

CODE OF PRACTICE FOR  
SHIP TOWAGE OPERATIONS  
ON THE THAMES  
2015



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**CODE OF PRACTICE FOR SHIP TOWAGE  
OPERATIONS ON THE THAMES  
2015**

**FOREWORD**

This Code of Practice is provided for the guidance of Masters, Pilots and tug crews involved or likely to be involved in ship towage operations on the tidal Thames. Ships' agents are also recommended to make themselves familiar with the content of the Code, and in particular the application of the Guidelines for the Utilisation of Ship Towage Tugs.

The Code remains in two parts:

Part One - Safe Working Practices for Ship Towage Operations; and

Part Two - Guidelines for the Utilisation of Ship Towage Tugs on the Thames.

This Code forms an integral part of the port's navigational Safety Management System, and hence contributes to the PLA's compliance with the requirements of the Port Marine Safety Code.

April 2015



# **PART ONE**

## **SAFE WORKING PRACTICES FOR SHIP TOWAGE OPERATIONS**

### **SECTION ONE - INTRODUCTION**

Part One of the Code provides both generic guidance on ship towage operations and also specific references to local good practice in ship berthing and unberthing operations on the Thames.

### **SECTION TWO – PREPARING FOR TOWAGE OPERATIONS**

#### **2.1 Planning and Co-ordination**

Before beginning towing operations, a comprehensive plan of action (part of the ship's port passage plan) should be (prepared and) agreed by the Pilot and Master – if a Pilot is embarked - taking account of all relevant factors, including tide, wind, visibility, the ship's size, type and characteristics, the berth operator requirements. A good knowledge of the type and capabilities of the tugs allocated to the job is important, in order that the Pilot and/or Master can ensure tugs are both suitable for the task ahead and positioned on the vessel so as to be most effective, and to facilitate a safe operation.

Any conflict or mismatch between the required manoeuvre and the tugs allocated must be resolved before the towage operation begins.

Responsibility for co-ordinating a towage operation lies with whoever has the conduct of the vessel being towed, be that the Master or the Pilot. When berthing and unberthing, it is the duty of the Master and/or Pilot to ensure that the vessel is handled in a safe and controlled manner, having due regard to the safety of all those involved, whether it be on the ship, assisting tug(s), line handlers or mooring gangs and other river users as appropriate.

The number of personnel employed in any towage operation should be determined having due regard for the size of the vessel and the prevailing operational and environmental circumstances. In all circumstances,

sufficient manpower should be provided to ensure that individuals are not exposed to undue risk, and that the operation can be conducted safely and efficiently. Due regard should also be given to the size, weight and scope of the towing gear and lines to be handled.

All those with a responsibility for personnel or equipment involved in assisting the towage/mooring of vessels have a duty to ensure that safe working practices are followed, and that associated equipment is fit for purpose. They should also ensure that those involved are properly trained, adequately briefed in their duties, and issued with, and use, suitable and effective personal protective equipment.

## **2.2 Pilot / Vessel Master Exchange**

In addition to the standard information passed to the Pilot, it is recommended that the Master provide the Pilot with a deck General Arrangement showing the layout and safe working load (SWL) of the mooring fittings, where known, and inform him about:

- which fairleads, chocks, bollards and strong points can be used for towing;
- the SWL of this equipment;
- areas of hull strengthened or suitable for pushing by tugs and relevant identification marks employed. (This information is needed due to variations in ship construction and the appropriate area frequently being out of line with the chock); and
- any special features (i.e. controllable pitch propellers, thrusters etc.).

**Note:** *Using ships' mooring lines as towlines is not recommended (except in an emergency) as the strength may not be in accordance with tug towing force and may therefore limit the tug's performance.*

The Pilot should advise the Master about:

- the tug rendezvous time and position;
- the number of tugs and the mode of towage;
- the planned (optimum) ship speed when connecting to the tug's lines;
- whether the ship's or the tug's line are recommended for use;
- the type of tugs to be used and their bollard pull(s);

- if escorting, the maximum towline forces that the tug may generate at escort speeds;
- maximum planned speed for the operation;
- the method by which the ship's crew should take on board and release the tug's tow line;
- the prohibition on the use of weighted heaving lines;
- that on release, the tug's gear should be lowered back always under control;
- areas of the transit posing particular risks with respect to the possible use of the tug;
- intentions with regard to use and positioning of the tug(s) for berthing manoeuvres;
- intentions with regard to use of the tug(s) in an emergency (escort operations); and
- primary (tug working) and secondary (London VTS) VHF channels for use in the operation.

### **2.3 Pilot / Tugmaster Exchange**

The Pilot and Tugmaster should, as a minimum, discuss the following issues:

- the SWL of the vessel's chocks, bollards and strong points to be used for towing. (Failure to provide this information could result in broken equipment);
- the tug hook up point, taking into account the prevailing weather and sea conditions, for escorting operation (if appropriate) and berthing;
- the planned (optimum) ship speed when connecting to the tug's lines;
- if active escorting, the start point of the escorted passage;
- the maximum speed of the tug;
- passage details in their entirety while accompanied by the tug(s), particularly details of any swing manoeuvre, release position and sequence of release;
- berthing details in their entirety, including tug positioning around the vessel's hull and the vessels required position on the berth;
- intended and emergency use of ships anchors;
- any unusual items regarding the particular vessel as gleaned from the Master/Pilot exchange;
- if appropriate, any shallow water or bank effect areas where significant surges may be experienced that might add to the tug loads;



- the Tugmaster should advise the Pilot (as far in advance as possible the scheduled manoeuvre) if the tug is experiencing a failure or reduction in its ability to manoeuvre or deliver full bollard pull; and
- when confirming that the tug is fast and ready to assist, the Tugmaster should also confirm both the tug's name and her position on the vessel.

## **2.4 Master or Pilot / Boatmen & Linesmen Exchange**

As described in the PLA Code of Practice for the Safe Mooring of Vessels on the Thames:

- the Pilot should ensure that the Boatmen/Linesmen are fully briefed as to the mooring/unmooring plan, being clear as to the allocation of tugs and which lines are to be run and when;
- the Pilot and Boatmen/Linesmen should exchange information regarding any restrictions that may affect line handling or the operation of line boats;
- any last minutes changes to mooring requirements must be passed as quickly as possible to avoid confusion or unsafe operations; and
- the Pilot should not leave the bridge or break communication with the Boatmen/Linesmen until the towage/mooring operation is complete.



## **2.5 Preparations on board**

### Tug and Vessel Procedures

Operations such as mooring and towing impose very great loads upon ropes or warps, gear and equipment. The Code of Safe Working Practices for Merchant Seamen sets out certain precautions, which should be taken, but the circumstances of recent accidents show that greater emphasis should be given to considering the system as a whole.

As a result of the imposed loads, sudden failure in any part of the system may cause death or serious injury to personnel.

Masters should avoid men being stationed or necessarily working in the bight of a warp or rope formed by the lead from the winch or windlass round and through the fairleads and over-side. In any case, the consequences of failure in any part of the system must be carefully considered and effective precautions taken.

All fixed and running gear including ropes should be carefully maintained, tested, certified and regularly inspected against wear, damage and corrosion. Particular attention is drawn to the need to ensure that fairleads, lead bollards, mooring bits etc. are:

- (a) used appropriately and within their design capabilities;
- (b) correctly sited; and
- (c) effectively secured to a part of the ship's structure which is suitably strengthened.

Investigation of one accident showed that due to corrosion fatigue, a roller pin fractured at a sharp change of section machined at the lower end. The place of fracture was inaccessible to inspection and maintenance, being just below the housing surface. In another instance, the welding between fairlead and deck failed. In a third case, a bollard which was pulled out had been secured to a deck pad by bolts of inadequate diameter and had loose nuts.

### Watertight Integrity

The watertight integrity of the tug should be maintained at all times. When a tug is engaged on any towage operation all watertight openings should be securely fastened. All watertight openings should be marked with a sign stating that they are to remain closed during towage operations. Any such openings used whilst moving about the tug during a towage operation should be re-secured immediately after use.

### Testing and Inspection of Towing Equipment

Towing hooks and alarm bells, if fitted, should be inspected daily. The emergency release mechanisms on towing hooks and winches should be tested, both locally and where fitted remotely, at frequent intervals to ensure correct operation. All towing equipment in use should be inspected for damage before undertaking and after completing a towage operation.

