Towage Guidelines

Port of Clydeport

November 2024

Document Information

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Introduction

The guidelines have been developed to enhance the safety of marine towage operations within Clydeport and provide a framework to enhance communications and teamwork between towage operators, tug masters, pilots, and the Harbour Authority.

Definitions

Vessel – means a ship, boat, houseboat, raft or water craft of any description, however propelled or moved, and includes non-displacement craft, a jet bike, a personal water craft, seaplanes on the surface of the water, a hydrofoil vessel, a hovercraft or any other amphibious vehicle and any other thing constructed or adapted for floating on or being submersed in water (whether permanently or temporarily)[1].

LOA - Vessel Length Overall. When calculating Vessel Length Overall (LOA), in respect of ship assist towage (where the Authorised Pilot is piloting the vessel), the LOA will not include the tugs and associated lines. In respect of project towage or dead tows, the LOA means the distance from the forward end of the towing vessel to the stern of the last vessel or object being towed (including tow lines).

Ship Assist Towage - or assisting vessels under way, typically during entering or leaving and/or shifting berth within a harbour. This may only be conducted where an Authorised Pilot is piloting the vessel

Dead Tows - assisting vessels without propulsion.

Project Towage - including unique vessels and/or cargo which require advance, in-depth consultation, with Clyde Marine Managers.

Harbour Tugs - Tugs authorised by the Harbour Authority to conduct towage assist and or Dead Tows within the Harbour

Sea Tugs – specialised tugs for sea passage of vessels with or without propulsion required for passage to/from a port/facility outside of Clydeport jurisdiction.

Non-Routine Towage – towage of a structure such as a rig, fish farm pens/barges etc

[1] The Clydeport (COP 26 etc.) Harbour Revision Order 2021

Chapter 1 - Towage Governance and Recommendations

Towage Governance

The Port Marine Safety Code[2] (PMSC) requires ports to develop a method and criteria to approve tugs, workboats and operators working within their jurisdiction. Statutory Harbour Authorities (SHAs) must be satisfied that Tugs operating within their jurisdiction are able to do so safely. Clydeport, as the SHA facilitates this requirement through a Compliance Check. This assesses operational safety and support systems, including risk assessment, training, plans and procedures, operated by such organisations. It is designed to be simple and relevant to the operations carried out by each organisation and is intended to satisfy the requirements placed on the SHA by the Port Marine Safety Code (PMSC). However the Compliance Check in no way absolves the towage providers of their responsibilities to operate safely and in compliance with relevant rules, regulations, standards and industry best practice.

Licensing Requirements

- The Clyde Port Authority Order Confirmation Act 1965 includes the following provisions related to tugs and towage:
    - Section 17 – authorises Clydeport to own and operate tugs and undertake towage services.
    - Section 18 authorises Clydeport to license tugs from time to time, charge a fee not exceeding £5 for granting a licence.
    - Section 93 authorises Clydeport to make Byelaws for regulating the use of tugs.
- The Clydeport (COP 26 etc.) Harbour Revision Order 2021, Article 5(1)(k) authorises Clydeport to issue General Directions regulating the use of tugs; however, no such Directions have been issued to date.

A list of harbour towage providers registered to undertake ship assist, project and dead tows within the SHA are available on the Towage section of the PPG Website https://www.peelports.com/marine/our-ports/clydeport

Towage Matrix

Clydeport's Towage Matrix ("the Matrix") is a live standalone document which sets a baseline requirement for minimum towage for vessels bound for specific locations within the Port. It is kept under constant review, based on the commercial traffic patterns within the port and from Industry wide learning and recommendation. It is underpinned by Risk Assessment, Pilot and Tug Master experience and is the default setting. Any deviation from the Matrix requires prior approval of the Clyde Marine Managers as described in the Matrix (Instructions). The Matrix can be found on the PPG website https://www.peelports.com/marine/our-ports/clydeport

The Matrix is derived from risk assessment, specific to each berth, maximum length and beam of vessels and assessed towage configuration. Draft, bow thruster, predicted tide times and predicted wind limits are also considered. These criteria have been incorporated into the

[2] Port Marine Safety Code

Matrix which should be followed for Portlinks bookings and towage assignment by the shipping agent/vessel.

It should be noted that advice within these guidelines is based on the following assumptions:

- When calculating Vessel Length Overall (LOA), in respect of routine/ship assist towage (where the Authorised Pilot is piloting the vessel) the LOA will not include the tugs and associated lines;
- In respect of general towage, project towage, non-routine or dead tows, the LOA means the distance from the forward end of the towing vessel to the stern of the last vessel or object towed;
- When piloting in the river, where a vessel's Deadweight (for ship assist towage) is less than 25,000t, an Authorised Pilot has discretion to require a Pilot Assistant;
- When piloting in the river, where a vessel's Deadweight (for ship assist towage) exceeds 25,000t, an Authorised Pilot and a Pilot Assistant will be required;
- When piloting in the river, where the LOA exceeds 185m but the Deadweight is less than 25,000t, an Authorised Pilot and a Pilot Assistant will be required;
- When piloting in the CHA area, non-routine or dead tows where vessel or object Length Overall is greater than 120m the Authorised Pilot has discretion to require a Pilot Assistant;
- A "Pilot Assistant" is a second Pilot required on board a vessel as described above. A Pilot Assistant must be an Authorised Pilot but need not be authorised for the particular size of vessel involved. Where possible the pilot assistant will not be lower than 1 full grade.

Deviation from the Towing Matrix

The Master of a vessel may consider the towage requirements in the Matrix are more or less than is needed for their vessel. The Master and Pilot(s) can discuss (generally during the inbound passage) a towage exemption from the Matrix and the Master can request to Clyde Marine Managers for an approval (directly or via the Agent). Clyde Marine Managers and assigned Pilot(s) will consult. The Clyde Marine Manager will decide to grant or deny the request.

