

### Operational Use of RNZ Jetty 3: Interaction with Proposed Berths 4 and 5 at Northport

#### Introduction

This analysis was carried out in September by Northport Ltd using their bridge simulator onsite at the port facility. The purpose of this study is to understand the potential impact the proposed Northport berths 4 and 5 would have on a small coastal tanker/ bunker barge arriving and departing RNZ Jetty 3. For this study, the existing Channel was used with the proposed new berths 4 and 5.

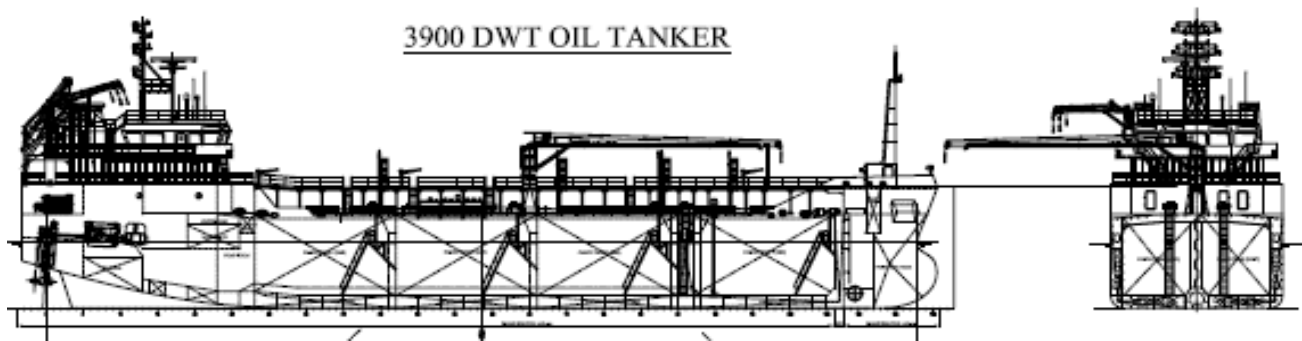
#### Design Ship

A new model based on the Bunker Barge Awanuia in a ballasted (4m) and loaded condition (6m) was developed. Awanuia is an 80m Product Tanker used as a bunker barge. She is fitted with 2 azimuthing thrusters aft and a bowthruster. The simulated design ship was tested in the Marsden simulation area (Marsden 5A) using the latest tidal data provided by Metocean.

#### Simulations

Run Number	Maneuver	Tide HW	Wind	Vessel Draft	BT Used	Comment	Master
001	Arrival	HW -3HRS	E20	B	Y	Controlled arrival	BG
002	Departure	HW -3HRS	E20	B	Y	Managed departure no problem	BG
003	Arrival	HW -3HRS	SW10	B	Y	Controlled all ok	RO
004	Arrival	HW -3HRS	SW20	B	Y	No problem.	RO
005	Arrival	HW -3HRS	SW25	B	Y	Max ROT 30 g/m on arrival. No issues	RO
006	Arrival	HW -3HRS	SW30	B	Y	Able to balance forces. Possible fendering on western edge of RNZ Jetty to protect	RO
007	Arrival	HW -3HRS	SW30	B	Y	No problems controlling into berth	RO
008	Departure	HW -3HRS	N20	L	Y	No problems when departing berth	RO
009	Departure	HW -3HRS	N30	L	Y	No problems when departing berth. Leads assist on the departure to provide indication of distance off berth 5	RO
010	Departure	HW -3HRS	SW30	L	Y	Not as much effect from wind due loaded condition	RO
011	Departure	HW -3HRS	NE30	L	Y	No problems with the departure	RO
012	Departure	HW 3HRS	SW20	L	Y	All managed ok	RO
013	Departure	HW 3HRS	SW30	L	Y	Controlled departure. Important to understand the construction of berth 5 to define the impact on the ebb tide	RO

014	Departure	HW 2HRS	SW15	L	Y	Vessel departed RNZ3 with only one POD available (Port). Departure was slow but controlled. Emergency condition. No tug used	BG
015	Departure	HW 2HRS	NE10	L	Y	Vessel departed RNZ3 with only one POD available (Port). Departure was slow but controlled. Emergency condition. No tug used	BG



### Pilot Card



**PILOT CARD**  
AWANUIA PARTICULARS FORM 2.7

Call Sign : ZMA2137

Displacement ( MT ) :  DWT ( MT ) :  Year Built : 2009

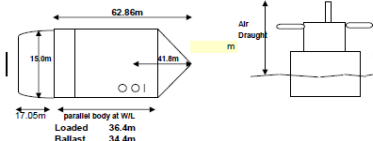
Gross Tonnage : 2747 Net Tonnage : 1100

Length Overall ( m ) : 79.00 Breadth ( m ) : 15.0 Bulbous Bow : Yes

Draught ( m ) : Fwd -  Aft -  Amidships :

Anchor Shackles ( 1 Shackle = 27.4 m / 15 Fathoms )

Port Anchor - 8 Sbd Anchor - 8



**ENGINE :** Maximum Power : 1080 kW per Engine  
2160 kW Total

Type of Engine : 2 x Wartsila 8L20 Diesel

Engines Run at Constant Speed (1000 RPM)

Clutched to Azipod Drive Unit.

