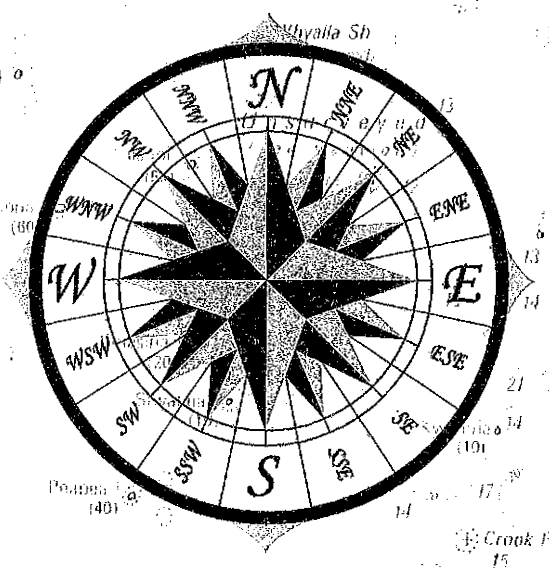
Pacific Island Qualified Fishing Deckhand



MODULE 13

Deck Maintenance

Coastal Fisheries Program
Training Section

South Pacific Commission

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MODULE 13:

DECK MAINTENANCE

LEARNING OUTCOMES

On completion of this module, students will:

- Understand the need for regular maintenance on winches, windlasses, derricks and all ancillary deck equipment.
- Understand the practices necessary for undertaking vessel maintenance and appropriate surface treatments.

CONTENT OUTLINE

- Why Maintenance
- Deck Equipment Maintenance
- Winches and Haulers
- Windlass
- Derricks and Lifting Devices
- Hatches and Openings
- Rust and Surface Treatments
- Maintenance Schedules
- Maintenance Tools and Equipment
- Safety

Why Maintenance

- One of the most annoying situations which can occur during a fishing trip, especially during the early days of fishing, is a breakdown or malfunction of a piece of important equipment such as a winch or line hauler. If a breakdown means an early return to port, it also means a poor wage for the trip. Similarly if a vital piece of equipment fails to function at a time strategic to vessel safety, the entire safety of a vessel might be at risk. Quite simply, fishers and seafarers trust their lives to the safe working of equipment in many situations at sea, and in particular, during fishing operations.
- In order to ensure that all deck equipment is in good functioning condition and will operate reliably during sustained use, it is important that vessel crew carry out regular maintenance, especially on equipment with moving parts.
- There are also several very important economic reasons for undertaking regular maintenance. Most importantly, a well maintained piece of equipment, be it a simple block or a complex winch, will last much longer than a similar item which is not regularly maintained. And equipment which lasts well means less breakdowns, less time lost and less regular equipment replacement costs.

Deck Equipment Maintenance

- The focus of a deckhands job centres around the safe and efficient operation of the working deck of a vessel. The range of equipment found on fishing vessels (seiners, longliners, trollers, trawlers) and cargo vessels includes an array of specialised winches and haulers. However, there are also many items which virtually all vessels have in common. For fishing vessels, this includes some type of winch or hauling unit, a windlass, lifting gear, hatches, doors and openings, and safety equipment.
- The main thing that many vessels have in common is steel parts and equipment. Be it a steel vessel or steel parts or a fibreglass or wooden vessel, there is always steel! And where there is steel, sun, air and sea water, there will be rust! And where there is rust, there is maintenance!
- Similarly, most fishing vessels decks have a range of moving parts constructed of steel such as rollers and sheaves. Without regular maintenance, moving parts can wear out quickly or seize up and become useless.

- Regular programmed maintenance of deck fittings, gear and equipment is a vital part of a deckhands workload. Maintenance requirements will vary according to the frequency of equipment use.
- It is important to remember that maintenance is not something that gets done when there is nothing else to do. It must be carried out as a regular part of daily duties, both at sea and in port.
- The general requirements for the maintenance of main equipment items can be summarised as follows.