### Tug/Workboat Personnel

Vessel crews involved in towage operations should always:

- wear approved and in-date self-inflating lifejackets and other appropriate PPE (e.g. hard hat, safety footwear, etc.) throughout the operation;
- ensure that the working area is safe and free from trip or slip hazards;
- remain alert to what the vessel crew is doing; and
- refuse a damaged towing hawser whilst notifying the Tugmaster and vessel.

### Tugs, Workboats and Linehandling Boats

(As described in the PLA Code of Practice for the Safe Mooring of Vessels on the Thames)

Engines and other equipment should be maintained to the manufacturers' specifications and be properly serviced. Equipment such as heaving lines and messengers should be of appropriate type, length and strength. All equipment should be checked before the start of each operation. Life saving equipment should be available for immediate use.

### PLA Vessel Licensing Requirements

All ship towage tugs and workboats (including line handling boats) used within the Port of London are required to be inspected and licensed by the PLA as being 'fit for purpose'. They should only be used in assisting ship manoeuvring and berthing/unberthing operations for which they have the capacity and/or are licensed.

The details of which tugs are currently licensed by the PLA to undertake ship towage operations in the port are promulgated by Notice to Mariners. (See [www.pla.co.uk](http://www.pla.co.uk))

Linehandling boats should be crewed such that they are capable of handling safely all the wires and ropes needed to complete the operation. It is strongly recommended that safe manning in linehandling boats should include a Coxswain and at least one Linehandler. The person in charge of the boat should meet the minimum competency standards as specified by the PLA.



## **SECTION THREE – COMMUNICATIONS**

VHF communications are a vital component of safe towage operations. It is essential that those on board the vessel, the tug(s), where appropriate the mooring/line boats, and those on the berth, are able to communicate promptly and effectively throughout the towage operation, should the need arise.

Prior to towing operations being undertaken, the Pilot, Master, Tugmaster(s), and Linehandlers and Boatmen should establish suitable means of communication, exchange relevant information (e.g. speed of vessel), and agree a plan for the towage operation. Pilots, Linehandlers and Boatmen should carry a fully charged spare battery for their hand-held VHF.

Once VHF communications have been established, tested and Pilot/Tugmaster/Linehandlers and Boatmen information has been exchanged, personnel should keep transmissions to a minimum and should normally only call when in doubt, or in an emergency. Mooring personnel should consider monitoring the tug/ship VHF working channel in order to have a proper appreciation of progress in the berthing/unberthing operation.

During operations, it is important that effective communications are maintained between:

- (a) the towing vessel and both the bridge team, and the mooring decks of the vessel undertow; and
- (b) the ship's tow party(ies) and the bridge team.

In all communications clear identification of the parties communicating should be used to prevent misunderstandings. The Tugmaster and Boatmen should be kept informed of engine movements, helm orders, proposed use of thrusters and anchors on the towed vessel.

### London VTS

The PLA operates two Vessel Traffic Services (VTS) Centres at Gravesend and Woolwich. Both use the call sign London VTS, but operate on different frequencies.

It is important that London VTS is included in the communication loop, as appropriate, when planning and then executing a ship towage operation. London VTS has its own role and responsibilities to undertake on such occasions and will be available to provide information on tug allocations, act as a communication link with the berths, agents, and where necessary

Boatmen and Linehandlers. London VTS will also advise the Pilot/Master of any traffic likely to be affected by or affect the towage operation.

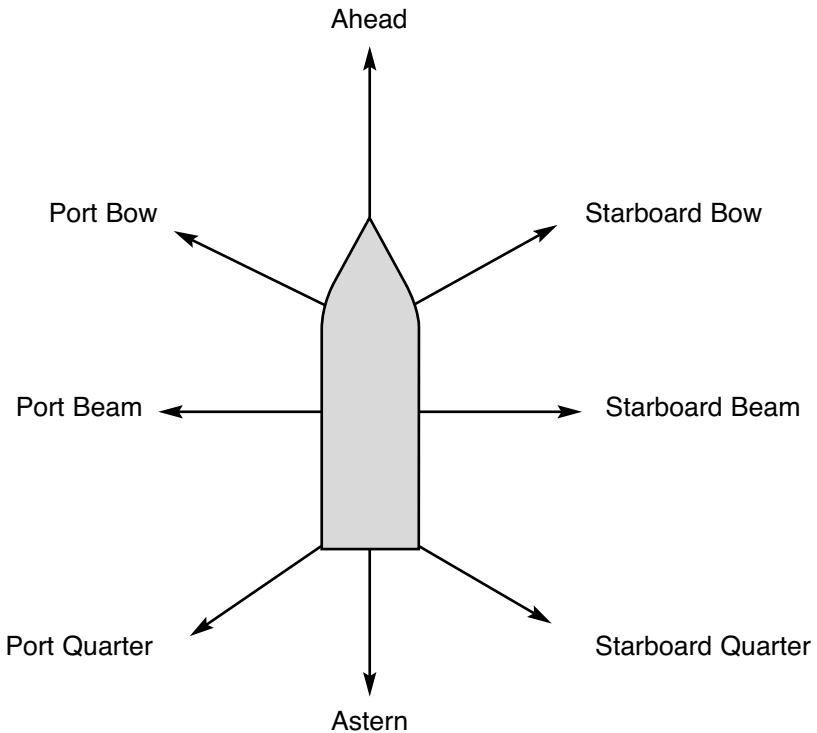
During the towage operation, it is important for Pilots and Masters to keep London VTS fully apprised of the planned manoeuvre and its progress, in order that VTS can keep other port users apprised, and to warn of dangers or restrictions created by the operation. Pilots and Masters are to advise London VTS of the tug VHF working channel.

The Tugmaster shall always maintain, so far as possible, a listening watch on the appropriate VHF channel for London VTS as well as the Pilot / Tug working channel.

## SECTION FOUR – PILOT INSTRUCTIONS TO THE TUG

It is vital in any regular towage operation, but especially important in a port the size and as diverse as London, with a large number of operational Pilots, that instructions to tugs are specific, consistent and easy to understand. To avoid confusion and errors, Pilots will ask for tug power and directional requirements as follows:

The direction of pull will be indicated as shown below:



The power required will be indicated as percentages, i.e.

**Stop - 25% - 50% - 75% - Full**

## **SECTION FIVE – TOWAGE OPERATIONS**

### **5.1 Connecting and Disconnecting Towing Gear**

#### Connecting

Before arrival at the tug connecting position, the Pilot or Master should establish effective communications with the tug(s) and agree working VHF radio channels. Likewise, effective communications must be established between the bridge and the vessels crew at 'stations' and they should confirm that they are ready to receive the tug (as appropriate).

The vessel's speed should be reduced to that which allows a safe rendezvous and connection with the tug(s). The required speed should be agreed in advance between the Master (and Pilot if embarked) and with the Tugmaster(s) involved. At all times during the connecting process, the Pilot and Master should be aware of the position and intention of all relevant shipping movements in the area. He should keep London VTS apprised of his intentions at all times, requesting advice on shipping as necessary.

The Pilot or Master should ensure that his planning takes full account of the time taken to connect the tow(s), especially if adverse conditions are likely to extend this process. Account should also be taken of potential language difficulties as it is not unknown for there to be uncertainty and confusion as to which ship's lead is to be used. Vessel mooring parties should be fully briefed and the Pilot and Master should check when in doubt and be confident that his instructions are being followed.

Before commencing a tow, the Tugmaster should determine which towing gear is suitable for the operation and instruct the crew accordingly. When receiving heaving lines, the tug crew should be aware of the risk of injury through being struck by a 'Monkey's Fist' or other weighted object attached to the line. Ships' personnel should wherever possible, agree with the tug crew the area where the heaving line is to be thrown, to allow the recipients to move clear. When connecting to a tow, the tug crew should ensure that the towing gear is clear of any obstructions, able to run freely and is released from the tug in a controlled manner. If the eye of the towline is passed around the first horn of the bits and over the second to spread the towing load on the bits, the maximum load is equivalent to the SWL of the bits. However, if the towing eye is passed only over the first bollard, then this will effectively double the SWL of the bits. (Ref: IMO MSC / Circ. 1175 24 May 2005).



