



Photo by Flying Focus-Bussum, The Netherlands

LAUWERSBORG

ROYAL NIESTERN SANDER'S NEWEST IS QUIET GENERAL CARGO SHIP WITH HIGH PAYLOAD

Builders: Koninklijke Niestern Sander B.V., Delfzijl, The Netherlands

Owners: Wagenborg Shipping, Delfzijl, The Netherlands

The recently inaugurated newbuilding hull number 834, 'Lauwersborg', is the first ship of a series of four general cargo/container vessels, featuring a forecastle, raised quarterdeck and deckhouse. The vessel features two cargo holds, enclosed by a double hull construction and covered by weathertight pontoon type hatch covers. The KNS MP7350 is the lengthened version of the KNS MP6100. It has been designed and built by Royal Niestern Sander in cooperation with various subcontractors. The hull of the Lauwersborg has completely been built at the Royal Niestern Sander yard in Delfzijl.

Also her sistervessels will be constructed at the yard in Delfzijl. The design and equipment of the gearless vessel comply with: the requirements of the Netherlands Shipping

Inspectorate (NSI) for unrestricted trading

- the GMDSS A3 radiotelephony requirements
- the Bureau Veritas rules and regulations
- the Finnish/Swedish Ice Class 1A.
- the Saint Lawrence Seaways regulations

High payload

The 'Lauwersborg' has a high payload compared with ships of similar overall dimensions. This is achieved through a high block coefficient in combination with a narrow beam and a deep draft.

The design has a further advantage that the ship can sail without adding ballast when loaded with all but the lightest cargoes, thanks to the extra stability provided by the increased draft.

The relatively high block coefficient has the

drawback of a slightly less speed (around 13,5 knots in ballast condition). In cooperation with the noise and vibration specialists at Intersona, the construction and insulation of the accommodation were designed and a better exhaust damper was chosen for the main engine exhaust, resulting in a very quiet ship overall. Even in the usually problematic area on the bridge wings, the noise levels stay far below 70 dB(A). The cabins typically have noise levels around 53 dB(A) and at 55-57 dB(A) in the messrooms, the crew can enjoy their meals in peace and quiet. With a gross tonnage of 4695 GT and an installed propulsion power of 2970 kW, the ship is ideally positioned below the thresholds of 5000 GT and 3000 kW which have an impact on the required manning.



The wheelhouse has two pilot seats

Koninklijke Niestern Sander

In 1980 two famous and independent shipbuilding and ship repair yards joined forces and names: Royal Niestern Sander. The combination of various assets "skilled labour, alert management, excellent engineering and design capacity" ensured the new company a solid foothold for future operations in an ever changing and demanding shipbuilding market. Royal Niestern Sander's shipbuilding facilities include an inshore newbuilding yard, fully equipped for the construction of ships up to 140 m length and a maximum width of 16 m. Furthermore, a site located in the harbour of Delfzijl, with free access to the North Sea is ideally suited for the assembly of seagoing vessels up to app. 165 m length and a maximum width of 26 m.

Royal Niestern Sander has established an exceptionally high standard in design and construction of a variety of seagoing vessels and inland crafts such as dry cargo vessels, product and chemical tankers, container feeders, ferries, offshore vessels and navy support vessels. As an innovative trendsetter, the yard gained itself fame as creative designer and experienced builder of advanced and com-

plex vessels. Ordered by the towage and offshore industry some of the world's most powerful vessels have been constructed.

Royal Niestern Sander's repair facilities include an inland slipway with a length of 147 m and a lifting capacity of 1650 ton per ship and also numerous repair berths and abundant cranes.

Furthermore, in the harbour of Delfzijl with free access to the North Sea, two floating docks are positioned. Dock 1 features an overall length of 103.30 m, an internal width of 19.60 m and has a lifting capacity for ships up to 10,000 dwt. Dock 2 has an overall length of 176.50 m, an internal width of 27.00 m and is suitable for the accommodation of ships up to 20,000 dwt.

The repair yard of Royal Niestern Sander is capable to render all services required by a wide range of shipowners and the yard's working force has gathered experience in all disciplines of the complicated business.

