1. OFFSHORE SUPPORT VESSELS

This section provides additional guidance for Australian offshore support vessels engaged in the carriage of cargo, in towing and in anchor handling operations on how to manage the key risks associated with these activities.

Further information is available in the Guidelines for Offshore Marine Operations.

1.1 Risk management

Offshore operations are often complex and hazardous, involving many parties who share responsibility for ensuring these operations are carried out safely. Before commencing any offshore operations, vessel operators must carry out a risk management process (described in section 2 of this Code) in consultation with all other relevant duty holders including the charterer, Offshore Installation Manager (OIM) and operators of any other support vessels carrying out simultaneous activities at an installation.

The outcome of the risk management process should be used by the operator to develop a Safety Management Plan which sets out the health and safety roles and responsibilities and various procedures that the company expects to be followed as part of the safe operation of its vessels.

Offshore installations operate under risk management plans or safety cases approved by the National Offshore Petroleum Safety and Environmental Management Authority. Offshore support vessels may therefore need to comply with additional requirements under the facility’s safety case regime which should be discussed and agreed as part of the charter party.

The Master must discuss with the operator and charterer any provisions of the charter party that may exceed the limitations or capabilities of the vessel to the extent that safety may be compromised. Each vessel should have on board a copy of the charter party prior to commencing operations so that the Master and crew are aware of any special expectations that the charterer may have of the vessel, and of their obligations to the charterer.

Weather forecasts must be available during all offshore operations, and operations planned accordingly.

1.2 Communication

To ensure effective safety management of offshore operations, it is essential that operators of offshore support vessels and charterers establish a process for consultation, ongoing communication and coordination of activities. A direct line of communication needs to be established between operators and charterers to enable all safety matters to be raised and addressed. Individuals should be nominated for this purpose. This direct line should not replace the first line of communication between the Master of the vessel and the OIM but should complement it.

Note: It is proposed to include this section into the revised Code of Practice for Health and Safety in Shipboard Work. Information already in the Code relevant to offshore support vessels is not repeated here.
Before commencing offshore cargo operations, anchor handling or towing, the planned activities should be discussed and agreed by radio between the OIM and Master, or their appointed deputies, to ensure that the installation and vessel are ready in all respects. The Master must be advised of any anticipated helicopter movements during the operations.

The installation should be informed of any factors limiting the vessel’s expected performance before or during operations, and the vessel’s Master should, in turn, be given information on limitations of the installation which may affect the operation.

Effective communication between the Master, the installation personnel, particularly the crane operator, the deck officer in charge on the vessel and the deck crew are vital for safety during operations. An effective radio communication link between the vessel and installation on a dedicated channel should be maintained at all times whilst the vessel is engaged in offshore operations.

1.3 Cargo Transfer Operations

Pre-planning

Cargo pre-planning should be conducted both at the shore terminals and offshore to facilitate the safe transfer of cargo between offshore support vessels and installations.

The order of loading, discharging and stowage arrangements should be planned to avoid ‘cherry picking’ and to minimise the number of lifts at the installations. The Master should be informed of any high priority items before loading so that they can be discharged first. A cargo plan should be maintained on board showing the locations of the “blocks” of cargo for each facility together with the number of lifts in each block and other relevant details.

All cargo should be accompanied by a cargo manifest identifying the goods loaded onto the vessel with details of the contents, destination, general dimensions and weight. Operators should provide equipment at the shore base to verify weight during loading operations.

The Master should be provided with details of any unusual items of cargo requiring special securing arrangements, or heavy lifts, before loading.

All deck cargo must be correctly stowed and adequately secured for the intended voyage.

Congestion on the cargo decks of both offshore vessels and installations can create hazardous situations. A vessel should plan to arrive at an offshore facility with approximately 10% of its useable deck clear and ready to receive initial back-load. This allows sufficient space to be cleared on the facility’s deck before any cargo is taken up from the vessel.

The Master has the authority to decide the sequence of cargo discharge to, and back-loading from, the installation.

