



CLYDEPORT TOWAGE GUIDELINES



Version 1: May 2020

CONTENTS

Chapter	Content	Page
	Introduction	4
Chapter 1	Towage Recommendations	
1.1	Towage Governance	5
1.2	Towing Matrix	5
1.3	River Transits East of Greenock Ocean Terminal	6
1.4	Deviation from the Towing Matrix	6
1.5	Qualifications	7
1.6	PEC Requirements	7
Chapter 2	Preparing for Towage Operations	
2.1	Planning & Co-ordination	8
2.2	Pilot/Master Exchange	8
2.3	Pilot/ Tug Master Exchange	9
2.4	Preparations onboard the Tug	9
2.5	Watertight integrity	10
2.6	Testing and inspection of towing equipment	10
2.7	Non-Routine Dead Tows	10
2.8	Towage Notification Form	10
Chapter 3	Communications	
3.1	VHF Communications between Parties	12
3.2	Port VHF Channels	12
3.3	Pilot Instructions to the Tug	13
Chapter 4	Towage Operations	
4.1	Connecting and Disconnecting Towing Gear	14
4.2	Common Hand Signals	14
4.3	Tow Quick Release	14
4.4	Girting	15
4.5	Use of a Gob/Gog Rope	15
4.6	Seafarer safety during towing operations	15
4.7	Safe Speed	16
4.8	Interaction	16
4.9	Bollard Pull	17
4.10	Towline Length	17
4.11	Static and Dynamic Forces in Towlines	17
4.12	Escort Towage	18
Chapter 5	Towage in Restricted Visibility	
5.1	Restricted Visibility Limitations for Towage	19
5.2	Restricted Visibility Develops during an Operation	19

5.3	Procedures When Restricted Visibility Exists or is Expected	20
Chapter 6	Further Guidance & Advice	
6.1	Girting	21
6.2	Guidelines & Reference Documents	21
Annex 1	Towage Matrix	
Annex 2	Towage Notification Form	

Introduction

These guidelines have been produced by Clydeport Operations Limited (COL) as the Harbour Authority in conjunction with pilots, tug masters and port users. The guidelines reflect the content of 'the Guide'¹.

The purpose of developing these guidelines is to enhance the safety of marine towage operations within Clydeport and provide a framework to prevent accidents, enhance communications and teamwork between towage operators, tug masters, pilots, and the Harbour Authority.

Clydeport continually risk assesses activities and operations within its area of responsibility and applies appropriate safety control measures to ship movements. This may include the use of a tug.

The Harbour Authority reserves the right to amend these Towage Guidelines in line with MAIB, MCA or similar recommendations that reflect the operations at Clydeport.

¹ Guide to Good Practice on Port Marine Operations, February 2018, Section 10

Chapter 1 - TOWAGE Governance and Recommendations

1.1 TOWAGE GOVERNANCE

- 1.1.1 The Port Marine Safety Code requires ports to develop a method and criteria to approve tugs, workboats and operators working within their jurisdiction. Clydeport facilitates this requirement through a Compliance Check. It is designed to assess the operational safety and support systems, including risk assessment, training, plans and procedures, operated by such organisations. This Compliance Check 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 Statutory Harbour Authority by the Port Marine Safety Code.
- 1.1.2 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;
- 1.1.3 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;
- 1.1.4 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;
- 1.1.5 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;
- 1.1.6 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;
- 1.1.7 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;
- 1.1.8 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.

1.2 TOWING MATRIX

- 1.2.1 The towing matrix is **Annex 1** to these guidelines. Ship assist towage and non-routine towage is to be notified in PORTLINKS.
- 1.2.2 It is recognised that due to the considerable variations in vessel size, shape, condition and degree of manoeuvring capability the recommended number of tugs from the matrix given may be in excess of what is the safe minimum number of tugs for a particular vessel. As a consequence the master of any visiting ship may order the recommended number of tugs as per the towage matrix contained within this document or opt to consult with Clyde Marine Managers. The Agent is to email; ClydeMarineManagers@peelports.com

1.2.3 **The request is to be made in good time, but no later than 24 hours (72 hours for unusual design, project or large vessels) before ETAs and 8 hours before ETDs, Monday to Friday 0800-1700. These requests will be assessed on a case by case basis with an authorised Clydeport Pilot.**

1.3 **RIVER TRANSITS EAST OF GREENOCK OCEAN TERMINAL**

1.3.1 Vessels with draughts over 8.4m and/or LOA over 165m, require a consultation process with Clyde Marine Managers. Contact numbers are 01475 886317/18/20. Monday to Friday 0800-1700.

