

Gob rope

Use and risks

by
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Introduction

Conventional tugs have been there for many years. What has changed over the last few decades is the number of conventional tugs, which has been decreasing steadily. More manoeuvrable tug types with omnidirectional propulsion systems have replaced older tug types. However, there is still a relatively large number of these tugs, but due to the decreasing number, experience with these tugs has decreased too. Operating conventional tugs includes risks and requires specific experience. If this specific experience decreases, there will be a greater chance of accidents with these tugs. See for instance the MAIB report '*Girthing and capsize of tug Biter with the loss of two lives while assisting passenger vessel Hebridean Princess*'. Published 13 November 2024.

Operating conventional tugs safely not only requires experience from the tug master but from the pilot as well, as they work as a team. When a tug master handles only conventional tugs, he will maintain his specific experience. However, the experience of both pilots and tug masters decreases if the number of these tugs decreases to a minimum in their port. As the specific experience is so crucial for the safety of operation with conventional tugs, attention to this specific experience becomes more important.

The greatest risk of working with a conventional tug is not knowing or understanding its capabilities and limitations, and consequently the risk of girthing.

Capabilities of conventional tugs and the use of gob rope

A conventional tug has certain limitations. When assisting a forward moving ship as stern tug, it can not give steering assistance to both sides and it is not able to control the ship's speed. When assisting a ship moving backwards into a harbour basin as a bow tug, the same limitations apply. Then there is also the risk of girthing. Tugs with omnidirectional propulsion units don't have these limitations.

The use of a gob rope can to a certain extent overcome the limitations of a conventional tug as well as the risk of girthing. There are variations in gob rope systems and variations in gob rope use. This will all be addressed below.

With a gob rope the towing point can be shifted from the towing hook to the tug's after end, although dependent on the type of gob rope system used. The towing point is seen here as the point from where the towing line runs straight to the ship. In reality, it lies in the extension of the towing line.