The Master should be informed of expected delays to operations so that the vessel's work programme may be synchronized with that of the installation. Excessive standby/waiting time alongside the installation should be avoided.
Bulk cargo transfer operations

Undertaking bulk cargo operations should include the following general precautions:

- The pressure ratings of all components of the transfer system should be checked to ensure that they are suitable for the proposed operation. The pressure at which bulk cargo is delivered must not exceed the safe pressure of the receiving system.
- Agreement is needed between all relevant parties, including vessel, base, facility or tanker regarding the pressure rating to avoid overpressure.
- Communication arrangements should be agreed and tested before commencing the operation and at frequent intervals as it proceeds.
- Relevant personnel must be readily available and nearby throughout transfer operations.
- Remote stop controls must be provided for all bulk cargo discharges, i.e. dry bulk and liquid bulk, to enable the immediate shutdown of operations in the event of a problem.
- In bad weather and under certain conditions of trim, considerable amounts of water may flow over the after deck when a vessel is approaching a rig stern-on under power. Open stern vessels pose an increased risk of flooding. Crew members should be aware of this possibility and seek positions of safety.
- Do not close valves against a cargo pump.
- Do not use compressed air to clear hoses used for the transfer of any hydrocarbon based products since an increased risk of explosion will result.
- Do not use potable water hoses for transferring other bulk liquids, including ordinary fresh water. The transfer of potable water and fuel at the same time should be avoided.
- Hoses should remain afloat at all times.

The vessel must advise the offshore installation of the following:

- maximum pumping rate;
- emergency stop procedure;
- notice required to stop bulk transfer under normal conditions; and
- draining back procedure.

The installation must advise the vessel of the following:

- size and length of hose
- type of hose connection;
- length of hose available;
- maximum rate at which bulk/liquids can be received;
- quantities of each product required;
- order of receiving bulk/liquids; and
- maximum back pressure that the installation’s pipe system can withstand.
Before arriving at offshore installations to discharge liquids, cargo and bulk, the following matters should be checked:

- that the ship can approach the installation safely;
- that there are no divers, ROVs etc in the water;
- that the weather/tide/current/sea and swell conditions are suitable;
- the type, weight and number of units to load or discharge;
- the existing cargo on deck;
- that there is sufficient space on deck to allow safe access to and from the work area;
- that all engine/steering/thrusters/joystick controls have been checked and are fully operational and the main engine pitch control is fully operational;
- vessel’s electrical load must be carried by auxiliary alternators and is not totally reliant on shaft alternators; and
- hose connection points on the vessel are in good order.

Before proceeding with the cargo operation the Master must ensure that:

- all emergency pump stops are operational;
- the vessel is able to remain on location in the prevailing weather and sea conditions;
- correct couplings have been identified for the products to be transferred; and
- constant communication is maintained with the person on the platform responsible for supervising the transfer of hoses and receiving of cargo.

Hoses should only be lifted by a certified wire strop on a certified hook eye fitting. Hoses should be secured to the vessel by a rope lashing before disconnection from the crane. Further rope lashings at appropriate places will minimize ‘kicking’ of dry bulk hoses.

When the hose is connected and installation lines are set, the support vessel should be instructed to start pumping at a slow rate. If no leaks are observed, the support vessel should be instructed to increase pumping, up to the full delivery rate. Relevant installation personnel should stand by appropriate valves so as to act quickly in event of an emergency.

When pumping has finished, both the installation and the support vessel should set their lines to allow the hose to be drained back to the vessel’s tank. If the installation has a vacuum breaker fitted to the line, this should be used to aid draining. Lines may also be blown through with air, if available, to ensure that they are properly cleared. In suitable conditions the crane should also be used to lift the hose to aid draining.
The hose terminations should be colour-coded by use of a coloured band to mark the product, and all support vessels and installations should adopt a universal colour and connection scheme as follows:

<table>
<thead>
<tr>
<th>Product</th>
<th>Coupling colour</th>
<th>Connection</th>
<th>Vessel coupling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry cement</td>
<td>Yellow</td>
<td>5” hammer lug union</td>
<td>Male</td>
</tr>
<tr>
<td>Dry barite &amp; bentonite</td>
<td>Orange</td>
<td>5” hammer lug union</td>
<td>Female</td>
</tr>
<tr>
<td>Potable water</td>
<td>Blue</td>
<td>4” hammer lug</td>
<td>Female</td>
</tr>
<tr>
<td>Fuel</td>
<td>Brown</td>
<td>4” quick release self-sealing coupling</td>
<td>Female</td>
</tr>
<tr>
<td>Base oil</td>
<td>White</td>
<td>4” quick release self-sealing coupling</td>
<td>Female</td>
</tr>
<tr>
<td>Drill water</td>
<td>Green</td>
<td>4” hammer lug</td>
<td>Female</td>
</tr>
<tr>
<td>Brine</td>
<td>Red</td>
<td>4” quick release self-sealing coupling</td>
<td>Male</td>
</tr>
<tr>
<td>Oil based mud</td>
<td>Black</td>
<td>4” quick release self-sealing coupling</td>
<td>Male</td>
</tr>
<tr>
<td>Methanol</td>
<td>Black and yellow (tiger stripes)</td>
<td>4” quick release self-sealing coupling</td>
<td>Male</td>
</tr>
</tbody>
</table>

**Fuel Handling Equipment**

The condition of hoses and connections should be inspected before each use to identify any chafed or worn areas. ‘Dry Break’ type couplings should be used where possible. In cases where ball valves are used in the end of fuel hoses measures should be taken to prevent damage to the valve handle when the hose is landed on the support vessel deck.

