

Flo/Flo – an effective solution for coastal trade

Domestic short-sea liner trading has traditionally been carried out by small vessels with limited cargo capacity calling at small ports often located up river estuaries. To overcome these constraints, the Emden-based Navtec Consult in Germany is offering an innovative technical solution for an open transportation system for short-sea and river-sea liner routes with a high throughput of non-homogenous cargoes.

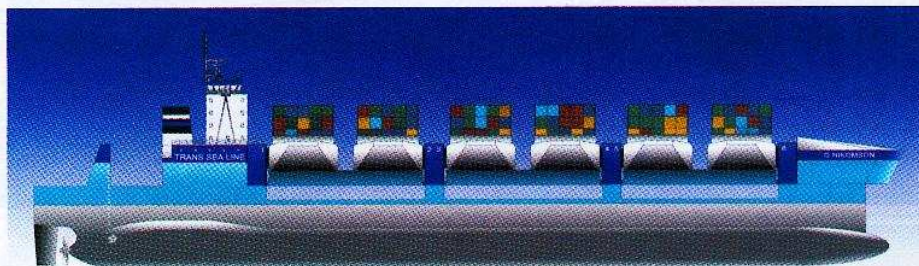
Trans sea lifter

Called Trans Sea Lifter (TSL), this large vessel is a SWATH (small waterplane area twin-hull) catamaran type barge carrier offering a stable sea frame with three individually submersible cargo platforms. The TSL's hulls are very slender at the water surface and provide a smoother ride at sea than can be achieved by a typical mono-hull or catamaran. Due to this minimal resistance to waves, the TSL can also sustain its service speed in rough head seas.

In addition to its excellent sea-keeping traits, the patented TSL sea frame is designed for quick changes in draught. The owner of Navtec Consult, Dipl.-Ing. Hermann J. Janssen, claims the TSL can change from voyage draught to loading draught within 15 minutes thanks to a ballast-system unique to the TSL.

Although the TSL can be built to almost any size, Janssen has developed the design for a 185 metre long and 70 metre wide (Suezmax) ship which is a size generally applicable to most short-sea shipping regions. These dimensions will give a total net cargo capacity in barges of 16,120 dwt accommodated on three cargo plat-

A float-on/float-off concept has been developed which could be the catalyst to a new and radical approach in short-sea shipping



Profile drawing of the Trans Sea Lifter Flo/Flo vessel

forms each measuring 76.5 metres x 32.6 metres.

The TSL is also designed for simple construction. It has two long parallel mid-bodies and the top-side structure consists of rectilinear flat panels. Because the fully assembled size of the TSL vessel would pose a challenge to many shipyards, it is designed to be built in modules, such as the torpedo shaped hulls, and then assembled afloat. It can therefore easily be built at small shipyards at an estimated cost of €100 million. This figure is based on a series of four built in a Northern European shipyard. There are additional operation-dependent costs such as barges and shipborne tugs.

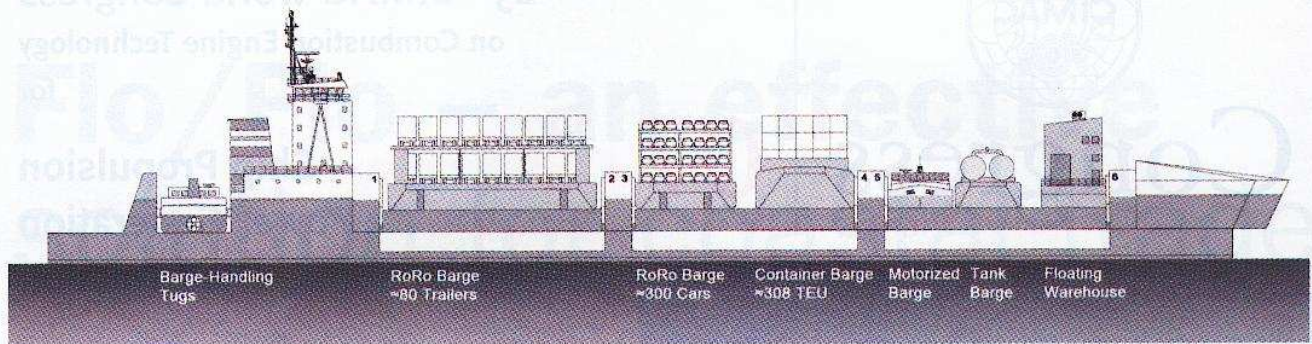
Varying draughts

While at sea, the TSL has a draught of 12 metres with the movable cargo platforms locked securely at 8 metres above the water line. Once the TSL reaches its destination it ballasts down within 15 minutes, increasing its draught to 20 metres for loading and discharging. The ballast system also unlocks the platforms which gives a water clearance of 4.30 metres

enabling the barges to float on or off (Flo/Flo). This draught change coupled with dynamic positioning during the Flo/Flo process, provides the TSL with fully autonomous offshore cargo handling capabilities.

