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ORCANA

BARKMEIJER SHIPYARDS COMPLETES VERSATILE SINGLE DECK DRY CARGO VESSEL FOR SCHEEPVAARTBEDRIJF DE HAAN, DELFZIJL

Builders : Barkmeijer Shipyards, Stroobos, The Netherlands
Owners : Scheepvaartbedrijf de Haan, Delfzijl, The Netherlands

December 2006 saw the handing over of the 'Orcana' to her owners Scheepvaartbedrijf de Haan based in Delfzijl, The Netherlands. The vessel, built by Stroobos-based Barkmeijer Shipyards, is a versatile single-hold dry cargo vessel for unrestricted service. The multipurpose dry cargo coastal vessel is the eleventh in the 4500DWT series, and the fifth vessel operating on HFO 380cSt. The vessel has a total cargo capacity of 4,500 metric tons at a summer-draught of 5.68 m. Meanwhile Barkmeijer

Shipyards has already started the production for the twelfth vessel from these 4500-DWT general cargo vessels.

Classification

Equipped for unrestricted navigation and transport of all kind of dry cargoes, the vessel is capable for the carriage of containers. The 'Orcana' has been designed and constructed in compliance with the rules and regulations of Bureau Veritas, notation: I + HULL + MACH,

general cargo ship Unrestricted navigation, + AUT-UMS MON-SHAFT, Heavy Cargo 105kN/m², non-homload 150kN/m² (max block length 5m; minimum spacing between blocks 2m) STRENGHTBOTTOM. The vessel is also is equipped for the carriage of dangerous cargoes in bulk in accordance to SOLAS chapter II-2 Regulation 19. The tank top has been strengthened for the carriage of heavy steel coils and containers.

Noise & Vibration Reduction

In the design of the ship special attention has been paid to reduce the vibration and noise levels. The combination of a tunnel construction in the aft ship and a controllable pitch propeller made it necessary to develop a low noise high

skew propeller. The sea trial confirmed that all measures which have been taken in the design of the ship resulted in a very calm and quiet ship.

General Arrangement

The single-screw dry cargo vessel features a raised forecastle and poop and a radius transom stern. The fore ship section with bulbous bow accommodates the bow thruster room, the paint store and fore peak compartment. The box-shape cargo hold is equipped with two movable bulkheads and covered with a one-side-fixed-pontoon-type hatch cover system. The ballast lines are routed through the double bottom pipe trunk. The ballast tanks are treated with a special tank coating. On the two-tier deckhouse a wheelhouse is fitted with covered bridge-wings.

Principal Particulars

Built under yard number 314, the 4500DWT series vessel features the following main characteristics:

Principal particulars	
Length o.a.	89.99 m
Length b.p.	84.98 m
Breadth mld.	14.00 m
Depth.	7.15 m
Draught.	5.68 m
Service speed.	12 kts
Tonnage	
Deadweight.	4,500 t
Gross tonnage.	2,999 t
Container capacity	
In Hold.	102 TEU
On Deck.	48 TEU
Total.	150 TEU
Cargo hold	
Hold volume.	5,931.71 cu.m (209,601 cu.ft)
Tank capacities	
Water ballast.	1,839,00 cu.m
Potable water.	88,00 cu.m
Gas oil.	37,00 cu.m
Heavy Fuel oil.	150,00 cu.m
Lube oil.	7,00 cu.m

Accommodation

The accommodation is designed for a comple-



The navigational aids and electronic communications systems, supplied by SAM-Electronics

ment of 8 arranged over three decks. The accommodation includes a mess room, a galley, an office, some stores and one spare cabin. The complete accommodation is mechanically ventilated and climate controlled by an air conditioning system.

In the accommodation, all bulkheads and ceilings and their linings are in accordance to fire protection method SOLAS I-C. Further, A-0, A-60 and B-0 insulation has been used throughout the accommodation as required by SOLAS. The floating floor and wainscoting provide optimum acoustic insulation and comply with the regulations for seagoing ships.

Movable Bulkheads

The obstruction-free box-shape cargo hold has a capacity of 209,601 cu.ft and can be subdivided into separated hold sections by means of two movable bulkheads. This allows the carriage of a variety of cargoes including grain and other bulk cargoes, containers, steel coils and/or any combination of these cargoes.

