

INSTRUCTIONS FOR USING THE RISK ASSESSMENT FORM

- 1.** Envisage the task in hand and identify the hazards associated with carrying out the task. These hazards are to be listed and addressed individually in the risk assessment form.
- 2.** Once the hazard has been identified, based on the combination of the likelihood and severity/consequence of the hazard, the risk evaluation score is to be assigned using the risk evaluation matrix on the last page. For example, a hazard which has a likelihood of 'unlikely' and a severity/consequence of "harmful", the risk evaluation score would be (moderate risk).
- 3.** With the determination of the risk evaluation score, using the recommended response table on the last page, appropriate action is to be planned and implemented.
- 4.** Using the above example of a risk evaluation score of 4 (moderate risk), appropriate controls must be applied to the risk and these must be listed out accordingly in the form along with the person responsible for applying the control and the completion date.
- 5.** Once the controls have been applied, the risk must be reassessed as a whole taking into account the applied controls and once again using the risk evaluation matrix on the last page, a residual score must be obtained.
- 6.** If the residual risk on reassessment is 'Trivial' or 'Tolerable' (scores 1 and 2), then no additional controls are required and only effective monitoring of the task to ensure compliance with procedures is necessary.
- 7.** However, if the reassessment of the risk again is 'Moderate', 'Substantial' or 'Intolerable' and yields a score higher than 2, it implies that the applied controls are not sufficient to address the associated hazards and therefore do not bring the risk to a safe level. This would require additional controls to be applied and steps 4 and 5 to be followed once again.
- 8.** This process would continue until the residual risk is eventually brought down to an acceptable level (scores 1 or 2).
- 9.** Effective supervision of the task to be carried out is necessary to ensure that there are no unauthorized and unsafe diversions which could effectively change the entire risk assessment therefore making it inappropriate for the current task.

This form is for guidance purposes only and does not replace any company procedures or applicable statutory regulations.

VESSEL NAME:			ACTIVITY: Tug and barge towing operations	PERSONNEL INVOLVED IN THE TASK:		
HAZARD CATEGORY	POTENTIAL HAZARDS IDENTIFIED	RISK EVALUATION SCORE (Refer page 12)	POSSIBLE CONTROL MEASURES REQUIRED (including existing & proposed)	ACTION		RESIDUAL RISK SCORE (Refer page 12)
				PERSON RESPONSIBLE	DATE COMPLETED	
Collision	<ul style="list-style-type: none"> - Navigational error - Communication failure - Handling error - Weather and sea conditions 	Likely (3) x Harmful (2) = 6 Substantial (example only)	<ul style="list-style-type: none"> ▪ Crew to be duly certified and experienced in towing operations. ▪ Navigating crew to be fully conversant with Collision Regulations (COLREGS). Any action taken to avoid collision should be in accordance with the COLREGS. ▪ Bridge watchkeeping level to be maintained in accordance with the regulation and prevailing circumstances and conditions. ▪ Proper¹ look-out to be maintained at all times. ▪ All navigational equipment, as statutorily required to be available and operational. ▪ Routine testing of emergency steering and propulsion controls to be undertaken to ensure in good working condition and that crew are familiar with their use. ▪ Proper² use of the available navigational equipment. ▪ Lights and shapes to be displayed as per COLREGS and/or local regulations. ▪ Communication between vessels (such as over VHF) as a collision-avoiding action should be avoided as errors in such communication is noted as a contributing factor in some instances. However, where this is undertaken, the communication should be clear and concise, and crew should always remain cautious. ▪ Proper watch to be maintained on VHF for traffic and VTS communication. ▪ While taking collision-avoiding action, full regard should be given to the towing arrangement i.e., length and speed of the tow, the turning capability of the tug and tow set etc. 	Masters, all officers and crew.		Highly Unlikely (1) x Harmful (2) = 2 Tolerable (example only)