Ensure that hoses passed to or from the vessel are empty and not under any pressure, and that the risk of spilling oil is eliminated or minimised.

**Dry Bulk and Cement Equipment**

Check the condition of hoses and connections. Worn sections of hoses should be replaced before use as a blow-out creates a severe dust hazard as well as a hazard from hoses whipping around under pressure.

Bleed off/ test cocks should be fitted near the hose connection point to enable crew to check that pressure is off the line prior to connecting/disconnecting. These cocks should be placed in the upper end of the pipe and regularly serviced to avoid blockage by product or rust.

**Glycol and Methanol Systems**

Glycol and methanol must only be carried in dedicated tanks and delivered through dedicated systems.

Methanol, when carried on deck, must only be carried in specialised portable tanks as a sole deck cargo. The tanks must be secured and adequate fire fighting equipment must be laid out ready for instant use. All tools and connections used must be made of approved material that will not provide a source of ignition.
Securing to the Installation

An adequate area for handling mooring lines should be left free of cargo at the stern of the vessel if the vessel is securing to the installation. If it is necessary to carry deck cargo in the area that the crew require for mooring activities, such cargo should be discharged to the installation before the vessel is moored.

Unusual cargo items

All tubular backloads should be indicated to the vessel in good time to allow for planning of stowage. Tubular cargoes should be pre-slung in bundles or singly and secured by bulldog grips or other equivalent methods to prevent slippage. All pipe lifts should be slung so as to be level. Varying lengths of sling in one lift should not be used.

Other operations, bulk handling etc., may have to be suspended whilst heavy lifts are underway. Subject to agreement with the Master, taglines may be attached to heavy or large lifts, if considered necessary to aid handling.

Crane Operations

For offshore crane operations a safety pendant (‘Stinger’) of sufficient length should be provided between either the headache ball or floating block and the hook, all of which should be of high visibility colour. The tag line attached to the ‘Stinger’ should be a minimum diameter of 12mm and not too short or too long to create a hazard.

The ‘Stinger’ and hook must be of an appropriate SWL for the lifts being worked. The installation should have a selection available for the type of cargo that is normally handled. The lighter the weight of the ‘Stinger’ and hook, the less hazardous it is for the deck crew on a moving ship to handle, provided that it is of sufficient SWL.

For routine cargo operations, only swivel self-locking safety hooks should be used. For non-routine cargo, alternative hooks or lifting gear as agreed between the Master and OIM may be used, providing that such equipment is fit for the purpose.

The crane driver should always have a clear view of the vessel’s deck and have direct radio communication to the bridge of the vessel. Directions given to the crane driver by the deck crew on the vessel must only be given by one person who has been designated to perform that function.

Consideration must be taken of impact loadings caused by the vertical movement of the craft in the swell when the weight of the cargo is taken by the crane.

When planning the loading ashore, containers and pre-slinging arrangements should be suitably de-rated to take account of the expected sea conditions during discharge at the offshore installation.

As far as is practicable, all crane lifts made from or onto a supply vessel should not be lifted directly over the vessel if the height of the lift above the vessel exceeds 3 metres inclusive of any swell which may be in existence. Once the height of the lift exceeds 3 metres, the remainder of the lift should be made over water.
1.4 Offshore Transfer of Personnel

Various methods may be used to transfer personnel to or from a vessel whilst it is offshore. The preferred method of undertaking such transfers will normally be by helicopter or where conditions are suitable, by specialised small craft.

If these methods are unavailable, ‘Frog’ personnel transfer capsules, transfer baskets or other forms of carrier lifted by a crane on the facility may be used. In general, baskets or carriers incorporating a rigid frame which provides protection for occupants are preferable.