Pitch Variable ahead and astern Pods turn thru 360 Deg Azimuth

100 % Pitch Astern is 50% Power, for maximum astern power pods must be turned to 180 Deg Azimuth

Do NOT Turn Pods through 270 Deg Azimuth - opposed thrust from pods may damage Azimuth Clutches/Pitch Control

Speed can be infinitely varied between 0 and 11 Knots through use of Pitch Controls

The engines are not operated in any critical range

The Maximum Number of Consecutive Starts is irrelevant as the Engines are continuous Running whilst manoeuvring

Time full ahead to full astern (sec) : 20 Secs

Time Limit Astern (sec) : Unlimited

**STEERING**

Azipod Drive

Time hard over to hard over : 25 sec; Pod from 90 Deg to 270 Deg thru 0 Deg

Rudder angle for Neutral effect (deg) : Zero

Propellers (nos) : 2 Direction of turn : Inward Turning Controllable Pitch

Thrusters (nos) : 1 Bow Power : 300 kW

Stem Power : - Azipods - up to 2180 kW

Steering idiosyncrasies : Steerage while reducing speed from 34 knots may be sluggish and require large pod angles if ship speed is too far above propeller speed.

Steering with stern way at above 4 knots requires large pod angles.

**EQUIPMENT CHECKED AND READY FOR USE :**

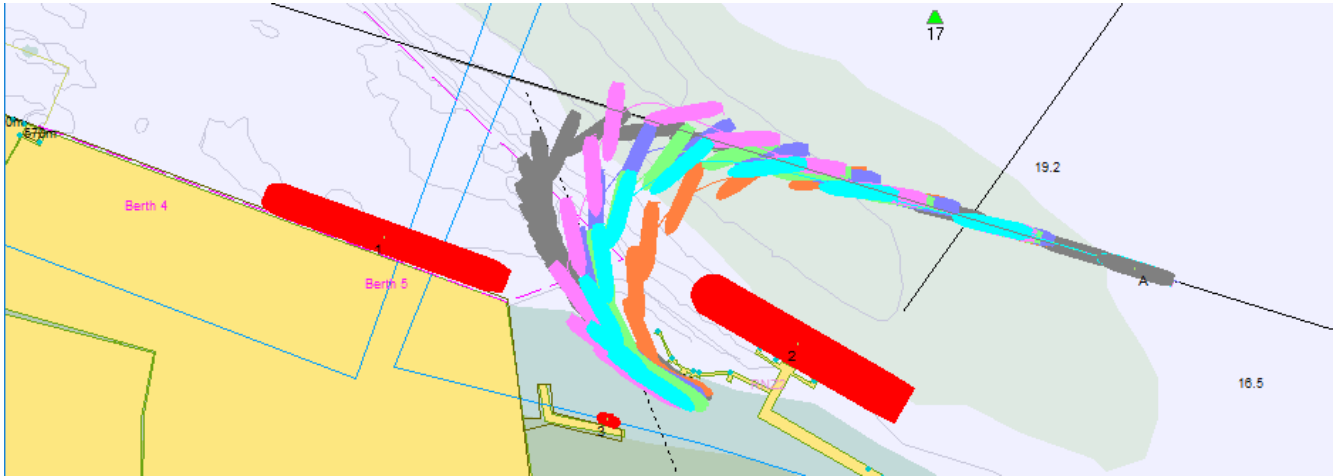
Equipment	Checked OK
Anchors : Cleared Away :	<input checked="" type="checkbox"/>
Whistle :	<input type="checkbox"/>
Flags :	<input type="checkbox"/>
X Band Radar : ARPA :	<input type="checkbox"/>
S Band Radar : ARPA :	<input type="checkbox"/>
Speed Log : Water / Ground :	<input type="checkbox"/>
Single Axis / Dual Axis :	<input type="checkbox"/>
Echo Sounder :	<input type="checkbox"/>
Transducer :	<input type="checkbox"/>
Electronic Position Fixing : Transas Sailor 3000 based on GPS :	<input type="checkbox"/>
Compass System : Gyro Compass Error (deg) :	<input type="checkbox"/>
Steering Gear : Number of Power Units in Use : 2 Per Pod :	<input type="checkbox"/>
Rudder / RPM / ROT Indicators :	<input type="checkbox"/>
Engine Telegraphs :	<input type="checkbox"/>
VHF : Mooring Winches & Lines :	<input type="checkbox"/>

Equipment Operational Defects :

