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BORNHOLM

MULTI PURPOSE GENERAL CARGO VESSEL FOR GERMAN OWNERS

Builders : Bodewes Shipyards B.V., Hoogezand, the Netherlands
Owners : Reederei Hermann Buss GmbH & Cie., Leer

The versatile 7800 DWAT Bodewes Multi Purpose General Cargo Vessel, is built to a design that has a number of features that makes it very interesting for shipowners. The flexibility of the Trader is almost without limits. To begin with, the payload varies from 6,700 to 8,100 tons.

The Trader can carry containers as well as bulk goods and dangerous goods. The Trader features two holds with dimensions that can vary according to the consultations made during the construction. For each voyage, these holds can be divided in the most econom-

ic way due to the movable bulkheads, which can be moved both in the horizontal and vertical direction.

This way, different kinds of load can be transported in a single voyage. Especially developed for the transport of dangerous goods, the explosion proof hold ventilation is capable of refreshing the air in the holds up to 10 times per hour. Built by Bodewes Shipyards Hoogezand - a Dutch shipbuilder with almost two hundred years of experience - the 7800 DWAT vessel definitely is a ship with unprecedented possibilities.

Trader Class

The most recent completion of a 7800 DWAT Trader-type vessel is 'Bornholm', a dry cargo vessel built for German owners. The 'Bornholm' was handed over to her owners Reederei Buss in April 2006. Reederei Buss is dedicated to maritime transportation and time chartering of vessels with high volume and low draft characteristics. The 'Bornholm' is a multi purpose general cargo vessel and the seventeenth unit completed in a series of the Bodewes Trader 7000 class designed by the yard. This newly built vessel - named after the Danish island of Bornholm - is the first in a series of 7800 DWAT vessels for the German owner. Before that six 4400 DWAT vessels were already delivered. The 'Bornholm' was christened by Mrs. Hastenrath and launched on 9 March 2006 in Hoogezand at Bodewes Shipyards B.V.

General Arrangement

'Bornholm' is a single-deck vessel designed for the carriage of a wide variety of dry cargoes ranging from general cargo to containers, steel coils up to 25 tons, forest products, paper and bulk cargoes as well as coal, grain and dangerous goods. The two holds are equipped with removable grain bulkheads. As such, the vessel's cargo capacity can be optimised for both short sea and deep sea services.

From stem to stern the hull arrangement below decks is as follows:

- Forepeak utilized for water ballast.
- Thruster room section incorporating the anchor chain lockers on tweendeck level.
- Deeptank utilized for water ballast and slops.
- Two dry cargo sections.
- Bunker compartment comprising three heavy fuel oil tanks.
- Engine room section with tweendeck.
- Aftpeak incorporating built-in potable water tanks and ballast tanks.

The cargo section between both cargo holds features a small compartment with entrances and ventilation tunnels. It also accommodates the airdryers. A double bottom runs the full length between fore peak bulkhead and aft peak bulkhead.

The cargo hold section is carried by a double hull. The double bottom and side tanks are separated in several compartments to provide the vessel a wide variety of ballasting and trimming possibilities. All double bottoms and side tanks are utilised as ballast water tanks except of the aft side tanks, which will be used for the storage of heavy fuel oil. The vessel's structure is protected with Sigma Coatings paint systems. An Ecol anti-fouling coating has been applied to the bottom of the hull. The tanks have been treated with high quality two-component coatings. Corrosion protection of the hull is with an impressed corrosion control protection (ICCP) system supplied by Corrosion.

Principal particulars

Length o.a.	118.85 m
Length b.p.	111.55 m
Beam mld.	15.20 m
Depth	8.45 m
Draught	7.05 m
Trial speed	14.7 kn

Tonnages

Deadweight	7,890 t
Gross tonnage	4,967 t
Nett tonnage	2,600 t

Tank capacities

H.F.O.	556 cu.m
M.D.O.	80 cu.m
Freshwater	50 cu.m
Ballast water	3,385 cu.m

Container capacity

In hold.	174 TEU
On deck	216 TEU
Total	390 TEU
14 ton Cont.	250 TEU

Classification

The 'Bornholm' has been designed and built to the rules and regulations of Lloyd's Register of Shipping, class notation: * 100A1 LMC, General Cargo Ship / Container Ship, Unrestricted Navigation, AUT - UMS, Heavy Cargo MON-SHAFT. The vessel is strengthened to the Finnish/Swedish Ice Class 1A



The navigation and communication equipment was delivered by Pro Nautas

requirements. The 'Bornholm' sails under the flag of Cyprus.