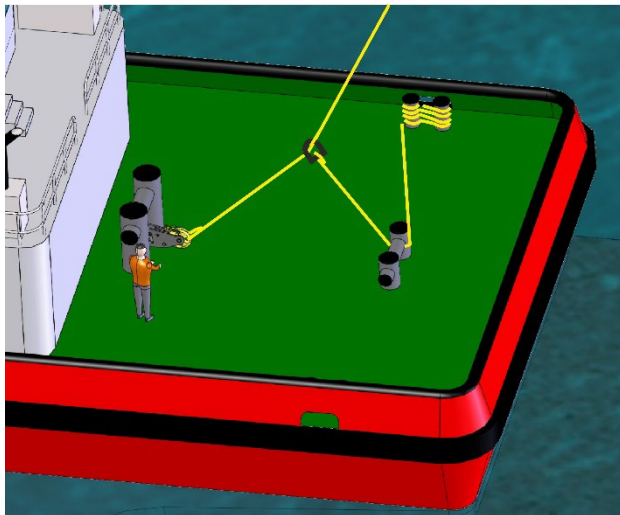


Figure 1- A

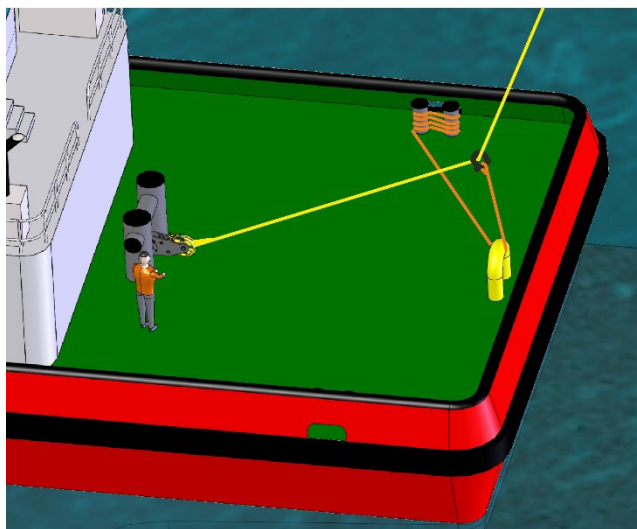


Figure 1 - B

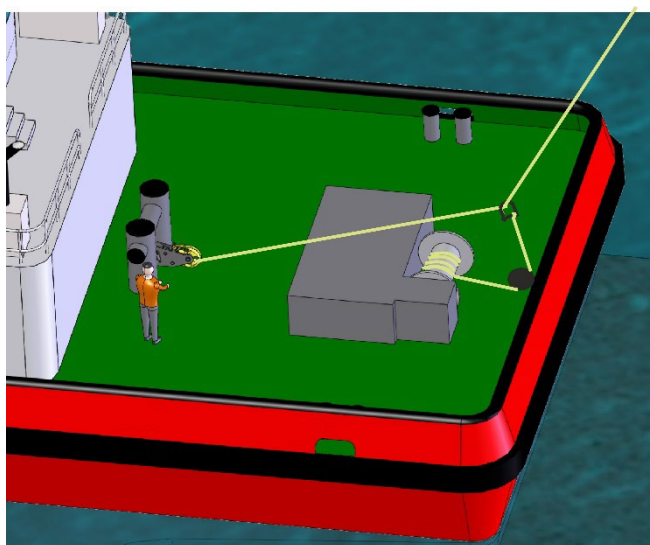


Figure 1-C

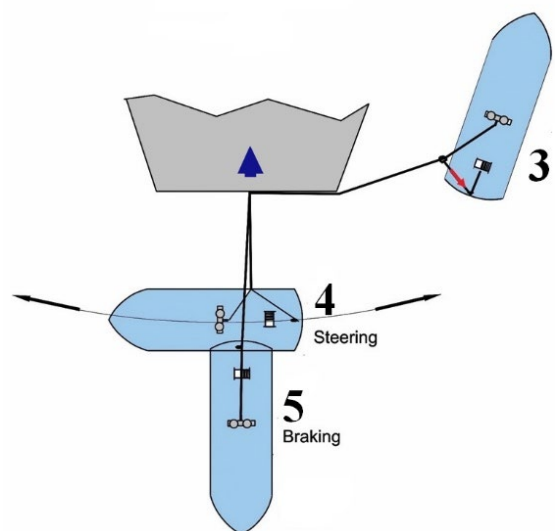
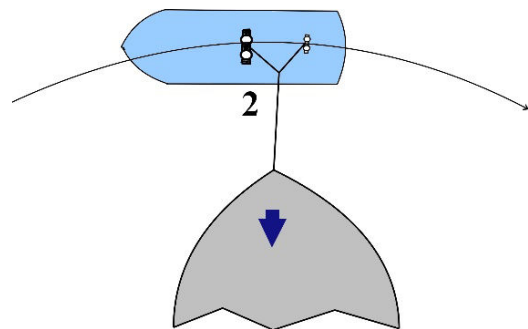
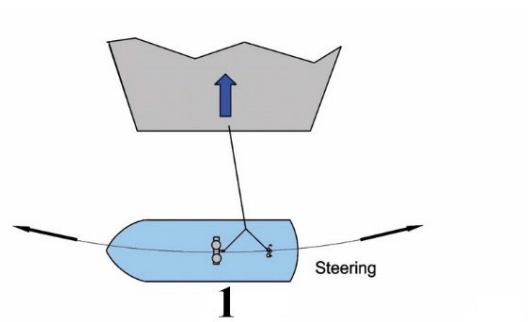


Figure 1
Various gob rope systems. Tug images made by IMC LC, The Netherlands.

Various gob rope facilities

It should be well considered that there are three variations in gob rope system design:

- A. A system to enlarge the capabilities of a conventional tug.
- B. A system to enlarge the capabilities of the tug and as a safety gear to prevent capsizing of the tug.
- C. A system with a gob rope winch with adjustable length, able to be used for A and B.

Explanation of the various systems

System A, Figure 1-A, is used to enlarge the capabilities of a conventional tug. A standard length of gob rope with a shackle at one end is generally used. In the middle of the deck, there is a guidance system for the gob rope, e.g. a set of bollards on the deck, and the other end of the rope is secured on the side bollards. The system enables the tug to operate broadside behind the ship or at the bow to give steering assistance both to starboard and port side, and as a drogue it controls to some extent the ship's speed (see numbers 1 and 2 above).

The system can also be used with dead ships. Such ships are pulled forward by one or two tugs, and in case the stern tug is a conventional tug, it can steer and control the ship's speed by operating in the way as shown at number 1. Even two conventional tugs can operate so aft.

System B. See Figure 1-B. With this system, tug capabilities can also be enlarged. The gob rope is led through a fairlead at the aft end of the tug. Various positions can be found on tugs for this aft fairlead. The position is, however, critical. If the tug is operating as an aft tug and is proceeding at e.g. the starboard side along with the ship (see number 3), and has to assist as a stern tug (number 5), it can swing around on the gob rope, provided that towing point is as far aft as possible. If that position is not far enough aft, the tug may end up broadside with the risk of capsizing. It shows how critical the location of the fairlead and towing point aft is. It also depends on the angle of water inflow on the tug. If during a turn, the water inflow comes from a direction abaft the beam, the centre of hydrodynamic pressure shifts also to an aft position and may oppose the turn. Therefore, for safety reasons, when turning on the gob rope, the aft fairlead and towing point should be as far aft as possible!