The yard is currently investing in a new shipbuilding workshop. This building, with dimensions 60x22x18 m has a lifting capacity of 200 tons and will be in operation later this year. With this new facility Royal Niestern Sander

is able to built fore- and aftship blocks up to approx. 500 tons in a very efficient way next to the slipway.

General arrangement

The fore ship accommodates the forepeak, bow thruster room, a deep tank and chain lockers. The forepeak

space is situated above the fore peak and deep tank. The bow thruster room is situated between forepeak and deep tank, with a casing to the forepeak space. In the fore peak tank, two sufficiently large self-stowing chain lockers are located. Forepeak and deep tank are utilized as ballast tanks. In the fore ship a hold ventilation duct has been fitted. The hold ventilation duct and hold entrance are located in the aft part of the forepeak. A paint store is situated on port side in the forepeak. Entrance to the paint store is via a door in the forepeak bulkhead. Amidships the vessel features two completely box-shaped cargo holds and two hatchways. The fuel oil bunker tanks are located between the holds. The double bottom construction and side tanks run the entire length of the hold area. The tank top extends up to the shell plating. The main deck extends from the superstructure to the forepeak. On top of the main deck, void spaces on PS and SB have been placed from the forepeak until 10 m forward of the poopdeck.

The aft ship accommodates the engine room including service tanks and aft peak. The upper aft peak is used for water ballasting purposes. The engine room features service tanks in the double bottom section and underneath the platform deck. Side tanks are partially situated above the platform deck. Freshwater tanks are situated in the aft of the engine room.

Superstructure

The superstructure is situated above the engine room section. The maindeck accommodation spaces include a cook's cabin, the mess room, the galley, a changing room, a laundry and a provision store. Complementing spaces on this deck are separated by watertight bulkheads. These spaces include the emergency generator room, the

The MaK main engine puts out 2970 kW



A Stamford shaft generator is used when sailing





The gantry crane just picked up a hatch cover



The hold can be divided with grain bulkheads

steering gear room, an AC room, a CO₂ room, and a store with workshop facilities. Heating and ventilation of the accommodation is with a single-duct air conditioning system. On the raised quarterdeck level, the three-tier deckhouse provides a captain's cabin, a chief engineer cabin, a first mate cabin, 4 crew cabins, 1 double crew cabin, a technical space below the wheelhouse and an office. All cabins are fitted with private sanitary units. The carpentry has been designed and installed by Royal Niestern Sanders' carpentry department. On the Officers deck an easy accessible technical space has been fitted for various equipment. Aft of the deckhouse, the boat deck has been extended to create space for placing the MOB boat and life rafts, and the Officers deck has been extended to create space for the embarkation platform for the free-fall lifeboat. The funnel is separated from the deckhouse and placed at centreline aft of the deckhouse. On the raised quarter deck this structure provides a large store room on PS, a deckstore on SB and entrances towards engine room, emergency generator room and CO₂ room.

ISPS gate

On the raised quarter deck, the accommodation ladder ships' entrance and the access to the maindeck can be closed by means of a gate during stays in port. This makes the aft-ship not accessible without permission. The ISPS required guard could therefore be replaced by an intercom/telephone connection towards the watchman onboard.

Main Characteristics

The 'Lauwersborg' features the following main characteristics:

Principal particulars	
Length o.a.	122,34 m
Length b.p.	115,97 m
Breadth mld.	14.40 m
Depth	8.10 m
Draught max.	6.50 m
Hold capacity	323.588 cuft

Tonnage

Deadweight	7.433 t
Gross tonnage	4.695 t

Tank capacities

Ballast water	3.239 cu.m
Freshwater	.68 cu.m
Heavy fuel oil	.363 cu.m
Gas oil	.89 cu.m
Lube oil	.23 cu.m
Sewage/grey water	.21 cu.m
Sludge/dirty oil	.31 cu.m

Ice strengthened hull

In order to reduce the total weight, the vessel has been built partly of AH36 steel, allowing an increased loading capacity. The double bottom features a tank top of 15 mm thick steel plate. The tank top is constructed with longitudinal frames spaced at 650 mm.

