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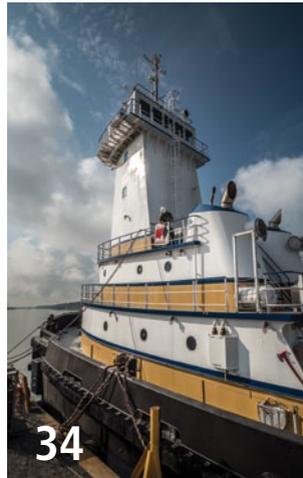
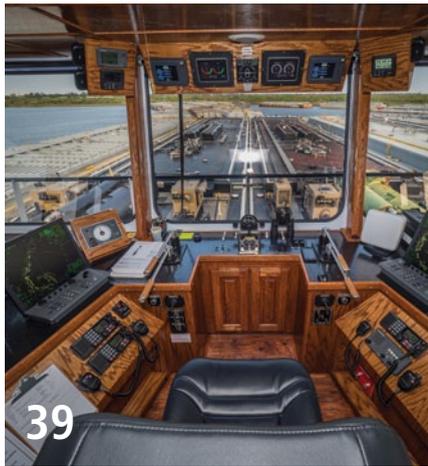


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# AMERICAN TUGBOAT REVIEW

Annual 2018  
Issue #225



Cover: The Edison Chouest Offshore tugboats *Elrington* and *Commander* arrived in Valdez, Alaska, this spring. *Commander* and its four sister tugs are the most powerful ASD escort tugboats in the world. Photo credit: Alyeska Pipeline Service Co.

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# AMERICAN TUGBOAT REVIEW

2018

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Left, Eastern Shipbuilding of Panama City, Fla., has stayed busy with new tug and towboat projects. Below, Rodriguez Shipbuilding owner Joe Rodriguez, left, and Capt. Mark Pearson oversee final outfitting on the Coeymans Marine tugboat *Daisy Mae*.

# Shipbuilders still facing headwinds

*Some signs of life amid a stubbornly soft market*

By Casey Conley and Susan Buchanan

The slowdown in new tug construction over the last few years has been tough for shipyards, naval architects and suppliers. The outlook for the next 12 months doesn't appear a whole lot better, although some firms see reason to be optimistic.

Many of the same factors that have dogged the industry since 2016 haven't gone away. Demand for new offshore/platform supply vessels is virtually nil. In their absence, shipyards along the Gulf of Mexico are competing fiercely for tug projects.

"Boats will never be this low again on price," said Joe Rodriguez, owner of Rodriguez Shipbuilding.

Cutthroat competition for work means historically low margins for shipyards. This leaves little room for error if costs exceed projections. Horizon Shipbuilding noted

"higher than anticipated" labor and materials associated with building new EPA Tier 4 tractor tugs in its bankruptcy filing last fall.

The inland towing market faces similar challenges. Jeffboat, a longtime builder of barges and towboats, recently announced it would shut down, likely for good.

"I'd say it hit the bottom sometime early last year," Great Lakes Towing Co. President Joe Starck said of the U.S. new tug market. "There are other tugs being built now, but at volumes that are still very slow."

Tug and towboat deliveries fell to 88 in 2017, down about 20 percent compared to 2016, according to Shipbuildinghistory.com, one of the few comprehensive sites tracking new vessels. From 2010 through 2017, the site recorded an average 106 new tugs per year.

Yet through the first three months of 2018, the site listed just 14 new tug deliveries.

Rodriguez Shipbuilding has been quiet since its last tug, *Daisy Mae* (profiled on page 23), left the yard in October 2017. Some other yards in the once-bustling shipbuilding town of Bayou La Batre, Ala., have steady work, but others are finishing existing jobs with little else in the pipeline.

The oil field slowdown, which is well-documented

by this point, has hurt shipbuilders across the Gulf. But rising construction costs from Coast Guard Subchapter M requirements and EPA-mandated Tier 4 engines are another hurdle for new tug construction. Rodriguez suggested potential clients have backed off recently after seeing shipyard quotes for new tugs.

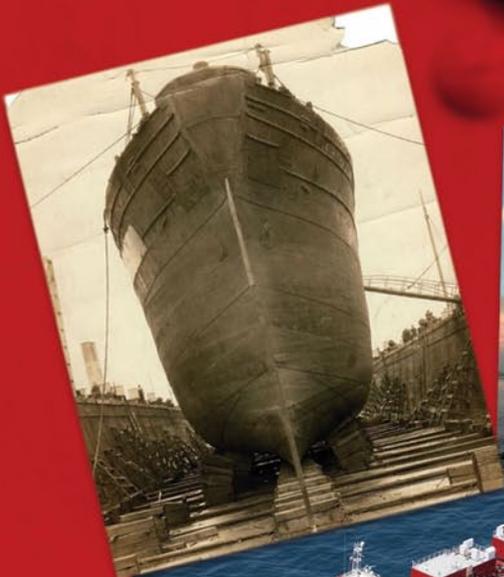
"The price to build what you want these days is surprising," he said. "If you had figures in your head from





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Great Lakes Shipyard

Left, Great Lakes Shipyard crews made progress this spring on a 2,000-hp tugboat at its Cleveland facility. Below, Conrad is building three ATB units for Vane Brothers, including *Wachapreague*, named for a coastal Virginia town. Bottom, Fincantieri Bay Shipbuilding built *Millville* with a Nautican propulsion system for the Wawa convenience store chain. Right, Senesco Marine is building two Franklin-class ATB tugs for Reinauer Transportation.

two, three, four years ago, then you're going to get a serious wake-up call."

E.N. Bisso & Son in New Orleans has two new Tier 4 tugboats on order from Eastern Shipbuilding in Panama City, Fla. The first is due next year and the second in 2020. The company president, Matt Holzhalb, acknowledged the effect of new regulations in a recent interview.

"Complying with Subchapter M and Tier 4 standards increases our costs," he said. "It takes

some effort to make sure that everything we're doing meets these requirements." The industry has worked closely with the Coast Guard to meet the new specifications.

Operators have revised their newbuild proposals to meet Subchapter M requirements, published in mid-2016, for the design, construction, onboard equipment and operation of towing vessels. Any U.S. towing vessel being built now must get a USCG certificate of inspection, or COI, before operating.

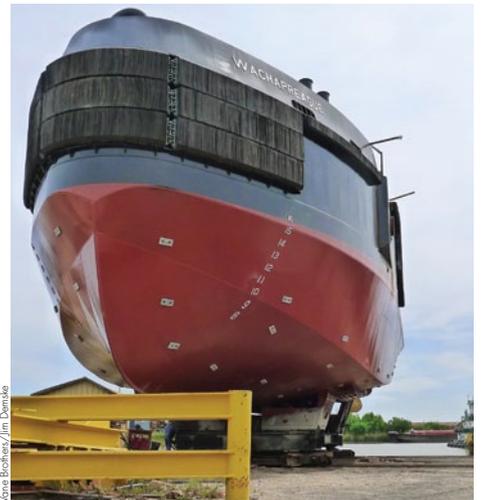
Elizabeth Boyd, president of propulsion equipment manufacturer Nautican, is feeling optimistic despite these headwinds.

"The first half of this year

is still pretty weak, but we are thinking that by the end of the year things will be looking up. It looks promising," she said in a recent interview.

Boyd recalled having relatively limited expectations during a series of recent trade shows, including the WorkBoat event last fall. Instead, there was a "steady stream" of customers who wanted to talk about upcoming projects.

"These were good, quality customers with boat designs



Vane Brothers/Jim Demko

and plans to get something done, and we have been working on quite a few of them," she said.

It's certainly not all bad news out there. Large operators such as Moran Towing, Harley Marine Services, G&H Towing and Marquette Transportation are pressing ahead with new tug projects. Harley Marine, for instance, has taken delivery of two tractor tugs since last summer, *Dr. Hank Kaplan* and *Rich Padden*, and a third is in the pipeline (profile on page 16). The Seattle company also has built four new ATBs and



Nautican Research and Development

## 2017 TOP TUGS

- Trident** – Seabulk Towing
- Earl W. Redd** – Harley Marine Services
- Capt. Brian A. McAllister** – McAllister Towing
- Caden Foss** – Foss Maritime
- Fishing Creek** – Vane Brothers
- Cleveland** – Great Lakes Towing Co.
- Clayton W. Moran** – Moran Towing Corp.
- Christine S.** – Petchem Inc.
- Douglas B. Mackie** – Great Lakes Dredge and Dock Co.
- Blue Fin** – General Dynamics NASSCO
- Independent** – Marine Towing of Tampa



Courtesy: Conley

ordered two new oceangoing tugs from Conrad Shipyard.

Foss Maritime announced a new series of Damen-designed tugs at its Rainier, Ore., shipyard. Operators on the West Coast and Gulf of Mexico also announced new diesel-electric hybrid tug projects, and Edison Chouest Offshore is nearly finished building nine new tugs for the Alyeska Pipeline Service

Co. in Valdez, Alaska (story on page 62).

As for the vessels getting built, they are trending toward lower emissions, more horsepower and larger size overall. Greater safety and cost controls also are factors, according to Robert Allan of naval architecture firm Robert Allan Ltd. in Vancouver, B.C.

In the U.S. Gulf and

Southeast, traffic involving large ships is increasing because of expanded Panama Canal throughput. "As ships get bigger, tugs have to be more powerful and typically larger to accommodate heavier machinery," Allan said. Growing U.S. oil and gas exports will call for more powerful and capable tugs, especially when escorts are required.

Bryan Nichols, director of business development with Jensen Maritime Consultants, argued that diversification will help shipyards ride out slower periods. Like some vendors, he also sees signs of life in the escort and ship-assist tugboat sector.

"Overall, the market is down but we have quite a few new tugs getting built

from us at Jensen and quite a few people looking at our tugs," he said, adding that some operators are starting to consider building again after "a break."

The slowdown in tugboat building comes during a period of relative strength in the U.S. economy. Right now it's not clear what factors, if any, will spur new demand for building projects.

Brandon Durar, president of deck equipment maker JonRie InterTech, believes Subchapter M could provide that boost as older vessels become more expensive to maintain or retrofit. He agreed new tugs remain something of a bargain.

"Right now is the best time to invest in your fleet," Durar said, adding that the alternative will be, "wait in line for a higher price." •

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# Tugboat tech, design advance despite slow market By Peter Marsh

Despite a down market for new construction, there were some key advances in tugboat design and technology over the last year.

Notable examples include wider adoption of Tier 4 marine engines in ASD tugboats, as well as orders for tugs with hybrid propulsion. International interest in liquefied natural gas (LNG) tugboats is growing slowly, while in North America the appetite for LNG-fueled tugs remains almost nonexistent. The prospect of unmanned tugs also moved closer to adoption with serious testing overseas.

Through mid-2018, Caterpillar and GE engines have been the choice of Tier 4 early-adopters such as Harley Marine Services, McAllister Towing and Moran Towing. Although that could change once competitors bring their Tier 4 solutions to market, Cat also entered the propulsion market with its first Cat-branded z-drives.

*Commander*, the first of five 140-foot escort tugs built by Edison Chouest Offshore,

is one of the most noteworthy tugs of the year. These vessels, which go to work in Valdez, Alaska, for the Alyeska Pipeline Service Co. starting July 1, have twin Caterpillar C280 Tier 4 engines generating 12,336 total hp and 136 metric tons of bollard pull.

## Little action on LNG-fueled tugs

LNG-fueled tugboats are operating in Europe, the Middle East and Asia, and within the last year more projects were unveiled around the world. These gas-powered tugs burn cleaner than marine diesel, but they also cost substantially more to build and outfit.

Here in the U.S. and Canada, operators have shown less interest for LNG as a fuel source. Mike Fitzpatrick, president and CEO of Robert Allan Ltd., said his firm gets a lot of inquiries about alternate propulsion, particularly LNG or dual-fuel engines. Most of the time, those inquiries don't lead to construction of an LNG-fueled tug.

"The capital cost is so much higher than a conventional

boat. It is still at this point impossible to build an economic case for a dual-fuel tug," he said during an interview in his Vancouver, B.C., office.

"If you turn a \$10 million tug into a \$14 million LNG-fueled tug, that is really what we are talking about here. The delta is somewhere between \$3 and \$4 million," he added.

Although a handful of RAL-designed LNG tugs are currently in service, under construction or about to take shape in Asia and elsewhere, economics alone were not the leading factor in choosing "green" propulsion systems. For instance, government subsidies will help fund the construction of vessels for PSA Marine in Singapore, reducing the difference between the cost of LNG and standard diesel propulsion.

Jensen Maritime and other big naval architecture firms also have developed LNG tug designs, and the Shearer Group of Houston is among major towboat designers working on LNG fuel for inland vessels.

There have been notable advances in LNG-fueling infrastructure in the U.S. — partic-

ularly in Jacksonville, Fla., for new LNG-powered container ships — but even in a harbor tug capacity, widespread adoption is likely a ways off.

## Hybrid tug projects under construction

Nearly a decade after Foss Maritime launched *Carolyn Dorothy*, the first hybrid-powered U.S. tugboat, other operators have announced diesel-electric projects of their own. Primary benefits of hybrid systems include reduced fuel burn, lower emissions and less wear on main engines.

Seattle naval architecture firm Jensen Maritime Consultants was chosen to design a 100-foot hybrid tugboat for Baydelta Maritime of San Francisco. Nichols Brothers Boat Builders on Whidbey Island, Wash., is building the vessel, and delivery is expected early next year.

Propulsion on the new tug will come from twin Caterpillar 3516C Tier 3 diesel engines, rated at 2,675 hp each. Rolls-Royce hybrid technology featuring two 424-kW electric motors powered by three CAT C9.3 generators will allow speeds up to 8 knots in electric-only mode. Bollard pull will be 90 short tons in combined diesel-electric mode. This project will be the first Rolls-Royce hybrid system installed on a tugboat.

Some 3,000 miles away, Washburn & Doughty of East Boothbay, Maine, is building two hybrid tugboats for Harbor Docking and Towing of Lake Charles, La. These 5,100-hp Tier 4 vessels will feature Caterpillar equipment from



The number of Rotortugs, which have two z-drives forward and one aft, is growing worldwide. Seabulk Towing in the U.S. now has three.

Seabulk Towing

“stem to stern,” including the hybrid propulsion system.

The cost difference between hybrid and conventional tugs is about \$1 million, according to Robert Allan Ltd.’s Fitzpatrick. He estimates a hybrid harbor tug working 2,000 hours a year at a 30 percent load factor could run on one main engine about 90 percent of the time. As such, it could cut the running hours on the engines in half.

“That’s where you start making an eco-

nomie case for it,” he said.

### Automation takes a step forward

At this point it’s likely a matter of when, not if, automation gains a serious foothold in the maritime industry.

One major breakthrough occurred last July, when Rolls-Royce and tug operator Svitzer demonstrated the world’s first remotely operated commercial vessel in Copenhagen, Denmark. The vessel was the 28-meter Robert Allan RAStar

ASD tug *Svitzer Hermod*. Rolls-Royce also plans to launch crewless tugboats and ferries by 2020.

From a wheelhouse in Svitzer headquarters, a captain remotely berthed the vessel, undocked, spun 360 degrees and sailed to Svitzer’s offices and docked again. The tug was equipped with numerous Rolls-Royce sensors and communications equipment including a dynamic positioning system, Lidar laser scanning, multiple cameras and other gear.

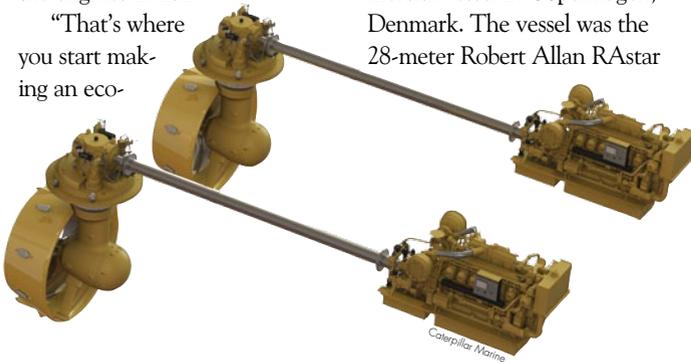
Oskar Levander, Rolls-Royce Marine’s vice president for innovation and digital systems, expects remote-control technology could lead to development of autonomous tugs. But there are technical chal-

lenges still to be overcome.

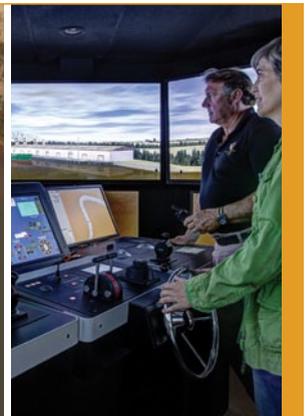
“We have demonstrated the situation awareness for navigation and operations for ship assistance,” he said, “but how do we autonomously hook up ropes?” He expects developments in robotics will provide the technology for handling mooring ropes remotely.

Robert Allan is working on several semi-autonomous or remote-controlled projects right now, including tugboats and fireboats, Fitzpatrick said. He expects the technology to advance first in Western Europe, Australia, Singapore and the U.S., where wages are high and safety regulations are more strictly enforced. •

American Tugboat Review editor Casey Conley contributed reporting.



Caterpillar offers an integrated propulsion system that includes z-drives.



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# Operators racing to meet Subchapter M deadline

Compliance required starting July 20; Coast Guard issues first COIs this spring

By Casey Conley

The deadline for Coast Guard Subchapter M compliance is fast approaching, but within the towing industry there is still uncertainty around the new inspection regime.

Operators and even some third-party surveyors have expressed frustration with the regulations, which they argue are not being enforced uniformly across different Coast Guard districts — and even sometimes within the same district.

Taken together, many towing companies will not be ready when the rules take effect July 20, according to Rob Keister, manager of compliance and special projects for Sabine Surveyors, one of nine third-party auditing organizations under Subchapter M.

“Some are a lot better off than others,” he said in a recent interview, but others “are just not ready for it. And three months is not enough time to get ready for it.”

Starting July 20, all existing tugboats and towboat vessels above 26 feet must comply with Subchapter M. However, after the first year, only 25 percent of a company’s fleet must have obtained a Coast Guard certificate of inspection (COI) before entering service.

That number increases by 25 percent each year, and all vessels must have this document by July 19, 2022. Single-vessel owners have until 2020 to get their COI. All towing vessels with major conversions or keels laid after July 20, 2017, must meet the regulations and

obtain a COI before entering service.

There are two methods for obtaining Subchapter M compliance, and operators must specify which method they are choosing. One involves submitting to a U.S. Coast Guard inspection.

The other method involves creating a Towing Safety Management System (TSMS) and hiring one of the nine third-party organizations to review the TSMS and conduct company and vessel audits and surveys. Companies with existing safety management systems (SMS) could meet TSMS requirements, according to Coast Guard Lt. Amy Midgett.

“Other Coast Guard-accepted SMS, such as the American Waterways Operators’ Responsible Carrier Program, may also be considered as meeting the TSMS requirements,” she said.

The COI is good for five years, although vessels must be re-inspected by the Coast Guard or re-surveyed each year by a third-party organization.

Vessels built to ABS and other class requirements will already meet most Subchapter M requirements. The Coast Guard issued the first COI in April to Marine Towing of Tampa for its tugboat *Endeavor*.

“Being ABS class, it was easy to pass Subchapter M rules,” MTT’s Capt. Jim Brantner said. “But I can see where vessels not built to class can have great expense to get into compliance.”

In early May, the Coast Guard issued the first COI

for an inland towboat to Marquette Transportation’s *Sacred Heart*.

Great Lakes Towing Co. is among the operators working to bring its 30-tug fleet into full compliance before July 20.

The firm hired a new employee focused solely on managing the documentation, training and tug conformity process required under Subchapter M. As of early May, fleet survey and audit fees had exceeded \$100,000, President Joe Starck said.

“The biggest problem we have is interpreting the regulations, which in some cases are ambiguous at best,” he said.

Lindsay Dew, who is leading Great Lakes’ Subchapter M efforts, said inspectors from one Coast Guard Marine Safety Unit will sometimes contradict interpretations of another. Other tug companies, he added, have shared similar concerns in recent months.

“I believe we are going to be ready. I don’t know what we are going to be ready for,” Dew said.

Subchapter M requirements are intended to be universal across all units, Midgett said. But she also acknowledged “limited flexibility” about certain provisions that might apply more to one part of the country than another.

“In some cases, the OCMI (Coast Guard officer in charge, marine inspection) is authorized by certain sections of the regulation to permit departures from specific requirements when special circumstances or arrangements warrant such

departures,” she said.

“In this regard, the OCMI recognizes that local practices in meeting the peculiarities of local conditions have often proved safe under conditions that do not conform to specific provisions of the regulations,” she continued, noting that certain provisions applying to the Great Lakes might not apply in the Gulf of Mexico or the Western Rivers.

Given the challenges some operators face, and the shrinking window to resolve them, Keister said some tugs won’t be in compliance come July 20. He also doesn’t expect serious repercussions for those vessels — that is, unless they are involved in a serious casualty.

“If a vessel is not in compliance, who is really going to know unless A, someone gets hurt on the boat and (goes) into litigation and the vessel is found not in compliance ... or B, the Coast Guard gets on board after a casualty and realizes the vessel not in compliance?” he said.

As the Subchapter M deadline approaches, the Coast Guard recommends firms develop a plan to bring their vessels into compliance if they haven’t already. Operators also must allow enough time for the Coast Guard or a third-party organization to conduct the necessary inspections, audits and surveys.

“Communication is the key to a smooth and productive process,” Midgett said. ●

*Susan Buchanan contributed reporting.*

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**TRITON/TRINITY** | Seabulk Towing, Fort Lauderdale, Fla.

# Seabulk spreads Rotortug fleet across the Gulf of Mexico

Story and photos by Brian Gauvin

**S**eabulk Towing turned heads in January 2017 when it welcomed *Trident*, the first U.S. Advanced Rotortug (ART), to its home base in Ft. Lauderdale, Fla.

In March 2018, *Trident's* sister ARTs, *Triton* and *Trinity*, gave

Mobile Bay tugboat watchers a treat, churning all three z-drives and propelling a water dance of omnidirectional moves.

*Trinity* was delivered in February, and since then has served Seabulk's Mobile, Ala., customers. A month later, *Triton* was in Mobile

*Above, Trinity going through its maneuvers near the Port of Mobile. Right, Capt. Bryan Welch helming Triton. Left, Seabulk Towing crew posing aboard Trinity: from left, Captains Mike Wilson, Welch and Steve Rotert, and chief engineers Buck Shoemaker, Richard Johnson and deck hand Kenny Bolin.*



for trials and crew training before heading to Port Arthur, Texas.

"The best way to describe the Rotortug would be as the next-generation SDM (Ship Docking Module)," said Rick Groen, Seabulk vice president and Seacor Ocean Transport vice president of operations. Seabulk is a subsidiary of Seacor Holdings.

"Even though the Rotortug was not invented nor designed by us, it is the logical next step of improvement from the SDM," Groen continued.

★ Second- and third-ever U.S. Rotortugs ★ 80 metric tons of bollard pull ★ The tugs can sidestep at 8.5 knots

SDMs are highly maneuverable tugs with fore and aft drives mounted on opposite sides of the centerline. Seabulk operates five such vessels. Rotortugs add power and propulsion redundancy, with two z-drives forward and one aft.

The ability to work LNG terminals was a prime motivator for building the ARTs. “We have a tremendous track record and want to expand on that by being an experienced Rotortug operator,” Groen said. “We feel very strongly the Rotortug is the ideal assist tug for terminals in general and LNG terminals in particular.”

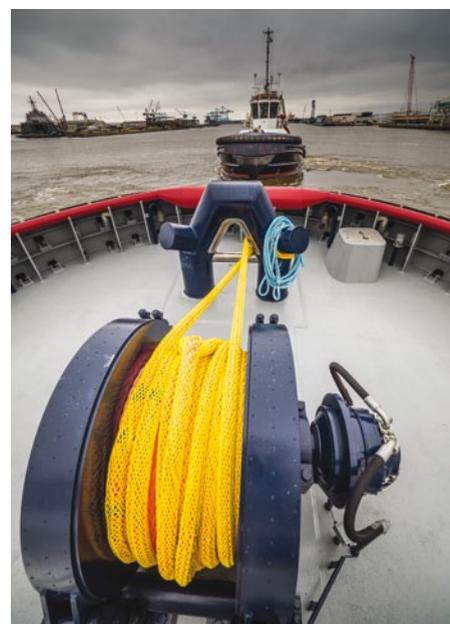
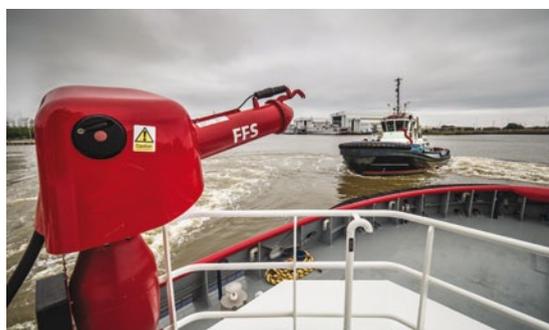
Robert Allan Ltd. of Vancouver, B.C., introduced several refinements to the Rotortug design while working with Kotug, the Dutch company that developed the vessels in the late 90s. Robert Allan later became the exclusive worldwide ART designer.

These tugs are typically defined

by their bollard pull and length, with the suffix “US” added to the American boats. As such, Seabulk’s 98.5-foot tugs with 80-ton bollard pull are designated ART 80-98US. They were built at Master Boat Builders, of Bayou La Batre, Ala.

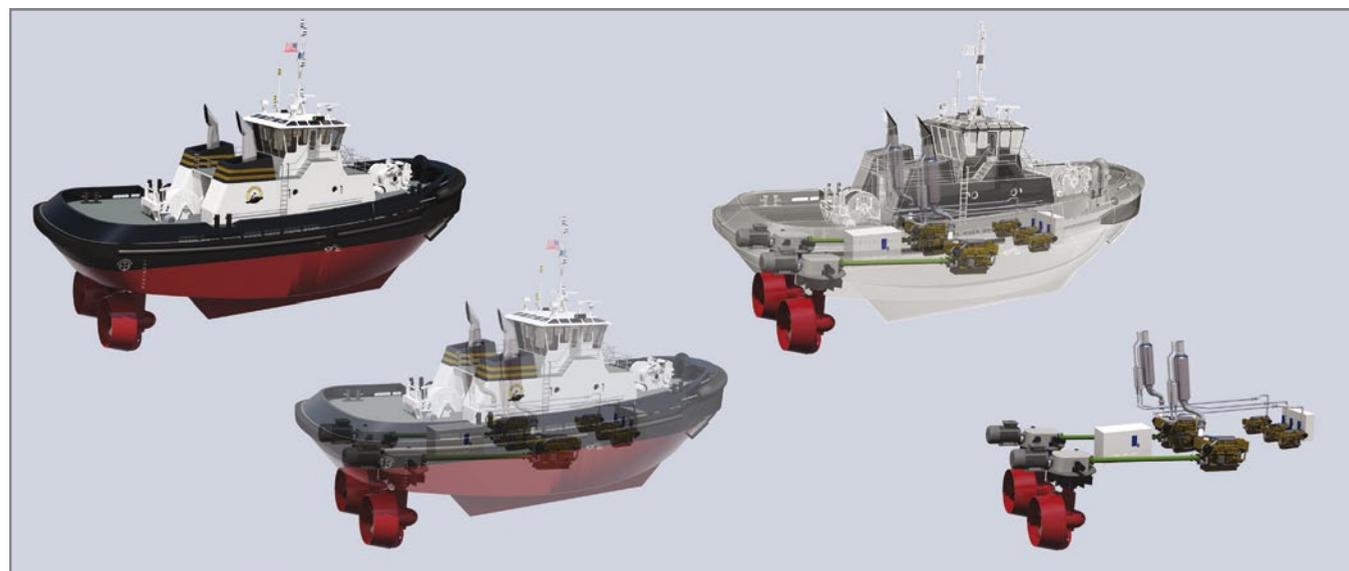
“We liked the vessel redundancy the design provided — the additional drive unit so if one breaks down you’re not incapacitated, and the ability to run the boat as an ASD, true tractor (tug) or SDM,” said Groen. “We could

Below, *Triton’s* remote-controlled FFS fire monitor is capable of 5,240 gpm. Right, JonRie supplied winches for *Triton* and its sister tug *Trinity*, shown off the bow.



lose a drive unit and still continue with the two units still functioning and have a bollard pull of 51 tons.”

The lead boat in the series, *Trident*, has proven itself during the



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last 14 months in Port Everglades, said Capt. Mike Wilson. He and Capt. Steve Rotert, armed with a boatload of experience on *Trident*, helped train the new tugs' captains and crew in Mobile.

During a recent visit, Capt. Bryan Welch from Port Arthur was completing his second training day on *Triton*. Welch has extensive



Below, *Triton* is powered by three Cat 3512C engines each producing 1,911 hp.

experience with ASD tugs, notably the 5,300-hp *Apollo* in Port Arthur. "These tugs are definitely different to operate," he said. "They are a lot more maneuverable than the ASDs."

Rotert acknowledged ARTs can take some getting used to. "But once you learn how to operate the third engine, it picks up quickly," he said.

On a typical ASD or tractor tug, a skeg provides the hydrodynamic force used to steer a ship. But on a Rotortug, the third thruster positioned aft provides for the same forces, Rotert explained. Not having a skeg increases maneuverability and makes for safer escorting as well. It also allows for more control in a ship's wake or bow wash.

"If you lose any propulsion, the tug will simply fall in behind the ship and avoid tripping," Rotert said.

