TugeZine

all about tugs

50 shades of Bogacay...

vol. 3 **nr. 15**

Alternatives . . . .

Whatever one thinks of energy transition and reducing carbon footprints the fact is that these subjects have gained a dynamic of its own. Freely translated: jump aboard the moving train or be left behind.

The problem of course being which part of the train you want to be in. For shiphandling tugs a hybrid propulsion system could be the optimum for the time being. Obviously the use of fossil fuel will be greatly reduced but it is still fossil. All-electric is a possibility where tugs are operating within a limited area and shore-power is available. Hydrogen is a clean product the production of which, however, requires enormous quantities of electricity. Apart from that hydrogen requires storage under high pressures. To make it green, the electricity required must be sourced from non-fossil fuel driven generating plants.

Methanol seems to be emerging as at least a transitional fuel. It is a liquid fuel carried in hull-integrated tanks and there is no need for large scale vessel modifications. In its purest form there are no sulphur oxides (SOx) emitted. The NOx and PM emission is lower than diesel. Methanol is also biodegradable. On in con-side it is highly corrosive and the energy density is around 50% of that of diesel therefore requiring double the tank capacity of that for diesel.

Another fuel now being looked at is ammonia. Zero carbon emission but it comes with some serious issues that have to be solved in the sphere of safety and technology. Challenges to overcome are toxicity, combustion properties, N2O emission and ammonia slip. It is also highly corrosive.

It will be interesting to see what will be the final solution for small craft like tugs. My guess is that for dedicated shiphandling tugs the fuel of the future will be determined on a port by port case, i.e. the locally most economical solution based on local availability.

Job van Eijk (editor)

Front Page:
The tug HAYDEN GRACE is the first of a new design put into the market photo: courtesy Robert Allan Ltd

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“Hayden Grace”

In November, 2022, *Hayden Grace* was successfully delivered to her owners. This is the first of Robert Allan’s RApport 2600 design to be constructed.

by TDI Tugboat Publications

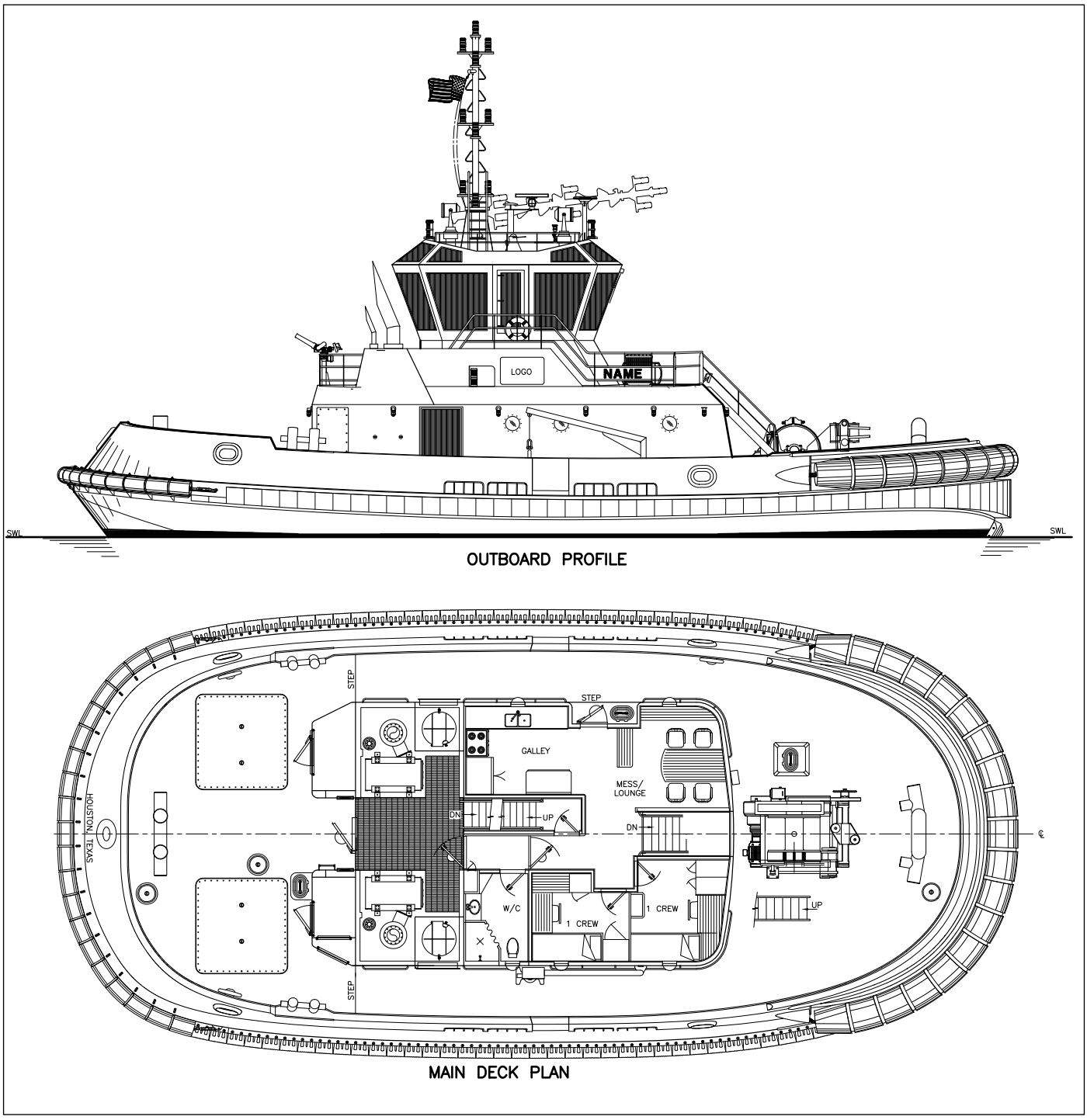
The tug was constructed by **Master Boat Builders Inc.** of Coden, Alabama. **Bay-Houston Towing** has a further two tugs of this type on order at Master Boat Builders slated for delivery in 2023. Another three of the same design were ordered from the yard by **Suderman & Young**. Meanwhile, *Hayden Grace* was put to work at Galveston.

Dimensions are 25,91 (oa) x 11,73 (mld) x 5,07 m. Draught is 4,6 m. Tonnage is below 400 (International) and below 200 (US Regulatory). The hull is protected at the bow by one tier of 36” / 18” (91,4 / 45,7 cm) OD/ID cylindrical fender at main deck level with a 20” (50,8cm) x 18” (45,7 cm) W-fender below. The same size W-fender is continued along the sheer lines of the main deck. At the stern 18” / 9” (45,7 / 22,8 cm) OD/ID cylindrical fendering is fitted.

Main engines are 2x Caterpillar 3512-E-HD with an output of 2.213 bhp each (4.426 bhp total) at 1.600 rpm driving two **Schottel** SRP-430-FP azimuthing thrusters fitted with 2.200 mm diameter propellers mounted in the stern. The main engines are to US Environmental Protection Agency Tier 4 and IMO Tier III standard for emissions. A selective catalytic reduction unit has also been fitted. Bollard pull is 52,5 tonnes. Speed is 12,5 knots.

Auxiliary power is provided by two identical **John Deere** 4045-AFM-85 gen sets, each with a capacity of delivering 99 kW 480V, 3-Phase at 60 Hz. Tank capacity: fuel 132 m^3, fresh water 15,8 m^3. The towing gear consists of a single-drum, high-performance hawser winch and an A-staple on the fore deck. The aft deck is fitted with an H-bitt for emergency towing.

HAYDEN GRACE - showing lay-out of main deck. Note extra fender down to the water line below the bow fenders *photo: courtesy Robert Allan Ltd*



General Arrangement HAYDEN GRACE *drawing: courtesy Robert Allan Ltd*

Onboard accommodation is available for 6 persons. The superstructure contains two single-berth cabins for respectively Master and Chief Engineer, a galley, mess and communal sanitary facilities. The lower deck has two double cabins, storage rooms and service spaces. The wheelhouse with its large windows offers 360-degree visibility, with excellent views of the working deck.

The tug is classed ABS ✠ A1 Towing Service, ✠ AMS, and USCG Sub-Chapter M. The tug will operate on the US Gulf coast primarily carrying out shiphandling duties.

HAYDEN GRACE *photo: courtesy Robert Allan Ltd*

HAYDEN GRACE - note stern fendering *photo: courtesy Robert Allan Ltd*

FRANCES E. HADEN still in the current fleet seen in approx 1993. Built in 1967 there is a marked difference in the development of shiphandling tugs over the past 55 years illustrated by the brand-new HAYDEN GRACE *photo: Nico Jonker*

CHLOE K is a Z-Tech 24-60 design. The tug was built in 2013 at Leevac Shipyard. With dimensions of 24,4 x 11,6 m the 60 tbp tug is fitted with Schottel azimuthing thrusters in the stern
photo: courtesy Robert Allan Ltd

Built in 2018 the 30,0 x 13,0 m tug delivers 81,5 tbp via its two Schottel azimuthing thrusters. MARK E. KUEBLER is a Z-Tech 30-80 design *photo: courtesy Robert Allan Ltd*

Z-Tech 30-75 WESLEY A at work. She is a product of Main Iron Works. The 30 x 12 m tug was delivered in 2007
photo: courtesy Robert Allan Ltd

MATTHEW K is a 4.300 bhp reverse tractor. The 30,5 x 11,6 m tug is fitted with Rolls-Royce azimuthing thrusters. She was delivered in 2000 by Main Iron Works *photo: Jan Plug*

Bay-Houston Towing Co

Owner of the newly delivered tug Hayden Grace is Bay-Houston Towing, a family run company that has been around for over 125 years.

by TDI Tugboat Publications

Bay-Houston Towing has its roots back in the 1890's when Capt. W.D. (William Douglas) Haden purchased a steam tug to operate in Galveston Bay. Earlier he had purchased a schooner and in addition to running this vessels he also ran a towpath where horses towed schooners up the Cedar Bayou when there was insufficient wind to navigate themselves. In 1914 the Houston Ship Channel was opened were Bay Towing provided the first tugs. In 1925 Capt. Haden purchased Buffalo Bayou-dan Ryan Towing co. and renamed this company Houston Towing Co. A year later the port of Corpus Christi opened for business and again Bay Towing provided the tugs. In 1948 – four years after his father passed away - C.R. Haden merged Bay Towing Co. and Houston Towing Co. into Bay-Houston Towing Co. Today, the company operates one of the most modern fleet s of shiphandling tugs in the U.S. Still a family-owned company their tugs serve the ports of Houston, Galveston, Texas City, Freeport and Corpus Christi.

Their current fleetlist numbers 25 tugs with another two on order. The oldest tug in the fleet is the 1967-built *Frances E. Haden* but no less than 16 newbuild tugs have joined the fleet since 2000.

Name	built	bhp	tbp ahead	tbp astern	prop configuration	design
under construction 1	2022	4.426	n/a	n/a	reverse tractor	RApport 2600
under construction 2	2022	4.426	n/a	n/a	reverse tractor	RApport 2600
Hayden Grace	2022	4.426	52,5 mt	n/a	reverse tractor	RApport 2600
George M	2020	6.772	84,4 mt	75,57 mt	reverse tractor	Z-Tech 30-80
Cecil M	2019	6.772	84,4 mt	80,50 mt	reverse tractor	Z-Tech 30-80
Cooper K	2019	6.772	85,3 mt	78,03 mt	reverse tractor	Z-Tech 30-80
Conolly M	2019	6.772	83,3 mt	77,09 mt	reverse tractor	Z-Tech 30-80
Mark E. Kuebler	2018	6.772	81,4 mt	75,98 mt	reverse tractor	Z-Tech 30-80
Laura B	2016	5.150	61,9 mt	52,16 mt	reverse tractor	Z-Tech 24-60
David B	2016	5.150	62,5 mt	52,73 mt	reverse tractor	Z-Tech 24-60
H Douglas M	2016	5.150	60,1 mt	52,07 mt	reverse tractor	Z-Tech 24-60
Zyana K	2016	5.150	60,8 mt	53,83 mt	reverse tractor	Z-Tech 24-60
Chloe K	2013	5.150	60,5 mt	51,72 mt	reverse tractor	Z-Tech 24-60
Hunter M	2009	6.300	75,4 mt	68,81 mt	reverse tractor	Z-Tech 30-75
Lexie M	2009	6.300	75,1 mt	72,28 mt	reverse tractor	Z-Tech 30-75
Wesley A	2007	6.300	75,4 mt	75,03 mt	reverse tractor	Z-Tech 30-75
Audrey	2008	6.000	74,9 mt	n/a	reverse tractor	
Matthew K	2000	4.300	49,2 mt	45,04 mt	reverse tractor	
Haden II	1999	3.900	52,1 mt	41,73 mt	twin screw / flanking rudders	
Harris II	1996	3.900	52,3 mt	38,37 mt	twin screw / flanking rudders	
Andrew K	1990	3.900	47,9 mt	39,83 mt	twin screw / flanking rudders	
William M	1989	4.000	47,1 mt	41,73 mt	tractor tug	
Mark K	1980	3.070	38,5 mt	25,86 mt	single screw / flanking rudders	
Captain W.D. Haden	1980	3.900	47,6 mt	42,86 mt	twin screw	
C.R. Haden	1977	3.900	51,4 mt	37,65 mt	twin screw	
Philip K	1976	3.900	57,7 mt	44,36 mt	twin screw	
Frances E. Haden	1967	1.700	15,6 mt	11,48 mt	single screw	

Notes: TugeZine uses the term 'reverse tractor' for tugs with azimuthing thrusters aft and the towing winch on the fore deck. Sometimes this type of tugs is fitted with a second towing winch aft, mostly for distant towing purposes. To operate in the 'tractor' mode the tug therefore has to run astern. They are also known as (azimuthing) stern drive tugs, or ASD's which strictly speaking indicates the azimuthing stern drives but without a forward winch. A true 'tractor' tug has the thrusters forward of the point of application of the towing force. Consequently it has the winch on the aft deck. A Tractor tug (note first letter) indicates a Voith Schneider tractor tug.