The bottom is strengthened with floors on every second frame and 4 longitudinal girders on either side of the pipe tunnel. The complete construction makes the vessel feasible for heavy cargo of 15 ton/m².

The side tanks are constructed with longitudinal frames and web frames. An ice-framing belt of longitudinal frames stiffens the shell around the waterline. The fore ship is built with transverse frames with stringers in the forepeak. The bow thruster tunnel is incorporated into the shell and the centreline girder. The decks and the stringer deck are stiffened with cross beams and longitudinal girders. In the fore ship and the aft ship a gradual transition from the longitudinal frame system into the transverse frame system has been made. The deck is also stiffened with longitudinal frames and the aft ship is made with transverse frames. The reported excellent performance during ice navigation is obtained by the special shape of the fore ship and bulbous bow. The transom stern and the stem are locally reinforced to cope with push-tow services by icebreakers.

The stern includes a stern anchor for the Saint Lawrence Seaways. In the aft peak a 50 mm thick ice knife has been incorporated in the construction, protecting the rudder.

Dangerous goods

The vessel has been designed for the transport of bulk cargoes, general cargo and containers. There are two box-shaped cargo holds. The vessel is also equipped for the transport of several classes of dangerous goods. The cargo holds are therefore equipped with:

- an explosion proof mechanical ventilation system (six air changes per hour);
 - ventilation ducts fitted to the bottom of the holds;
 - a fixed manually operated CO₂ fire-fighting system fitted in the cargo hold;
 - a fixed sprinkler system in the first two hatches of hold 1.
 - separating bulkheads;
 - a hold bilge system according to the rules of the Netherlands Shipping Inspectorate (NSI) for dangerous cargo with a dedicated ejector.
- The non-explosion proof equipment in the cargo holds can be switched off totally by means of a key switch in the bridge console. The coamings are fitted with coaming support lashing plates for fastening deck cargo. The hatch covers can also be fitted with timber stanchions on each side. In the side/wing tanks flush mounted lashing eyes are fitted. For bulk cargo stowing purposes two transverse grain bulkheads are fitted in the holds, each existing of two parts. The bulkheads can be fitted at several positions in each hold. Both holds are mechanically ventilated with a maximum capacity of six air changes per hour on an empty hold. The holds are ventilated with each two pressure fans. In the midship on top of the bunkertanks, also two hold dehumidifiers are positioned.

The ventilation ducts on deck can be temporarily removed for the carriage of project cargo on deck which exceeds the length of one hold. This construction makes the ventilators very easily accessible for maintenance.

Pontoon Hatch Covers

The hatchways are closed by pontoon type hatch covers, make Rodenstaal. The hatch



The sewage treatment plant is from Hamworthy

covers are of box-type construction with closed bottom plates. The maximum permissible load is - in compliance with the load line convention requirements - about 1.7 ton/sq.m. The hatches are locked with stainless steel quick-acting cleats. The hatch covers are handled by means of an electro-hydraulic newly developed travelling hatch cover crane made by Rodenstaal. The covers can be stacked up to a maximum height of seven covers. The travelling hatch cover crane is used to lift and transport the pontoon hatch covers as well as for moving and setting up the grain bulkheads.

Main engine heat recycled

The propulsion plant incorporates a medium-speed MAK 9M25C main diesel engine developing 2.970 kW at 750 rpm. The main engine has been resiliently mounted and runs on 380 cSt heavy fuel oil. The main engine is fitted with a Flender Bruinhof reduction gearbox. The gearbox is fitted with a PTO drive for the shaft generator. Main engine, reduction gearbox, cp-propeller and generator are directly coupled without clutches. The propulsor consists of a Wartsila Lips, four-blade cp-propeller with a diameter of 3.400 mm.

The main engine is equipped with a high temperature (HT) and a low temperature (LT) cooling water system, incorporating box coolers. In the HT system a heat exchanger and a circulating pump have been integrated which can be used both for preheating the main engine and for heat recovery when the engine is running. This heat is used for the heating of the bunker tanks. When the vessel is in port, heat is derived from the auxiliary diesel engine or emergency generator. Also the central heating system and air conditioning system derive their heat from this system. Fuel oil end heaters and separators are heated electrically.

