Technical Meeting — 2 March 2022

Bernard Dwyer, Managing Director/Chief Executive Officer of TT-Line, gave a presentation on *Design and Construction of the New Spirit of Tasmania Vessels* as a webinar hosted by RINA using the Zoom software platform with the Deputy Chair of the NSW Section, Phil Helmore, as MC on 2 March. This presentation attracted 24 participating on the evening.

Introduction

Bernard began his presentation with an introduction to TT-Line and their current operation. TT-Line is a State-owned entity which operates with an independent Board and, as a result, is required to be self sufficient and pay a dividend to the Tasmanian Government.

They currently operate two identical vessels, *Spirit of Tasmania I* and *II*, which ply between Station Pier in Melbourne and the Port of Devonport [Spirit of Tasmania III, *which plied the Sydney–Devonport route, was sold in 2006 and is now* Mega Express IV *of Corsica Ferries in Italy* — Ed.]

Spirit of Tasmania I
(Photo from Knud E. Hansen website)

These vessels commenced operation in 2002 and brought a big change to the Tasmanian economy. The vessels can operate at 28.5 kn, leaving at 7:30 pm for a crossing of Bass Strait and arriving at the other end at 6:00 am. This is important for freight, as a 6:00 am arrival in Devonport enables trucks to reach Hobart, unload and reload, and be back in Devonport in time for the 7:30 departure for the return voyage across Bass Strait. However, the vessels typically operate at 24 kn to maintain that schedule. If they have access problems, and are delayed by up to two hours, then they can increase speed to the 28.5 kn to catch up and remain on schedule.

During busy periods, e.g. in peak tourist season over summer, they also have day sailings as well. However, with the time taken to tie up, discharge, clean, reload and depart at both ends, they cannot fit two sailings into 24 h. In addition, passengers on day sailings need to be entertained for the whole trip as they don't have berths, where passengers on evening departures usually head straight for their beds after sailing.

Four or five years ago, they were carrying 340 000 passengers per year with 48 day sailings, 60% of which was tourists and 40% freight. Freight is carried only on trailers, not in containers. They knew that there was a lot of demand which was not being satisfied.

So, three years ago TT-Line spent $31 million on the vessels to update the interiors, delete the defunct swimming pool area, etc. and, in the subsequent time, went from 48 to 180 day sailings per year, increased to 450 000 pax/year and carrying 115 000 TEU/year; a remarkable increase in business. This showed that the demand is there, but they knew that they could not increase capacity further with the existing vessels.

Aiming for New Vessels

They therefore set about designing new vessels to cater for the demand which they knew was there. They spoke to TasPorts, and to the Devonport Harbourmaster to determine the largest vessel which would be able to berth in Devonport. They aimed for an increase in capacity of 40% and, in 2018, signed a contract with the German company Flensburger Schiffbau-Gesellschaft (FSG) to build two new vessels, with the first expected to enter service in 2021. However, FSG ran into financial difficulty and could not build the vessels.

TT-Line then went back to another tenderer, the Finnish company Rauma Marine Constructions (RMC), and came up with a Memorandum of Understanding in the middle of the pandemic. However, the Tasmanian Government at that stage insisted that wave-piercing catamarans also be considered together with the large monohulls. The operations of both were reviewed, and the Government eventually agreed that the MoU with RMC was the best option, and the contract for construction by RMC was signed in April 2021.

Geelong Terminal

Over four years of planning, they had also been thinking laterally and, if they were going to change some things, then why not change other things as well to assist in the efficient operations of the two ports?

At the Station Pier terminal in Melbourne they have a 1 ha site, which significantly constrains their operations with passenger vehicles, caravans and freight vehicles. They investigated the site at Corio Bay in Geelong and found that, with a 12 ha site, they had much more space both for vehicle parking and for loading and discharge. Here Bernard showed a slide of the Geelong terminal.