In assessing any variation from the Towage Matrix, the following points will be taken into consideration, namely:

- The berth (and adjacent shipping if applicable)
- The complexity of the manoeuvre
- Vessel design (standard/unusual)
- The length of the vessel
- The draft of the vessel
- The handling characteristics of the vessel
  - Manoeuvring aids – thrusters, size and number
  - Type of propulsion system – controllable pitch, fixed pitch, or azimuth
  - Type of steering system – single or twin rudders, high-lift or standard
  - Type of main engine – air start, diesel electric, gearbox
- The windage area of the vessel (and on deck cargo if applicable)
- The minimum under keel clearance during the planned passage transit
- Range of the tide on the date in question – springs or neaps
- Expected environmental conditions/weather forecast
- The Gross Registered Tonnage (GRT) in relation to the vessel's principal dimensions

- Any reported defects to the vessel
- Availability of line handlers

Qualifications

National certification of tug crew is set by the Maritime and Coastguard Agency in accordance with the PMSC and The Guide to Good Practice. All crew must meet these requirements and tugs must be safely and adequately manned. Clydeport Harbour Tug masters are STCW qualified.

Experience

Operators of harbour registered tugs shall ensure that their crews are trained with a sound understanding of the tugs they operate, relevant towage techniques and the area in which they operate. Through the Compliance Check, the SHA satisfies the towage provider crews meet this requirement.

Training/Education of Pilots with regards to Towage operations

In line with National Occupational Standards, Pilots are trained by the SHA to work with various tugs that operate as harbour tugs on the Clyde.

Working Hours

All tug crew members must be properly rested in line with the recommendations of national and international legislation. Please see HSE Working Time Directive[3].

Personal Protective Equipment

Personnel on exposed decks are to, at all times wear appropriate personal protective equipment ("PPE"), including hazardous duty (working) lifejackets, in line with the tug operator's current risk assessment. It is the Tug Master's responsibility to enforce the wearing and use of PPE[4].

Pilot Exemption Certificate (PEC) Requirements

Pilot Exemption Certificate (PEC) holders are not permitted to move their vessel when in a non-propelled status using tugs without a pilot being present. However Master's may use a tug in emergency (passive – not on a line) after consultation with Clyde Marine Managers and the towage provider.

Automatic Identification Signal (AIS) on vessels

Registered tugs (including work boats) must have an Automatic Identification (AIS) unit fitted to work in any of the Peel Ports SHAs.

All towing vessels must be fitted with operational AIS and transmitting during the towage operation, including when at anchor. AIS is not a substitute for keeping a proper lookout or navigating in accordance with the Rules. If AIS equipment becomes defective, Estuary Radio must be informed immediately on VHF Ch12. Thereafter, update to be provided to Estuary Radio (LPS) every 30 minutes on position course and speed. This will enable a manual injected track to be generated and assist the LPS operator to give other vessels accurate traffic information.

Charts of local area

[3] EUR-Lex - 31999L0063 - EN - EUR-Lex (europa.eu)

[4] Code of Safe Working Practices for Merchant Seafarers, 2015 edition – Incorporating Amendment 3, October 2018, Para 30.6.1 – 6.4

Towing vessels must carry the appropriate charts for their area of operation and should have an electronic chart plotter, with up-to-date chart corrections. Clydeport survey charts (in .pdf format) of sections of the River and in some areas on the Firth of Clyde are available to download from the Peel Ports website, in the Marine Information/Clydeport section, under Hydrographic Information (https://www.peelports.com/marine-information?port=clydeport)

Berthing and Unberthing; Tidal flow considerations

When berthing and unberthing, due consideration should be given to tidal flow effects, especially in Spring tides or during periods of, or just after, heavy rainfall. Timings as indicated in the Towage Matrix should be considered as guidance, but for any riverside berth East of No1 buoy, berthing and unberthing on the last 2 hours of the ebb tide should be avoided. Likewise, entering/leaving the Great Harbour, Rothesay Dock, KGV Basin and any other basin off the River Clyde on the last 2 hours of the ebb needs careful consideration.

Chapter 2 - Preparing for Towage Operations

Planning and Co-ordination

Before towing operations commence, a plan should be agreed by the Vessel Master and Pilot in consultation with the Tug Master. This should take account of all relevant factors, including tide, wind, visibility, ship size, type and characteristics, and specific berth requirements.[5] The Pilot is to ensure he has a sound knowledge of the tug's capabilities and limitations. The Pilot and Master are to agree the tugs are suitable for the task and positioned correctly for the operation. The Pilot, Vessel Master and Tug Master must be in total agreement 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. Communication with the tugs will be through the Pilot. It is the duty of the Master/Pilot to ensure that the vessel is handled in a safe and controlled manner, having due regard to the safety of tugs deployed on the job.

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 cases, 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 (PPE).

Pilot Master Exchange

In addition to the standard information passed to the Pilot, Masters shall provide the Pilot with a general deck arrangement showing the layout and safe working load (SWL) of the mooring fittings, where known, and inform him/her about:

- Fairleads, chocks, bollards and strong points that can be used for the towing operation.
- 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).
- Any special features (i.e. controllable pitch propellers, thrusters, Azimuths etc).
- All bollards should be marked with the SWL and a mooring equipment plan be available on request.

It is recognised that providing a deck arrangement plan formally is not always practicable. Pilots and Masters shall verbally exchange that information at the earliest opportunity and pass that information to the tug master where relevant.

Note: Using ships' mooring lines as towlines is not recommended. Towage providers should not operate with ships' lines; unless an emergency. If so, the Pilot and Master should confirm that the strength of the mooring line is in accordance with the tug's towing forces. If this is not the case, then the tug's power must be limited to ensure the line does not part.

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 the tugs' lines

5 Clydeport Berth Information https://www.peelports.com/marine/our-ports/clydeport

- The type of tug(s) to be used and their bollard pull(s)
- Maximum planned speed for the operation
- the method by which the ship's crew should heave and release the tug's towline;
- A dedicated crew member to monitor tug and tug's line during heave and release;
- Ship's crew to be instructed not to release the towline in an uncontrolled manner, which could result in injury to tug crew and/or fouling of propulsion units.
- The prohibition on the use of weighted heaving lines
- High risk areas during vessel transit (with respect to the possible use of the tug)
- Use and positioning of the tug(s) for berthing and manoeuvring.
- **Primary (tug working) VHF Channel 08 and secondary (Estuary Radio) VHF channel 12 for use in the operation**
- Tug Positions must be on the Master Pilot Exchange.

