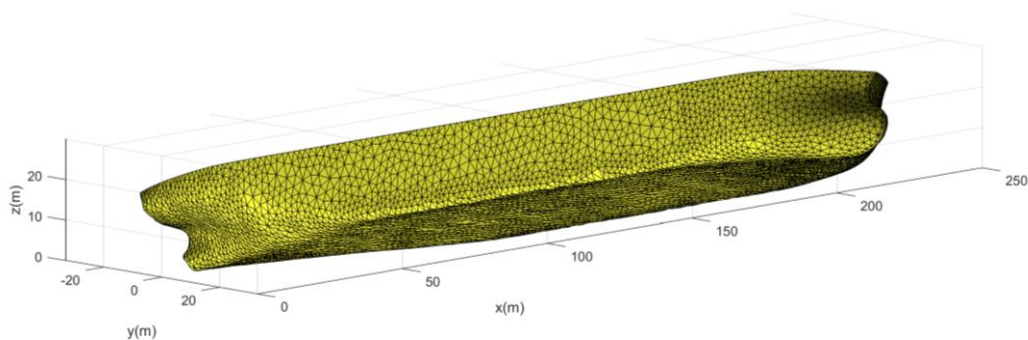
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



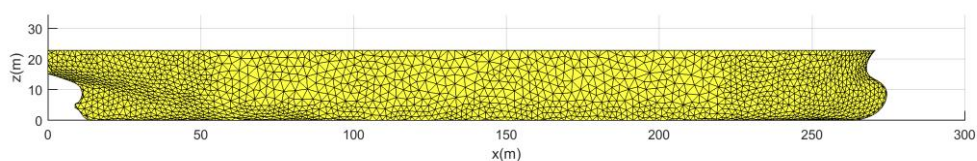
Date

March 2017

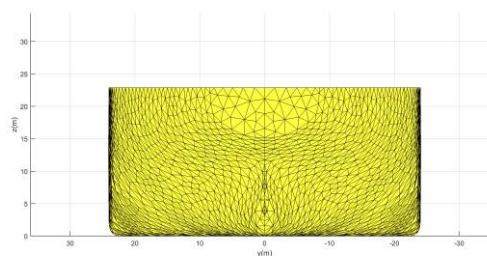
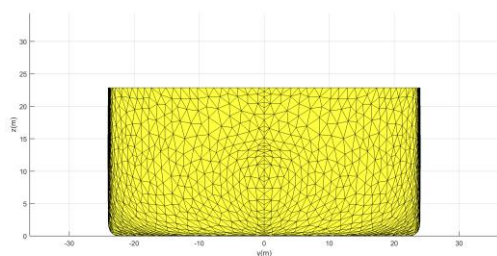


| Vessel ID                                                              | Tan-08                     |
|------------------------------------------------------------------------|----------------------------|
| Hull file name                                                         | Tan-08_Tanker_156900t.hull |
| Vessel type                                                            | Tanker, Suezmax            |
| Length over all (LOA) [m]                                              | 274.5                      |
| Length between perpendiculars (LPP) [m]                                | 264.0                      |
| Breadth [m]                                                            | 48.0                       |
| Design draught [m]                                                     | 17.0                       |
| Height [m]                                                             | 22.9                       |
| Capacity (TEU) [-]                                                     | 156900                     |
| Hydrostatics for Design Draught                                        |                            |
| Volume [m <sup>3</sup> ]                                               | 180934                     |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 141.5                      |
| Vertical Center of Buoyancy (VCB) [m]                                  | 8.83                       |
| Longitudinal Center of Floatation (LCF) [m]                            | 132.88                     |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 2056830                    |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 59000000                   |
| Block coefficient $c_B$ [-]                                            | 0.84                       |