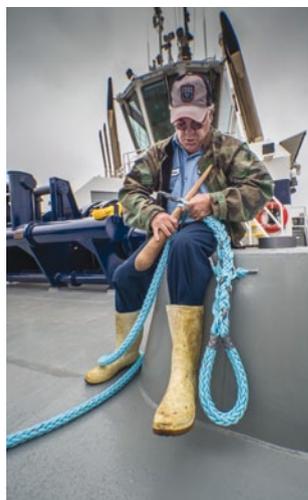
The ART 80-98US has a fore and aft speed of 12.5 knots, slips sideways at 8.5 knots and can turn

on a dime. The increased mobility and maneuverability provided by the third drive lets the tug shift position easily when ship handling under load in tight spaces.

The "rotoring" maneuver is another advantage when handling longer ships. With this move, the tug operates within a vessel's beam limits. In the rotoring mode, the tug's wash is directed away from the ship, allowing for more efficient control.

A notch on the joystick allows the clutch to be slipped on the drive engines between 0 and 125 rpm. Past 125 rpm, the clutches kick back up to 1,600 rpm. "We use it anywhere we don't want to create a turbulent wheel wash," said Rotert. "In tight slips or docking, wherever a strong wheel wash would push against a hull or dock and work against the tug."

As for slow docking, Wilson said: "You slip-clutch the port engine and work in SDM mode."



Above, deck hand Kenny Bolin splices a loop into mooring line aboard the Rotortug *Triton*.

Three Caterpillar 3512C Tier 3 diesel engines producing 1,911 bhp at 1,600 rpm provide propulsion on *Trident* and *Triton*. The engines are coupled with Schottel SRP 1012 z-drives. Twin Caterpillar 150-kW gensets provide electrical power.

When Seacor introduced Rotortugs into its fleet, the company planned to add a

stem drive to *Eagle*, a forward tractor tug based in Port Canaveral.

"It ended up that converting to a Rotortug was almost as expensive as building new," Groen said, "so we kept the engines and drives in storage, and then later decided to build a new one with the equipment."

As such, *Trinity*'s propulsion is a little different than its sister tugs. Its powertrain consists of Tier 3

Caterpillar 3512C mains generating 1,649 bhp and turning Veth z-drives. The two auxiliary generators are 99-kW John Deeres.

*Trident*'s wheelhouse, designed for maximum all-around visibility, provides a full and clear view of the tug's fore and aft working areas. The helmsman sits amid a sophisticated array of hardware and electronics populating the molded Alphasat Marine integrated bridge system. The console monitors can be configured independently according to the helmsman's preference. Displays feature touch-screen control for lights, whistle, horn, monitor displays and other functions.

As on *Trident*, *Triton* is outfitted with a JonRie Tri-Winch set. The

#### TRITON SPECIFICATIONS

**OWNER/OPERATOR:** Seabulk Towing  
**BUILDER:** Master Boat Builders  
**DESIGNER:** Robert Allan Ltd.  
**DIMENSIONS:** 98.5' x 43.5' x 18.5'  
**MISSION:** Escort and assist duties  
**CREW SIZE:** 4 to 6

#### PROPULSION:

- ◆ Engines: (3) Cat 3512C generating 1,911 bhp at 1,600 rpm
- ◆ Bollard pull: 80 metric tons
- ◆ Vessel speed: 12.5 knots
- ◆ Propellers: (3) Schottel SRP 1012 z-drives
- ◆ Auxiliary generators: (2) Cat (7.1 150-kW gensets

#### DECK EQUIPMENT:

- ◆ Winches: JonRie InterTech Series 230 hawser winch with 450' of 8" Samson Saturn-12 HMPE rope, 40' of Saturn-12 Pendant; JonRie InterTech Series 500 double-drum (towing and hawser) winch with 2,100' of 2.25" galvanized EIPS IWRC wire and 450' of 8" Samson Saturn-12 rope
  - ◆ Fendering: Schuyler Companies extruded cylindrical and W-block
  - ◆ Coatings: Intershield and Intertwine systems
- NAVIGATION GEAR:**
- ◆ Alphasat Marine integrated bridge
  - ◆ Radar: (1) JRC Sea Radar, (1) JRC River Radar

- ◆ Sat compass: JRC JLR-31
- ◆ GPS: Rose Point ECS
- ◆ Autopilot: Alphasat
- ◆ Depth Sounder: JRC JLR-31

#### COMMUNICATIONS:

- ◆ Radio: (4) Icom IC-M506 VHF

#### CAPACITIES:

- ◆ Fuel: 52,027 gallons
- ◆ Water: 4,736 gallons
- ◆ Gear oil: 867 gallons
- ◆ Engine oil: 867 gallons

#### FIREFIGHTING:

- ◆ Monitors: (1) forward-mounted FFS remote-controlled unit, 5,240 gpm
- ◆ Pumps: FFS SFP 250, PTO to the port main engine
- ◆ Onboard fire suppression systems: Ansul FM-200

#### ADDITIONAL INFORMATION:

- ◆ (2) Viking 10-person life rafts; SikaFloor Marine Flooring; Duramax box coolers; ABS classed



Seabulk Towing assigned *Triton* to Port Arthur, Texas, while *Trinity* works in Mobile, Ala. The lead tug in the class, *Trident*, operates from Port Everglades in Fort Lauderdale, Fla.

term refers to a JonRie Series 230 hawser winch on the bow and a JonRie Series 500 double-drum winch on the stern. The stern winch towing drum is wound with 2,100 feet of 2.25-inch wire rope and the aft hawser drum holds the same cordage as the bow winch.

The Tri-Winch configuration was designed for escort operation over the bow or stern and long-line towing over the stern. “It makes the winch set ideal for escorting, terminal support, towing and ship assist of the new containerships that come through the new Panama Canal expansion,” said JonRie President Brandon Durar.

The bow winch on *Trinity* is as described above. However, the stern winch on *Trinity* is a single-drum aft hawser winch. It is the first hawser winch designed and built by JonRie with an independent gypsy head, providing versatility for aft deck operations. The main drum can be used to hold a load while the gypsy can be used simultaneously as an arm to move a second line.

The wide beam of the ART allows for generous living areas. The master’s and chief engineer’s cabins are in the deckhouse above two double crew cabins on the lower accommodation deck. The deckhouse also has a fully appointed mess-lounge and galley.

“These are the best boats I’ve ever been on, including the Voith Schneider-powered tugs,” Wilson said. “They com-

pare to the Voiths for maneuverability but they have much more power. And a lot more thought in the design is paid to crew comfort: multiple heads — four of them — and everyone has their own room, a place to relax.”

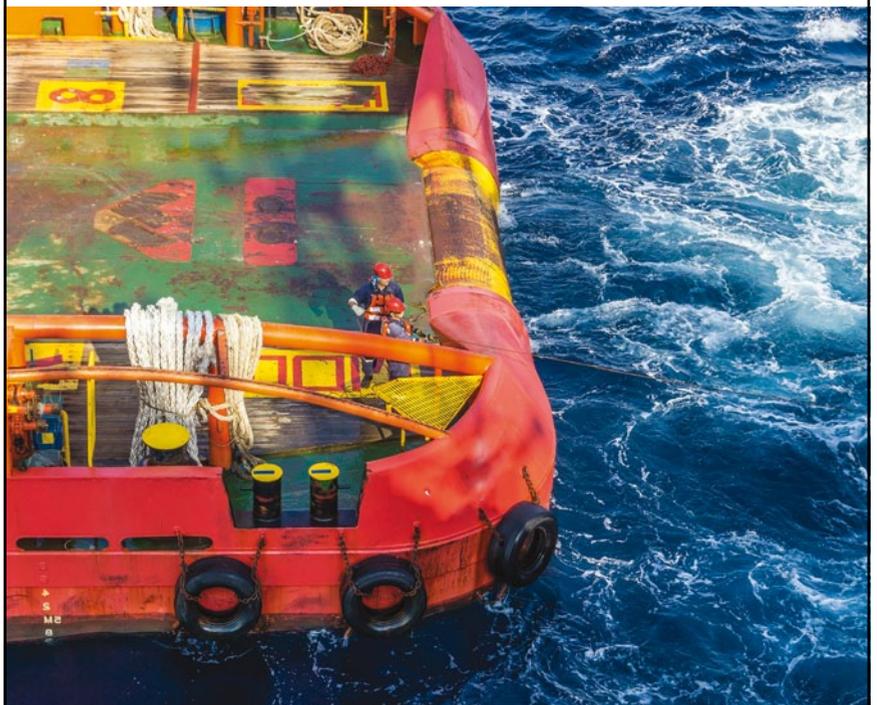
When SDMs were introduced, they were much talked about, as are ARTs in the U.S. now. Although new to U.S. harbors, ARTs have proven their worth worldwide. With three now working on U.S. shores, there is a sense these tugs are

gaining wider acceptance.

“Five years ago, maybe we built two or three Rotortugs a year,” said Mike Fitzpatrick, Robert Allan Ltd. president. “I think right now we have 14 that were either just recently delivered or under construction.”

“The market in general has accepted there are definitely some advantages of Rotortugs,” he continued. “You can see that now by the number that are being built.”

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**DR. HANK KAPLAN/RICH PADDEN** | Harley Marine Services, Seattle

# Caterpillar z-drives set Harley Marine's latest tugs apart

Story and photos by Casey Conley

**D**ozens of RAmports-series tugboats designed by Robert Allan Ltd. work in North American ports, but none quite are like Harley Marine Services' *Dr. Hank Kaplan* and *Rich Padden*.

These 5,350-hp RAmports 2400 harbor tugs are the first with Caterpillar integrated propulsion systems featuring Cat engines and z-drives. Cat also supplied electrical generators powering the 80-by-36-foot vessels.

Diversified Marine of Portland, Ore., delivered *Dr. Hank Kaplan*

*Above, Dr. Hank Kaplan shows off along the Seattle waterfront. Right, the Markey bow winch aboard Rich Padden. Below, Rich Padden crew, from left: engineer Joseph Corey, Capt. Mitchell Hetterle, junior captain Tanner Lippincott and AB/deck hand Wes Shoemaker.*

in mid-2017, and *Rich Padden* followed about five months later. Seattle-based Harley Marine assigned both to Starlight PNW, a newly formed unit providing ship-assist and barge-handling services in Puget Sound. Diversified is building a third tug in the series, *Vern Patterson*.

Capt. Mitchell Hetterle described the tugs as nimble, stable and powerful. He said they're responsive and forgiving, particularly when handling barges, which account for a good chunk of Harley's Seattle-area business.

"It's a pretty effortless boat in any situation you put it in because it handles so good," he said during a March ride aboard *Rich Padden* in Seattle. "It opens up a lot of doors."

"It's my favorite boat to run," he added. "This boat is the sportiest of all of them."

Robert Allan's RAmports series is one of the most widely adopted designs anywhere in the world. More than 400 such tugs have been built over the years

across 18 different platforms ranging from 22 to 36 meters. The length denotes the platform; RAmports 2400-series tugs are 24 meters long and so on.

The design itself is optimized for ship handling. It features a modified skeg and rounded bow, as well as an elevated wheelhouse for all-around visibility. The raised forecabin offers additional freeboard but not enough to prevent close-quarters work in a ship's flare.

"It's just got a good hull form," said Jim Hyslop, a Robert Allan Ltd. naval architect who worked on the updated design. "It's very maneuverable, it goes sideways very well and it goes astern very



well. Those are the main characteristics — good omnidirectional performance."

"It's a compact and efficient harbor tug for ship docking," he added.

*Dr. Hank Kaplan* and *Rich Padden* represent the latest RAmports design for Harley Marine. The 3,800-hp tugs *Tim Quigg* and *John Quigg* (since repowered to 4,500 and 4,800 hp, respectively) launched the series in 2004. They were followed 11 years later by *Michelle Sloan* and *Lela Franco*. These so-called "enhanced" Quigg-design tugs are more powerful with 5,350 hp, and their beams are four feet wider at 36 feet.

"These two with the new engines and drive units and the ... enhancements we've built over



\* First Caterpillar z-drives in the U.S. \* Third-gen RAmports 2400 design \* Interior enhanced for crew comfort

the years are really the third generation,” Matt Godden, Harley Marine’s senior vice president and chief operating officer, said of *Dr. Hank Kaplan* and *Rich Padden*.

Harley Marine and its chief executive, Harley Franco, have long favored Caterpillar engines. And over the last six or seven years, its tugs have been early adopters for new Cat technology. Prior examples of this partnership include *Ahbra Franco*, built in 2013 with Cat’s continuous pull engines, and *Earl W. Redd*, the first EPA Tier 4 boat, which entered service early last year.

“We’re the ‘beta test site’ sometimes is one way to explain it,” Franco said in an interview. “They know the product, and we are putting it in our vessels and we are giving them daily input — the good, the bad and the ugly.

“It’s like a cohesive mission between our company and theirs

to develop a better product,” he continued.

Caterpillar’s foray into z-drive units stems from its 2013 acquisition of Berg Propulsion, a Swedish company with a proven line of azimuthing thrusters. These units have been in use on workboats around the world but, until now, not in the U.S. Cat has rebranded Berg’s products under the trade name Cat Propulsion.

“We took the legacy design we

Right, the galley and mess aboard *Rich Padden* is comfortably equipped for its four-person crew. Below, Capt. Mitchell Hetterle steers *Rich Padden* along the Seattle waterfront.



had from Berg Propulsion products and changed them to match our 3500-series engines, so it really optimized the performance of the units with these engines,” said Emil Cerdier, Cat Propulsion Americas sales manager.

One big selling point, he said, is the integration between the engines and the drives. Another is the ability to monitor the entire propulsion system from a dedicated wheelhouse display.

Cat’s drives have a slip clutch

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*Pictured: the 6,000-hp Clayton W. Moran*



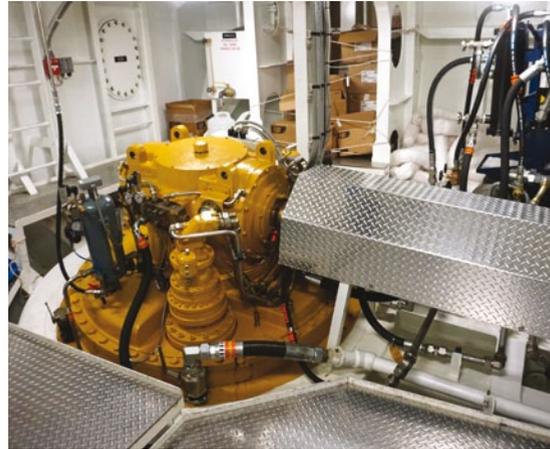


maneuvering and assisting with barge handling,” said Capt. Jonah Petrick, who runs *Dr. Hank Kaplan*. “It’s also good for maneuvering and docking in sensitive areas where prop wash is a concern.”

Propulsion comes from twin Caterpillar 3516C Tier 3 engines driving Cat MTA 524 z-drives through Centa shafts. The Cat

function that lets the operator reduce propeller rpm to as low as 35 rpm. Operators can “clutch in” during normal working operations when additional power is needed. The system is operated from an integrated bridge control unit, and has proven popular with Harley’s captains.

“That has been extremely useful for us, not necessarily in regards to ship assist, but for



Top, *Dr. Hank Kaplan* and *Rich Padden* have all-Caterpillar engine rooms. Above, the two tugs also are the first in the U.S. with Cat-branded z-drives.

C7.1 129-kW gensets provide ship service power represent an upgrade over recent predecessors in the series. Bollard pull is rated for 68 short tons ahead.

Deck gear consists of a Markey DEPC-32A winch on the stern and a Markey DEPC-48 on the bow, both spooled with Samson AmSteel-Blue line. A Burrard Iron Works capstan is installed on the foredeck to help with line handling.

The interior on Harley’s latest RAmports 2400 tugs hasn’t changed a great deal from the second-gen models. The main deck features a mess and galley plenty suitable for four people and the captain’s cabin. Down one level, there are two more shared rooms. Vibration and sound-deadening material was used throughout the accommodations spaces.

The wheelhouse is spacious and bright, with an array of Furuno navigation electronics and Nauticomp displays. The helm station is further forward than in

the second-gen vessels, offering a better view over the front of the tug, Hetterle said. Large windows provide 360-degree views, while CCTV cameras let the operator see what’s happening elsewhere on the vessel. The height of eye is 29 feet.

Both tugs have a custom fendering package that includes a 36-by-18-inch Shibata cylindrical fender at the main deck level above 12-inch, loop-type Schuyler fenders. Laminated bow fenders are located below the main deck and knuckle.

“Cylindrical fender is a soft contact when you initially make contact with the ship, and as you increase your push, what happens is you increase the contact area and therefore get lower pressures,” explained Hyslop, the naval architect.

The two new tugs, as well as the third one under construction at Diversified, are named for people with close ties to Harley Marine. Dr. Hank Kaplan is a cancer researcher at a prominent Seattle hospital, and Harley has long donated proceeds from an annual golf event to Kaplan’s cancer research fund.

Rich Padden is a Harley Marine board member and education advocate for students of diverse backgrounds. He and his wife, Laurie, also launched the Cystic Fibrosis Seattle Guild that has raised more than \$100 million for research. Vern Patterson, who passed away in 2015, was a longtime Caterpillar employee who had close ties with Harley Marine.

Since entering service, the new tugs’ performance has matched their pedigree. They’re earning strong reviews from captains, crews and local pilots, and they’ve proven effective and efficient at docking ships and handling barges.

In short, Godden said, they’ve been exceptional all around. ●

## DR. HANK KAPLAN/ RICH PADDEN

### SPECIFICATIONS

**OWNER/OPERATOR:** Harley Marine Services/  
Starlight PNW

**BUILDER:** Diversified Marine

**DESIGNER:** Robert Allan Ltd.

**DIMENSIONS:** 80’ x 36’ x 15’8”

**MISSION:** Harbor tug

**CREW SIZE:** 4

#### PROPULSION:

- ◆ Engines: (2) Caterpillar 3516C Tier 3 mains each rated for 2,675 hp
- ◆ Bollard pull: 68 short tons ahead
- ◆ Vessel speed: 12.5 knots
- ◆ Z-drives: (2) Caterpillar MTA 524
- ◆ Propellers: 4-blade, 2,400-mm diameter
- ◆ Auxiliary generators: (2) Caterpillar C7.1 Tier 3, 129 kW

#### DECK EQUIPMENT:

- ◆ Winches: Markey DEPC-32A (stern), Markey DEPC-48 (bow)
- ◆ Cordage: 150’ of 2.25” Samson AmSteel-Blue (stern); 620’ of 2.5” Samson AmSteel-Blue (bow)
- ◆ Capstan: Burrard Iron Works
- ◆ Fendering: Schuyler Companies and Shibata

#### NAVIGATION GEAR:

- ◆ Radar: (1) Furuno RDP-152, (1) Furuno RCU-014
- ◆ Electronic chart display: Nauticomp 29-1911 displays
- ◆ Compass: Furuno satellite compass; Ritchie magnetic compass
- ◆ AIS: Furuno FA170 providing inputs into ECS and radar
- ◆ E-nav software: Rose Point Navigation Systems
- ◆ Autopilot: Simrad AP70

#### COMMUNICATIONS:

- ◆ Radio: (3) Standard Horizon GX5500S VHF

#### CAPACITIES:

- ◆ Fuel: 33,186 gallons
- ◆ Water: 2,813 gallons
- ◆ Lube oil: 585 gallons

#### FIREFIGHTING:

- ◆ Onboard fire suppression systems: Kidde FM-200



**BENSON GEORGE MORAN** | Moran Towing Corp., New Canaan, Conn.

# Moran updates 93-foot workhorse for the Tier 4 era

By Casey Conley | Photos by Brian Gauvin

Over the past two decades, 92- and 93-foot tugboats have become the backbone of Moran Towing's ship-assist fleet. With *Benson George Moran*, that venerable class has undergone its first update since 2011.

The 6,772-hp vessel, named for Moran chairman Paul Tregurtha's grandson, is the company's first with EPA Tier 4-rated propulsion. The 93-by-

*Above, Benson George Moran is Moran Towing's first Tier 4 tugboat. Below, Capt. Clint Campbell watching the radar in thick fog off Port Arthur, Texas.*

38-foot tug is 12 percent more powerful than its predecessors. It's also the first newly built Moran tug with Caterpillar engines and Rolls-Royce z-drives.

Washburn & Doughty built the tug at its East Boothbay, Maine, shipyard. Bruce Washburn, the firm's naval architect and executive vice president, said the proven design required a series of modifications — largely to accommodate the aftertreatment modules and urea tanks.

Moran assigned *Benson George Moran* to Port Arthur, Texas. Since arriving in early 2018, it has earned strong reviews from Moran captains and local pilots.

"It can do the work of two conventional tugs," said Capt. Mark Taylor of the Sabine Pilots. "That frees up boats for our harbor to move other vessels, which

goes a long way toward making us more efficient."

"That particular tractor tug is the strongest in our harbor," he continued. "It's the biggest, strongest, most versatile tug we have."

Port Arthur-Beaumont is a major petroleum and chemical port, home to the Motiva Port Arthur refinery, one of the largest facilities in the U.S. The region attracts numerous towboats pushing tank barges, deep-draft tankers and the occasional bulker.

Assist tugs working in Port Arthur typically meet inbound ships south at the Texaco Island intersection southwest of the city then escort them to their destination. There, a second assist tug arrives for docking. During the escort, tugs are often asked to slow the ships while they pass other moored vessels.

"We're constantly being used

## **BENSON GEORGE MORAN** SPECIFICATIONS

**OWNER/OPERATOR:** Moran Towing Corp.  
**BUILDER:** Washburn & Doughty  
**DESIGNER:** Washburn & Doughty  
**DIMENSIONS:** 93' x 38' x 16.5'  
**MISSION:** Ship docking and escort  
**CREW SIZE:** 4, accommodations for 6

### **PROPULSION:**

- ◆ Engines: (2) Caterpillar 3516 Tier 4 each producing 3,386 hp
- ◆ Bollard pull: 80 metric tons
- ◆ Z-drives: (2) Rolls-Royce US 255
- ◆ Propellers: (2) 110" stainless-steel props
- ◆ Auxiliary generators: (2) John Deere 99-kW 4045AFM85

### **DECK EQUIPMENT:**

- ◆ Winches: Markey DEPCF-52 with level wind
- ◆ Cordage: 400' of Cortland 9.5" Plasma mainline
- ◆ Capstan: Markey CEW-60
- ◆ Fendering: Morse Rubber

### **NAVIGATION GEAR:**

- ◆ Radar: (2) Furuno TZT14

- ◆ Compass: Furuno SC30 satellite compass; Ritchie Globemaster YB-600

- ◆ AIS: Furuno FA150

### **COMMUNICATIONS:**

- ◆ Radio: (2) Icom IC-M604 VHF

### **CAPACITIES:**

- ◆ Fuel: 38,000 gallons
- ◆ Urea: 2,000 gallons
- ◆ Potable water: 4,134 gallons
- ◆ Lube oil: 1,345

### **FIREFIGHTING:**

- ◆ Monitors: (2) FFS 1200 each capable of 5,284 gpm
- ◆ Pumps: 11,750-gpm FFS pump driven by a Caterpillar C32 engine
- ◆ Onboard fire suppression systems: Ansul Sapphire FM-200



★ Moran's first Tier 4 tugboat ★ First Moran 93-footer with Cat engines ★ Most powerful tug in Port Arthur

to slow them down, then when they get past the dock the ship speeds up again, then they might

and not throwing a big wake in the water,” he continued.

Benson George Moran’s design can be traced back to Moran’s 92-by-32-foot tugs introduced nearly two decades ago. Over time, Washburn & Doughty lengthened the hull by a foot and the beam by 6 feet. These changes



Left, unlike its predecessors outfitted with EMD mains, Benson George Moran is equipped with Caterpillar engines. Below, Moran’s 93-foot tugboat class evolved from an earlier line of 92-footers first introduced nearly two decades ago.

slow down and speed up again several more times,” said Moran Vice President Steve Kelly, who runs the company’s Port Arthur office. “Depending how far up the Neches River they are going, this can happen three or four times, maybe five or six times.”

“It’s all about being careful



allowed for larger engines capable of providing more than 6,000 hp, better escort stability and roomier crew spaces.

Washburn & Doughty built 12 93-by-38-foot EPA Tier 3 tugs for Moran between 2011 and 2017, beginning with James A. Moran and ending with Clayton W. Moran, which the company assigned to its Norfolk operation. That 6,000-hp vessel has twin EMD 12-cylinder mains and Schottel drives.

Washburn said the latest 93-foot platform evolved in several important ways. For one thing, the main deck was raised by 12 inches, creating additional space in the engine room for Tier 4-required equipment. These systems inject diesel exhaust fluid (DEF) into the exhaust stream to reduce nitrogen oxides (NOx) and particulate matter (PM) emissions.

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More importantly, the additional freeboard also improved escort performance. “We did a (computational fluid dynamics) study on the hull to try to nail down what we could do to optimize the escort performance or indirect performance of the boat,” Washburn said. “It came up that adding 12 inches of freeboard would be optimal. We didn’t really gain anything after

that.”

Adapting the design to meet Tier 4 standards had its challenges. Among them, the vessel required a continuous supply of compressed air and an additional system for pumping the DEF. Stainless-steel tanks also were added to hold DEF.

“People have had their first crack at (Tier 4 designs) and are seeing what they like and what



Left, aft-facing FFS fire monitors on the FiFi-1-rated *Benson George Moran*. Right, Markey Machinery’s DEPCF-52 bow winch spooled with 400 feet of Cortland 9.5-inch Plasma line.



they don’t like,” Washburn said, noting that *Benson George Moran* was the yard’s first Tier 4 boat. “And it was the first boat our Cat dealer had done, so there was some learning going on all around.”



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Washburn & Doughty is building a second 6,772-hp Tier 4 tugboat for Moran due later this year, and a similar Tier 4 tugboat for G&H Towing of Houston.

From an operations standpoint, adapting to Tier 4 required training around DEF handling and spill response, Kelly said. But in general he considers it a non-event. "So far there really haven't been any major hurdles to overcome."

Propulsion on *Benson George Moran* consists of twin Caterpillar 3516 Tier 4 mains each rated for 3,386 hp. The engines turn Rolls-Royce US 255 z-drives with 110-inch stainless-steel props in nozzles. Bollard pull is guaranteed at 80 tons ahead, although crews are seeing higher numbers on their line tension meters, Kelly said.

Electrical power comes from twin John Deere 99-kW generators, and a Caterpillar C32 engine drives the ves-

sel's FFS fire pump capable of 11,750 gallons per minute. Twin stern-facing FFS 1200 monitors installed aft of the wheelhouse can each disperse 5,284 gpm. The tug has a FiFi-1 rating.

Like its most recent sibling outfitted to handle neo-Panamax ships, *Benson George Moran* has a 75-hp Markey DEPCF-52 electric hawser winch on the bow with the render-recover feature to maintain constant line tension. The drum is spooled with 400 feet of Cortland 9.5-inch line. On the aft deck is a CEW-60 electric capstan.

Moran has standardized the wheelhouse layout across its newbuilds, making *Benson George Moran* virtually identical to its earlier sister tugs. It features Furuno electronics and closed-circuit TV cameras installed throughout the vessel. LED bulbs are installed in crew spaces and used with navigation lights and floodlights.

*Benson George Moran* has a standard crew of four, with a captain, mate, engineer and AB/deck hand. The tug has four cabins — giving each crewmember their own space during normal operations — with total berthing for six. The captain and mate's rooms are located on the main deck, while the other two staterooms are below.

*Benson George Moran* has earned a reputation as a comfortable boat. The tug has flat-screen TVs and high-speed Internet in every cabin, and each room has programmable climate controls. Vibration- and sound-reducing materials were installed in floors, walls and ceilings. The main deck has an open floor plan between the galley and mess.

"The captains on her, without asking, came up to me one day and said, 'I love the boat,'" Kelly said. "Much of that has to do with the living area."

"It's the best design you can find for accommodating four guys," he added.

Capt. Ryan Riggins and Capt. Clint Campbell have been assigned to command *Benson George Moran*. Both Campbell and Riggins have offered high praise for the crew accommodations. The performance, they said, has been spot on.

"It's a really nice tug," Riggins said. "I like it, what can I say?"

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**DAISY MAE** | Coeymans Marine Towing, Coeymans, N.Y.

## Third engine gives *Daisy Mae* versatility and power to spare

Story and photos by Brian Gauvin

**R**odriguez Shipbuilding has made shallow-draft, triple-screw tugboats something of a specialty. Its latest product is *Daisy Mae*, built for Coeymans Marine Towing (CMT).

The 83-foot tugboat is based at the Port of Coeymans 10 miles south of Albany. It's primarily used for moving material to New York City more than 100 miles to the south.

"The bulk of the business is aggregate, but we are getting into

*Above, Daisy Mae mostly moves aggregate barges to New York City from upstate ports. Right, Capt. Mark Pearson operating the aft winch controls on the Markey TDS-24 stern winch.*



everything," said Mark Pearson, a senior captain and vessel manager for CMT.

Rodriguez Shipbuilding of Coden, Ala., delivered the 3,300-hp vessel in fall 2017. Yard owner Joe Rodriguez designed it with input from Pearson and Matt Hofmann, CMT's vice president of operations.

Originally, *Daisy Mae's* power was to be provided by two Cummins QSK38 engines providing 2,600 total hp. But because the Hudson ices up during the winter, the Coast Guard requires tugs working on the river to have at least 3,000 hp.

Rodriguez estimates the two Cummins mains turning propellers in Kort nozzles would produce more than 3,000 hp, albeit uncertified. Increasing horsepower would meet Coast Guard minimums during ice conditions, but the question was whether to incorporate larger engines or a third main.

