



MANAGEMENT SYSTEM MANUAL

7.9.2 Overboarding Operations

Originator:	Approved By:
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1. Purpose

The purpose of this procedure is to describe policies on board WHOI research vessels for working with scientific equipment over the side, referred to as “Overboarding.”

2. Scope

Much of research ship time is spent performing science operations, which includes towing instruments, working gear over the side or fantail, and/or placing heavy objects on the seafloor. On a large ship, there may be many independent groups working on different projects at the same time.

3. Procedures

A. Planning: Unique, first-time or one-time-only operations pose special difficulties and demand additional attention to planning.

Planning is a two-tier function:

1. Pre-cruise planning must address the general overboarding requirements. It is the responsibility of the Marine Operations Coordinator to ensure that all conceivable requirements are raised and considered.
2. On-board, prior to the actual operation, the Chief Mate is responsible to coordinate with the Chief Scientist, participating scientists, all special operating groups involved, the Bosun and ship’s crew, as necessary. This is to ensure that all individuals involved clearly understand what is required of them and that all equipment is appropriate and has been inspected. The following points may need to be considered:
 - Complexity of the operation(s)
 - Hazards
 - Development of checklists and written procedures (if necessary)
 - Designation of person in charge on deck
 - Designation of the “team”
 - Clear assignment of tasks
 - Communications
 - Qualifications of personnel involved in critical areas of the operation(s)
 - Limitations of personnel and equipment (loads and safe working loads)
 - Dynamic motion of vessel and suspended / unsecured loads
 - Coordination with ship’s crew
 - Environmental conditions (wind, weather, sea state, etc.)
 - Contingency plans
 - Safe construction of gear (Are all lifting points strong enough?)

A check-off list may be used to facilitate this planning. A record that the planning and inspections took place must be entered in the ship’s log.



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- B. Communications: Both levels of planning will have identified special communications requirements. However, communications between the person in charge on deck, the bridge watch officer and the winch operator must be clear, unmistakable and thoroughly tested prior to the beginning of operations.
- C. Operations:
1. Follow the plan. Only those with assigned duties may be on deck in the vicinity of the overboarding operations. Scientists must wait until the person in charge on deck gives permission before moving to the equipment.
 2. Nothing goes over the side unless permission from the watch officer is obtained, whether launching scientific gear or disposing of garbage. If, during a launching or pick up of towed gear, it appears the propeller or rudder may be fouled, the watch officer will immediately stop the screw.
 3. When working over the side, proper safety precautions will be observed at all times. A lifejacket and/or work vest must be worn. A safety harness is to be worn and another crewmember holding at least an AB rating shall double-check all knots.
 4. Possible towing hazards include:
 - Entangling gear in the rudder or screw.
 - Engaging gear with other gear off the same vessel, a nearby vessel, or a mooring.
 - Becoming "hung-up". When the science gear breaks loose, people in the path of the towline can be hurt.
 - Nonessential personnel should leave open decks.

D. Special Situations

Stuck Cores

Occasionally, cores get stuck in the mud due to high friction between the pipe and the mud or due to deformation of the pipe. Should this happen, the following procedures are to be followed.

1. Do not attempt to jerk the equipment free by hauling back on the winch fast. Shock loads created by the sudden stalling of the winch's drums will cause high wire tensions and may cause damage to the ship's gear.
2. Clear the deck of all personnel in the area of the trawl wire fairlead. Rig warning signs and make a general announcement that the fantail is secured.
3. The following procedures are suggested methods of attempting to free stuck cores. These attempts are presented in the order in which they should be tried as each is potentially more destructive than the previous.
 - a. Maneuver the ship as close to directly over the core as possible, to create a straight vertical line of pull.
 - b. Slowly haul in on the winch approaching the SWL of the trawl wire. Pay the winch in and out at no more than 15 meters per minute maintaining a maximum tension below the SWL.