¹ Reference to Rule 5 (Look-Out) of the International Regulations for Preventing Collisions at Sea, 1972, as amended

² Reference to Rule 7 (Risk of Collision) of the International Regulations for Preventing Collisions at Sea, 1972, as amended

		Likely (3) x Harmful (2) = 6 Substantial (example only)	<ul style="list-style-type: none"> Due regard to be given to the traffic condition while navigating in high-density traffic areas. The length of the tow should be adjusted for the prevailing conditions of navigable waters and traffic. Where the tug is under pilotage, information exchange to be carried out with the pilot including agreement on the passage plan and the use of assisting tugs. For barges engaged in ship-to-ship cargo operations, adequate fendering arrangements are to be provided on all vessels involved. Suitable assessment of the direction and intensity of the current, wind, sea, and swell and their effects on the maneuverability of the tug and tow set to be¹ carried out. 	Master, all officers and crew.		Highly Unlikely (1) x Harmful (2) = 2 Tolerable (example only)
Allision	<ul style="list-style-type: none"> - Handling error - Communication error - Navigational error - Weather and sea conditions - Towing gear failure 		<ul style="list-style-type: none"> Full regard should be given to the towing arrangement i.e., length and speed of the tow, the turning capability of the tug and tow set etc. Suitable assessment of the direction and intensity of the current, wind, sea, and swell and their effects on the maneuverability of the tug and tow set to be carried out. Where the tug is under pilotage, information exchange to be carried out with the pilot including agreement on the passage plan and the use of assisting tugs. The length of the tow should be adjusted for the prevailing conditions of navigable waters and traffic. A wide berth should be given to obstructions such as offshore installations and fishing grounds with a safe passing distance noted in the passage plan. All towing gear being used should be in good condition, certified and appropriate for the operation being undertaken. Routine testing of emergency steering and propulsion controls to be undertaken to ensure in good working condition and that crew are familiar with their use. Adequate fender arrangement to be in place, as required. 			

Grounding	<ul style="list-style-type: none"> - Improper passage planning - Handling error - Weather and sea conditions - Towing gear failure - Intentional beaching 	<p>Likely (3) x Harmful (2) = 6 Substantial (example only)</p>	<ul style="list-style-type: none"> ▪ Proper passage planning to be carried out for the voyage including adequate markings such as shallow areas, danger areas, port of refuge etc. ▪ Charts to be kept up to date with relevant (permanent and temporary) notices together with other sources of related information (such as Navtex warnings). ▪ Under keel clearance to be monitored with echo sounding equipment, where fitted. ▪ The effect of tides on the charted depth and maneuvering of the set to be taken into consideration. ▪ Shallow water effect on the maneuverability of the tug and the tow set to be taken into consideration. ▪ Weather to be monitored prior to and during the passage to ensure that any limiting weather conditions, as identified due to the operational limitations of the vessels / operational conditions imposed by Flag, Class (Certifying Authority and towage approvals etc are complied with. ▪ The bollard of pull of the tug is to be sufficient for the displacement of the barge with regard to anticipated weather conditions. Being mindful of the reduction of the bollard pull with the age of the vessel, the bollard of the pull to be periodically tested/estimated. The bollard certificate is to be available on board. ▪ All towing gear being used should be in good condition, certified and appropriate for the operation being undertaken. ▪ Routine testing of emergency steering and propulsion controls to be undertaken to ensure in good working condition and that crew are familiar with their use. ▪ Where barges are intentionally beached for cargo operations or while on standby it must be ensured that <ul style="list-style-type: none"> o such beaching is approved by all parties concerned, such as owners, operators, charterers and local authorities. o the barge is adequately secured. o the seabed or riverbed is suitable for beaching and that no charted underwater obstructions are present o the accompanying tug is to be on standby for assistance in case of any emergency or deterioration of the weather. 	<p>Master, all officers and crew.</p>	<p>Highly Unlikely (1) x Harmful (2) = 2 Tolerable (example only)</p>
	<p>This form is for guidance purposes only and does not replace any company procedures or applicable statutory regulations.</p>				