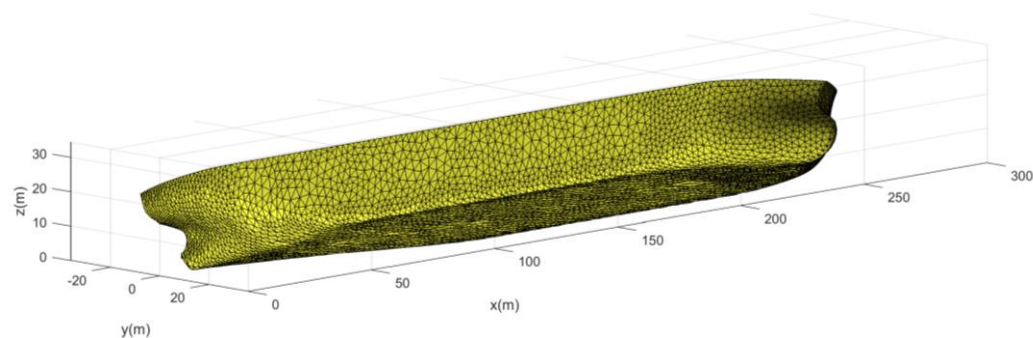
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



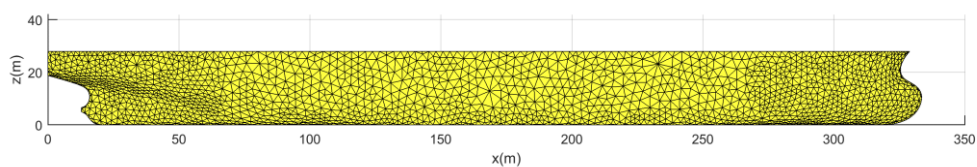
Date

March 2017

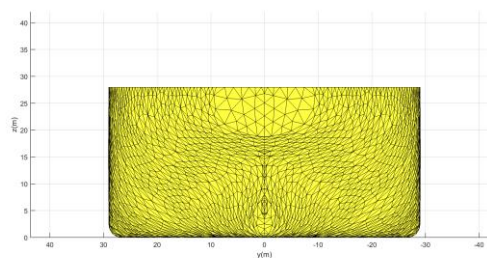
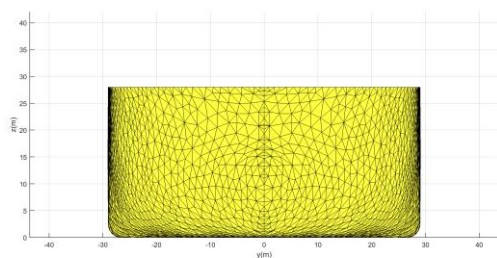


| Vessel ID                                                              | Tan-09              |
|------------------------------------------------------------------------|---------------------|
| Hull file name                                                         | Tan-09_300000t.hull |
| Vessel type                                                            | Tanker, CC          |
| Length over all (LOA) [m]                                              | 325.5               |
| Length between perpendiculars (LPP) [m]                                | 320.0               |
| Breadth [m]                                                            | 58.0                |
| Design draught [m]                                                     | 20.8                |
| Height [m]                                                             | 28.0                |
| Capacity (TEU) [-]                                                     | 300000              |
| Hydrostatics for Design Draught                                        |                     |
| Volume [m <sup>3</sup> ]                                               | 322581              |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 171.2               |
| Vertical Center of Buoyancy (VCB) [m]                                  | 10.87               |
| Longitudinal Center of Floatation (LCF) [m]                            | 160.14              |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 4196290             |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 120987000           |
| Block coefficient $c_B$ [-]                                            | 0.84                |

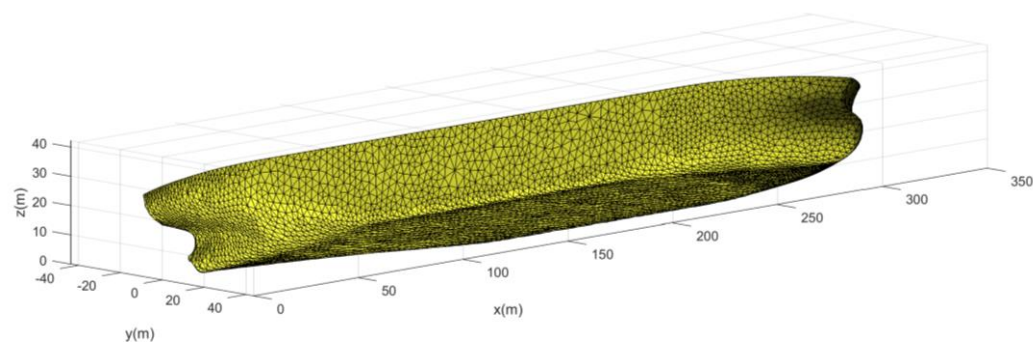
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