Pilot/Tug Master Exchange

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

- Clear understanding of responsibilities
- Method of communication - Please see the section covering Communications
- That the SWL of the vessel's chocks, bollards and strong points to be used in the operation and that they are fit for purpose.
- The tug hook up point, considering the prevailing weather & sea conditions.
- The planned (optimum) ship speed, when connecting to the tug.
- The maximum speed of the tug.
- If active escorting, the start point of the escorted passage
- Passage details in their entirety while accompanied by the tugs, 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 significant weather forecast/anticipated;
- Intended and emergency use of vessel's anchors;
- If appropriate, any shallow water or bank effect areas where significant surges may be
- experienced that may add to the tug's towline loads;
- The Tug Master shall advise the Pilot immediately if there is any reduction in the tug's operational characteristics, such as ability to manoeuvre, delivery of bollard pull or any other operational defect which could affect the tug's capabilities; and when confirming that the tug is fast and ready to assist, the Tug Master shall also confirm both the tug's name and position on the vessel
- Any further information deemed pertinent that has arisen from the Pilot/Master Exchange.
- If appropriate, any shallow water or tide effect areas where significant surges may be experienced, that might add to the tug's load.

PEC Holder and Tug Master

- Towage Assist is defined as lines being passed from vessel to tug. **PEC holders are not authorised to conduct Towage Assist in Clydeport.**
- However, in extremis, a Master may call for tug assistance to hold them onto a berth by pushing only. Where lines need to be attached to hold them off the berth, the services of an authorised pilot should be sought early on, if it is envisaged that there may be a requirement to do so due to inclement weather drawing in.
- Ultimately in a short notice emergency, the Master may wish to consider using a tug and attaching lines at short notice without pilot support and can do so, if the Master considers that its use without a pilot embarked would not exacerbate the situation.

Preparations onboard the Tug

Tug Masters are to ensure that all onboard pre-departure checks are completed before getting underway, all crew are fit and appropriately rested, adequately trained for the operation and wearing the correct PPE.

Mooring and towing operations inflict immense loads upon ropes or wires, gear and equipment. As a result, sudden failure in any part of the system may cause death or serious injury to personnel. During towing operations, Tug Masters shall employ a clear decks policy. Should the need arise for a crew member to go out onto the deck where there is no other alternative and/or for the sole purpose of the safety of the tug and its crew, then the tension on the line should be reduced to the absolute minimum for the duration of that activity.

Watertight Integrity

The watertight integrity of a tug should be maintained at all times. When the tug is engaged on any towage operation, all watertight openings should be securely fastened. The tug crew should avoid working below the waterline at this time.

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. The Pilot/Master is to inform the tug if they observe any exterior openings on the tug that are not closed, and which may affect the tugs' watertight integrity.

If entry is required through a hatch or door during towage operations, the Tug Master must be informed and the hatch or door closed immediately after use. Watertight doors are not to be left open, even if access is required for a short period of time.

Testing and Inspection of towing equipment

Towing hooks and alarm bells, where fitted, should be inspected regularly, preferably daily. The emergency-release mechanisms on towing hooks and winches should be tested, both locally and where fitted remotely, at frequent intervals as dictated by the towage operator to ensure correct operation.

All fixed and running gear including ropes shall 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 bitts etc. are used appropriately and within their design capabilities. All towing equipment in use should be inspected for damage before undertaking and after completing a tow. This is especially important with gob/gog ropes. Tug masters shall ensure they are fit for purpose and in good working order to ensure reliability. It is safety critical and will save your life.

Mooring winches and other equipment shall be maintained to the manufacturers' specifications and be properly serviced. Equipment such as heaving lines and messengers should be of appropriate length and strength. All equipment shall be checked before the start of each operation**.**

Dead Tows

'The Guide' requires Harbour Authorities to give special consideration to tows involving dead-ships or unusual objects and towage events of a non-routine nature. A dead ship is defined as a vessel in a condition under which the main propulsion plant, boilers and auxiliaries are not in operation due to the absence of power. Towing barges and dead ships by their nature requires careful consideration.

Ship-owners, towage contractors, tug masters, project managers and agents are further ADVISED that the person responsible for the safety and planning of the manoeuvre (and thereby acting as the Towing/Barge Master) must be clearly identified and be responsible for the production of risk assessments, method statements and passage plans which must be discussed and agreed in advance with the Harbour Authority. Once agreed, and before towing commences, a toolbox talk must be organised for all parties to discuss the operation and as a minimum include the tug master, barge master and pilot.

Unless otherwise agreed with the port authority, a barge/dead ship operation is to have a Tow Master (responsible person) to be in charge on board the barge/dead ship; this **must not be** the pilot. The Tow Master shall be suitably competent and experienced in barge operations and will have overall responsibility for the safety of the towage operation; the Pilot will have the conduct of the passage. The Tow Master must also be satisfied that all appropriate risk assessments are in place. The Tow Master will board the barge on arrival/departure (in the absence of an embarked individual) and will act as Tow Master who will remain responsible for the safety of the barge at all times.

Dead tow training is included within the Pilots training.

Towage Notification Form

All non-ship assist towage, non-routine or dead tows will require a Clydeport Tow Notification Form. This will not unreasonably be withheld but will require the involvement of marine managers and pilots in the authorisation. Early engagement to create sufficient time must be given for the tow plan to be reviewed. In the case of complex tows, a working group may be convened consisting of appropriately skilled personnel to ensure that all risks have been considered. When the details of the operation have been fully discussed and agreed, the written approval of the Harbour Authority will be given on this form. Complex operations will require information at least 3 weeks in advance to facilitate the planning process.

Submission of a Towage Notification Form and full Risk Assessment and Method Statements (RAMS) will be at least 48 hours in advance. Weekend or bank holiday towing operations require 72 or 96 hours submission respectively. The Tow Notification Form can be downloaded from the Peel Ports website.