The movable bulkheads, make Roden Staal, are of the corrugated single wall type with a strong beam at the bottom and top of the bulkhead. For positioning the movable bulkheads there are sliding slots fitted on the hatch coaming. On the lower side the grain bulkheads will be positioned by means of container stacking cones in the available ISO-sockets.

The 18 mm thick steel plate tank top has been strengthened with stiffeners allowing a maximum permissible load of 15 t/sq.m suitable for the carriage of a maximum container stack weight (point load) of 42 ton (TEU). For securing project cargo in the hold one tier of lashing eyes are fitted flush in the cargo hold side walls.

Hatch Covers

The ten pontoon type hatch covers are of the one-side-fixed-type, make Roden Staal, and allow a coaming deflection clearance of -20/+10 mm. The hatch covers are designed to carry one tier of containers of 15 ton line load and are fitted with dove tail foundations. The electrohydraulic travelling hatch cover crane, also make Roden Staal, handles both the hatch covers and the movable bulkheads.

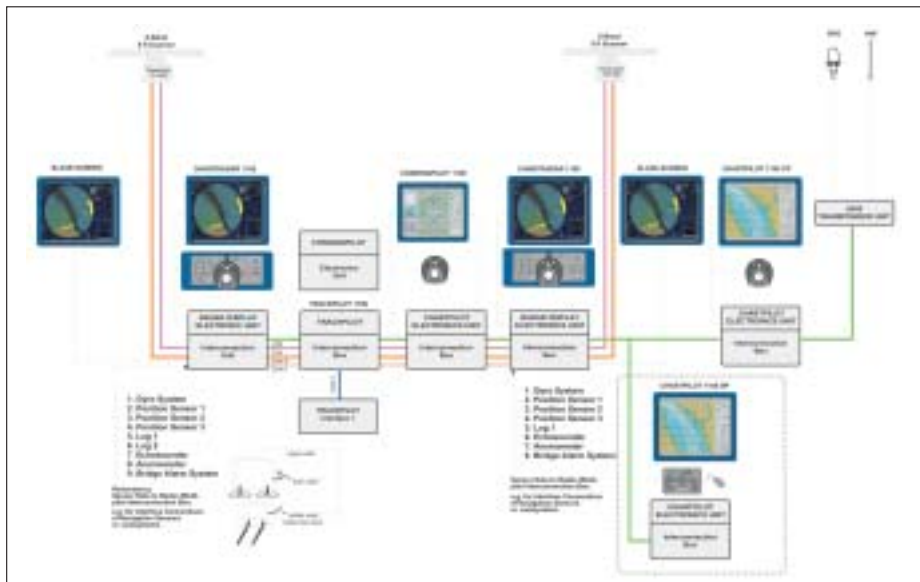
Propulsion Plant

The propulsion plant of the 'Orcana' consists of a MaK marine diesel engine, type 6M25 developing 1,800 kW at 750 rpm. The main engine is driving a Scana Volda four-blade high-skew controllable pitch propeller via a Scana Volda single-stage reduction gearbox with vertical offset. For actuation of the propeller pitch the hydraulic servo unit is integrated in the gearbox. The gearbox is fitted with a clutch in the primary shaft. Furthermore, the gearbox is fitted with a power-take-off which is driving the 400 kVA Motori Marelli shaft generator.

Course Control

Directional control is with a streamlined flap-type rudder actuated by a ram-type semi-proportional controlled steering gear, make Van der Velde Marine Systems. For optimizing ship handling a 250 kW electric driven Veth bow thruster unit is fitted. The electric motor of the bow

Lay-out of the SAM Electronics navcom package





The propulsion plant consists of a MaK marine diesel engine, type 6M25

thruster is directly driven by the shaft generator, through a frequency converter for speed regulation.