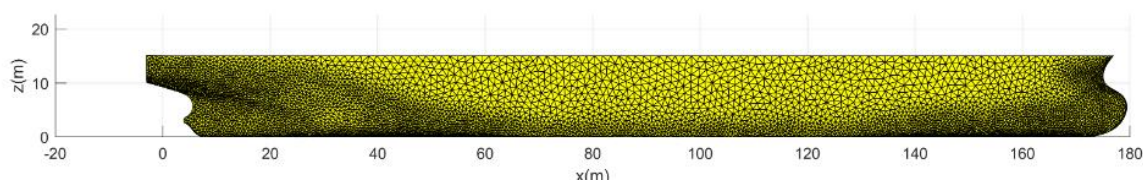


Date

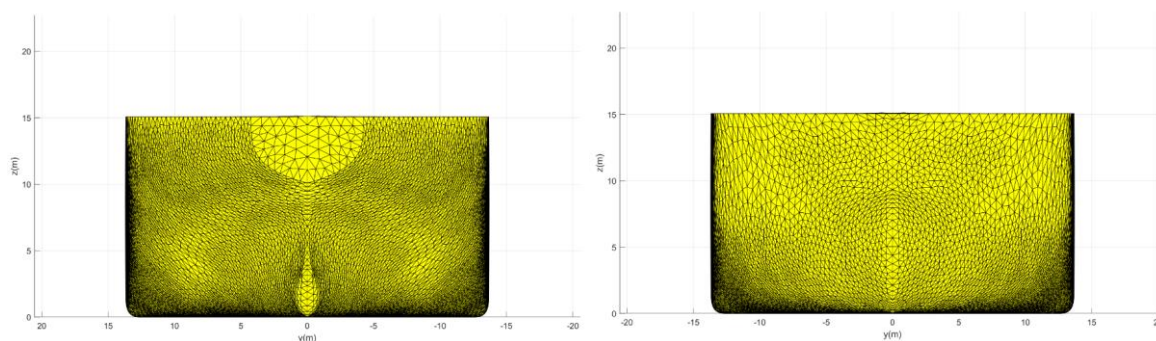
March 2017

| Vessel ID                                                              | Tan-10              |
|------------------------------------------------------------------------|---------------------|
| Hull file name                                                         | Tan-10_Tanker_37300 |
| Vessel type                                                            | Baltic Monarch      |
| Length over all (LOA) [m]                                              | 182.6               |
| Length between perpendiculars (LPP) [m]                                | 175.0               |
| Breadth [m]                                                            | 27.3                |
| Design draught [m]                                                     | 11.2                |
| Height [m]                                                             | 15.0                |
| Capacity (TEU) [-]                                                     | 37300               |
| Hydrostatics for Design Draught                                        |                     |
| Volume [m <sup>3</sup> ]                                               | 43402               |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 93.4                |
| Vertical Center of Buoyancy (VCB) [m]                                  | 5.86                |
| Longitudinal Center of Floatation (LCF) [m]                            | 87.39               |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 240919              |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 9330330             |
| Block coefficient $c_B$ [-]                                            | 0.81                |

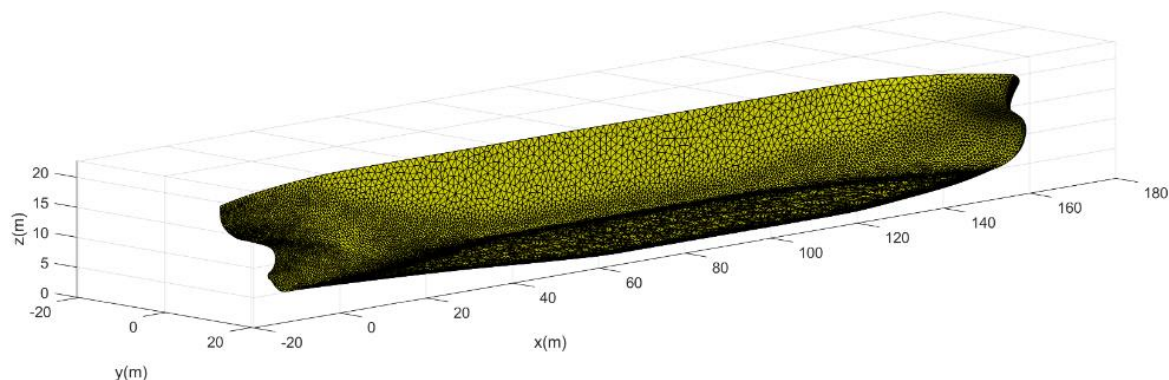
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



