

Correspondence

by Capt. G.V. Brooks and Capt. V.J. Schisler

Standardized tractor tug commands for ship-assist work

Many mariners have asked if there is a standardized tractor command language in use around the world. Sadly, the answer is no. The authors have been attempting to standardize tractor commands as they conduct training of pilots in the use of tractors at marine simulators.

For this discussion we will use the term “tractor” generically to include all z-drive reverse tractors or azimuthing stern drives (ASDs), fin first tractors, Voith Schneiders or z-drive true tractors, etc.

The commands listed here are basic, but will serve a pilot well to accurately control these unique tugs. Of course, these commands, if used, need to be understood by the tug crews, and they need to have practiced the higher-speed maneuvers before it would be appropriate to perform them with a ship.

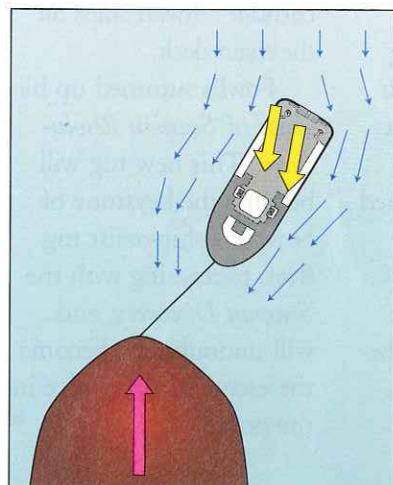
Tug power commands

This suggested tractor command language has been introduced in ports in the United States, Canada, Mexico, Chile, Australia and the Caribbean. For power commands we recommend “full” for 100 percent power, “half” is 50 percent, “easy” is 25 percent, and “dead slow” is 10 percent. Note that we are suggesting “easy” instead of “slow,” as “slow” is sometimes heard on the tug as “full.” To avoid this error chain link, we recommend “easy.”

In some ports where they have tractor tugs of various horsepower, pilots find it easier to use tonnage commands instead of trying to balance the power of a 3,200-hp boat working with a 4,200-hp boat. To accomplish this, the tractors need to be equipped with a tension meter and the tug crew needs to note their power and thruster azimuth settings

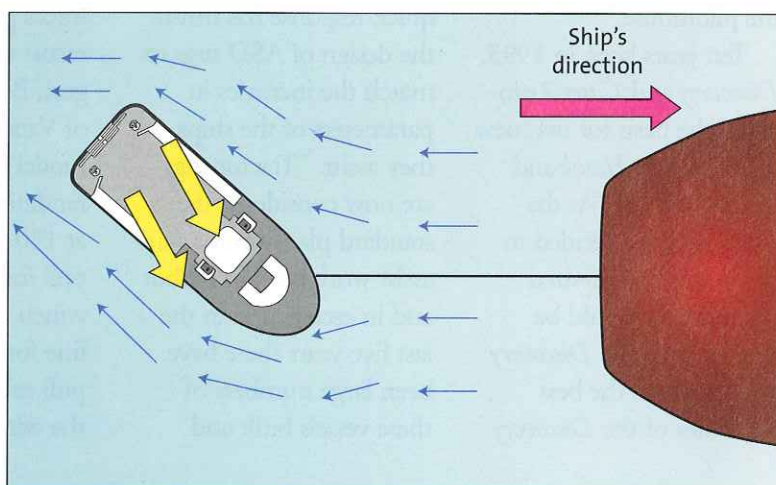
to create a certain power setting when operating astern (when the tension meter records accurately). The tug then repeats the same settings in the opposite direction when pushing (when the tension meter will not record as the towline is slack).

There is also a distinction between the orders “stop” and “stop and hold.” If a ship is making way when a pilot orders the tug to “stop,” the tug operator should stop his engines and let his tug “flop” back alongside the ship, reducing the effects of the water flowing around the tug’s hull. When the pilot orders the tug to “stop and hold,” he plans on using the tug again in that position in a short period of time. If the ship has some way on, a conventional tug will have to “nip” at the ship’s hull in order to remain in position. A tractor on the other hand can simply walk along sideways with the



Left, combination mode

Right, indirect braking



Grimy Howe Illustrations

ship, ready to work again quickly.

To “stop” the tractor made up to the center leads forward or aft, the pilot uses “inline slack line” to send it back to the neutral position directly behind/or ahead of the ship with minimal tension on his towline.