William M *is the former* C. Tractor 1 *(Chouest) acquired in 2005.* Audrey *is the former* Rosemary McAllister *chartered in 2010 as* Rosemary. *In 2017 renamed* Audrey.

CAPTAIN W.D. HADEN seen here in approx 2000 is a 3.900 bhp twin screw tug delivered in 1980 by Halter Marine, New Orleans. Dimensions are 33,0 x 10,4 m, engine output main engines total 3.900 bhp

photo: Jan Plug

HARRIS II dates from 1996 when she was delivered by Main Iron works. It is a twin screw fixed-pitch propeller tug fitted with flanking rudders. Dimensions are 30,0 x 10,4 m

photo: Mac Mackay

ANDREW K - built 1990 - is a 48 tbp twin screw tug fitted with flanking rudders. Dimensions are 27,0 x 10,4 m. Engine output totals 3.900 bhp

photo: coll. Job van Eijk

C.R. HADEN is a 1977-built 51 tbp twin screw tug. She was built by Todd Shipyard. Dimensions 29,3 x 9,8 m. Propulsion by two fixed-pitch propellers with 3.200 bhp (total) main engines

photo: Hans Hoffmann

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ARKTUR was built in 1993 at Gorokhovetskiy Sudos. Operator is Ilyichyovsk Sea Port, Ukraine. Twin screw, total main engine output 1.604 bhp. 182 GT

GENNADIY SAVELYEV is owned by Yuzhny Port Authority, Ukraine. The ASD 2810 tug was built in 2010 by Damen Shipyards Galati. Total main engine output 4.200 bhp. 60,2 tbp

KAPITAN NEZAVITIN ex Bazalt was built in 1982 by Hollming OY, Finland as one of a series of 7. BAZALT (Black Sea Shippng) and GRANIT (Port of Odessa) ended up in Ukraine. Dimensions are 39,60 (oa) / 38,20 x 12.00 mld x 7,08 m. Draught 6,10 m. Fitted with c/p prop in steerable nozzle. 5.040 bhp / 75 tbp

KEELBY, ex SVITZER KEELBY, ex ADSTEAM KEELBY-2007, ex REDCLIFFE-2005, ex W.J. TROTTER-2003 was built in 1986 by Carrington Slipways for account of Howard Smith subsidiary Queensland Tug. 34,00 (oa) / 32,5 (wll) x 10,82 x 5,40m. Draught 5,20 m. 4.800 bhp, 55 / 62 tbp. Reverse tractor tug fitted with Ishikawajima Duckpeller azimuthing thrusters. Main engines 8-cyl Yanmar 8Z-280-ET. One of a series of four the others being KEERA, AUSTRAL SALVOR and WAMBIRI. All were fitted for deepsea salvage work but employed as shiphandling tugs. Ukraine flag

P&O STAR is the former POSH HUMILITY built in 2011 by Yuexin Engineering in China. Reverse tractor tug fitted with Schottel azimuthing thrusters in the stern. Total output 5.438 bhp, 64,5 tbp forward, 62,7 tbp running astern. Dimensions are 32,0 x 11,6 m. Winches forward and aft. Owner P&O Maritime, operating at Yuzhny Port, Ukraine

KUTTABUL is a product of Australian Shipbuilding Industries, Fremantle. She was delivered to the owners McIlwraith McEachern in 1983. In 1985 to Howard Smith, intention was to rename her as HERON. To HoSmith subsidiary Gladstone Tug however without renaming. Dimensions 32,92 (oa) / 32,69 x 10,82 x 5,42 m. Main engines 2x Niigata 8L-275X total output 4.200 bhp. 55 tbp. Currently registered with Champion Shipping DMCC, UAE. Ukraine flag. 2015 or 2018 sold, 2018 changed to Ukraine flag. Owner P&O Maritime

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Icelandic Tugs

GRETTIR STERKI (1) was owned by Togskip at Seltjarnarnes, Iceland. Dimensions are 30,3 x 8,4 m. Main engines 2x Caterpillar 3516-DITA. Twin Lips c/p propellers. Fitted with a 100-tonne Kraaijeveld winch. 210 GT. Built 1998 by Damen Shipyards. Ex AFRIK PETREL. The tug was one of a series of three sisters acquired by Skipaþjónusta Íslands. The others are HERKULES ex AFRIK PUFFIN, ex LAMNALCO PUFFIN and KOLBEINN GRÖN ex AFRIK PELICAN ex LAMNALCO PELICAN. They arrived from West Africa in Iceland on board ROLLDOCK SUN in December 2018 and were transferred to Icelandic Ship Registry on 21 February, 2019. GRETTIR STERKI was mostly used to push the bunkering barge BARKUR. In October, 2020, she was sold by Ice Tugs to Lead Marine Contractors at Chaguaramas, Trinidad & Tobago, as LEADERSHIP flying the Panama flag. To complicate matters, HERKULES on 12 November, 2020, was renamed GRETTIR STERKI. She had not been operational since her arrival in Iceland but upon renaming was started up as pusher for the barge BARKURINN

photo: Capt. Hilmar Snorrason

Faxaflóahafnir sf. (the Associated Icelandic Ports) was established on 1 January 2005. The company is responsible for harbour activities in Gamla höfnin í Reykjavík (the Old Reykjavík Harbour), Sundahöfn, Grundartangi and in Akranes, as well as facilities for smaller boats in Borgarnes. The company owns four tugs: MAGNI (85 tbp), HAKI (39,5 tbp), LEYNIR (12,8 tbp) and THJÓTUR (6 tbp). HAKI is a Damen Stan Tug 2208 delivered in 2006. 22,62 (oa) x 8,44 (oa) x 3,74 m. Draught aft 3,69 m. Engine output 2.720 bhp total

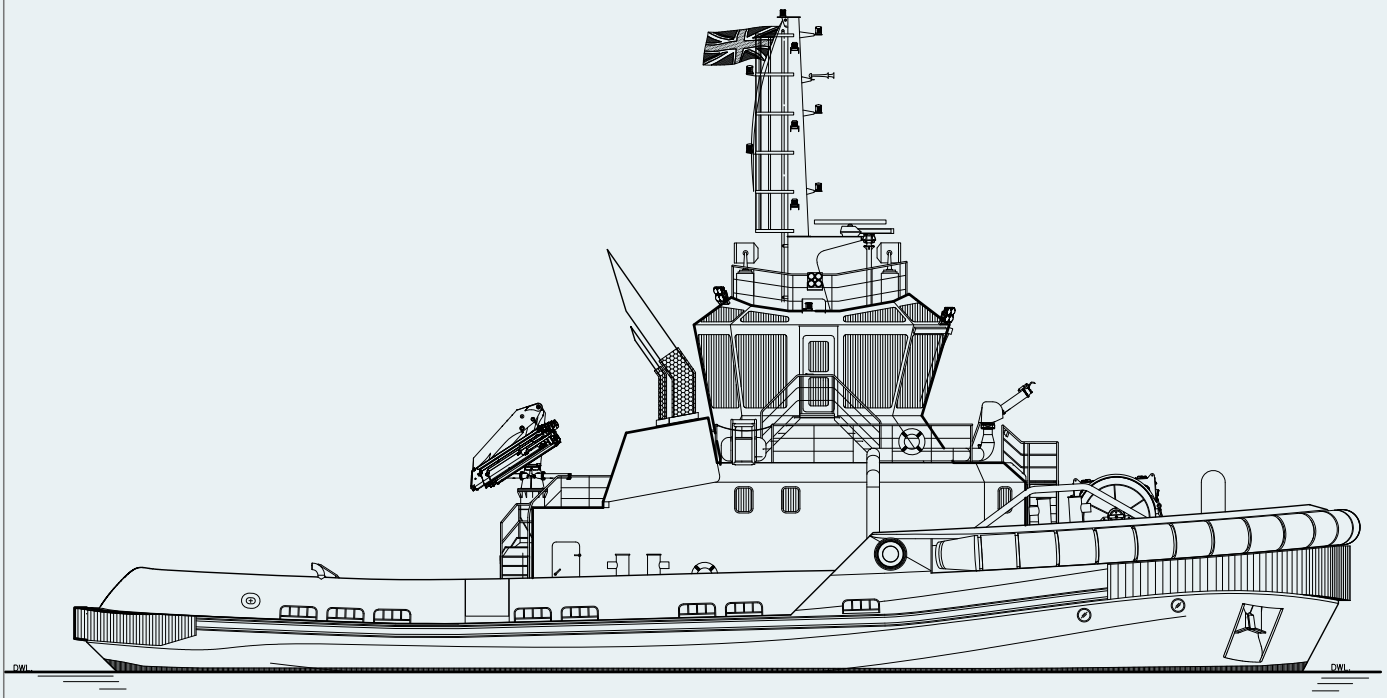
photo: Capt. Hilmar Snorrason

LEYNIR is a Damen Stan Tug 1605 delivered in 2000. 18,85 (oa) x 5,69 (oa) x 2,51 m. Draught 2,10 m. Total engine output 950 bhp. Listed owner is Akraneshöfn, Akranes

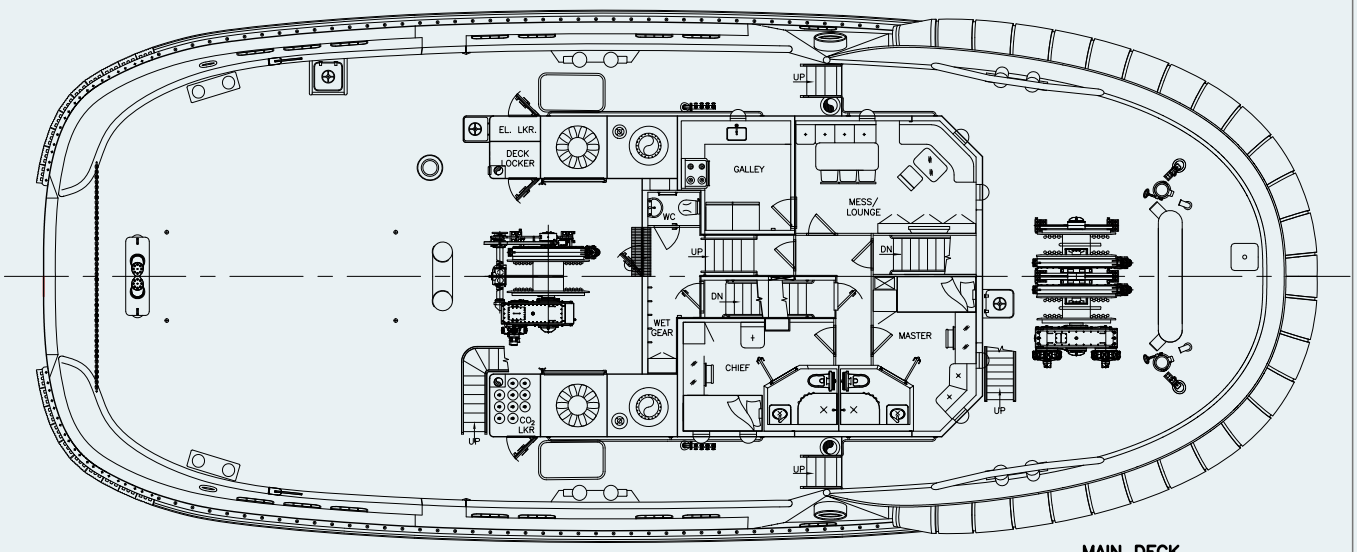
photo: Capt. Hilmar Snorrason

TOGARINN (ex Boluda's SERTOSA DIECIOCHO) was owned by Skipathjonusta Islands EHF. Acquired in 2016. The tug was built in 1977 by Enrique Lorenzo, Vigo. Dimensions 33,5 x 8,9 m. B&W Alpha diesels total output 3.800 hp. Single Lips c/p prop. In 2020 towed from Reykjavik destination Belgium for scrap named DYNAMI and flagged at the Seychelles. Instead arrived at Bolnes near Rotterdam. Sold in August 2021 to unnamed Panamanian interests. Sailed for Colon but returned next day with engine problems. Crew disappeared and vessel left abandoned at the Lek Harbour, Rotterdam. Vessel detained by Port Authority, tanks emptied and superstructure boarded up. Later removed to lay-up berth at Ridderkerk