By lengthening the gob rope, the towing point can be shifted more forward, and the tug can then operate as shown at number 4.

Particularly with the far aft situation of the fairlead and towing point, the tug is very limited in manoeuvring. This is a problem if the tug has to assist a vessel. It should then be free to manoeuvre, except if it has to assist, as shown at number 5. A rigged gob rope ready for use creates so a problem for the tug and the ship to be assisted. If the gob rope were slack, there is no time to rig the gob rope properly in case of a risk of capsizing. It mostly goes all too fast, while the towline is under high tension.

A conventional tug with a single propeller soon reaches its manoeuvring limits when operating on a short gob rope. Some older tugs even have a limited effective rudder area with little side force. A conventional tug with twin propellers offers additional manoeuvrability, although gob rope manoeuvres still remain risky. Knowing the limitations of the tug will add to safety awareness.

Therefore, the idea of a gob rope as a safety gear can be very doubtful. If assisting a ship effectively with the gob rope slack, it can not help you in case an emergency situation develops. You can't rely on it. It is even better to remove it if you will not use it! Even if it is slack, it can create problems.

System C is a safer system. See Figure 1-C. With this system the towing point can be shifted from the towing hook to far aft by using a variable gob rope length by means of a winch and without a person on deck. It can then operate in the way as shown at numbers 4 as well as 5. See also Figure 2. In case of an emergency, it is able to shift the towing point far aft, to prevent capsizing. In Germany this system is even compulsory.

It should furthermore be realized that dangerous situations do not only happen with a stern tug in situations as shown in Figure 1, but also in other situations. For instance, the ship may overtake a forward or aft tug, creating a risk of capsizing. So, what has been said above applies to such stations as well. In reference 1 various risky situations are shown.

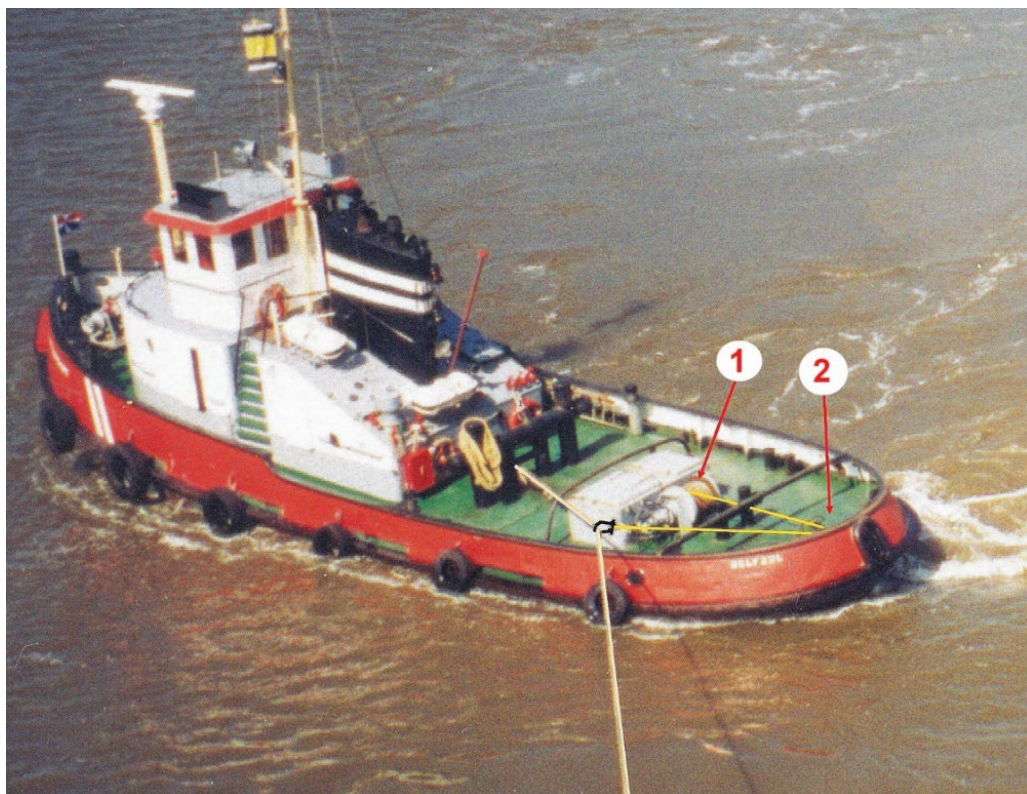


Figure 2
Tug with gob rope winch acting as a steering tug
1 Gob rope winch; 2 Aft fairlead