Date

April 2021

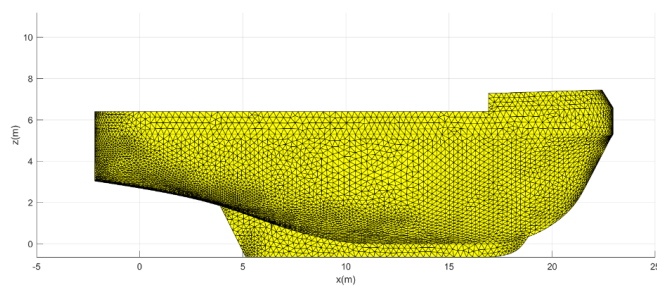
## 3.7 Tugboats

The following list of tugboats represent 3 selected tugboats of different size. They are generated generically based on inhouse data.

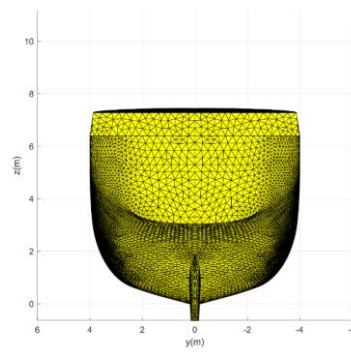
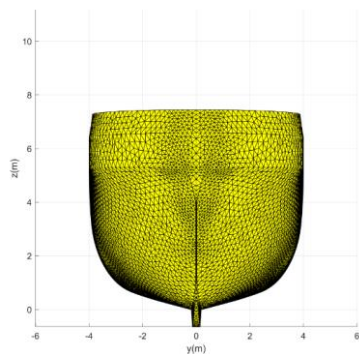
The Hydrostatic characteristics such as LCB, and block coefficients have been selected based on the FORCE Technology database.

| Vessel ID                                                              | TUG-01           |
|------------------------------------------------------------------------|------------------|
| Hull file name                                                         | Tug-01.hull      |
| Vessel type                                                            | Conventional Tug |
| Length over all (LOA) [m]                                              | 23.3             |
| Length between perpendiculars (LPP) [m]                                | 22.0             |
| Breadth [m]                                                            | 8.0              |
| Design draught [m]                                                     | 3.50             |
| Height [m]                                                             | 6.40             |
| Hydrostatics for Design Draught                                        |                  |
| Volume [m <sup>3</sup> ]                                               | 322.6            |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 10.69            |
| Vertical Center of Buoyancy (VCB) [m]                                  | 2.23             |
| Longitudinal Center of Floatation (LCF) [m]                            | 9.09             |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 717.86           |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 6280.5           |
| Block coefficient $C_B$ [-]                                            | 0.52             |

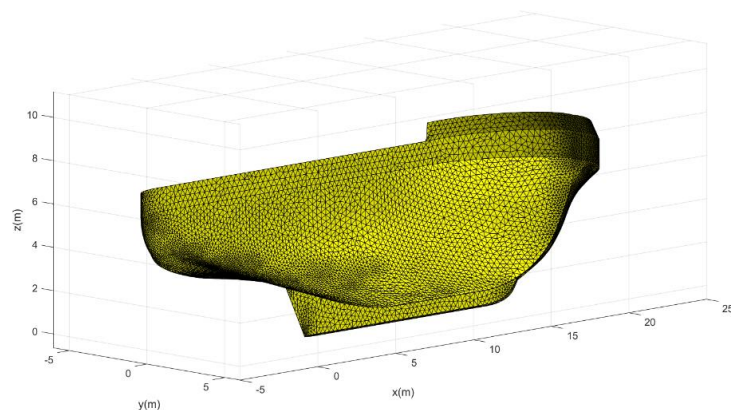
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view