Capsizing	<ul style="list-style-type: none"> - Inadequate stability - Cargo shift - Overloading - Hull breach due to poor condition of the barge - Weather and sea condition 	<p>Likely (3) x Harmful (2) = 6 Substantial (example only)</p>	<ul style="list-style-type: none"> ▪ The crew is to ensure that the stability of the tug and the tow is adequate and within the limits of their respective approved Stability Booklets. ▪ Cargo in bulk is to be adequately trimmed, as per the requirement of the approved Stability Booklet. ▪ Crew are to adhere with Loading and discharging procedures set down in the barge's approved Stability Booklet, with loading/discharging operations duly monitored. ▪ Sideboards and stanchions, where fitted, should always be maintained in a serviceable condition. ▪ Non-bulk cargo to be stowed and lashed as per the approved Cargo Securing Manual (CSM). Where an approved CSM is not available or special cargo is to be loaded that does not fall under the contents of the CSM, a Marine Warranty Survey (MWS) is to be carried out for verifying the adequacy of the cargo securing for the voyage. A copy of such a report is to be retained on board / ashore. ▪ Additionally, for barges carrying containers it must be ensured that: <ul style="list-style-type: none"> o the barge is statutorily allowed to carry containers. o heavier containers are stowed at lower tiers whilst lighter (and empty) containers stowed in the higher tiers. o Verified Gross Mass (VGM) information to be used for stability and stack weight calculations. o maximum permissible stack weight of the cargo space and of individual containers is not exceeded. 	<p>Master, all officers and crew.</p>		<p>Highly Unlikely (1) x Harmful (2) = 2 Tolerable (example only)</p>
-----------	---	---	---	---------------------------------------	--	--

Capsizing (continued)		Likely (3) x Harmful (2) = 6 Substantial (example only)	<ul style="list-style-type: none"> ▪ The barge is to be loaded within the operating limits of the load line certificate. ▪ When there are signs of unaccounted weights, all internal spaces to be investigated / sounded and necessary corrective steps, in consultation with Class/ Certifying Authority, to be undertaken. ▪ Any unaccounted weights (as above) to be considered whilst ascertaining the maximum permissible deadweight. ▪ Structural integrity of the barge to be maintained in sound / seaworthy condition. ▪ Any signs of excessive corrosion/ diminution of plating are to be immediately brought to the attention of the Class/ Certifying Authority and necessary corrective steps to be undertaken. ▪ Periodic inspections of all internal spaces, tank tops, sideboards, and the external hull to be carried out to verify the structural integrity. Records of the same to be maintained. ▪ Weather to be monitored prior to and during the passage to ensure that any limiting weather conditions, as identified due to the operational limitations of the vessels / operational conditions imposed by Flag, Class (Certifying Authority), towage approvals etc are complied with. ▪ Contingency plans regarding shifting of cargo or listing of the tow to be in place and crew training undertaken to ensure familiarisation. ▪ Possible ports of refuge to be identified in the passage plan. 		Highly Unlikely (1) x Harmful (2) = 2 Tolerable (example only)
-----------------------	--	--	---	--	---