The risk management process should be followed whenever personnel transfers are considered. Personnel transfer should include the following general precautions:

- The capacity of the personnel transfer basket, carrier or craft as determined by the manufacturer of the equipment must not be exceeded at any time.
- The suitability of the vessel to carry out a transfer should be determined by its ability to maintain station alongside the installation and have sufficient clear deck space to safely receive the carrier.
- Personnel should be briefed on the correct means of boarding, riding and disembarking the carrier. A person to be transferred who is not sufficiently experienced or trained should not be permitted to transfer unaccompanied.
- Personnel transfer should generally not proceed where the prevailing conditions include one or more of the following:
  - Wind speeds in excess of 20 knots (10 metres / second) at height of 10 metres above sea level.
  - Significant wave heights in excess of 2.5 metres.
  - Horizontal visibility of less than 500 metres, vertical visibility of less than 100 metres.
  - Heavy accumulations of snow or ice on landing areas, access and egress routes, etc.
- Overseeing supervisors and operators of equipment used in transferring personnel between offshore installations and/or vessels should be competent to undertake the tasks assigned to them.
- Wherever possible, supervisors should have a clear view of all phases of the entire transfer operation.
- The means of communication between the various personnel involved in the transfer operations should be determined as part of the risk management process. All such means of communication should be in place and their correct operation verified prior to the commencement of any transfer activities.
- Transfer operations should be conducted during daylight hours. If this is not possible, the transfer areas should be adequately illuminated.
- A basket or carrier should be fitted with sufficient buoyancy to support the unit itself and its occupants in the event of entering the water.
- Baskets or carriers should be visually inspected by a competent person before each operation to ensure that all rigging, fixtures and fittings remain fit for purpose and secure.
- Lift-off and landing areas on the facility and vessel should be clearly marked and kept free of any obstructions.
• Appropriately briefed personnel should be in attendance for both lift-off and landing to assist in controlling the movement of the basket or carrier. In particular, such personnel should be briefed in the use of attached tag lines.

• Any other work in the vicinity of the lift-off and landing areas should be suspended whilst the transfer is in progress.

• The transfer route should be planned so that the basket or carrier is always well clear of any exhausts, discharges or obstructions.

• After the basket or carrier is lifted from the deck of the facility the crane should be slewed so that it is over the water, whereupon it is lowered to a height of approximately 2 metres above the vessel’s cargo rail. The basket or carrier should then be moved to a position over the designated landing area on the vessel before being finally lowered onto its deck. Transfers from the vessel to the installation should follow the reverse route.

• Free-fall or non-powered lowering should not be used.

Safety Equipment

Personnel being transferred should be provided with appropriate personal protective equipment which may include:

• Watertight immersion suit
• Thermal protection
• Inflatable lifejacket or buoyancy aid
• Personal Locator Beacon, where detection and tracking facilities are available.

Personnel should be given instructions on the correct donning and use of the equipment. Before boarding the basket, carrier or craft it should be checked by the person supervising the transfer.

Personnel should not wear any clothing or carry any items which could restrict their mobility or interfere with the correct operation of any protective equipment.

Rescue procedures

Rescue facilities must be available at immediate notice during personnel transfer operations. Where a stand-by vessel is in attendance, if not directly involved in the transfer operation, its rescue boat should be made ready for immediate launching.

Alternatively, fast rescue boats or craft installed on other vessels, should be identified and agreed before the persons in charge give the necessary authorisation.
Roles and responsibilities

The duties of those involved in the transfer of personnel should at least cover the following:

Offshore Installation Manager

- the necessity for the transfer
- the fitness and training of the persons to be transferred
- the suitability of the vessel
- visibility and sea state
- limitations on transfer by night
- the suitability of the crane for personnel transfer
- wind speed limitations on crane operations
- the briefing of participants to ensure that procedures are understood
- the briefing of the Master of the vessel
- the adequacy of the crane driver’s experience
- the notification of the stand-by vessel before commencement
- the inspection and testing of the personnel basket or carrier
- establishing effective communication between the installation, the crane, the vessel and the stand-by vessel

Master of the vessel

- confirmation to the OIM of accepting the transfer and understanding the procedure
- confirm that the vessel is stationary and that its station keeping arrangements are fully operational
- the deck crew is fully briefed
- persons to be transferred are adequately briefed and fit to be transferred

Crane Driver

- the crane is fully operational
- the windspeed is satisfactory for safe operation
- the crane driver has a clear and unobstructed view of the carrier or basket, or is able to see the directions of the ‘Dogman’
- adequate communications are established.
Dogman and Deck Supervisor

- the transfer procedure is understood
- they are clearly identifiable as ‘Dogman’ and ‘Deck Supervisor’
- the personnel basket or carrier is correctly used
- the transferees are fit for transfer and understand procedures
- proper communications have been established
- they have a full view of the transfer areas.

Individuals who are to be transferred

- the transfer procedure is understood
- confirm that they agree to the transfer
- correctly use the safety equipment provided
- observe all instructions from those in charge of the operation.

Transfer by Boat

The vessel Master is responsible for deciding whether such transfer is safe in the prevailing conditions, by taking into account the following:

- Wind and sea state
- Movement of the vessel from which the boat is to be launched
- Movement at the access point on the installation
- Performance characteristics of the boat and launching/recovery equipment
- Boat crew and transferee training and experience
- Any other prevailing circumstance that may affect the safety of the transfer.