Auxiliary Power

Electric power is derived from a 400 kVA, 400 V, 50 Hz shaft generator. The shaft generator can, for a short time, run in parallel to take over the load of the main generator set or the emergency/harbour generator set. Both generator sets consist of a SISU-diesel engine, type 645 DSBIG and Stamford generator, type HCM 434C with an output of 210 kVA, 400 V, 50 Hz. The main generator set is placed in the engine room in a sound-absorbing casing. The main generator set and the emergency/harbour generator set are suitable to operate shortly in parallel mode for taking over the ship's load. The emergency/harbour generator set is fitted on the poop deck and is automatically started in case of a black out. Auxiliary engines were supplied by Veth Motoren, Papendrecht.

Bilge & Ballast System

Bilging, ballasting, deck washing and fire-fighting is served by two ballast pumps, two general service pumps and three ejectors, delivered by A. de Jong TH. One fiifi pump is placed forward in the bow thruster room. The bilge line, both ballast lines and the remote controlled ballast tank valves, which are fitted on the branch suction lines, are placed in the pipe tunnel amidships. The ballast system is remote controlled from a control cabinet in the engine room featuring a mimic diagram of the vessel's ballast system. One ejector is dedicated to serve the hold bilges in accordance with SOLAS requirements, the second ejector is serving the ballast tanks and engine room bilges. A third ejector is placed in the forecastle to serve the chain lockers and the bilges in the forecastle. In accordance to MARPOL regulations a 15 ppm bilge water separator is fitted, and is provided with an oil content alarm unit.

Deck Equipment

The vessel features a single anchor handling winch and a capstan. The Ridderinkhof wind-

lass forward is fitted with two chain wheels for 36 mm diameter U3 stud link chain cable and two warping heads of 360 mm diameter and handles two High Holding Power POOL TW fully balanced bow anchors each weighing 1,575 kg. Anchors and anchor chain cables were supplied by Wortelboer. On the aft ship a Legendijk telescopic store crane with a safe working load of 999 kg is provided to handle the stores and gangway.

Life-saving Appliances

For life-saving services, one combined rescue boat/life raft davit on starboard side and a life raft davit on port side are provided. Rescue boat and davit were supplied by Promac, Zaltbommel. Life-saving appliances further include four 12-person inflatable DSB life rafts and a number of personal live-saving equipment such as life jackets, immersion suits, life buoys and a set of emergency signals.

The electro-hydraulic travelling hatch cover crane



Wheelhouse

The spacious wheelhouse is carried on top of the deckhouse. The M/V 'ORCANA' has been equipped with the highly sophisticated NACOS System (Navigation and Command System) and GMDSS for regions A1+A2+A3.

The package of navigational aids and electronic communications systems, supplied by SAM Electronics Nederland BV, includes the following main components:

- one Integrated Navigation and Command System NACOS 35-5, with sensors, consisting of :
- two X-Band Chart Radar 1100 series systems, Scanners 1 x 5ft and 1 x 8ft , with extra video buffers for connection of extra Chart Radar slave screens;
- two ECDIS-systems / Chart Pilot-1100;
- one TrackPilot-1100, Track keeping system with dedicated Conning Monitor;
- one AIS unit, fully integrated with radar systems / DEBEG-3400;
- one Doppler-speed log / Consilium,
- one Echo sounder / DEBEG-4630;
- one GPS - Compass / DEBEG-2200;
- one GPS receiver / DEBEG-4422.

Gyro package:

- one Gyrocompass system / Anschuetz, Standard 22 G/GM with repeaters,
- one Magnetic compass system / Classen plath.

GMDSS RADIO Station to full fill the requirements of GMDSS to IMO/SOLAS 74 for sea area A1, A2, A3

- one MF/ HF SSB/DSC radio telephone / DEBEG-3105;
- two VHF/DSC radio telephones; with 4 extra remote handsets / DEBEG RT-5022;
- two Inmarsat-C terminals / DEBEG-3220C;
- one Inmarsat F-33 terminal;
- one EPIRB / DEBEG-3545;
- two Radar transponders system / DEBEG-5900;
- one Navtex / DEBEG-2902;
- three GMDSS handheld VHF sets / DEBEG SP-3300;
- one Iridium Sat. phone with SSAS add on kit.