The ship should not test the bow or stern thrust controls prior to berthing at the time when the tug is under the bow or stern passing up a line.

The Pilot or Master should maintain radio contact with the Tugmaster/vessel crew throughout the process. He should be ready to revise the intended tug position if the Tugmaster reports any restrictions at the chosen position, e.g. large flare, overhanging anchor or unsuitable push up point. The Pilot or Master must keep all those involved up to date and apprised of any changes to the agreed plan.

### Tug Positioning and Speed

The Pilot or Master should always advise the Tugmaster before making headway on the vessel, allowing the tug to move to a suitable position for towing while making way.

The positioning of tugs on a vessel is a matter for discussion between the Pilot and/or Master and the Tugmaster(s), having full regard for the areas of the hull, which should be avoided, e.g. watertight doors, between frames etc.

In strong tidal conditions a high percentage of the tug's power may be utilised in maintaining position on the vessel before applying thrust to the vessel. If the tugs are made fast alongside they are at their most effective with a minimal ship speed through the water.

### Disconnecting

During disconnection, both the vessel's and tug's crew on deck should be aware of the risk of injury if the towing gear is released from the tow in an uncontrolled manner and avoid standing directly below.

They should also be aware that any towing gear which has been released and is still outboard may 'foul' on the tug's propeller(s), steelworks or fendering, causing it to come tight unexpectedly. The towline should always be lowered onto the tug deck, never just 'cast off' and left to run.

### Ships Mooring Lines

Ship's mooring lines should not normally be used for towing operations except in an emergency, or where a proper risk assessment has been carried out. Where such use is authorised, extreme caution should be taken to ensure that the size and condition of the line is suitable and that it is kept slack and under control when lowering to the tug and making fast.



## **5.2 Precautions during Towing Operations**

### Crew Safety during Towing Operations

Once the towing gear is connected, the crew should indicate this to the Tugmaster and then clear the area and, if required to remain on deck, stand in a safe position clear of any 'snap-back' or DANGER ZONES. If the crew are required to attend the towing gear during a towing operation, the length of time exposed should be kept to a minimum.

During towage operations the towing gear equipment and personnel should be continuously monitored and any change in circumstances immediately relayed to the Tugmaster. This is particularly important on tugs where the Tugmaster has a restricted view of the towing area/ personnel. Crew should be aware that the tow may have to be released in an emergency situation, and that this may occur without warning.

Having verified the towline is fast to the tug, then this must be confirmed with the vessel's bridge. The Pilot or Master should then confirm 'all fast' to the tug, thus completing the loop. Sometimes it is not possible for the Tugmaster to see the crew on deck due to structural design or at night when they may be obscured by deck lighting on the ship.

### Safety of Boatmen and Mooring Boats

Tugmasters, Pilots and Masters should be aware, at all times, of the position and intentions of mooring boats, especially in strong tidal conditions, at night, during restricted visibility or adverse weather conditions. This is particularly important in circumstances where visibility is limited from the tug wheelhouse and ship's bridge.

Remember that bow and stern thrusters, and the wash from tugs and the vessel being assisted, can all cause significant problems for mooring boats, especially when they are in close to the vessel and/or tug(s) picking up and running with lines. Controllable pitch propellers are a separate, but equally dangerous hazard.

When running aft breast or stern lines, the Pilot or Master should never use the vessel's engines without confirming with the Boatmen and/or Linehandlers as to the position of the mooring boat.

Sound signals can be used as a warning on occasions when vessel noise compromises VHF monitoring.

Use of bridal/gog/gob rope during towing operations - Girting or Girding.

A suitable bridle/gog/gob rope or wire should be used where it is identified, through the position of the tug in assisting the tow or the nature of the operation, that the tow line is likely to reach such an angle to the fore and aft line of the tug that a 'girting' or 'girding' situation may arise.

### Maintain Communications

The Pilot or Master and Tugmaster should ensure that effective communication is maintained throughout the operation. The Pilot should ensure that the vessel Master is kept apprised of the use/intended use of the tugs, especially should circumstances dictate a change from the intended plan. The towage operation should be maintained at a safe speed, commensurate with the conditions and circumstances. The vessel's crew should be warned that the tug may be used at full power at any time.

## **SECTION SIX – SAFE SPEED**

### **6.1 Speed Kills**

This concept applies equally well to ship towage operations as it does to road transport. Most ship towage manoeuvres should be carried out with the minimum of way on the ship. This is especially true when swinging, and no way should be on the ship when working a conventional tug stern to stern.

Exercise caution when using the engines while the tugs are working. The after tug will be affected by the wash and every tug will be affected by the change of speed either up or down, and a rapid change in speed is all the worse. If the situation dictates the use of the engines, the minimum that the situation allows should be used and the tugs should be informed of what the ship is about to do as it will affect their own actions.

Taking the example of a conventional tug on forward, swinging the ship and broad out on the bow - If the ship starts to move ahead it is in danger of running past the tug, which once past the point of balance, will be swung on the end of a pendulum to smash against the ship's side. The Tugmaster's only option is to trip the tow line. If, however, the Pilot or Master warns the tug before he starts the ship's engine, the Tugmaster should immediately reduce the angle of the tow off the bow and thus remove the risk of being over run.

### **6.2 Some speed is required at times**

When taking up the tow line, Tugmasters will ideally expect a speed of around 6 knots through the water. This gives the necessary way to assist the tugs in manoeuvring close to the ship whilst also giving plenty of power in reserve should they have to break away. As the Tugmaster is trying to balance the tug in a position to pass the towline he is looking for a steady speed. If the Pilot or Master requires to change the speed, e.g. to maintain steerage way, he must tell the Tugmaster of his intentions before ordering a change to the engine speed.

The forward tug is especially vulnerable when passing up the tow line. This tug has to position itself very close under the bow, sometimes under 1 metre from the ship's waterplane. The Tugmaster will be concerned about any bulbous bow or other underwater protrusion, the proximity of the flare of the bow and other odd bits sticking out (some container ships for example). At the same time the Tugmaster is fighting the hydraulic pressure wave that exists around the bow. The forward tug would be most disconcerted with a change of speed while passing up the tow. Alterations of course should also be avoided whilst connecting the tow.

Conventional tugs will also require a little way to enable them to disconnect. Voiths do not.



## **SECTION SEVEN – TOWAGE IN RESTRICTED VISIBILITY**

### **7.1 Introduction**

The following procedures are to be followed by all those involved in ship towage operations in the Port of London, including:

- Tugmasters
- Pilots
- Vessel Masters
- London VTS - Duty Port Controller and/or Duty Officer
- Duty Towage Controllers

#### Purpose and Application

The purpose of these procedures is to clarify, in good time, what towage services will be available to vessel Masters and Pilots when Restricted Visibility exists or is expected to exist in, or in the vicinity of, the areas of the Port where tugs will assist vessels. They will apply at times when the vessel requiring tug assistance is either preparing to leave a berth or is at, or west of, the Oaze Buoy inward bound.

#### Restricted Visibility

“Restricted Visibility” means all circumstances when visibility is less than 0.5 nautical miles.

### **7.2 Procedure when Fog exists or is expected**

1. When Restricted Visibility is deemed to exist in or is expected to exist in, or in the vicinity of, the areas of the Port where tugs will assist a vessel, the Duty Port Controller or Duty Officer will ascertain from the Duty Towage Controller what towage services will be available to the vessel at the time when the towage service is required.
2. To assist in the identification of the actual towage requirements it may be effective for the Pilot or Master of the vessel to liaise directly with a duty Tugmaster. In these circumstances it is important that the Duty Port Controller (and/or Duty Officer) and Duty Towage Controller are appraised of any resultant decisions made by the Pilot or Master and the Tugmaster.

It is suggested that the range of towage services potentially available may be categorised as follows:

- Normal towage services.
- Push/pull operations (made fast alongside).
- Push operations (not made fast).
- Other (as agreed between Pilot or Master and the Tugmaster).
- No service.