Loss of cargo / Cargo shift	<ul style="list-style-type: none"> - Inadequate stability - Inadequate securing - Poor condition of sideboards - Weather and sea condition - Cargo theft during towage 	<p>Likely (3) x Harmful (2) = 6 Substantial (example only)</p>	<ul style="list-style-type: none"> ▪ Crew to ensure that the stability of the tug and the tow is adequate and within the limits of their respective approved Stability Booklets. ▪ Cargo in bulk to be adequately trimmed, as per the requirement of the Stability Booklet with loading/discharging operations duly monitored by appropriate personnel. ▪ Sideboards and stanchions, where fitted, should always be maintained in a serviceable condition. ▪ Non-bulk cargo to be stowed and lashed as per an approved CSM. Where an approved CSM is not available or special cargo is to be loaded that does not fall under the contents of the CSM, a MWS is to be carried out for verifying the adequacy of the cargo securing for the voyage. A copy of such a report is to be maintained. ▪ To ensure compliance with the Club's Barge Clause where it forms a part of vessel's terms of entry (Insurance policy). <ul style="list-style-type: none"> o the barge is statutorily allowed to carry containers. o heavier containers are stowed at lower tiers whilst lighter (and empty) containers stowed in the higher tiers. o Verified Gross Mass (VGM) information to be used for stability and stack weight calculations. o maximum permissible stack weight of the cargo space and of individual containers is not exceeded. ▪ Weather to be monitored prior to and during the passage to ensure that any limiting weather conditions, as identified due to the operational limitations of the vessels / operational conditions imposed by Flag, Class (Certifying Authority), towage approvals etc are complied with. ▪ Contingency plans regarding shifting of cargo or listing of the tow to be in place and crew training undertaken to ensure familiarisation. ▪ Possible ports of refuge to be identified in the passage plan. 	<p>Master, all officers and crew.</p>		<p>Highly Unlikely (1) x Harmful (2) = 2 Tolerable (example only)</p>
-----------------------------	---	--	--	---------------------------------------	--	--

Loss of cargo due to piracy/ pilferage	- Cargo theft during towage	Likely (3) x Harmful (2) = 6 Substantial (example only)	<ul style="list-style-type: none"> ▪ Proper look-out to be maintained at all times. ▪ RADAR to be monitored for any signs of small boats approaching the tug and barge set. ▪ Search lights may also be placed on tug boats and used periodically, during hours of darkness, to scan areas in vicinity of the tug and tow set. ▪ Positioning and securing of non-bulk cargo should be in such a manner to minimize easy break-in. ▪ In the carriage of high value cargoes, use of barbed wires/razor wire can be considered to prevent easy access. ▪ Further reference to be made to 'Tug Boats and Barges (TaB) Guide Against Piracy and Sea Robbery' and the Club's guidelines on the Piracy. 	Master, all officers and crew		Highly Unlikely (1) x Harmful (2) = 2 Tolerable (example only)
--	--------------------------------	---	--	-------------------------------	--	---

Loss of tow	<ul style="list-style-type: none"> - Towing gear failure - Insufficient tug power - Weather and sea condition 	<p>Likely (3) x Harmful (2) = 6 Substantial (example only)</p>	<ul style="list-style-type: none"> ▪ Tug, towing arrangements and gear to be in accordance with industry acceptable standards taking into consideration the nature of operation and expected weather conditions. ▪ All towing gear and equipment to be well maintained, regularly inspected, tested, and duly certified. ▪ A towing arrangement plan is to be available and posted on the tug. ▪ The tow line is to be inspected to ensure it is free of splices/ joints. ▪ A duly certified spare tow line, of sufficient capacity, is to be carried on board. ▪ Length of the tow line to be adjusted as required to ensure continuous control of the tow. ▪ The Emergency Towing Arrangement is to be set during towage operations and the tug's crew is to be familiar with its deployment. ▪ The bollard pull of the tug is to be sufficient for the displacement of the barge with regard to anticipated weather conditions. Being mindful of the reduction of the bollard pull with the age of the vessel, the bollard pull of the tug to be periodically tested/estimated. The bollard certificate is to be available on board. ▪ Suitable assessment of the weather condition is to be carried out prior to the voyage for the full perceived transit. The weather is to be monitored throughout the voyage. ▪ The tow connection is to be checked at regular intervals during the voyage and a towing log maintained. ▪ Ports of refuge to be identified during the passage planning and shelter sought in adverse weather conditions. ▪ A Fitness to tow survey to be carried out for non-customary towages. 	<p>Master, all officers and crew.</p>	<p>Highly Unlikely (1) x Harmful (2) = 2 Tolerable (example only)</p>
-------------	--	--	---	---------------------------------------	--