The sea floor depression area needed to accommodate the 20 metre loading draught is about 1.5 x the length of the TSL which means an area of 277 metres in diameter. When faced with traversing shallow coastal waters, the TSL will be able to decrease its draught to 7.50 metres making it a highly versatile coast-capable vessel.

The main propulsion engines will either consist of four 11,250 kW Wärtsilä 9L46F at 600 rpm or four 11,000 kW MAN 9L48/60B at 500 rpm. These will be located in the after section of the hulls and each pair will drive a 7 metre diameter CP propeller giving a service speed of 21.7 knots at 90% MCR. Two 600 kW stern thrusters are installed to assist in the dynamic positioning of the vessel achieved in conjunction with the main propellers. Electrical power is provided by two 1,500 kW gensets and two 1,200 kW shaft generators. An interesting feature



is the two 7,000 kW generators for the ballast water system each of which is powered by one of the main propulsion engines while the vessel is in Flo/Flo mode.

Cargo platforms

The TSL's three cargo platforms provide the port interface and carry the 'detachable cargo holds' which are any type and combination of flat-bottomed vessels (typically standard sized self-propelled or dumb barges), that sit on each of the 6,600 tonne carrying capacity platforms. A wide range of cargoes can be carried including up to 1,848 TEU based on six 308 TEU dumb barges optimized for the container trade without cell guides. Due to barges being carried athwartship, they can overhang by 5 metres on either side expanding the usable footprint area of the cargo platform to 32.6m x 86.5m.

These cargo platforms are designed for selective discharge. The vessel operator controls the platforms individually by ballasting the TSL down to loading draught first and then selecting which platforms are to be lowered for cargo exchange. One, two or all three platforms can be submerged simultaneously or sequentially and this allows for highly controlled cargo exchange at each port of call. When the TSL is under way, the platforms are safely stowed with their deck 8 metres above water level.

A fourth fixed platform is located at the stern of the TSL and will be utilized according to a specific application. For example, it may contain ship-borne barge handling tugs for operating autonomy or additional smaller sized barges for more capacity, depending on operational preferences of the owner.

Simply stated, the TSL system is a universal short-sea liner service enabled by barges. The TSL sails on a fixed route between major and regional ports on a ferry-like schedule arriving outside port entrance/river mouth where the following Flo/Flo operations take place:

- Outbound barges are pre-positioned for loading prior to the TSL's call.
- Harbour tugs meet TSL with outbound barges.
- One or two ship-borne 800 kW tugs tow off inbound barges.
- The TSL exchanges inbound for outbound barges and sails on after 90 minutes.
- Harbour tugs move inbound barges to coastal and inland ports for discharging and reloading.

Vessel throughput

Because a TSL and a conventional coastal vessel do not operate the same way, any comparison benchmark must be based on performance over a given time. Therefore vessel throughput (capacity x number of round voyages per year) is the true comparison benchmark in the short-sea trade. Janssen claims that the fixed short window for cargo handling and 21 knot steaming speed allows a single TSL to execute 5 to 7 times the number of round voyages per year than a conventional feeder vessel of similar slot capacity, thereby achieving 5 to 7 times

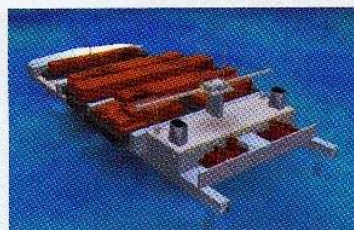


Illustration showing the wide range of cargoes the TSL can handle

Stern view showing a fully loaded TSL with two barge handling tugs stowed on the aft cargo platform

the annual cargo throughput on typical short-sea routes.

Treating barges as detachable cargo holds essentially makes them floating super containers. This enables flexibility in port operations, as cargo loading and unloading no longer is scheduled around the feeder ship. Loading and unloading is scheduled around the preceding or subsequent link in the overall transportation chain, such as loading containers directly into barges upon the arrival of a Mega-Carrier.

Furthermore, the super container aspect makes the TSL trade-independent as the barge has the trade focus and not the TSL. This allows for cross-trade cargo aggregation on the same vessel. In other words, on voyages when TSL slot capacity is under-utilized, barges of a different trade can be loaded on the TSL.

With a Flo/Flo process that claims to give a port turn-around of 1.5 hours, the TSL transfers the variable cargo handling time to the barges. Put in financial terms, the high value asset (TSL) has greater productivity, because the low value asset (barges) absorbs the non-productive lay time.

The TSL is not just a ship, it is the core of a completely new short-sea shipping system and ship owners should take a close look at the many practical advantages of the system.

Although there are currently no firm orders, there is much interest expressed in implementing the TSL system from ship owners/operators and Navtec is currently looking for strategic development partners interested in being in the forefront of shipping technology. ■

● For further information see: www.TSLtec.com