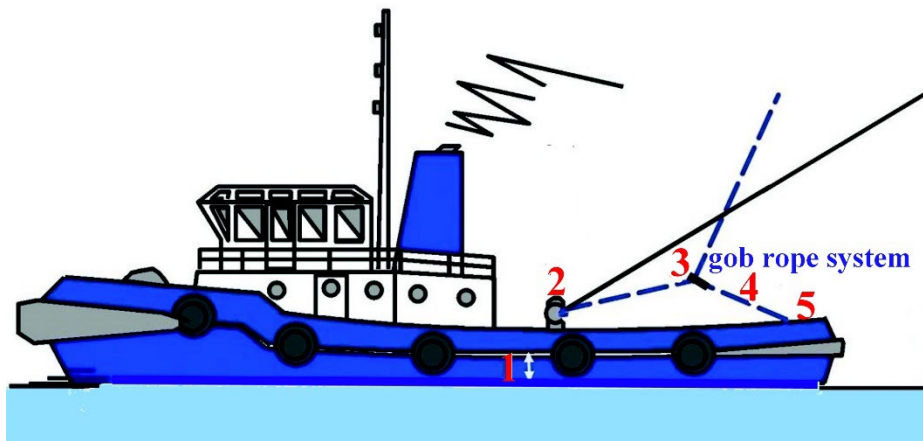


Figure 3

Ten important rules

Important safety aspects will now be mentioned.

1. First:

- 1.1 For safe operating a conventional tug, it is an absolute necessity that tug masters and pilots have a good knowledge of the manoeuvrability of the tug and of its limitations when assisting ships, as well as have a sound experience with them.
- 1.2 All openings through which water can flow into the tug should be closed during tug operations.
- 1.3 In case a conventional tug is carrying out manoeuvres as shown in Figure 1, ship's propeller should be used with utmost care, as the propeller wash is a contributing factor if the tug tends to capsize.

Further important aspects. See Figure 3.

2. *Stability, freeboard, and safe ship speed*

2.1 A safe ship speed is the most crucial factor. Even a little more than the recommended speed increases the heeling force on the tug considerably. For instance, in case of 4 knots speed instead of 3 knots, the heeling force almost doubles. The heeling force increases with the square of the speed.

Reference 1 recommends a speed of not more than about 3 knots for tug manoeuvres with a gob rope, although also lower speeds are recommended. Please mind it is speed through the water.

If a tug master finds the ship's speed too high for a certain manoeuvre, he should inform the pilot and/or ship's captain and not execute the manoeuvre if it has still to be performed.

2.2 Always important is tug stability and freeboard. See Figure 3, nr. 1. The smaller tug's stability and freeboard, the further the speed should be below 3 knots when carrying out manoeuvres with the gob rope.

3. *Towing hook* (Figure 3, nr. 2)

If the tug is equipped with a radial towing hook of sufficient diameter, being a diameter in excess of half the tug's width, it will reduce the heeling angle caused by the lift effect of the radial hook. See example at Figure 4.

4. *Quick release hook* (Figure 3, nr. 2)

The quick release on the towing hook is the most important safety guard. Working should be reliable, even in extreme situations, such as in case of the towline under high tension and the tug has a large list.

5. *The gob rope connection to the towline* (Figure 3, nr. 3)

The gob rope should be connected to the main rope by a clean and rust-free iron shackle and not by a piece of rope. A shackle slides well over the fiber or steel wire main tow line and does not squeeze. The shackle should be so large that the eye of the main towline can pass through the shackle's eye. A shackle with a too small diameter for the towline (steel or synthetic) can furthermore lead to wear and fatigue. This can cause unexpected failures.

6. *The length of the gob rope* (Figure 3, nr. 4)

Length of gob rope depends on where it will be needed for.

If the gob rope is to be used as safety gear or to turn the tug from position 3 to 5 (Figure 1) length of part 4 should be minimal to have the towing point as far aft as possible.

7. *Location fairlead aft* (Figure 3, nr. 5)

If the gob rope is to be used as safety gear or to turn the tug from position 3 to 5 (Figure 1) fairlead aft should be located as far aft as possible on the tug deck.

8. *The towline and gob rope strength*

The towline and gob rope should have such a strength that it can cope with the forces that can be experienced. MBL to be minimal 3 x bp.

9. *Securing gob rope*

Securing the part of the gob rope that is not attached to the towing line, should be such that it will not slip.

10. *Keep an eye on the tug*

The safety of operations with conventional tugs depends on a safe ship speed, which is under control of the pilot. Regularly checking with the tug master is necessary.

As far as possible keeping an eye on the tug is very important. If a tug gets in trouble, it often can be seen by the pilot. He/She should then reduce ship speed immediately.



Figure 4
Tug with radial towing hook

Reference 1: 'Tug Use in Port. A Practical Guide' 4th edition; 2021. Captain Henk Hensen. Polestar Publishing.