**Notes:**

1. Within the Thames a Harbourmaster or his designated Deputy may, using all available information, decide that Restricted Visibility pertains in a particular area or at a particular time or is likely to pertain and inform shipping as appropriate.
2. For inward bound vessels having a maximum draft of 10m or more, this procedure is applicable prior to the vessel passing the Oaze Buoy. This is to ensure that the vessel has sufficient sea room to abort the transit should that be necessary.
3. The procedure assumes that Restricted Visibility persists throughout the towage operation. Because it is recognised that Restricted Visibility can improve very quickly, the decision on the level of service agreed may be qualified by 'if the Restricted Visibility persists'. The response from the Duty Towage Controller must however be positive in regard to the service, which will be available, when the vessel requires it and the restricted visibility persists.

**7.3 Procedure when Restricted Visibility occurs during a towage operation**

1. Should Restricted Visibility occur during a towage operation, the Pilot and/or Master and the Tugmaster(s) will discuss the situation immediately and agree upon a course of action to ensure the safety of all persons and vessels involved, given the location, environmental and vessel traffic conditions, seeking the advice of London VTS as appropriate.
2. The Pilot or Master will advise London VTS of the circumstances and the decision immediately, keeping VTS informed of any operational developments, or any improvement or deterioration of the visibility, as necessary

## **SECTION EIGHT – THE USE OF TUGS IN SHIP HANDLING**

Different tug types and their capabilities and characteristics are discussed in several good reference publications (See Section 11). Pilots, Masters and Tugmasters should be aware of the limitations of the tugs involved in each operation. Particular consideration should be given as to the best use of individual tugs given the planned manoeuvre and the local conditions and circumstances. The following provides an introduction to some of the major issues involved in the use of ship towage tugs. Further reading is recommended.

The Duty Towage Controller should make every effort to provide tugs of appropriate bollard pull and capability for the particular towage operation in question.

### **8.1 Interaction**

Interaction and its effects on the tug and its handling are well known and appreciated in port/harbour towage. Pilots, Masters and Tugmasters are reminded that these effects increase with speed.

In areas where interaction exists, and when manoeuvring alongside a tow, the Pilot and/or Master and Tugmaster should be aware of the possibility of underwater obstructions such as bulbous bows, stabiliser fins etc., and areas of the ship's sides, such as pilot doors, which are to be avoided. The use of bow thrusters by the towed vessel may present a hazard to the tug. When in close proximity to or coming alongside a tow, the crew should be aware of interaction and the effect it may have on the tug. This may take the form of sudden movement or contact and result in loss of balance or movement of equipment and other objects.

Marine Guidance Notice 199 (M) - Dangers of Interaction - provides further guidance and information on the effects of interaction, including when manoeuvring at close quarters.



## **8.2 Tug Escorting**

Escorting as a regular operation is becoming common within the port towage industry. It should only be carried out after investigating the suitability of the tug for the operation and the Pilot, Master and Tugmaster(s) agreeing a plan.

This type of operation is carried out in the 'passive' and 'active' modes: passive when running free in close attendance and active when made fast to the towed vessel. If active escort is being undertaken the form of towage can be 'direct' or 'indirect', depending on the speed of the towed vessel. When made fast, all those involved should be aware that increased loads can be applied to towing gear, especially when operating in the indirect mode.

## **SECTION NINE – LOCAL TOWAGE OPERATIONS**

The following identifies established local procedures as examples of good practice in ship towage operations.

### **9.1 Tanker and other River Berths**

Great care is to be exercised when coming alongside tanker berths due to the complexity of pipework on the jetties. Vessels should always land parallel to distribute the landing load evenly along the jetty length. The tide runs strongly in these areas and care must be taken to allow for this when berthing and unberthing. Communication should be established on the relevant VHF working channel with the mooring team at the earliest opportunity and positioning/mooring requirements confirmed.

When manoeuvring at river berths in general, make the tug(s) fast in advance of arrival off the berth and allow for the strength of the current when swinging and approaching the berth. Remember that making fast a tug or tugs too early can severely reduce the maximum speed available to the vessel, increasing the time from making fast the tug to approaching the berth. The after tug can be used to reduce the speed of the vessel and the vessel's engine can still be used to maintain steerage, but be aware that the propeller wash could cause the after tug some difficulties.

### **9.2 Tilbury Lock**

Inward vessels should take their tugs in Gravesend Reach and communicate on VHF Ch 04 with Tilbury Lock and VHF Ch 15 with the tugs.

A flood tide approach is normally made by swinging the vessel off Northfleet Hope Container Terminal and approaching close to Tilbury Lock upper lead in arm. The positioning of tug(s) is dependent on the manoeuvring characteristics and the manoeuvring aids of the vessel involved, and thus the resultant tug allocation guidance.

An ebb tide approach to the lock is normally made close to and landing on the lower lead in arm, before swinging into the lock at slow speed. If a single tug is used in this manoeuvre, it is normally made fast aft to assist lifting the stern up against the ebb tide. If a second tug is taken, it would normally be used at the bow of the vessel.

Ebb tide berthing at Tilbury Lock is generally only allowed for vessels up to 166 metres or 8.0 metres draught. Any potential exceptions to this rule must be discussed with the Duty Port Controller and the Tilbury Dockmaster in advance of the vessel's arrival.

### 9.3 Northfleet Hope Container Terminal – Tilburyness

The strong tidal flows around Tilburyness have resulted in a number of incidents where ships departing the container terminal have failed to successfully negotiate the bend. Some of these incidents have resulted in vessels making contact with berths on the south side of the River. The effect is particularly pronounced when vessels are departing on the flood tide.

When a vessel, berthed head down, is departing on a flood tide from the container terminal using tugs, and a strong tidal counter flow is present off the berth, it is strongly recommended that the tugs are retained until the vessel has fully entered the stream.



## SECTION TEN - COMMON HAND SIGNALS

The following hand signals are in common use:

1. An outstretched arm with hand open and flat, being waved downwards means "slack off".
2. A sharp upward movement of the arm with the hand cupped towards the signaller means "let go" or "cast off".
3. Crossed arms in front of the body means "make fast" or "is made fast".
4. A circular movement of the hand above the head means "heave away".
5. Both hands raised above the shoulders, with open hands facing forward means "stop".
6. A raised hand with the fist being clenched and unclenched means "heave or hoist slowly" (inching).



## **SECTION ELEVEN – FURTHER GUIDANCE AND ADVICE**

Further guidance and advice can be found in the following publications:

- Tug Use in Port: A Practical Guide – Nautical Institute
- Recommendations for Ships' Fittings for use with Tugs – OCIMF
- The Shiphandlers Guide – Nautical Institute
- Current relevant Merchant Shipping Notices
- Code of Safe Working Practices for Merchant Seamen
- Management of Health & Safety at Work Regulations 1999
- Current relevant Merchant Shipping Acts
- Code of Practice for the Safe Mooring of Vessels on the Thames - PLA

### Acknowledgements

The PLA wishes to extend its thanks to all those involved in the review and consultation exercises undertaken during the development and subsequent revisions of the tug allocation tables and the further development of the Code. We are particularly grateful to those Pilots, Tugmasters, Boatmen, Berth Operators and others who contributed text and photographs.

Selective guidance and advice from several of the above publications has been used in this Code of Practice.

## **PART TWO**

# **GUIDELINES FOR THE UTILISATION OF SHIP TOWAGE TUGS ON THE THAMES**

### **SECTION ONE - INTRODUCTION**

These guidelines were first established in 1993, following extensive consultation with a wide cross-section of river users and terminal operators, and in the light of technical advice from British Maritime Technology.

They remain appropriate and relevant to shipping operations on the tidal Thames today. The criteria align very closely with the guidance and data published in Nautical Institute publications, such as: Tugs Use in Port, The Work of the Harbourmaster, and The Shiphandler's Guide.

Further refinements have been introduced with this edition, e.g. to take greater account of current developments in manoeuvring aids and ship design; and to introduce a consistent format to the tug allocation tables by replacing the deadweight referenced tables with the standard length, draft and manoeuvring aids criteria.

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## SECTION TWO – APPLICATION OF THE GUIDELINES

It is not intended, subject to the requirements of specific named Berth Owners (see below) that the Guidelines be regarded as a rigid set of rules that must be followed on all occasions. The final decision on the number of tugs to be used must rest with the Master of the vessel, in consultation where appropriate, with the Pilot and/or the Port of London Authority (PLA) Duty Port Controller (DPC), who will take account of the particular exceptional circumstances, including the prevailing weather and tidal conditions.