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- c. Slowly haul back the wire to just short of the yield tension. Before reaching yield, stop or pay out wire to prevent exceeding the yield point. Maneuver the ship to create a vertical wire angle to eliminate side loading of the crane boom. Haul in the wire to just short of yield tension and stop the winch. Slowly boom the crane up to increase the tension. It is important that the wire angle be kept vertical.
 - d. If the above steps fail, return the boom to its crutch, reduce the wire tension to the SWL, set the winch brake and maneuver the ship with the expectation of freeing the equipment or parting the wire.
 - e. Declining weather conditions or other factors may force the Master to bypass the above procedures. The Master may decide to cut the wire using an OxyAcetylene torch. Should this option be exercised, the person making the cut should be well protected from the parting wire. To lessen the possibility of injury due to the wire whipping back, the cut should be made right at the deckline.
4. A constant watch should be kept on the tension readout and the maximum pull recorded.
 5. Should the equipment become free by procedure 3b. and the SWL not exceeded, no further action is required.
 6. Should the SWL of the wire be exceeded or the wire broken at any point, the following is to be done:
 - a. Remove a 40m shot of wire adjacent to the break and send to the Port Engineer. Tag with date, cast number and maximum tension. The Port Engineer shall send the wire out for an additional break test and failure analysis. Results of the analysis shall be sent to the Master and the Principal Investigator of the NSF funded proposal "Shipboard Scientific Equipment: Oceanographic Cable".
 - b. Remove enough wire from the winch to guarantee that the remaining wire was not subjected to the excessive tension. This is to include the first three (3) wraps on the drum

Stuck Dredges

Rock and subsurface dredges are also used aboard WHOI vessels and they too can become stuck on the bottom, usually while pulling the dredge up a slope. These hang-ups are most often due to the dredge becoming engaged with a large rock or structure. Should this happen, the following steps should be followed:

1. Do not attempt to jerk the equipment free by hauling back on the winch fast. Shock loads created by the sudden stalling of the winch's drums will cause high wire tensions and may cause damage to the ship's gear.
2. Clear the deck of all personnel in the area of the trawl wire fairlead. Rig warning signs and make a general announcement that the fantail has been secured.



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3. The following procedures are suggested methods of attempting to free stuck dredges. These attempts are presented in the order in which they should be tried as each is potentially more destructive than the previous. The boom will remain in the boom crutch for the entire operation.
 - a. Slowly haul in on the winch approaching the SWL of the trawl wire. Pay out 10m of wire at 30m/min. Tension should decrease progressively as you pay out, maintaining a maximum tension below the SWL. Wait a few minutes, then start hauling back in at 15 m/min., again being very attentive to the tension. If tension builds, stop hauling in before you reach SWL and repeat the above procedure. If this does not work, repeat the procedure but pay out 20m of wire
 - b. If using the ship's DP system, back down the track at 0.5 knots. If not in DP, reduce propulsion and allow the anchored dredge to pull the ship back towards the dredge, creating a more vertical wire angle. As conditions permit, continue procedure "a" while maintaining a maximum tension below SWL. In general terms when dredging in a forward direction, an aft wire angle will develop. If the dredge becomes stuck, backing down the track reduces the wire angle until it is vertical and may free the dredge. If it does not, continue to back down the track until the wire angle becomes forward. This will increase the odds of freeing the dredge. In the event that none of these actions free the dredge; dredges are equipped with weak links. Weak links are configured by the Dredge Tech to part before the elastic limit (yield tension) of the trawl wire is reached.
 - c. If the above fail, reduce the wire tension to the SWL, set the winch brake and maneuver the ship with the expectation of freeing the equipment or parting the weak link.
 - d. Declining weather conditions or other factors may force the Master to bypass the above procedures. The Master may decide to cut the wire using an OxyAcetylene torch. Should this option be exercised, the person making the cut should be well protected from the parting wire. To lessen the possibility of injury due to the wire whipping back, the cut should be made right at the deckline.
4. A constant watch should be kept on the tension readout and the maximum pull recorded.
5. Should the equipment become free by procedure 3a. and the SWL not exceeded, no further action is required.
6. Should the SWL of the wire be exceeded or the wire broken at any point, the following is to be done:
 - a. Remove and send to the Port Engineer a 40m shot of wire adjacent to the break. Tag with date, cast number and maximum tension. The Port Engineer shall send the wire out for an additional break test and failure analysis. Results of the analysis shall be sent to the Master and the



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- b. Remove enough wire from the winch to guarantee that the remaining wire was not subjected to the excessive tension. This is to include the first three (3) wraps on the drum.

4. Reporting

If the SWL of the wire has been exceeded or the wire broken at any point, an entry shall be made in the wire log.