Accommodation

The 'Bornholm' is a single deck vessel featuring a raised forecastle deck and poopdeck. The superstructure - with five-tier accommodation section and wheelhouse on top - is carried on the aft deck. The captain's cabin, chief engineer's cabin and the office are situated on the captain's deck. The officers' deck accommodates the cabins for chief mate, second mate and second engineer. On the boat deck one deck lower are the cabins of four other crew members. The poopdeck accommodates the galley, the messrooms, the cook's cabin, and a spare cabin. The paintstore is located in the funnel. Climate and temperature control of the accommodation section is with a De Haan single-duct air conditioning system allowing individual control of the ventilation rate in each cabin.

Cargo Holds

The cargo hold section consists of two separate cargo holds, measuring 42.75 m x 12.65 m and 39 m x 12.65 m. Inner bottom plating and stiffeners of double bottom have been strengthened to cope with loads of 15 ton/sq.m (suitable for the carriage of heavy cargo).

The wall height of the cargo hold is approximately 9.40 m. One movable separation bulkhead will be delivered and can be positioned at 7 different positions. This bulkhead is divided into two parts. There will be hold ventilation through this bulkhead and steps for climbing will be foreseen on port- or starboardside. When not in use, this bulkhead will be positioned against the bulkhead between the two cargo holds. For handling the securing pins two workbaskets with electric tackles will be delivered for hanging underneath the gantry crane. They will be stored on the poopdeck in front of the deckhouse.

Container foundations have been arranged in the cargo hold in the tanktop for:

- 20 ft container stackloads (70 t)
- 40 ft container stackloads (74 t)

Navcom Package

Pro Nautas has been awarded with the order for the delivery and the installation of the navigation and communications package on board 'Bornholm'. Pro Nautas specialises in the design of systems for navigation, communications, automation, electrical power, propulsion and hydrographic survey applications. The scope of supply includes:

- one Decca Bridgemaster "E" 251/6 ARPA, X-Band radar system;
- one Decca Bridgemaster "E" 253/12 ARPA, S-Band radar system;
- one Transas Shipguard SSAS System;
- one Saab R4 Universal Automatic Identification System,
- one Saab R4 DGPS Navigator;
- one Saab R4 GPS Navigator;
- one LAZ 5100 echosounder;
- two Sailer satcom C systems;
- two VHF/DSC Sailor RT 5022 systems;
- one Navtex NT2000 system;
- one Fleet 77 system;
- one GMDSS A3 radio station;
- one Anschutz Standard 22 Compact Gyrocompass incl. repeaters;
- one Reflecta 1 Magnetic Compass;
- one Anschutz Pilotstar D digital autopilot;
- three Axis 30 Portable VHF GMDSS sets;
- one Consilium SALR1A Doppler log.

Engine Room

The propulsion plant consists of a MaK 8M32 medium-speed main diesel engine developing 3,840 kW at 600 rpm. The main engine runs on IFO 180. It is connected to the tailshaft through a Vulkan flexible coupling and a Renk gearbox, type HSU 800 C with a reduction ratio of 3.783:1. The prime mover is a four-bladed 3,900 mm Berg controllable pitch propeller. The gearbox is fitted with a PTO drive powering a Leroy Somer shaft generator. There are another two auxiliary generator sets and an emergency diesel generator, which is located on the boat deck.

The engine room systems include a heating system for the accommodation section and for heating of the fuel oil tanks. Engine room auxil-



The hatches are handled by a Coops & Nieborg gantry crane

ary systems further include Alfa Laval fuel oil and lube oil separators, air compressors, ballast pumps, a bilgewater separator, and a freshwater generator. Part of the engine room tanks is fitted with a bubble tank gauging system.

Course keeping and directional control is with a free-hanging flap type rudder. The Barke rudder is controlled by a two-ram steering gear with a proportional control system. Fitted in the fore ship is a Jastram fixed transverse thruster, type BU 60 F, featuring a four-bladed 1,230 mm diameter Jastram propeller. The thruster unit is driven by a 300 kW electromotor, and provides a thrust of 4.6 t.

