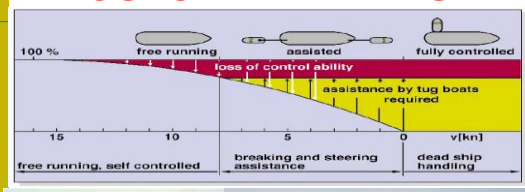
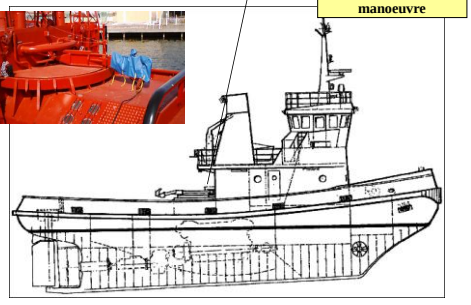
TUGBOAT HANDLING



Berthing: Using a Tug During Berthing (Standard P&I, dec 2004)

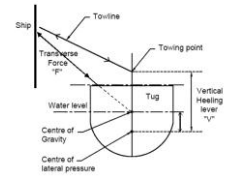
- **The use and conduct of tugs is a feature in virtually every dock damage case that the Club has investigated. Apart from those cases where tugs do silly things or the line breaks.**
- **The main problem appears to be the use of insufficient, underpowered tugs or a decision to dispense with tugs altogether.**
- **Modern ships with bow thrusters are more manoeuvrable than ships used to be. However, there are occasions when tug assistance is essential – in windy conditions, in current or in tide.**
- **It is far better to pay for tugs than to pay US$1 or US$2 million to repair a damaged dock.**

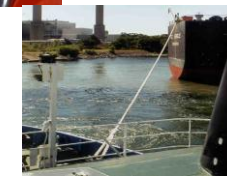
Conventional tug



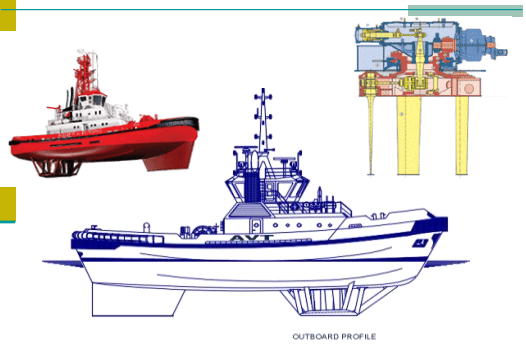
The hook is located over the ship's centre of gravity in order for the ship to be able to manoeuvre

Towing Hook

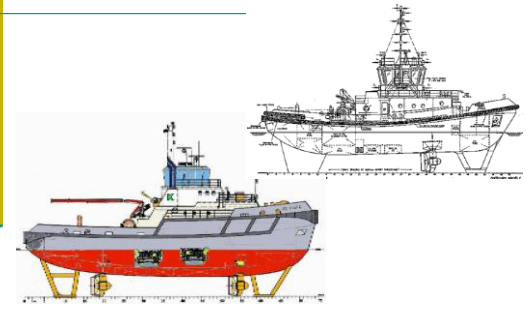




Tractor Tug/Voith-Schneider



Tractor tug - Schottel



Definitions

- **Bollard pull** is an industry standard used for rating tug capabilities and is the pulling force imparted by the tug to the towline. It means the power that an escort tug can apply to its working line(s) when operating in a direct mode.
- **Direct Mode** is a towing technique which, for the purpose of this regulation, is defined as a method of operation by which a towing vessel generates by thrust alone; towline forces at an angle equal to or nearly equal to the towline, or thrust forces applied directly to the escorted vessel's hull.
- **Indirect Mode** is a towing technique which, for the purpose of this regulation, is defined as a method of operation by which an escorting towing vessel generates towline forces by a combination of thrust and hydrodynamic forces resulting from a presentation of the underwater body of the towing vessel at an oblique angle to the towline. This method increases the resultant bollard pull, thereby arresting and/or controlling the motion of an escorted vessel.