Personal injury	<ul style="list-style-type: none"> - Snap back from the tow line - Falling overboard 	<p>Likely (3) x Harmful (2) = 6 Substantial (example only)</p>	<ul style="list-style-type: none"> ▪ Crew to be equipped with appropriate Personal Protective Equipment (PPE) whilst working on the tug or barge. ▪ Lifejackets/Personal Floatation Devices (PFDs) to be used whilst working outboard, boarding, tying up, or connecting the barge. ▪ Working areas are to be kept safe and free from trip or slip hazards. ▪ Appropriate warning notices to be in place near mooring areas and the crew to be aware of the hazards associated with snap-back. ▪ Appropriate and detailed training must be provided to those involved in mooring operations. Non-designated crew, not trained/experienced in mooring/ towing operations should not be involved in these operations and those under training, should be supervised. ▪ Crew are to be well rested to avoid fatigue. ▪ Effective communication should be established and maintained between the crew on the tow and the tug. ▪ Crew to be made aware of the dangers of working on deck in heavy weather. ▪ Crew to be involved and their feedback sought when carrying out the operational risk assessment. 	<p>Master, all officers and crew.</p>		<p>Highly Unlikely (1) x Harmful (2) = 2 Tolerable (example only)</p>
-----------------	--	--	---	---------------------------------------	--	--

Environmental pollution	<ul style="list-style-type: none"> - Cargo spillage at sea - Damage to environmentally sensitive areas 	<p>Likely (3) x Harmful (2) = 6 Substantial (example only)</p>	<ul style="list-style-type: none"> ▪ All necessary steps to be taken as per control measures to prevent Loss of cargo. ▪ Material Safety Data Sheet (MSDS) of the cargo to be obtained from the shipper prior to the loading operation. ▪ Barge to be duly certified for carriage of dangerous and environmentally sensitive cargoes. ▪ Dangerous goods and environmentally sensitive cargo to be carried as per local, national, and/or international regulations. ▪ Passage to be planned with due care for environmentally sensitive areas which may be prohibited for navigation or recommended to be avoided. Further steps to be taken as per control measures to prevent Grounding. ▪ A wide berth should be given to environmentally sensitive areas such as coral reefs with a safe passing distance noted in the passage plan. ▪ Proper look-out to be maintained at all times. ▪ Routine testing of emergency steering and propulsion controls to be undertaken to ensure in good working condition and that crew are familiar with their use. 	<p>Master, all officers and crew</p>	<p>Highly Unlikely (1) x Harmful (2) = 2 Tolerable (example only)</p>
-------------------------	--	---	---	--------------------------------------	--

RISK EVALUATION MATRIX TO OBTAIN SCORE

		Severity/Consequence		
		Slightly Harmful (1)	Harmful (2)	Extremely harmful (3)
Likelihood	Highly Unlikely (1)	Trivial Risk (Score 1)	Tolerable risk (Score 2)	Moderate Risk (Score 3)
	Unlikely (2)	Tolerable Risk (Score 2)	Moderate Risk (Score 4)	Substantial Risk (Score 6)
	Likely (3)	Moderate Risk (Score 3)	Substantial Risk (Score 6)	Intolerable risk (Score 9)

THE TABLE BELOW INDICATES THE RECOMMENDED RESPONSE IN EACH CASE.

Trivial	No action is required.
Tolerable	No additional controls are required. Monitoring is required to ensure control is maintained.
Moderate	Efforts are required to reduce risk. Controls are to be implemented within a specified time.
Substantial	New work not to start until risk reduced. If work is in progress, urgent action to be taken. Considerable resources may be required.
Intolerable	Work shall not be started or continued until the risk has been reduced. If reduction is not possible, the activity shall be prohibited.

This form is for guidance purposes only and does not replace any company procedures or applicable statutory regulations.