Artist's impression of the TT-Line terminal at Geelong
(Image courtesy TT-Line)

An advantage of the increased space is that freight customers will be able to drop off their freight for loading 24 h before departure, compared to 3 h at Station Pier. The passenger and freight vehicles can also be kept separated. The building to the right of the vessel contains the facilities, including a coffee shop for tourists and freight drivers to relax. The vessels will load vehicles over the stern in Devonport and over the bow in Geelong, so the whole operation becomes drive-through, and they expect to reduce the total turn-around time, including cleaning, from 3.5 h to 1.5 h. The new vessels are 40% larger than the existing vessels and more efficient. As demand increases, they will be able to add in day sailings and still keep to a 24 h schedule, which they can't at the moment. This is expected to cater for projected demand over the 25-year life of the vessels.

The New Vessels

The new vessels will be named, unsurprisingly, *Spirit of Tasmania IV* and *V* — the brand is now well-known and loved. The livery will be red-and-white, similar to that on the current vessels, and the Spirit of Tasmania logo has been refreshed to highlight the bow of the ship against the blue sea and sky framed within the shape of Tasmania.

Artist's impression of starboard bow of the new Spirit of Tasmania vessels
(Image courtesy TT-Line)

Artist's impression of port quarter of the new Spirit of Tasmania vessels
(Image courtesy TT-Line)

Principal particulars of the new vessels, in comparison to the current vessels, are

Vessel	*Spirit IV* and *V*	*Spirit I* and *II*
Length OA	212 m	194 m
Beam	31 m	25 m
Deadweight	6400 t	5651 t
GT	48 000	29 338
Passengers	1800	1400
Cabins	301	222
Standard recliners	118	121
Business recliners	53	0
Vehicle lanes	3700 m	500 m
Main engines	4×Wartsila LNG and diesel each 10 305 kW @ 600 rpm	4×Sulzer V16 diesel each 10 560 kW @ 510 rpm
Propulsion	2×CPP	2×CPP
Speed	28.5 kn	28.5 kn
Route distance	Geelong–Devonport 242 n mile	Melbourne–Devonport 232 n mile
Crossing time	9–11 h	9–11 h
Classification Society	LR	ABS

The engines on the new vessels are dual fuel, and they expect to be operating mostly on LNG when they arrive. Carbon emissions are increasingly important, and the engines are also expected to be able to operate on the new biofuels. The Tasmanian Government is looking at the generation of hydrogen in Tasmania, and so TT-Line is also looking at that.

The vessels will be able to carry 1800 passengers on day sailings, and 1150 overnight, as all overnight passengers are berthed. There are 8 accessible cabins, all with interconnecting doors to cabins for support people.

The move to the new terminal in Geelong will happen this year. *Spirit of Tasmania IV* is expected to arrive in Australia in 2023, and *Spirit V* a year later so, for a while, there will be a combination of the old and new vessels operating.

General Arrangement

Here Bernard showed a general arrangement drawing of the new vessels, zooming in on features of interest. However, as some of the information is sensitive, the drawing has not been included here and descriptions may suffice.

The fast rescue boat is located at about mid-height of the superstructure where, in the current vessels, it is located on the top deck.

Safe return to port is critical, and there is a second safe-return-to-port bridge provided with duplicated controls. There are also rations kept onboard for both crew and passengers—it is at that sort of level.

The crew work four weeks on and four weeks off. Their cabins and private recreation area are on the top deck. The officers and crew cabins are mainly on the outside so that they obtain natural light. However, there are skylights to the passageway for the inside cabins so that they also receive some natural light.