photo: Capt. Hilmar Snorrason

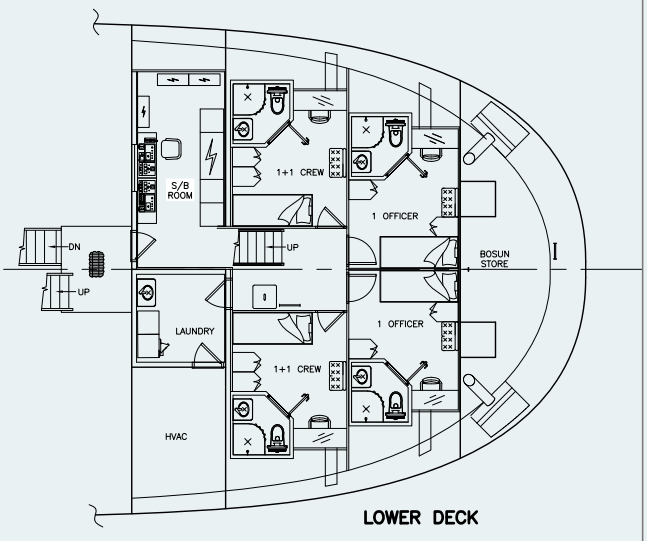


OUTBOARD PROFILE



MAIN DECK

ODIN OF SCAPA *photo: coll. Job van Eijk*



LOWER DECK

General Arrangement FREYJA and sisters *drawing: Robert Allan Ltd*

“Freyja” for Scapa

The Orkney Islands Council delivers marine services from the oil port of Scapa Flow that hosts multiple ship to ship transfer operations of crude oil and vessels serving the Flotta oil terminal, to the major harbours of Kirkwall and Stromness.

by Job van Eijk

Freyja of Scapa is the third new tug built by Sanmar Shipyards for Orkney Islands Council. The tug reached her new home in the Scapa Flow after completing a 3.500 nautical mile delivery voyage from the Sanmar Tuzla Shipyard.

Like its previously delivered sister tugs *Odin of Scapa* and *Thor of Scapa* – delivered in September, 2020 - the new tug is of the RAstar 3200SX design by Canadian naval architects Robert Allan Ltd adapted to Sanmar’s requirements. Sanmar markets the tug as the Kocacay class. The tugs are designed to provide the levels of performance and seakeeping ability that is essential when operating in extremely challenging conditions such as those often found in the seas around Orkney.

Dimensions are 32 (oa) x 13 (mld) x 5,35 m. draught 5,5 m max. Tonnage: 497 GT, 149 NT. Main engines are two high-speed marine diesel Caterpillar 3516C engines, each producing 2.350kW at 1.800 rpm (4.700 kW / 6.392 bhp total) driving Kongsberg US-255-CP azimuthing thrusters with 2,8 m diameter c/p propellers. Bollard pull 78 tonnes ahead. Free running speed 14,3 knots. The protective fendering at the bow consists of one tier of 900 mm OD x 550 ID cylindrical fender at the main deck level, with 48-30 W fenders between the raised forward deck and the knuckle. Hollow 300 x 300 “D” fender provide protection at the main and forecastle sides and sheer lines. 48-30 W type fendering is used at the stern.

Towing gear consists of a DMT escort winch on the bow and a DMT towing winch aft, with MacGregor Triplex towing pins aft. Two manually operated fifi monitors are fitted. Firefighting capability is to FiFi-1 standard with self-protection water-spray installation. Tank capacity: fuel oil 162 m^3, fresh water 20 m^3 , sewage / black water 9 m^3. The superstructure houses an entrance lobby, the galley, mess, cabins with ensuite sanitary space for the Master and Chief Engineer and a laundry. The lower deck contains one plus one double berth cabins with shared sanitary space and two single cabins with ensuite toilets.

The wheelhouse is designed with a single split control station which provides maximum all round visibility and exceptional visibility to the bow and side fendering.

David Sawkins, Deputy Harbour Master Strategy and Support of Orkney Islands Council, said: “We are as delighted with the quality of the new tug as we were

FREYJA OF SCAPA *photo: Sanmar Shipyard*

KINLOCH was one of two sisters that were the first tugs to serve the Scapa terminal. The fire tower was added prior to commencement of operations *photo: coll. Job van Eijk*

HARALD replaced the J.P. Knight vessels *photo: coll. Job van Eijk*

with the original two, which have been working hard in Scapa Flow and around Orkney since their arrival in October 2020. It is already apparent that *Freyja of Scapa* is going to be as busy given the ongoing increased activity in our waters. The new tugs allow us to continue to move with the times, ensuring a first-class service to our clients."

Scapa

Scapa Flow is a body of water in the Orkney Islands. The area is sheltered by the islands of Mainland Orkney, Graemsay, Burray, South Ronaldsay and Hoy. Scapa Flow was a major base for the Royal Navy during the First and Second World Wars, but the facility was closed in 1956. The anchorage has a maximum depth of 60 m, with most of it being 30 m. Scapa Flow hosts an oil port - the Flotta Oil Terminal – opened in 1977. Ship-to-ship transfers of crude oil products also take place whilst the world's first ship-to-ship transfer of LNG took place here in 2007. Flotta, an island on the edge of Scapa Flow, was selected as the location for the terminal. The facility covers about one sixth of the island.

Orkney Towage Company Ltd. was formed on 21 April, 1976, to provide towage services for the Flotta terminal. Shareholders were **J.P. Knight** (49%) and **Orkney Islands Council**. Anthony Knight was appointed Managing Director. The 38 tbp J.P. Knight tugs *Kinloch* and *Kessock* had been built especially for the Orkney job. They entered service in 1974, before Orkney Towage was formed. In 1978 a third tug – *Kintore* – followed. In 1989 the older pair were replaced by replaced by the 55-tpb stern drive tugs *Einar* and *Erlend*. In 1992 *Kintore* was replaced by the 55-tbp stern drive tug *Harald*. It was around this time that J.P. Knight withdrew as a shareholder even though Knight remained on the Board as a member until 2004. As an aside, by the mid-1980's the Knight tugs had been transferred in the registry to their subsidiary **Caledonian Towage & Marine Services Ltd.**, a company that was focussed on the work in the northern waters. The triple-screw 3.000 bhp tug *Keston* occasionally was called in as a relief vessel when one of the tugs was away for a docking period

Tug duties include the berthing and sailing of oil tankers and gas tankers from the Jetty and Single Point Mooring, the berthing and sailing of oil tankers involved in Ship-to-Ship operations and escort duties for oil tankers arriving and departing Scapa Flow. When not required in Scapa Flow the tugs are available for third party use.

The 410 GT / 1989-built *Einar*, 410 GT / 1990-built *Erlend* and the 411 GT / 1992-built *Harald* were named after Earls of Orkney, namely Einar Sigurdsson, Erlend Thorfinnsson and Harald Maddadsson. The names of the new tugs are a link to Norse mythology as Odin is the god of wisdom, poetry, death, divination, and magic whilst Thor is the god of thunder and lightning, associated with strength, storms, hallowing and fertility. The names were chosen following a public vote with people being asked to cast their vote for four groups, each containing three names. In all, 566 votes were cast. **Freyja** is a goddess associated with love, beauty, fertility, war, gold, and magic for seeing and influencing the future. Her father was Njörd, the sea god.

KESTON in absence of one of the three Scapa tugs acted as the relief tug for Scapa. With a triple-screw configuration she was an unusual vessel. The crane aft of the fire tower remained until later in her career. In 1979 this was still fitted *photo: Jack Gaston*

Sources: various press releases, Orkney newspaper articles, J.P. Knight by Cock Peterse and Jaap Bijl published in Lekko NL 352 and 353, files Job van Eijk

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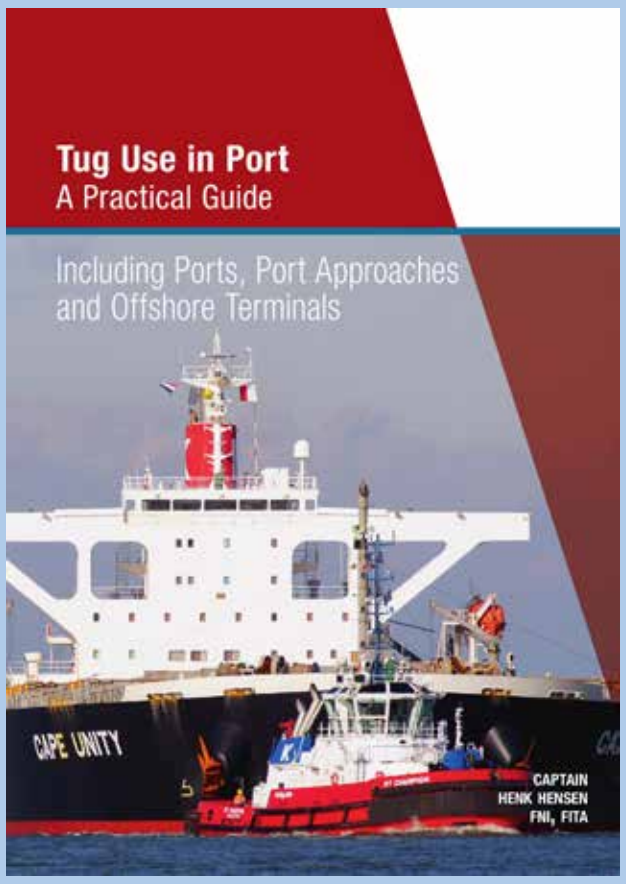

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Fifty shades of Bogacay

In late 2011 Sanmar contracted Robert Allan Ltd to provide a new design for a compact but powerful shiphandling tug. The new product arrived in the market in 2013. 10 years later the 50th example is delivered to the owners.

by TDI Tugboat Publications

Robert G. Allan (r) in Turkey discussing construction details on board SANMAR 4, the first Sanmar-built RAL design *photo: Sanmar Denizcilik*

The new tug is a customised version of Robert Allan's RAmparts design. It was in fact based on the RAmparts 2500-W but updated for Sanmar's production and marketing objectives and including ideas to improve the basic design. The new design became the **RAmparts 2400-SX** which Sanmar markets under the class name '**Bogacay**'. Consequently all tugs in the series are launched with the name *Bogacay* followed by a number.

Bogacay I incidentally was the 100th tug built by Sanmar Shipyard. This first tug of the series was purchased by the 'launching customer' Gemport. They renamed the tug *Zeycan Y. Bogacay II* was taken up in Sanmar's own tug fleet the advantage of which is that new designs can be tested under operational conditions for a longer period than just the trial run. As Sanmar is not averse to sell almost brand-new tugs from its own fleet, this creates opportunities for potential customers as well.

The design

The hull is essentially the same as the Ramparts 2500W hull first introduced for Italian operator Rimorchiatori Riuniti. Standard RAmparts class characteristics include good dead rise for improved thruster performance, modest side flare, a half-raised forecastle deck for good sea keeping, gently rounded deck line in plan to ensure that the tug can safely and easily come alongside and remove itself from an attended ship at speed. It also has the conically shaped double chined stern unique to all Robert Allan Ltd. designs which ensures that the tug can run astern at high speeds and maintain good control and directional stability. The hull is under the 24m rule length for load line and tonnage conventions. The design also centred around low-manning and therefore a high standard of machinery automation.

Sanmar requirements

Customization to suit Sanmar requirements involved incorporating solutions allowing a set of options to be offered to clients. Also, adaptions had to be made for optimizing production efficiency when under construction in the Sanmar yards.