Further guidance is available in the ILO Code of Practice on Accident Prevention on Board Ship at Sea and in Port.

1.5 Anchor Handling

Anchor handling involves lifting extremely large weights and can involve a fleet of vessels working together as they move the anchors of an installation. Risk assessments are essential for such operations. Offshore personnel should be aware of the operational limitations of the various vessels used, including their power and freeboard. Detailed procedures for each operation should be set out in the ship’s Operations Manual.

Vessel owners must ensure that vessels involved in anchor handling operations are fit for the purpose and adequately manned.

Where several vessels are working together on the same operation, a specific communication plan for that activity must be established to ensure an effective and coordinated action in the event of any unintended incident.
Communication between vessel workstations where the Master and winch driver will be, and the anchor handling deck must be decided prior to the operation.

As anchor handling is often performed over the stern, control measures must be implemented to eliminate or minimise the risk of crew members being washed across the deck by seas coming aboard during operations. The Master has the authority to cease operations if the weather is such that there is a significant risk of injury due to boarding seas.

If in attendance, the standby vessel should be informed of all operations in progress.

**Crew Briefing**

The Master must brief the crew on the planned operation prior to work commencing, including any unusual aspects of the job and hazards that may be encountered. A Job Safety Analysis covering the proposed work program should be reviewed and discussed at this ‘toolbox meeting’.

If it becomes necessary to deviate from the plan during the operation, written procedures must be established detailing responsibilities. Any deviation from the plan must be agreed by all parties.

Crew should be provided with an opportunity to familiarise themselves with the operation of deck machinery.

**Clear Decks**

Anchor handling vessels should have clear decks prior to commencing anchor handling operations. All personnel should be clear of the deck and in a protected place at all times, except when they are actually working on the anchor handling equipment.

**Equipment**

Anchor handling equipment is exposed to heavy wear and damage. A system must be in place for the testing, inspection and maintenance of anchor handling equipment.

All equipment used in anchor handling operations should be secured until required. Care should be taken when opening up wire coils, in particular pendant wires, as injuries have occurred when the coils spring open following release of the securing bands.

When running anchors, the anchor-handling vessel Master should be advised where the installation winches have payout limitations so that speed can be controlled.

It is preferable to have a length of chain installed between the crown of the anchor and the pendant and this chain should be long enough to reach the vessel securing device and thus allow crews to change pendants without the need to deck the anchor.

A safe and effective method of stoppering wire pendants should be implemented.
**Wires**

Work wires must be of adequate size for the power of the vessel, the strength of the anchor handling winch, the size of anchors to be worked and the depth of water. They should be at least the same diameter as that specified for the tow wire of the vessel. They must be long enough to have at least one full wrap on the work drum when the wire is led out as far as it would normally be when working with anchors.

The securing device for the ‘bitter end’ of the work wire must be the correct size for the wire in use to provide an adequate fixing to the winch drum.

Tugger wires should be of adequate size and strength with regard to the size and weight of the gear being handled, and the power of the tugger winches. The SWL must be at least equal to the maximum pulling power of the winch. They must be of sufficient length to always have at least one full wrap on the winch drum at the maximum extension. Tugger wires must also have an adequate means of securing the ‘bitter end’ to the winch drum.

‘Latchlock’ style hooks are preferred for use on tugger wires.

**Sockets and Eyes**

Because the majority of breaks occur at or near the wire terminal, the condition of all sockets and eyes should be closely monitored. The terminals of work wires, tuggers and pennants in particular are subject to damage (work hardening, kinking and overstress) due to being wound onto winch drums under load and compressed or distorted by other layers on top.

Similarly, the ‘long stirrup’ type of socket should not be used for anchor handling where it is to be wound around a winch drum. ‘Short stirrup’ type sockets should be used instead.

Sockets should be inspected often with particular attention to the join between the lug and the body of the socket. Hard eyes should be checked, paying particular attention to the wire at both ends of the swage and the condition of the thimble. Wires with badly crushed or distorted thimbles should not be used.

Sockets and eyes must be of an appropriate size to enable easy connection when used with the correct size shackle. The use of two shackles between pendants or work wires is discouraged due to the hazards created when winding excess gear onto work drums.

Current test certificates (preferably proof load or ultrasonic/magnetic particle test as a minimum) must be available for sockets (with individual serial numbers rather than the previously used batch numbers) prior to use. Sockets should be properly fixed to the wire by an experienced person using correct procedures and materials that are approved for the purpose.

**Shackles**

Only shackles of sufficient SWL must be used when handling anchors, taking into account that the anchor may be deeply embedded in the seabed thus increasing the load to which the equipment is subjected.