Drawing on his triple-screw expertise, Rodriguez suggested tucking a 750-hp Cummins QSK19 engine between the two larger mains. The configuration also includes Kort nozzles, which can boost thrust by 25 percent or more. *Daisy Mae's* overall bollard pull is 50 tons, and Rodriguez believes it rivals a 4,000-hp tug.

Pearson acknowledged some

\* Triple-screw propulsion package \* 50-ton bollard pull \* Model bow for towing, pushing barges

“back and forth on the issue” of adding a third engine. But he said the redundancy offered by a third main was the deciding factor. “We would have the ability to finish a job in the case of an engine going down,” he said.

All three engines are equipped with shaft brakes, allowing for different power scenarios depending on the season, the job and other factors. For example, Pearson said the smaller engine likely won't be used when the Hudson is clear of ice. However, it could be used in place of a larger main for transits and harbor jogging to save fuel and engine wear.

The Cummins QSK38 mains are coupled to Twin Disc MGX-5321 deep-case gears at a 5.96:1 ratio, and shafted to Kahlenberg stainless-steel, four-bladed,

75.25-by-80-inch propellers. The Cummins QSK19 is coupled to a Twin Disc MGX-5222 gear at a 6.1:1 ratio and shafted to a Kahlenberg stainless-steel, four-bladed, 65.25-by-72-inch propeller.



Above, Cummins Marine engine technician Chris Stealham fine-tunes the Cummins QSK38 engine aboard *Daisy Mae*. Right, second AB Michael Grooms and engineer Raymond Churchill clinch the cable as it reels into the Markey towing winch.

The third engine also allowed for smaller wheels and less draft, resulting in a 10-foot molded depth. Depending on load conditions, the tug can operate in 8 feet of water. Another benefit: Rodriguez argues tugboats with a triple-screw configuration can rival z-drive tugs for maneuverability at a much lower price.

“*Daisy Mae* is set apart from other tugs for a few reasons,” Pearson said. “She has four flanking rudders, giving her river towboat maneuverability in a coastal model bow tugboat.”

The model bow design gives *Daisy Mae* better sea-keeping abilities than a conventional push-knee riverboat. But the tug, fitted with steering rudders on each of the mains, has the maneuverability of a riverboat. The combination of flanking rudders, foil-shaped steering rudders, shaft brakes, Kort nozzles and the muscular horsepower of the port and starboard mains on a beamy hull results in a nimble, responsive boat.

“With the three-screw tug, we have three steering rudders for main propulsion and flanking rudders for the two outside wheels. Because they are in Kort

nozzles, we use the flanking rudders to direct the flow of water from the wheels. When you're landing a 600-foot tow with a fair tide, the flanking rudders work very well.”

The riverboat characteristics are well suited to the river currents and cramped harbors on the Hudson and in New York City. On the other hand, the model bow was of great benefit on *Daisy Mae*'s maiden voyage shortly after Hurricane Maria ravaged Puerto Rico.

After departing the Rodriguez yard, *Daisy Mae* made Port Canaveral, Fla., Charleston, S.C., and then Hampton Roads, Va., where the tug picked up a barge at Newport News. From there, the vessels headed south to West Palm Beach, Fla., where the barge took supplies for Puerto Rico's relief



effort. The tow primarily had four-wheel-drive trucks carrying tanks of fuel, bucket trucks and some containers of supplies.

“It was a five-and-a-half-day trip, one way,” Pearson reported in mid-November, as he prepared for a second run. “She has proven herself a sturdy sea boat, and she is a comfortable boat because of the beam-to-length ratio. We are working out the best fuel burn with the three engines — which ones to have running for the best fuel economy.”

“Aside from a couple of initial minor bugs, there are no major issues with the boat,” he added.

## DAISY MAE SPECIFICATIONS

**OWNER/OPERATOR:** Coeymans Marine Towing  
**BUILDER:** Rodriguez Shipbuilding Inc.  
**DESIGNER:** Joe Rodriguez  
**DIMENSIONS:** 83' x 31' x 10'  
**MISSION:** Pushing aggregate barges  
**CREW SIZE:** 5

### PROPULSION:

- ◆ Engines (2) Tier 3 Cummins QSK38, 1,300 hp at 1,800 rpm; (1) Tier 3 Cummins QSK19, 750 hp at 1,800 rpm
- ◆ Bollard pull: 50 tons
- ◆ Vessel speed: 10 knots top speed
- ◆ Propellers: (2) Kahlenberg stainless-steel 4-blade 75.25"x80" Kaplan-style prop; (1) Kahlenberg stainless-steel 4-blade 65.25"x72" Kaplan-style prop
- ◆ Gearbox: (2) Twin Disc MGX-5321 at 5.96:1 ratio; (1) Twin Disc MGX-5222 at 6.1:1 ratio
- ◆ Auxiliary generators: (2) Cummins QS87-DM, 60 kW
- ◆ Electronic chart display: Simrad NSS16 evo2 with (3) 16" HD touch-screen displays
- ◆ Compass: Simrad HS80A GNSS; Ritchie traditional compass
- ◆ AIS: Simrad V5035 Class-A transceiver
- ◆ Autopilot: Simrad AP70
- ◆ Depth sounder: Simrad CHIRP, StructureScan and ForwardScan transducer

### COMMUNICATIONS:

- ◆ Radio: (3) Standard Horizon GX5500S VHF radios
- ◆ Satellite connection: Globalstar satphone
- ◆ Weather station: Simrad SiriusXM Marine Coastal WM-3 weather receiver
- ◆ Bridge monitoring system: Furuno BR-510 alarm system

### CAPACITIES:

- ◆ Fuel: 33,000 gallons
- ◆ Water: 8,000 gallons
- ◆ Lube: 500 gallons

### FIREFIGHTING:

- ◆ Hiller Companies fixed CO2 suppression system

### DECK EQUIPMENT:

- ◆ Winches: Markey TDS-24 towing winch with 2,000' of 1.5" wire; (2) Patterson 40-ton deck winches with 150' of 1.5" Plasma line
- ◆ Fendering: M&M Bumper Service

### NAVIGATION GEAR:

- ◆ Radar: Simrad NSS16

“Everybody likes her. And she is a nice, heavy sea boat for her size. And I love my single-drum, three-speed Markey winch for towing.”

Pearson gave a nod to

**Below, *Daisy Mae*'s lower pilothouse is equipped with advanced Simrad electronics.**



Rodriguez Shipbuilding for having turned out a quality vessel in a short time frame. “Joe’s employees show pride in their work in every aspect of this build and have exceeded our expectation for what to expect from a shipbuilder and a new vessel for our fleet.”

**Right, *Daisy Mae* has a 41.5-foot height of eye from the upper pilothouse.**

The tug is equipped with a Markey TDS-24 towing winch wound with 2,000 feet of 1.5-inch wire. For pushing in a model bow makeup, it has two Patterson 40-ton deck winches with 1.5-inch Plasma line run through sheaves on the aft deck.

In 2001, Carver Laraway purchased the Port of Coeymans from the P&M Brick Plant and redeveloped the 400-acre site into

a thriving, privately owned marine terminal. In addition to *Daisy Mae*, the CMT fleet includes the 2,200-hp *Helen Laraway*, the 1,200-hp push tugs *HR Pike* and *CMT Otter*, and the 2,600-hp *Mr. Jim*.

*Daisy Mae* has a 41.5-foot height of eye from the upper pilothouse, which sits over the radars and hinged mast on struts bolted to the top of the bridge. The

structure can be removed if an air draft issue arises on, for example, lower bridges spanning New York State’s many canals.

But as Rodriguez said, “*Daisy Mae* can clear 45 feet so it shouldn’t be a problem.” ●



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Vane Brothers/Jim Demske

**ASSATEAGUE** | Vane Brothers, Baltimore

# Vane Brothers changes course with new ATB class

By Casey Conley

Over the last decade, Vane Brothers upgraded its fleet with nearly 25 new model bow tugboats. But with those big projects winding down, the company has set its sights on a new articulated tug-barge (ATB) class.

The lead tugboat *Assateague* went to work in mid-February with

Naval architect Greg Castleman reduced volumes wherever possible to keep *Assateague* under 500 gross tons. The narrow tower is one example.

the 80,000-bbl barge *Double Skin 801*. Since then, the vessels have hauled clean oil products from Texas to Fort Lauderdale, Fla., with additional stops at several Gulf of Mexico ports.

Jim Demske, Vane's senior port captain overseeing tugboat construction, said the vessel showed impressive handling during sea

trials and has remained a high performer since joining the fleet.

"The first load the guys took was in Texas City and from there they headed for Port Everglades. The entire way over, the crew reported beam seas of 8 to 10 feet, but the tug and barge rode beautifully," he said.

Castleman Maritime designed *Assateague* and sister tugboats *Chincoteague* and *Wachapreague*, due in July and November 2018, respectively. Bristol Harbor Group designed the barges. Conrad Shipyard is building the tugs and barges for this project.

Baltimore-based Vane Brothers' fleet has nearly 150 tugs and barges, yet *Assateague* and *DS-801* are just its third ATB unit. Most Vane tugs are model bow workhorses that tow 50,000-bbl barges between East Coast ports or push 30,000-bbl bunker barges around Northeast, mid-Atlantic and Caribbean harbors.

*Assateague's* two predecessors are *Brandywine* and *Christiana*, both built about 12 years ago at Bay Shipbuilding. At 110 feet and 4,400 hp, the new ATB tug is shorter and less powerful than those earlier vessels, which measure 116 feet, have 6,000 total hp and move 140,000-bbl barges.

For the new class, the 80,000-bbl capacity fit an important niche. "It was what the market was really dictating," Demske said. "There was a lot of need for that 75,000- to 80,000-bbl quantity to be moved. There is no sense in having a 150,000-bbl barge to move around if it is only going to be moving 70,000 or 80,000 bbl at a time."

Vane hired naval architect Greg Castleman, whose namesake firm based outside Houston has a reputation for solid, easy-to-build designs. Castleman's objective was to design a functional, powerful ATB tug that came in under 500

★ Lead tug in new ATB class ★ Coupler pins installed in separate rooms ★ Designed to stay under 500 tons

gross tons, thereby sidestepping SOLAS requirements.

He achieved it, with three tons to spare, by minimizing volumes everywhere possible. The narrow tower connecting the pilothouse to the superstructure is one notable example.

The location of the Beacon Finland JAK-700 coupler system is also unique. Rather than sharing a single room in the forward hull, the pin mechanisms are located in separate spaces. At 38 feet from the bow, the pins are further aft than in some comparable ATBs.

“I put them where I thought they should go, and then put the design in front of Beacon Finland and they said that it was absolutely the ideal location for reducing pin loads and keeping motion under control on the boat,” Castleman said in a recent interview.

Another quirk of the *Assateague* class: It shares key design elements

with tractor tugs long favored by Bisso Towboat Co. of Luling, La., including *Liz Healy* (profiled on page 30). Below deck, the hull forms on both tugs are nearly identical, even though *Assateague* is 10 feet longer.

“It was done by scaling the length,” Castleman explained. “The basic shape of the hull is the same, the width is the same, and it was a very successful hull form in getting

flow to the propellers.”

Propulsion aboard the ATB comes from twin 2,200-hp Cummins QSK60 Tier 3 engines turning 102-inch Hung Shen props through Reintjes WAF 873 reduction gears. Electrical power comes from twin 125-kW Cummins gensets and a single 65-kW Cummins emergency unit. *Assateague*’s running speed is a brisk 13 knots light or 10 knots

*Assateague* is paired with the 80,000-bbl *Double Skin 801*. The barge is built to haul clean oil products.



Vane Brothers/Jim Demske



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Barge displacement (Tons)  
**200–60 000**

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Vane Brothers / Steve Magdeburger

pushing a loaded barge.

The 403-by-74-foot DS-801 has 10 cargo tanks and is outfitted with an OmniThruster HT600 bow thruster. Electrical power comes from three John Deere 294-kW generators and a fourth Deere unit generating 99 kW. Twin Vapor Power ONC-5937-AHK-50 units provide cargo heating capabilities. Schoellhorn-Albrecht Machine Co. of St. Louis built a custom gangway linking the tug and barge.

Bristol Harbor Group of Bristol, R.I., adapted the barge plans from a previous design developed for another Conrad customer. Castleman provided computational fluid dynamics data on the tug, which Bristol Harbor took into account with this project. The two firms worked closely to make sure the vessels would function well together during various operating conditions.

“The misnomer is that a barge is a dumb piece of equipment,” Bristol Harbor Vice President Cory Wood said. “They are complex systems. When you start taking into account cargo heating systems, cargo pumping systems, electrical systems, bow thrusters, deck equipment and all

the hydraulics ... there are a lot of pieces that have to be integrated in a small unit.”

Steve Magdeburger, Vane Brothers’ special projects manager, worked closely with Bristol Harbor Group and oversaw construction at Conrad Deepwater South in Amelia, La. Conrad Orange of Orange, Texas, is building the tugs.

*Assateague* has a comfortable wheelhouse finished in mahogany and equipped with Simrad and Furuno electronics. Closed-circuit cameras offer a glimpse of the back deck, engine room and other key spaces. The height of eye is 53 feet.

Vane’s newbuild tugs have made crew comfort a priority and *Assateague* is no different. The vessel has six cabins, each with flat-screen TVs with satellite service,

**Assateague and DS-801 are just the third ATB in Vane Brothers’ fleet of more than 150 tugs and barges.**

#### ASSATEAGUE SPECIFICATIONS

**OWNER/OPERATOR:** Vane Brothers  
**BUILDER:** Conrad Orange  
**DESIGNER:** Castleman Maritime  
**DIMENSIONS:** 110’ x 38’ x 17’  
**MISSION:** Transporting clean oil products  
**CREW SIZE:** 6

#### PROPULSION:

- ◆ Engines: (2) Cummins QSK60 engines each generating 2,200 hp
- ◆ Bollard pull: 40 metric tons
- ◆ Vessel speed: 13 knots light, 10 knots loaded barge
- ◆ Propellers: (2) Hung Shen 102”x79” 4-bladed bronze props
- ◆ Gearbox: (2) Reintjes reverse-reduction WAF 873 at 7.087:1 ratio with internal hydraulic shaft brakes, supplied by Karl Senner LLC
- ◆ Thrusters: 500-hp OmniThruster HT600 on barge DS 801
- ◆ Auxiliary generators: (2) 125-kW Cummins, (1) 65-kW Cummins

#### DECK EQUIPMENT:

- ◆ Capstan: (1) 40-hp Coastal Marine Equipment C83 aft, (1) 20-hp Coastal Marine Equipment C83 forward
- ◆ Coupler system: Beacon Finland JAK-700
- ◆ Cranes: 2500-pound Thern crane installed aft
- ◆ Fendering: M&M Bumper Service

#### NAVIGATION GEAR:

- ◆ Radar: (2) Simrad E50 24” LCD
- ◆ Electronic chart display: Rose Point Navigation Systems
- ◆ Compass: Ritchie YB-500; Furuno gyrocompass
- ◆ AIS: Simrad
- ◆ Enav software: Rose Point Navigation Systems
- ◆ Autopilot: Simrad AP70, Furuno Bridge Navigational Watch Alarm System w/motion detection
- ◆ GMDSS: Furuno NX700 receiver

#### COMMUNICATIONS:

- ◆ Radio: (6) Standard Horizon (3 on GMDSS)
- ◆ Satellite connection: KVH TracVision

#### CAPACITIES:

- ◆ Fuel: 110,000 gallons
- ◆ Water: 10,000 gallons
- ◆ Lube oil: 4,000 gallons

#### FIREFIGHTING:

- ◆ Onboard fire suppression systems: Hiller Companies fixed CO2

#### CLASS/RATINGS:

- ◆ +A1, Towing Vessel, +AMS, +ABCU

and berthing for 10.

The tankerman also can monitor the barge from a computer terminal installed adjacent to the crew’s mess.

Thermal acoustic coatings laid under insulation reduce vibration and engine noise. Dex-O-Tex poured floors also were installed above a layer of sound-deadening material to make crew spaces even quieter. Prominent use of LED lighting reduces generator loads and the number of spare bulbs on board.

“The men have been giving nothing but glowing praise for her,” Demske said, adding that “a lot of these guys are seasoned ATB men, and they were able to critique her pretty well.”

*Assateague* is named for a barrier island within Maryland and Virginia, while *Chincoteague* is a barrier island in Virginia. *Wachapreague*, the third tug in the class, is named for a coastal Virginia town. The second and third vessels will be paired with barges DS-802 and DS-803, which will carry black oil and heated asphalt, respectively.

“We owe it to our customers and our crews to have the safest, most advanced and efficient fleet in operation,” Vane Brothers President C. Duff Hughes said of the new vessels.

The ATBs aren’t the only new vessels Vane Brothers is expecting over the next year or so. The company has two more 4,200-hp Elizabeth Anne-class model bow tugs coming from St. Johns Ship Building of Palatka, Fla., and Chesapeake Shipbuilding of Salisbury, Md., is building three more 3,000-hp Sassafras-class model bow tugs. The company also announced in late 2017 that Chesapeake will build four 3,000-hp push tugs, the first of which is expected in early 2019.

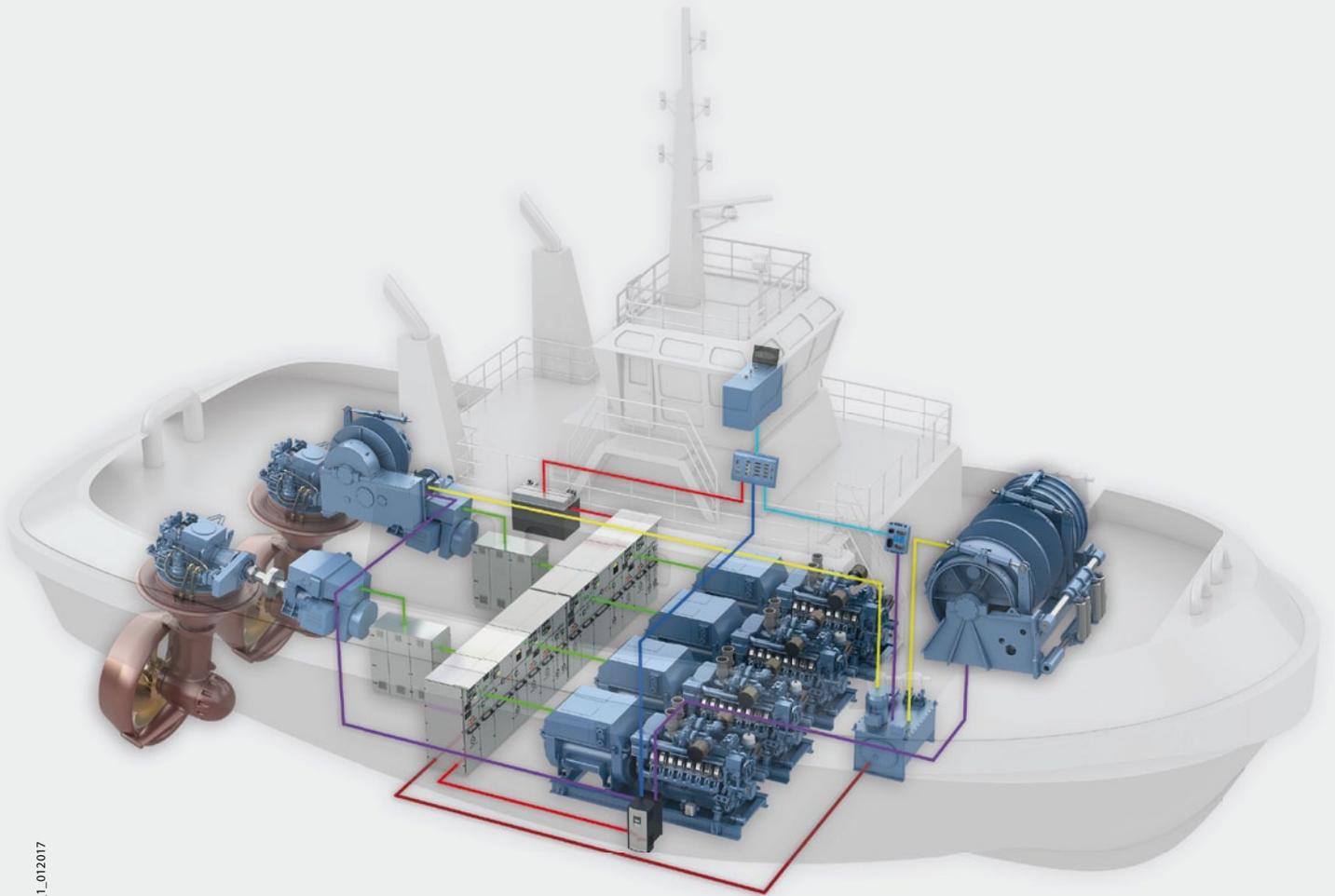
“You can see,” Hughes said, “that we are covering all of our bases.”

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**LIZ HEALY** | Bisso Towboat Co., Luling, La.

## With *Liz Healy*, Bisso Towboat sticks with what works

Story and photos by Brian Gauvin

Three years ago, following the arrival of the ASD tug *Becky S.*, Bisso Towboat Co. President Scott Slatten said every new delivery made him feel “like a kid in a candy store.”

The following year, in 2016, the candy store featured the ASD tug *Mr. Ruben*. Late last year, his sweet tooth for new tugs was sated with delivery of the 100-by-38-foot *Liz Healy*.

In January 2018, two months after *Liz Healy*'s christening on the New Orleans waterfront, the tug was already hard at work in the Mississippi River. Capt. Bryan Tastet steered alongside *Alma S.* and *Mr. Ruben* to assist the loaded bulker *Super Luna* into the Zen-Noh grain terminal upriver from New Orleans.

“This boat has great maneuverability and horsepower,” said

**Above, *Liz Healy*, Bisso Towboat's latest ASD tug-boat working on the Lower Mississippi River. Right, *Liz Healy* is crewed by, from left, chief engineer James Jacobs, deck hand Adam Simmons, mate Michael Becnel and Capt. Bryan Tastet.**

Tastet. “And the winch is a deck hand's dream.”

While *Alma S.* pulled on the stern and *Mr. Ruben* tugged at the bow, *Liz Healy* moved into the widening space between the dock and the ship, nosed onto the ship's bow and began pushing. The trifecta turned the ship downriver and waved goodbye.



*Liz Healy* was built at Main Iron Works, Bisso's go-to boatyard for the past 27 years. In 1999, Main Iron built the 100-by-38-foot *Cecilia B. Slatten* — the first z-drive tug on the Mississippi. It was followed by *Alma S.*, *Michael S.*, *William S.*, *Becky S.* and *Mr. Ruben*. *Liz Healy*, named for the company's general counsel, is the seventh of the class.

After *Cecilia B. Slatten*'s delivery, Bisso Towboat acquired the design from naval architect Greg Castleman. While retaining the same 100-by-38-foot dimensions, Bisso and Main Iron tweaked and upgraded the house arrangements, bridge layout, propulsion and towing machinery, and air conditioning systems over the years. Through that process, they arrived at what is essentially an enhanced version of the second tug, *Alma S.*, built in 2006.

There are also subtle changes, such as additional defroster vents located a little higher to better clear the windows. But in dimensions, the tugs are alike.

When *Becky S.* joined the fleet in spring 2015, the most exciting upgrade from the crew's point of view was the addition of a second head, lending credence to the cliché that two heads are better than one.

Next in succession of popularity was the addition of a 6-foot

★ Ice-class z-drives for durability ★ Keel-cooled AC system ★ Aluminum grill installed between the stacks

mudroom located aft of the galley between the stacks. The change allowed for moving the engine room door from the galley to the mudroom, greatly reducing the noise in the crew quarters.

To combat the steamy Louisiana summers, when AC and hot air compete for dominance, Bisso adopted a keel-cooled air



Left, Capt. Bryan Tastet positions *Liz Healy* midships against the bulker *Super Luna* in the Mississippi River near Convent, La. A sister tug, *Mr. Ruben*, is pushing on the bow of the ship. Right, JonRie supplied the Series 230 bow winch on *Liz Healy*.



conditioning system on *William S.* that has been used on new-builds ever since.

"It's extremely efficient," said Capt. Jon Davis, Bisso's vice president of engineering. "The forced air is constantly being cooled by the river water." Davis noted the system also reduces maintenance costs.

## LIZ HEALY

### SPECIFICATIONS

**OWNER/OPERATOR:** Bisso Towboat Co.  
**BUILDER:** Main Iron Works  
**DESIGNER:** Bisso Towboat/Main Iron Works  
**DIMENSIONS:** 100' x 38' x 13.5'  
**MISSION:** Ship assist and escort  
**CREW SIZE:** 4

#### PROPULSION:

- ◆ Engines: (2) Caterpillar 3516 Tier 3 mains each generating 2,240 hp
- ◆ Bollard pull: 60 tons
- ◆ Propellers: (2) Rolls-Royce US 205 FP z-drives
- ◆ Auxiliary generators: (2) 99-kW Marathon generators with John Deere 4045 engines

#### DECK EQUIPMENT:

- ◆ Winches: JonRie InterTech Series 230 hydraulic bow winch
- ◆ Cordage: 500' of 8" Samson line
- ◆ Capstan: Washington Chain & Supply quick-release pelican hook
- ◆ Fendering: M&M Bumper Service

#### NAVIGATION GEAR:

- ◆ Radar: Simrad radar with Simrad NSS16

- ◆ evo2 multifunction display controlling radar, chartplotter, wind and depth sounder
- ◆ Electronic chart display: Simrad M016
- ◆ AIS: Simrad V5035
- ◆ E-nav software: Rose Point Navigation Systems
- ◆ Autopilot: Simrad AP70

#### COMMUNICATIONS:

- ◆ Radio: Icom IC-M506 VHF; Icom fleet set; Furuno PA system;
- ◆ Satellite connection: Intellian i2 sat TV tracking system

#### CAPACITIES:

- ◆ Fuel: 30,163 gallons
- ◆ Water: 10,938 gallons potable water
- ◆ Lube oil: 1,826 gallons

#### CLASSIFICATIONS:

- ◆ ABS International Load Line, ISM Certification, USCG Inspected/Certified

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Liz Healy's propulsion comes from two Caterpillar 3516 Tier 3 mains and Rolls-Royce US 205 FP z-drives with 90.5-by-82.25-inch propellers. That arrangement produces 60 tons of bollard pull.

Starting with *Michael S.* in 2010, Bisso Towboat began using Caterpillar engines, freeing up engine room space. Also, all connections for hoses, fuel, water and oil discharge were made accessible from outside the engine room,

relieving the engineer from having to drag hoses around the machinery within the room.

Bisso also reconfigured the duct work for the engine room blowers on *Becky S.*, installing a curved port duct that directs the air forward, combined with a perpendicular starboard intake duct that creates a draft all the way forward.

The Rolls-Royce z-drives on *Liz Healy* are ice class, built heavier than



Bisso Towboat has used Caterpillar engines aboard its ASD tugs since *Michael S.* in 2010. The updated Cat mains aboard *Liz Healy* each generate 2,240 hp.



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normal for heavy duty and longevity. The Kort nozzles are stainless steel to ward off the effects of electrolysis. "Electrolysis will eat up the nozzles if they're not stainless, and the longevity will offset the initial cost," said Tastet.

On *Becky S.* and subsequent tugs, Bisso replaced the Markey bow winches with JonRie Series 230 hydraulic auto-tensioning hawser winches wound with 500 feet of Samson 8-inch line. The winch is equipped with pedals at the helmsman's feet. "They free up the hands when paying the line in and out while working a ship," said Tastet. "With all the other things that you have to take care of while working a ship, it's a real help."

Standard equipment on a Bisso Towboat bow is a stainless-steel H-bitt and a stainless-steel staple on the bow stem. A Washington Chain & Supply RSRH-100 100-ton capacity, quick-release pelican hook and a stainless-steel H-bitt are standard on the stern. Main Iron included an aluminum grill between the stacks, a bit of a lagnappe the yard builds into all its tugs.

The shoulder and quarter bitts are also stainless steel and slanted inboard, as are the bulwarks, in order to tuck more easily under a ship's counters.

"Being a tractor tug, the boat is so much safer than a conventional boat," said Ruben Dupre III, Bisso Towing's vice president, safety and control. "We can go a lot of places conventional tugs cannot."

M&M Bumper of Bourg, La., custom designed and fabricated the fen-

dering on *Liz Healy*. “We build it by hand,” said company President Robyn Gonsoulin. “The 22-inch thick bow fender, combined with the bulwarks and the hull fender, is constructed as an all-in-one unit. Building a fender this way is not an easy task. The bow fender alone uses 892 truck tires and weighs in at over 20,000 pounds.”

M&M also fabricated a 24-by-11-inch-thick laminated stern fender. The rubber is trimmed by hand to fit the vessel, and the 42 recycled aircraft tires are pre-rigged with galvanized steel chain and shackles to reduce labor at the shipyard.

*Liz Healy*'s pilothouse, finished in Spanish cedar and surrounded by abundant glass, is a signature of Main Iron's approach to quality finishing. The four staterooms located below the waterline are also finished in Spanish cedar.

Introducing the first ASD tug to the Mississippi River in 1999 was a significant move at a time when there was widespread skepticism about z-drives. Many wondered if the propulsion system could withstand the river's notorious currents and abundant debris.

Dupre III is the son of Ruben Dupre Jr., namesake of the tug *Mr. Ruben*, who held numerous positions with the company from 1981 until his retirement in 2015. He also played an integral role in growing and modernizing the company fleet, including its decision to build *Cecilia B. Slatten*.

“He and I were the ones who put our necks on the line back in 1997 when we convinced our president at the time,



The highly polished stainless-steel staple and bitts add strength and prevent chafing.

my father, Capt. Billy Slatten, to build the first ASD tractor tug for use on the river,” Slatten said. “I’ll never forget when he told us both, ‘If these z-drives don’t work out on the river, you’re both gonna be looking for a job.’”

