

Tenacity reflects a determined approach to efficiency

Although the fourth vessel in a series, the 50,000 dwt IMO II/III *Tenacity* was modified to allow for a more optimised hull form and larger propeller

The 50,000 dwt product/chemical carrier *Tenacity* has been designed for worldwide trading and has the flexibility to carry either petroleum products, vegetable oils and other IMO II and III cargoes.

To support her smooth sailing, the owners and yard decided to implement a number of design improvements, notably in terms of the hull lines, propeller in order to improve propulsive efficiency as well as in terms of the design of forecastle and accommodation in order to reduce the air resistance and improve fuel consumption.

On deck the company has opted for Hatlapa windlasses and winches and Posgrunn steering gear. TTS supplied the provision and hose-handling cranes. Xinjiang supplied the lifeboats onboard; Viking the liferafts.

The company opted to have heat exchangers on deck rather than coils in the tank in order to have an unobstructed tank bottom, explains Nickolas Sarakinos the vessel's technical manager. "This helps 'cargo squeezing' especially when dealing with viscous cargoes like styrene or palm oil to minimise any residual cargo remaining on board and takes place during the final tank stripping process. Taking this approach also means there is less initial cost and if there is a problem it is easier to repair heaters that are on deck."

A flexible and easy to operate cargo system is another hallmark. Corrugated bulkheads with no internal structures between the cargo tanks have been specified for easy cleaning and quick changes between cargoes.

Tenacity has five pairs of coated cargo tanks and two fully coated slop tanks. International Paint phenolic epoxy has been applied in the cargo tanks.

For cargo loading and discharge the company opted for electric Marflex Deepwell pumps as they require less piping on deck and have lower initial installation and operating costs, versus hydraulic pumps. The pumps have been designed for a maximum



Energy efficiency and environmental considerations underpin the design of *Tenacity*

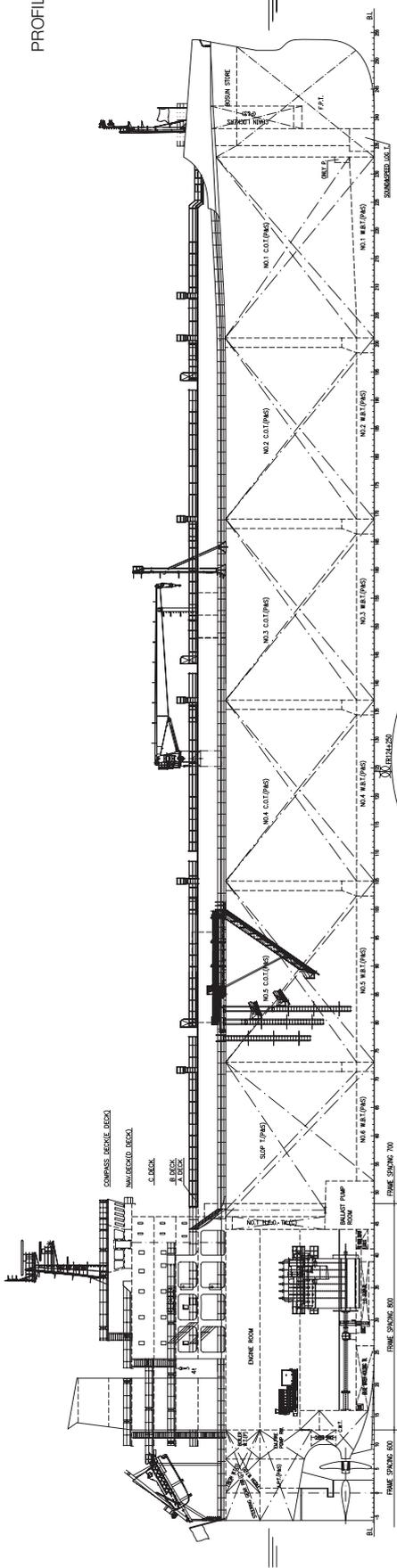
loading rate of 3,300 m³/h in six tanks sets simultaneously. The optimal/maximum unloading rate of cargo is about 3,050 m³/h with five pumps and one slop pump working simultaneously or 3,300 m³/h where six pumps working through six manifolds are working simultaneously. A Damcos tank level gauge monitors cargo levels.

To inert the spaces, an Aalborg inert gas generator plant has been installed. Each cargo and slop tank also has a Pres-Vac high-velocity venting system.