**It should be noted however, that in cases where the vessel Master refuses to accept the Pilot's, or in advance of the Pilot being embarked, the Duty Port Controller's advice in respect of the number of tugs required to facilitate a safe operation, the Harbour Master may impose the required number of tugs by Special Direction. These tugs will be for the owner's account.**

The purpose of these Guidelines is to ensure, so far as possible, safe ship manoeuvring operations. Any advice given by a Pilot, DPC or by the Harbour Master asking a vessel Master to comply with the Guidelines will be given on that basis and against significant experience and knowledge of local conditions and operating parameters.

In establishing the Guidelines, the following assumptions have been made:

- (a) The vessel receiving ship towage assistance in manoeuvring is a normally responsive vessel with all mechanical equipment in proper working order;
- b) The weather conditions are favourable;
- c) The tidal conditions are advantageous;
- d) There is no adverse local vessel traffic activity or effect;
- e) All manoeuvring aids in full working order and producing the power advertised; and
- f) Any bow and stern thrusters are fully operational, suitably immersed and delivering their full rated output.

**Note:** *Thrusters on a common hydraulic line with deck machinery are known to be badly affected when winches are operated, and therefore will make the vessel unable to comply with f) above.*

This Part also serves to provide guidance to Agents and others involved with the programming of shipping that will enable them to plan safe and efficient operations within the Port of London. Ships' Agents are not in a position to make judgements on behalf of the vessel Master, on the number of tugs allocated to a vessel.

If vessel Masters and/or Ships Agents have any queries regarding the allocation of tugs or the number of tugs to be allocated as identified by the Code, they must discuss these questions with the Duty Port Controller at London VTS, Gravesend. If necessary, the DPC will seek the advice of the Pilot allocated to the vessel, or if need be, the Harbourmaster.

### **Mandatory Requirements**

Berth owners and operators may continue to impose their own tug requirements for vessels using their terminals, which are equivalent to or in excess of those identified in this Code of Practice.

**The operators of the berths listed below require that the provision of the Guidelines be adhered to in respect of vessels manoeuvring at their facilities.**

#### **North**

Calor  
Oikos  
Coryton (Thames Oil Port)  
S Jetty (Shell)  
London Gateway Port  
Tilbury Landing Stage  
Tilbury Ro-Ro  
Tilbury Lock  
Northfleet Hope Container  
Terminal  
Tilbury Grain Terminal  
Grays  
Vopak  
Thames Refinery

#### **South**

Northfleet Thames Terminal  
Bevan's  
Tower Wharf  
Littlebrook Power Station  
Victoria Deep Water  
London Cruise Moorings:  
- Greenwich Ship Tier  
- Tower Bridge Upper (HMS Belfast)



- Notes:**
1. *Tate & Lyle requires any vessel sailing from Thames Refinery **stern to tide**, having a length overall of between 130m and 149.9m, be provided with an additional tug over and above the Code of Practice guidelines.*
  2. *Vopak requires that, in addition to the provisions of the Tug Allocation Tables, vessels of 100m LOA with no manoeuvring aids, and vessels of 128m LOA or 8m draft with any type of manoeuvring aid, require a minimum of one tug.*

## **Tug Assessments**

### Assessments for Reduced Tug Allocation

If the Berth Owner/Operator is in agreement, a vessel owner/operator whose vessel has good manoeuvring capabilities and characteristics and which regularly visits the Thames may apply to the Harbour Master to have the vessel assessed to reduce the number of tugs allocated to it under reasonable weather and tidal conditions.

Only the following Berth Owners/Operators are willing to allow Tug Assessments for ships calling at their facility:

Calor Gas Terminal	Northfleet Thames
London Gateway Port	Tower Wharf
Tilbury Landing Stage	
Tilbury Ro-Ro	
Tilbury Lock	
Northfleet Hope Container Terminal	
Tilbury Grain Terminal	

With the exception of vessels using Tilbury Lock (see below) individual vessels will be limited to a maximum of two such assessments – one for berthing and one for an un-berthing operation. During an assessment the vessel will have the recommended number of tugs available but the Pilot, with the agreement of the Master, given reasonable conditions and within the bounds of safety, will endeavour to use fewer tugs. He will then submit a report to the Harbour Master on the safety of the operation, including how the vessel handled. Recommendations for future tug allocation will then be based on the outcome of the assessment.

Applications for a reduced tug allocation assessment must be made in writing, by email to the Lower District Harbour Master ([LowerDistrictEnquiry@pla.co.uk](mailto:LowerDistrictEnquiry@pla.co.uk)) who, subject to agreement by the Berth Owner/Operator, will arrange for the nominated vessel to be assessed - generally on its next visit.

### Maximum Reduction in Tug Allocation

Any vessel that has already been assessed and had a tug reduction approved will not be assessed for a further reduction in tug allocation, except in exceptional circumstances and if a highly manoeuvrable vessel, and as agreed by the Harbour Master and the Berth Owner/Operator.

### Tilbury Lock

In the case of vessels using Tilbury Lock, assessments will be limited to four - that is, one assessment each for docking on the flood and ebb tides; and one assessment each for un-docking on the flood and ebb tides.

### London Gateway Port

Assessments for a reduced tug allocation for vessels using London Gateway Port will be undertaken only for vessels less than 320m LOA and/or 13.5m draught, but not for vessels at or above those criteria – i.e. Ultra Large Container Ships (ULCS) as defined by the PLA.

**Note:** *This decision will be reviewed in the future, once pilots have gained good operational experience in handling the ULCS in a wide range of tidal and weather conditions as part of a future review of the London Gateway Port tug allocation tables.*

### Tug Assessment Validity

Tug Assessments will be valid for up to five years, but no longer than three years from the vessel's last visit to the port. At that point a new tug assessment will be required.

Where a vessel that has a reduced tug allocation undergoes any significant changes to its manoeuvring ability, a further tug assessment will be required.

### Sister Vessels

Tug Assessments will normally only be valid for individual vessels. The Harbour Master will consider (following an application in writing) a request to apply the results of a Tug Assessment to a 'sister' vessel, subject to the vessel's machinery, equipment and manoeuvring characteristics being the same as that already assessed.

## Tilbury Grain Terminal – Inner Berth

The construction of the extension to the Northfleet Hope Container Terminal (NHCT) impacted on larger vessels berthing and unberthing at the Tilbury Grain Terminal - Inner Berth. It is acknowledged that the limited area available to the rear of the Tilbury Grain Terminal jetty restricts the use of tug assistance for ships manoeuvring to and from the Inner Berth.

Pilots now adhere to the requirement that vessels of over 90 metres LOA manoeuvring to and from the Tilbury Grain Terminal - Inner Berth should take a suitable PLA licensed 'ship towage tug', particularly when there is a large vessel moored alongside the NHCT Upper Berth. The table below indicates when this requirement may be relaxed.

	Vessel Length (LOA)		
	0-90m	90-100m	100-128m (max)*
No Manoeuvring aids	NIL	1 TUG**	1 TUG**
CPP & Enhanced Rudder	NIL	NIL	1 TUG**
Bowthruster but no CPP or Enhanced Rudder	NIL	NIL	1 TUG**
CPP, Enhanced Rudder & Bowthruster	NIL	NIL	NIL

**Notes:** \* Agents and Masters wishing to arrange for the berthing/unberthing of a vessel of over 128 metres must consult the Duty Port Controller and the Duty River Pilot.

\*\* A suitable PLA licensed 'ship towage tug' as listed in the appropriate Notice to Mariners is adequate for manoeuvring under most circumstances

In addition, vessels of over 100 metres LOA, not employing a Pilot, should also take a tug unless they have been properly assessed for exemption from taking a tug and have adequate manoeuvring aids.

## **Barking Creek**

Some vessels trading to berths in Barking Creek are very close to, or at the physical limits in terms of length and/or draught, which allow a vessel to transit the Creek, manoeuvre and swing safely for the berth. In some cases, these operations require tug assistance.

The use of tug assistance in Barking Creek is necessarily restricted by the confined nature of the area, the draught limitations imposed by the Creek itself and the cill depth of the Barking Creek Barrier.