Having crossed the ASD threshold, the next challenge will be updating the class for Tier 4, and the difficulty of shoehorning new equipment into the machinery spaces without major design changes. “We really like this tug design

and want to keep it with Tier 4 propulsion,” said Slatten.

Currently the 12-boat Bisso Towboat fleet is over 50 percent ASD-driven. The company is committed to z-drives, which Slatten said have proven admirably suited to ship-assist work in tight spots and in the river's difficult currents. They're also not as vulnerable to river debris as once thought. “Eventually we would like to have a 100 percent ASD tractor fleet.”



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Harley Marine Services

ONECURE/TODD E. PROPHET | Harley Marine Services, Seattle

# Next-gen Tier 4 ATBs delivering for Harley Marine

By Casey Conley

The industry took notice last spring when Harley Marine Services welcomed *Earl W. Redd*, the first EPA Tier 4-rated tractor tugboat. A year later, the company has two more with *OneCURE* and *Todd E. Prophet*.

Conrad Shipyard built the 4,560-hp pusher tugs at its Morgan City, La., shipyard using plans from Entech Designs. They are paired with 80,000-bbl tank barges built by Gunderson Marine through an Articouple pin system. GE Tier 4 engines provide propulsion.

In all, Conrad built four articulated tug-barge (ATB) units for Harley Marine in 2017, including the 4,500-hp Tier 3 siblings *Bill Gobel* and *Min Zidell*. All four are working along the West Coast, where they serve ports in the continental U.S., Alaska and Hawaii.

The new vessels represent a doubling of Harley Marine's ATB

Conrad Shipyard built four ATB tugs for Harley Marine in 2017, including *Bill Gobel* and *Min Zidell*, Tier 3 siblings to *OneCURE*, pictured above, and *Todd E. Prophet*.

fleet to eight units, and it operates a ninth on charter. They also highlight further acceleration away from towed barges to articulated tug-barge units for moving petroleum products and chemicals.

"Not only is it great from a safety component, and an efficiency and reliability component, it adds value to the charterer so that they are getting better utilization for the vessel they employ," Harley Franco, Harley Marine's namesake president, said during a recent interview at the company's Seattle headquarters. "When you're a charter and you're waiting for the weather to break and you are paying for a vessel to be sitting at the dock, your economics really get blown out."

Naval architect Frank Basile, who passed away in February, developed the hull used in *OneCURE* and its siblings more than a decade ago for conventional tugboats. More

recently, the design was modified into an ATB tug by removing the double pilothouse, among other changes.

Kimia Jalili, who now owns Entech Designs in Kenner, La., the

## ONECURE/TODD E. PROPHET SPECIFICATIONS

**OWNER/OPERATOR:** Harley Marine Services/Olympic Tug & Barge  
**BUILDER:** Conrad Shipyard  
**DESIGNER:** Entech Designs  
**DIMENSIONS:** 116' x 36' x 16'9"  
**MISSION:** Moving oil products on the West Coast

### PROPULSION:

- ◆ Engines: (2) GE 6L250 Tier 4, 2,280 hp each
- ◆ Vessel speed: 12.5 knots
- ◆ Propellers: (2) 4-blade 93"x116" stainless-steel props
- ◆ Gearbox: (2) Reintjes WAF 1963 at 4.467:1 ratio with internal hydraulic shaft brakes supplied by Karl Senner LLC
- ◆ Auxiliary generators: (2) 99-kW John Deere 6068TFM

### DECK EQUIPMENT:

- ◆ Capstan: Markey CEW-60
- ◆ Coupler system: Articouple FRC 55
- ◆ Fendering: Schuyler Companies 12" D-rubber at the bow and stern

### CAPACITIES:

- ◆ Fuel: 100,000 gallons
- ◆ Water: 7,390 gallons
- ◆ Lube oil: 666 gallons
- ◆ Hydraulic oil: 309 gallons

★ Harley Marine's first and second Tier 4 ATBs ★ Engine room modified for Tier 4 ★ Hull design evolved from conventional tug



Brian Gauvin

Left, Harley Marine no longer installs winches on its ATB tugs. In its place on *OneCURE* is a Markey CEW-60 capstan and hefty H-bitt. Right, naval architect Kimia Jalili considers *Todd E. Prophet* and its siblings "visually pleasing" ATB tugboats.

successor to Basile's firm, said the hull form underwent additional changes in 2012 for Harley Marine's first-generation ATBs. These included a new tank arrangement and engine foundations for GE Tier 3 mains.

Accommodating GE's heavier Tier 4 mains required additional modifications, she said. For instance, the engine room bottom structure is half-inch plate with deep frames at

every other frame. The engine foundations are also significantly stronger.

"The width of the hull generates a large stability margin," Jalili said of the 36-foot beam. "The high tower and eye level (51.5 feet) accommodates a great visibility. I may be biased but I think it is a very visually pleasing looking tug with some tra-

ditional elements and smooth side profile in comparison to many other similarly operating tugs out there."

*OneCURE* and its Tier 4 counterpart *Todd E. Prophet* are paired with their 80,000-bbl barges through an Articouple FRC 55 system located in the forward hold below the main deck. All eight of Harley



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Marine's ATBs use Artcouple pins, and the company considers them a competitive advantage.

Elliott Bay Design Group has designed several petroleum tank barges for Harley Marine Services over the years. The Seattle firm collaborated with Entech to ensure precise integration between the new tugs and their 428-foot barges.

"Design features include a ship-shape bow that reduces resistance and allows for better maneuvering and ship handling," said Michael Complita, Elliott Bay's principal in charge. "Our engineers have designed and optimized hull mid-body to enhance fuel efficiencies and increase vessel speed."

Although some U.S. and Gulf of Mexico operators run larger barges, Franco said the 80,000-bbl range is a good fit for the West Coast. That capacity aligns well with available storage tanks, and the relatively



Brian Gauvin

short hops from refineries to fuel ports is another factor.

"If you are going on a longer haul, bigger might be a better value," he said. "But if you look at where the refineries are on the West Coast, it's a nice setup for us."

The four-tug order Conrad recently completed has two vessels with Tier 3 engines and two with

Left, Conrad Shipyard installed the H-bitt on *OneCURE's* bow. Below, propulsion on *OneCURE* comes from twin GE 6L250 Tier 4 mains paired with Reintjes WAF 1963 reduction gears turning 116-inch, four-bladed, stainless-steel props.

Tier 4 mains. The split stemmed from the timing of the orders. Two were made before the Tier 4 cutoff, and two came afterward, said Matt Godden, Harley Marine's senior president and chief operating officer.

The use of GE engines is a departure for a company that touts its longstanding partnership with Caterpillar. *OneCURE* and the three others are equipped with GE medium-speed engines, which are performing well. Godden said going



Brian Gauvin

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with Caterpillar would have required redesigning the engine room to accommodate the urea-based aftertreatment system for Cat's Tier 4 engines. GE's Tier 4 engines use an on-engine method to cut emissions, and their footprints are similar to their Tier 3 models.

Propulsion on *OneCURE* and *Todd E. Prophet* comes from twin GE 6L250 engines generating 2,280 hp at 900 rpm. The mains turn four-bladed, 93-by-116-inch, open-wheel props through Reintjes WAF 1963

reduction gears. The electrical plant consists of 99-kW John Deere 6068 gensets.

Crewing on *OneCURE* and its three siblings is generally six people, although depending on the run could be as high as eight. Amenities include high-speed Internet access and cable TV in the mess and each cabin.

The wheelhouse is equipped with Furuno electronics. Closed-circuit cameras installed throughout the vessel also display on a wheelhouse monitor.

There are no towing winches on any of the new ATBs. Some earlier Harley ATB tugs do have winches, although the company has omitted them starting with *Emery Zidell* in 2014. The decision saves money and also recognizes the tugs will rarely, if ever, be needed for traditional wire towing. Harley's newer ATB tugs do have H-bitts and Markey CEW-60 capstans for emergencies.

Although *OneCURE* has initially been paired with the barge *Edward Itta*, it will ultimately work with *OneDREAM*, and *Todd E. Prophet* will work with *All Aboard for a Cure*. Both barges have twin Volvo Penta 13L pump engines and electrical power from two John Deere 99-kW generators. Rapp Marine supplied the barge crane, anchor and six mooring winches.

*OneCURE* and *OneDREAM* honor Larry and Sherry Benaroya of the Benaroya Research Foundation, which performs diabetes research in the Pacific Northwest. Todd E. Prophet was a Harley Marine senior vice president and chief financial officer before he passed away from cancer.

Since Jan. 1, 2017, Harley Marine has taken delivery of four ATB tugs and barges, two ship-assist tugs and the versatile *Earl W. Redd*, which can perform ship handling, towing and ocean rescue. The fleet expansion will continue with two more ocean tugs under construction at Conrad Shipyard.

The Louisiana-based builder will deliver two 100-foot tugboats scheduled for delivery a few months apart in late 2018 and early 2019. Entech Designs provided plans for the 3,000-hp vessels that will be outfitted with Caterpillar Tier 4 engines. Diversified Marine of Portland, Ore., also is building the Tier 4 ship-assist tug *Vern Patterson* due out in early 2019.

Franco said the company also might build more ATB tugboats in the coming years as it looks to expand its coastal towing capabilities. "We like that 80,000-bbl spot," he said, noting that the company also operates two 80,000-bbl towed barges.

"Probably, when ... those 80s are towed into their shipyard haulouts, we will take a serious look at converting them to ATBs," Franco continued. "We'd have to build two more tugs, but it would be replacing two mature tugs, so it makes a lot of sense."

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**ELIZABETH PRINCE** | Genesis Marine, Houston

# Genesis Marine welcomes new class of 'go-anywhere' towboats

Story and photos by Brian Gauvin

Last August, the 84-foot *Elizabeth Prince* left the John Bludworth Shipyard in Corpus Christi, Texas, and joined Genesis Marine's inland fleet. The 2,680-hp pushboat has proved a worthy addition.

"It's a go-anywhere type of boat," said Capt. Chris McBain, a vessel group manager for Genesis Marine. "She can work anywhere: around Houston, the Lower Mississippi

or Illinois River, the (Intracoastal Waterway)."

About a month after delivery, on a clear mid-October day, *Elizabeth Prince* was moored near the San Jacinto Battleground Monument on a loop of the Old River in Channelview, Texas.

Where the Old River, the San Jacinto River and Buffalo Bayou meet in the upper end of the Houston Ship Channel is a work-

boat aficionado's El Dorado. At any given time, more than 50 vessels gather there across multiple fleets. Viewed from the air, the vessels project out from the bank like the fringe on a buffalo hunter's coat.

At the time, shortly after Hurricane Harvey

Top, *Elizabeth Prince* and its siblings have a standardized pilothouse layout to improve crew familiarization. Right, Capt. Frank Struve helms *Elizabeth Prince* on the Old River near the confluence of Buffalo Bayou and the San Jacinto River in Channelview, Texas. Left, John L. Bludworth III designed *Elizabeth Prince* and its sister towboats.



The Bludworth design, Bird explained, produces a good solid "workhorse" boat. "And to top it off, the boats are so beautiful," he said. "It's like walking into a house." They are indeed handsome vessels with their granite counters, custom cabinets and wood finishes.

"But the big advantage is the standardization throughout our fleet, minimizing operational, maintenance and repair costs. When catching one for the first time, the crews are almost instantly familiar with them, as they are essentially the same boat," said Bird.

Delivered in August 2017, the 84-foot *Elizabeth Prince* is powered by two Caterpillar 3512C engines



★ Final boat in 16-tug order ★ Standardized wheelhouse layout ★ Versatile "workhorse" design



## ELIZABETH PRINCE

### SPECIFICATIONS

**OWNER/OPERATOR:** Genesis Marine  
**BUILDER:** John Bludworth Shipyard  
**DESIGNER:** John L. Bludworth III  
**DIMENSIONS** 84' x 32' x 11'  
**CREW SIZE:** 6

#### PROPULSION:

- ◆ Engines: (2) Caterpillar 3512C mains generating 2,680 total hp
- ◆ Vessel speed: 10 knots
- ◆ Propellers: 82"x67"
- ◆ Gearbox: (2) Twin Disc MGX-5600 DR at 6.04:1 ratio
- ◆ Auxiliary generators: (2) John Deere PE4045 99-kW Marathon gensets

#### DECK EQUIPMENT:

- ◆ Winches: (2) Wintech electric, 40 tons
- ◆ Cordage: Ultrex Spectra face wires

#### NAVIGATION GEAR:

- ◆ Radar: (2) Furuno FAR-2117
- ◆ Compass: Ritchie w/ Furuno SC50 satellite compass
- ◆ AIS: Furuno FA170
- ◆ E-nav software: Rose Point ECS

#### COMMUNICATIONS:

- ◆ Radio: (3) Standard Horizon GX5500S

#### CAPACITIES:

- ◆ Fuel: 37,000 gallons
- ◆ Water: 14,000 gallons

Above, propulsion on the 2,680-hp *Elizabeth Prince* and its sister towboats comes from twin Caterpillar 3512 Tier 3 engines. Right, *Elizabeth Prince* normally has a six-person crew. Pictured from left are Capt. Frank Struve, level III tankerman Jeremy Farris, vessel group manager Capt. Chris McBain, relief captain Fred Brasseaux and level III tankerman Calvin Temple.

with Twin Disc MGX-5600 gears at a 6.04:1 ratio. Total output is 2,680 hp.

Electrical power comes from twin John Deere PE4045 99-kW Marathon gensets. Electric 40-ton Wintech deck winches with Ultrex face wires are installed on the fore-deck behind each push knee.

Shipyard owner John L. Bludworth III designed *Elizabeth Prince*. "We were very fortunate and honored to have been selected by Genesis Marine to design and build a total of 16 towboats for them to add to their growing fleet," said Gasper D'Anna, the shipyard president.

D'Anna explained that the boat's



design, placement of machinery and other equipment is balanced along the centerline. The alignment minimizes the side-to-side list of the hull and eliminates the need for ballast to keep the vessel true. "The fore and aft trim of the hull," he said, "is controlled through consumption of fuel and potable water, minimizing the need to add ballast for trim."

The hull design, the lines with deadrise and a clipped chine, allow for cleaner water to get to the propellers, which leads to better performance, D'Anna said. The hull design allows for larger steering and flanking rudder blades, providing better steering in all situations.

*Elizabeth Prince* is equipped with four flanking rudders and two large steering rudder blades.

Genesis Marine's newbuild program features four 110-by-32-foot towboats rated for 3,150 hp. Eleven more, including *Elizabeth Prince*, are 84 feet by 32 feet with 2,680 hp, and one is a 92-footer with a retractable pilothouse also rated for 2,680 hp.

Equipment is standardized across the new vessels. All feature Caterpillar 3512C, EPA Tier 3 main engines connected to Twin Disc reduction gears. In each case, John Deere 99-kW units provide electrical power.

"I've worked on all styles of boats, but the *Elizabeth Prince* is spot on," said Capt. Frank Struve. "The boat is very roomy and comfortable and is also very responsive. It is very well balanced and very powerful.

"The center of gravity is right on, right out of the yard," he continued. "I bring a little level aboard with me, and this boat keeps the bubble right

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Level III tankerman Jeremy Farris tightens the Spectra face lines aboard *Elizabeth Prince*.

in the middle. It handles very well, flanks very well and does what she needs to do.”

In recent decades, keeping mariners happy — and retaining them — has taken greater importance when designing and finishing a workboat. Bludworth has taken this approach seriously during construction.

“We make the living areas as comfortable and quiet as possible because crewmembers will be living on the boat for weeks at a time,” D’Anna said. “The shipyard joiner crew builds and installs the custom stained-wood cabinets and bunks and then adds stained trim work, usually with the owner’s company logo on the door trim as well as other areas.”

With the granite countertop and dining table, stainless-steel appliances and faux wood flooring, the vessel has an attractive galley comparable to a kitchen in a well-appointed house. The bunks even have pillow-top mattresses.

Well-placed sound reduction coatings and insulated living areas contribute to the quiet and comfortable crew spaces, D’Anna explained. The design of the hull and the structure within the hull also contribute to reduced vibration.

“The beds are comfortable and the boat is well-insulated and quiet,” said relief captain Fred Brasseaux. “There is plenty of room in the crew quarters. This boat handles great, with the steering and the horsepower. It handles the barges very well.”

The wheelhouse electronics suite is comprised of a pair of Furuno 2117 radars, Furuno AIS, a Ritchie-Furuno satellite compass, Rose Point navigation software and an electronic chart display.

“The electronics are state of the art,”

Brasseaux said. “I like having as many instruments available to me as possible. I’ve used them all at one time or another, but not necessarily all at the same time.”

Genesis Marine owns and operates 134 vessels in its inland and offshore fleets. The inland fleet has 33 push boats and 82 barges. Its total capacity is 2.3 million barrels of product consisting of black oil, asphalt, heavy fuel and crude stock. The company also moves jet fuel and other refined products offshore.

*Elizabeth Prince* completes the Houston company’s newbuild program for its inland fleet. During the six-and-a-half-year program, 18 tugs and 32 new barges joined the inland division. Its average age is 6.5 years — one of the youngest in the inland towing industry.

“We will have this boat looking brand new for quite a while,” Capt. Struve said. “I’ve got a great crew who is very proud of the boat and Genesis, and I’m very proud of them.”

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**TERESA BRUSCO** | AmNav Maritime, San Francisco

## Brusco's newest tug finds work under AmNav charter

By Peter Marsh | Photos by Maria Barnowl

**B**rusco Tug & Barge has taken delivery of another in a long line of Robert Allan-designed ship-docking tugboats. And like its sister tug Sarah, Teresa Brusco works under charter with AmNav Maritime of San Francisco.

AmNav won a recent contract docking containerships in Tacoma, Wash. The compact

Teresa Brusco helped launch service, working Blair Waterway's tight confines roughly 25 miles south of Seattle.

Diversified Marine of Portland, Ore., built the 78.1-by-30.4-foot Teresa Brusco. Delivery was in late 2017.

Brusco Tug of Longview, Wash., has seven ASD tugboats built to the Robert Allan Ltd.

Above, Teresa Brusco is Brusco Tug's seventh ASD vessel built to the Robert Allan "Cates" design. AmNav Maritime has chartered two of them. Right, Brusco's latest tugs have Markey DEPC-48 electric winches on the bow. Left, one feature of the Cates design is the one-man wheelhouse.



"Cates" design — an early precursor to the RAport series. These dayboats have a low freeboard, flush deck and small deckhouse. The first was delivered in 2001, followed by a second vessel four years later. The building program resumed in 2012, adding five more identical tugs to Brusco's fleet.

All seven are powered by Caterpillar 3512-series engines. The last three boats, Bo Brusco, Sarah and Teresa Brusco, have 4,750 hp at 1,600 rpm. Teresa



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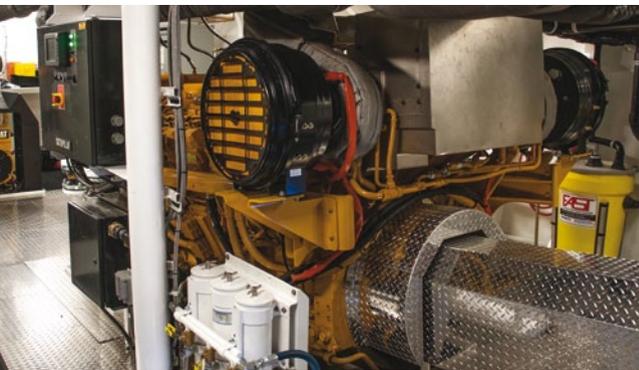


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Brusco's engines turn Rolls-Royce US 205 z-drives with fixed-pitch props through Centa carbon fiber shafts. Bollard pull exceeds 60 long tons.

Teresa and its siblings have twice the installed horsepower of the original tug prototype built in 1990 for the Cates company of Vancouver, B.C. The 73.5-by-28-foot *Cates III* was fitted with twin Caterpillar 3512 engines each producing 1,175 hp turning Niigata Z-Pellers. "This was our

Above, twin Caterpillar 3512 mains are capable of 4,750 total hp. Right, engineer Nick Fuller checks fluids in Teresa Brusco's all-Cat engine room.

first tug with the larger-radius bow, and can very rightly lay claim to being the first anywhere with a very compact, one-man wheelhouse," Allan recalled.

His design continued to evolve in the 1990s as Caterpillar 3512 engines grew more powerful. By 2000, the beam increased from 28 feet to 31 feet, 4 inches to handle 1,800-hp Cat engines. Propulsion came from Ulstein z-drives producing 50 tons of bollard pull.

The Cates concept eventually produced four design options



comprising Robert Allan Ltd.'s RApport series. Allan describes them as "ideal for fast maneuvering, side-slip and quick response

### TERESA BRUSCO

#### SPECIFICATIONS

**OWNER:** Brusco Tug & Barge  
**OPERATOR:** AmNav Maritime  
**BUILDER:** Diversified Marine  
**DESIGNER:** Robert Allan Ltd.  
**DIMENSIONS:** 78.1' x 30.4' x 11.2'  
**MISSION:** Harbor, ship assist  
**CREW SIZE:** 2

#### PROPULSION:

- ◆ Engines: (2) Caterpillar 3512 Tier 3 engines generating 4,750 total hp
- ◆ Bollard pull: 67 short tons ahead
- ◆ Thrusters: Rolls-Royce US 205 z-drives
- ◆ Auxiliary generators: (2) Caterpillar C4 ACERT 99-kW units

#### DECK EQUIPMENT:

- ◆ Winches: Markey DEPC-48, 50 hp
- ◆ Cordage: 600' of 2-5/8" Samson Saturn-12 line

- ◆ Fendering: Shibata cylindrical; Schuyler Companies double loop

#### NAVIGATION GEAR:

- ◆ Radar: Furuno RDP-8122
- ◆ GPS: Furuno GP33

#### COMMUNICATIONS:

- ◆ Radio: (3) Icom IC-M504 VHF
- CAPACITIES:**
- ◆ Fuel: 6,700 gallons
- ◆ Water: 500 gallons
- ◆ Lube oil: 100 gallons
- FIREFIGHTING:**
- ◆ Pumps: Darley, 1,000 gpm

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in tight conditions.” That certainly includes the conditions in Port Hueneme, north of Los Angeles, where the first two Brusco tugs were assigned.

This was the first of several West Coast contracts Brusco won. Brusco has based its five 78-foot RAport-series tugs in Port Hueneme, Portland, Ore., and Grays Harbor and Everett, Wash., alongside a few straight-shaft boats.

Brusco’s first ASD tug, *Wynema Spirit*, was purpose-built for Port Hueneme, where it was joined by *Lulapin* in 2005. Capt. Mike Fullilove, now Brusco’s manager of operations, remembers the crew’s satisfaction with the new design.

“We handle U.S. Navy ships, tankers, fruit ships, containerships and car carriers up to 230 meters in length with very little room to spare,” he said. “They enter the



port by a narrow channel and have to be turned in a 1,000-foot basin.”

These tugs had an established reputation by the time the sixth boat, *Sarah*, launched in 2015 and later went to work for AmNav in San Francisco Bay. Based on that successful partnership, AmNav chartered *Teresa Brusco* for Tacoma.

Above, *Teresa Brusco*’s hull is protected by Schuyler and Shibata fendering. Right, *Teresa Brusco*’s crew during a recent voyage in Commencement Bay off Tacoma, Wash., were, from left, James Edmonds, Nick Fuller and Grant Fuller.

AmNav President Milt Merritt recalled looking to charter another compact ASD tug with high bollard pull after winning the Tacoma ship-docking contract.

AmNav has operated four similar Robert Allan Ltd. vessels for many years. They were part of the 10-boat program for 80-foot Dolphin-class tugs built at Foss Shipyard in Rainier, Ore., in the early 2000s. “We really like all our Robert Allan-designed tugs, they work great in the other ports we operate in Los Angeles, Long



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Beach, San Francisco and Oakland,” said Capt. Brad Westlund, AmNav’s new port manager.

Teresa Brusco received fresh paint in AmNav’s colors of red, white and blue in April, shortly after arriving in Puget Sound. Despite the livery, the slanted staple on the foredeck continues to distinguish the Brusco boats. David Brusco and the crew in Port Hueneme developed it in 2001. He is now a Puget Sound Pilot and recently piloted a ship

assisted by Teresa Brusco.

Back then, Brusco crews noticed the standard vertical staple on *Wynema Spirit* came close to the hull of ships with overhang aft and extreme flare forward. A local metal shop fabricated the slanted prototype angled aft at 37 degrees.

This change moved the top of the staple back, allowing plenty of clearance. It was incorporated into the design for the next six boats. The bow is surrounded by a semicircle of Shibata cylin-

dric rubber, with Schuyler Companies’ double-loop fendering covering the rest of the bow down to the waterline.

Another small change came more recently. The accommodations on the first five boats provided a head, small galley and dinette booth. Diversified Marine outfitted the last two tugs with a double bunk next to the galley, which reduces seating space but provides space for crew to relax during downtime.

Teresa is also the first of Brusco’s fleet to feature two Caterpillar C4.4 ACERT 99-kW gensets for a 100-percent Cat engine room. These units supply the hotel loads and power a pair of Quincy air compressors, Rolls-Royce steering motors, the Markey hawser winch and other equipment. One genset connects to a Darley fire pump with 1,000 gallons per minute for an optional fire monitor.

“The new C4.4 ACERT shares the same design strategy with the C7.1 ACERT and was engineered to incorporate an 18 percent increase in power density, compared to the mechanical C4.4 platform,” noted Seth Charna, a Caterpillar Marine product champion.

A common feature of Brusco’s engine room is the location of all coolant and bilge pumping valves on the centerline under the engine room ladder. This simplifies the movement of bilge or ballast water and procedures during emergencies.

Brusco’s latest tugs have Markey DEPC-48, 50-hp, single-drum electric hawser winches with Render/Recover. The drum can hold 600 feet of 2-5/8-inch Samson Saturn-12 line and has a rated performance of 28,000 pounds at 54 feet per minute. It also features automatic tension control. The air-set brake can hold 612,900 pounds.

Diversified Marine is located on the south bank of the Columbia River’s South Channel, 100 miles from the Pacific Ocean. Yard founder and manager Kurt Redd credits his team of experienced and dedicated employees for the high quality of their work. He believes this keeps a steady flow of repeat orders coming from established operators such as Harley Marine, Brusco Tug and Shaver Transportation.



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Chris Reinauer

**BERT REINAUER** | Reinauer Transportation, Staten Island, N.Y.

# Reinauer goes back in time for its first Tier 4 ATB

Story and photos by Casey Conley

**R**einauer Transportation didn't need to look far for its first Tier 4 articulated tug-barge (ATB) design.

Rather than commissioning new plans, the company dusted off drawings from its Nicole-class tugs, the last of which entered

service in 2003. Despite their age, the three existing ATBs in the class are strong performers, and their hulls have proved efficient and durable.

These efforts yielded *Bert Reinauer*, an 8,400-hp SOLAS-rated tug named for the founder

of Staten Island-based Reinauer Transportation. The 126-by-40-foot tug is mated with the 523-foot, 160,000-bbl barge *RTC 165*.

Ocean Tug/Barge Engineering of Milford, Mass., designed the vessels and Reinauer sub-

**Top, Bert Reinauer is named for the founder of Reinauer Transportation. Above right, the sturdy H-bitt installed on Bert Reinauer's bow. Left, Bert Reinauer mates with the 523-foot barge RTC 165 through an Intercon 50-inch coupler.**



Casey Conley

sidary Senesco Marine of North Kingstown, R.I., built them. *RTC 165*, built to haul clean oil products, is reportedly the largest-ever vessel built entirely in Rhode Island.

"We were trying not to reinvent the wheel," Vice President Chris Reinauer said during a recent vessel tour at Senesco. "We wanted a 150,000- or 160,000-bbl barge, and we had existing units that were successful."



Casey Conley

"By building the boats the way we did, we recaptured things like spare parts," he continued. "The propellers are the same, the shafts are the same, the reduction gears are the same. The only changes that were really big were the engines, the electronics upstairs, the generators and the SOLAS class."

The lead boat in the class, the 7,200-hp *Nicole Leigh Reinauer*, entered service in 1999. *Christian Reinauer* and *Meredith C. Reinauer* followed in 2001 and 2003, respectively. The vessels are powered by twin Caterpillar 3612 engines and outfitted with Intercontinental couplers.

Propulsion on *Bert Reinauer* consists of twin GE 12V250 units each generating 4,200 hp at 900 rpm. Reinauer considered several Tier 4 engine platforms, including Caterpillar. GE won out largely because its engines do not require exhaust aftertreatment and related equipment to meet the tougher EPA emissions rules.

★ Reinauer's first Tier 4 tug ★ Meets SOLAS requirements ★ Three main generators for redundancy



Left, the easy-to-clean stainless galley is located alongside a comfortable crew mess area.

Casey Conley

“We think on-engine technology is going to be better in the long run,” Reinauer said, referring to the exhaust gas recirculation, or EGR, solution in GE engines. With the other engines, “you give up fuel storage for urea, and you also have an exhaust system that is massive that I am not even sure we could fit in here.”

GE 12-cylinder engines cool and reroute exhaust gas from one bank of cylinders back into the engine. This reduces the combustion temperature, thus reducing the output of nitrous oxides, or NOx, and other pollutants. Caterpillar and other Tier 4 marine engines on the market inject urea-based diesel exhaust fluid (DEF) into the exhaust stream to reduce emissions.

Naval Architect Robert Hill, president of Ocean Tug/Barge Engineering, developed plans for what he calls the Atlantic II class in the mid-1990s. Unlike the blockier “facet tug” he pioneered for Reinauer more than a decade ago, *Bert Reinauer* and its siblings have a traditional chined hull form. The three existing Atlantic II ATBs are known as fast, nimble, easy-handling boats with comfortable crew accommodations.