Tow notification forms must be fully completed. Failure to complete this form in full will result in delays to processing and potentially additional costs incurred for the applicant.

Chapter 3 – Communications

VHF Communications between Parties

Any unclear messages should be questioned . Effective VHF communications are a vital component of safe towage operations. It is essential that all those involved in the towage operation within the harbour are able to communicate promptly and effectively throughout. Prior to towing operations, the Pilot, Master, Tug Master(s), Line handlers and Boatmen should agree the working VHF channel for the operation. Agreed plan and relevant information should be passed to all concerned.

Once VHF communications have been established, tested and 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 gain appreciation of progress during the operation.

It is important that effective communications are maintained between; the towing vessel, the Pilot, the bridge team, and the mooring decks of the vessel under tow. In all communications, clear identification of the parties communicating should be used to prevent misunderstandings. The Tug Master should be informed in advance of large course alterations or increase or reduction in speed.

In all communications, clear identification of the parties call signs should be agreed in advance and used to prevent misunderstandings. The Tug Master and Boatmen shall be kept informed of the proposed use of thrusters and anchors on the towed vessel and of engine movements and helm orders, as appropriate. Early warnings of intended course/engine changes should be given where possible.

VHF Channels

The Pilot is to ensure they communicate with Estuary Radio VHF Ch12 on commencement of any towing operation. The Tug Master shall always maintain, so far as possible, a listening watch on VHF channel 12 as well as the agreed Pilot/Tug working channel.

Pilot Instructions to the Tug

During towage operations it is very important that Pilots communicate unambiguously, clearly and easy to understand about all their intentions and requests/instructions to the assigned tugs.

Clyde Pilots ordinarily use the following instructions for power:

No Weight
Minimum
10%
25%
50%
75%
Full

For direction, this can depend on the berth, but generally it is either use of direction relative to the vessels position or cardinal marks:

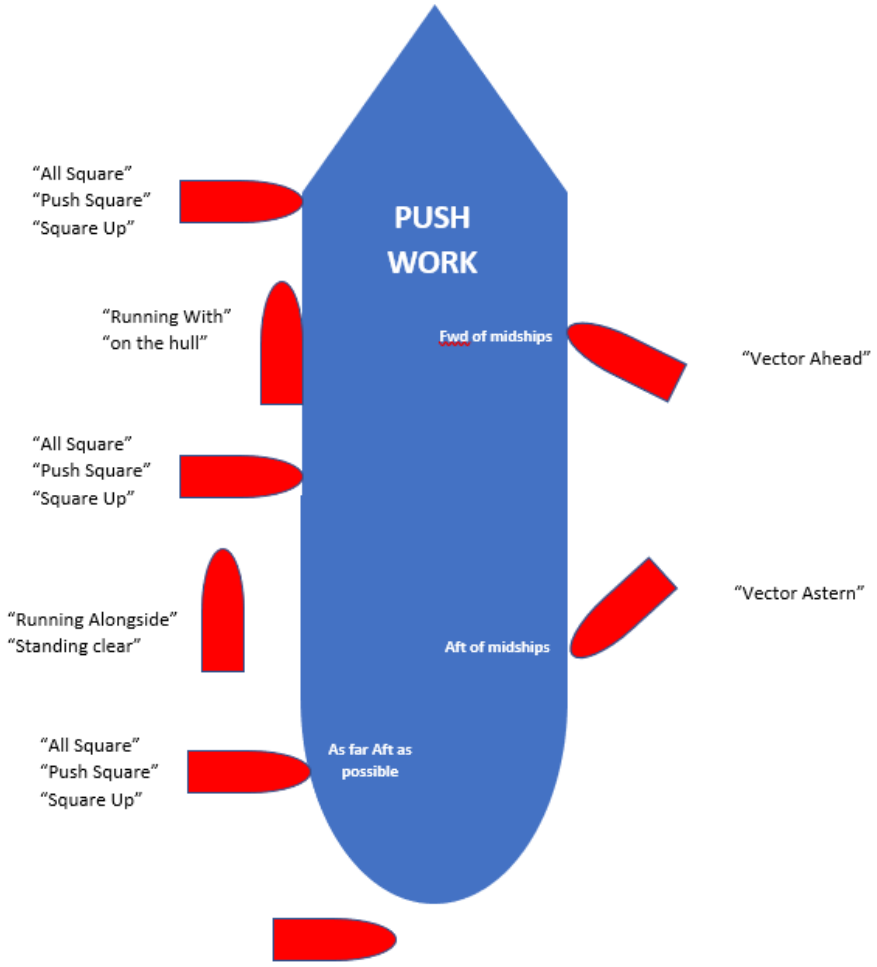
Ahead; stbd/port bow; starboard/port; stbd/port quarter; astern
Pull to the North; East; South; West etc

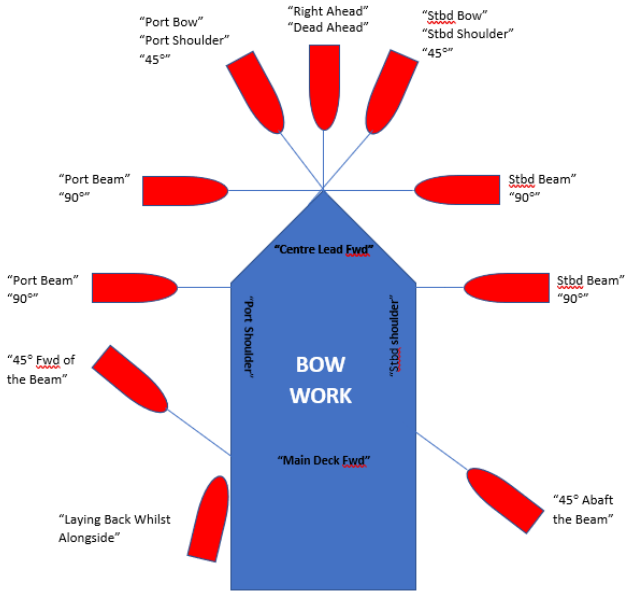
On some berths the instruction may be given to pull in the direction of a recognised mark (ie Rothesay Dock – pull the bow towards the fire pump).