There are both economy-class and business-class recliners, as well as multiple classes of cabins, lounges, and recreation bars.
The new vessels use all of the beam for cabins, where the current vessels have walkways outside of the cabins. There are outside areas at the stern of the vessels for people to take the fresh air.
There are two cinemas, a teenagers' lounge, a library, and a café in the centre of the vessel. There is also a tasting bar/lounge for tasting Tasmanian produce. The retail area is five times the size of that on the current vessels.
The *a la carte* restaurant has been brought back—it was removed on the current vessels when they were refurbished, much to the chagrin of some people. There is a big buffet restaurant which caters for the majority of the passengers.
There are two gaols (i.e. brigs).
There is a drivers' lounge for the freight drivers; it is not large, but is as provided for freight drivers in Europe.
Decks 3, 5 and 7 are for motor vehicles and freight. Ramps for loading of passenger and freight vehicles are necessarily close together. The current vessels have a height limit of 2.1 m for passenger vehicles, and they can raise or lower the hanging decks as required. The new vessels have a height limit of 2.2 m, and a 2.3 m width as well, both for safety and passenger comfort. Without the hanging decks, the height limit is 4.8 m, which caters for the new standards for caravans and motor homes as well as for freight vehicles. Deck 3 can cater for vehicles 4.8 m high and 3.2 m wide. As a matter of interest, vehicles on all decks can be unloaded via Deck 3 if necessary.
The pet kennels on the current vessels are on the vehicle decks, so the owners cannot visit their pets while the vessel is under way. On the new vessels, the pet kennels are in the casings, outside the vehicle decks, and have their own air conditioning, etc., so owners can visit and exercise their pets while under way.
On the current vessels there is not lift access to every level. Foot passengers come on board and up escalators to reach their deck. On the new vessels there will be no escalators, and foot passengers will either use stairs or the lifts to reach every level.
There is a trailer lift from Deck 5 to Deck 3, so that trailers carrying frozen stores for the vessel can be driven to Deck 3 and unloaded directly into the store.
The main engines are located about two-thirds of the length aft of the bow, with the LNG tanks in the space forward of the engine room. They expect to have to fill the tanks every second trip.
Passengers typically drive onto the vessels (90%) and the remainder (10%) are on foot. There is gangway ability onto Deck 8 in Devonport, but at Geelong the foot passengers will come onto the vessel by bus!

Construction

RMC began constructing *Spirit of Tasmania IV*, the first of the two new vessels, at its yard in Finland on 28 February. The start of construction was marked with a traditional steel-cutting ceremony, which included a welcome address from Jyrki Heinimaa, CEO and President of RMC. The ceremony was completed with the signing of steel plates to commemorate the occasion.

Delegates from RMC and TT-Line at the steel-cutting ceremony
(Photo from Cruise&Ferry website)

Conclusion

TT-Line has embarked on a significant upgrade program for their trans-Bass Strait service. The new vessels are larger than the current ones, have 40% more capacity, more features, and are more environmentally friendly. In addition, the move of the Victorian terminal to Geelong is expected to streamline the operation, reduce the turn-

around time to 1.5 h, and enable each vessel to have two return sailings in 24 h in peak periods. This is expected to meet the projected demands on the service for the next 25 years.

Questions

Question time was lengthy, and raised some further interesting points.

The current vessels have one stern thruster and two bow thrusters, but are unable to operate more than two at any one time. The new vessels will have the same arrangement, but will be able to operate all simultaneously.

The new vessel will be fitted with active-fin stabilisers which are larger than on the current vessels.

They are aware of methane slip, which results directly from the performance of the engine itself. Methane slip occurs either by leakage through piston rings, or as a result of insufficient combustion, when gas is emitted unburned from the engine. Because it is unplanned and, thus, largely unmeasured, it is generally seen as a greater environmental threat than planned emissions due to bunkering, fuel changes, pipework leaks, etc. Two-stroke cycle diesel engines (as fitted to the new vessels) generally produce minimal amounts of slip, but they will be monitoring it and adjusting engine load and propeller pitch for minimal slip.

They did consider azipod propulsion, but all the analyses showed that twin controllable-pitch propellers was the more-efficient option. The controllable-pitch propellers are inward turning, a decision taken after extensive tank tests.

The auxiliary machinery comprises Wärtsilä 9L20DF sets.

Bernard indicated that he would be happy to arrange a tour of *Spirit IV*, after arrival in Australia and before entering service, for RINA Tasmanian Section—watch for her arrival!

The presentation was not recorded due to the sensitive nature of some of the material presented.

The certificate was subsequently posted to Bernard.