Link type shackles (‘Baldt’ or ‘Kenter’ style) or hinge links are preferred for use between pennants or where multiple shackles must be wound onto the winch drum. The risk of fouling the pennant as it is unwound under load is much reduced when these links are used.

If ‘Bow’ type shackles are used for winding onto winch drums they should be placed such that the pin is toward the winch as this also reduces the incidence of fouling of the wire when it is unwound under load.
Roller Fairleads

The use of roller fairleads mounted on the deck or crash barriers of vessels should be carefully monitored. Inspection and maintenance must be performed regularly as any uplift by external forces, such as a tugger wire, may dislodge roller fairleads from their seating. Careful reassembly of these leads after maintenance is important.

Personnel should never stand inside the bight of wire around a roller fairlead.

Hydraulic or Mechanical Stoppers

These usually come in the form of ‘Shark Jaws’ (or Triplex gear), ‘Ulstein Tong’, and ‘Karm Fork’ designs or other similar proprietary mechanical/hydraulic securing devices. These devices should be used strictly in accordance with the manufacturer’s instructions.

‘Ulstein Tongs’, ‘Karm Forks’ and other types that use removable jaws for different applications are dangerous if the wrong jaws are used. For this reason it is important that the correct jaws be used for chain and wire applications.

Ensure the device is ‘Locked’ either mechanically (by pins or bars) or hydraulically before crew members commence work on the connection. Visual inspection must be done on each occasion with the hydraulic locking type to ensure that the arms have reached the over-centre point where locking is effective.

Hard eye or soft eye wires with a “Tellurit” or sleeve (ferrule) type termination should not be used in a mechanical stopper where the sleeve bears the weight against the stopper jaws or inserts. Wire pendants may be supported in mechanical stoppers by attaching five links of anchor chain to the pendant or forming three links of anchor chain with the thimble and using a chain link in the mechanical stopper.

Soft eye pendants wear more quickly than hard eye pendants and therefore require frequent inspection. If doubts exist as to the suitability of the pendant it should be returned to the rig and replaced.

Any equipment returned to the installation as suspect or unserviceable must not be used or sent back to a vessel for use until it has been repaired, retested and recertified by a competent person.

Buoy Catchers

The Master should consider the following factors before deciding to use the ‘Lightweight’ type of buoy catchers:

- Weather conditions
- Depth of water
- Weight of the buoy and pennant system
- Size and movement of the vessel
- Likelihood of the anchor being fouled
- Other conditions that may lead to an excessive load being applied to the catcher.

If any of the above factors are unfavourable, an alternative should be used to reduce the potential failure of the buoy catcher. A heavier chain may be pulled around the pennant under the buoy or around the crucifix with a tugger wire or mooring line and shackled back to the work wire, thus providing a much more substantial buoy catcher which is less likely to fail under heavy load.
Ensure that the heavy chain buoy catcher is properly stoppered while connection is being made due to the likelihood of snatch loads being suddenly applied to the gear.

All anchor handling vessels must carry equipment that may be used as a heavy duty alternative to the ‘Lightweight’ buoy catchers.

Regardless of the type of catcher used, it is essential for safety that all crew are ‘off the deck’ or behind the crash rail while heaving the buoy as excessive weight may suddenly come on the catcher, parting it. This may happen due to a fouled anchor making the pennant shorter than expected, the vessel drifting away from the line of the anchor in the swell or some other unforeseen circumstance.

**Chasers**

It is preferable for chain chasing operations that the chaser wire be one continuous length. This reduces the hazards associated with numerous shackles and sockets on the winch drum while recovering anchors.

The chaser wire should be the same size as the work wire normally used on the vessel and long enough for there to be at least one full wrap on the drum when it is paid out to its full working length for the water depth.

**Chain Hooks and Tuning Forks**

When using chain hooks ensure that the SWL is not exceeded. As there is no means of locking in position, they may become distorted and fail if overloaded or twisted. Chain hooks should not be used to haul chain if there is any doubt as to the load that they may be required to bear.

‘Tuning Forks’ or other locking type chain handling devices are preferred over chain hooks as they reduce the risk of injuring crew or damaging equipment.

**Pipelines, Sub-Sea Obstructions/Structures**

All personnel involved must have full details regarding the location of pipelines and sub-sea obstructions/structures relating to the whole operation.

Where it is known that anchor handling and/or towing operations will be conducted near pipelines or sub-sea obstructions/structures, then full written procedures should be agreed by all parties.