The ballast system is remote controlled from a control cabinet in the engine room



Teh alarm- & monitoring system was supplied by Alewijnse Noord

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

- Ajax Fire Protection Systems,** Amsterdam: CO₂ installation
- Alewijnse Noord,** Drachten: electrical installation; alarm- & monitoring system
- Alfa Laval Benelux,** Breda: fuel oil and lub oil separator
- Arco Roosters,** Reuver: engine room gratings; steps
- Belkoned Marine Service,** Best: sea trial; speed & manoeuvring measurements
- Bloksma,** Almere: box coolers
- Börger Machinefabriek,** Hoogezaand: ventilation cowls & goosenecks
- Bosch Rexroth,** Boxtel: pneumatic ballast system & air controls
- Bureau Veritas,** Groningen: classification
- Caldic Techniek,** Rotterdam: Stamford generators
- Castrol Marine,** Rotterdam: lube oils
- Caterpillar Marine Power Systems,** Kiel (G): MaK main engine; flexible coupling & silencer
- Centraalstaal,** Groningen: prefab steel sections kit
- Chemetall,** Oss: Ampak cathodic protection
- Conoship International,** Groningen: stability calculations; tank sounding tables
- Datema,** Delfzijl: navigation- and search lights; LightPartner light system, fire fighting, life-saving appliances, fire extinguishers, medicines

- DESMI K&R Pompen,** Utrecht: pumps
- Dulasta,** Staphorst: bilge well gratings
- Econosto,** Leek: whistle controller
- Heatmaster,** H.I. Ambacht: fuel heating system
- Helmers Accommodatie & Hempel,** Vlaardingen: ballast tank coating work
- Interieur,** Sappemeer: carpentry; insulation work
- IHC Lagersmit,** Kinderdijk: Supreme stern tube seals
- International Paint,** Rhon: paint systems; tank coatings
- Intersona,** Epe: noise & vibration consultancy
- Jager,** Dokkum: rope reels
- Jong T.H., A. de,** Dordrecht: bilge ejectors
- Kroon,** Hoogezaand: ship's hardware; engine room tools
- Lagendijk Constructie,** Wemeldinge: store crane
- Leeuwen Jr's Buizenhandel,** Van, Zwijndrecht: steel pipes, welding bends, flanges, fittings and valves
- Materiaal Metingen Europe (MME),** Ridderkerk: Harbinger® aluminium gangway complete with ring platform and bulwarkladder
- N.R. Koeling,** Krimpen a/d IJssel: AC installation
- Promac,** Zaltbommel: Promac-Hatecke rescue-boat with davit; Promac-Scana Volda propulsion system & CP-propeller
- Recoma Technische Installaties,** Leeuwarden: airconditioning; ventilation; sanitary system
- Ridderinkhof,** Hasselt: windlasses, capstan

- Roden Staal,** Drachten: hatchcovers; hatchcover crane; grainbulkheads
- Repos,** Dokkum: name plates
- SAM Electronics,** Rotterdam: communications & nav aids systems
- Schutte,** Stadskanaal: manhole covers & rings
- Sperre,** Ridderkerk: starting air compressors
- Tehado,** Harlingen: booster unit
- Tjamme Vis Scheepsstoffering,** Hoogkerk: upholstery
- Trinoxx,** Hardinxveld-Giessendam: windows; portholes; weathertight doors; ventilation louvres
- Uittenbogaart, T.B.,** Rotterdam: B+V Turbulo® separator; Mergator sludge pump
- Valveco,** Ridderkerk: valves and pipe couplings
- Van der Velden® Marine Systems,** Reinbek (G): Barke® flap rudder and steering gear
- Veth Motoren,** Papendrecht: SisuDiesel/Stamford generator sets; Veth tunnel thruster
- Walinga,** Harlingen: rigging
- Weewer Isolatie,** Groningen: A-60 fire retardant insulation engine room
- Winteb,** Winschoten: ventilation check valves
- Winter, Jan,** Steenwijk: painting & tank coating
- Wismarer Korrosion Schutz,** Rostock (G): tank coating application
- Wolfard & Wessels Werkuigbouw,** Foxhol: complete engine room equipment, piping & installation; fuel heating system
- Wortelboer,** Rotterdam: anchors & anchor chain cables