1.3.2 Unless deemed otherwise, towage operations in the river will require the use of appropriate tug provision, namely Harbour Tugs from local service providers familiar with the area, and using tugs appropriately sized for the operation. The changeover location and process is to be risk assessed and agreed prior to arrival/departure.

1.3.3 **Towing North of Cumbrae Gap to Kempock Point**

1.3.4 For sea tows entering the Port; tug masters are expected to shorten up their tow to ensure a more controlled tow through confined waters. Pilotage is not required until Kempock Point if the total LOA of the tow is less than 120m. Pilot boarding positions will vary on a case by case basis and will form part of the Towage Notification process.

1.3.5 Tug Masters must navigate with extreme caution and with due regard to their circumstances including presence of naval and other traffic, on passage North of the Cumbrae Heads.

1.4 **DEVIATION FROM THE TOWING MATRIX**

1.4.1 Such consultation can be arranged by the master of any vessel through his Agent who will then contact the appropriated pilot to give due consideration to the masters request. In assessing any variation from the Towage Matrix the following points will be taken into consideration namely:-

- The Length of the vessel
- The draught of the vessel
- The windage area of the vessel
- The minimum under keel clearance during the planned passage transit
- Range of the tide on the date in question – springs or neaps
- Expected wind conditions
- Disposition of other vessels and port infrastructure
- The forecast weather conditions, including visibility
- 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
- The Gross Registered Tonnage (GRT) in relation to the vessels principal dimensions
- Unusual design of vessel
- Any reported defects to the vessel
- Type of main engine – air start, diesel electric, gearbox
- Availability of boatmen

1.5 **QUALIFICATIONS**

- 1.5.1 National certification of tug crew is set by the Maritime and Coastguard Agency in accordance with the PMSC² and 'the Guide'³. All crew must meet these requirements and tugs must be safely and adequately manned.
- 1.5.2 Operators of 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. COL compliance audit towage operators. Training and certification forms part of that.

1.6 **PEC REQUIREMENTS**

- 1.6.1 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.

² Port Marine Safety Code, November 2016, Chapter 2 Key Measures to Secure Marine Safety, Para 2.18 Competence Standards

³ Guide to Good Practice on Port Marine Operations, February 2018, Section 10, Sub-Sections 10.4-10.5

Chapter 2 - Preparing for Towage Operations

2.1 PLANNING AND CO-ORDINATION

- 2.1.1 Before towing operations commence, a comprehensive plan should be agreed by the Master and Pilot. This should take account of all relevant factors, including tide, wind, visibility, ship size, type and characteristics, and specific berth requirements.⁴ The Pilot is to ensure he has a sound knowledge of the tug's capabilities and limitations (Section 2.2 below). The Pilot and Master are to ensure the tugs are suitable for the task ahead and positioned on the vessel so as to facilitate a safe operation. The Pilot and Master must be in total agreement before the towage operation begins.
- 2.1.2 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 all those involved.
- 2.1.3 Tug manning requirements may vary depending on the operation. This should be highlighted in the towing master's plan and in all cases, adequate manpower should be provided to ensure that individuals are not exposed to undue risk, and that the operation can be conducted safely and efficiently. It is the duty of all those involved to follow safe working practices and ensure that associated equipment is fit for purpose. They should also ensure that they are properly briefed in their duties and issued with, and use, suitable and effective personal protective equipment (PPE). Any requirement for additional tug manning should be identified and planned in advance through consultation with towage providers.

2.2 PILOT/MASTER EXCHANGE

- 2.2.1 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 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., bits and fairleads
- 2.2.2 It is recognised that providing a deck arrangement plan formally is not always practicable, especially when boarding at night in the vicinity of Ashton Buoy. Pilots and Masters shall verbally exchange that information at the earliest opportunity and pass that information to the tug master where relevant.
- 2.2.3 **Note: Using ships' mooring lines as towlines is not recommended. Towage providers in Clydeport do not operate with ships' lines; however, in emergency this may be needed. 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**

⁴ Code of Safe Working Practices for Merchant Seafarers, 2015 edition – Incorporating Amendment 3, October 2018, Para 30.1.2

the case, then the tug's performance must be limited to ensure the line does not part.