Sanmar's planned **propulsion** range required the ability to install azimuthing thrusters of different sizes to enable bollard pulls of 50, 60, 70 or – somewhat

SVITZER HANNE, ex BOGACAY II working at Freeport, Bahamas, on 1 December, 2019 *photo: Ko Rusman*

Sanmar's Ali Gurun speaking at the naming ceremony for SVITZER AMSTEL, ex BOGACAY XII, 30 August 2016 *photo: Job van Eijk*

ASYAPORT KUMBAG (ex BOGACAY XIV) is one of two sisters delivered to Asyaport, Turkey
photo: Sanmar Shipyard

KITTIWAKE on 3 June, 2017, arriving at the end of her delivery trip to the U.K. *photo: David Dodds*

later – 75 tonnes. Incidentally no 50 tbp boat was ever delivered so this was dropped at an early stage. Rolls Royce US-205-FP was used while for the 60 tbp tug, US-255-FP for the 70 and 75 tbp. The same shaft line and same diameter drive well was to be used for all three options. Also the same engine bed had to be able to fit both Caterpillar 3512-C-HD and 3516-C-HD engines with the required power levels to generate the three required bollard pulls. The design must also be prepared to accept optional box cooling.

As far as **towing gear** was concerned the same deck foundation had to be suitable for fitting a double drum winch, a split drum winch or a single drum winch. Standard was an electrical DMT TW-E250kN twin drum winch with each drum fitted with 135 m of 40 mm diameter synthetic tow rope. Brake capacity of the winch was 150 tonnes. The aft deck was standard fitted with a Data Hidrolik DTH-70-130P or DTH-90-135P. Also the ability to install an optional aft winch must be incorporated in the design. Likewise the seating for the towing staple – either the single or double aperture versions – must be such to suit the three winch types. Also the option to fit or retrofit an escort winch and escort staple must be in-built in the design.

Options required for **fire-fighting** must be readiness to fit optional FiFi-1 standard gear which also required (optional) c/p thrusters. The main fire pump was driven by a dedicated Caterpillar C-32. Capacity of the pump as per standard 2.800 m^3 / hr. Two remote-operated FFS foam / water monitors came with this option.
Another option was for FiFi-½ standard. In that case the 1200 m^3 / hr fire pump was driven from a clutched flexible coupling to the front of the port main engine. A single FFS foam / water monitor came with this option.

Optional deck equipment offered was a marine grade hydraulic knuckle boom / folding boom 80 tm Palfinger 11001 crane with a maximum reach of 10 m. Also optional were hydraulic tow pins of a size suitable to accommodate the available bollard pull.

Standard specifications
The RAmparts 2400-SX has dimensions of 24,40 (oa) x 11,25 (mld) x 4,38 m with a maximum draught of 5,20, 5,60 or 5,70 m depending on choice of thrusters. The hull is protected by ship-handling **fenders** at the bow comprising an upper row of 800 mm diameter cylindrical fender and a lower course of W-fender.

Sanmar's CEM CEVEN (left) and Targe Towing's Tom Wooley signing the order for BOGACAY XXVI to be named KITTIWAKE
photo: Job van Eijk

launch name	current name	kW	bhp	tbp	built	flag	current owner
Bogacay	*Zeycan Y*	3.530	4.800	60	2013	Turkey	Gemport
Bogacay II	*Svitzer Hanne*	3.530	4.800	60	2014	Peru	Svitzer
Bogacay III	*Svitzer Tyne*	3.530	4.800	60	2013	U.K.	Svitzer
Bogacay IV	*Eren Enerji III*	3.530	4.800	60	2015	Turkey	Eren Enerji
Bogacay V	*Shaheen 2020*	3.530	4.800	60	2015	UA Emirates	P&O Drydocks World
Bogacay VI	*Palaemon*	4.000	5.440	67	2014	Turkey	Egeport
Bogacay VII	*RR Turchia*	4.000	5.440	70	2014	Italy	Rimorchiatori Riuniti
Bogacay VIII	*Seaspan Raptor*	4.700	6.392	80	2015	Canada	Seaspan
Bogacay IX	*Ocean Kingston Pride*	4.700	6.392	80	2015	Jamaica	Groupe Ocean
Bogacay X	*Hercules*	4.480	6.092	75	2015	Sri Lanka	Sri Lanka Shipping Co.
Bogacay XI	*Seaspan Harrier*	4.480	6.092	75	2016	Canada	Seaspan
Bogacay XII	*Svitzer Amstel*	3.530	4.800	60	2015	Netherlands	Svitzer
Bogacay XIII	*Asyaport Barbaros*	3.530	4.800	60	2015	Turkey	Asyaport
Bogacay XIV	*Asyaport Kumbag*	3.530	4.800	60	2015	Turkey	Asyaport
Bogacay XV	*Marintug IV*	3.530	4.800	60	2015	Turkey	Marintug
Bogacay XVI	*Jabal Yabsa*	4.200	5.712	70	2016	UA Emirates	Port of Fujairah
Bogacay XVII	*Jabal Al Bidiya*	4.200	5.712	70	2016	UA Emirates	Port of Fujairah
Bogacay XVIII	*Jabal Al Aqqah*	4.200	5.712	70	2016	UA Emirates	Port of Fujairah
Bogacay XIX	*Garip Y*	4.200	5.712	70	2016	Turkey	Gemport
Bogacay XX	*Ivindo*	4.200	5.712	70	2016	Gabon	Sarep Gabon SA
Bogacay XXI	*Bogacay XXI*	3.530	4.800	60	2016	Turkey	Sanmar Towage
Bogacay XXII	*Svitzer Monte Cristi*	4.200	5.712	70	2016	Dominican R.	Svitzer
Bogacay XXIII	*Svitzer Catuan*	4.200	5.712	70	2016	Dominican R.	Svitzer
Bogacay XXIV	*MIP 2*	3.530	4.800	60	2016	Turkey	Meksin International Port
Bogacay XXV	*Bedia Safi*	3.530	4.800	60	2016	Turkey	Safi Port
Bogacay XXVI	*Kittiwake*	3.530	4.800	60	2017	U.K.	Targe Towing
Bogacay XXVII	*Superman*	4.200	5.712	72	2017	U.K.	SMS Towage
Bogacay XXVIII	*Marintug III*	3.530	4.800	60	2017	Turkey	Marintug
Bogacay XXIX	*MIP 3*	3.530	4.800	60	2016	Turkey	Meksin International Port
Bogacay XXX	*Celal Safi*	3.530	4.800	60	2016	Turkey	Safi Port
Bogacay XXXI	*SAAM Valparaiso*	4.200	5.712	70	2018	Panama	SAAM Towage
Bogacay XXXII	*Citta di Salerno*	3.530	4.800	60	2017	Italy	Rimorchiatori Salerno Srl
Bogacay XXXIII	*Eren Enerji II*	3.530	4.800	60	2018	Turkey	Eren Enerji
Bogacay XXXIV	*Arechi*	3.530	4.800	60,3	2019	Italy	Rimorchiatori Riuniti
Bogacay XXXV	*Galluzzo*	4.700	6.392	75	2019	Italy	Rimorchiatori Napoletani
Bogacay XXXVI	*Marintug VI*	4.200	5.712	70	2018	Turkey	Marintug
Bogacay XXXVII	*Peterel*	4.200	5.712	70,6	2019	U.K.	Targe Towing
Bogacay XXXVIII	*Bogacay XXXVIII*	4.200	5.712	70,3	2019	Turkey	Sanmar Towage
Bogacay XXXIX	*Queensferry*	4.200	5.712	71,8	2020	U.K.	Ineos
Bogacay XL	*SAAM Palenque*	4.200	5.712	72	2020	Panama	SAAM Towage
Bogacay XLI	*Ste Anne*	3.530	4.800	60	2020	Seychelles	Seychelles Port Authority
Bogacay XLII	*SAAM Albatros*	4.200	5.712	70	2021	Peru	SAAM Towage
Bogacay XLIII	*SAAM Quibian*	4.200	5.712	70	2022	Panama	SAAM Towage
Bogacay XLIV	*Svitzer Isabela*	4.200	5.712	70	2022	Dominica	Svitzer
Bogacay XLV	*Bogacay XLV*	3.530	4.800	60,1	2021	Turkey	Sanmar Towage
Bogacay XLVI	*Svitzer Rivas*	4.700	6.392	82,5	2022	Dominican R.	Svitzer
Bogacay XLVII	*Bogacay XLVII*	4.700	6.392	80	2022	Turkey	Sanmar Towage
Bogacay XLVIII	*Halcon III*	4.200	5.712	70,8	2021	Chile	SAAM Towage
Bogacay XLIX	*Med Capella*	3.530	4.800	61,3	2022	Netherlands	MedTug
Bogacay L	*SAAM Condor*	4.200	5.712	70,3	2022	Peru	SAAM Towage

SEASPAN HARRIER ex BOGACAY XI

photo: Robert Allan Ltd

SHAHEEN 2020 ex BOGACAY V

photo: Sanmar Shipyard

MARINTUG VI ex BOGACAY XXXVI

photo: Sanmar Shipyard

SVITZER AMSTEL working in the confines of Amsterdam Ship Repair illustrates why short is an advantage *photo: Arie Boer*

CELAL SAFI ex BOGACAY XXX was delivered to Safi Port *photo: Sanmar Shipyard*

Noise and vibration reduction measures have been implemented throughout, including resiliently mounted main engines, resiliently mounted gensets and auxiliary engine (on Vulkan T60 mounts), high attenuation engine exhaust silencer systems that were also fitted with spark arresters, ventilation intake air silencers, sound dampening deck treatments, and insulation measures.

Tank capacity was 72,4 m^3 for fuel, 10,8 m^3 for fresh water, 6,6 m^3 for foam, black water 3,8 m^3, grey water 3,8 m^3, oily water 4,40 m^3. Ballast water capacity 42,6 m^3.

The first two tugs delivered were set up as follows: Propulsion consist of 2x Caterpillar 3512-C main diesels each with an output of 1.765 kW at 1.800 rpm (total output 4.800 bhp) driving 2x Rolls-Royce US 205-FP azimuthing thrusters. 2x Caterpillar AT-C-4.4 diesel gensets each with a power output of 86 kW, 50 Hz. Bollard pull ahead is 60 tonnes. Free running speed ahead 12 knots.

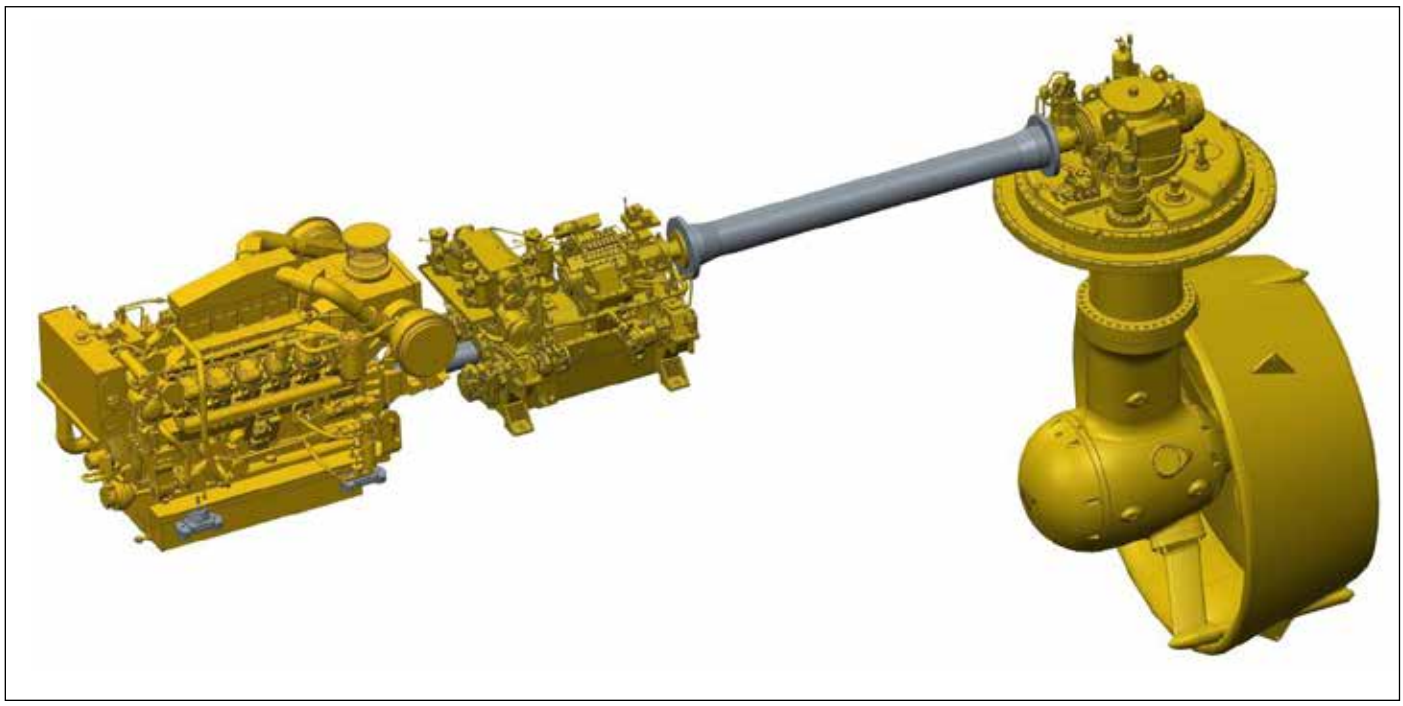
Towing gear consists of a DMT TW-E 250-KN electric double drum hawser winch with a pull of 250-KN (25 tonnes) at 0-9m / min or 80 KN (8,1 tonnes) at 0-28 m / min. Furthermore a Data Hidrolik tow hook and capstan are fitted aft.

