

CASE STUDY

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Press Information

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Wilmington Tug relies on MTU marine engines for safe and reliable docking of ships at Delaware River ports

Installed in new tugboats and retrofitted into older ones operated by a Delaware tugboat company, MTU's Series 4000 marine engines provide the power and reliability needed to safely guide the largest vessels plying the Delaware River. Quiet and fuel efficient, the engines simplify the jobs of the tug operator's staff and are key to safe docking.

WILMINGTON, Delaware—From the merchant marine industry's point of view, the Delaware River and Bay is one busy place. Extending 90 miles from Cape Henlopen at the mouth to the northern port, Philadelphia, it's the largest freshwater port complex in the world and the second-largest oil port complex in the U.S., second only to Houston. That's 3,000 inbound vessels and over 70 million tons of cargo annually—and about 85 percent of the East Coast's oil imports. Given these impressive statistics, it's no wonder that the fleets responsible for guiding and docking the shipping traffic have high stakes in reliability.

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[Wilmington Tug](#), one of the leading ship-assist companies on the Delaware River, also has impressive statistics of its own. The company has doubled in size in the last decade to a fleet of eight tugs that assist about 2,000 ships per year—with cargos ranging from oil and steel to bananas, lumber and cars. More traffic and less room on the river leave fewer margins for error. To ensure that its tug fleet performs with the reliability needed to safely dock ocean-going ships, Wilmington Tug's vessels are powered by [MTU engines](#).



“In our business, which is primarily docking and undocking ships, reliability of the tugboat is critical,” said Hickman Rowland, owner and president of Wilmington Tug. “Big tankers come up the river carrying a million and a half barrels of oil, and our tugs must be at full capacity to meet those ships. There is no second way to do that. In our work, you never know when the call is coming. Most important for us is that when we get the call to go to duty, we know the engines will start. And we need to know they’ll run for the entire job and give us the power we need.”

Tugs transition from Detroit Diesel 2-Cycles to MTU Series 4000 engines

Harry Rowland, father of Hickman, founded Wilmington Tug in 1965. Hickman joined the company in 1971, and the two played a significant role in tugboat advancement by building the first Z-drive tractor tug. Introduced in the U.S. in 1977, Z-drive is a propulsion system that gives tugs greater maneuverability. On a Z-drive tug, the propeller can actually spin 360 degrees, allowing the tug to shift sideways, forward and backward—just the kind of flexibility required for ship docking.

Together with the Z-drive system, the early tugs were outfitted with Detroit Diesel 2-Cycle engines, the predecessor to MTU four-cycle engines. “Since the early days, we haven’t had to worry about rebuilds every few thousand hours because we know the engines are reliable,” said Hickman Rowland. But with

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cargo ships increasing and the margin for error dwindling, the Wilmington Tug crew realized their engines needed to advance with the times.



After a thorough search in 2001 for an engine meeting their specific requirements, Hickman Rowland and his colleagues found what they were looking for and installed two MTU Series 4000 engines in a new tugboat. The result? “We were so pleased that we’ve put the engines in every new boat we’ve built since then,” said Rowland. “And now we’re starting to re-power our old boats with them. When we transitioned from the Detroit Diesels to the MTU engine, we were concerned about going from a two-cycle to a four-cycle engine. But what surprised us was just how easy it was.”

Currently, four of Wilmington Tug’s eight boats have Series 4000 engines, all of which were purchased from [Penn Detroit Diesel](#), a Philadelphia-based MTU distributor. The engines include units with 8, 12 and 16 cylinders. Running at about 1,800 rpm, the 16-cylinder engines deliver almost 2,400 horsepower for tugging the largest cargo ships.

Six of the tugs have a pair of engines that power twin screws, while the other two boats have a single engine apiece.

Hickman Rowland and his staff had many engine options to choose from, but Series 4000 engines stood out for several reasons. “We loved the way they’re designed,” said Bill Martin, Wilmington Tug’s port engineer. “Rather than an assembly of parts bolted together, they’re designed from the ground up as a complete package.” The package includes mounts and other features that ease the process of installing the engine in a boat.

In addition, Martin and his colleagues appreciate the fact that the engines were built specifically for marine use. For example, he points to the triple-walled

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exhaust manifolds that limit heat rejection to a vessel's engine room, helping to keep temperatures down and allowing users to save on engine-room ventilation.