“She has a very, very nice hull under her and nice big wheels with huge rudders,” Hill said of



Chris Reinauer

*Bert Reinauer* in a recent interview. “She steers like a car with the barge, and we put enough power in her that she does well with the barge. She also has very nice accommodations on her.”

The hull has a traditional curved sheer line, and the deck-houses have a rounded design reminiscent of classic tugboats. “Our concession to modernity is the canted pilothouse windows that give the helmsman a no-glare view in all directions for 180 degrees,” Hill said.

*RTC 165* is another source of pride. Design characteristics include a water flow-friendly stern that also allows for a large working deck aft. The barge’s bow also has low wave-making characteristics.

Above, *Bert Reinauer’s* pilot house has a 55-foot height of eye and Furuno electronics.

“The barge shape, despite what you may naturally think, doesn’t need to look like a containership to go fast,” he said. “We do have barges that look somewhat full-bodied but are very fast. It’s all about where the water goes and how the water flows over the hull.”

Reinauer uses durable materials and builds redundancy into its boats to avoid repairs and lost time. For instance, all pipes that come through the deck are stainless steel, as are watertight doors and hatch inserts. Installing multiple wash water pumps, water heaters, ballast pumps and other components also prevents a minor malfunction from keeping the tug in port.

The third generator, in addition to the emergency SOLAS unit, is another example. *Bert Reinauer’s* electrical plant consists of three John Deere 6068 125-kW generators installed

## BERT REINAUER

### SPECIFICATIONS

**OWNER/OPERATOR:** Reinauer Transportation Co.  
**BUILDER:** Senesco Marine  
**DESIGNER:** Robert Hill, Ocean Tug/Barge Engineering  
**DIMENSIONS:** 126’ x 40’ x 22’  
**MISSION:** Transporting clean oil products  
**CREW SIZE:** 7

#### PULSION:

- ◆ Engines: (2) GE 12V250 Tier 4 mains generating 8,400 total hp
- ◆ Vessel speed: 13 knots light
- ◆ Propellers: (2) 5-bladed steel Hung Shen open wheels
- ◆ Gearbox: (2) Lufkin at a 5.036:1 ratio
- ◆ Auxiliary generators: (3) 125-kW John Deere 6068, (1) 99-kW John Deere 4045 SOLAS unit

#### X-Band chart radar

- ◆ Compass: Simrad GC80 gyrocompass; Simrad HS80A GNSS compass
- ◆ Autopilot: Simrad AP80
- ◆ GMDSS: Furuno RC1815DF (A3)

#### COMMUNICATIONS:

- ◆ Radio: Standard Horizon
- ◆ Satellite TV: KVH Trac-Vision TV-5

#### CAPACITIES:

- ◆ Fuel: 145,000 gallons
- ◆ Water: 10,000 gallons
- ◆ Lube oil: 3,500 gallons

#### DECK EQUIPMENT:

- ◆ Capstan: Coastal Marine Equipment, 500 tons
- ◆ Coupler system: Intercontinental 50” with lightering mode
- ◆ Cranes: Global Davit for rescue boat
- ◆ Fendering: Morse Rubber

#### FIREFIGHTING:

- ◆ Onboard fire suppression system: Ansul FM-200

#### OTHER DETAILS:

- ◆ Jotron onboard communication equipment; FLIR CCTV and DVR system

#### NAVIGATION GEAR:

- ◆ Radar: Furuno FAR-3000

side by side in the engine room. A 99-kW John Deere emergency unit required under SOLAS regulations is installed on the main level.

“The first time we have a generator failure and ... we sail on time, it pays for the generator,” Reinauer said of the third unit, adding that not all competitors have three gensets on their vessels. “It’s that simple — and we’re not delaying the customer.”

Other than the GE mains, propulsion on the new tug consists of Lufkin reduction gears turning five-bladed Hung Shen props through steel shafts. SOLAS equipment on board includes two Viking life rafts, a Furuno GMDSS in the wheelhouse and a 40-hp rescue boat.

Minor differences between *Bert Reinauer* and its siblings include extensive use of LED lights on the new tug and the repurposing of a laundry room to add storage space. The washer-dryer units are now located in starboard fiddley.

*Bert Reinauer* is designed to be comfortable for long voyages between ports. The tug will typically operate with seven people, although it has berthing for 10 in six cabins across three decks. There are four heads, and the bathroom/shower on the main deck has multiple showers and toilets.

The galley located on the 01 deck is equipped with stainless-steel appliances, including three refrigerators. It is separate from the spacious crew mess area. Floating floors are used in crew spaces to reduce vibration and noise. Resilient mount engines also contribute to a quieter environ-

ment. The wheelhouse has a 55-foot height of eye and is outfitted with Furuno electronics.

Reinauer long ago decided not to install stern winches on its ATB tugs. The move saves money and recognizes the tugs are unlikely to operate outside the barge’s notch. Over the years, no Reinauer Transportation tug has broken out of the notch while underway, Reinauer said. There is a Coastal Marine Equipment capstan installed aft for line handling in an emergency.

*Bert Reinauer* mates with the 523-foot RTC 165 using an Intercon 50-inch coupler. The unit has “lightering mode,” meaning the tug can remain in the notch during loading and unloading. Earlier tugs in the class do not have this feature.

Reinauer Transportation operates 25 tug and barge units ranging from 20,000 bbl to 160,000 bbl, primarily along the East Coast. *Bert Reinauer* will be an expansion of the fleet, and it will carry chemicals and clean oil products anywhere a client needs it to go. Case in point: Another Reinauer ATB, *Dylan Cooper* and *RTC 108*, recently traveled more than 2,600 miles from New York to Green Bay, Wis.

Shipbuilders at Senesco should stay busy after *Bert Reinauer* leaves the yard. Reinauer also is building two smaller Franklin-class facet tugs in the yard. These 116-footers will be paired with existing 80,000- to 100,000-bbl barges.

The vessels, *Josephine* and *Kristy Ann*, also will be equipped with GE Tier 4 engines and Nautican propulsion systems. Delivery is expected later this year. •



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Rob Wright

**CAPT. COOPER** | Bald Head Island Limited, Bald Head Island, N.C.

# Metal Trades' first-ever tugboat proves its worth time and again

By Casey Conley

**W**ith its tapered hull and spider-like pilothouse, *Capt. Cooper* is a unique boat with an important job.

Bald Head Island Limited developed the 850-hp vessel to push a deck barge between mainland North Carolina and the resort island located four nautical miles away. The two-vessel unit makes four round trips a day carrying virtually all large cargo and provisions for the island's visitors and full-time residents, a number that can swell to 5,000 during the high summer season.

CT Marine of Portland, Maine, designed the 50-by-24-foot vessel. *Capt. Cooper* was the first ever self-

**Above, *Capt. Cooper* pushes the 100-foot barge *USS Brandon Randall* between the North Carolina mainland and Bald Head Island. Right, the two vessels make four round trips a day carrying cargo and provisions for the resort island.**

propelled vessel project for shipyard Metal Trades Inc. in Hollywood, S.C. Delivery came in August 2017.

Capt. Claude McKernan, manager of Bald Head Island Limited's Barge Department, said the new tug was developed for simplicity and efficiency. Pushing the 100-by-

34-foot barge *USS Brandon Randall* is its sole job. Given the short runs, the tug was built as a day boat without crew accommodations. And with facilities at both ends of the route, it also lacks a head.

"This was conceived to be reliable, safe and maintenance-free," he said in a recent interview. "We have reduced maintenance points wherever we could on the boat."

*Capt. Cooper* replaced the 42-year-old *Capt. Alex*, a tug that required increasing upkeep in recent years. Bald Head Island runs one tugboat, so unscheduled lost time means canceled transits or hiring an outside tug at great expense. Ferries carry people to the island, which does not allow personal vehicles.

"We had been pushing for a new tugboat for a while because it's the only one we have, and if it breaks down or needs major maintenance we don't have a standby tug and the island tends to run low on essentials, including provisions, construction supplies and needed equipment," McKernan said, adding, "We knew we needed a newer, more reliable vessel."

The seemingly mundane route from Southport, N.C., to Bald Head Island across the Cape Fear River has some challenges. Tidal currents exceeding 4 knots can push perpendicularly against the vessels as they approach the island's jetties. Once inside, a hard-starboard turn is required in tight quarters to line up for the landing.



Rob Wright

★ Shallow 5.5-foot draft ★ Wedge hull form that tapers at the stern ★ Full aluminum superstructure



Bald Head Island Limited

These features necessitated *Capt. Cooper's* unique hull and superstructure, as well as its advanced steering system, explained naval architect Christian Townsend, who developed the tug's plans with his father, Corning Townsend.

The Townsends initially planned *Capt. Cooper* to have an 18-foot beam. But further analysis suggested additional width was required for stability. Yet the confined harbor made a 24-foot beam

Above, propulsion aboard *Capt. Cooper* comes from twin John Deere Tier 3 mains. Right, the deck locker door leads to the main deck upper engine room.

impossible. The design firm solved this problem by creating a tapered hull that's 24 feet wide amidships and just 17 feet at the transom.

"They literally couldn't swing the stern in if it was any wider at all, but they needed the width of the boat forward for stability and greater twisting torque for maneuvering the barge," Christian



Bald Head Island Limited

Townsend said.

Meeting the 5.5-foot draft requirement was another challenge. Designers chose an aluminum superstructure encompassing everything from the main deck up. All of the aluminum was left bare to reduce maintenance.

Even so, the vessel was still too heavy, so the upper house walls were removed. Four structural supports hold the pilothouse eight feet above the lower house.

The novel design is not unique to *Capt. Cooper*, but it remains something of a rarity in the U.S. and around the world. Over time, the look has earned the nickname "spider house," Christian Townsend said. "It's kind of sticking, I guess."

CT Marine's design also called for flanking rudders, which focus extra thrust for precise turns like those approaching the landing on Bald Head Island. The flanking



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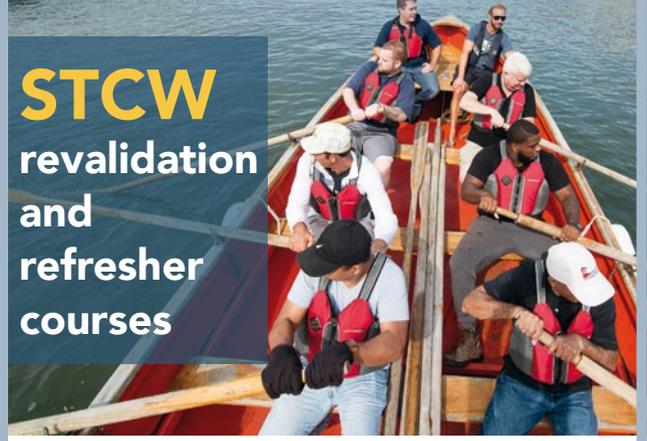


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Rob Wright

rudders go 45 degrees hard-over instead of the 35 degrees typical on a similar pushboat. All told, *Capt. Cooper* has eight rudders.

The new tug also maintains the same 26.5-foot height of eye as *Capt. Alex* for a consistent vantage point over the barge.

“It’s been doing real well. It’s a big step up for us,” said Capt. Rusty Terry, who likened the new vessel to replacing a 1976 Subaru Brat with a brand new Chevrolet pickup.

“We have eight rudders on here ... four flanking and four main rudders. The maneuverability is real good and it handles real well,” he continued.

*Capt. Cooper* cruises at 8 knots with a loaded barge thanks to twin John Deere 425-hp Tier 3 engines turning five-blade nibrals through a ZF gearbox. Electrical power comes from two Northern Lights 40-kW generators. All equipment, including the John Deere 13.5-liter engines, was selected primarily for reliability and ease of maintenance.

The wheelhouse is outfitted with Furuno navigation electronics, while on deck the tug has two Patterson deck winches with syn-

thetic Samson face lines.

Bald Head Island Limited interviewed a handful of shipyards before choosing Metal Trades, located just southwest of Charleston. The yard has been around for 56 years and has a solid reputation for barge construction and vessel overhauls. But until *Capt. Cooper* it had never built a twin-screw pushboat.

McKernan visited the company’s shipyard and left impressed with its capabilities. Proximity also was a factor in the decision, allowing for regular day trips to the yard to monitor construction. The shorter delivery distance to North Carolina after construction was completed reduced costs compared to a yard farther away.

Around the time Bald Head Island Limited approached them, Metal Trades leaders were already planning to move into tugs and other self-propelled boats. Yard management planned to build a vessel on spec when they won the contract for *Capt. Cooper*.

New vessel construction manager John Geiges said *Capt. Cooper* was a perfect first boat for the shipyard.

The tug, built to Coast Guard

**The tight quarters and challenging approach into Bald Head Island necessitated *Capt. Cooper’s* wedge-shaped hull designed by CT Marine of Portland, Maine.**

Subchapter M standards, also allowed the yard to develop experience with the new regulations. Metal Trades’ electrical supervisor, David Crocker, internally developed the complete electrical drawings for the tug.

“We didn’t suffer a learning curve,” Geiges said in a recent interview.

“We put a lot of planning into it and one thing I am proud of, we never went backward,” he continued. “We never did anything we had to rip out, we always kept going forward.”

Looking back, McKernan acknowledged some reluctance about choosing a shipyard without extensive tugboat building experience. But, speaking almost eight months after delivery, he has no regrets.

“When you take delivery of a brand new custom-built boat, generally you are going to have some issues,” he said. “We have basically had none.”

### CAPT. COOPER SPECIFICATIONS

**OWNER/OPERATOR:** Bald Head Island Limited LLC  
**BUILDER:** Metal Trades Inc.  
**DESIGNER:** CT Marine  
**DIMENSIONS:** 50’ x 24’ x 5.5’  
**MISSION:** Island community supply and logistics  
**CREW SIZE:** 2

#### PROPULSION:

- ◆ Engines: (2) 425-hp John Deere 6135AFM85 Tier 3 mains
- ◆ Vessel speed: 8 knots maximum
- ◆ Propellers: (2) ZF Marine 48”x39” 5-blade nibrals
- ◆ Gearbox: ZF Marine W350-1 at 3.96:1 ratio
- ◆ Auxiliary generators: (2) Northern Lights, 40 kW

#### DECK EQUIPMENT:

- ◆ Winches: (2) Patterson WWP30E-5.0 for face wires
- ◆ Cordage: Samson Saturn-12

#### NAVIGATION GEAR:

- ◆ Radar: Furuno
- ◆ Electronic chart display: Furuno
- ◆ Compass: Ritchie
- ◆ AIS: Furuno

#### COMMUNICATIONS:

- ◆ Radio: Icom VHF
- CAPACITIES:**
- ◆ Fuel: 5,000 gallons
- ◆ Water: 78 gallons
- ◆ Lube oil: Does not store

#### FIREFIGHTING:

- ◆ Hoses: (2) with 1.5” Akron brass Coast Guard nozzles; deckhouse forward station, 100 feet; deckhouse aft station, 50 feet
- ◆ Pumps: (2) MP Pumps HHLF Series, 5 hp, 60 Hz, 230V
- ◆ Onboard fire suppression systems: Fireboy-Xintex CO2

#### COATINGS:

- ◆ Hull: International Marine Coatings Intershield 300V epoxy

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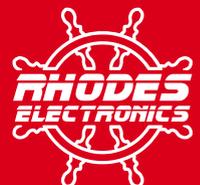
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Rendering by Robert Allan Ltd.

**ISLAND RAIDER** | Island Tug and Barge, Burnaby, British Columbia

# Island Tug and Barge upgrades fleet with z-drive ATBs

By Alan Haig-Brown and Casey Conley

**B**ritish Columbia's Island Tug and Barge has a history of innovation, and the company is taking another step forward with a new class of z-drive articulated tug-barge (ATB) units.

The first new ATB tug, *Island Raider*, is due in July from Island Tug and Barge's (ITB) shipyard



Casey Conley

near Vancouver, B.C. The second, *Island Regent*, will be delivered in late 2018. The Canada-flagged tugs will push 25,000-bbl petroleum barges.

Tidewater Transportation of Vancouver, Wash., bought ITB in September 2017. These ATBs will be joining ITB's current fleet of eight tugs and 11 barges. They're the first, and likely the last, built in-house.

Capt. Ferdi van de Kuylen, ITB's vice president of operations, said the new ATBs will be more maneuverable and cost effective versus traditional towed barges.

"The project team spent months working on an ATB design to ensure the unit meets all the requirements of our customers and regulatory agencies," said van de Kuylen.

Former CEO Bob Shields, who planned the two ATBs before selling the firm, described numer-

**Top, Robert Allan Ltd. designed *Island Raider* and sister tug *Island Regent*. The rendering shows how the ATB will look when finished. Left, Island Tug and Barge built *Island Raider* in a temporary shipyard space near Vancouver, B.C. Launch was scheduled for early June 2018.**

ous benefits from the ATB units. In particular, he noted time lost handling the towline at landings or shortening up in narrow passages.

Naval architects at Robert Allan Ltd. in Vancouver, B.C., developed plans for the ATBs. Using computational fluid dynamics (CFD), designers considered several hull forms — including a catamaran. Ultimately, they abandoned that plan after realizing the monohull would be 25 percent more efficient.

Through digital trial and error with CFD modeling, designers developed an ATB tug that becomes effectively one unit when coupled with the barge.

"If you are designing a tug to be always in the notch, it's going to be (relatively ineffective) on its own," said Mike Fitzpatrick,

## ISLAND RAIDER

### SPECIFICATIONS

**OWNER/OPERATOR:** Island Tug and Barge  
**BUILDER:** Island Tug and Barge  
**DESIGNER:** Robert Allan Ltd.  
**DIMENSIONS:** 82' x 41' x 12'  
**MISSION:** ATB pushing petroleum products barge  
**CREW SIZE:** 4

### PROPULSION:

- ◆ Engines: (2) Cummins KTA38 producing 850 hp each at 1800 rpm
- ◆ Vessel speed: 10 knots light barge, 8 knots loaded (est.)
- ◆ Propellers: 4-blade in nozzle
- ◆ Drives: Rolls-Royce US 105-P9 azimuthing thrusters
- ◆ Thrusters: (1) Schottel SPJ on barge radio controlled from wheelhouse
- ◆ Auxiliary generators: (2) John Deere 4045AFM85 with Stamford Generator UCM274E1, 99 kW

- ◆ Fendering: Schuyler Companies laminated fendering

### NAVIGATION GEAR:

- ◆ Integrated ship's consoles by JRC/Alphatron
- ◆ Radar: JRC
- ◆ Electronic chart display: JRC
- ◆ Compass: JRC
- ◆ AIS: JRC
- ◆ E-nav software: JRC
- ◆ Autopilot: JRC

### COMMUNICATIONS:

- ◆ Radio: Sailor

### CAPACITIES:

- ◆ Fuel: 26,500 gallon
- ◆ Water: 3,700 gallons
- ◆ Barge: 4 million liters, or about 25,000 bbl

### DECK EQUIPMENT:

- ◆ Winches: Burrard Iron Works E3W aft-mounted anchor winch
- ◆ Coupler system: Articouple FRC 35S
- ◆ Cranes: Palfinger Ned-Deck SOLAS davit with Polaris self-righting rescue boat

### FIREFIGHTING:

- ◆ Kidde fixed FM-200 system in engine room

★ Z-drive propulsion unique on ATBs ★ Broad bow resembles river towboat ★ Barges fitted with 500-hp pump jets



Casey Conley

president of Robert Allan Ltd. “But you are then able to design it so the difference between an ATB and conventional propelled vessel is (close to) negligible.”

Maneuverability benefits from z-drives apply across vessel classes, whether it’s a harbor tug, inland towboat or ATB. Fitzgerald added that the price difference between ASD and traditional propulsion is often smaller than many operators and shipyards expect.

“When you actually go through the full construction equation and look at the fact that you don’t need a gearbox, you don’t have stern tubes and rudders and steering gear, the cost differential is much less than you might otherwise think.”

The result of these design

**Above, after buying Island Tug and Barge, Tidewater hired Justin Nichols of Nichols Marine Services to oversee construction of the z-drive ATB tugs. Right, z-drives will allow for better maneuverability than with traditional towed barges.**

efforts is an 82-by-41-foot tugboat with a relatively shallow 12-foot draft. These dimensions fall under the 25-meter and 500-ton SOLAS limit. “We got a very large, comfortable tug on the hotel side as a bonus,” Shields explained.

*Island Raider* will be paired with *ITB Resolution*, while *Island Regent* will push *ITB Reliant*. Those barges, built a decade ago, were modified at Vancouver Drydock with specifically designed modules for the new pusher tugs.

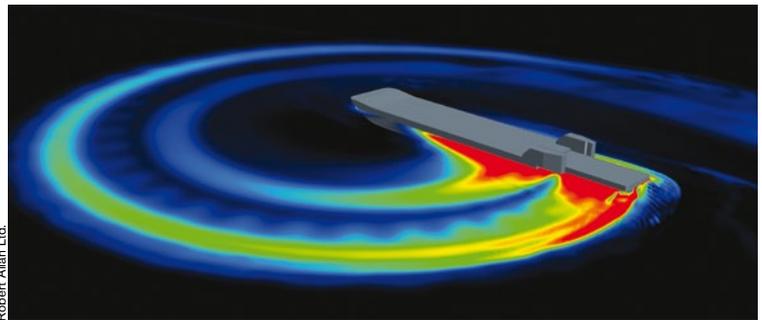
The tugs are under construction in an industrial park on Annacis Island alongside the Fraser River. Although previous management began the project, Tidewater committed to finishing them at the Annacis Island yard. During a March visit, *Island Raider* was undergoing final outfitting while workers assembled

*Island Regent’s* hull and house modules inside a nearby construction building.

Tidewater hired Justin Nichols of Nichols Marine Services in Washington to oversee the ATB construction. The job employs 60 people from nearly a dozen sub-contractors. Although the work has taken longer than expected, the product is top-notch, he said.

The two tugs have broad bows, which are designed to fit tightly in the barge notch for optimum water flow efficiency. Forward, a raised forecastle deck contains an Articouple pin system built by Taisei Engineering Consultants. The self-aligning coupler system lets the tug adjust for changing barge draft by remote control from the wheelhouse in less than a minute.

The steel main deckhouse



Robert Allan Ltd.



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Casey Conley

Propulsion comes from twin Cummins KTA38 diesel engines turning Rolls-Royce z-drives through carbon fiber shafts.

continues aft from the forecastle and contains accommodations. There are six cabins overall, including four singles and two shared double bunk rooms. The standard crew is four — captain, mate and two deck hands.

The next level up includes a wet room, large mess/lounge area and a fully stainless-steel finished galley. Stairs will lead up to a smaller cabin area for the HVAC and wheelhouse electronics. Above that is a large wheelhouse on a tower, with a full walk-around catwalk located 40 feet above the water.

Alphatron Marine developed the wheelhouse layout and view for optimal situational awareness. The tug bridge has integrated voyage data recording as well as data logging capability for keeping track of courses and fuel consumption, among other things.

The vessels will use only electronic charts, eliminating the chore of manual updates while creating more space on the bridge. Closed-circuit cameras are installed throughout the boat for bridge monitoring and management. An infrared camera mounted on the searchlight also displays on a bridge monitor.

Propulsion comes from a pair of V-12, IMO Tier II-certified, Cummins KTA38 diesels each generating 850 hp at 1,800 rpm. Carbon fiber shafts link the mains with twin Rolls-Royce US 105-P9 z-drives. The engines and their systems are entirely independent, allowing propulsion if one sustains a catastrophic failure.

Forward of the engine room, the domestic equipment space includes a workshop, making good use of the ample space available. Forward of that,

an electric over hydraulic pump for the coupling pins is located just below the main deck pin rooms.

The ATBs are not outfitted with a stern winch, meaning they will lack conventional towing capabilities. The vessels will serve tank barge routes between Vancouver, Vancouver Island and Puget Sound ports, all of which are in relatively sheltered waters. During an emergency, a towing bitt mounted on the foredeck will hold the emergency towing cable on the barges, allowing the tug to hold the barge in position.

The barges are fitted with 500-hp Schottel omnidirectional pump jets at the bow. These thrusters, common on inland waterway barges in Europe, draw water through a flat grid on the barge's bottom. It is then driven out through thruster ports that give the barge 360-degree propulsion control. This, together with the tugs' z-drives, will allow the ATB unit to effectively walk sideways parallel to its moorings.

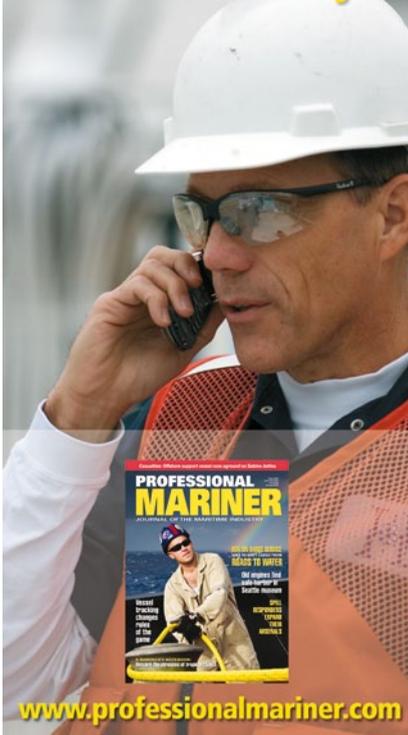
The remote-controlled thruster can propel the tug and barge unit at 5 knots. When transiting narrow sections of the route, such as the Narrows in Vancouver Harbor, it will be in "stand-by" mode for immediate response. For mooring, the ATB unit can stop well off the dock and walk sideways for a gentle and controlled landing. Unlike conventional bow thrusters, these Schottel units are still effective while the ATB is underway.

The new ATBs are projected to have remarkable efficiencies compared with a traditional towing setup. One of ITB's existing tugs, *Island Scout*, tows roughly 25,000-bbl barges now at about 5.8 knots loaded and about 7 knots empty. With identical twin 850-hp Cummins KTA38 mains, the new tugs are projected to make 8 knots loaded and 10 knots empty at the same rpm with the same capacity barges.

Although these vessels predated Tidewater's ownership, new management is looking forward to delivery.

"We're excited," said Island Tug and Barge President Adrian Samuel. "They'll be working the second they're commissioned."

