

Testing berthing and mooring designs

Gene Guest, Director, MarineSafety International, New York, USA

Changing the waterway ‘system’

Simulation testing of waterway designs and modifications reduces risk and saves money. A company or port authority contemplating changes or additions to a berth or mooring area should consider using simulation to help assure that the waterway accommodates safe navigability. Such tests frequently reveal money saving modifications.

Adding or modifying a berth causes a systemic change. A berthing ‘system’ includes the waterway, the ships that use the waterway while in transit to and from the berth or mooring, and the tugs that assist the ships. Most importantly, it also includes the humans who control the ships and the tugs. This human control element is a significant part of the system and should not be ignored. For valid testing, therefore, all parts of the pilotage team must be included, which means that the ship’s master, the pilot, docking pilot or mooring master and the tug masters must all be realistically engaged in the tests. Clearly, the only proper way to do this is by using multiple simulators linked together.

Multiple, linked simulators

Ship simulators were initially developed to train mariners in manoeuvring and navigating. Later, it became apparent that simulators could play a vital role in testing waterway and channel improvements. Pilots are able to navigate an array of ships in the new channel before dredging commences. Data and the observations of pilots often suggest modifications that improve navigation safety, reduce risk, and sometimes even decrease the amount of dredging necessary, thereby saving money.

As technology made it possible to link simulators, multiple ships, or a ship and its tugs, could be manoeuvred in the proposed waterway, giving the design a more thorough and realistic test. MarineSafety International was a pioneer in the use of multiple, linked ship simulators. Each of MarineSafety’s three

centres has several full mission ship simulators capable of being linked for interactive exercises.

An operational testing and training example

BG LNG Services initiated a testing and training project at MarineSafety in Newport, Rhode Island, USA. LNG carriers were transiting to a terminal in Lake Charles, Louisiana. The project used three simulators to represent an LNG ship and two tugs. Exercises simulated day and night time port entries and dockings under both routine and emergency conditions for LNG carriers ranging in size from 72,000 to 138,000 cubic metres. The Human element comprised mariners from the Lake Charles Pilots, Golar Management, Ceres Hellenic, Harbour Docking and Towing, and Seabulk Towing. Simulator tests evaluated limiting weather conditions, tug requirements, navigation aids, and aspects of terminal design. Procedures for transits to and from the berth were established and the placement and use of tugs determined. A series of 3-day training programmes was later conducted to assure that mariners not involved in the tests would understand and assimilate the established procedures.

Project testing and training is at the forefront of the marine industry’s need to address safety and security. Along with testing the engineering design, multi-participant communication and coordination need to be practiced to develop a smoothly functioning waterway system.

ENQUIRIES

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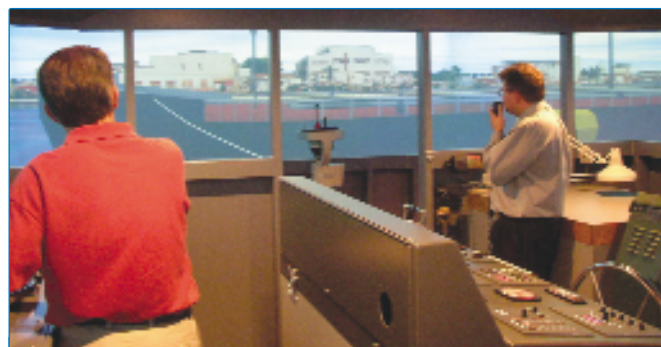
Marine Air Terminal, La Guardia Airport, Flushing, New York, NY 11371, USA

Tel: +1 (718) 565-4182 Fax: +1 (718) 565-4186

E-mail: gene.guest@marinesafety.com Web site: www.marinesafety.com



Figures 1 & 2. Tractor Tug Tethered Escort.



Figures 3 & 4. Tractor Tug Berthing Assist.