Electrical Installation

The electrical installation was designed and installed by Alewijnse Noord. The electric power is supplied by the two auxiliary generators of 264 kW, one 348 kW shaft generator and an emergency generator of 70 kW. The auxiliary generators and the emergency generator are all composed of Cummins motors and Stamford alternators. The two auxiliary generators can run continuously in parallel. The shaft generator is utilised during sailing or dedicated to the 300 kW bow thruster with frequency drive. Shipboard power supply consists of a 3-phase 400V/230V 50Hz circuit. The automation is supplied by 24 VDC with 320 Ah batteries. Alewijnse took care of the electrical installation, incorporating the following equipment:

- complete electrical installation;
- fire detection installation;
- engine room alarm and monitoring installation;
- switchboards;
- bridge console, bridge wing consoles and ER console;
- shaft generator;
- bow thruster motor;
- bow thruster frequency drive;
- bridge nautical watch alarm system;
- central aerial system;
- navigation lights;
- window wipers;
- galley and laundry equipment;
- telephone installation;

- lighting fixtures;
- search light;
- general alarm/public address system.

Alarm & Monitoring

Alewijnse Noord also supplied the Alarm and Monitoring system for unattended machinery spaces. The Alarm System provides safe operation with unmanned engine room. In case an engine room alarm should occur the engineer on duty will be warned first, in his cabin or in the mess room. The duty engineer can be selected via the watchduty alarmsystem WGA03. The Rolf Janssen exhaust measuring unit AMW2 is integrated in the alarm system and calibrated for a MAK8M32.

Deck Equipment

Anchoring equipment consists of two 2,295 kg high-holding-power Pool TW bower anchors, each connected to 495 m of 44 mm diameter anchor chain cable. The forecastle carries two

combined windlass/mooring winches, each with a drum and warping head. On the aft ship two mooring winches are installed, each with a drum and warping head. The weight of the stern anchor is 970 kg and the length of the wire cable for the aft anchor is 130m. All winches are electro-hydraulic driven.

Fire-Fighting Equipment

Fire-fighting systems were supplied by MX Fire Protection and safety equipment by Datema. The safety equipment has been based on 12 persons occupancy. Portable equipment is in compliance with Class Rules and includes:

- portable extinguishers;
- hoses with spray nozzles;
- nozzles;
- fireman's suit with air breathing apparatus;
- line-throwing apparatus, rockets, lifesaving jackets etc.;
- life jackets;
- survival suits;
- medical chest and requirements of dangerous goods.

As fixed fire-extinguishing system, a CO₂ system has been provided in compliance with SOLAS requirements. The system consists of CO₂ total flooding installations for engine room, separator room and cargo hold. The installation for the engine room is served by a pneumatic activation system, placed in a control cabinet. The CO₂ fire extinguishing installation for the cargo holds consists of a pipeline with cargo hold nozzles.

The fire extinguishing installation is directly activated near the CO₂ cylinders. Installations for the carriage of dangerous goods include:

- explosion proof fans in cargo holds (with grating);
- CO₂ system on cargo holds, excluding smoke sampling;
- additional fire/safety equipment;
- chemical suits;
- signalling signs by decals.

Life-Saving Appliances

The deck crane, located at port side on the officer's deck, is fitted for the combined handling of the Hatecke free-fall lifeboat, the rescue boat

The propulsion plant consists of a MaK 8M32 medium-speed main diesel engine



and to handle the store hatch cover. A 15-person Hatecke free-fall GRP lifeboat is fitted on a cradle at the stern. Life-saving appliances further include two 15-person inflatable life rafts and a Hatecke rescue boat. A 6-person life raft is fitted on the forecastle.

Subcontractors and suppliers of equipment fitted on board the 'Bornholm'
(partial list)

- Alewijnse Noord**, Drachten ...: electrical installation; fire detection; alarm & monitoring; switchboards; bridge consoles; galley and laundry equipment; shaft generator; bowthruster motor; bowthruster frequency drive, navigation- and searchlights; telephone installation; window wipers
- Alfa Laval**, Utrecht ...: separators
- AMW-Marine**, H.I. Ambacht ...: *Renk* reduction gearbox; *Berg* propeller; *Vulkan Rato* flexible couplings
- Atlas Copco Ketting Marine Center**, IJmuiden ...: *Atlas Copco* air compressors
- Bendit Isolatietechniek**, Groningen ...: thermal, accoustical and fire retardant insulation
- Benes Machinefabriek**, Hoogezaand ...: rudder
- Boer Staal, De**, Uitgeest ...: steel plates
- Bosch Rexroth**, Boxtel ...: pneumatic control heads and control air seals
- Caldic Techniek**, Rotterdam ...: *Stamford* generators
- Centraalstaal**, Groningen ...: prefab steel sections kit
- Coops & Nieborg**, Hoogezaand ...: hatch covers; hatch cover gantry crane
- Corrosion & Water-Control**, Moerkapelle ...: impressed current cathodic protection (ICCP) system
- Cummins Diesel**, Dordrecht ...: auxiliary engines