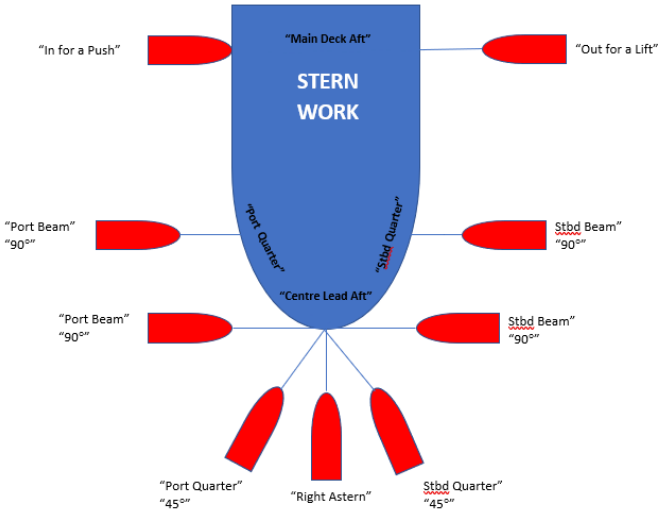
The Tug Master must immediately inform the Pilot/Master of any concerns as to the safety of the tug and its crew. The Pilot/Master and Tug Master shall take immediate action to ensure the safety of both the tug and assisted vessel; if necessary they must abort the operation as soon as it is safe to do so.
Pilots should only refer to the tug's name when conveying instructions to the tug and refrain from using the Tug Master's name. This will also assist the vessel's bridge team to understand what is going on.

Hand Signals
If hand Signals are to be used they must comply with industry standards. Communication between the tug and mooring deck/position is important, and it is advisable to use standard hand gestures in addition to VHF radio communications. These are particularly useful in passing securing information and determining towline length.

Tug Positions







Emergency Communications

Pilots, PEC holders and Tug masters should be well acquainted with the emergency towing sound signals. In the case of a VHF communications failure, the pilot or tug master(s) shall sound the below sound signals to highlight the loss of communication. On the sounding of these signals the tugs shall arrest any ship movement and the pilot will assist where possible to ensure the safety of the ship and tugs is maintained until communications by VHF or other means can be established.

Communications failure sound signal: 

The reply to which either by the tug(s) or the ship: 

From Pilot to Tug:

HEAD TUG:

Tow to Starboard 1 Short Blast 

Tow to Port 2 Short Blasts 

Tow Ahead 3 Short Blasts 

Stop 5 or more Short Blasts 

FORWARD ALONGSIDE TUG:

Tow off 1 Short Blast 

Push On 2 Short Blasts 

Stop 5 or more Short Blasts 

Both forward tugs must work together

STERN TUG:

Tow to Starboard 1 long + 1 Short Blast 

Tow to Port 1 long + 2 Short Blasts 

Tow Astern 1 long + 3 Short Blasts 

Stop 1 long + 5 or more Short Blasts 

AFT ALONGSIDE TUG:

Tow Off 1 long + 1 Short Blast 

Push On 1 long + 2 Short Blasts 

Stop 1 long + 5 or more Short Blasts 

Both stern tugs must work together

Chapter 4 - Towage Operations

Connecting and Disconnecting Towing gear

Before commencing a tow, the tug master should (where applicable to that vessel) determine which towing gear is suitable for the operation and instruct the crew accordingly.

When receiving heavy 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 a line. They should stand clear of and where possible indicate the area that the heaving line is to be thrown down to. **The use of dangerously weighted heaving lines will be reported to the MCA[6].** Prior to any towage operation the pilot is to remind the Master that the use of weighted heaving lines is prohibited.

When connecting to the assisted vessel, (where applicable to that vessel) the tug crew should ensure that the towing gear is clear of any obstructions, able to run freely and is run out from the tug in a controlled manner.

During disconnection, seafarers on deck should be aware of the risk of injury if the towing gear is released by the assisted ship in an uncontrolled manner, and avoid standing directly below.

They should also be aware that any towing gear that has been released and is still outboard may 'foul' on the tug's propeller(s), steelworks or fendering, causing it to come tight unexpectedly.

Tow Quick Release

The emergency release mechanisms on winches and towing hooks should be tested both locally and where fitted remotely. Towing winch and towing hook release mechanisms are to be frequently tested for correct operation. All methods of "tripping" or "run out" are to be tested (Pneumatic, manual pull, lever or knock out etc). Consideration should be given to testing under load

Release mechanisms are also to be tested at other times, if a fault is suspected or an exceptional shock loading has been experienced.

Records of testing the emergency release mechanisms should be kept and made available to the Harbour Authority on request. Under no circumstances is towing equipment to be connected to any winch or hook that has a suspect release mechanism. Correct maintenance and operation are essential.

Running Against the tide

Masters and Pilots should be aware that it is sometimes difficult to manoeuvre a tug into position against the tide without pulling any weight on the towline. Sometimes it may be appropriate for a tug to run with the vessel stern first to make fast and thus be ready to tow in the same direction.

Girting

Vessel's Masters, Pilots and Tug Masters must have a clear understanding of girting and its consequences. Girting happens when the towline is secured amidships off a tug and leads off the beamat right-angles to the tug. Should the line come under tension, this will exert a heeling moment on the tug, and should the force of that moment be sufficiently powerful it can overcome the tug's righting lever causing it to girt, which can lead to deck-edge immersion, flooding and potentially capsize. ,unless the towline is released in good time. Due to the rapid

[6] Safety Bulletin 2 - Dangerously weighted ships heaving lines - GOV.UK (www.gov.uk)

nature of these incidents, it cannot be assumed that the winch will pay out, or that the towline part prior to a capsize incident.

Conventional tugs are particularly vulnerable to girting, and due to their relative lack of manoeuvrability, it may be impossible to extract them from a problematic situation. Omni-directional tugs, such as ASD, ATD and Voith's, have integral anti-girting design, due to the positioning of the towing point at the extremities, avoiding an athwartships moment.