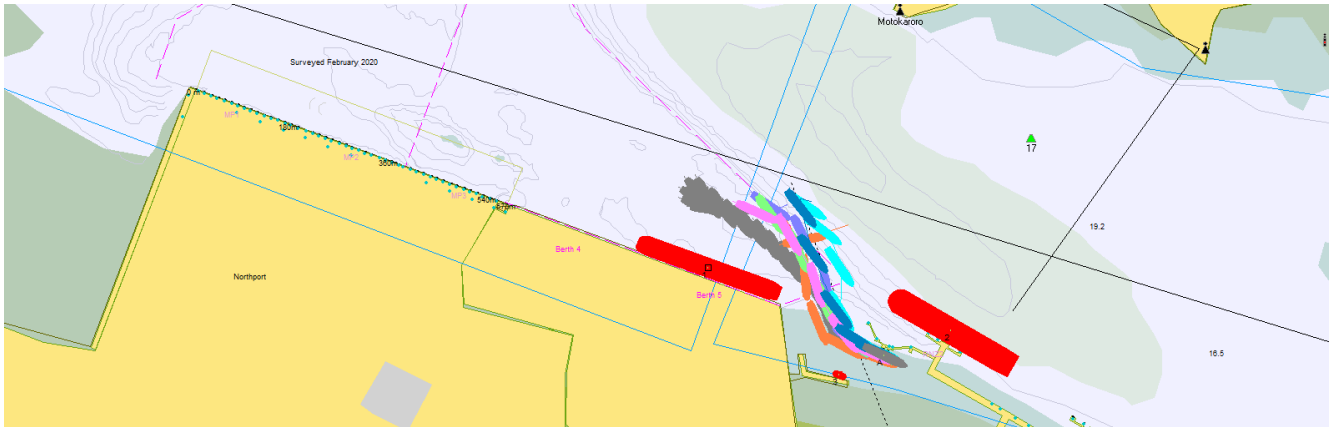
Other Important Details : Vessel Inerted / Not Inerted / Gas Free / Not Gas Free / In Ballast / Loaded With :

Master \_\_\_\_\_ Pilot \_\_\_\_\_

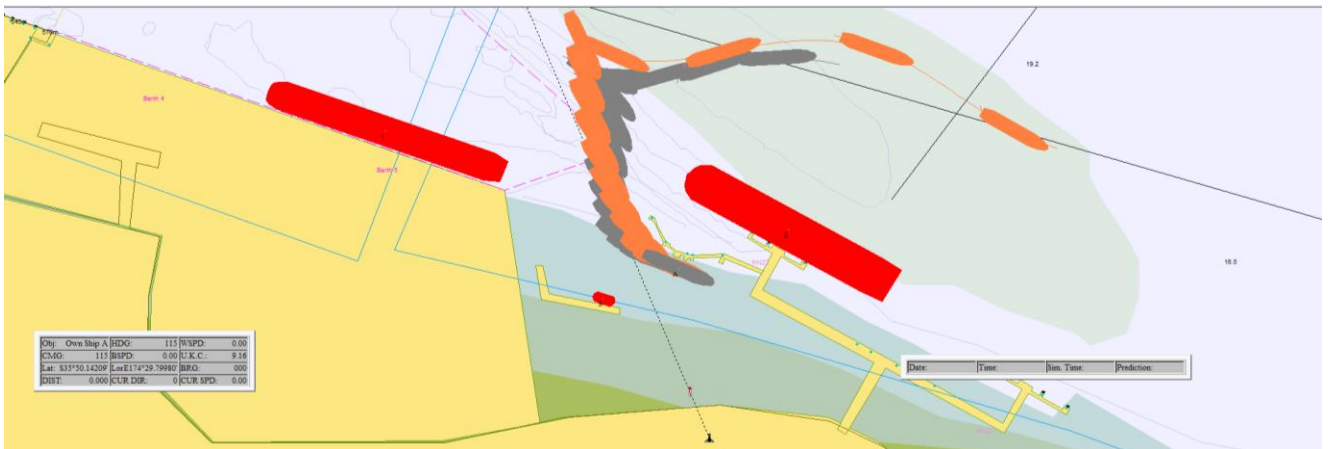
### Simulation Run Plots Arrivals



### Simulation Run Plots Departures



### Simulation Run Plots Departures with One POD Emergency



## **Conclusion**

From the simulations it was seen that the design vessel could continue with its existing operations with minimal impact from the proposed new Northport Berths 4 and 5. The following points can be noted

1. Departures will be assisted by the positioning of a set of traditional leads on the beach between Berth5 Northport and Refining NZ. Coordinates (WGS 84) for the leads are

Front Lead      35° 50.21509'S 174° 29.8076'E              Rear Lead      35° 50.24268'S 174° 29.8212'E

2. Fendering on the western side of the Refining NZ Berthing Dolphins will help prevent damage to the RNZ berth structure and the ship in the unlikely event of an emergency.
3. Tidal streams in the vicinity of RNZ Jetty 3 should be studied for possible impact of the new Northport Berths particularly the ebb stream. Worst case tidal streams were modelled for this simulation study.

## **References**

1. ABS Vessel\_Manueverability\_Guide\_e-Feb17.pdf
2. Wheelhouse Poster MT Awanuia
3. Interview with Richard Oliver ex Master Awanuia