The DVZ sewage treatment plant



Snijder Filtertechniek delivered the Wyckomar UV drinking water system

- Datema Delfzijl**, Delfzijl ...: lifesaving equipment; fire fighting, nautical and medical equipment
- Econosto**, Capelle a/d IJssel ...: valves & fittings
- Eefting Engineering**, Kolham ...: hydraulic- and pneumatic piping installation; HFO booster module; tank gauging system
- Expert**, Drachten ...: laundry equipment
- Fassmer**, Berne (G) ...: gangway
- Global Davit**, Bussum ...: combined stores / MOB crane
- Haan, v/h Gebr. De**, Hoogezaand ...: air conditioning; ventilation; sanitary installation
- Hatecke, Ernst**, Drochtersen (G) ...: free-fall lifeboat; MOB boat
- Helder & May**, Europoort RT ...: *Nautec SX A-60* floors; *Tefrolith FTG 35* with *Nautec FS* subfloors; tiled floors
- IHC Lagersmit**, Kinderdijk ...: Supreme stern tube seals and white metal bearings
- Imtech Marine & Offshore**, Rotterdam ...: galley range
- Intersona**, Heerde ...: noise and vibration calculations and measurements
- Janssen, Rolf**, Germany ...: *Aurich* alarm & monitoring system
- JVS Scheeps- en Industrie-techniek**, Papendrecht ...: *Jastram* bowthruster unit
- Kraaijeveld**, Sliedrecht ...: deck machinery
- Kroon**, Hoogezaand ...: *Inexa TNF* accom system; *Alvedoor* fire doors; ship's hardware
- Lloyd's Register of Shipping**, Rotterdam ...: classification
- Lubrafil**, Barendrecht ...: automatic selfcleaning fuel filters
- Leroy-Somer**, Soesterberg ...: shaft generator and bow thruster motor
- MacGregor**, Rotterdam ...: container fittings
- Machine Support**, Ridderkerk ...: main engine, gearbox and PTO alignment & mounting with *Epocast 36* and *Vibracor® SM* elements
- MaK (Nederland)**, Dordrecht ...: main engine
- Mx Brandbeveiliging**, Almere ...: fixed CO₂ system for engineroom and cargo holds including smoke detection
- Nautische Unie**, Delfzijl ...: liferafts
- Nicoverken Marine Services**, Schiedam ...: *Blücher Metal* stainless steel drainage system
- Noordhof Schilderwerken**, Kropswolde ...: painting
- N.R. Koeling**, Krimpen a/d IJssel ...: provision & selfcontained unit
- NRF**, Mill ...: boxcoolers
- PCC EuroValve**, Losser ...: valves & fittings
- Pro Nautas**, Leer (G) ...: navigation and communication package
- Reikon**, Spijkenisse ...: *Azcue* pumps
- Ruyter Dieseltechniek, De**, Sliedrecht ...: *Cummins/Stamford* generator sets

Scheen, Hoogezand: carpentry
Ship's Equipment Centre (SEC), Groningen: chocks and rollers
Sigma Coatings, Uithoorn: coating systems
Snijder Filtertechniek, Hasselt: *Separ* fuel filters;
Wyckomar UV drinking-water system
Theunissen, Malden: *Aqua Signal* lighting;
Pesch Seematz searchlights

Trinoxx, Hardinxveld-Giessendam: doors and windows
Vacon Benelux, Gorinchem: bow thruster frequency drive
VAF Instruments, Dordrecht: *ViscoSense*® viscosity control system
Velden Barkemeyer, Van der, Reinbek (G): *Barke* steering gear
Vulkan Benelux, H.I. Ambacht: highly flexible *RATO* couplings

Westfalia Separator, Cuijk: separators for fuel and lube oils
Winel, Assen: *Bolero* tank vent check valves; watertight musketeer doors
Wolfard & Wessels, Werktuigbouw, Foxhol: engine room installation
Wortelboer, Rotterdam: anchors & chains

GENERAL ARRANGEMENT