Common causes of girting are:

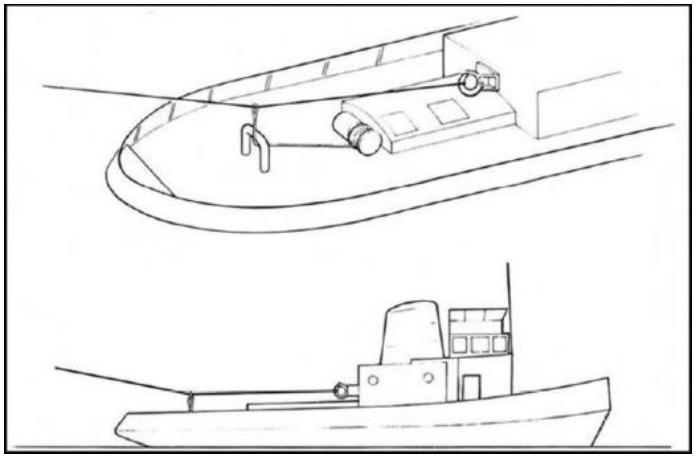
- The assisted vessel turns abruptly and without warning away from the tug
- The speed of the vessel is too high
- The tug is too far astern of its intended position, compared to the speed of the vessel

Please see Chapter 5 - 'Further Guidance and Advice Section'. It provides information on additional reading.

Use of a GOB/GOG rope[7]

The use of a gob/gog rope for towage of vessels by conventional tugs is **compulsory.** This includes both forward and aft tugs.

Conventional tugs deliver the highest bollard pull in the forward direction and will mostly be used as a bow tug on a hawser. When connected at the stern of the vessel being assisted, they will effectively be working in the "conventional" mode, also referred to as "stern to stern". The "towing point" will be moved further aft from the towing hook by using a Gob-line and a "stopper" block. The use of the Gob-line is very important to avoid girting of the tug. Shown in below diagram.



As discussed in other sections; the rope should be inspected thoroughly before and after use for signs of degradation and replaced at regular intervals ensuring good practice. This practice is also important for shackles and bollards or any other equipment associated with the rope or wire.

[7] An adjustable gog rope, on a dedicated gog winch, fitted to the tow line allows for a moveable 'fairlead' from which the tow line leaves the tug. The purpose of the gog rope is to optimise the tow line angle relative to the tug and enhance tug safety.1

Seafarer Safety during Towage Operations

Once the towing gear is connected, the deck crew should indicate this to the master and then clear the deck. Should the need arise for a crew member to go out onto the deck where there is no other alternative and/or for the sole purpose of the safety of the tug and its crew, then the tension on the line should be reduced to the absolute minimum for the duration of that activity.

During towage operations, the towing gear, equipment and personnel should be continuously monitored and any change in circumstances immediately relayed to the master. This is particularly important on tugs where the master has a restricted view of those areas/personnel. During all towing operations, where a tug is made fast to the assisted ship, the crew should be aware that the towing gear may have to be released in an emergency situation, and that this may occur without any warning.

Safe Speed – Conventional Tugs

When making fast and letting go a conventional tug, speed and the orientation of the tug are critical factors. The Master, Pilot and Tug Master are ensure that speed is **through the water NOT speed over the ground**. It is generally accepted that 2 to 4 knots is appropriate for conventional tugs but the Master, Pilot and Tug Master should agree at the Pilot/Master/Tug Master Exchange the speed for each part of the manoeuvre. The pilot needs to ensure the vessel's speed is steady and caution must be exercised when using the engines whilst the tugs are working. The stern 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.

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.

Safe Speed – ASD Tugs

The following ASD tug connecting speeds should be adhered to unless the circumstances of the case deem otherwise and only with the tug Master's consent;

- Bow tug - <5kts
- Side tug - <6kts
- Stern ASD tug - <7-8kts

It remains the responsibility of the Master, Pilot and Tug Masters to ensure the operation is conducted at a safe speed for all participating vessels throughout the operation.

Interaction

Interaction and its effects on the tug and its handling are well known, and appreciated in port/harbour towage. Pilots, Masters and Tug Masters are reminded that these effects are multiplied as the vessel's speed increases. Areas of high and low pressure exist in and around the ship's hull and these areas can cause adverse movements of smaller vessels in close proximity. The speed of water flowing between the tug and the vessel increases at the last moment as the tug comes alongside. As this happens the tug therefore has to increase speed to maintain the same speed as the vessel. The Tug Master has to compensate for the tug either being drawn in or pushed off the vessel.[8]

[8] Code of Safe Working Practices for Merchant Seafarers, 2015 edition – Incorporating Amendment 3, October 2018, Para 30.8.1 – 8.3 [11] MGN 199(M) Dangers of Interaction, 2002

In areas where interaction exists, and when manoeuvring alongside a vessel, the Tug Master should be aware of the possibility of underwater obstructions such as bulbous bows, stabiliser fins and areas of the ship's side, such as pilot doors, which are to be avoided.

The Pilot/Master and the crew should be aware of interaction and the effect it may have on the tug. Marine Guidance Notice 199(M) – Dangers of Interaction – provides further guidance and information on the effects of interaction, including when manoeuvring at close quarters.[11]

Critical Tug Positions

The positioning of tugs on a vessel is a matter for discussion between the Pilot/Master and the Tug Master, having full regard for the areas of the hull which should be avoided, e.g. watertight doors, between frames etc. 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 water plane. The Tug Master will be concerned about any bulbous bow or other underwater protrusion, the proximity of the flare of the bow etc. At the same time the Tug Master is countering the hydraulic pressure wave that exists around the bow to avoid severe interaction.

Flares or cut-aways at the bow or stern are of particular concern and can increase the dangers of interaction. Extra caution should be taken by Pilots/Masters when the tug is making fast under a flare/cutaway, especially when the vessel is moving/swinging towards the tug. The danger is compounded at night with the risk of shadows from deck lighting.