Firefighting is to FIFI-½ standard with a fifi pump driven off the front of the port main engine. The pump delivers 1.200 m^3/hr of sea water to a single

Sheer fendering consists of 300 mm D- rubber 300 mm. “W” block type fendering is fitted at the stern.

The **accommodation** in the superstructure comprises the galley, mess, two single-berth officer cabins for respectively the Master and Chief Engineer and a common toilet / shower. The lower deck has 2 double berth cabins, a laundry, galley stores, and a common toilet / shower. The **wheelhouse** is designed with frameless bonded windows for minimum window mullion obstruction and a single split control station which provides all round maximum visibility and exceptional visibility to the bow and side fendering. The **engine room** featured a small sound resistant switchboard room.

TURCHIA ex BOGACAY VII, a delivery to Italy *photo: Sanmar Shipyard*



Caterpillar AVD system *artwork: Caterpillar*

remote-operated 1.200 m³ / hr water / foam monitor.

The Hybrid

In December, 2017, it was announced that the tug *Bogacay XXXVIII* was to be fitted with an innovative hydraulic hybrid propulsion system. The tug was to be fitted with the new Caterpillar Marine **Advanced Variable Drive**™ (*AVD*®) system, utilizing hydraulic power transmission through a planetary gear system. This enables the propeller speed to be optimized independently of engine speed and allows independent distribution of power among the various propulsion components.

Bogacay XXXVIII is the first hybrid version of the Bogacay-design. The tug has been optimized for harbour tug operations with 70 tonnes of bollard pull and FiFi-1 capability. Propulsion equipment features Caterpillar 3512C main engines, Caterpillar MTA-627 azimuthing thrusters, and a C32 auxiliary engine powering the hybrid hydraulics as well as the FiFi pump. This new project is the first vessel to showcase the Caterpillar Marine *AVD*® system.

BOGACAY XXXVIII is a hybrid fitted with Caterpillar's AVD drive system *photo: Sanmar Shipyard*

On 11 January, 2020, Sanmar and Robert Allan Ltd. celebrated the commissioning of the 200th tug built by Sanmar to a Robert Allan Ltd. design. Boğaçay XXXVIII is the latest evolution of a successful RAL design, incorporating the newly developed Caterpillar "advanced variable drive" (AVD) hydro-mechanical hybrid propulsion system. At the time of writing the tug is part of Sanmar's towage fleet in Izmit Bay, Turkey.

Bogacay XXXVIII has been painted with a bright green hull and colourful flowers on the deckhouse inspired by Andy Warhol's "Flowers" print. This regalia, reflective of the changing trend towards reduced environmental impact from tugs is bound to attract much attention in the usually moribund world of tugboat aesthetics. She measures in with a length overall of 24,40 m, moulded beam of 11,25 m, moulded depth of 4,38 m and maximum draught of 5,40 metres. The vessel is classed by ABS with the notation +A1, TOWING VESSEL, +AMS, +ABCU, UWILD, QR, UNRESTRICTED SERVICE, BP (70 tonnes).

The Caterpillar AVD system consists of a pair of dual input, continuously variable transmissions, located in the shaft lines between the main engines and the Z-drives. The AVDs can accept power from the Caterpillar 3512 main engines, rated at 1.765 kW at 1.800 rpm and / or from two 435 kW hydraulic motors powered by a single

Caterpillar C32 auxiliary engine rated at 1.081 kW at 2.100 rpm. The power is delivered to two Caterpillar MTA-627-FP azimuthing thrusters with 2,7-m diameter fixed pitch propellers.

"Thanks to the flexibility enabled by the innovative Caterpillar AVD technology, the speed of the vessel's engines can be modulated and optimized independently from the speed of the fixed pitch propellers. The speed of the propellers can be varied continuously throughout their full speed range. In addition, the power of the main and auxiliary engines can be channeled independently or jointly to propel the vessel," said Igor Strashny, Caterpillar ITDD Engineering Manager with responsibility for Advanced Marine Propulsion. "These features provide superior vessel performance and maneuverability while facilitating significant improvements in fuel and operational efficiency. Caterpillar AVD™ technology is a cost effective and fully integrated hybrid propulsion solution that reduces maintenance costs and has conventional service requirements. The system is scalable to meet requirements of a wide range of vessel types, applications, power levels and enables effective downsizing of engines without the loss of performance", said Strashny. A primary advantage of the Caterpillar AVD system is the continuously variable transmission which can modulate propeller speed down to zero rpm like a slipping clutch. It can also spin the propeller up faster than would be possible if the engine was directly coupled to the drive, allowing the engines to operate in their peak efficiency zone instead of operating along the propeller demand curve at higher specific fuel oil consumption, thus resulting in significant fuel savings. With a fixed pitch propeller pitched for bollard condition at zero knots, this feature enables full power to be taken from the engine when free running, much like a CP or DEP system.

"This (AVD system) allows propeller speed independent of engine speed so optimal engine efficiency can be achieved leading to fuel savings of fifteen to twenty percent," commented Nathan Kelly, Caterpillar Marine Product Definition Engineer. "Basically, all the benefits of a variable speed diesel electric propulsion (DEP) system at a fraction of the cost and size."

Other advantages include improved response and acceleration as well as lower overall maintenance costs due to significantly reduced operating hours on the main engines. It is noteworthy that with this system the engines are smaller than would normally be the case in a tug of this power (3512 versus 3516 engines). The additional power to achieve maximum bollard pull comes from the C32 engine, which also drives the Fi-Fi pump.

Caterpillar said the tug's return on investment was three years or less based on projected fuel and operating cost savings. "Different from a typical Power Take In (PTI) solutions, the AVD incorporates a planetary gear set allowing seamless clutch engagement of main engines, auxiliary engines, or both to provide a scalable power installation to meet any customer need in terms of maximum vessel speed, power, or bollard pull," said Nathan Kelly.

Tank capacities are 72,4 cubic metres of fuel oil, 10,8 cubic metres of fresh water, and 6,6 cubic metres of Fi-Fi foam.
The towing gear consists of a **DMT** TW-E 250KN electric double drum hawser winch with a pull of 250 kN at zero to nine metres per minute on low speed and 80 kN at zero to 28 metres per minute on high speed; a **Data Hidrolik** tow hook; and Data Hidrolik 5 tonne aft capstan.

The vessel has been outfitted for a crew of six people. The main deckhouse contains the galley, mess, two officer cabins, and a common WC. The lower deck contains two double berth cabins, a laundry, galley stores, and a common WC space. The wheelhouse provides all round maximum visibility and exceptional visibility to the bow and side fendering. The engine room features a small, sound resistant switchboard room.
On trials, *Bogacay XXXVIII* achieved 70,35 tonnes bollard pull ahead and a free running speed of 13,3 knots.

Note: this article is based on Robert Allan Ltd, Sanmar Denizcilik and Caterpillar press releases and Job van Eijk files. Furthermore the extensive article on JABAL YABSA elsewhere in this magazine was earlier published in Lekko International 218 and also authored by Job van Eijk.

SAAM CONDOR (ex Bogacay L) - the 50th Bogacay delivered *photo: Sanmar Shipyard*

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“Jabal Yabsa”

This 70-tbp shiphandling tug was built by Sanmar Shipyard as “Bogacay XVI” delivered to the owner Port of Fujairah in 2016.

by Job van Eijk

The contract for these tugs was signed in March, 2015, between Sanmar and His Highness Sheikh Saleh Bin Mohammed Al Sharqi, Chairman of the Department of Industry and Economy of the Government of Fujairah. The tugs concerrned are of the Robert Allan RAmparts 2400-SX type, also known ast the Sanmar Bogacay class. The first tug has now been delivered.

Jabal Yabsa – launch name *Bogacay XVI* – has main dimensions of 24,40 m oa x 11,25 mld. Depth is 4,38 m and maximum draft 5,87 m. Hull draft is 3,17 m. The tug is classed ABS +A1, +AMS, FiFi-1, Towing Vessel, UWILD, Unrestricted Service. The tug is fitted for operation at LNG terminals Zone 2.
Sister ships to follow are *Bogacay XVII* to be named *Jabal Al Bidiya* and *Bogacay XVIII* to be named *Jabal Al Aqqah*.

Hull
The hull is divided into five watertight compartments. From forward to aft these are fore peak, accommodation / forward service space – the latter with restricted overhead, engine room, thrusters room and aft peak. The main deck is split in the towing deck and an extended semi-raised forecastle deck. Unusual in shiphandling tugs the Fujairah three are fitted with a single vertical push knee.

Extensive fendering has been applied. The bow is protected by a single row of rubber 800 / 400 mm diameter hollow cylindrical fenders. The second row consist of W-type fenders of differing height. The sides are protected with rubber D-type fenders while the stern is fitted with hollow 600 / 300 mm cylindrical fendering with a second row of W-type fenders.

Forecastle deck
The towing winch forward is a double drum frequency-controlled constant-tension electrical **DMT** TW-E250kN which is fitted with a warp head to port. The drums each have a capacity of 347 m x 40 mm synthetic rope. Brake capacity is 150 tonnes. Hauling capacity is 25 tonnes at a speed of up to 9 meter / minute or 8 tonnes up to 28 meter / minute. Bollard pull running astern is 65 tonnes. Forward of the winch sits a double towing staple. The anchors are handled by capstans.

Two inflatable life rafts were fitted to port and starboard at this level.

Below forecastle deck
Forward of the forward collision bulkhead sits the bosun’s locker and the chain lockers on top of the ballast tanks. The bosun’s store is accessible form the forecastle deck.

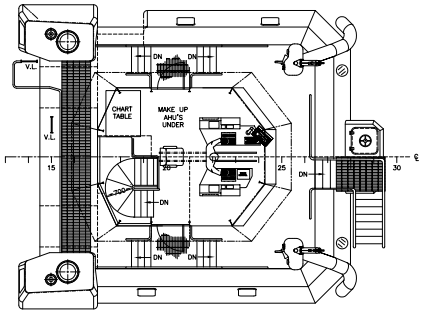
The accommodation area holds two twin berth cabins with lockers and desk, but again without private facilities. Aft of the cabins, to port, is the air conditioning room. To starboard is the sanitary space with shower, toilet and wash basin.

Below the lower accommodation is the **forward service space**. This area has reduced headroom. In this area – which is accessible from the engine room – are the two hydrophores, the two condenser units, the grey water pump, the sewage pump, the sewage treatment plant and the hot water tank.