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# TRACTOR TUGS IN NORTH AMERICA

Operator Tugboat	Year	Length	Builder	HP	Propulsion/Company	Engine
<b>Amak Towing, Ketchikan, Alaska</b>						
Brian T (ex-Escort Eagle)	1995	109 ft	Nichols Brothers	3,100	z-drive aft/Aqua	Cat
Anna T (ex-Pacific Explorer)	1998	105 ft	Marco Shipyard	4,400	z-drive aft/Aqua	Cat
<b>AmNav Maritime Services, San Francisco (Marine Resources Group/Foss)</b>						
Pacific Combi	1967	95 ft	Martinlich Shipbuilding	3,600	Combi-tug	EMD
Liberty (ex-Peter Foss)	1999	97 ft	Main Iron Works	4,000	z-drive aft/Ulstein	Cat
Revolution	2006	78 ft	Foss/Rainier	5,080	z-drive aft/Rolls-Royce	Cat
Independence	2007	78 ft	Foss/Rainier	5,080	z-drive aft/Rolls-Royce	Cat
Sandra Hugh	2008	78 ft	Foss/Rainier	5,080	z-drive aft/Rolls-Royce	Cat
Patricia Ann	2008	78 ft	Foss/Rainier	5,080	z-drive aft/Rolls-Royce	Cat
Freedom	2009	90 ft	Honolulu Marine	4,400	z-drive/Rolls-Royce	Cat
Sarah	2015	78 ft	Diversified Marine	4,750	z-drive/Rolls-Royce	Cat
Teresa Brusco	2017	78 ft	Diversified Marine	4,750	z-drive/Rolls-Royce	Cat
<b>ArcelorMittal Mines Canada, Port Cartier, Quebec</b>						
Brochu	1973	100 ft	Star Shipyard	3,600	cycloidal/Voith	Alco
Vachon	1973	100 ft	Star Shipyard	3,600	cycloidal/Voith	Alco
<b>Atlantic Towing Ltd., Saint John, New Brunswick, Canada</b>						
Atlantic Spruce	1997	101 ft	East Isle Shipyard	4,004	z-drive aft/Aqua	Cat
Atlantic Hemlock	1996	95 ft	East Isle Shipyard	4,004	z-drive aft/Aqua	Cat
Atlantic Willow	1998	95 ft	East Isle Shipyard	4,004	z-drive aft/Aqua	Cat
Atlantic Larch	2000	101 ft	East Isle Shipyard	4,004	z-drive aft/Aqua	Cat
Atlantic Oak	2004	101 ft	East Isle Shipyard	5,000	z-drive aft/Aqua	Cat
Atlantic Fir	2005	101 ft	East Isle Shipyard	5,000	z-drive aft/Rolls-Royce	Cat
Atlantic Cedar	2005	101 ft	East Isle Shipyard	5,000	z-drive aft/Aqua	Cat
Atlantic Beaver, Atlantic Bear	2008	101 ft	East Isle Shipyard	5,800	z-drive aft/Aqua	Cat
Spiritfire III	2008	101 ft	East Isle Shipyard	5,800	z-drive aft/Aqua	Cat
Atlantic Legacy, Guapo Warrior	2014	94 ft	Damen Shipyard	5,000	z-drive aft	Cat
Kairi, Manatee	2014	94 ft	Damen Shipyard	5,000	z-drive aft	Cat
<b>Baydelta Maritime, San Francisco</b>						
Delta Billie	2009	100 ft	Nichols Brothers	6,850	z-drive aft/Rolls-Royce	Cat
Delta Cathryn	2009	100 ft	Nichols Brothers	6,850	z-drive aft/Rolls-Royce	Cat
<b>Bay-Houston Towing, Houston</b>						
William M	1989	102 ft	North American Shipbuilding	4,000	z-draft fwd/Ulstein	EMD
Matthew K	2000	100 ft	Main Iron Works	4,300	z-drive aft/Ulstein	EMD
Wesley A	2007	98 ft	Main Iron Works	6,300	z-drive aft/Schottel	Cat
Rosemary	2008	96 ft	Eastern Shipbuilding	6,000	z-drive aft/Schottel	EMD
Lexie M, Hunter M	2008/9	98 ft	Orange Shipbuilding	6,300	z-drive aft/Schottel	Cat
Chloe K	2013	80 ft	Leevac	5,150	z-drive aft/Schottel	Cat
Zyana K	2016	80 ft	Eastern Shipbuilding	5,150	z-drive aft/Schottel	Cat
David B	2016	80 ft	Eastern Shipbuilding	5,150	z-drive aft/Schottel	Cat
Laura B	2016	80 ft	Eastern Shipbuilding	5,150	z-drive aft/Schottel	Cat
H. Douglas M	2016	80 ft	Eastern Shipbuilding	5,150	z-drive aft/Schottel	Cat
<b>Bisso Towboat, New Orleans</b>						
Cecilia B. Slatten	1999	100 ft	Main Iron Works	4,300	z-drive aft/Aqua	EMD
Alma S	2006	100 ft	Main Iron Works	4,300	z-drive aft/Rolls-Royce	EMD
Michael S	2009	100 ft	Main Iron Works	4,000	z-drive aft/Rolls-Royce	Cat
William S	2012	100 ft	Main Iron Works	4,000	z-drive aft/Rolls-Royce	Cat
Becky S	2015	100 ft	Main Iron Works	4,480	z-drive aft/Rolls-Royce	Cat
Mr. Ruben	2016	100 ft	Main Iron Works	4,480	z-drive/Rolls-Royce	Cat
Liz Healy	2017	100 ft	Main Iron Works	4,480	z-drive/Rolls-Royce	Cat
<b>Boston Towing &amp; Transportation, Boston (Unit of Reinauer Transportation)</b>						
Freedom, Liberty	2003	87 ft	Washburn & Doughty	4,400	z-drive aft/Rolls-Royce	Cat
Independence	2009	128 ft	Derektor Shipyard	5,400	z-drive aft, CP props	MTU
Justice	2009	98 ft	Martinac Shipbuilding	5,400	z-drive aft, CP props	MTU
<b>Brusco Tug &amp; Barge, Longview, Wash.</b>						
Wynema Spirit	2001	78 ft	Diversified Marine	3,600	z-drive aft/Ulstein	MTU
Lulapin	2005	78 ft	Diversified Marine	4,000	z-drive aft/Rolls-Royce	Cat
Simone Brusco	2013	78 ft	Diversified Marine	4,000	z-drive/Rolls-Royce	Cat
Peter J Brix	2014	78 ft	Diversified Marine	4,000	z-drive/Rolls-Royce	Cat
Bo Brusco	2014	78 ft	Diversified Marine	4,750	z-drive/Rolls-Royce	Cat
<b>Canadian Navy (Glen series of Voith-Schneider tugs)</b>						
Glendale, Glendyne	1975	92.5 ft	Yarrow Shipyard	1,800	Cycloidal/Voith-Schneider	Ruston
Glenbrook, Glenevis	1976	92.5 ft	Georgetown Shipyard	1,800	Cycloidal/Voith-Schneider	Ruston
Glenside	1977	92.5 ft	Georgetown Shipyard	1,800	Cycloidal/Voith-Schneider	Ruston
<b>Cook Inlet Tug &amp; Barge, Anchorage, Alaska (unit of Foss Maritime)</b>						
Stellar Wind	1993	85 ft	Tri-Star Marine	3,500	z-drive aft/Ulstein	Cat
Glacier Wind	1997	65 ft	Tri-Star Marine	2,450	z-drive aft/Ulstein	Cummins
<b>Crescent Towing, New Orleans (Unit of Cooper T. Smith)</b>						
Point Clear	1999	104 ft	Thoma-Sea	5,200	z-drive aft/Ulstein	GE
Savannah	2002	96 ft	Bollinger Shipyards	4,000	z-drive aft/Ulstein	Cat
Bulldog	2005	98 ft	Washburn & Doughty	6,700	z-drive aft/Rolls-Royce	GE
Lisa Cooper	2010	92 ft	C&G Boat Works	5,225	z-drive aft/Rolls-Royce	GE
J.K. McLean	2011	92 ft	C&G Boat Works	5,225	z-drive aft/Rolls-Royce	GE
David J. Cooper	2012	92 ft	C&G Boat Works	5,225	z-drive aft/Rolls-Royce	GE
Mardi Gras	2016	92 ft	Steiner Shipyard	5,500	z-drive aft/Rolls-Royce	GE
Arkansas, South Carolina	2017	92 ft	Steiner Shipyard	5,500	z-drive aft/Rolls-Royce	GE
<b>Crowley Marine Services, Seattle</b>						
Tioga	1994	85 ft	Tri-Star Marine	4,500	z-drive aft/Ulstein	Cat
Professor, Guard	1996/7	120 ft	Nichols Brothers	5,500	cycloidal/Voith	Cat
Master, Admiral, Guide	1998	105 ft	Nichols Brothers	4,800	cycloidal/Voith	Cat
Leader, Scout, Chief	1999	105 ft	Nichols Brothers	4,800	cycloidal/Voith	Cat
Nanua, Tan'erliq	1999	153 ft	Dakota Creek	10,192	cycloidal/Voith	Cat
Alert, Aware, Attentive	1999	140 ft	Dakota Creek	10,192	z-drive aft/Ulstein	Cat
Response	2003	129 ft	Marco Shipyard	7,260	cycloidal/Voith	Cat
Goliath (ex-S/R Mare Is.)	1997	105 ft	Marco Shipyard	5,150	z-drive aft/Aqua	Cat
Valor, Vigilant, Veteran	2007/8	100 ft	Nichols Brothers	6,800	z-drive aft/Rolls-Royce	Cat
Hawaii	2013	120 ft	JT Marine Inc.	5,358	z-drive/Schottel	GE
Washington	2014	120 ft	JT Marine Inc.	5,358	z-drive/Schottel	GE
Veteran	2014	100 ft	Nichols Brothers	6,800	z-drive aft/Rolls-Royce	Cat
<b>Dunlap Towing, Everett, Wash.</b>						
James Dunlap	1995	101 ft	Hansen Boat	4,300	z-drive aft/Ulstein	EMD
Gretchen Dunlap	2015	101 ft	Hansen Boat	6,800	z-drive/Rolls-Royce	Cat
<b>E.N. Bisso &amp; Son, New Orleans</b>						
Josephine Anne	2007	96 ft	Eastern Shipbuilding	4,000	z-drive aft/Rolls-Royce	Cat
Beverly B	2010	96 ft	Eastern Shipbuilding	4,000	z-drive aft/Rolls-Royce	Cat
Elizabeth B	2010	96 ft	Eastern Shipbuilding	4,000	z-drive aft/Rolls-Royce	Cat
Aura	2013	87 ft	Great Lakes Shipbuilding	4,600	z-drive/Rolls-Royce	Cat

# TRACTOR TUGS IN NORTH AMERICA

Operator Tugboat	Year	Length	Builder	HP	Propulsion/Company	Engine
Archie T. Higgins	2015	96 ft	Eastern Shipbuilding	4,000	z-drive/Rolls-Royce	Cat
Gladys B	2016	80 ft	Signet Shipbuilding & Repair	5,300	z-drive/Rolls-Royce	MTU
<b>Edison Chouest Offshore, Galliano, La.</b>						
LOOP Responder	1992	155 ft	North American Shipbuilding	7,300	cycloidal/Voith	Cat
C-Tractor 2 - 5	1989-93	102 ft	North American Shipbuilding	4,200	z-drive aft/Ulstein	EMD
C-Tractor 6	1994	82.8 ft	North American Shipbuilding	4,800	z-drive aft/Ulstein	Cat
C-Tractor 7 - 10	1994	90 ft	North American Shipbuilding	2,400	z-drive aft/Ulstein	Cat
C-Tractor 11	1994	82.8 ft	North American Shipbuilding	4,800	z-drive aft/Ulstein	Cat
C-Tractor 12 - 14	1996/9	105 ft	North American Shipbuilding	4,000	z-drive fwd/Ulstein	Cat
C-Tractor 19-22	2009	110 ft	Gulf Ship	5,500	z-drive fwd	Cat
Elrington, Latouche, Bainbridge, Ingot	2018	102.5 ft	North American Shipbuilding	6,008	z-drive/Rolls-Royce	Cat
Commander, Courageous, Champion	2018	140 ft	North American Shipbuilding	12,336	z-drive/Rolls-Royce	Cat
<b>Express Marine, Camden, N.J.</b>						
Duty	2006	102 ft	Patti Shipyard	3,000	z-drive aft/SteerProp	Cat
<b>Foss Maritime, Seattle (Foss Marine Holdings)</b>						
Brynn Foss	1982/07	100 ft	Tacoma Boatbuilding	4,700	z-drive/Voith	EMD
Andrew Foss	1982	106.7 ft	Tacoma Boatbuilding	4,000	cycloidal/Voith	EMD
Arthur Foss	1982	107 ft	Tacoma Boatbuilding	4,000	cycloidal/Voith	EMD
P.J. Brix	1982	87 ft	Marine Industries	2,560	z-drive aft/Niigata	Cat
Henry Foss, Wedell Foss	1982/05	100 ft	Tacoma Boatbuilding	5,000	z-drive/Voith	EMD
Lindsey Foss	1993	155 ft	Trinity Marine	8,000	cycloidal/Voith	EMD
Garth Foss	1994	155 ft	Trinity Marine	8,000	cycloidal/Voith	EMD
Daniel Foss	1998	95.2 ft	Conversion	3,300	z-drive aft/Ulstein	Cat
Marshall Foss, Lynn Marie	2001	98 ft	Halter Marine	6,250	z-drive aft/Ulstein	MTU
Campbell Foss (hybrid)	2006	78 ft	Foss/Rainier	5,080	z-drive aft/Rolls-Royce	Cat
America, Pacific Star	2008	98 ft	J.M. Martinac	6,610	z-drive aft/Niigata	MTU
Alta June	2008	78 ft	Foss/Rainier	5,080	z-drive aft/Rolls-Royce	Cat
Carolyn Dorothy (hybrid)	2008	78 ft	Foss/Rainier	5,000	z-drive aft/Rolls-Royce	Cummins
Kalama	2009	86 ft	Kewalo Shipyard	4,400	z-drive aft/HRP	Cat
Delta Lindsey	2010	100 ft	Nichols Brothers	6,850	z-drive aft/Rolls-Royce	Cat
Caden Foss	2017	110 ft	JT Marine Inc.	6,772	z-drive/Rolls-Royce	Cat
<b>Foss Maritime, Hawaii Region (Foss Marine Holdings)</b>						
Eleu	1989	73 ft	J.M. Martinac	2,800	z-drive aft/Niigata	Cat
Mamo	1996	78 ft	Trinity Marine	3,300	z-drive aft/Ulstein	Cat
Mikiala II	1977/01	100 ft	Main Iron Works/Foss	3,300	z-drive aft/Ulstein	Cat
Mikioi	2004	78 ft	Foss Rainier shipyard	4,700	z-drive aft/Rolls-Royce	Cat
Pi'ilani	2005	78 ft	Foss Rainier shipyard	5,080	z-drive aft/Rolls-Royce	Cat
Moana	2007	100.2 ft	Foss Rainier shipyard	3,000	z-drive aft/Voith	Cat
<b>Fournier Tugs Inc., Belfast, Maine</b>						
Fournier Tractor	1984	85 ft	Main Iron Works	3,500	z-drive aft/Ulstein	EMD
<b>Harbor Docking and Towing, Lake Charles, La.</b>						
Ted, George	2008/9	105 ft	Main Iron Works	6,140	z-drive aft/Rolls-Royce	EMD
Pat	2013	96 ft	Main Iron Works	6,300	z-drive/Rolls-Royce	Cat
<b>Harley Marine Services, Seattle</b>						
Gyrfalcon	1995	105 ft	Marco Shipyard	4,000	z-drive aft/Ulstein	Cat
Z-3, Z-4, Z-5	1999	94 ft	Marco Shipyard	4,000	z-drive aft/Ulstein	Cat
Millennium Falcon	2000	105 ft	Marco Shipyard	4,400	z-drive aft/Ulstein	Cat
Millennium Star	2000	105 ft	Marco Shipyard	4,400	z-drive aft/Ulstein	Cat
Millennium Dawn	2002	105 ft	Marco Shipyard	4,400	z-drive aft/Ulstein	Cat
Millennium Maverick	1996	100 ft	Trinity/Halter	4,300	z-drive aft/Aqua	EMD
Tim Quigg	2004	80 ft	Diversified Marine	4,500	z-drive aft/Rolls-Royce	Cat
John Quigg	2004	80 ft	Diversified Marine	4,800	z-drive aft/Rolls-Royce	Cat
Bob Franco	2013	100 ft	Diversified Marine	5,360	z-drive aft/Schottel	Cat
Robert Franco	2013	100 ft	Nichols Brothers	6,850	z-drive aft/Rolls-Royce	Cat
Ahbra Franco	2013	100 ft	Nichols Brothers	6,890	z-drive aft/Rolls-Royce	Cat
Lela Franco	2014	80 ft	Diversified Marine	5,150	z-drive aft/Rolls-Royce	Cat
Michelle Sloan	2015	80 ft	Diversified Marine	5,150	z-drive aft/Rolls-Royce	Cat
Earl W. Redd	2017	120 ft	Diversified Marine	5,350	z-drive/Rolls-Royce	Cat
Dr. Hank Kaplan	2017	80 ft	Diversified Marine	5,350	z-drive/Caterpillar	Cat
Rich Padden	2017	80 ft	Diversified Marine	5,350	z-drive/Caterpillar	Cat
<b>Knutson Towboat Company</b>						
Centennial (ex-Kamaehu)	1993	72 ft	Knutson Marine	3,000	z-drive aft/Schottel	Cummins
<b>Marine Towing of Tampa, Tampa, Fla.</b>						
Endeavor	2000	80 ft	Halter Marine	4,200	z-drive inline/Ulstein	Wärtsilä
Freedom	2005	92 ft	Washburn & Doughty	5,000	z-drive aft/Rolls-Royce	Cat
Liberty	2007	92 ft	Washburn & Doughty	5,000	z-drive aft/Rolls-Royce	Cat
Patriot	2013	93 ft	Washburn & Doughty	5,000	z-drive aft/Rolls-Royce	Cat
Independent	2017	93 ft	Washburn & Doughty	5,000	z-drive aft/Rolls-Royce	Cat
<b>McAllister Towing &amp; Transportation Co., Inc.</b>						
Steven McAllister	1963/07	109 ft	Southern Shipbuilding	4,000	z-drive aft/Schottel	Cat
Ellen McAllister	1966/07	109 ft	Marinette Marine	4,000	z-drive aft/Schottel	Cat
Dorothy McAllister	1971/06	109 ft	Marinette Marine	4,000	z-drive aft/Schottel	Cat
Stacy McAllister	1970/05	95.5 ft	Peterson Builders	4,000	z-drive aft/Schottel	Cat
Robert E. McAllister	1970/05	109 ft	Peterson Builders	4,000	z-drive aft/Schottel	Cat
Donal G. McAllister	1970/02	109 ft	Marinette Marine	3,000	z-drive aft/Schottel	EMD
Kaleen M. McAllister	1970/02	109 ft	Southern Shipbuilding	3,300	z-drive aft/Schottel	EMD
Timothy McAllister	1970/06	109 ft	Marinette Marine	4,000	z-drive aft/Schottel	Cat
Margaret McAllister	1970/06	109 ft	Marinette Marine	4,000	z-drive aft/Schottel	Cat
Patrick M. McAllister	1974/02	102 ft	Marinette Marine	5,150	z-drive aft/Ulstein	EMD
Beth M. McAllister	1974/03	109 ft	Peterson Builders	3,000	z-drive aft/Schottel	Cat
Matthew McAllister (ex-Orion)	1982	95 ft	Mid-Coast Marine	3,000	cycloidal/Voith	EMD
Alex McAllister	1985	95 ft	Eastern Shipbuilding	4,000	z-drive aft/Ulstein	EMD
Brooklyn McAllister	1986	115 ft	Offshore Shipbuilding	4,000	z-drive aft/Schottel	EMD
Erin McAllister	1996/01	95.5 ft	Trinity Marine	5,100	z-drive aft/Ulstein	Cat
Vicki M. McAllister	2001	96 ft	Eastern Shipbuilding	4,650	z-drive aft/Schottel	EMD
Emily Anne McAllister	2003	98 ft	Eastern Shipbuilding	4,650	z-drive aft/Schottel	EMD
A.J. McAllister	2003	98 ft	Eastern Shipbuilding	5,150	z-drive aft/Schottel	EMD
Moira McAllister (ex-Independent)	2003	92 ft	Washburn & Doughty	5,000	z-drive aft/Rolls-Royce	Cat
Rainbow	2004	92 ft	Washburn & Doughty	5,000	z-drive/Rolls-Royce	Cat
Andrew McAllister	2008	98 ft	Eastern Shipbuilding	6,000	z-drive aft/Schottel	EMD
Gregg McAllister	2008	82 ft	Eastern Shipbuilding	4,000	z-drive aft/Schottel	Cat
Reid McAllister	2008	82 ft	Eastern Shipbuilding	4,000	z-drive aft/Schottel	Cat
Bridget McAllister (ex-Leo)	2006	78 ft	Foss Shipyard	5,080	z-drive aft/Rolls-Royce	Cat
Buckley McAllister	2014	96 ft	Senesco Marine	5,150	z-drive/Schottel	Cat
Eric McAllister	2014	96 ft	Senesco Marine	5,150	z-drive/Schottel	Cat
Tate McAllister	2014	93 ft	Washburn & Doughty	6,000	z-drive/Schottel	EMD

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Operator Tugboat	Year	Length	Builder	HP	Propulsion/Company	Engine
Janet M McAllister	2001	96 ft	Eastern Shipbuilding	4,650	z-drive aft/Schottel	EMD
Jeffrey McAllister	2017	96 ft	Eastern Shipbuilding	5,000	z-drive aft/Schottel	EMD
Capt. Brian A. McAllister	2017	100 ft	Horizon Shipbuilding	6,772	z-drive aft/Schottel	Cat
Rosemary McAllister	2018	100 ft	Eastern Shipbuilding	6,772	z-drive aft/Schottel	Cat
<b>McKeil Marine, Hamilton, Ontario</b>						
Leonard M	1986	110 ft	McTay Marine	4,000	z-drive aft/Rolls-Royce	
Sharon MI	1993	114 ft	Imamura Shipbuilding	4,000	z-drive aft/R expeller	
Beverly MI	1993	114 ft	Imamura Shipbuilding	4,000	z-drive aft/R expeller	
Lois M	1991/2014	107.5 ft	Matsuura Iron Shipbuilding	4,800	z-drive aft/R expeller	
Tim McKeil (ex Pannawonica I)	1991/2014	107.5 ft	Matsuura Iron Shipbuilding	4,800	z-drive aft/R expeller	
<b>Moran Towing, New Canaan, Conn.</b>						
Patricia Moran	1962/99	80 ft	Jakobson Shipyard	4,200	z-drive aft/Rolls-Royce	EMD
Sewells Point	1977/95	100 ft	Jakobson Shipyard	3,005	z-drive fwd/Mortrac	DD/EMD
Harriett Moran	1978/96	100.5 ft	Jakobson Shipyard	3,005	z-drive fwd/Mortrac	DD/EMD
Town Point	1978/98	100 ft	Jakobson Shipyard	3,005	z-drive fwd/Mortrac	DD/EMD
Drum Point	1986/97	100 ft	Jakobson Shipyard	3,005	z-drive fwd/Mortrac	DD/EMD
Z-One	1996	87.7 ft	Halter Marine	4,000	z-drive aft/Ulstein	BTA
Fort Bragg	1998	92 ft	Washburn & Doughty	4,400	z-drive aft/Ulstein	Cat
Elizabeth Turecamo	1998	110 ft	Eastern Shipbuilding	6,140	z-drive aft/Aqua	EMD
Marci Moran	1999	92 ft	Washburn & Doughty	4,200	z-drive aft/Rolls-Royce	EMD
Karen Moran	1999	92 ft	Washburn & Doughty	4,200	z-drive aft/Rolls-Royce	EMD
Kerry Moran	1999	100 ft	Jakobson Shipyard	4,200	z-drive aft/Ulstein	EMD
Susan Moran	1999	92 ft	Washburn & Doughty	4,200	z-drive aft/Rolls-Royce	EMD
Tracy Moran	2000	92 ft	Washburn & Doughty	4,200	z-drive aft/Rolls-Royce	EMD
Surrie Moran	2000	92 ft	Washburn & Doughty	4,200	z-drive aft/Ulstein	EMD
Wendy Moran	2000	92 ft	Washburn & Doughty	4,200	z-drive aft/Rolls-Royce	EMD
Diane Moran	2001	92 ft	Washburn & Doughty	5,100	z-drive aft/Ulstein	EMD
Gamma Lee T. Moran	2002	92 ft	Washburn & Doughty	5,100	z-drive aft/Ulstein	EMD
Kaye E. Moran	2003	92 ft	Washburn & Doughty	5,100	z-drive aft/Ulstein	EMD
James R. Moran	2004	92 ft	Washburn & Doughty	5,100	z-drive aft/Ulstein	EMD
Lynne Moran	2005	92 ft	Washburn & Doughty	5,100	z-drive aft/Ulstein	EMD
Edward J. Moran	2006	98 ft	Washburn & Doughty	6,500	z-drive aft/Rolls-Royce	EMD
April Moran	2006	92 ft	Washburn & Doughty	5,100	z-drive aft/Schottel	EMD
Eleanor F. Moran	2007	92 ft	Washburn & Doughty	5,100	z-drive aft/Schottel	EMD
Laura K. Moran	2008	92 ft	Washburn & Doughty	5,100	z-drive aft/Schottel	MTU
Capt. Jimmy T. Moran	2008	86 ft	C&G Boat Works	5,100	z-drive aft/Schottel	MTU
Shiney V. Moran	2009	86 ft	C&G Boat Works	5,100	z-drive aft/Schottel	MTU
Catherine C. Moran	2009	98 ft	Washburn & Doughty	6,000	z-drive aft/Rolls-Royce	EMD
Loretta B. Moran	2010	98 ft	Washburn & Doughty	6,000	z-drive aft/Rolls-Royce	EMD
Lizzy B. Moran	2010	92 ft	Washburn & Doughty	5,100	z-drive aft/Schottel	MTU
James A. Moran	2011	93 ft	Washburn & Doughty	6,000	z-drive aft/Schottel	MTU
Mark Moran	2012	86 ft	Washburn & Doughty	5,100	z-drive aft/Schottel	MTU
Katie T. Moran	2012	86 ft	Washburn & Doughty	5,100	z-drive aft/Schottel	MTU
Annabelle Dorothy Moran	2012	86 ft	Washburn & Doughty	5,100	z-drive aft/Schottel	MTU
Hayley Moran	2014	93 ft	Washburn & Doughty	6,000	z-drive/Schottel	EMD
George T. Moran	2014	93 ft	Washburn & Doughty	6,000	z-drive/Schottel	EMD
Payton Grace Moran	2015	93 ft	Washburn & Doughty	6,000	z-drive/Schottel	EMD
Kirby Moran	2015	93 ft	Washburn & Doughty	6,000	z-drive/Schottel	EMD
JRT Moran	2015	93 ft	Washburn & Doughty	6,000	z-drive/Schottel	EMD
James D. Moran	2015	93 ft	Washburn & Doughty	6,000	z-drive/Schottel	EMD
Cooper Moran	2016	93 ft	Washburn & Doughty	6,000	z-drive/Schottel	EMD
Jonathan C. Moran	2016	93 ft	Washburn & Doughty	6,000	z-drive/Schottel	EMD
Maxwell Paul Moran	2016	93 ft	Washburn & Doughty	6,000	z-drive/Schottel	EMD
Jack T. Moran	2016	93 ft	Washburn & Doughty	6,000	z-drive/Schottel	EMD
Clayton W. Moran	2016	93 ft	Washburn & Doughty	6,000	z-drive/Schottel	EMD
Benson George Moran	2017	93 ft	Washburn & Doughty	6,770	z-drive/Rolls-Royce	Cat
<b>Newfoundland Transshipment, Placentia Bay, Newfoundland</b>						
Placentia Pride	1998	125 ft	Marystown Shipyard	5,600	cycloidal/Voith	Bergen
Placentia Hope	1998	125 ft	Marystown Shipyard	5,600	cycloidal/Voith	Bergen
<b>Ocean Group, Quebec City, Canada</b>						
Escorte	1967	84.5 ft	Jakobson Shipyard	1,300	z-drive aft/Voith Schneider	GM
Ocean A. Simard	1980	92 ft	Georgetown Shipyards	3,340	z-drive aft/Voith Schneider	Alco
Ocean Intrepide	1997	82 ft	Ocean Industries	4,000	double z-drive/Niigata	Mitsub.
Ocean Jupiter	1998	82 ft	Ocean Industries	4,000	z-drive aft/Niigata	Mitsub.
Ocean Stevns	2003	108 ft	Ocean Industries	5,000	double z-drive/Rolls/CP	MaK
Ocean Arctique	2005	101 ft	Ocean Industries	5,000	double z-drive/Rolls/CP	MaK
Ocean K. Rusby	2005	98 ft	East Isle Shipyard	5,000	double z-drive/Rolls/CP	Cat
Ocean Raymond Lemay	2006	98 ft	East Isle Shipyard	5,000	double z-drive/Rolls/CP	Cat
Ocean Henry Bain	2006	98 ft	East Isle Shipyard	5,000	double z-drive/Rolls/CP	Cat
Ocean Cartier	2007	90 ft	Shanghai Shipyards	5,220	z-drive aft/Voith Schneider	Yanmar
Ocean Bertrand Jeansonne	2008	98 ft	East Isle Shipyard	5,000	double z-drive/Rolls/CP	Cat
Ocean Georgie Bain	2009	82 ft	Ocean Industries	4,000	double z-drive/Niigata	Cat
Ocean Raynald T.	2009	98 ft	East Isle Shipyard	5,000	double z-drive/Rolls/CP	Cat
Ocean Clovis T.	2009	98 ft	East Isle Shipyard	5,000	double z-drive/Rolls/CP	Cat
Ocean Serge Genois	2010	82 ft	Ocean Industries	4,000	double z-drive/Niigata	Cat
Ocean Yvan Desgagnes	2010	98 ft	East Isle Shipyard	5,000	double z-drive/Rolls/CP	Cat
Ocean Ross Gaudreault	2011	98 ft	East Isle Shipyard	5,000	double z-drive/Rolls/CP	Cat
Ocean Pierre Julien	2013	82 ft	Ocean Industries	4,000	double z-drive/Niigata	Cat
Ocean Tundra	2013	118 ft	Ocean Industries	8,160	double z-drive/Rolls/CP	MaK
Ocean Taiga	2016	118 ft	Ocean Industries	8,160	double z-drive/Rolls/CP	Mak
<b>Otto Candies, Des Allemands, La.</b>						
Devin Candies	2000	150 ft	Bender Shipbuilding	9,300	z-drive aft/Rolls-Royce	EMD
Kelly Candies	2000	150 ft	Bender Shipbuilding	9,300	z-drive aft/Rolls-Royce	EMD
<b>Polaris Materials, Vancouver</b>						
Numas Warrior	2008	58 ft	Sylte Shipyard	2,100	z-drive aft/HRP	MTU
<b>Rio Tinto-Alcan Inc., Quebec</b>						
Fjord Eternité	2006	101 ft	East Isle Shipyard	5,000	z-drive aft/Rolls-Royce	Cat
Fjord Saguenay	2006	101 ft	East Isle Shipyard	5,000	z-drive aft/Rolls-Royce	Cat
<b>Samson Tug Boats Inc., Delta, British Columbia (Canada)</b>						
Shuswap	2011	58 ft	Sylte Shipyard	3,200	z-drive aft	MTU
Kootenay	2012	64.3 ft	ABD Boats	5,000	z-drive aft	MTU
<b>Sause Brothers, Coos Bay, Ore. (Hawaii)</b>						
Tira Lani	1999	79 ft	Sause Brothers	4,000	z-drive aft/Ulstein	Cat
<b>Seabulk Towing, Port Everglades, Fla.</b>						
Eagle	1988	92 ft	Tampa Shipyards	3,200	z-drive fwd/Niigata	B&W
Florida	1990	80 ft	Main Iron Works	3,000	z-drive/Rolls-Royce	EMD
Broward	1995	100 ft	Atlantic Marine	5,100	z-drive fwd/Aqua	EMD
Hawk	1995	110 ft	Trinity/Halter	6,700	z-drive aft/Aqua	Wärtsilä
Condor	1996	110 ft	Halter Marine	6,700	z-drive aft/Aqua	Wärtsilä