Bollard Pull

The bollard pull of a tug is the amount of static force (pull) that can be exerted on a stationary object. The towing force that the tug can apply to an assisted vessel depends upon the type of propulsion unit, and the method of assistance. it should be borne in mind that the stated Bollard Pull of a tug is not a constant force that can be imparted on the vessel in any given scenario, and is only an indication of the maximum static pull in controlled situations. Factors such as ships speed, tidal stream and the mode of operation, will impact the maximum force that can be applied to the assisted vessel.

Safe Working Load of Vessel Mooring Equipment

The Pilot/Master should establish the SWL of the vessel's mooring equipment intended to be used for towage operation as part of the Pilot/ Master exchange. This information should be compared with the bollard pull (or dynamic escort force) of the allocated tug. Use of equipment with lower SWL should be avoided. If this is not possible, then the Tug Master must be advised of the SWL and not to exceed this limit. Panama fairleads are preferred to other types of fairleads for towing operations.

Tow Line Length

When towing on a line a tug master determines the length on the basis of his insight and experience. The towline length when towing on a line depends on factors such as type and length of tug, size and deck height of the ship to be assisted, environmental conditions and available manoeuvring space for the tug. Ship's speed is also important.

There are advantages and disadvantages to both short and long towline lengths and pilots should familiarise themselves with how the manoeuvrability of both the tug and the vessel being assisted is affected.

Safety is paramount, and tug masters should carefully consider the towline length for a forward tug assisting a ship under speed. When using a short towline, the distance between the forward tug and ship's bow is very small. Consequently, the time available for a tug master to

react is very limited. The tug master should constantly and closely observe course and speed changes. Master and Pilot must ensure that they are careful with engine and rudder movements and the Pilot must keep the tug master well informed about intended manoeuvres.[9]

Static and Dynamic Forces in Short and Long Tow Lines.

The below is information gathered from Chapter 7 of Tug Use in Port, A Practical Guide. Pilots and tug masters are encouraged to read this section to consolidate their knowledge.

Static Forces in Short and Long Tow Lines

A tug sometimes has to work with a steep towline angle, for instance when a ship has to enter a dry dock. Up to a vertical towline angle of 40 degrees the influence on the force in the towline is not so large. However, when the vertical towline angle further increases, the force in the tow-line increases very rapidly. At a vertical towline angle of 60 degrees the force is already twice the exerted towing force of the tug. A vertical towline angle of 45 – 50 degrees for tugs secured at the ship's side is not too large but when towing on a line it is a large angle, although it does happen. In this case the static force in the towline is already 1.5 times as high as the towing force of the tug.

There is not always a direct relationship between the forces in a towline and the towing force exerted by the tug. Tugs operating in the indirect towing method, particularly at high speeds as is the case with escort tugs, experience very high towline loads mainly due to the high lift forces generated by the tug's underwater body and skeg, if fitted. However, the main factors for the maximum static forces in the towline during normal harbour operations are the tug's bollard pull and the towline angle.

Dynamic forces in a short and long towline

In addition to static forces, dynamic forces can occur in a towline and can reach high values. They are generated by sudden accelerations of the tug, wrong tug manoeuvres, waves, swell, and so on, creating shock loads in the towline. Horizontal tug accelerations can be kept under control to some degree by careful manoeuvring, but this is not the case with vertical accelerations due to waves and swell. It is obvious that these vertical accelerations, which can even be created by waves of passing ships, have a large effect on the forces in a towline, especially in the case of short and steep towlines. The longer a towline and the higher the elasticity, the better dynamic forces can be absorbed and the lower the peak values of the towline loads will be. That is why much attention has to be paid to strength and elasticity of a towline especially when tugs have to work in wave and/or swell conditions with short towlines.

Assuming again a vertical towing angle of 45 – 50 degrees, towline forces certainly reach higher values than the previously mentioned 1.5 times bollard pull, due to the dynamic forces generated. How large the dynamic forces are will depend, amongst other things, on length, type and/or composition of the towline. But towline forces in excess of two times the bollard pull of the tug are not uncommon, particularly when towlines with little stretch, such as steel wire and the modern fibre towlines, are used. It is clear that when the brake holding power of the towing winch is less than this value the brake of the winch may slip. This is, of course, only when the minimum breaking strength of the towline is sufficient to cope with the dynamic forces.

It is also worth noting that a short towline means the ship and tug are closer together and this will impact on interaction between both vessels and subsequently impacting tug safety and effectiveness of the towing operation.

[9] Tug Use in Port, A practical Guide, Captain Henk Hensen, Second Edition, Chapter 7, Sections 7.5.4 – 5.5

Mooring Vessels

Tug Masters, Pilots and Masters should be aware, at all times, of the position and intentions of mooring boats, especially in strong tidal conditions, at night or during restricted visibility or adverse weather conditions. This is particularly important in circumstances where visibility is limited from the tug's 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. The Pilot or Master should never use the vessel's engines without confirming with the Boatmen and/or Line handlers as to the position of the mooring boats. Sound signals can be used as a warning on occasions when vessel noise compromises VHF monitoring.

Escort Towage

Tugs designed for escort operations can exert (when using dynamic towing techniques) a towing force somewhat higher than the tug's bollard pull. This fact must be considered by Pilots/Masters when considering use of escort tugs.

Escorting as a regular operation is becoming common within the port towage industry. This type of operation is carried out in the 'passive' and 'active' modes: passive when running free in close attendance, and active when fast to the tow. If active escort is being undertaken the form of towage can be 'direct' or 'indirect', depending on the speed of the tow. 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.

Standard Risk Assessment (Ship Towage)

All towage companies operating in Clydeport shall have in place current risk assessments for all standard towing operations and any unusual or specific operation will require a task-specific risk assessment for the towing operation. Significant deviations from the planned towage operation at the time will be dynamically risk assessed.

Restricted Visibility

Some areas of Clydeport are prone to heavy and dense patches of restricted visibility, especially in Autumn and early Spring where conditions can change without warning and visibility can reduce rapidly. Once committed to the Port limits there is the option of going to a designated anchorage in the Firth of Clyde but in the River Channel past No1 buoy, there is no option but to berth, with no turn around facility, so vessels should not commit to entering the river channel in actual, or forecast, dense restricted visibility. If committed past No1 buoy and/or having departed from the berth, and restricted visibility develops, Pilots are to dynamically risk assess the situation, accounting for the individual vessel with consideration for size, crew competence, equipment and PPU availability during these likely periods of Restricted Visibility.