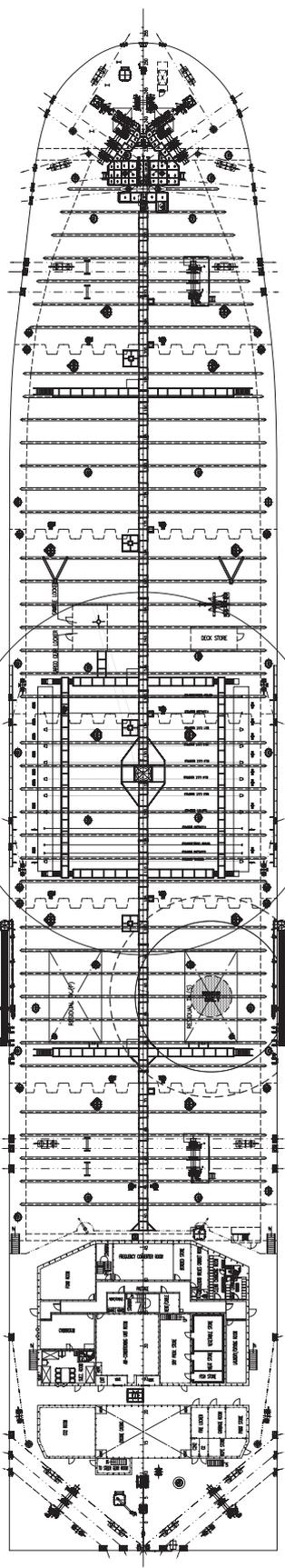
For tank cleaning, *Tenacity* is equipped with 24 Scanjet SC30T programmable single nozzle tank cleaning machines: capacity 24 m³/h at 8 bar of inlet pressure. Each machine has a magnetic transmission, designed to eliminate the risk of leakage into the cargo and also

TENACITY	
Managers	Sea Pioneer Shipping
Builder	GSI Shipyard
IMO No	9416408
Length, oa	183m
Length, pp	174m
Breadth	32m
Draught, design	13m
Draught, scantling	13m
Deadweight	50,000 dwt
Cargo tank capacity	51,500m ³
Main engine	MAN B&W 6S50ME-B9
Service speed	14.5 knots
Flag	Liberia
Class	DNV