Winches and Haulers

- Winches and haulers are generally the most important pieces of fishing related equipment on the deck of a fishing vessel. They are often in constant use, exposed to weather and salt water and subject to significant stress during hauling or winching operations.
- Most winches are fitted with lubrication points (grease nipples) and rely on the regular application of grease to moving parts, particularly bearings and guiding gear (worm gear).
- Many winches rely on hydraulic power and have hoses and fittings connecting the hydraulic pump with the winch motor. The connector fittings are often made of steel and can rust easily. These can be protected by special grease impregnated tape known as denso-tape which seals the fitting and protects it from moisture and corrosion. Similar results can be obtained with the use of special waterproof grease.
- ***Basic maintenance for winches will include:***
  - regular applications of grease (be careful not to apply to much grease as the excess can accumulate on deck and become very slippery)
  - regular visual checks of hydraulic hoses and fittings to check for wear and tear and possible oil leaks
  - regular check of brake pads and drum to ensure they are free of debris and not showing signs of undue wear
  - regular lubrication of clutch lever mechanism to ensure it moves easily in and out of gear
- In addition, winches will be subject to regular overhaul, normally in conjunction with an overall vessel survey. During overhaul, the winch should be stripped down and all bearings and bushes inspected and replaced if necessary.

Windlass

- On most fishing vessels the windlass is not in regular use but it is vital that it be available for use at all times. The specific windlass arrangement for a particular vessel will vary according to the size and type of vessel and some detail is provided in Module 10. The windlass will generally be located in the bow of a vessel and, as such, will be exposed to wind and weather. Keeping a cover tied over the windlass will reduce the overall maintenance requirement.

- A windlass is a specialised form of winch for use when anchoring and the overall maintenance requirements will be the same as for general winches. However, a windlass working a chain and anchor arrangement will have a spurling pipe linked to the chain locker and this pipe must be kept blocked up to ensure no excess water leaks into the chain locker. In addition, there will be a locking mechanism such as a devils claw to secure the chain forward of the windlass and lock the anchor firmly into place. The associated turnbuckle threads should be kept coated in waterproof grease to ensure free movement on the threads.

- On vessels where the windlass is not in regular use for anchoring, the vessels captain should ensure the windlass is kept in good working order through regular testing. This will often occur as a safety measure when a vessel is entering port or negotiating a narrow waterway. In these situations, the windlass will be turned on and a deckhand will be placed on standby to lower the anchor should the need arise.

Derricks and Lifting Devices

- The use of derricks on fishing vessels is generally limited to the loading or unloading of fish and the movement of heavy items around the deck. On more modern vessels, derricks are often replaced with hydraulic powered cranes. Whatever lifting devices are fitted to a vessel, the general requirement for regular maintenance relates to moving parts (such as blocks and sheaves) and pressure points.

- As with winches, good and regular lubrication with grease is the main maintenance requirement. It is also important to keep a close eye on the condition of wires and ropes in both running and standing rigging. All lifting gear should have a major overhaul and recondition during vessel survey but this does not mean that regular maintenance and inspection should not be undertaken. As part of regular maintenance, blocks should be lowered and inspected, and, in addition to lubrication, any overly worn parts should be replaced.

Hatches and Openings

- The requirement for all hatches and openings is that they can be open and closed quickly at all times. This primarily involves ensuring that water tight door locks and hatch dogs are free moving. Door locks can become tight with a build up of dry grease and may need to be removed, cleaned and re-greased. For hatch dogs, the main requirement is to keep the winding thread sufficiently lubricated to ensure easy turning. Threads can be cleaned with a wire brush and re-greased as required.
- There is also a need to ensure that all vent and pipe covers can be quickly put in place or removed. This is particularly important in relation to engine room vent covers which must be able to be fully closed in the event of an engine room fire.
- On vessels where there are gates or doors to control the flow of water through the scuppers, the deckhand must ensure that scupper gates can be easily opened or closed and are not seized up or fouled by debris.
- Another area for particular care in maintenance is any fire hose connectors in the deck area. These must be kept free of rust and regularly tested to ensure fire hoses can be easily connected.