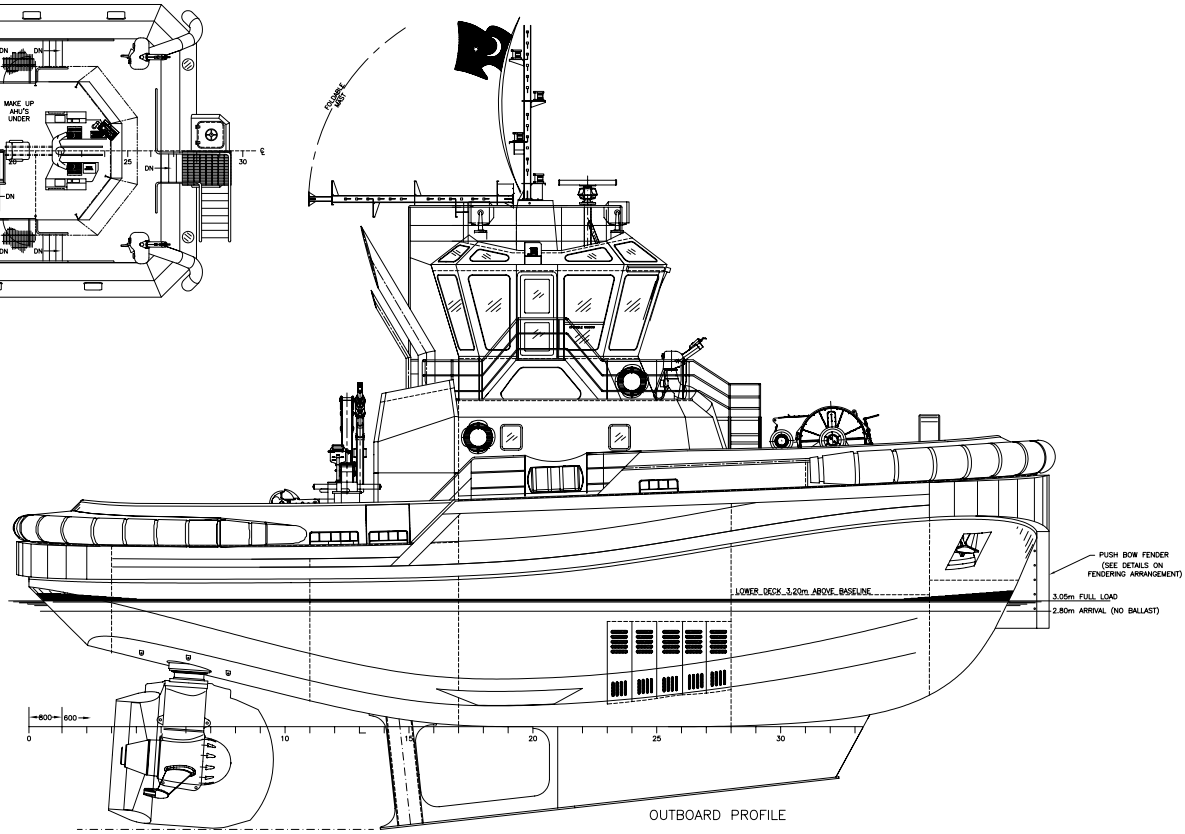
DMT towing winch and towing staple
photo: courtesy Sanmar Shipyard

Towing deck
The tugs have not been fitted with an aft towing winch. Instead a 70-tonne SWL **Data Hidrolik** tow hook is fitted on the crane pedestal on the centre line, with a capstan to port. The hydraulic knuckle boom crane – a **Heila** 16-3S - has a capacity of 1,2 tonnes at a reach of 11,00 meter. Minimum reach is 2,8 meter

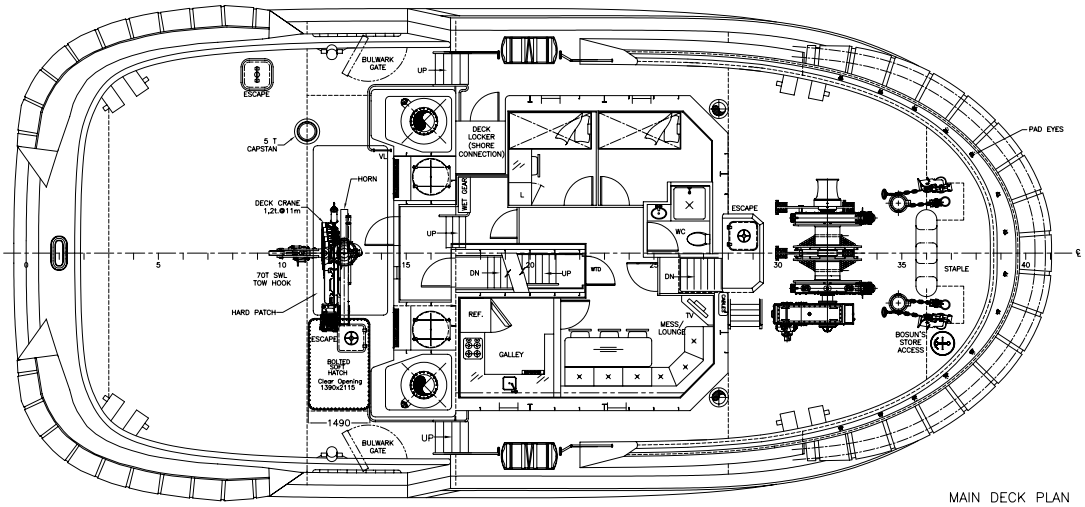
JABAL YABSA running trials *photo: courtesy Sanmar Shipyard*



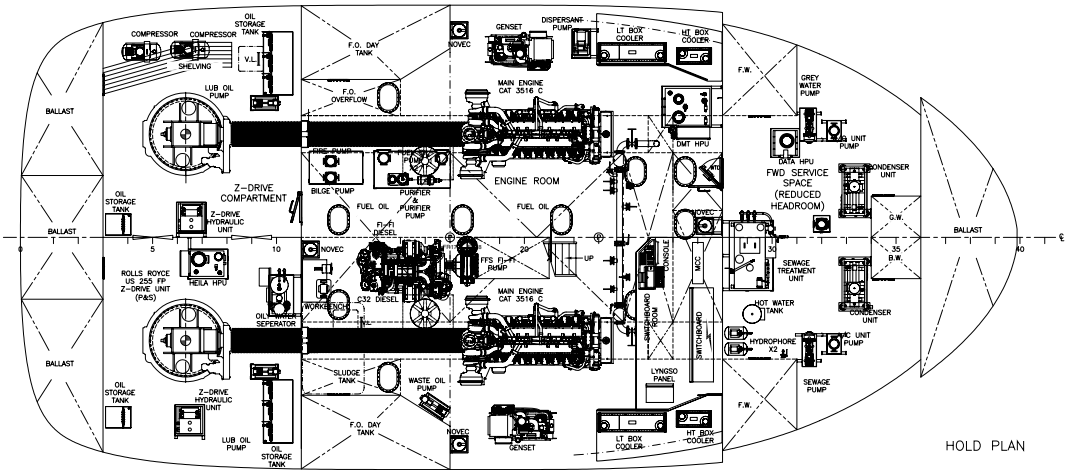
BRIDGE DECK



OUTBOARD PROFILE



MAIN DECK PLAN



HOLD PLAN

General Arrangement JABAL YABSA *drawing: courtesy Sanmar*

Wheelhouse looking forward *photo: courtesy Sanmar Shipyard*

Port side main engine *photo: courtesy Sanmar Shipyard*

with a lift of 5,7 tonnes. Bollard pull is 70 tonnes running forward.

Superstructure

The superstructure sits on the extend semi-raised forecastle deck, with only the engine exhausts and the engine room air intakes sitting on the towing deck. At deck level, the superstructure houses the Master and Chief Engineer in two single-berth cabins sitting to port forward. To starboard is the messroom / lounge which seats a maximum of 9. Direct aft is the galley, which can be accessed from the messroom. The cabins do not have private facilities but instead a toilet / shower / wash-basin unit is fitted against the forward bulkhead. The access to the accommodation and the engine room is from the towing deck. From the towing deck it is possible to enter the accommodation as well as the engine room. Entrance to the lower accommodation is through another staircase at the forward end of the superstructure. Aft of the cabins and forward of the funnel a deck store was fitted that also houses the shore connections.

Bridge Deck

The helmsman's position is between the two control desks. A chart table was fitted portside aft in the wheelhouse. The NavCom equipment is suited for GMDSS Area A2. Included are radar , GPS , DGPS , echo sounder, AIS , chart plotter, magnetic compass, autopilot, and speed log. An intercom system has been fitted.

Top Deck

The top deck is fitted with search lights forward and aft. The navigation mast is foldable allowing a reduction of air draught. The radar sits on top of the wheelhouse.

Engine room

The switchboard control room is situated at the forward end of the engine room to starboard. The main engines are two **Caterpillar** 3516-C, each developing 2.100 kW / 2.856 bhp at 1.600 rpm. The drive train produces a speed ahead of 12,5 knots, speed astern is 12,0 knots.These main engines are flanked port and starboard by the two gen sets which are Caterpillar C4.4, each 86 kW. The engine exhaust silencers are fitted with spark arresters.

The tug is equipped to FiFi-1 standard. A Caterpillar C-32 diesel engine powers the FFS fire-fighting pump. The pump has a capacity of 2.800 m^3/hr and services the two **FFS** remote controlled foam / water monitors. A foam tank holding 4,4 m^3 has also been fitted.

The bilge pump and purifier unit sit between twe two drive shafts. A work bench was fitted against the engine room aft bulkhead. The waste oil pump is fitted to starboard. The hydraulic power unit of the DMT winch is fitted to port mounted against the forward engine room bulkhead.

Tank capacity

Fuel oil capacity is 75,0 m^3. Fresh water

Messroom *photo: courtesy Sanmar Shipyard*

Galley *photo: courtesy Sanmar Shipyard*

Fire pump *photo: courtesy Sanmar Shipyard*

tanks hold 11,.7m³. Black and grey water tanks each hold 3,0 m³. The oily water tank holds 1,6 m³ and the ballast water capacity is 42,0 m³.

Thruster room

The thrusters are **Rolls-Royce** US-255 units with fixed-pitch propellers inside mild steel nozzles. Propeller diameter is 2.600 mm. The thruster room also houses two compressors fitted to port. Furthermore the hydraulic units for the thrusters are mounted here in addition two two thruster oil tanks. Finally the Heila hydraulic power unit is fitted here.

Aft peak

The aft peak consists of three ballast tanks.

Crew cabin *photo: courtesy Sanmar Shipyard*

Capstan aft towing deck
photo: courtesy Sanmar Shipyard

Engine room control booth
photo: courtesy Sanmar Shipyard

Fire pump engine
photo: courtesy Sanmar Shipyard

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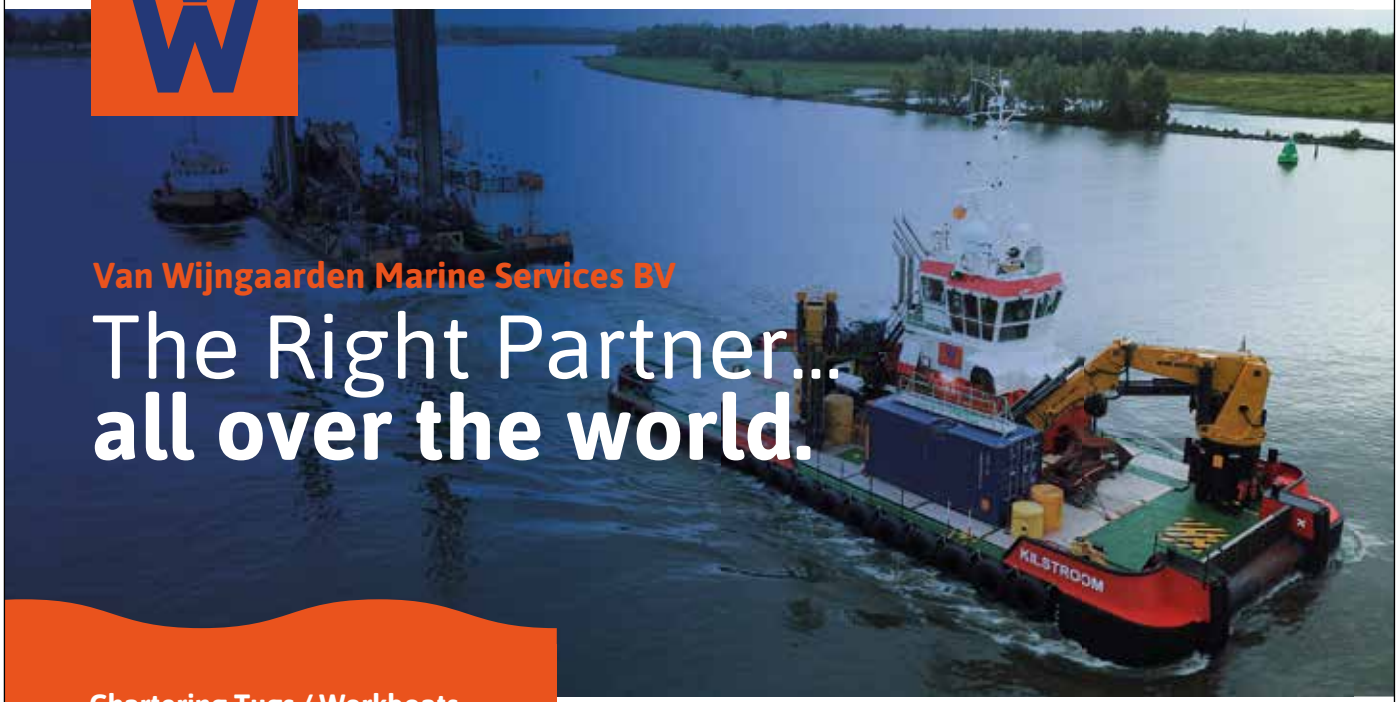

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RSD-E Tug 2513

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Tug News – New Tugs

compiled by TDI Tugboat Publications

FAIRPLAY-93 is the latest Fairplay arrival for the Rotterdam fleet. The 70-tbp tug had been under construction at Damen Song Cam in Vietnam built for stock. The tug was about to leave Vietnam when Fairplay took the lease. The 23 meter long vessel, with a 12 meter beam and 5.40 meter draught, was built to the Damen standardized ASD 2312 design. Two azimuthing stern drive propellers in nozzles each span a diameter of 2,8 meter. Power comes from two Caterpillar 3512TA engines with a total output of 5.102 bhp. Twin fins under the hull allow for side stepping thus facilitating operations in narrow harbours *photo: Reinier van de Wetering*

Gibraltar Salvage

The contract for the wreck clearing operation of the bulker OS 35 has been won by the Dutch company Koole Contractors. The Gibraltar Port Authority in mid-December 2022 announced that the tug *Koole 42* and barge *H-283* departed Surinam for Gibraltar. Likewise the tug *Koole 31* and the barge *H-10030* were mobilised from The Netherlands.