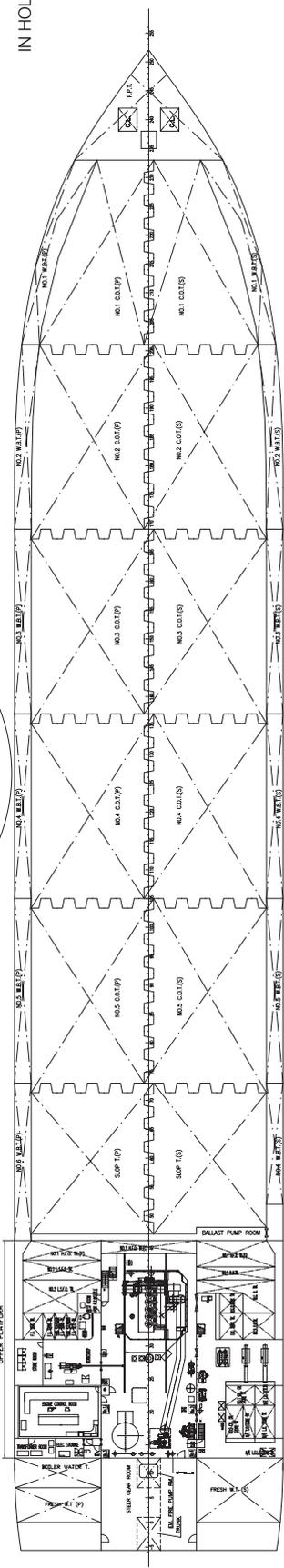
PROFILE



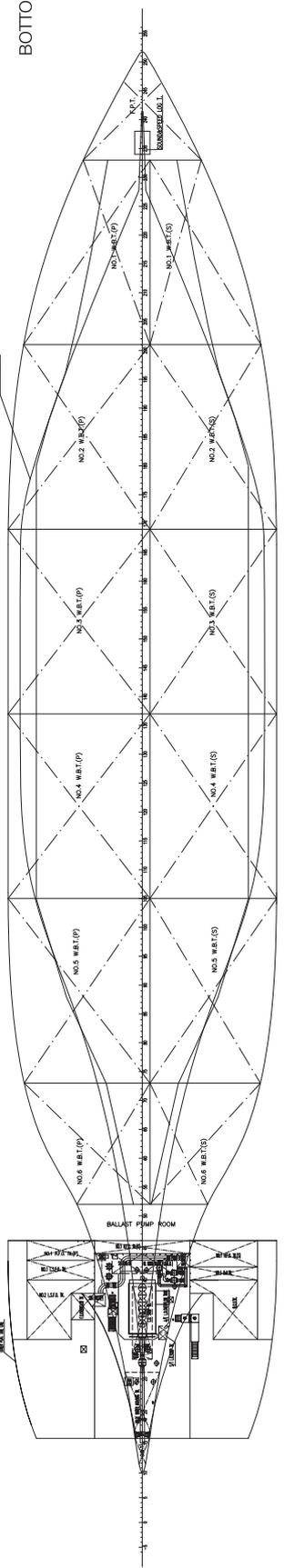
UPPER DECK



IN HOLD



BOTTOM



enable convenient removal of the drive unit without exposing the tank to atmosphere

In the engine room, a MAN B&W 6S50ME-B9 develops a total of 7,628kW (SMCR) and for a service speed of 14.5 knots (at CSR : 6,484kW) based on a contractual daily fuel consumption of 25 t/day and fuel specific consumption of 160.6gr/kw/h. This drives a large Shanghai Marine Propeller Design company supplied propeller. An alpha lubricator for reducing cylinder oil consumption has been installed alongside torque metre monitoring of the engine. "We consider these to be very good tools for reducing the emissions as well consumption. This will also support us when sailing in the growing number of emission control areas around the world."

Mr Sarakinos adds that these installations mean that the engine has a number of energy saving properties. For example it only needs to generate 3,600kW to deliver the required cooling power. On a conventional vessel of similar type and size 4,100kw would be required. While bow thrusters have been a standard feature on other vessels in the tanker fleet it was decided not to fit this equipment on the new generation of vessels. Mr Sarakinos says that with most port authorities using tugs there is no need. Plus power and fuel consumption is enhanced without them.

A Headway Oceanguard ballast water treatment system has been fitted. "We opted for this system as it is one of the few that meet United States and other international requirements. Another factor is the installation and projected operating costs compare very favourable with other systems on the market." The system uses a combination of electrocatalysis, ultrasound and filters. It is not chemical based.

The selection process took about a year



The vessel was built at China's GSI Shipyard (in Guangzhou). The vessel will operate worldwide and has a ballast water treatment system onboard. This will be run when in service and operational data will be shared with the manufacturer



By adapting the aft-hull design, a larger propeller could be installed

and saw the company draw up a shortlist of over 25 systems "some used chemicals, some ozone, some filters only, some are vortex". The feasibility studies were carried out by Sea Pioneer with input from class. *Tenacity* is the first vessel in the series to have ballast water treatment plant installed. Sea Pioneer intends to run the plant when the vessel is in service and to share operational data with the manufacturer.

A medium gas oil chiller unit allows the engine to switch between low sulphur distillate fuel and 380 centistoke heavy fuel. Starting and service air are provided by Sperre compressors.

Electric power plant is powered by three MAN B&W-Zhenjiang diesel generator engines of 960 kW each, which can be operated on 380 centistoke heavy fuel at 50°C and low sulphur distillate fuel.

One oil fired Alfa Laval Aalborg auxiliary boiler (25,000 kg/h) supplies steam for cargo system operation, cargo heating and the

engine room and one Alfa Laval Aalborg composite boiler (1,200 kg/h oil-fired part and 500 kg/h exhaust gas part at CSR load of M/E) supplies steam for general service as available at normal sea going condition. The Luzhou-Gola incinerator is fully compliant with Marpol regulations. Jowa supplied the oil discharge monitor and bilge water separator. The cargo area is protected by a Unitor fire protection system. Salwico fire and gas detection systems have also been specified.

Principal navigation equipment includes Kelvin Hughes navigation and GMDSS package; Yokogawa gyro compass/magnetic compass and auto pilot. Satellite communication is via an Inmarsat F satellite.

The accommodation caters for a complement of 34 mostly Filipino crew. Crew welfare has been prioritised. As well as generous accommodation and leisure amenities, subsidised Internet access and phone calls are provided. **TST**