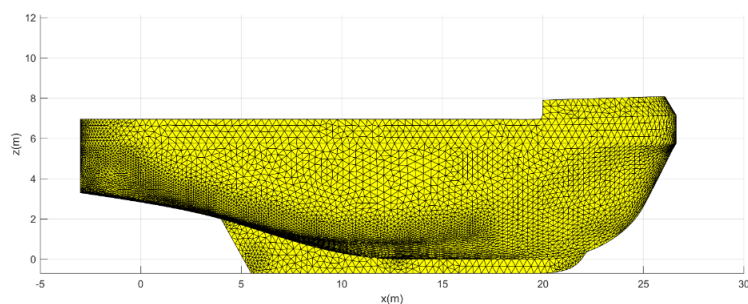


Date

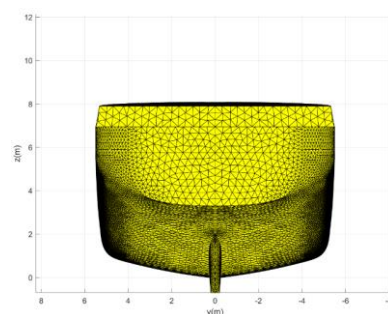
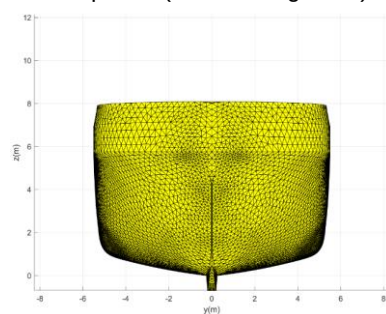
April 2021

| Vessel ID                                                              | TUG-02      |
|------------------------------------------------------------------------|-------------|
| Hull file name                                                         | Tug-02.hull |
| Vessel type                                                            | Push/Tug    |
| Length over all (LOA) [m]                                              | 28.3        |
| Length between perpendiculars (LPP) [m]                                | 25.65       |
| Breadth [m]                                                            | 11.0        |
| Design draught [m]                                                     | 3.80        |
| Height [m]                                                             | 6.95        |
| Hydrostatics for Design Draught                                        |             |
| Volume [m <sup>3</sup> ]                                               | 616.7       |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 12.27       |
| Vertical Center of Buoyancy (VCB) [m]                                  | 2.37        |
| Longitudinal Center of Floatation (LCF) [m]                            | 10.37       |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 2262.47     |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 14828.7     |
| Block coefficient $C_B$ [-]                                            | 0.57        |

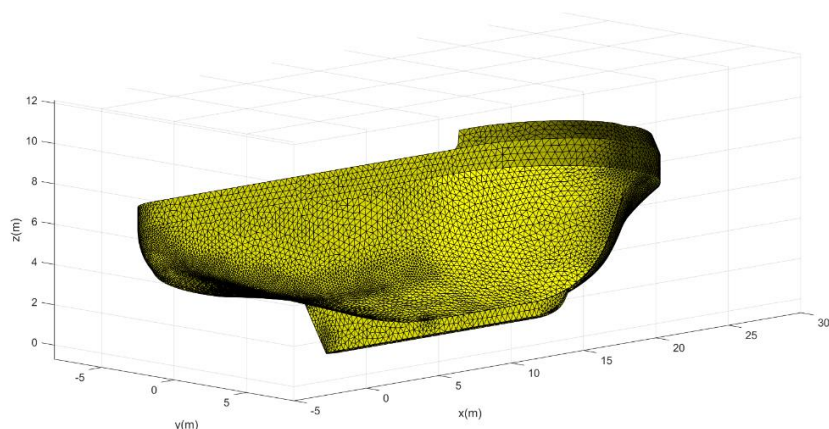
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