The following applies to Clydeport:

a. For river transits; visibility shall not be less than twice the length overall (LOA) of the vessel. However, where restricted visibility exists in areas of the river or is likely to develop, pilots should consider taking the vessel to anchor or remain on the berth and reassess go/no-go for the remainder of the tidal window.

b. For the Firth of Clyde and adjoining sea lochs transits; pilots are to ensure that restricted visibility is covered in the pilot/master exchange and dynamically risk assessed (DRA) with consideration for size, crew competence, equipment and PPU

availability. Restricted visibility in those areas is often patchy and therefore no restriction is placed out with that DRA.

c. Berthing within the Firth of Clyde and adjoining sea lochs; Pilots are to ensure that visibility shall not be less than twice the length overall (LOA) of the vessel at the berth. That transit to the berth is as above in (b.) respect of the DRA process.

d. Restrictions within the Dockyard Port exist for all vessels. 2c (400yds). This is based on line of sight from harbour control to 'S' buoy. However, this may change, and the Dockyard Port closed earlier based on local conditions, especially in constrained navigational areas.

e. Restrictions at Finnart Oil Terminal for arrival and departure is 5c (1000yds).

The minimum visibility for any towage operations is 400 metres or the assisted vessels length if greater and in all cases the Master/Pilot/Tug Master can see other vessel's bridge.

These procedures should outline the Pilot/Master/Tug Master Exchange as part of the passage planning and associated risk assessment process. The process should include consideration of the dangers associated with towing in restricted visibility and the control measures appropriate. These considerations should include:

- Type of tug, propulsion method, towing from winch or hook and location of winch/hook.
- Proposed method of towing.
- Operational status of navigational aids and equipment.
- Minimum speed to maintain steerage of vessel to be assisted.
- Movement of other vessels in area.
- Navigational characteristics of the particular area of the port including the use of information from Estuary Radio
- Contingency plan should visibility deteriorate after the tow has commenced and/or if the tug has to disengage at any stage of the operation.

Restricted Visibility During an Operation

Should visibility reduce to a level that it becomes restricted during a towage operation the Pilot, in consultation with the Master and Tug master will discuss the situation and agree a course of action to ensure the safety of all persons and vessels involved, given the location of the tow, and the prevailing environmental and vessel traffic conditions. The Pilot will immediately inform the port LPS (Estuary Radio VHF Ch12) of the circumstances and the decisions made. They will then keep them updated of any further operational developments as well as any improvement or degradation of the visibility.

Some potential courses of action are:

- Let go the forward tug, or any other assisting tug and take the vessel to anchor.
- Use the tugs to turn the vessel, let go the tugs and the vessel proceeds outside the Port Limits.
- Let go the forward tug, or any assisting tug and have the tug assist in a pushing mode.
- Allow the tug to manoeuvre the vessel under the Pilot/Masters instructions. This may include using the tug to maintain the vessels position at a safe location in the Port.

Depending on location and traffic, the safest course of action may The Tug Master should immediately inform the Pilot and Master and Port Control of any concerns he may have as to the safety of his tug and crew. If necessary, the operation should be aborted as soon as it is safe to do so.

The Port Authority retains the right to make a final decision on when visibility has improved sufficient for the operation to proceed.

Towing in Adverse Weather Conditions

When towing in adverse weather, hazards associated with towage operations are increased. In circumstances where heavy weather (e.g., high winds and/or heavy swell) exists, or is likely to exist, the Master/Pilot and Tug Master shall as part of the passage plan and risk assessment process agree how the operation will be conducted, what hazards are associated with the towage operation and what risk reduction measures are to be applied.

When completing this assessment, the following must be considered:

- Sea and/or swell conditions at the intended operating area and the route to/from same.
- Wind speed, direction and trend; e.g., rising, steady or falling.
- State of tide and trend.
- Information offered by latest weather forecast and other vessels in the area.
- Type of tug, propulsion method, towing from winch or hook and location of winch/hook.
- Proposed method of towing, including likelihood of shock-load to towing gear.
- Movement of other vessels in the area.
- Navigational characteristics of the particular area of the river including the use of information from Clydeport Local Port Service.

A contingency plan should weather deteriorate before/after the tow has commenced and/or if the tug has to disengage at any stage of the operation must be formulated. This could include after careful consideration, but not only be limited to, one or more of the following:

- Tug does not make fast and remains on station to assist the vessel to a position of safety.
- Tug is let go and remains on station to assist the vessel to a position of safety.
- Tug is let go to assist in a pushing mode.

If there is likelihood that the weather conditions may pose a significant threat to the tug, it's crew or towing equipment, the Tug Master shall immediately inform the Pilot/Master of any concerns that he may have. The Pilot/Master and Tug Master shall take immediate action to ensure the safety of the tug and the assisted vessel (and their respective crews) and, if necessary, the operation shall be aborted as soon as it is safe to do so.

The agreed course of action must be fully communicated to "Estuary Radio" on VHF Ch12.

Chapter 5 – Further guidance and advice

Further guidance and advice can be found in the following publications

- The Risk of Tugs Capsizing due to Girting
- http://eurotugowners.com/guidelines-for-safe-harbour-towage-operations/
- towage-guidance-matrix-for-clydeport-ver14-may-2021.pdf (peelports.com)
- The workboat code Edition 3
- Tug Use in Port: A Practical Guide – Nautical Institute;
- Recommendations for Ships' Fittings for use with Tugs – OCIMF;
- The Ship handlers' Guide – Nautical Institute;
- Current relevant Merchant Shipping Notices;
- Code of Safe Working Practices for Merchant Seamen;
- Management of Health & Safety at Work Regulations;
- Current relevant Merchant Shipping Acts;
- Port Marine Safety Code
- A Guide To Good Practice on Port Marine Operations
- Clydeport Tow Notification Form
- The Clydeport (COP 26 etc.) Harbour Revision Order 2021
- Clydeport Towage Matrix