**Carriage of Spare Anchor Buoy**

Each vessel engaged in anchor handling operations should carry a spare anchor buoy on deck throughout the work in order that the vessel’s work wire can be buoyed off should the need arise, e.g. if the weather deteriorates during anchor running operations and it is not considered prudent to bring the vessel back alongside to recover the chasing pendant, or if the vessel suffers a mechanical breakdown which restricts its ability to manoeuvre safely alongside the installation.
**Winch Drum Visibility**

On all anchor handling vessels the winch driver must have a clear view of the winch drum that is being operated. The Master should also have a clear view of the drum. Both the Master and winch driver should have a clear view of the working deck.

On vessels where there are video cameras installed to provide a view of the winch drum, these and the associated lighting must be positioned to give the best view possible. The video system should be maintained so that the winch driver always has a clear view of the drum.

In an emergency or system breakdown it may be necessary to operate the winches using a crew member as an observer at the drum using a radio or hand signals to communicate direct to the winch driver. If this is necessary the observer should be positioned to eliminate or minimise any risks from the winch or the equipment being wound on/off. Hand signals should be agreed prior to the operation and all personnel fully briefed on the requirements.

**Chain Chasing**

This operation should be performed using the recommended amount of wire for the depth of water and using the methods recommended by the manufacturer.

To avoid picking up bights of chain/wire with consequent overloading of the gear, tension should be maintained by the installation on the anchor chain/wire until the vessel has run the full distance and is ready to commence heaving.

To avoid overloading of the equipment, the vessel should be kept directly over the line of the anchor cable while chasing and care should be taken not to use excessive amounts of power on the vessel's propulsion.

The crew should be off the deck and in a protected location during chasing operations.

**Grappling**

Care should be taken deploying grapples and ‘J’ hooks over the stem as if the weight suddenly comes on the pendant wire it may whip across the deck.

Excessive power or speed may cause sudden overloading on equipment when the grapple or ‘J’ hook encounters the cable.

**Recovering Anchors**

Care should be taken when lifting anchors, especially those that are deeply embedded in the seabed, to avoid as much as possible sudden heavy loads on the pendant string from the rise and fall of the vessel in the seaway.

If it is necessary to deck an anchor, it should be secured on deck so that it cannot move due to the movement of the vessel.
Multiple Pendants

Care should be taken when stowing multiple pendants on the winch drum to avoid fouled pendants when the wire is unwound. If ‘bow’ type shackles are used they should be placed so that the pin is toward the winch as this reduces the possibility of fouling behind the pin when the wire is unwound under load.

Length of Pendant from Rig

The length of pendant that is passed to the vessel from the installation should be sufficient to allow the vessel Master room to manoeuvre to keep the pendant slack while it is being connected to the work-wire/pendant by the deck crew.

Anchor Deployment

The anchor handling vessel should be held in line with the anchor cable while the anchor is deployed and until the buoy is in the water so that the pendant is laid out in a straight line away from the anchor, reducing as much as possible the hazards associated with fouled anchors.

The installation should tension the cable as soon as possible after the anchor is on the bottom to ‘set’ the anchor below the seabed and thus avoid fouled anchors.

Buoy Deployment

Buoys should be deployed from as close to the stern of the vessel as possible to avoid an uncontrolled and damaging progression along the length of the deck.

Passing Pendant to Rig

Ensure that the pendant is not released from the securing device on deck until the crane has taken the weight as this can lead to unacceptable shock loads on the crane.

Clearing Fouled Anchors

Crew members should be aware that coils of pendant wire fouling an anchor may move sharply as they are cleared. Clearing should be accomplished as much as possible using tuggers and other mechanical means.

Pendant wires that have been cleared from a fouled anchor should be closely inspected by an officer of the vessel for damage before a decision is made as to whether they are suitable for use. If there is damage to the wire sufficient to render it suspect, the wire should be marked ‘Out of Service’ and returned to the installation where it should be quarantined.
1.6 Towing

Towing can be hazardous. Offshore personnel should be aware of the operational limitations of the various vessels, including their power and freeboard.

Vessel owners are responsible for ensuring that vessels involved in towing operations, together with their equipment, are fit for the purpose and adequately manned by competent personnel.

A safe method of passing the main towing pendant from the installation to the towing vessel should be established. A system to prevent tow-line chafing should be used.

If a messenger is used to pass the tow-wire to the towing vessel, it should be strong enough to support the entire weight of the towing bridle and fore-runner, or at least long enough to allow an adequate strength messenger to be on the winch of the towing vessel before the weight of the gear is taken. Recovery wires attached to appropriate winches on board the installation may be used to relieve weight on the towing vessel's equipment during connection/disconnection but these should not be so taut as to hold the weight of the gear above the water level or in any other way pose a danger to the towing vessel crew. The installation crew must take instruction from the towing vessel master when using these winches.

