

## Basic & Advanced Tug Handling Training

Modern tugs are highly manoeuvrable and capable assets. Using the full potential of these tugs requires well trained personnel. MARIN offers specific ASD/ATD/Rotor tug training on different levels using purpose-built manoeuvring simulators. Manoeuvring simulators are the ideal means to familiarise tug captains with the specifics of modern tugs. Diminishing tug crews urge the operators to increase their formal (onshore) training. Our simulator training allows clients to train their personnel from the basics of ASD manoeuvring to advanced operations. The training does not only focus on manoeuvring aspects but also includes emergency response training.

MARIN offers basic and advanced tug handling training for all types of tugs and operations. We provide the best hydrodynamic behaviour and simulations, and tailor made programs provided by highly proficient instructors.

### Tug modelling

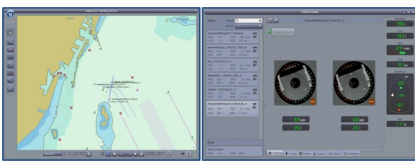
For more than twenty years MARIN has been creating accurate hydrodynamic models of specific tugs. Many tug manufacturers have validated the tug models used in our simulators through their company captains and end users. Specific and accurate models are available for a wide range of tugs, including conventional, ASD, ATD and rotor tugs. Extra features, directly related to the hydrodynamic modelling, are part of the standard mathematical modelling like the towing properties, shallow/deep water hydrodynamics, bank effects, ship-ship interaction, fender effects and current. Towline behaviour, winching operations and the visual aspects are treated in adjoining software modules. High-frequency calculation is performed to enable a correct dynamic line response modelling (including speed stiffening effects) resulting in realistic line breaking. Equally, the winch is modelled according to its heaving and holding characteristics.

In addition to all these aspects the propeller wash of the towed vessel is physically modelled in order to simulate the dangerous wake behind the towed vessel when the propeller is running. The wake is visualised and made dependent on the actual propeller RPM and the ship speed through the water. Realistic seakeeping behaviour and full static and dynamic stability is also included.

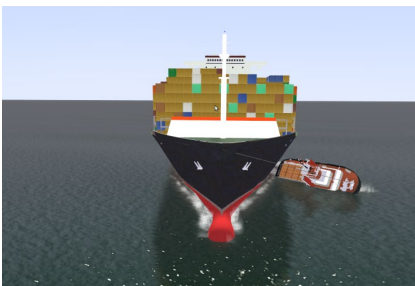




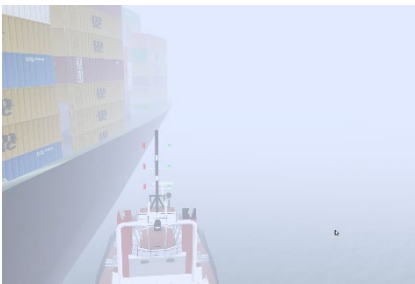
Motion based simulator



Simulator environment



Girting and capsizing exercise



Training in fog

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## Tug simulators

For this type of training we have four dedicated tug simulators available all equipped with a 360° projected visual scenery. This way the tug captain is provided with nearly the same view as from his own boat. This includes a good view abeam of the tug, which is a great help in estimating the speed of the tug. With flexible controls every type of tug can be simulated.

For some scenarios we make use of our motion based simulator, which is capable of simulating extreme motions, e.g. in case of capsizing. This allows for practicing responses in emergency situations like capsizing in very realistic but safe conditions.

## Training programmes

Over the years different training programmes have been developed. The first level is all about tug handling. One cannot expect a tug master to provide adequate assistance to a vessel if he lacks proper control over his own vessel. The second level can only be achieved when the first one is completed and is all about assisting a vessel with all appropriate components and towing techniques. The third and final level is for experts. At this level the difficulty of the exercises will be increased, forcing the trainee to the limits of his ability. Tug masters will be driven to the extremes in controlling their tugs in situations where every mistake will lead to undesirable tug positions. The enhanced level of tug handling allows the tug master a higher degree of automation and a subsequent higher degree of focus on vessel handling as well as situational awareness. Dedicated assessment scenarios are available to monitor progress and measure proficiency.

## Schedule

Upon request a training programme will be set up. As a rule of thumb each level requires 4 to 5 days training but of course the actual programme depends on the objectives of the client, the level of experience of the tug masters at the start of the training and of course the projected end level. It also depends on the actual exposure on the simulator. In a larger group each individual has less exposure to the simulator than in a smaller group. For a level 1 training, two participants for each simulator is ideal. One drives the tug and the second observes the colleague, each taking turns. For advanced and expert level training there are ideally three participants for each simulator. One for driving the tug, the second is responsible for assistance of the tug master during the job, and the third is the observer/pilot.

The training will normally be executed in our specially designed training area with generic ASD tugs. Of course the set-up can also be tailored to your demands as a dedicated training for a specific type of tug in a specific area. A critical analysis together with the client will ensure that all aspects for a valuable training are taken into account and the training objectives are achieved.