Series 4000 engines also are designed to reduce environmental impact. Despite their high power levels, the engines emit less pollution than the two-cycle engines they replaced. In addition, the engines feature common rail fuel injection, which significantly lowers fuel consumption. As a result, Martin notes, the fuel economy of the engines is comparable to that of their less-powerful predecessors at Wilmington Tug, which is good for the environment and for a business that consumes large quantities of fuel.

Tugs have special requirements

What tugboats basically do is make a ship go sideways, because that's the one thing a ship can't do on its own. In addition to reliability, Series 4000 engines help meet the special maneuverability requirements of tugboat operation. "Our business requires the tug to idle for long periods of time, but then bring the power up very quickly when it's needed," said Chris Rowland, head of operations and son of Hickman Rowland. "We've been impressed by the ability of the Series 4000 engines to idle for a long time and then rev very quickly to full power."

This is especially true to ensure safe mooring, when cargo ships rely on tugs to push and pull them to their assigned places alongside docks. "Customers are very concerned about damage to ships as well as to piers, particularly when the ships are oil tankers because there's the possibility that oil can be spilled into the river," said Chris Rowland. "In the past, you never wanted to have an incident, but now it's a zero-tolerance world where docking errors are concerned."

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What's more, wind becomes a bigger issue as cargo ships grow, due to increasing "sail area," the area of the side of a ship. When strong winds blow against these larger sail areas, "that's when the engine power of our tugs really comes into play," said Martin.



Series 4000 engines also make life much easier for the captain and deckhand operating the tugs. "Nothing is worse in the tug business than a boat that vibrates and makes noise," said Chris Rowland. "It is totally disconcerting and very uncomfortable for the crew. So we are very keen to make our boats quiet and smooth. There's not one person who comes aboard our boats who doesn't remark on how smooth and how quiet they are."

Reliable engines continue legacy of family-owned business

Wilmington Tug's reliability record has been good for the company's bottom line. "We get paid for the jobs that we do," said Hickman Rowland. "When a tugboat sits at the dock, we're not being paid, so downtime is brutal for us." With Series 4000 engines powering his tugs, however, "the boats run and we can make it to all of our jobs."

A healthy bottom line is good news for the Rowland family, whose roots on the Delaware River go back to the 1700s and include many ancestors who were river pilots and ship captains. Times and technology have changed, but the need for reliability has been constant.

"When you're pushing oil tankers, you have a lot of responsibility," said Chris Rowland, grandson of the firm's founder. In undertaking such demanding tasks, "our MTU engines give us a level of comfort knowing that reliability and power is going to be there when we need it."

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Wilmington Tug, a leading ship-assist company on the Delaware River, relies on MTU Series 4000 engines for its fleet of eight tugs.



MTU Series 4000 engines help Wilmington Tug provide the power and reliability needed to safely guide the largest vessels on the Delaware River.



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About MTU

MTU Detroit Diesel, Inc. is the North American regional headquarters of MTU Friedrichshafen GmbH, one of the world's most important providers of diesel engines and drive and propulsion systems for ships, heavy-duty land and rail vehicles, and distributed energy. It offers a complete line of power solutions from 30 to 12,200 bhp (20 to 9,100 kW) for applications in the marine, rail, power generation, oil and gas, agriculture, mining, construction and industrial, and defense markets. MTU Detroit Diesel, Inc. is the sales and after-sales organization of the Tognum Group in North America. www.mtu-online.com

Tognum

With its two business units, Engines and Onsite Energy & Components, the Tognum Group is one of the world's leading suppliers of engines and propulsion systems for off-highway applications and of distributed energy systems. These products are based on diesel engines with up to 9,100 kilowatts (kW) power output, gas engines up to 2,150 kW, stationary fuel cells up to 345 kW and gas turbines up to 45,000 kW.

The product portfolio of the Engines business unit comprises MTU engines and propulsion systems for ships, for heavy land, rail and defense vehicles and for the oil and gas industry. The portfolio of the Onsite Energy & Components business unit includes distributed energy systems of the brand MTU Onsite Energy and fuel-injection systems from L'Orange. The energy systems comprise diesel engines for emergency standby power, prime power and continuous power, as well as cogeneration power plants based on gas engines and gas turbines that generate both power and heat.

In 2009, Tognum generated revenue of €2.5 billion and employs more than 8,700 people. Tognum has a global manufacturing, distribution and service structure with 27 fully consolidated companies, more than 140 sales partners and over 500 authorized dealerships at approximately 1,200 locations. The shares of Tognum AG (ISIN: DE000A0N4P43) have been stock-exchange listed since 2007 and are included in the MDAX.

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