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VESSEL PROFILE: *CROWN POINT*

Columbia Gateway

Crown Point: A New Quiet Tug for Tidewater

By Peter Marsh

(LEFT) The ***Crown Point*** is the first new tug for Tidewater in over 30 years. The design includes numerous improvements in the layout, with all-round visibility from inside the wheelhouse and from the upper decks. **(RIGHT)** The wheelhouse has full height windows on all sides to give the pilot the best view in all directions, and the latest electronics to see around the bend. Photos by Peter Marsh.

IT'S BEEN MORE THAN 30 YEARS since Tidewater Transportation of Vancouver, Washington has built a new tug, so there was a vast amount of new technology to consider for their new class of three 102-foot by 38-foot push boats. The first of the trio, the ***M/V Crown Point***, was built by Vigor Industrial at the Portland Shipyard to a design by CT Marine Naval Architects and Marine Engineers of Edgecomb, Maine – specialists in this type of vessel. "During the last year and a half, a great deal of effort went into designing, engineering and building a towboat that would meet or exceed our performance parameters," said Bruce Reed, Tidewater's C.O.O. and V.P.

The result is a vessel that incorporates many advanced concepts to set new standards in safety and efficiency. The heavily-built flat-bottomed hull looks traditional but also has some modern thinking: the upswept stern is slightly concave to improve water flow to the propellers and the bow plating is convex to withstand impacts from logs and flotsam. Thanks to full-height glass, good use of space and an intelligent layout, the wheelhouse offers its operators superb all-round visibility, ergonomics and operational function.

"With crew endurance being a priority, we employed Noise Control Engineers of Billerica Mass. to develop a sound and vibration control package for the vessel," Reed explained. Tests show that every space in the vessel has exceptional sound and vibration reduction for crew comfort and performance. The changes begin in the engine room, where two Caterpillar 3516C Tier 3 diesel engines produce 2,240 bhp each at 1600 rpm. The engines drive two 92" x 100" Kaplan-type, stainless steel propellers in CT-28 Kort nozzles via Reintjes (WF 873) 6:4.41 reduction gears and 9.25" shafts.

The engine noise suppression measures include Christie and Grey vibration-control engine mounts and comprehensive acoustic insulation of the bulkheads with vibration damping tiles. Particular attention was paid to the elevated mufflers, which are heavily insulated and flexibly mounted where they pass through two openings in the overhead deck above the engine room. Positioned Aft on the main deck is a dedicated generator room with sound-proof doors housing two Cat 7.1, Tier 3 480-volt generators, rated at 200 kW at 1,800 rpm. The machinery spaces are protected by a Kidde NOVEC 1230 fire suppression system while centralized fire detection and alarms cover both machinery and accommodation areas.

Located all the way aft on the main deck is the steering compartment—also a separate room with its own heavy doors. The Matthews steering system utilizes four pairs of rudders: two behind each nozzle facing a pair of flanking rudders around the shaft to provide better maneuverability. This is vital when transiting the eight locks while pushing tows of four 220 to 280-foot barges on the Columbia/Snake River navigation system to reach Lewiston, Idaho, 350 miles from Vancouver, WA. Fuel capacity is 44,000 gallons with a service speed of 8 knots – sufficient for two round trips.

In order to utilize the newest technology and minimize power usage, variable-frequency drives were used in all major rotating machinery

applications and LED lighting was employed throughout. In the event of one gen-set stopping, an automatic transfer system built by Hyak Electroworks of Vancouver, Washington ensures the other generator will start and pick up the load in less than 30 seconds. The proliferation of electronic systems throughout the vessel requires every area to have its own sub-panel, in addition to the main switchboard in the generator compartment. Timberline Marine Electric of Washougal, Washington provided the electrical installations as well as building several panels and the main alarm system.

It's on the main deck in the accommodation area that the insulation package achieves its full potential, following the consultants' plan. This starts with a floating floor under the entire accommodation block: the galley, day room, fitness room, heads and crew cabins. Each of these spaces is effectively a freestanding insulated box surrounded by an 8-inch space filled with specific insulating materials in the walls and overheads. There are soundproof doors at both ends of the central corridor leading from the mechanical areas aft to the galley, creating a double barrier.