Access for vessels to and from the Creek is limited to a short period over the high water. For most wind conditions of under Force 5 an attendant suitably (PLA) licensed workboat of 120 horsepower is adequate to assist (without connecting a tow line) by pushing in, swinging and manoeuvring. A workboat is of particular help in pushing a vessel away from a berth.

In conditions where a vessel is being manoeuvred in the Creek in a wind of over Force 5 from directions south through to west, and particularly when leaving the Creek stern first, it is strongly recommended that a suitable tug licensed by the PLA as a 'ship towage tug' is employed. Due to depth limitations in the Creek the tug should have a draught of no more than 4.0 metres.

## **SECTION THREE - NOTES TO THE TUG ALLOCATION TABLES**

### **Part A – River Berths: London Bridge to Sea Reach No. 7 Buoy**

Any windage must be allowed for separately using the formula / table and indicative diagram included in Part E.

### **Part B - Northfleet Hope Container Terminal**

These three-part tables use an indicative bollard pull of 50 tonnes. Table 4 additionally identifies the necessary augmentation of towage or the need to abort the manoeuvre due to wind conditions.

### **Part C - Tilbury Lock**

### **Part D – London Gateway Port**

The specified tug allocations are mandatory at these facilities.

### **Part E – Allowances for Wind**

The Guidelines include a table and indicative diagram to take account of windage. High-sided vessels may require additional tugs when manoeuvring in strong winds. The windage table and accompanying indicative area of a large container vessel should be used in conjunction with the main tables as a guide to determine what additional bollard pull might be required in strong wind conditions.

Also included is a useful formula for calculating the total bollard pull requirement for varying wind conditions.

### **Part F – Table of Equivalences**

Contains Kw and bollard pull equivalents for the upper figure of each horsepower range used in the Guidelines.



## SECTION FOUR – USING THE TUG ALLOCATION TABLES

### Step 1

Turn to the appropriate Part (A-D) dependent upon the destination or departure berth and/or the vessel type and size.

### Step 2

Using Table 1, identify the Ship Type Code as defined by the vessel's length overall and draught.

### Step 3

Take the Ship Type Code from Table 1 and the vessel's operational manoeuvring aids to establish the Manoeuvring Aids Allowance Code in Table 2.

### Step 4

Table 3 will then identify the number of tugs required as defined by the *Manoeuvring Aids Allowance Code* and the nature of the manoeuvre.

### Step 5

Where relevant, Table 4 provides an augmentation to towage requirements due to wind conditions. Part E provides an estimated allowance for windage and also a useful formula for calculating the bollard pull required in varying wind strengths.

- Notes:**
1. *Not all vessels have the Safe Working Load (SWL) marked on bollards used for towing. In all cases, the SWL of ships' bollards should be compared with the potential bollard pull of the tug(s) employed in order to avoid overloading the ship's equipment.*
  2. *Additional tables (Table 4) are included in Parts B and D for Northfleet Hope Container Terminal and London Gateway Port regarding allowance to be made in the number of tugs allocated, for wind speed and direction.*

## SECTION FIVE – TUG ALLOCATION TABLES

### PART A - RIVER BERTHS: LONDON BRIDGE TO SEA REACH No.7 BUOY

TABLE 1 - SHIP SIZE CODE

LOA (m)	Maximum Draught (m)										
	Up to 5m	Up to 6m	Up to 7m	Up to 8m	Up to 9m	Up to 10m	Up to 11m	Up to 12m	Above 12m		
Up to 99.9	A	A	A	A	-	-	-	-	-	-	-
100 to 109.9	B	B	B	B	C	C	-	-	-	-	-
110 to 139.9	C	C	C	C	C	D	-	-	-	-	-
140 to 149.9	C	C	C	C	D	E	E	E	E	E	E
150 to 169.9	D	D	D	D	E	E	E	E	E	E	E
170 to 179.9	E	E	E	E	E	E	E	E	E	E	E
180 to 199.9	E	E	E	E	F	F	F	F	F	F	F
200 to 219.9	E	E	E	F	F	F	G	G	G	G	G
220 to 239.9	E	E	E	F	F	G	G	G	G	G	G
240 and above	F	F	F	F	F	G	G	G	G	G	G

RIVER BERTHS: LONDON BRIDGE TO SEA REACH No. 7 BUOY

TABLE 2 - MANOEUVRING AIDS ALLOWANCE CODE

Ship Size Code from Table 1

Manoeuvring Aids	A	B	C	D	E	F	G
No Manoeuvring Aids	S	T	U	V	W	X	
Controllable Pitch Propeller and/or Enhanced Rudder	S	S	U	V	W	X	
Twin Screw, Enhanced Twin Rudder & Bow Thruster (Min1200hp)	S	S	T	T	T	V	W
Bow Thruster - Maximum Power (100hp ≈ 1.1t)							
Up to 499hp (372Kw)	S	T	U	V	W	X	
500hp to 999hp (745Kw)	S	S	T	U	W	W	
1000hp to 1499hp (1118Kw)	S	S	T	T	V	W	
1500hp to 1999hp (1491Kw)	S	S	T	T	U	W	
2000hp and above	S	S	T	T	U	U	
Bow and Stern Thruster - Maximum Combined Power							
1500hp (1118Kw) and above	S	S	S	T	U	U	W



RIVER BERTHS: LONDON BRIDGE TO SEA REACH No.7 BUOY

TABLE 3 - NUMBER OF TUGS REQUIRED

Manoeuvring Aids Allowance Code from Table 2							
Location and Operation		S	T	U	V	W	X
Tower Bridge Moorings & George's Stairs Tier	Berth	0	0	1	1	-	-
	Berth (S)	0	1	1	2	-	-
	Sail	0	0	1	1	-	-
	Sail (S)	0	1	1	2	-	-
London Bridge to Margaretness	Berth	0	0	1	1	2	-
	Berth (S)	0	0	1	2	2	-
	Sail	0	0	1	1	2	-
	Sail (S)	0	0	1	2	2	-
Margaretness to Sea Reach No. 7 Buoy	Berth	0	0	1	1	2	2
	Berth (S)	0	0	1	2	2	3
	Sail	0	0	1	1	2	2
	Sail (S)	0	0	1	2	2	3

Notes:

1. (S) = Swing necessary or manoeuvring stem to tide.
2. Vessels over 160m swinging into the West India Dock, Bellmouth and backing up to Greenwich **must** use 3 tugs, unless fitted with adequate manoeuvring aids and as agreed with the district Harbour Master.
3. Tug allocations for ships over 210m LGA navigating above the Thames Barrier are subject to the requirements identified in the associated risk assessment(s). The district Harbour Master must be consulted in such cases.
4. See Page 3 for additional requirements at Thames Refinery and Vopak.

**PART B - NORTHFLEET HOPE CONTAINER TERMINAL**

**TABLE 1 - SHIP SIZE CODE**

LOA (m)	Maximum Draught (m)									
	<6m	<7m	<8m	<9m	<10m	<11m	<12m	>12m		
110-159.9	A	A	A	A	B	-	-	-		
160-179.9	C	C	C	C	C	C	C	C		
180-190	C	C	C	D	D	D	D	D		
190-200	C	C	D	D	D	E	E	E		
200-220	C	C	D	D	E	E	E	E		
220-240	C	D	D	D	E	E	E	E		
240+	D	E	E	E	E	E	E	E		

NORTHFLEET HOPE CONTAINER TERMINAL

TABLE 2 - MANOEUVRING AIDS ALLOWANCE CODE

Manoeuvring Aids	Ship Size Code						
	A	B	C	D	E		
No Manoeuvring Aids	U	V	W	W	W		
Enhanced Rudder	U	V	W	W	W		
Bow Thruster Power (hp)							
500hp to 999hp (745Kw)	U	U	V	V	W		W
1000 to 1999hp (1491Kw)	T	T	V	V	W		W
2000hp and above	T	T	U	U	V		W
Bow and Stern Thruster Combined Power(hp)							
2000hp (1491Kw) and above	T	T	U	U	U		W

**TABLE 3 – NUMBER OF TUGS REQUIRED**

This table is based on the requirement for each tug to have a minimum tug bollard pull of 50 tonnes.