2.2.4 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 type of tug(s) to be used and their bollard pull(s)
- Maximum planned speed for the operation
- 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**

2.3 PILOT/TUG MASTER EXCHANGE

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

- That the SWL of the vessel's chocks, bollards and strong points to be used in the operation are fit for purpose.
- The tug hook up point, taking into account the prevailing weather conditions.
- The planned (optimum) ship speed, when connecting to the tug.
- The maximum speed of the tug.
- 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 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.
- The Tug Master should advise the Pilot (as far in advance as possible of the scheduled manoeuvre) if the tug has experienced a failure or reduction in its ability to manoeuvre or deliver full bollard pull. Please see the section below covering Communications.

2.4 PREPARATIONS ON BOARD THE TUG

2.4.1 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.

2.4.2 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 ensure their decks are clear of all personnel. 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.

2.5 WATERTIGHT INTEGRITY

- 2.5.1 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.
- 2.5.2 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.⁵ 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.

2.6 TESTING AND INSPECTION OF TOWING EQUIPMENT

- 2.6.1 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 to ensure correct operation.
- 2.6.2 All towing equipment in use should be inspected for damage before undertaking and after completing a tow.⁶ This is especially important with gob/gog ropes. Tug masters shall ensure they are in good working order to ensure reliability. It is safety critical and will save your life.

2.7 NON-ROUTINE DEAD TOWS

- 2.7.1 'The Guide' now requires Harbour Authorities to give special consideration to tows involving dead-ships or unusual objects and towage events of a non-routine nature.⁷
- 2.7.2 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.

2.8 TOWAGE NOTIFICATION FORM

- 2.8.1 All non-ship assist towage, non-routine or dead tows will require a Towage Notification Form, ANNEX 2. This will not unreasonably be withheld but will require the involvement of marine managers and pilots in the decision. To that end, 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 venture have been fully discussed and agreed the written approval of the Harbour Authority will be given on this form. Such complex operations may require information at least 3 weeks in advance to facilitate the planning process.

⁵ Code of Safe Working Practices for Merchant Seafarers, 2015 edition – Incorporating Amendment 3, October 2018, Para 30.2.1 – 2.2

⁶ Code of Safe Working Practices for Merchant Seafarers, 2015 edition – Incorporating Amendment 3, October 2018, Para 30.3.1 – 3.3

⁷ Guide to Good Practice on Port Marine Operations, February 2018, Section 10, Sub-Sections 10.4.8

- 2.8.2 Submission of a Towage Notification Form and full Risk Assessment and Methods 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; <https://www.peelports.com/ports/clydeport> and sent to Clydeport at ClydeMarineManagers@peelports.com. PORTLINKS will be used to book the pilot for such evolutions. In support of operations, Clydeport understands that the above timeframes cannot always be met and we try and meet the operational requirement. However, Clydeport will not be responsible for any subsequent delays.
- 2.8.3 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

3.1 VHF COMMUNICATIONS BETWEEN PARTIES

- 3.1.1 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 line handlers and mooring boats, and those on the berth, are able to communicate promptly and effectively throughout the towage operation. Prior to towing operations, the Pilot, Master, Tug Master(s), Line handlers and Boatmen should establish communications, exchange relevant information and agree a plan for the towage operation. Pilots, Line handlers and Boatmen should carry fully charged VHF handhelds.
- 3.1.2 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.
- 3.1.3 It is important that effective communications are maintained between; the towing vessel, the Pilot, the bridge team, and the mooring decks of the vessel undertow. In all communications, clear identification of the parties communicating should be used to prevent misunderstandings. The Tug Master should be kept informed of engine movements, helm orders, proposed use of thrusters and anchors on the towed vessel.
- 3.1.4 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:



3.2 PORT VHF CHANNELS

- 3.2.1 Primary (tug working) VHF Channel 08 and secondary (Estuary Radio) VHF channel 12 for use in the operation. Finnart Channel 14.
- 3.2.2 Clydeport operates a Local Port Service (LPS). The LPS is run from the Group Port Control Centre (GPCC in Liverpool). The Pilot is to ensure he communicates with Estuary Radio (VHF CH12) on commencement of any towing operation, whether it is an inbound or outbound transit or shift.
- 3.2.3 The Tug Master shall always maintain, so far as possible, a listening watch on VHF channel 12 for Estuary Radio as well as the Pilot/Tug working channel.