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Operator Tugboat	Year	Length	Builder	HP	Propulsion/Company	Engine
SDM Escambia, SDM New River, SDM St. Johns	1997/98	90 ft	Halter Marine	4,000	z-drive inline/Ulstein	Cat
SDM Suwannee River	2000	90 ft	Halter Marine	4,200	z-drive inline/Ulstein	Wärtsilä
Gasparilla	2007	96 ft	Eastern Shipbuilding	5,000	z-drive aft/Schottel	Cat
Energy Hercules	2007	96 ft	Eastern Shipbuilding	5,000	z-drive aft/Schottel	Cat
Energy Zeus	2007	96 ft	Eastern Shipbuilding	5,000	z-drive aft/Schottel	Cat
Buccaneer	2007	96 ft	Eastern Shipbuilding	5,000	z-drive aft/Schottel	Cat
Sabine	2007	96 ft	Eastern Shipbuilding	5,000	z-drive aft/Schottel	Cat
Apollo, Athena	2013	93 ft	Washburn & Doughty	5,300	z-drive/Schottel	Cat
Atlas	2013	92 ft	Great Lakes Shipyard	4,640	z-drive/Rolls-Royce	Cat
Trident	2017	98.5 ft	Master Boat Builders	5,733	triple z-drive/Schottel	Cat
Trinity	2018	98.5 ft	Master Boat Builders	5,733	triple z-drive/Schottel	Cat
Triton	2018	98.5 ft	Master Boat Builders	4,947	triple z-drive/Veth	Cat
<b>Seaspan Marine, North Vancouver (Division of Washington Marine Group)</b>						
Charles H. Cates I	1983	78 ft	Allied Shipbuilders	2,400	Niigata Z-Peller	DD
Charles H. Cates III	1986	78 ft	John Manly Shipyard	2,400	Niigata Z-Peller	DD
Charles H. Cates X	1990	60 ft	Allied Shipbuilders	1,300	Niigata Z-Peller	Cat
Seaspan Hawk, Falcon	1993	80 ft	Vancouver Shipyards	3,100	z-drive aft/Niigata	DD
Seaspan Resolution	2009	98 ft	Martinac Shipbuilding	6,000	z-drive aft/Niigata	EMD
Seaspan Raven, Eagle	2010	92 ft	Sanmar Denizcilik	5,000	z-drive aft/Rolls/CP	Cat
Seaspan Kestrel, Osprey	2011	92 ft	Sanmar Denizcilik	6,300	z-drive aft/Rolls/CP	Cat
<b>Shaver Transportation, Portland, Ore.</b>						
Portland	1981	107 ft	Nichols Brothers	4,000	z-drive aft	MTU
Washington (ex-Falcon)	1990	92 ft	Tampa Shipyards	3,200	z-drive fwd/Niigata	B&W
Vancouver	1993	76 ft	J.M. Martinac	3,600	z-drive aft/Niigata	MTU
Deschutes	1997	91 ft	J.M. Martinac	3,600	z-drive aft/Aqua	MTU DD
Willamette	1999	91 ft	J.M. Martinac	3,600	z-drive aft/Aqua	MTU DD
Sommer S	2012	77 ft	Diversified Marine	5,360	z-drive aft/Schottel	MTU
<b>Signet Maritime, Houston</b>						
Signet Valiant	1994	81.5 ft	Signet Shipbuilding & Repair	3,000	z-drive aft/Ulstein	EMD
Signet Enterprise	1999	105 ft	Marco Shipbuilding	4,400	z-drive aft/Ulstein	Cat
Signet Intrepid	1999	105 ft	Marco Shipbuilding	4,400	z-drive aft/Ulstein	Cat
Signet Volunteer	2001	70 ft	Horizon Shipyard	1,200	z-drive aft/Rolls-Royce	Cummins
Signet Victory	2001	81.5 ft	Signet Shipbuilding & Repair	3,000	z-drive aft/Aqua	EMD
Signet Challenger	2003	104 ft	Thoma-Sea	4,200	z-drive aft/Rolls-Royce	Cummins
Signet Reliance	2007	98 ft	Signet Shipbuilding & Repair	5,000	z-drive aft/Rolls-Royce	Cat
America, Pacific Star	2008	98 ft	J.M. Martinac	6,610	z-drive aft/Niigata	MTU
Signet Weatherly	2012	105 ft	Signet Shipbuilding & Repair	4,720	z-drive aft/Niigata	MTU
Signet Constellation	2012	100 ft	Trinity Offshore	6,834	z-drive aft/Rolls-Royce	Cat
Signet Stars & Stripes	2012	100 ft	Trinity Offshore	6,834	z-drive aft/Rolls-Royce	Cat
Signet Magic	2013	80 ft	Signet Shipbuilding & Repair	5,150	z-drive aft/Rolls-Royce	Cat
Signet Arcturus, Signet Polaris	2014	105 ft	Pati Marine	6,834	z-drive aft/Rolls-Royce	Cat
Signet Vigilant	2014	72 ft	Signet Shipbuilding & Repair	2,460	z-drive aft/Rolls-Royce	MTU
<b>Saam Smit Towage, Vancouver, B.C.</b>						
Smit Hunter	1989	50 ft	John Manly Shipyard	1,300	z-drive aft/Aqua	DD
Smit Spirit	1996	52 ft	Pacific Shipyard	3,000	z-drive aft/Aqua	MTU/DD
Smit Pride	1997	52 ft	Pacific Shipyard	3,000	z-drive aft/Aqua	MTU/DD
Smit Mississippi	1998	102 ft	Damen Shipyard	4,900	z-drive	Wärtsilä 6L26
SST Tiger Sun	1999	72 ft	Sylte Shipyard	5,000	z-drive/Ulstein	MTU/DD
Smit Humber	2000	100 ft	Damen Shipyard	4,900	z-drive	Wärtsilä 6L26
Smit Clyde	2000	100 ft	Damen Shipyards	4,900	z-drive aft/Schottel	Wärtsilä 6L26
SST Orleans (ex-TP 3)	2009	100 ft	Nichols Brothers	6,850	z-drive aft/Niigata	Cat
Smit Venta	2009	94 ft	Damen Shipyard	4,900	z-drive aft/Rolls-Royce	Cat
Smit Saba	2009	94 ft	Damen Shipyard	4,900	z-drive aft/Rolls-Royce	Cat
SST Salish, SST Capilano	2016	71 ft	ABD Boats	5,364	z-drive/Rolls-Royce	MTU
<b>Smith Maritime, Honolulu (unit of Kirby Offshore Marine)</b>						
Noke	2006	65 ft	Rozema Boatworks	950	z-drive aft/Thrustmaster	MTU
<b>Standard Towing Ltd., Port McNeill, B.C.</b>						
Popint Valiant	1998	80 ft	Ocean Industries	3,300	z-drive/Niigata	Mitsub.
Numas Warrior	2008	58 ft	Sylte Shipyard	4,640	z-drive aft/HRP	MTU
Renegade	2012	63 ft	Main Iron Works	3,200	z-drive aft/ZF	Cummins
<b>Suderman &amp; Young Towing Co., Houston</b>						
Jess Newton	2001	100 ft	Main Iron Works	4,300	z-drive aft/Ulstein	EMD
Denia	2004	96 ft	Eastern Shipbuilding	5,150	z-drive aft/Schottel	EMD
Thor	2007	98 ft	Main Iron Works	6,300	z-drive aft/Schottel	Cat
Evelena, Lamar	2008/9	98 ft	Orange Shipbuilding	6,300	z-drive aft/Schottel	Cat
Zeus	2013	80 ft	Leevac	5,150	z-drive aft/Schottel	Cat
Triton	2015	80 ft	Eastern Shipbuilding	5,150	z-drive aft/Schottel	Cat
Neptune, Oceanus, Poseidon	2016	80 ft	Eastern Shipbuilding	5,150	z-drive aft/Schottel	Cat
<b>Svitzer Canada Ltd. (EcTug), Halifax, Nova Scotia</b>						
Point Chebucto	1992	110 ft	Halifax-Dartmouth	4,000	z-drive aft/Aqua	Cat
Svitzer Bedford	2005	105 ft	Asenav, Chile	5,000	z-drive aft/Schottel	Cat
Svitzer Montreal	2004	100 ft	Irving East Isle Shipyard	5,000	z-drive aft	Cat
<b>Thames Towboat, New London, Conn.</b>						
Paul A. Wronowski	1980	90 ft	Thames Shipyard	3,600	z-drive aft/Niigata	Cummins
John P. Wronowski	2004	96 ft	Eastern Shipbuilding	3,400	z-drive aft/Schottel	Cummins
<b>U.S. Navy, Seattle, Wash.</b>						
YT 802	2006	90 ft	Converted YTBs	3,600	z-drive aft/Schottel	Cat
YT 803 - YT 806	2009/11	90 ft	J.M. Martinac	3,600	z-drive aft/Schottel	Cat
YT 807	2012	90 ft	J.M. Martinac	3,600	z-drive aft/Schottel	Cat
<b>Western Towboat, Seattle</b>						
Westrac	1987	72 ft	Western Towboat	2,500	z-drive aft/Ulstein	Cat
West Point	1992	60 ft	Western Towboat	1,200	z-drive aft/Ulstein	Cat
Westrac II	1995	79 ft	Western Towboat	2,400	z-drive aft/Ulstein	Cat
Western Titan	1997	108 ft	Western Towboat	4,500	z-drive aft/Rolls-Royce	Cat
Pacific Titan	2000	108 ft	Western Towboat	4,500	z-drive aft/Rolls-Royce	Cat
Gulf Titan	2001	120 ft	Western Towboat	4,500	z-drive aft/Rolls-Royce	Cat
Ocean Titan	2004	120 ft	Western Towboat	5,000	z-drive aft/Rolls-Royce	Cat
Alaska Titan	2008	120 ft	Western Towboat	5,000	z-drive aft/Schottel	Cat
Arctic Titan	2012	120 ft	Western Towboat	5,000	z-drive aft/Schottel	Cat
Bering Titan	2015	120 ft	Western Towboat	5,000	z-drive aft/Schottel	Cat
<b>Wilmington Tug, Wilmington, Del.</b>						
Tina	1977	65 ft	Gladding-Hearn	1,800	z-drive aft/HRP	Lugger
Sally	1987	70 ft	Gladding-Hearn	2,400	z-drive aft/HRP	MTU
Lindsey	1989	70 ft	Gladding-Hearn	2,600	z-drive aft/Ulstein	Cummins
Capt. Harry	2002	80 ft	Washburn & Doughty	4,200	z-drive aft/Ulstein	MTU
Sonie	2007	80 ft	Washburn & Doughty	4,800	z-drive aft/Rolls-Royce	MTU
Madeline	2008	80 ft	Gladding-Hearn	4,800	z-drive aft/Rolls-Royce	MTU

# Edison Chouest, Damen team up for world's most powerful ASD tugboats

By Casey Conley



Alyeska Pipeline Service Co.

When it comes to tugboat design and technology, some people believe North American operators lag behind trendsetters in Asia, Europe or Australia. Yet the world's most powerful ASD ship handling tugboats are operating in the United States, not in Rotterdam or Sydney or Singapore.

The 140-by-54-foot *Commander* arrived in Valdez, Alaska, this spring. Starting July 1, it will escort tankers in Prince William Sound for Alyeska Pipeline Service Co.

It is the first of five identical escort vessels built and owned by Edison Chouest Offshore.

Virtually everything about this tug class, based on the Damen ASD 4517 design, stands out. It has 12,336 total hp from twin Caterpillar C280-16 Tier 4 engines turning 157.5-inch controllable props in Rolls-Royce z-drives. They are capable of 15 knots ahead and more than 150 tons of direct bollard pull.

"I can tell you the larger Alyeska tugs are the biggest- and strongest-ever built ASD

escort and mooring assist tugs in the world," said Jan W. van Hogerwou, Damen's senior vice president for North America.

These tugs also have some of the most advanced remote monitoring of mechanical and electrical components. Land-based crews will be able to detect component and onboard system failures before the crew knows, he said. "Downtime of these highly advanced tugs will therefore be reduced to the absolute minimum whilst safety of the

crew has evolved to the highest standard."

Edison Chouest Offshore (ECO) takes over escort service in Prince William Sound from Crowley Maritime on July 1. The Louisiana company will hold the escort contract for 10 years, and is building nine new tugs for the project — including four new 102.5-foot, 6,008-hp general purpose tugboats. These vessels will tow oil-response barges and assist docking tankers.

*Elrington* is the lead boat in the smaller class, which has Cat 3516E Tier 4 engines and Rolls-Royce z-drives with 102-inch props. It boasts 72.5 tons of bollard pull. ECO also is supplying four oil spill response barges.

In addition to the z-drives, Rolls-Royce provided the fore and aft winches on all nine new tugs.

"ECO's *Commander*, *Elrington* and *Latouche* tugs have arrived in Prince William Sound from the Gulf of Mexico, and all nine tugs will have arrived by late June," said Lisa Matlock, outreach coordinator for the Prince William



Dunlap Towing/Matt Branscome

Above, with 12,336 hp, *Commander* and its sister tugs are the world's most powerful ASD tugs. Left, *Sigrid Dunlap* undergoing final outfitting at Hansen Boat Co. in Everett, Wash.

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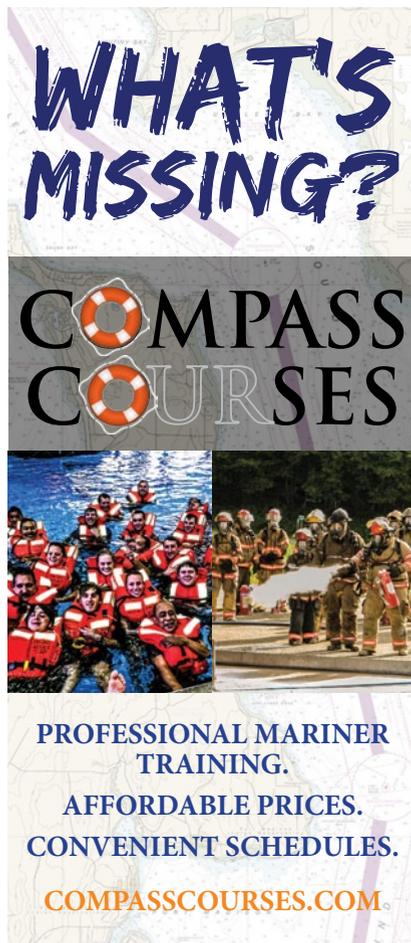


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## TUGBOAT ROUNDUP

Sound Regional Citizens' Advisory Council. "These purpose-built vessels are a powerful, unified fleet that can transfer crew between them."

Two escort tugs will accompany the loaded tankers during outbound transits from Valdez. One will be tethered to the ships from the Valdez Marine Terminal beyond the Valdez Narrows, according to Alyeska Pipeline Service.

"The tugs stay within a quarter-mile during a tanker escort to make sure every tanker remains within visual sight and easy range for response," said Kate Dugan, an Alyeska Pipeline Service spokesperson. "In an emergency, the escort vessels might be called upon to stop the tanker, counter any undesired deviation in course or take the tanker under tow."

*Commander* and its sister tugs are equipped with berthing for 12 people, FFVI fire-fighting capabilities, oil spill detection equipment and an infrared camera. *Elrington* and its siblings also have berthing for 12 and oil spill detection equipment. Two will have fire-fighting equipment.

Tom Barrett, president of Alyeska Pipeline Service Co., said its incoming crews have spent the spring training in Alaskan waters, in simulators and on board the new tugs as they arrive. He predicted a seamless transition to the ECO vessels.

*Susan Buchanan contributed reporting.*

### Sigrid Dunlap

Dunlap Towing was preparing in spring 2018 to take delivery of an oceangoing tugboat built by Hansen Boat Co. of Everett, Wash. Hockema

Whalen Myers Associates provided plans for the vessel.

Dunlap Towing plans to use the 121.5-by-38-foot *Sigrid Dunlap* to tow barges between Seattle and Honolulu. The tug is ABS A1 classed and SOLAS rated. *Sigrid* is based on designs from *Phyllis Dunlap*, built in 2001. However, it has extensive upgrades and is more powerful than its predecessor.

"Nearly every system was reworked to incorporate the latest regulatory requirements and vendor equipment," naval architect Michael Whalen said.

Propulsion comes from twin 2,675-hp Caterpillar C-175 Tier 3 engines turning 120-inch, three-bladed, stainless-steel props through Reintjes WAF 1173 reduction gears. *Sigrid Dunlap* also has a Nautican integrated propulsion unit. Electrical power comes from Caterpillar C7.1 gensets each producing 125 kW.

The tug has a Markey double-drum TDSDS-36 towing winch spooled with 3,100 feet of 2.25-inch wire and 2,200 feet of 1.25-inch towing wire in separate drums. The hawser winch is a Markey DESW-32-20 electric drive unit.

The wheelhouse has Furuno radars, electronic chart display, radios and GMDSS. Simrad provided the autopilot system and gyrocompass, and Jastram supplied the steering system.

There are seven total state-rooms on *Sigrid Dunlap*, two of which are single berths and five are doubles. Total crew will be six people. The tug has capacity for 152,000 gallons of diesel, 1,800 gallons each of lube and hydraulic oil, and 2,000 gallons of potable water.



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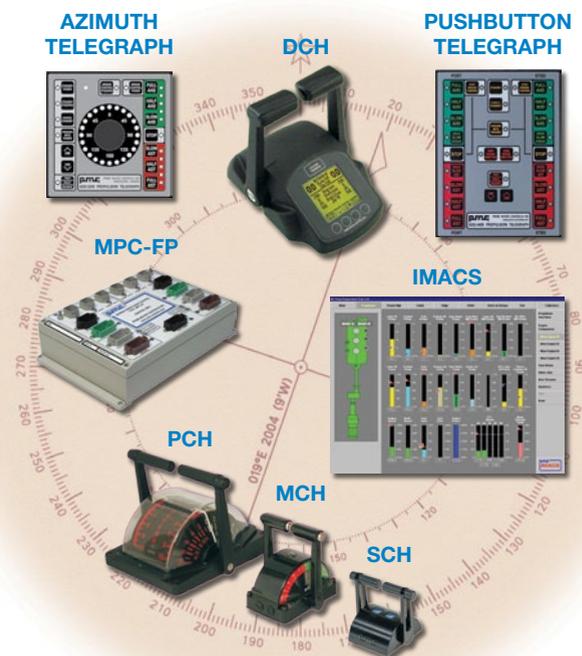


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## TUGBOAT ROUNDUP

### Mount Baker/Mount Drum

Nichols Brothers Boat Builders delivered the tugboats *Mount Baker* and *Mount Drum* to Kirby Offshore Marine. Jensen Maritime Consultants designed the 120-by-35-foot vessels.

The lead vessel, *Mount Baker*, left Nichols' Whidbey Island, Wash., shipyard in May 2017, followed by *Mount Drum* in November 2017. The ocean towing tugs are capable of 8 knots while towing a loaded barge. Bollard pull exceeds 69 tons.

Propulsion comes from twin Caterpillar 3516C engines generating 2,447 hp at 1,600 rpm. Those mains turn Nautican fixed-pitch props inside nozzles through Reintjes WAF 873 reduction gears. Caterpillar C7.1 generators provide electrical power.

On deck, the tugs have a Markey TESD-34 tow winch, a Markey CEW-60 electric capstan and a Smith Berger tow pin. Fendering from Schuyler Cos. protects the hulls forward and aft.

### New York/Cape Fear

Vane Brothers of Baltimore took delivery in April 2018 of the 4,200-hp *New York*, the sixth of eight Elizabeth Anne-class model bow tugs ordered from St. Johns Ship Building in Palatka, Fla. The late naval architect Frank Basile designed the vessels.

Like its sister vessels, the 100-by-34-foot *New York* is outfitted with twin Caterpillar 3516 Tier 3 engines generating 2,100 hp each. Two 99-kW John Deere PowerTech 4045 generators provide electrical power. A third Deere

4045 unit powers the tug's Intercontinental DD200 towing winch.

Simrad electronics and navigation equipment populate the lower and upper wheelhouses. The tug operates with a five-person crew but has berthing for seven.

As of spring 2018, *New York* was undergoing final outfitting. It will primarily tow petroleum barges along the East Coast. The final two tugs of the eight-vessel order, named *Jacksonville* and *Charleston*, are due in late 2018 and early 2019, respectively.

Vane Brothers also will take delivery in mid-2018 of the 3,000-hp Sassafras-class tug *Cape Fear*. Chesapeake Shipbuilding is building the vessel.

### Kāpena Jack Young

Young Brothers Limited expects to take delivery on June 15 of *Kāpena Jack Young*, the first of four new oceangoing tugboats. Damen designed the 123-by-36.5-foot tug built by Conrad Shipyard in Morgan City, La.

Main propulsion is provided by twin GE 8L250MDC Tier 4 engines generating 6,000 total hp at 900 rpm. The engines turn 126-inch fixed-pitch props through Optima-type nozzles and Reintjes WAF 3455 gears at a 5.523:1 ratio. Three Caterpillar C7.1 generators provide electrical power.

*Kāpena Jack Young* and its sister tugs will have Markey TESD-34 100-hp electric towing winches and Smith Berger towing pins and shark jaws. Bollard pull is 80 tons and

operating speeds are estimated at 12.5 knots light.

Wheelhouse electronics consist of Furuno navigation equipment, Simrad autopilot, Sailor VHF radios and KVH satellite system. The tug has berthing for 10 in six cabins.

The new tugs will tow cargo barges between the Hawaiian islands. They will replace four of seven existing tugs in the company's fleet and pair with existing barges delivered within the last decade.

#### On the Horizon:

- Shaver Transportation of Portland, Ore., is building *Samantha S*, a versatile 8,400-hp tractor tug, at nearby Diversified Marine. The 110-by-42-foot tug will have twin GE Tier 4 engines producing 4,200 hp each and Rolls-Royce US 305 z-drives. Delivery is expected in fall 2018.

- Western Towboat of Seattle is building the 4,000-hp harbor tug *Mariner* at its Seattle shipyard. The 80-foot vessel is based on Western's Westrac design with modifications by Capt. Russ Shrewsbury. Delivery is expected in early 2019.

- Construction also is underway on Hull 6502 at Great Lakes Shipyard in Cleveland. The vessel is the second in the 65-foot, 2,000-hp Great Lakes class based on the Damen Stan 1907 ICE Class design. The lead vessel in the series, *Cleveland*, entered service last summer.

- Gulf Island Fabrication is building a 118-by-45-foot ice-class tugboat for the Saint Lawrence Seaway Development Corp. based on

a Robert Allan Ltd. Tundra 3600 design. The tug will be equipped with Tier 4 engines. Delivery is expected in summer 2019.

- Gulf Island also won a contract to build four Suderman & Young Towing Co. tugboats based on the Robert Allan Ltd. Z-Tech 30-80 design.

- Harley Marine Services of Seattle has ordered two 100-by-34-foot oceangoing tugs from Conrad Shipyards. The new vessels, expected in late 2018 and early 2019, will have Caterpillar Tier 4 engines and Cat gensets. Entech Designs provided the vessel plans.

- Foss Maritime has partnered with Damen Shipyards on a tugboat series based on the Damen ASD 2813 design. Foss plans to build the tugs at its Rainier, Ore., shipyard. The company will keep some of the new tugs and sell others. The first deliveries are expected in 2019.

- Baydelta Maritime has ordered a 100-foot z-drive tugboat with a Rolls-Royce hybrid propulsion system paired with Caterpillar Tier 3 engines. Jensen Maritime Consultants designed the tug, and Nichols Brothers Boat Builders is building it. Delivery is slated for early 2019.

- Washburn & Doughty of East Boothbay, Maine, is building two 93-by-38-foot hybrid z-drive tugs for Harbor Docking and Towing of Lake Charles, La. Caterpillar will provide the Tier 4 engines, hybrid system, generators and z-drives. Delivery dates for the new tugs have not been disclosed. •

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# Marquette expands ASD fleet with new triple-screw towboat class

By Casey Conley

C&C Marine and Repair



Marquette Transportation has launched a new class of triple-screw ASD towboats built by C&C Marine and Repair.

The Belle Chasse, La., shipyard delivered *Cindy L. Erickson*, the lead boat in the 6,600-hp class, in early 2018. Three months later, it completed *M/V Chris Reeves*, the second of up to four sister towboats. CT Marine of Portland, Maine, designed the vessels.

The 160-by-50-by-11.5-

foot towboats are powered by three 2,200-hp Cummins QSK60 Tier 3 engines turning Steerprop SP25D z-drives from Karl Senner LLC. Cummins gensets provide electrical power.

“Structurally, there is no other towboat floating that has the moxie that the *M/V Cindy* has,” naval architect Christian Townsend said. “The raised stern is the first indicator that the boat does not share structural similarities to that of a conventional

propulsion system.”

CT Marine also incorporated its flat tunnel design, which provides unequal water flow to the centerline wheels compared to the outboard wheels. The superstructure is set on springs to reduce noise and vibration. There are nine cabins with berthing for 13 people.

The third vessel in the class is due in August, and an optional fourth boat is tentatively set for delivery in December.

## SCF Explorer

*SCF Explorer* is the third boat in SCF’s class of 6,600-hp, triple-screw ASD towboats also built by C&C Marine of Belle Chasse, La. The Shearer Group of Houston designed the vessels.

Top, C&C Marine and Repair delivered *Chris Reeves* three months after *Cindy L. Erickson*, the lead boat in the new towboat class. Left, clockwise from top, SCF Marine’s *SCF Explorer* is the third in a series of three triple-screw ASD towboats; *Fort Defiance* is one of the last towboats Jeffboat delivered before shutting down; *Jesse D. Pasentine* is the first vessel Florida Marine Transporters built at its Harvey, La., shipyard.

The 160-by-50-by-11.5-foot *Explorer* and its siblings *SCF Vision* and *SCF Mariner* are powered by three 2,200-hp Cummins QSK60 Tier 3 engines. They also have Steerprop SP25D z-drives, Centa intermediate shaft lines and Voith Safeset torque-limiting couplings provided by Karl Senner LLC. John Deere generators provide electrical power.

*SCF Explorer* has eight cabins spread across three decks. There are six full heads and one day head. Crew amenities include satellite TV and Internet, a work-out room and a comfortable galley-mess area.

## Jesse D. Pasentine/Capt. Troy J. Hotard

Florida Marine Transporters has built 94 towboats over the last 12 years, but *Jesse D. Pasentine* is the first built at the company’s own shipyard in Harvey, La. Gilbert Associates of Braintree, Mass., provided the plans.

The 120-foot vessel is powered by twin Caterpillar 3512 Tier 3 engines generating 2,000 hp each, which turn five-blade open-wheel



Photo credits: Clockwise from top: Karl Senner LLC; ACBL; Florida Marine Transporters

props through Twin Disc reduction gears. Twin John Deere 175-kW gensets provide electrical power to the vessel.

Four Patterson 40-ton deck winches and a Schoellhorn-Albrecht capstan are installed on deck. The wheelhouse features Furuno electronics and navigation equipment. *Jesse D. Pasentine* pushes clean oil products in the Mississippi River and other inland waterways.

Jeff Brumfield, Florida Marine's director of vessel construction, said *Jesse* is performing terrifically. He also praised the workmanship from crews at the company's shipyard, where four more 120-foot towboats are under construction.

Across the Gulf of Mexico, Eastern Shipbuilding of Panama City, Fla., delivered *Capt. Troy J. Hotard* for Florida Marine and is building two more vessels for Florida Marine. These 90-foot, 3,000-hp tugs are powered by Caterpillar engines and have Patterson deck winches.

### Ray S

Enterprise Marine Services took delivery late last year of the 3,000-hp *Ray S* from Conrad Shipyard in Amelia, La. Conrad also designed the vessel, named for longtime Enterprise Products employee Ray Sick.

The 102-by-36-foot vessel has twin Caterpillar 3512C Tier 3 diesel engines turning 88-inch, four-blade, stainless-steel props through Twin Disc gears. John Deere-Kohler 99-kW gensets provide electrical power.

Other components

include Duramax coolers, Nabrico deck winches and a capstan from Schoellhorn-Albrecht. The wheelhouse features Furuno navigation equipment.

### Shawnee Forest/Fort Defiance

Jeffboat's shipyard on the Ohio River in Jeffersonville, Ind., delivered two new ASD towboats for American Commercial Barge Line before closing for good.

The yard launched *Fort Defiance* in October 2017, followed by *Shawnee Forest* several weeks later. The 70-by-32-foot vessels are powered by twin 1,000-hp Caterpillar Tier 3 engines turning ZF Marine z-drives. Twin 65-kW John Deere 4045 Tier 3 generators provide electrical power.

The vessels, built for harbor use, can hold 22,200 gallons of fuel, 4,650 gallons of ballast and 5,800 gallons of potable water.

### Sam P. Hise

Master Marine of Bayou La Batre, Ala., has delivered *Sam P. Hise* to Waterfront Services Co. of Cairo, Ill. The 67-by-28-foot vessel is the third boat in a four-boat order.

Propulsion comes from twin Mitsubishi Tier 3 engines each generating 803 hp paired with Twin Disc MG-5351 reduction gears at a 5:1 ratio. Twin 65-kW Northern Lights generators provide electrical power, and R.W. Fernstrum & Co. provided the engine keel coolers.

The vessel also has Wintech 40-ton deck winches, fendering from Schuyler Companies and a Mitsubishi split-system HVAC unit. •



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# Buyer sought for West Coast mega ATB

By Casey Conley



Marcon/Bob Beegle

Anyone in the market for a new ATB tug?

Nichols Brothers Boat Builders finished building the second of two 139-by-44-foot tugs in May. But as of then, there was no buyer for the vessel modeled after *Abundance*, which was delivered in mid-2017.

*Abundance* currently pushes the 508-foot liquefied ammonia barge *Harvest* for Savage Companies.

The unnamed tug, currently laid up at Foss' Seattle facility, has EMD 16-710 Tier 3 engines generating 4,000 hp each at 900 rpm driving 133.8-inch Rolls-Royce props in nozzles. The reduction gears are Lufkin RHS 3200.