The Sperre starting air compressors

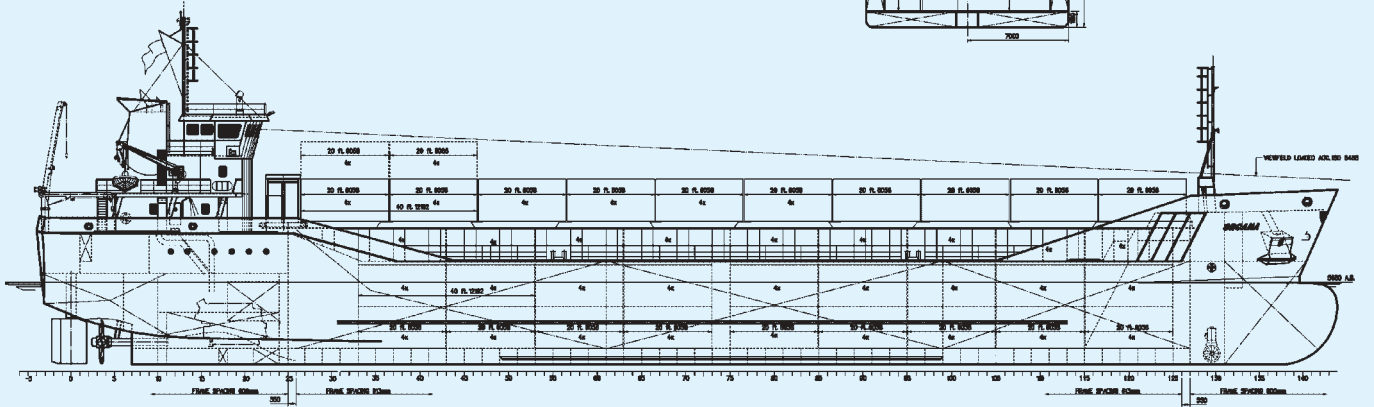
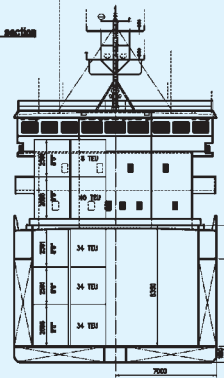


The Alfa Laval oil separator plant

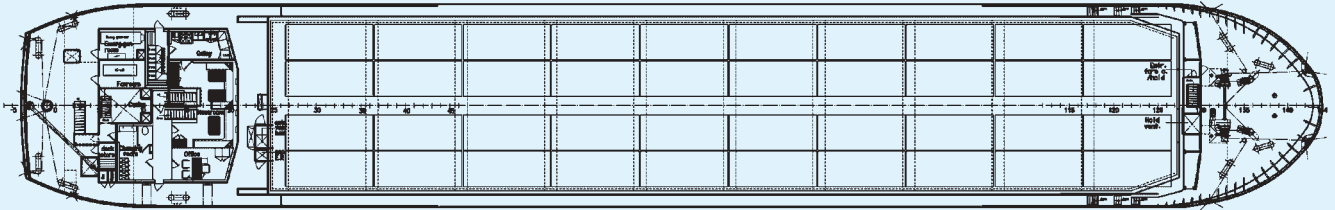


GENERAL ARRANGEMENT

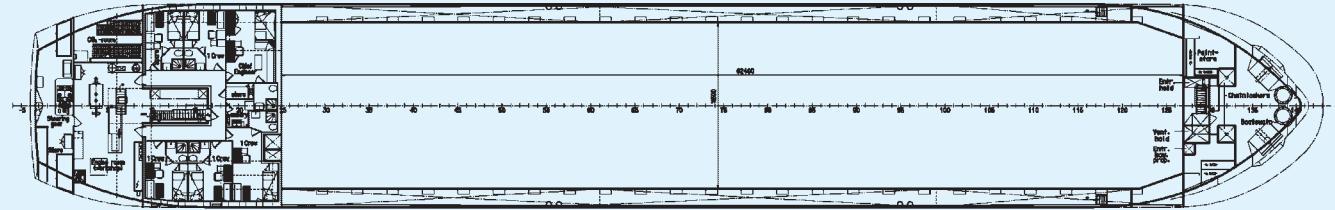
Deck section



Hatch covers



Main deck



Trunking