3.3 **PILOT INSTRUCTIONS TO THE TUG**

- 3.3.1 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. In most ports Pilots will instruct the tugs by requesting a percentage of tug power (i.e. Full – 50% - 25%- Stop) and direction of pull (i.e. Ahead, Astern, Starboard, Port).
- 3.3.2 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.

Chapter 4 - Towing Operations

4.1 CONNECTING AND DISCONNECTING TOWING GEAR

- 4.1.1 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.
- 4.1.2 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.** Prior to any towing operation the pilot is to remind the Master that the use of weighted heaving lines is prohibited.
- 4.1.3 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.
- 4.1.4 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.
- 4.1.5 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.⁸

4.2 COMMON HAND SIGNALS

- 4.2.1 Communication between all parties is very important during connecting and disconnecting and it is advised that standard hand gestures are used. Having a standardised approach will reduce confusion.
- 4.2.2 The following hand signals are in common use:
- An outstretched arm with hand open and flat being waved downwards means "slack off"
 - A sharp upward movement of the arm with the hand cupped towards the signaller means "let go" or "cast off"
 - Crossed arms in front of the body means "make fast" or "is made fast"
 - A circular movement of the hand above the head means "heave away"
 - Both hands raised above the shoulders, with open hands facing forward means "stop";
 - A raised hand with the fist being clenched and unclenched means "heave or hoist slowly" (inching).

4.3 TOW QUICK RELEASE

- 4.3.1 The emergency release mechanisms on winches and towing hooks should be tested both locally and where fitted remotely. Towing winch and towing hook release

⁸ Code of Safe Working Practices for Merchant Seafarers, 2015 edition – Incorporating Amendment 3, October 2018, Para 30.4.1 – 4.4

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).

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

4.3.3 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.

4.4 **GIRTING**

4.4.1 Vessel's Masters, Pilots and Tug Masters must have a clear understanding of girting and its consequences. Girting happens when the towline comes at right-angles to the tug. The tug is pulled bodily through the water by its tow, which can lead to deck-edge immersion, flooding and capsize; unless the towline is released in good time.

4.4.2 Please see 'Further Guidance and Advice Section' towards the end of this document. It provides information on additional reading.

4.5 **USE OF A GOB/GOG ROPE**

4.5.1 The use of a gob/gog rope for towage of vessels by conventional tugs within the Clydeport Harbour Authority is compulsory. This includes both forward and aft tugs.

4.5.2 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.

4.6 **SEAFARER SAFETY DURING TOWING OPERATIONS**

4.6.1 Once the towing gear is connected, the deck crew should indicate this to the master and then clear the deck. In repetition of 2.4.2; **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**

4.6.2 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.

4.6.3 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.

4.6.4 Tug crews should wear appropriate personal protective equipment in line with Company procedure.⁹

⁹ Code of Safe Working Practices for Merchant Seafarers, 2015 edition – Incorporating Amendment 3, October 2018, Para 30.6.1 – 6.4

4.7 SAFE SPEED

- 4.7.1 When making fast and letting go a conventional tug, speed and the orientation of the tug are critical factors. The Pilot is to ensure that speed is through the water NOT speed over the ground. It is generally accepted that 2 to 3 knots is appropriate for conventional tugs but the pilot should check with the tug master on a case by case basis. 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.
- 4.7.2 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.
- 4.7.3 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

4.8 INTERACTION

- 4.8.1 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.¹⁰
- 4.8.2 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.
- 4.8.3 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

¹⁰ 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

4.9 BOLLARD PULL

4.9.1 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. There are other contributing factors that lead to the loss of bollard pull over time.

4.10 TOW LINE LENGTH

4.10.1 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.

4.10.2 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.

4.10.3 Again safety is paramount and tug masters should consider carefully the towline length for a forward tug assisting a ship under speed.

4.10.4 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. Pilots must ensure that they are careful with engine and rudder movements and keep the tug master well informed about intended manoeuvres.¹²

4.11 STATIC AND DYNAMIC FORCES IN SHORT AND LONG TOWLINES

4.11.1 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.

4.11.2 Static forces in short and long tows

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.

¹² Tug Use in Port, A practical Guide, Captain Henk Hensen, Second Edition, Chapter 7, Sections 7.5.4 – 5.5

4.11.3 **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.

- 4.11.4 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.

4.12 **ESCORT TOWAGE**

- 4.12.1 Active and passive escort towage is conducted on a routine basis. Escort requirements can be found within the towage matrix.