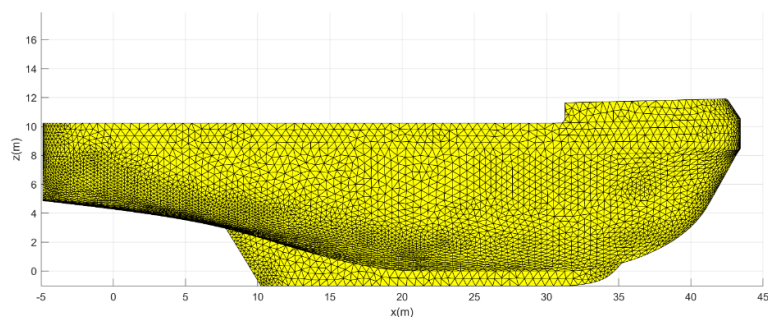
Date

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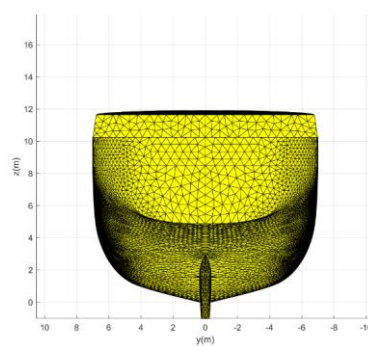
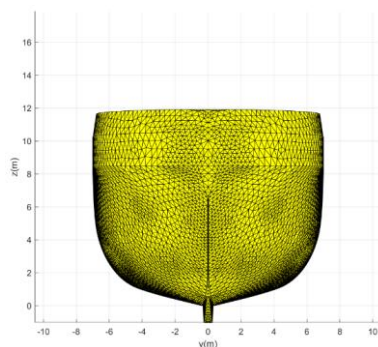


| Vessel ID                                                              | TUG-03               |
|------------------------------------------------------------------------|----------------------|
| Hull file name                                                         | Tug-03.hull          |
| Vessel type                                                            | Enhanced Tractor Tug |
| Length over all (LOA) [m]                                              | 47.24                |
| Length between perpendiculars (LPP) [m]                                | 21.78                |
| Breadth [m]                                                            | 14.0                 |
| Design draught [m]                                                     | 5.60                 |
| Height [m]                                                             | 10.24                |
| Hydrostatics for Design Draught                                        |                      |
| Volume [m <sup>3</sup> ]                                               | 1677.9               |
| Longitudinal Center of Buoyancy (LCB) [m]                              | 20.05                |
| Vertical Center of Buoyancy (VCB) [m]                                  | 3.61                 |
| Longitudinal Center of Floatation (LCF) [m]                            | 16.72                |
| Transversal moment of inertia of waterplane area IT [m <sup>4</sup> ]  | 7249.5               |
| Longitudinal moment of inertia of waterplane area IL [m <sup>4</sup> ] | 78389.4              |
| Block coefficient $c_B$ [-]                                            | 0.51                 |

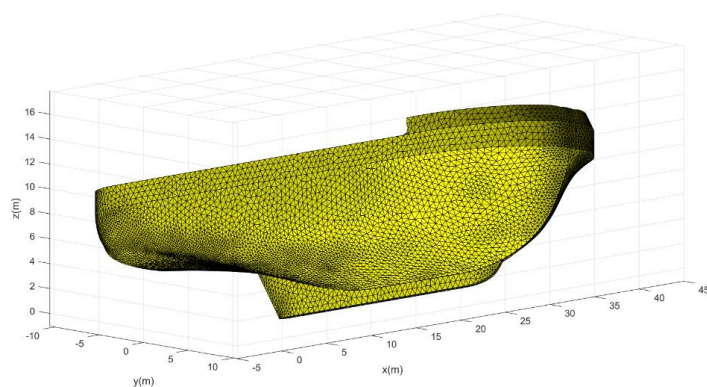
Longitudinal profile



Lateral profile (left: bow, right: aft)



3D view



Date

April 2021

## 4 References

- /1/ Practical Ship Design, Elsevier Ocean Engineering Book Series, Vol. 1, D.G.M. Watson, 1998.
- /2/ Determination of Regression Formulas for Main Dimensions of Tankers and Bulk Carriers based on HIS Fairplay Data, DTU, Work Package 2, September 2012.
- /3/ Statistical Analysis and Determination of Regression Formulas for main Dimensions of Container Ships, DTU, 2013.

