

Training Methods using Scale Tugboats

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SYNOPSIS

The tugboat industry has come a long way – we have built the super tugs, we have installed the render recover winches, we've added all the computer navigation systems available – but we still haven't implemented a training system that brings all of these elements together for successful tugboat operations. These new tugs are the most powerful and dynamic tugs that have ever been built, and we have no standards for training to match the sophistication of these vessels. What we need is a comprehensive training regime that would encompass every aspect of training to enable new captains and crew of these powerful vessels to utilise them to their fullest extent. In recent surveys of operational vessels, it appears that the tugs we have now are being utilised less than 80 per cent of their potential; the customer is expecting 100 per cent. There is a desperate need for new training methods.

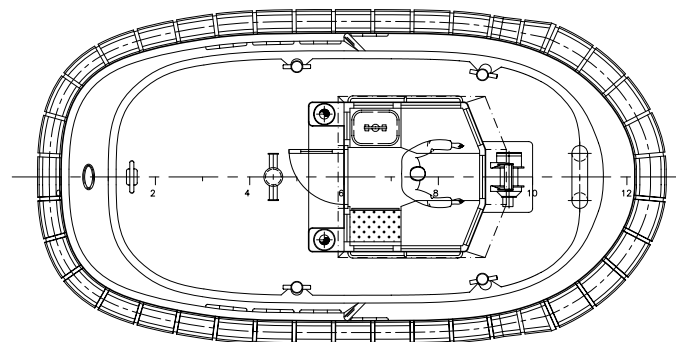
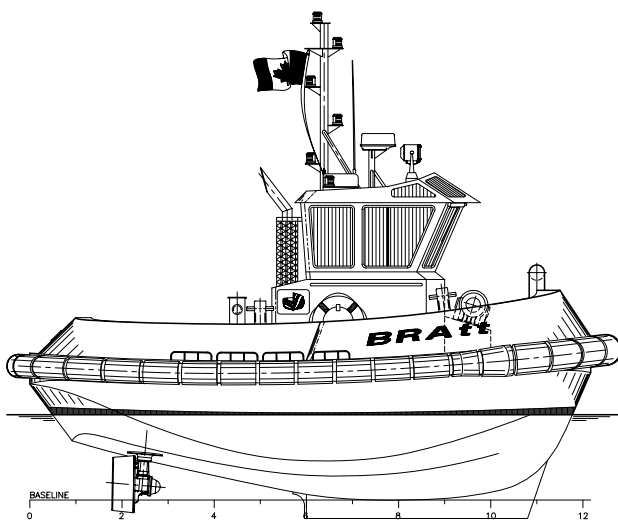
Quarter-scale tugboats, approximately 7.9m long (26ft), would make a superb choice for the training of new tug skippers. These scale tugs would be fully equipped with all the same equipment as real tugs, including realistic scale thrust and dynamics, providing a base for skippers to build their skills while generating cost recovery.

1. TUG TRAINING

Operational training

Today's tugs are becoming increasingly powerful and sophisticated but, above all, extremely manoeuvrable. The agility of the modern shiphandling tug is such that it has the ability to ensure that the vessel's BP can be applied precisely, where and when it is required. In this way shiphandling becomes quicker, safer and more efficient. This ability is, however, coupled to a real need for understanding by the tugmaster of exactly how a tug will react. With the agility and power available, mistakes can occur rapidly in the hands of the unwary. In order to benefit fully from the advantages offered by modern shiphandling tugs, a new standard of crew training is essential.

Operational requirements during escort and docking operations will also see a new set of commands between pilots and tugs to utilise the full potential of the new technology. Considerable simulator training already takes place for both pilots and tug crews, particularly where the handling of large tankers and LNG shipping is involved, but training new tugmasters does require a more hands-on approach. Traditionally new tugmasters have come up through the ranks, starting as deckhands, progressing to mate and then captain. On modern high-tech tugs, designed for use with very small crews, many of those training opportunities have been lost. Equally, putting a partially-trained novice into the driving seat of the company's latest new US\$10m addition to the fleet is also fraught with problems. An opportunity to take the latest pieces of equipment away into a secluded corner to 'play and learn' for a few hours, which is possible in many other industries, rarely occurs in the towing business.



A possible alternative could be a quarter-scale training tug, just 7.3m (26ft) long with all the dynamics of the full-size tug. Any such vessel would, of course, have to earn its keep and could be equipped to carry out other duties that require a small, agile, vessel with adequate (scale) power. Line handling and small ship assist duties might well contribute to a cost-effective training facility.

Scale model testing, employing smaller models, is being used very effectively for special tugmaster and pilot training, and works very well. Models are also used almost routinely to develop new techniques and hull designs. In the early days of model testing, the use of powered models was shunned because suitable propulsion and control systems that could produce a scale performance were not available. That is no longer the case. Realistic, radio-controlled, scale models are now providing valuable data in the hands of design teams.



Velox at Port Revel.

Recruit, train and retain

In the next 10 years, the industry will lose the largest number of senior staff in its history and will need to train a large number of tugmasters to a new level of competency. This will require an investment in time and a carefully configured company training programme. This will be more difficult than ever before because, as previously mentioned, there is less scope in a very small crew to undertake 'on the job' training. A world shortage of marine manpower has shown that an accelerated rate of intake and training is required. In this world downturn this must be done efficiently.