The terms “push” and “pull” expose the operation to errors as the term “pull” sounds somewhat like “full,” and if the pilot does not speak clearly or the wind is blowing into his walkie-talkie microphone, the tug operator might misunderstand the order. In order to make our tug commands clearer and less susceptible to misinterpretation, we suggest that pilots consider using the terms “towards” and “away” (from the ship) to remove this potential link of an error chain. A correct order would be “*America*, towards, 30 tons.”

Tractor maneuvers

Direct pull: In the direct pull mode, the tractor tug simply pulls on its line (like a conventional tug) creating towline forces in the direction desired by the pilot. When the ship is moving slowly, the tractor can apply its full rated bollard pull to the ship, and move from one position to another relatively quickly (30 seconds from one side to another).

However, as the ship’s speed through the water increases, more and more of the tug’s power is used up to obtain positions at greater angles to the ship’s centerline and it takes an increasing amount of time to get into these positions. Because of this, the direct pull mode at angles to either side should only be used at speeds of 4 knots or less with most tractors. Please note that some ports have dropped the “direct” out of this order and simply use the term “pull.” A correct order would be “*Edward (Moran)*, pull, port, 90 (degrees), half.”

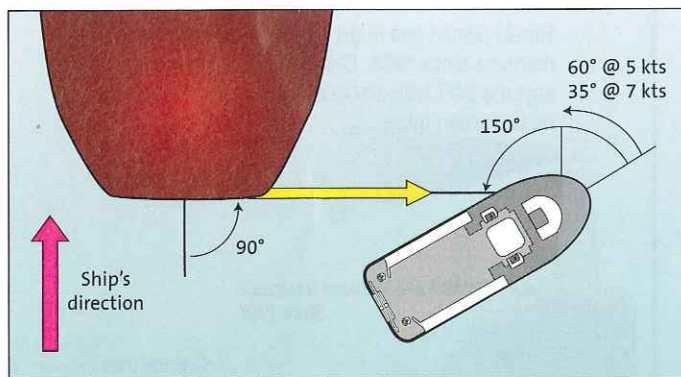
Indirect: In the indirect mode, the tractor turns its working end to the side of the ship where the pilot desires the force vector, and “flies” the boat (like a water skier) out into a position where the towline is at a 45° angle to the ship’s centerline. When in this indirect towing position, the tug operator will set the tractor at about a 30° angle to the water flow, and by observing his tension meter, adjust this angle to create the maximum towline performance or the tonnage figure the pilot wants.

Since the towline forces are created by the water flowing past the tug’s hull (like a wing) in the indirect mode and since the tractor’s engines

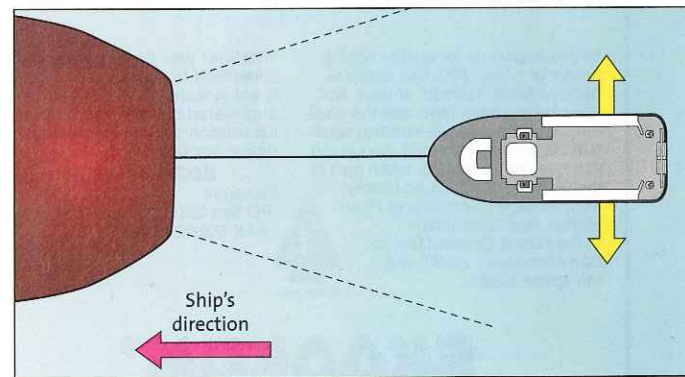
are used only to obtain the desired position, no engine order is given. If the pilot desires more steering forces, he can increase this towline angle; or if he desires to slow the ship down, he can reduce the angle.

The indirect mode is normally considered a high-speed escort maneuver, as a well designed tractor will create its maximum towline forces at speeds up to 10 knots (this is generally considered the maximum allowable escort speed around the world). However, this towing mode is also very effective in steering a ship at very modest speeds of 4 to 6 knots. A correct order would be: “*Thor*, indirect starboard.”

Powered indirect: In the powered indirect mode, the tug operator uses his engines to push the towline all the way up to the 90° position to the ship’s centerline (all towline forces are now steering forces), and then adds the boat’s power as selected by the pilot. In this position, the water flowing around the tractor’s hull creates indirect forces that are added to the boat’s mechanical power. At the mid-speed ranges (5 to 7 knots), this is the most powerful way to use tractors to address a rudder failure, as the steering forces created will be higher than can be created in the indirect



Above, powered indirect



Above, transverse arrest

mode. The limiting factors in employing this procedure are the stability (beam) and underwater bow shape (or skeg) of the tractor. Operators and pilots are again cautioned to practice these maneuvers at lower speeds to gain a feel for the stability and effectiveness of the tug used.