As soon as the towing vessel is connected and commences towing operations, winches on the vessel being towed (if used in the towing gear) must be continuously manned during the initial stages of the tow, and be under control of the towing vessel's Master.

Clear Decks

Once the tow is safely connected, the crew should ‘clear the deck’ and stay clear until the tow is streamed to towing length and the Master authorizes fitting of chafing gear or other necessary maintenance.

Vessels involved in towing should have decks as clear as possible with no cargo or other equipment encroaching on the area of the deck covered by the tow wire between its extremes of possible movement.

Towing Equipment

The towing equipment should be inspected by a competent officer of the vessel before connection to ensure that there are no apparent defects that may affect the safety of the tow.

The main towing equipment must be of sufficient size and construction as recommended by the rig/barge builder. The power of the towing vessel and size of the towed vessel gear should be taken into account. As a guide, the towed vessel bridle and forerunner should be larger and stronger than the towing vessel tow-wire.

The bridle and fore-runner should be long enough to allow the towing vessel room to manoeuvre while connecting and disconnecting and there should be an effective and safe means of passing/recovering the gear to/from the towing vessel.

The securing points on the installation should be of a type that allows slipping of the towing gear in an emergency (‘Smit’ brackets or similar).
Reserve Tow Equipment

The secondary towing system on an installation should be identified, a readily available method of retrieval of the main towing gear established, and a safe method of passing the secondary towing system agreed.

Towing vessels engaged in long tows or where there is only a single towing vessel should carry a complete set of spare gear to enable reconnection in the event of failure.

Where possible, spare tow-wires should be stored permanently on powered drums as this greatly assists the crew should the spare tow-wire be required to be installed. Spare tow-wires should be stowed on the drums with the bitter-end outward.

Towing vessels should ensure that the installation personnel are aware of the time that may be required to rig their spare towing wire. When an additional vessel is available as reserve tug whilst on passage, it should be rigged for towing.

All crew must be fully briefed on the procedure for installing the spare tow gear and reconnecting as this is normally required to be done in adverse conditions when hazards are greater than normal and mistakes can be made due to undue haste.

Manned Tow

The personnel on board the towed vessel are responsible for:

- using the proper navigation signals on a manned tow and following the instructions issued by the tow master, and
- maintaining the vessel properly ballasted and trimmed and not making changes without the prior knowledge and agreement of the Master of the tug.

A continuous communications link on a dedicated channel should be established and maintained between the tug and tow for the duration of the tow.

Unmanned Tow

The Master or officer of the towing vessel must inspect the towing arrangements of unmanned tows to become familiar with the layout of both main and reserve towing gear on the vessel to be towed and to have any apparent defects corrected before connection.

The Master or officer of the towing vessel must also check that the navigation lights of the vessel to be towed are working and have sufficient capacity to last the entire length of the proposed tow.

A competent officer of the towing vessel should inspect any machinery that may be fitted to the vessel to be towed to ensure that side valves, watertight doors and any other hull openings are closed and that the towed vessel is in all respects ready for the proposed tow, properly ballasted and trimmed.

The reserve towing gear should be rigged so that it can be recovered by the tug crew without having to board the tow. This normally means a floating line streamed astern of the tow connected to the reserve towing gear.

The Master of the towing vessel should also check that sea fastenings on any cargo that the towed vessel is carrying are adequate for the intended tow.
1.7 Barge Work

Safe access and egress between the vessel and barge must be provided if assistance with mooring is needed. Movement of the floating vessel and barge can cause movement of the gangway, thus increasing the risk of workers falling or being injured. A small boat may be used to transport personnel to the barge and provide access via a barge ladder.

**Hipping up**

Hipping up to the barge for close handling work requires considerable tension to be applied to the tug mooring lines if it is to be done effectively. The crew must be properly briefed prior to hipping up so that they are aware of the particular hazards associated with this operation.

Hipping up at sea presents additional hazards due to movement caused by sea and swell and deck crew should exercise great care when handling mooring lines to avoid injuries.

Consideration must be given to the limitations imposed by the shape of the vessel and the effect that any movement in the seaway will have on the safety of the operation. In most circumstances, support vessels are not designed with sufficiently straight sides and bow or with sufficient structural strength in this area to allow hipping up vessels in a situation where movement in the seaway between the vessels may occur.

**High Wire Hazard**

Crews must be made aware of the hazard presented by a high wire when working close to a barge with a high bow and short bridle and fore-runner. This may cause the towing gear to rise and fall from the work deck if weight unexpectedly comes on the wire during connection/disconnection. No attempt should be made to work on the wire while it is off the deck or when there is any weight on the gear.