Electrical service comes from two 200-kW Caterpillar C7.1 generators, while a Caterpillar C9.3 engine powers the fire pump. The emergency generator is a Cat C7.1 unit producing 138 kW.

The U.S.-flagged tug will mate with a barge through an Articouple pin system. Service speed is 14 knots.

Robert Hill of Ocean Tug/Barge Engineering of Milford,

Mass., designed *Abundance* and *Harvest*. He said the unit is "running fantastically" for Savage and expects similar performance for the second tug.

"It is the same highly effective boat and will make someone a fine ATB," he said in a recent interview. "It is really heavily built. It is not a paper tiger design. It is a really nice piece of equipment."

Details surrounding ownership of the unnamed new SOLAS-rated tug at Nichols Brothers weren't available. Ship broker Marcon is currently listing it for sale.

## Millville

Convenience store chain Wawa took delivery of the ATB tug *Millville* and barge *1964* from Fincantieri Bay Shipbuilding late last year.

The 8,000-hp *Millville* is powered by twin GE Tier 4 engines turning Nautican props in nozzles through Reintjes reduction gears. John Deere gensets provide electrical power. The tug and barge are linked through an Intercontinental coupler

system.

Guarino & Cox designed the tug and 185,000-bbl barge. Wawa sells roughly 2 percent of all gasoline in the U.S., and the new vessels will supply its 140 or so Florida retail locations.

## Paul McLernan

Kirby Corp. took delivery in July 2017 of the second of two ATB units from Fincantieri Bay Shipbuilding.

The 123-by-38-foot *Paul McLernan* is paired with the 155,000-bbl *155-02* through an Intercontinental coupler. The 521-foot barge hauls petroleum and chemical cargoes.

Propulsion on the 6,000-hp tug consists of twin EMD Tier 3 engines turning stainless-steel props through Reintjes reduction gears.

## On the Horizon

• Bouchard Transportation of Melville, N.Y., announced the construction of the 112-foot, 4,000-hp tug *Evening Breeze* and *Barge No. 252*. VT Halter Marine is building the tug, and Bollinger Shipyards

Marcon is trying to find a buyer for the 139-foot tugboat built by Nichols Brothers Boat Builders. The unnamed second boat, currently laid up in Seattle, is a sister tug to *Abundance* delivered last summer.

will deliver the 55,000-bbl barge. The tug will have Tier 4 engines and will pair with the barge through an Intercontinental coupler.

• VT Halter also is building the first U.S. ATB bunkering unit for handling liquefied natural gas. Harvey Gulf will operate the 452-foot ATB unit capable of moving 4,000 cubic meters of LNG. It will operate along the southeastern U.S. and primarily serve cruise ships.

• Crowley Maritime subsidiary Crowley Fuels has ordered an Alaska-class ATB unit to transport clean petroleum in the Alaska market. Bollinger Marine Fabricators of Amelia, La., will build the 100,000-bbl ice-class and Polar Code ATB unit designed by Jensen Maritime Consultants. The propulsion system will include Tier 4 GE engines.

## ARTICULATED TUG-BARGE UNITS IN SERVICE IN NORTH AMERICA

Following is a list of articulated tug-barge units (ATBs) in service in U.S. and Canadian waters. Listed alphabetically by company name. Updated as of May 2017.

**Karen Andrie**, owned and operated by **Andrie Inc.**, Muskegon, Mich.; 120 ft; 4,000 hp; built 1965, repowered 2008; converted to JAK coupler system 2009; matched with 50,000-bbl heated asphalt barge *Endeavour*, 2009, constructed at Jeffboat Inc.

**Buster Bouchard**, operated by **Bouchard Transportation Co.**; 127 ft.; built 1979; 6,140 hp; Intercon coupler system; matched with 468-ft, 158,128-bbl barge *B. No 253* carrying black oil in Jones Act petroleum service.

**Marion C. Bouchard**, operated by **Bouchard Transportation Co.**; 127 ft.; built 1979; 6,140 hp; Intercon coupler system; matched with 468-ft, 158,128-bbl barge *B. No 265* carrying black oil in Jones Act petroleum service.

**Capt. Fred Bouchard**, operated by **Bouchard Transportation Co.**; 127 ft.; built 1982; 5,750 hp; Intercon coupler system; matched with 468-ft, 158,128-bbl barge *B. No 275* carrying black oil in Jones Act petroleum service.

**Ellen S. Bouchard**, operated by **Bouchard Transportation Co.**; 122 ft.; built 1982; 3,900 hp; Intercon coupler system; matched with 399-ft, 80,000-bbl barge *B. No. 280* carrying clean oil in Jones Act petroleum service.

**Rhea I. Bouchard**, operated by **Bouchard Transportation Co.**; 112 ft.; built 1982; 5,100 hp; Intercon coupler system; matched with 399-ft, 80,000-bbl barge *B. No. 284* carrying clean oil in Jones Act petroleum service.

**Ralph E. Bouchard**, operated by **Bouchard Transportation Co.**; 127 ft.; built 1987; 6,140 hp; Intercon coupler system; matched with 467-ft, 138,000-bbl barge *B. No 230* carrying black oil in Jones Act petroleum service.

**Bouchard Girls**, operated by **Bouchard Transportation Co.**; 127 ft.; built 1989; 6,140 hp; Intercon coupler system; matched with 468-ft, 158,128-bbl barge *B. No 295* carrying black oil in Jones Act petroleum service.

**Barbara E. Bouchard**, operated by **Bouchard Transportation Co.**; 127 ft.; built 1992; 6,140 hp; Intercon coupler system; matched with 467-ft, 138,000-bbl barge *B. No 240* carrying clean oil in Jones Act petroleum service.

**Robert J. Bouchard**, operated by **Bouchard Transportation Co.**; 127 ft.; built 1994; 6,140 hp; Intercon coupler system; matched with 468-ft, 158,128-bbl barge *B. No 285* carrying black oil in Jones Act petroleum service.

**J. George Betz**, operated by **Bouchard Transportation Co.**; 127 ft.; built 1995; 6,140 hp; Intercon coupler system; matched with 483-ft, 138,000-bbl barge *B. No 235* carrying asphalt and black oil in Jones Act petroleum service.

**Danielle M. Bouchard**, operated by **Bouchard Transportation Co.**; 150 ft.; built 1997; 10,000 hp; Intercon coupler system; matched with 580-ft, 252,000-bbl barge *B. No 245* carrying clean oil in Jones Act petroleum service.

**Brendan J. Bouchard**, operated by **Bouchard Transportation Co.**; 130 ft.; built 1999; 6,140 hp; Intercon coupler system; matched with 424-ft, 110,000-bbl barge *B. No 215* carrying asphalt and black oil in Jones Act petroleum service.

**Jane A. Bouchard**, operated by **Bouchard Transportation Co.**; 130 ft.; built 2003; 6,140 hp; Intercon coupler system; matched with 430-ft, 110,000-bbl barge *B. No 225* carrying clean oil in Jones Act petroleum service.

**Morton S. Bouchard IV**, operated by **Bouchard Transportation Co.**; 130 ft.; built 2004; 6,140 hp; Intercon coupler system; matched with 467-ft, 138,000-bbl barge *B. No 242* carrying black oil in Jones Act petroleum service.

**Linda Lee Bouchard**, operated by **Bouchard Transportation Co.**; 130 ft.; built 2006; 6,140 hp; Intercon coupler system; matched with 430-ft, 110,000-bbl barge *B. No 205* carrying asphalt and black oil in Jones Act petroleum service.

**Evening Star**, operated by **Bouchard Transportation Co.**; 112 ft.; built 2012; 4,000 hp; Intercon coupler system; matched with 317-ft 59,000-bbl barge *B. No. 250* carrying clean oil in Jones Act petroleum service.

**Denise A. Bouchard**, operated by **Bouchard Transportation Co.**; 112 ft.; built 2014; 4,000 hp; Intercon coupler system; matched with 399-ft, 80,000-bbl barge *B. No. 282* carrying clean oil in Jones Act petroleum service.

**Kim M. Bouchard**, operated by **Bouchard Transportation Co.**; 150 ft.; built 2015; 10,000 hp; Intercon coupler system; matched with 628-ft, 260,000-bbl barge *B. No 270* carrying black oil in Jones Act petroleum service.

**Donna J. Bouchard**, operated by **Bouchard Transportation Co.**; 150 ft.; built 2016; 10,000 hp; Intercon coupler system; matched with 628-ft, 260,000-bbl barge *B. No 272* carrying clean oil in Jones Act petroleum service.

**Frederick E. Bouchard**, operated by **Bouchard Transportation Co.**; 130 ft.; built 2016; 6,000 hp; Intercon coupler system; matched with 404-ft, 110,000-bbl barge *B. No 220* carrying clean oil in Jones Act petroleum service.

**Morton S. Bouchard Jr.**, operated by **Bouchard Transportation Co.**; 130 ft.; built 2016; 6,000 hp; Intercon coupler system; matched with 420-ft, 110,000-bbl barge *B. No 210* carrying clean oil in Jones Act petroleum service.

**Sea Reliance, Ocean Reliance, Sound Reliance & Coastal Reliance**, operated by **Crowley Maritime**; 9,280 hp; 126 ft; new 2002-2003; barges 550-1 through 550-4 carry refined oil products; U.S. West Coast; Intercon coupler systems; 155,000 bbls.

**Pacific Reliance & Gulf Reliance**, operated by **Crowley Maritime**; 9,280 hp; 127 ft; introduced 2006; operating with tank barges 650-1 & 650-2, 587 ft, 178,000 bbls.

**Resolve, Integrity, Courage & Commitment**, operated by **Crowley Maritime**; new 2007-2009; 9,280 hp; 135 ft; heavy fuel burners; Intercon coupler systems; with barges 650-3, 650-4, 650-5, 650-6; all 178,000-bbl capacity; petroleum products.

**Pride, Achievement, Innovation & Vision**, operated by **Crowley Maritime**; deliveries 2009-2011; 10,500 hp; 135 ft; heavy fuel burners; Intercon coupler systems; with barges 650-7, 650-8, 650-9, 650-10; all 185,000 bbl capacity; petroleum and chemical products.

**Legacy, Legend, & Liberty**, operated by **Crowley Maritime**; 148 ft; 16,320 hp; Intercon coupler systems; with barges 750-1, 750-2, 750-3; all 327,000 bbl capacity; petroleum and chemical products.

**Baltimore**, operated by **Express Marine**; 125 ft; 3,600 hp; converted to JAK pin system 2008; matched with 470-ft dry bulk barge *EMI 1850*, transports coal.

**Freedom**, operated by **Express Marine**; 115 ft; 6,000 hp with Steerprop ASD propulsion system; matched with 480-ft coal barge *EMI 2400*, both built 2010; JAK coupler system; transports coal.

**Honor**, operated by **Express Marine**; 106 ft; 4,000 hp; converted to JAK pin system 2015; matched with 470-ft dry bulk barge *EMI 2100*, transports rock.

**Strong**, operated by **Foss Maritime**; 6,800 hp; 150 ft; built 1978; Artubar coupler system; barge *Mariner* carries ro-ro cargoes of trailers, cars, and deck cargo; 9,100-sq-ft deck area; Pacific routes in U.S., Hawaii & Alaska; 568 ft long; 13,375 gross tons.

**Thunder**, operated by **Foss Maritime**; 120 ft; 8,400 hp; built 1992; Bludworth coupler system; ro-ro barge *Lightning* carrying liquid cargo, deck cargo & containers, 7,164 dwt, 460 ft.

**Douglas B. Mackie**, operated by **Great Lakes Dredge & Dock Co.**, Oak Brook, Ill.; 15,442 hp, 158.4 ft; built 2017; Articouple FRC 80; matched with 433-foot hopper dredge barge *Ellis Island*, 14,788 cubic yard capacity

**Emery Zidell**, operated by **Harley Marine Services**, Seattle, Wash.; 4,492 hp, 116 ft; built 2014; Taisei Engineering Articouple FRC 55; matched with 80,000-bbl oil barge *Dr. Robert Beall*; West Coast service.

**Jake Shearer**, operated by **Harley Marine Services**, Seattle, Wash.; 4,492 hp, 116 ft; built 2014; Taisei Engineering Articouple FRC 55; matched with 83,000-bbl oil barge *FFA*.

**Barry Silverton**, operated by **Harley Marine Services**, Seattle, Wash.; 4,492 hp, 116 ft; built 2014; Taisei Engineering Articouple FRC 55; matched with 83,000-bbl oil barge *Fight A.L.S.*

**Dale R Lindsey**, operated by **Harley Marine Services**, Seattle, Wash.; 3,000 hp, 116 ft; built 2015; Taisei Engineering Articouple FRC 43M; matched with 28,450-bbl oil barge *Petro Mariner*.

**Bill Gobel**, operated by **Harley Marine Services**, Seattle, Wash.; 4,522 hp, 116 ft; built 2017; Articouple FRC 55; matched with 83,000-bbl barge *Edward Iita*.

**Min Zidell**, operated by **Harley Marine Services**, Seattle, Wash.; 4,522 hp, 116 ft; built 2017; Articouple FRC 55; matched with 82,000-bbl barge *Zidell Marine 277*.

**OneCURE**, operated by **Harley Marine Services**, Seattle, Wash.; 4,650 hp, 116 ft; built 2017; Articouple FRC 55; matched with 80,000-bbl barge *OneDREAM*.

**Todd Prophet**, operated by **Harley Marine Services**, Seattle, Wash.; 4,650 hp, 116 ft; built 2017; Articouple FRC 55; matched with 80,000-bbl barge *All Aboard for a Cure*.

**Dorothy Ann**, operated by **Interlake Steamship**; 7,200 hp; 124.25 ft; z-drive propulsion; 1999; Bark River articulation system; self-unloading barge *Pathfinder*; carries bulk cargoes on Great Lakes; 26,700 tons; 606 ft.

**Island Raider**, operated by **Island Tug and Barge**; 1,700 hp; 82 ft; built 2018; z-drive propulsion; paired with 25,000-bbl petroleum barge *ITB Resolution*.

**Adriatic Sea, Beaufort Sea, Java Sea, Kara Sea, Tasman Sea & Norwegian Sea**, operated by **Kirby Corp.**; 3,300 to 4,800 hp; converted to JAK 400 coupler systems; converted or new double-hull oil barges; deliver petroleum or liquid-bulk products; U.S. East & Gulf Coasts.

**Lincoln Sea**, operated by **Kirby Corp.**; New York; 7,000 hp; 124 ft; built 1999 by J.M. Martinac Tacoma, Wash.; Intercon coupler system; double-hull petroleum products; barge *DBL 140*, 140,000 bbls; 504 ft.

**Davis Sea**, operated by **Kirby Corp.**; approx. 2,000 hp; converted to JAK coupler system 2005; with barges *DBL-105*, *DBL-28* and *DBL-27*.

**Labrador Sea**, operated by **Kirby Corp.**; 2,400 hp; converted 2008 to JAK coupler system; matched with 30,000-bbl bunker barge.

**Irish Sea, Rebel & Viking**, operated by **Kirby Corp.**; 5,700 hp, 7,200 hp and 4,300 hp respectively; converted 2007 to JAK coupler system; matched with double-hull petroleum barges.

**Bismarck Sea**, operated by **Kirby Corp.**; 1976; 5,700 hp; matched with tank barge *DBL-106*, 100,000 bbls; JAK coupler system.

**Dublin Sea**, operated by **Kirby Corp.**; 10,000 hp; built 2009; Intercon coupler system; matched with 185,000-bbl petroleum barge, *DBL-185*; attached to K-Sea West Coast division.

**William J. Moore** (Canadian), operated by **Kirby Corp.**; 4,400 hp; 135 ft; Bludworth connection system; barge *McCleary's Spirit* carries refined petroleum products on Saint Lawrence River & Lake Ontario; 95,000 bbls.

**Sea Eagle**, operated by **Kirby Corp.**; 5,600 hp; 125 ft; built 1998; Bludworth coupler system; barge *TMI 17* carries chemical & petroleum products; 17,000 dwt.

**Sea Raven**, operated by **Kirby Corp.**; 7,200 hp; 120 ft; built 1978; Bludworth coupler system; barge *ATC 23* carries chemical & petroleum products coastwise U.S.; 19,946 dwt; 490 ft.

**Sea Hawk**, operated by **Kirby Corp.**; 8,000 hp; 124 ft; built 2002; Intercon connection system; barge *ATC 21* carries chemical product Gulf Coast & Eastern Seaboard; 129,000 bbls; 450 ft.

continued on next page

# Articulated Tug Barges

continued from previous page

**Osprey**, operated by **Kirby Corp.**; 5,800-hp single screw with CP prop; with barge *ATC 25*, converted to double hull; 170,000-bbl petroleum/chemical products.

**Jason E. Duttinger**, operated by **Kirby Corp.**; 6,000 hp; 125 ft; built 2013; matched with barge *Winna Wilson*; Articouple connection system.

**Captain Donald Lowe Sr.**, operated by **Kirby Corp.**; 6,000 hp; 125 ft; built 2013; matched with barge *Margo Dale*; Articouple connection system.

**Heath Wood** operated by **Kirby Corp.**; 6,000 hp; 125 ft; built 2016; matched with 155,000-bbl barge *Kirby 155-01* outfitted for hauling petroleum and chemical products.

**Paul McLernan** operated by **Kirby Corp.**; 6,000 hp; 123 ft; built 2017; matched with 155,000-bbl barge *Kirby 155-02* outfitted for hauling petroleum and chemical products.

**Samuel de Champlain**, owned by **LaFarge North America**; operated by Andrie Inc.; 7,200 hp; 150 ft; converted 2006 to Bludworth connection system; operates with barge *Innovation*; 460 ft; 17,000 tons of cement products; operates on Great Lakes.

**GL Ostrander**, owned by **LaFarge North America**; operated by Andrie Inc.; 7,200 hp; 140 ft; refit 1996; Bludworth coupler system; self-unloading barge *Integrity* carries cement on Great Lakes; capacity 14,000 tons; 460 ft.

**La Force**, operated by **Martin Midstream Partners**; 116.5 ft; built 1974; 5,100 hp; matched with 334-ft, 58,821-bbl tank barge *M 6000* carrying diesel fuel.

**Texan**, operated by **Martin Midstream Partners**; 96 ft; built 1979; 7,130 hp; matched with 369.6-ft, 52,169-bbl tank barge *Ponciana* carrying liquefied petroleum gas and liquefied flammable gas.

**Martin Explorer**, operated by **Martin Midstream Partners**; 115.8 ft; built 1996; 7,130 hp; matched with 432-ft, 37,369-bbl tank barge *Margaret Sue* carrying bulk liquids and sulfur.

**Everlast** (Canadian), operated by **McAsphalt Marine Transportation**, Hamilton, Ontario; 6,000 hp; built in Japan; Articouple connection system; barge *Norman McLeod* carries heated asphalt products on Great Lakes & Saint Lawrence River; 70,000 bbls; 379 ft.

**Leo A. McArthur** (Canadian), operated by **McAsphalt Marine Transportation**, Hamilton, Ontario; 5,300 hp; built in China 2009; matched with 70,000-bbl product barge *John J. Carrick*, built in China, 2009; Articouple connection system, heated asphalt cargoes on Great Lakes.

**Paul T. Moran**, operated by **Moran Towing Corp.**, New York; 7,200 hp; 150 ft; Bludworth articulation system converted 1999; repowered 2010; with barge *Massachusetts*, 1982; double-hulled 2005; delivers petroleum products on Gulf Coast and Eastern Seaboard; 430 ft; 140,000 bbls.

**Barney Turecama**, operated by **Moran Towing Corp.**, New York; 5,100 hp; 121 ft; converted 2005 to Intercon connection system; barge *Georgia*; 2005; carries petroleum products on Gulf Coast and Eastern Seaboard; 118,000 bbls; 425 ft.

**Scott Turecama**, operated by **Moran Towing Corp.**, New York; 5,100 hp; 121 ft; converted 2004 to Intercon connection system; barge *New Hampshire*; 2004; carries petroleum products on Gulf Coast and Eastern Seaboard; 118,000 bbls; 425 ft.

**Pat R. Moran and Linda Moran**, operated by **Moran Towing Corp.**, New York; 121 ft; 5,100 hp; Intercon coupler system; new 2007 and 2008; matched with 118,000-bbl oil barges *Charleston* and *Houston*.

**Lois Ann L. Moran**, operated by **Moran Towing Corp.**, New York; built 2008; 121 ft; 5,100 hp; Intercon coupler system; barge *Philadelphia*; 2008; carries petroleum products on Gulf Coast and Eastern Seaboard; 118,000 bbls; 425 ft.

**Mary Ann Moran**, operated by **Moran Towing Corp.**; 121 ft; 5,100 hp; new 2010; coupled with converted dry bulk barge *Virginia*; built 1982; Intercon connection system; carrying grain cargoes between New Orleans and Puerto Rico.

**Mariya Moran**, operated by **Moran Towing Corp.**, New York; built 2015; 121 ft; 6,000 hp; Intercon connection system; barge *Texas*; 495 ft; 160,000-bbl; carries petroleum products on Gulf Coast and Eastern Seaboard.

**Leigh Ann Moran**, operated by **Moran Towing Corp.**, New York; built 2015; 121 ft; 6,000 hp; Intercon connection system; barge *Mississippi*; 495 ft; 160,000-bbl; carries petroleum products on Gulf Coast and Eastern Seaboard.

**Barbara Carol Ann Moran**, operated by **Moran Towing Corp.**, New York; built 2016; 121 ft; 6,000 hp; Intercon connection system; barge *Louisiana*; 468 ft; 122,000-bbl; carries chemicals and petroleum products on Gulf Coast and Eastern Seaboard.

**OSG Honour & OSG Enterprise**, operated by **OSG Ship Management**; 5,600 hp; converted to Bludworth connection systems; barges *OSG-209* & *OSG-214* carry petroleum products on East and Gulf Coasts.

**OSG Navigator & OSG Intrepid**, operated by **OSG Ship Management**; 5,600 hp; 136 ft; refits 1993 & 1986; Intercon coupler system; barges *OSG 252* & *OSG 254*; carry petroleum products East & Gulf Coasts.

**OSG Independence & OSG Columbia** operated by **OSG Ship Management**; 125 ft; 1980 and 1981; 5,600 hp and 6,140 hp; assigned to oil barges *OSG 243* & *OSG 242* with Bludworth connection systems; carry clean products on East and Gulf Coasts.

**OSG Vision, OSG Horizon**, operated by **OSG Ship Management**; 12,000-hp heavy fuel burners with CP props; matched with 342,000-bbl petroleum barges *OSG 350* and *OSG 351*; Intercon coupler systems; primarily carry crude in the Delaware Bay and River.

**OSG Courageous**, operated by **OSG Ship Management**; 8,000 hp; 139 ft; built 2011; Intercon coupler system; barge *OSG 244* carries petroleum products East & Gulf Coasts.

**OSG Endurance**, operated by **OSG Ship Management**; 8,000 hp; 139 ft; built 2011; Intercon coupler system; barge *OSG 192* carries dirty products on Gulf Coast.

**Amberjack** — converted to conventional tug, operated by **Penn Maritime**; 3,900 hp; 116 ft; built 1981; converted to Bludworth articulation system 1998; barge *Biscayne* (ex-*Morania 450*); carries heated oil products; 70,000 bbls; 405 ft; built 1981; conversion 1998.

**Eliza & Lucia**, operated by **Penn Maritime**; 7,000 hp; 127 ft; built 1995; Intercon coupler system; barges *Atlantic* & *Caribbean* carry asphalt; East & Gulf coasts; 18,000 dwt; 460 ft.

**Teresa & Julie**, operated by **Penn Maritime**; 7,000 hp; 127 ft; new 1997-98; Intercon coupler system; barges *Acadia* & *Yucatan* carry heated oil products; East Coast, Gulf Coast & offshore; 160,000 bbls; 490 ft.

**Valiant**, operated by **Penn Maritime**; 8,000 hp; acquired in 1998; converted to Bludworth connection system; barge *Everglades* carries heated petroleum products; 180,000 bbls.

**Capt. Hagen**, operated by **Penn Maritime**; 6,000 hp; 123 ft; built 2004; Intercon coupler system; barge *Key West*; 140,000 bbls; built 2004; carries petroleum products; Gulf of Mexico.

**Tarpon & Dolphin**, operated by **Penn Maritime**; 4,300 hp; converted to JAK coupler systems 2006; with barges *Potomac* and *Penn 410*; both 80,000 bbls; carrying heated oil and asphalt cargoes.

**Skijack & Coho** operated by **Penn Maritime**; 4,000 hp; 116 ft; JAK coupler system; new 2008/2009; matched with 90,000-bbl heated oil barges.

**Yellowfin, Bluefin & Maka**, operated by **Penn Maritime**, new 2009-2011; 4,000 hp; JAK coupler system, matched with 90,000-bbl heated asphalt barges.

**Prentiss Brown**, operated by **Port City Marine Services**, Muskegon, Mich.; 118 ft, 4,300 hp, built 1967; converted to Bludworth connection system 2008; matched with self-unloading 505-foot cement barge, *St. Mary's Challenger* (ex-*Medusa Challenger*, converted former steamer 2014, in Great Lakes service.

**Bradshaw McKee**, operated by **Port City Marine Services**, Muskegon, Mich.; 118 ft, 4,300 hp, built 1977; converted to Bludworth connection system 2008; matched with self-unloading 437-foot cement barge, *St. Mary's Conquest* (ex-*Southdown Conquest*), converted former steamer, in Great Lakes service.

**Dace Reinauer, Joanne Reinauer, Lucy Reinauer**, operated by **Reinauer Transportation**; conversions 2007-08; JAK coupler systems; with petroleum transport barges; East Coast.

**Timothy L. Reinauer, Craig Eric Reinauer, Morgan Reinauer, Austin Reinauer**, operated by **Reinauer Transportation**; repowered and converted to Intercon C coupler system 2004-2009; with interchangeable 100,000-bbl barges; petroleum products on East Coast.

**Stephen Reinauer**, operated by **Reinauer Transportation**, New York; 108 ft; 3,000 hp; converted to ATB in 2007; with new oil barge; 80,000 bbls; JAK system; carries petroleum products Eastern Seaboard.

**Nicole Leigh Reinauer, Christian Reinauer & Meredith Reinauer** operated by **Reinauer Transportation**, New York; 7,200 hp; 124 ft; built 1999, 2001 & 2003 by Atlantic Marine, Jacksonville, Fla., & Mobile Ala.; Intercon coupler systems; barges *RTC 135*, *RTC 145* & *RTC 150* carry clean petroleum products on Eastern Seaboard; 135,000 to 150,000 bbls.

**Ruth M. Reinauer, Laurie Ann Reinauer**, operated by **Reinauer Transportation**, built Senesco Shipyard 2009-10; 4,000 hp; Intercon coupler systems, matched with new 80,000 to 100,000-bbl barges, also from Senesco Shipyard.

**Reinauer Twins**, operated by **Reinauer Transportation**; built Senesco Shipyard 2011; Intercon C coupler system; matched with new 100,000-bbl oil barge, also from Senesco Shipyard.

**B. Franklin Reinauer and Curtis Reinauer**, operated by **Reinauer Transportation**; built Senesco Shipyard 2012; with oil barges; 80,000 bbls, JAK system; carries petroleum products Eastern Seaboard.

**Dean Reinauer**, operated by **Reinauer Transportation**; built Senesco Marine 2013; with oil barge *RTC 106*; 100,000 bbls; Intercon coupler system.

**Haggerty Girls**, operated by **Reinauer Transportation**; 4,700 hp; built 2013; JAK coupler system.

**Dylan Cooper**, operated by **Reinauer Transportation**; built Senesco Marine 2015; Intercon coupler system; paired with 100,000-bbl fuel barge *RTC 108*.

**Gracie M. Reinauer**, operated by **Reinauer Transportation**; built Senesco Marine 2016; Intercon Series C coupler system; paired with 100,000-bbl fuel barge *RTC 109*.

**Bert Reinauer**, operated by **Reinauer Transportation**; built Senesco Marine 2018; 8,400 hp; Intercon coupler system; paired with 523-foot 160,000-bbl *RTC 165* carrying chemicals and clean oil products.

**Seaspan Challenger** (Canadian), operated by **Seaspan Marine Corp.**, Vancouver; 3,600 hp; 131 ft; single screw; built 1970; converted to JAK coupler system 2002; barge *Coastal Spirit* deck cargoes servicing Vancouver Island.

**Arctic Taglu & Arctic Hooper** (Canadian), operated by **Seaspan Marine Corp.**, Vancouver; 2,250 hp; 110 ft; Sea Link articulation systems; ro-ro trailer barges *Georgia Link* & *Fraser Link*; servicing Vancouver & western Canada.

**Brandywine & Christiana**, operated by **Vane Brothers** of Baltimore; 116 ft; 6,000 hp; built 2006-2007; Intercon coupler system; matched with barge *DS-141* and *DS-143*, 460 ft, 135,000 bbls.

**Assateague**, operated by **Vane Brothers** of Baltimore; 110 ft; 4,400 hp; built 2018; Beacon Finland coupler system; matched with barge *DS-801*, 403 ft, 80,000 bbls.

**Cavek**, operated by **Vitus Marine**, Anchorage, Alaska, for the Alaskan Village Electric Coop; 76 ft, 1,800 hp; built 2011; coupler, Taisei Engineering Articouple FRC-35; matched with 208-ft, 10,000-bbl oil barge that also carries deck cargo; serves Western Alaskan communities.

**Naniq**, operated by **Vitus Marine**, Anchorage, Alaska, for the Alaskan Village Electric Coop; 76 ft, 1,800 hp; built 2011; Taisei Engineering Articouple FRC-35; matched with 183-ft, 8,000-bbl oil barge that also carries deck cargo; serves Western Alaskan communities.



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