A correct order for this towing mode would be "Liberty, powered indirect starboard, half."

Transverse arrest: In the transverse arrest mode, the z-drive tractor operator places the boat's thrusters' prop wash out to 90° to both sides and adds power as directed by the pilot. (Note that as the tug's thrust is placed to both sides of the boat, a

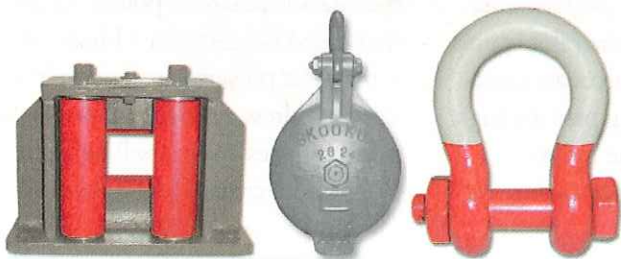
Voith Schneider can't conduct this maneuver.) At zero speed, the tractor would simply hover and create no towline forces; however, at higher speeds, the ship must drag the water plume behind the ship, which acts as a sea anchor and greatly adds to the retarding ability of the tug. (We have observed towline forces at 1.6 times the boat's bollard pull at 10 knots.) However, this retarding force drops off as the ship's speed decreases. This is a high-speed emergency maneuver which is safer than putting the z-drives full astern where the tug's engines might stall if not at full power. Because this move can cause severe vibration, the pilot should only use

transverse arrest at half power unless there is a true emergency.

While in the transverse arrest mode, the tractor can still be used to steer the ship by ordering the tug to no more than 30° to either side of the ship's centerline. The command for this maneuver would be "Rosemary (McAllister), transverse arrest, half."

Indirect braking: Voith Schneider tractors cannot perform the transverse arrest maneuver. Moreover, they are very difficult to control while attempting to retard a ship when escorting, since the tug's skeg digs into the ship's prop wash and causes the boat to shear from side to side. Crowley Maritime, which oper-

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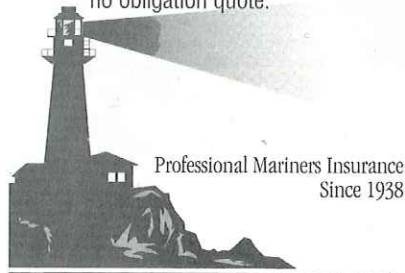
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ates a fleet of Voith Schneider tractors, set out to find an effective maneuver without this instability.

What Crowley found was that if they first put the tug's wheel over (as if to go into the indirect mode) but also pulled "back" with the boat's propellers, they could hold the boat in the indirect mode with the towline directly behind the ship.

In this position, the tractor is creating indirect towing forces and adding its mechanical power to the towline forces. Not only is the boat very stable when operating in this mode, but the potential retarding force that a pilot can employ is very high. A proper command for this maneuver would be "Response, indirect braking, half."

Working the stem

Combination mode: When working the stem of the ship most pilots simply use the direct pull commands as outlined above, which work perfectly fine. However, we have observed ports where the pilots will use the term "combination mode" when working the bow boats.

This term was coined in Europe over a decade ago and refers to the fact that the tractor, while working at an angle to the ship will have its non-working end (stern on an ASD and bow for a VSP) cocked up into the water flow. In this position, not only is the tug pulling with its mechanical power, but the hull of the tug is also acting like a wing creating indirect forces. This combination of forces is referred to as the "combination mode." A proper command for this maneuver would be "Sabine, direct pull, starboard, 45,

half," or "Master, combination mode, starboard, 45, half."

In this article, we have used angles to describe the position of the towline in relation to the ship. But when working the bow this can cause confusion. In the example command above, "Sabine, direct pull, starboard, 45, half," it is not clear if the tug should pull at a 45° angle off the heading of the ship or should be pulling at a 45° angle aft to retard (and steer) the ship. Some pilots will specifically address this latter command by saying "Atlantic Oak, port, 45, pulling aft for sternway."

Clock reference

One way around this issue is to use the hours of a clock to solve this ambiguity, where 12 o'clock is pulling dead ahead of the ship, and 3 o'clock is pulling to starboard at a 90° angle. This methodology is used in many ports of the world and is generally well accepted.

Safe utilization of these commands requires good communications, training and practice. •

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Capt. Victor Schisler has 45 years of experience in the towing and piloting industry, the last 38 years as a pilot for Jabobsen Pilot Service in the Port of Long Beach, Calif. He also serves as facilitator of simulators for training pilots in the use of tractor tugs.

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