The 35.000 dwt Tuvalu-registered bulker departed Gibraltar on 30 August, 2022, but collided with the empty anchored 90.986 dwt Marshall Islands-registered *Adam LNG* gas carrier. As a result the bulker started taking water and was put ashore in a sinking condition, some 300 m off Catalan Bay. Reportedly, apart from the cargo the vessel carries 183 tons of heavy fuel oil, 250 tons of diesel, and 27 tons of lube oil in its tanks. After the vessel broke its back the decision was taken to sink the remains to prevent pollution further own the coast line. Oil booms were deployed including absorbing booms to catch leaking hydraulic oil. A start was made with stripping the entire vessel down to the steel bulkheads. Deadline for the wreck removal contract is 30 May, 2023.

Ammonia fuel trials

COSCO Shipping Heavy Industry Co. and COSCO Shipping Heavy Industry Technology Co. have developed an ammonia supply system design that is going to be trialled on a tug. Given the challenging characteristics of ammonia, ABS conducted a comprehensive review and risk assessment focused on ammonia filling, storage, supply, ventilation and emergency handling to address the safety and reliability of the systems.

Georgios Plevrakis, ABS Vice President, Global Sustainability, said: " Ammonia offers ship owners and operators a zero-carbon, tank-to-wake emissions profile. Yet, we also recognize that ammonia presents a specific set of safety and technology challenges, and ABS is committed to leading the industry in supporting its safe adoption at sea."

Ji-Jiang Jiang, COSCO Shipping Heavy Industry General Manager, said: "This is the first comprehensive technology research project in China focusing on ammonia burning, ammonia-diesel,

An ammonia-fueled tug has been developed in China

artwork: COSCO Shipping Heavy Industries (Dalian)

All-electric tugs ordered by SAAM *artwork: SAAM*

dual-fuel engine, ammonia fuel supply system, exhaust gas treatment and onboard application. In the future, we will continue to pioneer innovation, with the development of green, low-carbon and smart shipping."

The tugboat is designed to be 36 meters in length with a towing capacity of up to 60 tons. The ammonia supply system will be part of the vessel, providing ammonia for propulsion.

Methanol dual-fuel

Class bureau RINA has granted 'Approval in Principle' for **Med Marine**'s design of a methanol dual-fuel tug. The design is for a tug of 24,25 (oa) x 11,80 m with a design draught of 3,75 m. Estimated tonnage is 390 GT. Bollard pull 40 tonnes.

Biofuel trials

Another type of alternative fuel is being tested on **Crowley**'s tug *Veteran* operating in San Francisco Bay. *Veteran* is a 5.070 kW (6.895 bhp) tug with a bollard pull of 82 tonnes. Crowley said the biofuel is lower in carbon intensity compared to conventional fuel. The use of the biofuel results in a reduction of greenhouse gas and air emissions such as CO2 and SOx.

Electric for Vancouver

Teck Resources Limited and SAAM Towage announced an agreement to deploy two electric tug boats at the Neptune Terminal in Vancouver, British Columbia in support of Teck's climate goals. This will mark the first electric tugs operating in Canada as a full tugboat package for harbour assist and tug services.

At full capacity, the new units will reduce 2.400 tons of greenhouse gases each year. The **ElectRA 2300SX** type tugs are designed by Vancouver based **Robert Allan** and will be built at **Sanmar Shipyards** in Turkey.

The tugs will have an overall length of 23 meters and a 70 tonnes bollard pull. Power comes from two separate battery Li-ion energy storage systems, making them 100% electric and zero-emissions ships. They will be charged from British Columbia's hydroelectric power grid. SAAM Towage has a well-established presence in British Columbia, including nine tugs serving Vancouver's Inner Harbour.

Vroon restructure

Offshore vessel and tanker fleet owner Vroon says financial and management restructure plans are 'next step' in events that began in January 2022 when lenders took control of company in debt for equity swap. The company said its restructuring is the next step in an operational and financial shift communicated in 2022.

According to Vroon the current financial performance of the company is resulting in a positive cash flow and a sufficient level of liquidity, the unsustainable high debt requires action. "This was already communicated last year and as such is nothing new," according to the company. Vroon intends to keep its deepsea fleet of livestock carriers, product tankers, high-heat tankers and **emergency response and rescue vessels**. The remaining 40-strong offshore support fleet will be divested. Vroon cited a timeline of 18 months for the divestment of its offshore fleet. In the meantime operations continue as usual. "Any transfer of vessels to new ownership will take place in a controlled manner with the continued dedication of our staff," Vroon said.

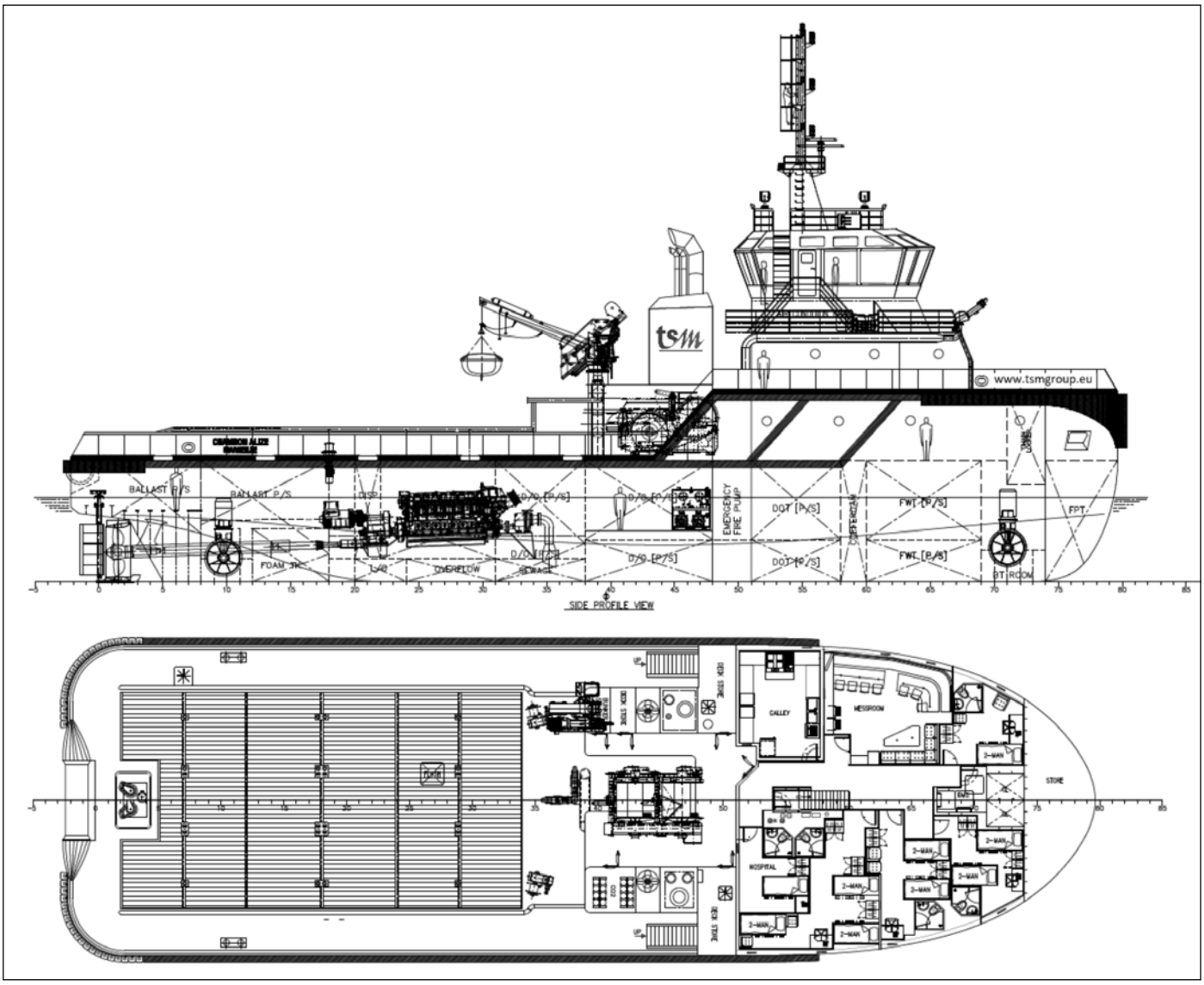
Electric pusher

Western Baltic Engineering (WBE), Klaipeda, Lithuania came up with new designs for an electric pushboat for use on Europe's inland waterways, design name 'Electric Eel'. Western Baltic announced the first of this type will be built next year for the **Lithuanian Inland Waterways Authority**. The new design is intended to replace diesel pushers which presently dominate the market for pushing on Europe's inland waterways. The concept is in line with the European Union attempting to shift freight to Europe's Inland Waterways via more green powered vessels.

The Lithuanian Inland Waterways authority has big plans to ramp up use of the 450 km stretch of waterway between Klaipeda on the Baltic Sea to Kaunas to switch cargo from the road network in line with EU policy. The authority estimates the pusher can help remove 10.000 trucks a year from Lithuania's roads.

The 26-metre pusher will be powered by three DNV approved batteries with a combined weight of 74 tonnes, two held in TEU containers on deck which can be replaced via crane at harbour, and one permanent battery below deck which

KOOLE 31, ex VIKING departing Rotterdam Waterway on 21December, 2022
photo: Reinier van de Wetering



General Arrangement TSM ALIZE *drawing: Thomas Services Maritimes*

can be charged at quayside. Pushing capacity is 2.000 tonnes and top speed is 22 km / hr downstream at 85 per cent engine load. The electric batteries create an engine power of 500 hp / 400 kW compared to a diesel equivalent of 1.000 hp / 800 kW. According to Western Baltic the biggest challenge was weight and draft. The Lithuanian inland waterway is presently very shallow so design window only allowed for a vessel of no more than 195 dwt, with a draught maximum of 1,2 metres.

European opportunities

European road freight accounts for 75 per cent of EU inland freight. The EU now drives for a modal shift from road to water transport. The European Green Deal and the Sustainable & Smart Mobility Strategy outline the steps needed to achieve an increased use of inland water transport with the strategy indicating that inland waterway transport and short-sea shipping should increase by 25% by 2030 and by 50 % by 2050. According to Eurostat, Rhine countries account for around 84% of EU inland waterway transport, mainly split between the Netherlands and Germany, while Danube countries have more than 10 per cent share and all other countries taken together make up the rest. There are 41.000 km of inland waterways flowing through 25 EU Member States transporting 150 billion tonne kilometres of cargo every year. 75% of inland waterway navigation takes place across borders.

Current estimates are that some 330 push boats operate on the Danube alone, serving a fleet of some 2.000 non-propelled barges. Western Baltic estimates each of these vessels is emitting 196.317 kg Tank To Wheel (TTW) of CO2 per navigation while our electric pusher design slashes this at a stroke as it emits zero CO2. Our design can be bought and then built at a local shipyard near the customer or we can built it in Lithuania.