Manoeuvring Operation	Manoeuvring Aids Allowance					
	T	U	V	W		
Berth	0	1	1	2		-
Swing and Berth	0	1	2	2		-
Sail	0	1	1	2		-
Sail and Swing*	0	1	2	2		-

**Note:** Bow thruster/stem thruster ratings are for delivered power – where a shared power pack is used with other deck equipment, then the actual power may be decreased significantly

NORTHFLEET HOPE CONTAINER TERMINAL

TABLE 4 - AUGMENTATION OF TOWAGE REQUIREMENT DUE TO WIND CONDITIONS

Wind Speed - Constant and/or Gusts	Wind Direction			
	Southerly Quadrant	Northerly Quadrant	Westerly Quadrant	Easterly Quadrant
Less than 25 kts	Tug Allocation Tables Apply	Tug Allocation Tables Apply	Tug Allocation Tables Apply	Tug Allocation Tables Apply
Gusts over 25 kts	Tug Allocation Tables plus 1	Tug Allocation Tables plus 1	Tug Allocation Tables plus 1	Tug Allocation Tables plus 1
Gusts over 35kts	Abort Manoeuvre	Abort Manoeuvre	Abort Manoeuvre	Abort Manoeuvre
Gusts over 40 kts	Abort Manoeuvre	Abort Manoeuvre	Abort Manoeuvre	Abort Manoeuvre

**Reduction in towage requirement for vessels sailing**

The tug requirement can be reduced by one, provided the following conditions are satisfied:

1. The vessel LOA must be less than 225 metres;
2. The wind speed must be less than 15 knots;
3. The vessel must have an operational bow thruster of 1475hp/1100kW or more;
4. The vessel's draught is less than 10 metres;
5. The Vessel must be berthed head down; and
6. If unberthing on the ebb tide from the upper berth, the lower berth must be clear.

**Additional towage requirements for stern-to-tide berthing**

An additional tug will be required under the following circumstances:

1. The vessel is berthing stern to tide on the Upper Berth and Lower Berth;
2. The vessel's LOA is greater than 225 metres, or
3. The vessel's draught greater than 10 metres.

**PART C - TILBURY LOCK**

**TABLE 1 - SHIP SIZE CODE**

LOA (m)	FLOOD TIDE DOCKING & EBB AND FLOOD TIDE UNDOCKING							EBB TIDE DOCKING
	Maximum Draught (m)							Maximum Allowable Parameters – Either 8m draught or 166m LOA
	Up to 5m	Up to 6m	Up to 7m	Up to 8m	Up to 9m	Up to 10m	Above 10m	
Up to 99.9	A	A	A	A	B	B	-	A*
100 to 129.9	A	A	A	B	B	B	-	B*
130 to 139.9	B	B	C	C	D	D	-	C*
140 to 149.9	D	D	D	D	D	E	-	E*
150 to 199.9	D	D	E	E	E	F	-	E*
200 and above	F	F	F	F	F	F	F	-
235 and above, undocking stern first	G	G	G	G	G	G	G	-

**Note:** \*Agents and Masters arranging tug allocation for **Ebb Tide Docking** must consult the Duty Port Controller before final arrangements are made.

TILBURY LOCK

TABLE 2 – MANOEUVRING AIDS ALLOWANCE CODE

Ship Size Code from Table 1

Manoeuvring Aids	A	B	C	D	E	F	G
No Manoeuvring Aids	S	T	U	V	W	X	Y
Controllable Pitch Propeller and/or Enhanced Rudder	S	T	U	V	W	X	Y
Twin Screw, Enhanced Rudder & Bow Thruster (Min 1000hp)	S	S	S	T	U	V	Y
Bow Thruster - Maximum Power (100hp = 1.1t)							
Up to 499hp (372Kw)	S	T	U	V	W	X	Y
500hp to 1499hp (1118Kw)	S	S	T	U	V	X	Y
1500hp and above	S	S	T	U	V	W	Y
Bow and Stern Thruster - Maximum Combined Power							
Up to 1499hp (1118Kw)	S	S	T	T	V	X	Y
1500hp to 1999hp (1491Kw)	S	S	T	T	V	W	Y
2000hp and above	S	S	T	T	U	W	Y

**Note:** Bow thruster/stern thruster ratings are for delivered power – where a shared power pack is used with other deck equipment, the actual power may be decreased significantly.

TILBURY LOCK

TABLE 3 - NUMBER OF TUGS REQUIRED

Manoeuvring Aids Allowance from Table 2

Location and Operation		S	T	U	V	W	X	Y
Tilbury Lock	Docking	0	1	2	2	2	3	-
	Undocking	0	0	0	1*	2*	2*	-
	Undocking – Stern First	(235m LOA and above)			-	-	-	3

Notes:

- \* The PLA Duty River Pilot must be consulted before the Master or Agent arranges the sailing of a vessel exceeding 188m LOA or 29.5m beam on an ebb tide.
- \* Vessels in excess of 185m LOA should employ 2 tugs when undocking on spring ebb tides which are considered to occur on high waters predicted 12.00 to 16.00 and 00.00 to 04.00.



**PART D - LONDON GATEWAY PORT**

**TABLE 1 - SHIP SIZE CODE**

LOA (m)	Maximum Draught (m)										
	<6m	<7m	<8m	<9m	<10m	<11m	<12m	<13m	>13m		
110 - 129.9	-	-	A	A	B	-	-	-	-	-	
130 - 159.9	A	A	B	B	B	-	-	-	-	-	
160 - 199.9	A	B	B	B	C	C	C	C	-	-	
200 - 259.9	B	B	C	C	C	C	C	C	-	-	
260 - 299.9	C	C	C	D	D	D	D	D	E	E	
300 - 319.9	C	C	D	D	D	D	D	D	E	E	
320 - 349.9	C	C	D	D	D	D	D	D	E	E	
350 - 369.9	D	D	D	D	D	E	E	E	E	E	
370 and over	D	D	D	D	E	E	E	E	E	E	

LONDON GATEWAY PORT

TABLE 2 – MANOEUVRING AIDS ALLOWANCE CODE

Manoeuvring Aids	Ship Size Code				
	A	B	C	D	E
No Manoeuvring Aids	V	V	W	W	X
Enhanced Rudder	U	V	W	W	X
Bow Thruster – Maximum Power (hp)					
Up to 999hp (745Kw)	U	V	W	W	X
1000hp and above	T	U	W	W	X
Bow and Stern Thruster - Combined Power (hp)					
2000hp (1491Kw) and above	T	U	V	W	X

**TABLE 3 – NUMBER OF TUGS REQUIRED**

Manoeuvring Operation	Manoeuvring Aids Allowance					
	T	U	V	W	X	
Berthing – No Swing	0	1	1	2	2	
Swing to Berth	0	1	2	2	3	
Sailing – No Swing	0	1	1	2	2	
Sailing with a Swing*	0	1	2	2	3	

**Notes:**

1. Bow thruster/stem thruster ratings are for delivered power – where a shared power pack is used with other deck equipment, the actual power may be decreased significantly.
2. This Table is based on the requirement for each tug to have a minimum bollard pull, as follows:
  - a) for vessels up to 250m LOA and/or 12.0m draught - 60 tonnes bollard pull;
  - b) for vessels up to 320m LOA and/or 13.5m draught - 60 tonnes bollard pull; and
  - c) for vessels over 320m LOA and/or 13.5m draught - 80 tonnes bollard pull.
3. An additional tug may be necessary in circumstances where the vessel is required to manoeuvre stem to tide or in high wind conditions; (See also Table 4 below), and must be considered as part of the dynamic risk assessment at the time.
4. Notwithstanding the tug allocation requirement for vessels over 320m LOA and/or 13.5m draught (Ship Code 'X') of 2 tugs for No Swing, 3 tugs for a Swing, should it be deemed necessary through circumstances at the time that an additional (3rd or 4th) tug is required, that tug should normally have a minimum BP of 70 tonnes.