The engine room systems have been installed by Marine Service Noord.

Navigation equipment

The wheelhouse, situated on top of the deckhouse, is equipped with a complete Imtech BlueLine integrated bridge system based on a three work station system. It incorporates full radar, ECDIS and a Conning and Heading



Sandfirden delivered the gensets

pilot. The complete navcom package is supplied and installed by Imtech/Radio-Holland Netherlands. For the equipment, the owner, yard and Eekels have designed a special ergonomic wheelhouse console built by Eekels. Searchlights were supplied by Theunissen Technical Trading, along with a SeaTeleCom communication suite.

Integrated Alarm & Monitoring

For this newbuilding Eekels has delivered an integrated alarm monitoring and control system. The system is an alarm system for all engine room alarms, which monitors the main engine and includes dead man's alarm function. Alarms are forwarded to the bridge, the cabins, the VDR installation and the owners work station PCs on the bridge and inside the ECR. It provides safe operation of the vessel during unmanned engine room operations. The system consists of 90 on/off channels, 30 analogue and 14 analogue exhaust gas temperature channels.

Steering Gear

The steering equipment consists of a Bot rudder

der in spade design, handled by a frequency controlled-type steering engine. The maximum rudder angle is 60 degrees to either side. The rudder is controlled by a Rolls Royce Tenfjord SR 722 steering gear. The steering gear can be controlled by means of the non follow-up tillers situated on the bridge and in the bridge wings, and from the autopilot. The fitting of a transverse bow thruster tunnel, makeVeth, enhances manoeuvring capacity at slow speed with a 1,200 mm diameter fixed pitch propeller. The 350 kW Veth bow thruster unit is electrically driven, powered by the shaft generator, and is frequency controlled from the bridge.

Shaft generator

Auxiliary power is derived from a Stamford shaft generator type HCMF, power output 510kVA, driven through a PTO on the reduction gearbox and two diesel driven generators. The two auxiliary generator sets are placed in the engine room and consist of 200 kW Sisu 645 DSBIG diesel engines, with Leroy Somer generators, and a power output of 231 kVA. In the emergency generator

SEC delivered the mooring gear



The steering gear is from Rolls Royce



IMPAS installed the engine room piping

The RWO bilge water separator



room a 110 kW Sisu 620 DSRG emergency diesel engine drives a 120 kVA Leroy Somer generator. The gensets are equipped with a stand-still heating system.

The electrical installation consists of the following mains:

- 3-phase 400VAC, 50 Hz, for power supply;
- 3-phase 230VAC, 50 Hz, for lighting, small systems and emergency systems;
- a 24VDC circuit for instruments.

In case of a "black out" of the shipboard power mains, the 230 V emergency lighting will be automatically switched on. It will be switched off automatically as soon as the on board power supply returns on-line.

The complete electrical installation was supplied and installed by Eekels Elektrotechnik. Eekels Elektrotechnik's scope of supply included: switchboards, control desks, alarm & monitoring systems, frequency controlled bow thruster motor, all lighting fixtures, a PA/General Alarm system, an emergency telegraph system, fire detection system, etc.

Bilge and ballast systems

The engine room accommodates two bilge/ballast pumps and a general service pump serving the bilge, ballast, fire fighting and deck washing system. A general service ejector and a hold bilge ejector have also been installed in the engine room. The bow thruster room accommodates a fire-fighting pump. A bilge-collecting tank and a bilge water separator have been installed in the engine room.

The bilge system complies with the rules of Bureau Veritas and with the requirements of the Netherlands Shipping Inspectorate (NSI). According to these requirements the bilge system of the holds allows the transport of dangerous cargo. Both ballast pumps are used as bilge pumps. The main bilge system is also connected to the general service ejector. For the hold bilge system a separate ejector has been installed, driven by the general service pump. In the bow thruster room a bilge ejector is installed. The bilge ejector can be driven by the fire-fighting pump in the bow thruster room or by the general service pump via the deck washing line. Separator room auxiliary systems further include a HFO fuel oil system with Alfa Laval separators, a hot water system for heating purposes, a dirty oil collecting system, a sanitary system incorporating a hydrophore with two pumps and an electric boiler, and a starting air system comprising two air compressors.