Port captain Brian Fletcher proudly pointed out that this unprecedented effort has resulted in noise levels of less than 60 decibels in the accommodations during vessel operation. The captain and mate's staterooms on the upper deck benefit from the same acoustic treatment and might be even quieter. "This is the quietest tug I have ever piloted," claimed Larry Bartel, a Tidewater captain since 1981, after the trials. To add to the comfort, all cabins have their own dedicated heating and cooling unit in the overhead, and the galley would not look out of place in a modern home. All these features have been shown to minimize fatigue and reduce injuries among crew.

The deck machinery consists of seven Patterson WWP 65E-7.5, 65-ton electric winches spooling Samson 1 3/8-inch Turbo 75 Synthetic Line. They can be controlled from the bridge or by local push-button stations on the main deck. The vessel is wrapped 360 degrees with a comprehensive fender system designed and provided by Schuyler Rubber of Woodinville, Washington. This system protects against steel-to-steel contact, reducing impact and sleep disruptions, as well as offering the vessel "grip" when maneuvering barges and equipment.

The wheelhouse is 40 feet above the water and much larger than the traditional version. It is dominated by the full-width single-pane forward window that gives a panoramic view ahead over the top of the barge train. All the windows and furnishings are framed with hardwood and the bridge has enough space for a large chart table and a head. It is equipped with the latest electronics for navigation and communication, and the view of the stern deck is also uninterrupted.

"The launching of the ***Crown Point***, and the forthcoming ***Granite Point*** and ***Ryan Point*** vessels, marks an important step for Tidewater," said Marc Schwartz, the company's maintenance and engineering manager. "These vessels will strengthen our fleet, as well as reinforce Tidewater's commitment to our customers, community, and environment."

The ***Crown Point*** is also the first self-powered vessel built by Vigor at the Portland Shipyard, where they have launched numerous barges since 2007. "The delivery of the ***Crown Point*** represents the conclusion of a successful project that has further diversified Vigor's new build portfolio" observed Bryan Nichols, director of sales at Vigor Fab. "It has been an honor to partner with Tidewater on this project and to shine a light on the fact that great vessels are being built right here in Portland."

The three tugs are named for landmarks on the upper Columbia River. ***Crown Point*** is the popular viewpoint, state park, and National Natural Landmark at the entrance to the Columbia River Gorge. Note that the tug also features a salute to historic riverboat heritage: there is a vintage steam whistle on the roof. It's powered by compressed air but still produces a full nostalgic sound. The ***Crown Point*** will officially join Tidewater's fleet of 16 vessels when it is commissioned in late June.

Headquartered in Vancouver, Washington, Tidewater operates the largest barge transportation and terminal network on the Columbia-Snake River system with over 100 barges transporting a wide range of cargo upstream to a network of small ports and terminals, and carrying mainly grain, and other regional commodities downstream for export by ship. PMM

MARINE NOISE CONTROL

Noise Control Engineering (NCE) is an acoustical engineering consulting firm that has provided technical assistance on hundreds of vessels. NCE's staff has authored more than 50 papers on shipboard noise, including the "Design Guide for Shipboard Airborne Noise Control", an industry standard published by SNAME with a supplement in 2000 sponsored by the US Coast Guard. NCE is the only company in North America to be certified in "Ambient Environmental Testing" from the American Bureau of Shipping for measurements of noise, vibration etc.

"Any vessel can be a very noisy place: ask anyone who works on one. Smaller craft have high power machinery operating just feet away from sleeping cabins, offices and control rooms. Noise control is a critical factor for the marine industry," the company says. "Quiet ships lead to improved crew morale and performance, lower long-term hearing loss, and reduced crew fatigue."

NCE uses its own Designer-NOISE™, Finite Element Analysis, and other software tools to make accurate noise predictions based on a ship's general arrangement, structural details and machinery arrangements. NCE selects cost-effective noise treatments from a wide range of solutions that includes: vibration isolators, acoustical insulation, damping, floating floors and silencers. Resilient mounts can be used with diesel engines, generators, air compressors, refrigeration compressors and other vibrating equipment. PMM

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