Chapter 5 - Towage in Restricted Visibility

5.1 RESTRICTED VISIBILITY LIMITATIONS FOR TOWAGE

- 5.1.1 The River Clyde is 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 river there is no option to berth or turn short-round. Therefore transiting these high risk areas will require management. Pilots are advised to dynamically risk assess individual vessels with consideration for size, crew competence, equipment and PPU availability. Through risk assessment, towage operations in the CHA Area are as follows: -
- 5.1.2 Minimum visibility in the Clyde River for all planned towage operations shall not be less than twice the combined length of the tow overall. For ship assist towage, that includes all lines and associated tugs. 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.
- 5.1.3 Minimum visibility in the Firth of Clyde and adjoining sea lochs for all planned towage operations is 0.2NM or the assisted vessels length if greater, and such that the Master/Pilot can see the tug and the Tug Master can see the towed vessel;
- 5.1.4 Pilots should clarify before committing to approach or transit of the river that adequate visibility exists at the berth.

5.2 RESTRICTED VISIBILITY DEVELOPS DURING AN OPERATION

- 5.2.1 Should visibility become restricted during a towage operation, the Pilot/Master and the Tug Master 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.
- 5.2.2 The Pilot or Master will advise "Estuary Radio" of the circumstances and any decisions made immediately, keeping them informed of any operational developments, or any improvement or deterioration of the visibility.
- 5.2.3 The Tug Master should immediately inform the Pilot/Master and Estuary Radio of any concerns that he may have as to the safety of his tug and crew. The Pilot/Master and Tug Master should take immediate action to ensure the safety of both the tug and the assisted vessel. If necessary the operation should be aborted as soon as it is safe to do so.
- 5.2.4 In the **Firth of Clyde** this could include one or more of the following:
- Let go the forward tug or any assisting tugs 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 other assisting tugs) and have the tug assist in a pushing mode.
 - Allow the tug to manoeuvre the vessel under the Pilot/Master's instructions. This may include using the tug to maintain the vessels position at a safe location in the Port.
- 5.2.5 In the **Clyde River** this could include one or more of the following:

- Slow the vessel to a minimum it can be kept on its course or take all way off and endeavour to maintain position in the channel whilst a decision can be made.
- Consider letting go the forward tug or all assisting tugs. This should be done at slow speed when the towline is under the least tension.
- Let go the forward tug (or any other assisting tugs) and have the tug assist in a pushing mode.
- The vessels propulsion can be stopped and under pilot direction, the tug(s) can tow the vessel to the nearest Berth. However this should only happen if the fwd tug has visibility of the bow.

5.2.6 **If the above options are not safe or practicable then, as a last resort and with the agreement of all parties that it is the safest course of action, the operation can continue to completion.**

5.2.7 Additional CCTV cameras placed sporadically in the river may help the pilot to understand the nature of the fog in the river, however, fog density and formation fluctuates and cannot be solely relied upon. CCTV may be used in conjunction with other methods to aid in an informed decision.

5.3 **PROCEDURES WHEN RESTRICTED VISIBILITY EXISTS OR IS EXPECTED**

- The pick up speed in reduced visibility is to be the minimum speed through the water that a vessel can maintain.
- Tug Masters may request the Pilot / Master to take all way off the vessel and the tugs manoeuvre the vessel.
- Tug Master to re-confirm watertight integrity of tug with the Pilot. Likewise 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.
- Pilot/Master and Tug Master to agree the plan, which should be recorded
- During operations in restricted visibility the Pilot / Master of the assisted vessel shall provide well in advance all engine movements, thrusters movements and alterations of course
- Pilot/Master and Tug Master shall inform the other of any changes in their circumstances that will impact on the agreed plan.

Chapter 6 - Further Guidance and Advice

6.1 GIRTING

1. https://www.westpandi.com/resources/?page=3&category=lossprevention_1&type=bulletin
2. <https://www.gov.uk/maib-reports/girting-and-capsize-of-tug-flying-phantom-while-towing-bulk-carrier-red-jasmine-on-river-clyde-scotland-resulting-in-1-person-injured-and-loss-of-3-lives>

6.2 GUIDELINES & REFERENCE DOCUMENTS

1. <http://eurotugowners.com/guidelines-for-safe-harbour-towage-operations/>
2. <https://britishtug.com/documents/>