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TABLE 4 - AUGMENTATION OF TOWAGE REQUIREMENT DUE TO WIND CONDITIONS

Wind Speed - Constant and/or Gusts	Wind Direction		
	South West Quadrant	South East Quadrant	North East Quadrant
Constant - Less than 25 kts	Tug Allocation Tables Apply	Tug Allocation Tables Apply	Tug Allocation Tables Apply
Gusts over 25 kts	Tug Allocation Tables Apply	Tug Allocation Tables Apply	Tug Allocation Tables Plus 1 Tug
Gusts over 35kts	Tug Allocation Tables Plus 1 Tug & Dynamic Risk Assessment	Tug Allocation Tables Plus 1 Tug	Tug Allocation Tables Plus 1 Tug & Dynamic Risk Assessment
Gusts over 40 kts.	Tug Allocation Tables Plus 1 Tug & Dynamic Risk Assessment	Tug Allocation Tables Plus 1 Tug & Dynamic Risk Assessment	Tug Allocation Tables Plus 1 Tug & Dynamic Risk Assessment

**Note:** High Winds – Dynamic Risk Assessment

Subject to the conditions at the time and the size of the vessel involved, the decision to continue with the manoeuvre will be determined by the associated dynamic risk assessment and will involve all relevant parties i.e. the Master, Pilot, Duty Port Controller and the Berth.

## PART E

### ALLOWANCES FOR WIND

The formula below can be used to calculate the total power bollard pull required to assist a vessel in varying wind strengths.

$$\text{Required Bollard Pull (Kg)} = 0.08 \times A \times V^2$$

Where: A is the wind area of the vessel in m<sup>2</sup>; and

V is the wind speed in m/sec

Figures 1 - 3 shown below, provide an indication of the lateral wind forces that might be experienced by high-sided vessels, including tankers and container ships in varying wind conditions.

[All figures are reproduced by kind permission of the Nautical Institute]

Fig 1

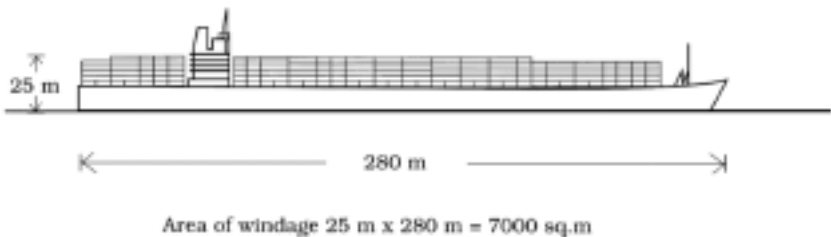


Fig 2

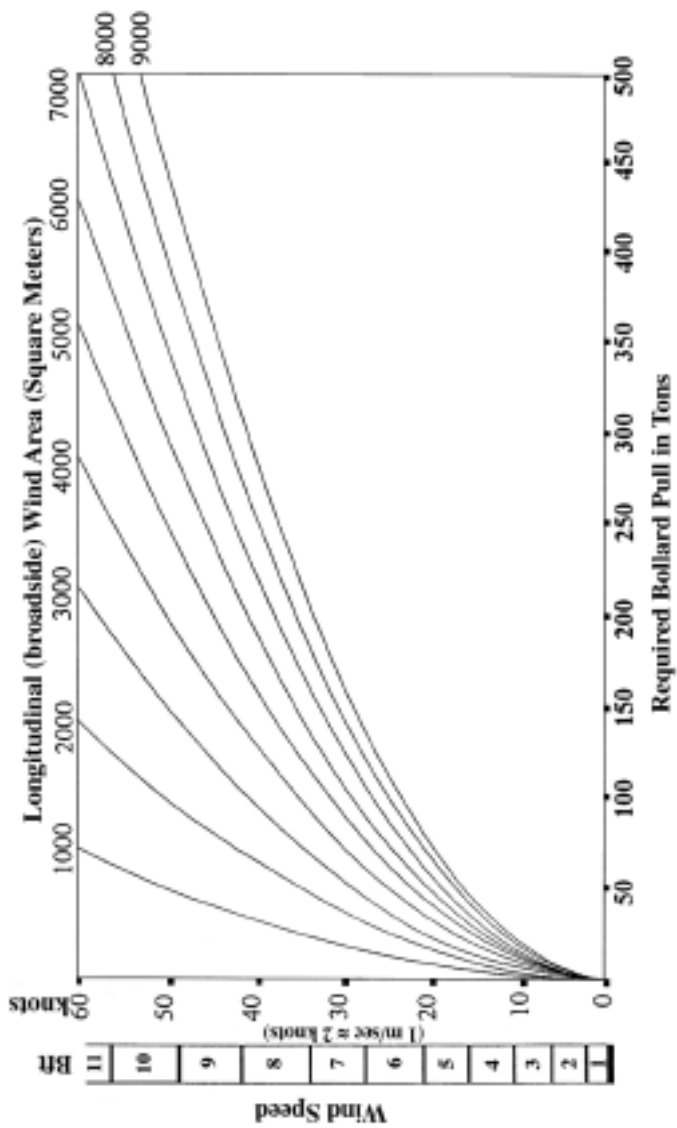
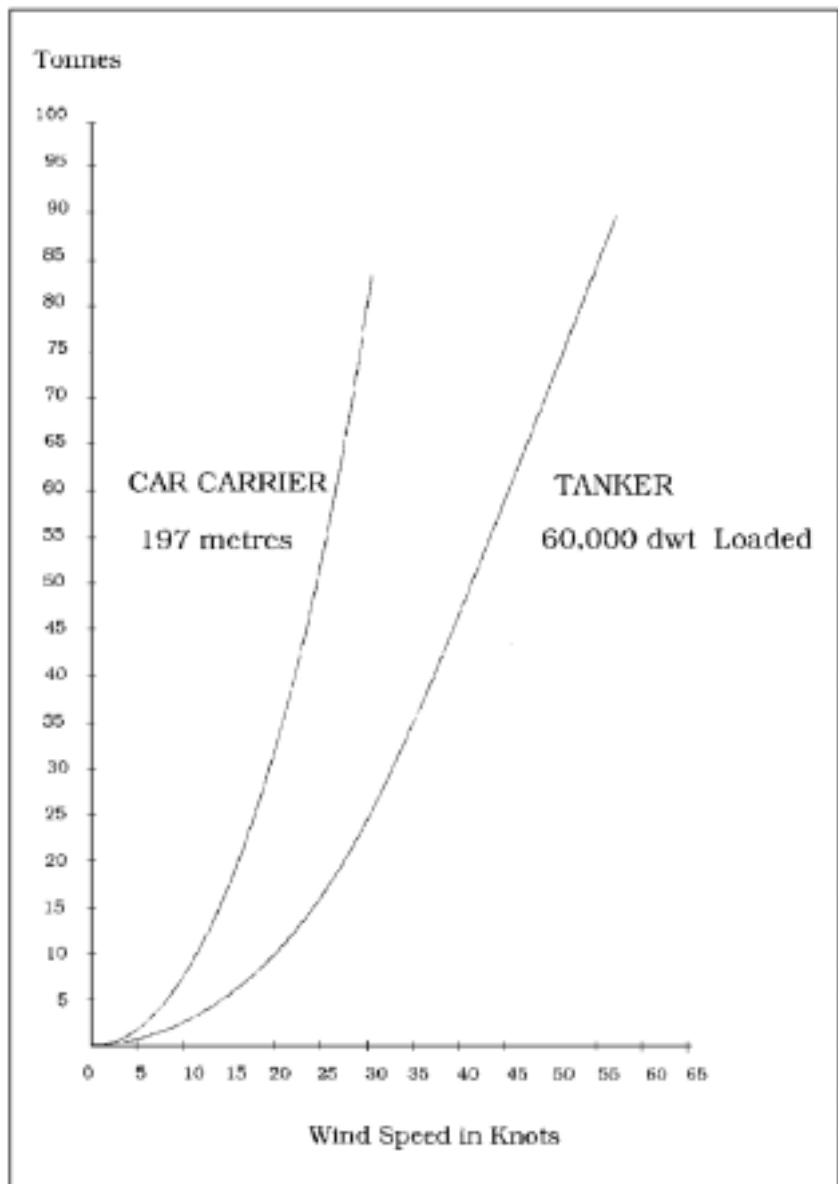


Fig 3



**PART F - TABLE OF EQUIVALENCES: HORSE POWER / Kw / BOLLARD PULL (Approximate)**

Horse Power	Kw	Bollard Pull (t)
499	372	5.5
999	745	11.0
1499	1118	16.5
1999	1491	22.0
2499	1864	27.5
2999	2237	33.0



# NOTES



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