Life-Saving Appliances

Two 13-person Viking life rafts are located on the boat deck, one on each side. The rafts are placed on cradles fitted with hydrostatic release devices. One 6-person life raft is located on the foreship aft of the breakwater. In accordance to NSI requirements a rescue boat, make Hatecke is placed on the boat deck. The rescue boat is fitted with an 18.5

A stern anchor is fitted for navigation on the Great Lakes



kW (25 hp) outboard engine. A 13-person Hatecke GFF 4,9M Free Fall Lifeboat with hydraulic recovery frame is fitted aft of the superstructure.

The personal life-saving appliances include:

- eight survival suits, ARO V40, including emergency light and reflecting strips;
- four lifejackets, SOLAS approved, with reflecting strips, whistle and emergency light;
- eight life buoys with reflecting strips;
- two electric life buoy lights with bracket;
- two wooden life buoy containers for light/smoke signals;
- two combined MOB light/smoke signals, including bracket;
- two 30 m long floating life buoy lines;
- one line-throwing appliance in drum, including four rockets and lines;
- twelve red parachute flares in watertight containers;
- two 9 m long embarkation ladders with forerunner.

Fire-Fighting Equipment

Ajax Fire Extinguishing Systems supplied a CO₂ extinguishing plant for cargo hold and engine room, a locally operated separate CO₂ bottle for the separator room, a Flexifog hotspot fire fighting system and a sprinkler system in the forward two hatchcovers of hold 1. The cargo holds are equipped with a smoke sampling system.

The CO₂ flooding system for the engine room is operated by means of a pneumatic control system. The main control valve is located in the CO₂ room. The required number of cylinders and the main control valve is operated by a pneumatic control system. An audible alarm is activated in the engine room when the door to the CO₂ control cabinet opens. A switch on this door will automatically stop the engine room ventilation.

The CO₂ system for the cargo hold is operated mechanically, from inside the CO₂ room. The main control valve and the closing valves on top of the cylinders are opened manually.

The vessel's fire alarm system consists of:

- one fire alarm centre on the bridge with branches;
- nine smoke detectors placed in the engine room, steering gear room and emergency generator room;
- five smoke detectors in the accommodation alleyways;
- six manual fire alarms at the exits;
- fifteen temperature sensors fitted in the cabins and the provision storage;
- an alarm on the engine room alarm panel, in the messroom and in the chief engineer's cabin;
- audible alarm in the engine room.

The fire alarm system is coupled to the vessel's general alarm system.

Deck Equipment

The ship is equipped with two high-holding power Pool-TW bower anchors. Two combined windlass/mooring winches handle the anchors. The aft ship carries one dedicated mooring winch and one combined winch for the stern anchor and mooring.

The anchor/mooring winch on the aftship is equipped with a warping head, a mooring drum and a wire drum for the stern anchor. The winches are powered by a high-pressure hydraulic system, of which the power pack is on deck. In the bulwark fore and aft, roller fairleads are positioned according Saint Lawrence Seaways regulations.

Conclusion

The 'Lauwersborg' is the first in a series of four sister vessels to be built for Wagenborg Shipping. The next in line will be the 'Lingeborg', to be delivered in February 2008. At the time of writing, the 'Lauwersborg' had just completed her maiden trip to Finland with captain Huib van der Mijle at the helm. The crew was reported to be very satisfied with the performance and the comfort onboard the vessel.

