

## Staten Island Ferry Modeled in ShipConstructor

The new state-of-the-art Staten Island Ferry boat Guy V. Molinari, now in service, was built with the help of some state-of-the-art software. Marinette Marine, part of the Manitowoc Marine Group, designed the ferry structure using ShipConstructor, the AutoCAD-based 3D product modeling system for the design and fabrication of ships and offshore structures.

The Staten Island Ferry is a New York icon, carrying passengers between Staten Island and lower Manhattan since 1905. Today the ferry service transports 65,000 people every weekday using a fleet that ranges in age from 18 to 40 years. The \$40 million Molinari, along with two sister ships, are replacing the Kennedy-class boats which began service in 1965.

The contract to replace the aging ferries was awarded to Marinette Marine in 2001. The company has earned an international reputation for building technologically advanced vessels, including Navy minesweepers and Coast Guard icebreakers, but the new ferries are something special. Boasting an unprecedented level of technology and marine innovation, the ferries are the largest ships ever launched at the Marinette Marine facility.

Marinette Marine is also known for its efforts to modernize the U.S. shipbuilding industry by participating in the Second-Tier Shipyard Design Enhancement Project, a collaborative program aimed at providing U.S. second-tier shipyards with a state-of-the-art design system. In 2003 the program chose ShipConstructor as its design software-of-choice.

ShipConstructor, developed by Albacore Research Ltd. (ARL) in Victoria, British Columbia, is increasingly being adopted by small and large shipyards and designers worldwide because of its ease-of-use and scalability. ShipConstructor is allowing them to streamline the production process and realize substantial savings of time and money. It is also making the engineering process a whole lot easier. Such was the case with Marinette Marine and the Staten Island Ferry.

“We’ve used AutoCAD [without ShipConstructor] in the past,” said Scott Crow, Lead Engineer at Marinette Marine, “and ShipConstructor made it so much easier to model the structure. It’s also made what we do more accurate.”

“We designed the hull structure of the double-ended ferry, to a large extent, by mirroring it about midship,” said Crow. “By treating the vessel as two bow units, we were able to significantly reduce the amount of modeling required.” The superstructure, sub-contracted to Genoa Design International Ltd. in Conception Bay South, Newfoundland to expedite the design process, was modeled with ShipConstructor in a similar fashion.

Creating a full-size 3D model in ShipConstructor also enabled Marinette Marine to minimize interferences associated with the design. “Using 3D data exported from ShipConstructor and our piping software, we were able to do a complete systems interference check, clearing ninety percent of possible interferences before the first piece of steel was cut,” added Crow.

Most significantly, Marinette Marine was able to assemble the vessel within ShipConstructor, piece by piece, to identify access and fit problems while still in the design stage. “Constructing the full size 3D model also allowed us to simulate the pilot’s view of the main deck and make design changes to provide safe visibility for the ferry crew,” said Crow.

The Molinari was launched with great fanfare in September 2003. Some 4,000 people turned out for the celebration. The vessel was then completed and outfitted with temporary drag anchor, bow, and fenders in order to meet U.S. Coast Guard requirements for ocean-going vessels. After making its way through the Great Lakes locks, the St. Lawrence seaway, and into the Atlantic Ocean, the ferry was docked at Providence, R.I. so Promet Marine Services Co. of Providence could remove the temporary hardware and prepare the vessel for its celebratory arrival in New York in September 2004.

After months of testing and crew training, the Molinari made its inaugural voyage on January 26, 2005. Onboard were Mayor Michael R. Bloomberg, former Borough President Guy V. Molinari, for whom the vessel is named, and Department of Transportation Commissioner Iris Weinshall.

“The boat is spectacular, it's state of the art,” said Weinshall.

“The Staten Island Ferry system is one of the most important transportation methods that the City has, and it and its riders deserve first-class boats,” said Mayor Bloomberg.

Compared to the 40-year old Kennedy-class ferries, the Molinari is not radically different in appearance. At 310 feet long by 70 feet wide, it can carry up to 4,400 passengers, 900 more than the old ferries. It can also carry 30 vehicles, though cars have been banned from the ferries since the September 11<sup>th</sup> terrorist attack.

There are five passenger cabins on four passenger decks with outdoor passenger areas on all decks, about twice as much outdoor space as the old ferries. There's also an extra, fifth hurricane deck so passengers can ride at the same level as the captain. The vessel even houses exhibit space for art shows, intended to display nautical scenes relevant to Staten Island.

The diesel-electric propulsion system consists of three engines, only two of which are necessary for operation. In contrast, the old ferries have four engines that must run together. The new engines are also more efficient and should require less maintenance.

The Molinari is equipped with the latest in marine technology, including radar, collision avoidance, communications and GPS navigation systems. The twin pilothouses are fully equipped to monitor and control all vital on-board systems, and four high-speed rescue boats are outfitted to allow rapid deployment.

The Molinari will be joined by its two sister ships later this year. One has already left Marinette and is in Rhode Island being prepared for service. The other ferry is currently under construction in Marinette.

“Everybody is proud of these,” said Marinette Marine Vice President Martin Lakes. “And they should be.”