Tugboat – bollard pull

- Most harbour tugs has ~ 800 – 3000 HP
- Voith schneider ~ 1.0 ton/100 HP
- Normal propeller ~ 1.3 ton/100 HP
- Ducted propeller ~ 1.6 ton/100 HP

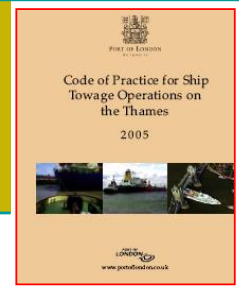
- Example tug 2500 HP – 15 – 39 ton bollard pull

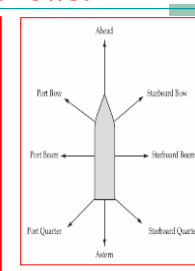
How much bollard pull?

1. **Ship size – Displacement, L_{pp}**
2. **Wind speed – wind area**
3. **Current**
4. **Draft – water depth**
5. **Desired manoeuvre**
6. **Time for manoeuvre**
7. **Space**
8. **Other factors eg. Ice**

- **To reach the necessary bollard pull**
  - **Few big – strong tugs?**
  - **Many small – weak tugs?**

The direction of pull will be indicated as follows:





- The power required will be indicated as percentages, i.e.
- **Stop - 25% - 50% - 75% - Full**

Damage

Guidelines for port of Holyhead

- **4. TUG GUIDELINES**
- The port has one 25 tonne BP tug for general harbour use. Tugs from other ports are not readily available. A visiting vessel should consult the port on tug and tug crew availability and suitability, prior to arrival.
- The port tug has twin kort nozzle propulsion and is consequently only suitable for ship berthing assistance in the following conditions.
- · When the tug assistance is for very slow speed manoeuvring off / onto the berth.
- · When the assistance is in the push / pull configuration.
- · When the tow is over the stern the direction of vessel and tug must be generally the same.
- · To avoid a girting situation the tug must never be allowed to be pulled astern by the vessel being assisted. Therefore the tug, when towing over the stern, must not be made fast to the stern when the vessel is moving ahead or made fast to the bow when moving astern.
- · The tug assistance is clearly agreed between Pilot, Master and tug crew and incorporated into the passage plan.
- The decision on tug use will be based on, but not limited to, the characteristics of the vessel, the weather conditions expected and the state and height of tide.

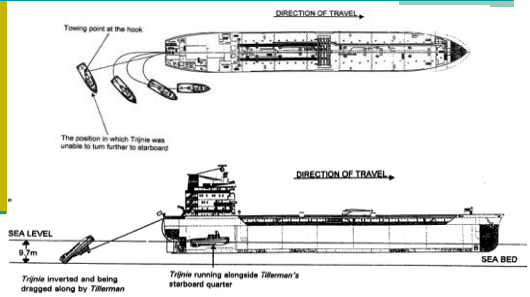
CAPSIZE OF TUGS

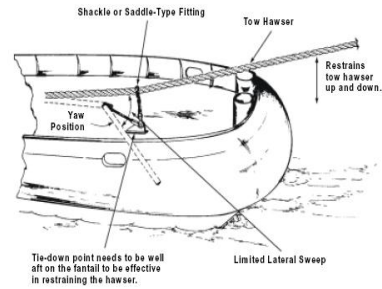
- **The danger of girding arises when a tug is towed broadside by her own tow rope and is unable to manoeuvre out of this position. It may arise when the ship in tow gives a kick ahead or astern on her main engines. This is especially dangerous when a tug is towing on the beam and lack of judgement in such circumstances may manoeuvre the tug into a helpless position with danger of capsizing.**
- **Modern tugs have a large engine power in relation to their size and the strength of the tow rope is in proportion to the engine power. In consequence, if the tug is pulled laterally through the water with the tow rope bearing out on the beam it cannot be guaranteed that the tow-rope will part before the tug is capsized.**
- **Although tugs are provided with the slip hooks there is some likelihood of the slipping arrangement failing to function when the tow rope is bearing athwart the tug.**
- **In an emergency, Master and Mates in charge of tugs, who consider their vessel to be in danger of girding, have been ordered to slip the tow regardless of the situation of the vessel towed.**