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

Ajax Fire Protection Systems, Amsterdam	fixed CO ₂ system for engine room/cargo hold; smoke sampling system cargo holds; local appl water mist system engine room objects
Alfa Laval Benelux, Breda	fuel- and lube oil separators; freshwater cooler
Atlas Copco Ketting Marine, Ijmuiden	compressors; oil injected rotary screw air compressor
Benes Machiniefabriek, Hoogezand	rudder
Bloksma, Almere	box coolers
Bosch Rexroth, Rotterdam	complete ballast control system
Bot-Groningen, Groningen	rudder
Boer Staal, De, Uitgeest	plates & bulb flats
Bureau Veritas, Rotterdam	classification
Brusselle Marine Industries, Nieuwpoort (B)	mooring equipment; windlass; capstan
Caldic Techniek, Rotterdam	Stamford generators
Cappellen Consultancy, Van, Papendrecht	noise & vibration consultancy
Centa Nederland, Stellendam	CENTAX-55-GSS3, PTO elastic coupling with classification
Coops & Nieborg, Hoogezand	pontoon-type hatch covers; grain bulkheads; hatch cover travelling crane
Corrosion & Water-Control, Moerkapelle	impressed current cathodic protection system (ICCP)
Datema Delfzijl, Delfzijl	life-saving appliances
Eekels Elektrotechniek, Kolham	complete electrical installation; fire detection system; galley & laundry equipment; communication systems
Flender Bruinhof Marine, Rotterdam	reduction gearbox
GEA, Millingen a.d. Rijn	heat exchanger
Graaf Schildersbedrijf, De, Groningen	paint application
Haan, v/h Gebr. De, Hoogezand	air conditioning; central heating; sanitary systems

HMC Hydrografic and Marine Consultants, Almere-Stad	loading computer	bulkheads; deckrigger (gantry crane)
Hatecke, Ernst, Drochtersen (G)	free-fall lifeboat; rescue boat; davit	
Helder & May, Europoort RT	Nautec subfloors; synthetic floor	Rolls-Royce Marine Benelux, Pernis RT
Impass, Westerbroek	pipings for engine room and hull	Tjenford steering gear
Intersona Adviesbureau, Heerde	noise and vibration calculations; sea trial measurements	RossmarkWaterbeheer, Ede
Kroon Technische Groothandel, Hoogezand	ship's hardware; engine room tools; manhole covers & rings	RWO bilge water separator
Leroy-Somer, Soesterberg	generators	electric motors
Lubrafil, Barendrecht	automatic fuel filter	Ship's Equipment Centre (SEC), Groningen
MaK (Nederland), Dordrecht	main engine	anchors; anchor chain cables; mooring equipment; windlass; capstan
Marine Service Noord, Westerbroek	engine room installation	loading computer
Materiaal Metingen Europe (MME), Ridderkerk	sacrificial anodes; impressed current	SEC Davits, Nieuwegein
Meblomor, Czarnków (P)	WT doors	davit
MX Brandbeveiliging, Almere	CO ₂ fire extinguishing system	Sigma Coatings, Uithoorn
NRF, Mill	box coolers	coating systems
N.R. Koeling, Krimpen a/d IJssel	main AC for accommodation & control room	Sandfirden Technics, Den Oever
Radio Holland Netherlands, Rotterdam	Navais communication systems;	Sisu Diesel emergency/harbour generator set
Recoma Technische Installaties, Leeuwarden	AC; central heating; sanitary system	flexible couplings
Reikon, Spijkenisse	Azcue pumps; Gefico freshwater generator	Stromag, Roosendaal
Roden Staal, Drachten	hatchcover system; pontoon hatchcovers; tweendeck / grain	Theunissen Technical Trading, Malden
		Pesch Seematz searchlights; SeaTeleCom communication equipment
		Trinoxx, Hardinxveld-Giessendam
		doors, windows & portholes
		VAF Instruments, Dordrecht
		ViscoSense & ProFlow
		Veth Motoren, Papendrecht
		Veth tunnel thruster with e-motor
		Viking Life-Saving Equipment, Zwijndrecht
		liferrafts & life saving appliances
		Vulkan Benelux, Hendrik Ido Ambacht
		flexible couplings
		Wartsila Propulsion Netherlands, Drunen
		controllable pitch propeller installation with seals & bearings
		Winel, Assen
		vent check valve; WT doors
		Winteb, Winschoten
		vent check valve
		Witt, Jan de, Bussum
		Dampa ceilings; Isolamin bulk head panels; Momec doors;
		Wortelboer, Rotterdam
		anchors & anchor chain cables