Hydrogen-fueled push boat

Back in January, 2022, the **Schiffswerft Hermann Barthel**, Derben, Germany delivered a hydrogen-fueled inland waters push tug. The tug has been developed at the Department of Design and Operation of Maritime Systems at the Technical University of Berlin. It is the world's first push boat in which battery-electric propulsion is combined with hydrogen and fuel cell technology. The project team expects to make *Elektra*'s hydrogen fuel cell technology adaptable to a wide range of vessels that sail on both inland and coastal waters. To this end extensive trials are carried out under operational conditions by Hermann Barthel in partnership with Berliner Hafen- und Lagerhausgesellschaft (BEHALA) (port and logistics service provider), Ballard Power Systems (fuel cells), ARGO–ANLEG (hydrogen system), Schiffselektronik Rostock (electrical energy system), EST-Floattech (battery system), and HGK Shipping (nautical operator). Homeport

Regional

Van Wijngaarden's AMERSTROOM towing the splitbarge SCHELDESTROOM seen here on 16 November, 2022, in the Oude Maas *photo: Nico Giltay*

ARIA seen on 12 December, 2022, is the latest Shoalbuster 3209 by Damen Shipyards. Yard number 571810 is seen here off Hoek van Holland to commence trials in Europoort

photo: R. & F. van der Hoek

TSM ALIZE (2012, 45 x 13 m, 58 tbp, ex CHAMBON ALIZE) seen 26-11 2022 in the Oude Maas river. She was acquired by Thomas Services Maritimes in 2021. Currently working with Ailes Marines on the Saint-Brieux offshore windfarm construction project. The windfarm is scheduled for commissioning in 2023

photo: Nico Giltay

Museum tugs en-route to a shipyard for maintenance, HAVENDIENST 2 on the left is a motor patrol vessel / tug / icebreaker / firefighting vessel. It was the first post-war newbuild for the Port of Rotterdam (later to become Rotterdam Port Authority). Built by Shipyard Hendriks, Dodewaard, in 1954. Dimensions 22,07 x 5,29 m. First main engine was a Sulzer 4-stroke 240 bhp with a c/p propeller. Later re-engined with 200 bhp Bolnes. The air draught of the vessel is such it can pass underneath the lowest of the Rotterdam city bridges allowing operation on the Schie River as well. Delivered as HAVENDIENST 1 she was renamed HAVENDIENST 2 in 1983. In 2002 renamed RPA 25 but same year handed over to the Rotterdam Maritime Museum. The other tug is DOCKYARD V, a steam tug built in 1942. She was one of a series ordered prior to WW-2 for a Russian owner. They were intended for operation at Murmansk but completion was delayed by WW-2. Launched in 1942 but completed in 1947. 1956 These tugs were then taken up in the fleet of the builder, Rotterdam Dockyard Co. (RDM). The tug measures 25,06 x 6,31 m. Main engine output is 500 ihp changed from coal-burning to oil. 1978 handed to the Dockyard V Society, Leiden. 1983 returned to ownership of RDM. 1994 to Rotterdam Maritime Museum as a working exhibit *photo: Nico Giltay*

'Electric Eel' is the concept name for the electric pushboat designed by Western Baltic Engineering
artwork: Western Baltic Engineering

for the tug is Berlin Westhafen. *Elektra* was built under a Euro 13 million (USD 15,7 million) project funded mainly by the German Federal Ministry of Transport and Digital Infrastructure.

Dimensions of the tug are 20 x 8,2 m with a draught of 1,25 m. Propulsion is by two Schottel azimuthing thrusters type SRP-100 with nozzle (200 kW each) and a Schottel steering and control system. The hybrid system fitted on *Elektra* includes a battery package consisting of 242 DNV-approved modules with a total capacity of 2,5 MWh and three maritime fuel cell systems with 100 kW of peak power each. The battery was supplied by EST-Floattech. The battery and the fuel cells will be used together to power the electric motors. However, for complete redundancy, the two powertrains were designed to operate as entirely independent systems. The tug's total electric power capacity of 21.200 kWh will enable an emissions-free round trip from Berlin to Hamburg. On hydrogen alone it will be able to travel a minimum of 100 kilometres over a 16-hour day or longer. With 750 kg of gaseous hydrogen - stored at a pressure of 500 bar - on board and a battery capacity of approximately 2,500 kilowatt hours, the ship has a range of approximately 400 kilometres when sailing in combination with the loaded heavy lift barge *Ursus*. Due to its 400-km range, next to the Westhafen in Berlin, only one additional land-based station is needed to supply the Elektra with hydrogen and electricity to sail on the waterways of Berlin in the direction of the Rhine / Ruhr, Hamburg and Stettin. In total, the vessel can operate push-barge combinations up to 150 metres in length. *Elektra* will, however. primarily be used for transportation of goods on the Berlin to Hamburg and inner-city routes in the German capital city. EST-Floattech said the tug's most important transportation task will be carrying Siemens turbines, which need to be shipped from the production site in the centre of Berlin to the Western Harbour or to Hamburg.

The first stations for the changeover of hydrogen tanks and 500 kilowatt electric charging stations will become operational in Berlin's Westhafen as well as in the port of Lüneburg in 2023. The TU Berlin has contracted Mittelelbe Business Park and H2 Green Power & Logistics for filling and transporting the tank systems (Multiple Energy Gas Container – MEGC) with green hydrogen until the end of the Elektra project at the end of 2024. The MEGC can be exchanged with the onboard crane and the power connection runs via a loading beam that guide the cables to land. This way, the handling of the arm-thick cables is very easy for the ship's crew, the vessel is connected to the charging station in a short time and the quayside is free of cables.

From 2025 onward the vessel will run commercially between Berlin and Hamburg.

Electrifying Shift

Vancouver, BC-based **Shift Clean Energy** has been selected to supply its energy storage systems to no less than 17 new hybrid and electric tugboats in a step forward for decarbonizing the marine industry. Customers include **Vallianz Holdings** and **Zeeboat** for fully electric tugboats, and others soon-to-be-named for large-scale hybrids set to begin operations in 2023 and 2024, according to Shift.

"We are seeing customers and designers gravitate towards our solutions due to their inherent reliability, long life and safe operations," Shift CEO and founder Brent Perry said. "Safety and industry leading cost efficiency are at the core of delivering these projects."

Electric tugboats have economic and environmental advantages. An operational e-tug can reduce at least 150 tons of nitrogen oxide (NOx) and 2,000 tons of carbon dioxide (CO2) emissions annually as compared to a conventional tug. This is equivalent to removing 500 typical passenger vehicles from the road.

"Shift is thrilled to have been selected to supply these tugboats with clean, efficient energy," Perry commented. "As an organization, we are proving that decarbonization with our (energy storage) systems is simple to implement and reaps a myriad of environmental and economic benefits. Shift is excited to continue decarbonizing ports and electrifying the shipping industry." Since its inception, Shift has partnered with various technology leaders. They include energy company Yinson Holdings, based in Malaysia, on the recent hydromover launch in Singapore; vessel and equipment company Vallianz on its e-tug project, and Copenhagen-based facility management company ISS on the all-electric Zeeboat.

ELEKTRA is the world's first hydrogen-fueled inland waters pushboat currently being tested until 2025 after which she will go commercial *photo: EST Floattech*

Books

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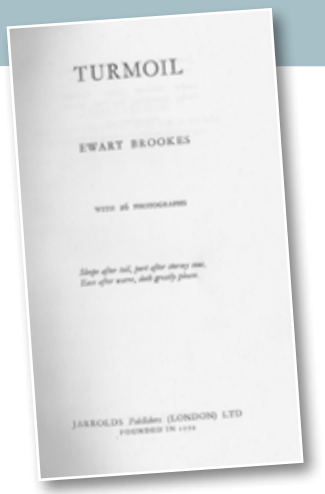


Related to the back page of this issue is **"Turmoil"** by Ewart Brookes. Although much has been written about the *Flying Enterprise* case, as far as we know only three books were actually written on the subject. Ewart Brookes had "Turmoil" published in 1956. Although the book is written specifically to unravel the attempted rescue and salvage of the freighter it takes the first six chapters to sketch the history and activities of rescue / salvage tugs. Chapter eight to eleven handle the actual *Flying Enterprise* case. The remaining chapters deal with ocean rescues and tows by salvage tugs including Turmoil. Included are 26 photographs showing ocean tows and salvage with a good number on the Flying Enterprise.

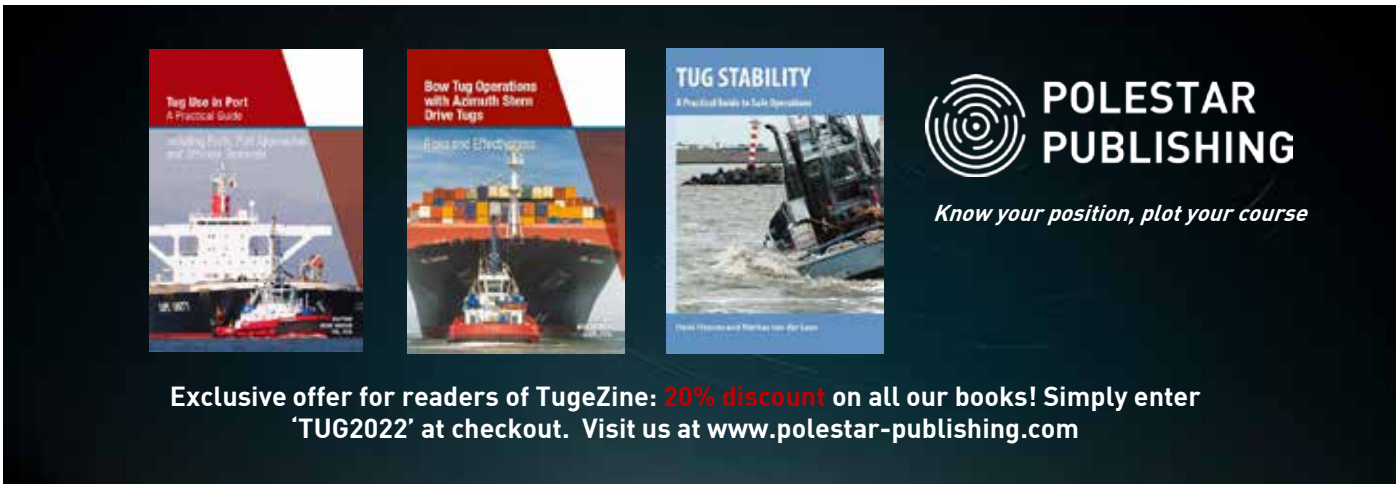
The book is excellent reading but is difficult to obtain. Try second-hand booksellers, Amazon and Ebay. (Note: an American edition of the book was published in 1957 by Dutton)

Turmoil. Author: Ewart Brookes. Published: 1956 Publisher: Jarrolds Publishers Ltd, London. Size hxb 217 x150 mm. English language. Hardback cover. 180 pages. 26 photos in b&w plus map with track of Flying Enterprise. Available second-hand, price varies so potential buyers are advised to search and compare offers.

Another book is "**Flying Enterprise & Kurt Carlsen**" by Bjarne Bekker. In a personal account from his meetings with Kurt Carlsen, the author tells, for the first time, the complete life story of the famous seaman: About his childhood in Elsinore, where his father was a gaffer in the peat bogs, and about his love for beautiful, petite Agnes from the fishing community in Blavand. And not least, about the drama that assembled the world around the radio.

A third book is "**Simple Courage: A True Story of Peril on the Sea"** by Frank Delaney.

Note that the book "**Bustler Class Rescue Tugs: in war and peace**" by Ron Neish also contains a very compact report on the Flying Enterprise operation. **This book is on offer to our readers at a discount, see advert of Whittles Publishing on this page.**



INDEX TUGeZINE 2022

On 21 December, 1951, the 6.731 grt American freighter FLYING ENTERPRISE left Hamburg for the USA. In the Western Approaches the ship ran into a storm. A freak wave caused a crack in the hull and a shifting of cargo. On 28 December an SOS was issued. At the time the list to port was already some 45 degrees. Passengers and crew were evacuated by ships that had remained close by. Only Captain Kurt Carlsen stayed on board awaiting a tug. Reacting to the SOS several salvage tugs had left station or changed course. First to arrive - in the night of 3 to 4 January, 1952 - was the British-flagged TURMOIL, one of the famous 'Bustler' class of war-built deepsea tugs. By that time the list had increased to some 60 degrees. Captain Parker made eight attempts to hook up, five of which had a chance of success. However, Capt. Carlsen had to heave the lines by hand which turned out to be near impossible. On the next attempt Capt Parker crept closer to the casualty than ever before. With only feet between them a sudden lurch made the vessels touch and at the same moment TURMOIL's mate Kenneth Dancy leapt aboard the casualty. At first light the connection was made and TURMOIL started the tow nursing the casualty towards Falmouth. On 9 January, however, in increasingly rough seas, the tow parted. In the early hours of 10 January the wind became gale force. With the casualty becoming more sluggish and settling in the water salvage was no longer feasible and it now became a matter of rescue. At 1445 LT Capt Carlsen signalled they wanted to abandon ship. At 1522 both man jumped from the funnel as the FLYING ENTERPRISE was now on its side. At 1531 both men were aboard TURMOIL. At 1611 the casualty disappeared below the waves. What remained was the question why the Master had remained on board that long. It was later suggested it had something to do with a peculiar piece of cargo that was important to the U.S. Government. Nevertheless the whole story immortalized Capt Carlsen, the TURMOIL, capt. Parker and Ken Dancy. The photo shows Capt. Carlsen at work with the messenger line during the first attempts to make the connection

photo: crew TURMOIL