Girding = capsizing of a tug by the vessel it is towing (http://www.m-i-link.com/dictionary/)

CAPSIZE OF TUGS

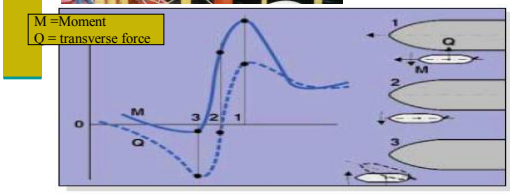
Milford Haven

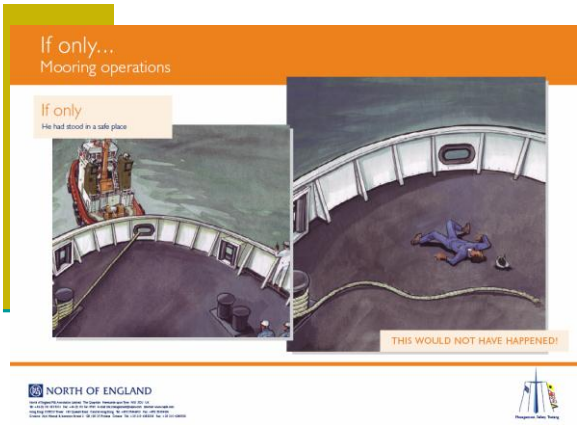




Carousel Tug

TUGBOAT HANDLING

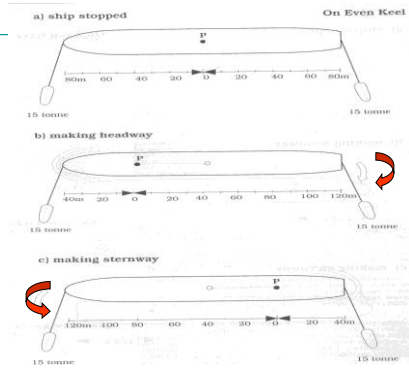




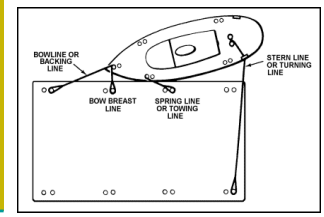
Safe Speed

- **A panel made up of the European Tugowners Association (ETA) and the European Pilots Association issued their safety concerns to class societies, yards and marine insurance companies.**
- **In particular, the panel said, it is wrong to consider a minimum speed of 9-11kt as 'dead slow ahead' when dealing with 10,000teu vessels. "This is definitely too much for tugs and their crews to safely connect a towing line," it warned. The alliance also raised doubts about the structural strength of hulls and bollards of such large ships.**

Turning Levers and Moments



Yankee koppling



I. Benno Ltd Sweden

Ship Handling with Tugs
Safety Do's and Don'ts

Do's

- **Do** order the tug as early as possible.
- **Do** give clear instructions to the Tug Master.
- **Do** listen to any advice offered by the Tug Master.
- **Do** advise the Tug Master prior to each stage of the manoeuvre.
- **Do** advise the tug prior to all engine movements.
- **Do** give the Tug Master time to react
- **Do** advise the Tug Master of any areas on which he cannot he push.
- **Do** lower the tug's rope when letting go.

Don'ts

- **Do** not make the tug fast against the advice of the Tug Master.
- **Do** not manoeuvre the vessel without advising the tug.
- **Do** not use excessive speed with the tug made fast. (max 8 kts)
- **Do** not drop the tug's rope into the water.
- **Do** not let go of the tug without advising the Tug Master.
- **Do** not work against the tug