Introduction to new technology

Unprecedented development and the introduction of modern technology has resulted in the introduction of a wide variety of new vessels. These range from small 'compact' shiphandling tugs of only 22-24m in length with BPs of up to 70 tonnes, to 36m terminal tugs. The latter continue to develop and BP figures of 90-110 tonnes are not uncommon. Inherent in the modern terminal tug is a very real escort capability and the ability to produce dynamic forces in the towline exceeding 150 tonnes at a speed of 10 knots in the tethered escort mode.

The foregoing new vessels require new and greater skills to deliver safe operation – the dynamic

performance of escort tugs alone demands real understanding to achieve the best and safest results. The next generation of crews will have new skills in order to utilise these technologies in the best possible manner. Winch development in the last five years has advanced to match the new tug performance, enabling and requiring the tugmaster to manage line tension in an entirely different way. History has shown that hands on the controls and time on the job will build confidence; modern training tugs and methods, with support from seasoned tugmasters, will give us a new generation of tug captains for the future.

Tools for success

To be successful, a candidate must be pre-screened and become familiar with the type of tug and its design dynamics. Docking procedures and techniques must be fully explained and understood, in theory and practice. Candidates must train on the new types of winch currently in use and be capable of working with pilots on voyage planning and communications. The safety requirements for LNG and crude shipments leave no room for mistakes.

2. WINCHES

Advances in winch technology and training

As we head into the next era of tugboating, we are seeing advances in winch technology, just as we do in other areas of tug design. We hear the terms full render/full recover, line tension and scope indication, slip brake device, auto abort systems (ABS), independent drive level winds, auto position escort winch systems (APEW)TM and many others. What are these systems, how do they work, and what advantage do they provide?

Too often a sophisticated winch system is installed on a new tug only for it not to be used or not be used to its full potential owing to a lack of training or a lack of understanding. In today's tough economic times, and even during good times, to train the winch operator on a company's tugboats is cost-prohibitive because of loss of vessel revenue and the inability of shipping companies to supply their vessels for training. During the past 10 years, the industry has been thinking outside the box in respect of every aspect of tug design



Figure 1: Scale training tugboat.

and now it is time to think outside the box in respect of winch training. The perfect platform, and the most cost-effective way to achieve the best results, is a scale training tugboat with a scale, fully working, winch system. This would allow the operators to find the best solution and the right advantage for their winch system, which could then be used in a classroom simulator. The scale tugboat winch system can also be used to train on the outer limits without concerns about damaging or sinking the asset. The scale tugboat winch system is also a perfect test platform to trial new ideas and concepts.

Training to find the best solution

Too often a new winch system is installed on a vessel and, due to the lack of training and the pressure of requiring the new tug to generate revenue, the best method of using the winch is never achieved. One way to achieve this is to have few select engineers and scientists behind closed doors determine the best solution during a set time period. Another way of achieving this is by using a scale tugboat winch system, giving greater accessibility in determining a solution, allowing not just engineers to test but also masters and port captains through training to find the best use of their winch system without time constraints and without the costs.

An example is the concept of full render/full recover escorting, which requires a master to operate the tug and an operator at the winch to adjust the tension during a steering manoeuvre; when the tug is required to fly to the opposite side of a tanker, the tension needs to be reduced. The new concept of set-scope escorting requires only a master in order to achieve the same results, owing to the fact a predetermined tension is set before an emergency occurs. This allows the master to position the tug in the indirect mode and only after the line tension is exceeded will the winch pay out line, and only fully recover the line back to the original set scope after the tension is reduced. The master can therefore fly from side to side on a tanker without the winch pulling the tug into the ship. Using a scale training tugboat, the master can find the best or a simple solution to an emergency situation.

Training to achieve the right advantage

A scale training tugboat is also the perfect tool to achieve the right advantage of a winch system. Again, without time constraints and very little cost, the winch system can be perfected and best advantage achieved. As the tug industry becomes more competitive, using a tug to its full capacity is a given. Training is the key to achieving a competitive advantage, making the winch system work at 100 per cent and providing the customer the very best service.

If an operator wants to purchase or invest substantial funds in a sophisticated winch system the training scale tugboat is the most economic way of trialing the new system, building a scale winch system for training or testing (Figure 2). The trials will determine the best features that will achieve the competitive advantage of the winch system and tug. Before purchase, the

winch system features can be enhanced or modified so that the operator doesn't end up with the wrong winch system for the tug.



Figure 2: Building a scale winch system for training or testing.

Training on the outer limits

The greatest advantage of the scale training tugboat and a scale winch system is the ability to test a winch system to the outer limits of its design, allowing the operator when training to take the tug and winch system to extreme limits. It also allows the training master to push the limits of the tug and winch without compromising safety or worrying about sinking the vessel.

For example, when using the auto position escort winch system™ (Figure 3), the operator can test just how much it is possible to heel the vessel on its side, and how fast and how much force is generated in steering a tanker in an emergency situation. It will also allow the operator to learn how quickly one can get into a jackknife position and how fast the tug can get on its side without worrying about tripping the tug or sinking a company asset.



Figure 3: Auto position escort winch system.

Training as an ongoing test platform

In conclusion, the scale training tugboat and winch system is the perfect platform for continual testing. Every time a new idea is put forward, it can be placed on the test platform and immediately examined to see what the results are. Also, any new concepts and procedures can be tried right away and taken to the next level if proven successful. The scale training tugboat will help find the best solution, right advantage and take training to the extreme limits in order to achieve a system capability of 100 per cent.