Rust and Surface Treatments

- Rust never sleeps! The process of rusting will occur when any steel object is exposed to air and water so the main means of rust control is to ensure that metal surfaces are covered with a protective coating.
- There are a wide range of rust treatments and associated paint systems available and it is not necessary for a deckhand to have a detailed knowledge of these.
- For general maintenance purposes, a deckhand should be aware of the importance of thoroughly cleaning surfaces to be painted and removing all signs of rust. Heavy rusting can be attacked with a chipping hammer or a compressed air driven needle gun. When flaking rust has been removed, metal surfaces can be treated with corrosive acids or oils in preparation for painting.

- Most vessels have a designated paint locker which is looked after by the bosun. In most working situations, the bosun or deck boss will direct the deckhand to areas which require painting and also supply the correct paint for the job. If using a standard paint system, the painting job will comprise:

  - **primer:** red lead, red oxide or yellow chromate based paint applied directly to a bare metal surface
  - **undercoat:** white lead, white zinc or titanium white applied as a sealer over the primer coat
  - **topcoat:** compatible substance non-porous paint applied in 2 or 3 layers to provide a final sealing to the surface

- As there are a large number of different paints available with different compatible combinations, a deckhand should always consult the bosun or deck boss prior to undertaking a painting job.
- It is very important that all painting equipment is cleaned and stored after use. A poorly sealed paint tin can easily spill and make for many hours of hard clean up work. A paint brush which has been improperly cleaned cannot be used again and care must be taken to remove all paint residue.
- For successful painting, there are some general rules to follow:

  - take care to prepare the surface well as poor preparation will result in early rusting or paint flaking
  - always check that you have the right paint for the job
  - always thoroughly mix the paint before application
  - be careful with application - if the paint is to thick, it will run and if it is to thin, it will not last
  - always carry some cleaning agent (turpentine for oil based paints) and a rag to clean up spillages
  - always apply paint systematically and do not knock off for a break in the middle of a particular job
  - be sure to let each coat of paint dry properly before applying the next coat
  - be careful not to paint over surfaces which have not previously been painted such as threads and grease nipples
  - make sure you clean up properly when the job is finished

Maintenance Schedules

- A well organised vessel will already have established maintenance schedules and, for the deck department, these will be coordinated by the bosun or deck boss.
- The specifics of a vessels maintenance schedule will depend on the nature of the vessel, the type of fishing operation and the regularity of use of particular items of equipment.
- The preparation of maintenance schedules will not generally be a deckhands responsibility but it is useful to know what items should be considered. Specific fishing gear maintenance is covered in Module 20 so the main areas for deck equipment will be as outlined in this module.

Maintenance Tools and Equipment

- The most useful tool for a deckhand in relation to vessel maintenance is a well trained pair of eyes and a responsible attitude. Seeing what needs to be done, what wear and tear is occurring and what responses are necessary. Having crew who are prepared to keep deck systems in good operating order is vital to the safe operation of a working deck.
- Actual equipment which will commonly be used will include:

  grease guns, wire brushes, chipping hammers, scrapers, rust guns, paint brushes, emery paper and sand paper, oil soaked cloths, basic tools for block dismantling (spanners, hammers, pliers), knifes, and general cleaning equipment (refer Module 12)

- These tools and items of equipment must have recognised storage areas and be maintained in good working order and condition. They are a part of the deckhands tools of trade and it is important that the deckhand becomes familiar with their use.
- Many more modern vessels will also have a range of power tools such as drills, angle grinders and spray paint systems. It is important that deckhands are familiar with the correct usage of such equipment. None of these tools are particularly complex but they can be dangerous if used incorrectly.

Safety

- There are a number of safety items which should be made available for deckhands undertaking maintenance work. These items are designed to protect workers from personal injury and should be worn at all times when potentially dangerous work is undertaken.
- The items which should be available include:

- **ear muffs:**	for any work which produces or is close to loud noise
- **breathing apparatus:**	for any work which produces dust or fumes, particularly in a closed or confined space
- **safety glasses:**	for any work which may produce dust or chips of rust or paint
- **gloves:**	to protect hands from any toxic or abrasive chemicals
- **safety shoes or boots:**	for any work which involves the use of heavy items

- The use of these items for maintenance work is common sense. It is not a matter of being overly cautious and these items should be on hand for all maintenance work.

TEACHING NOTES

DELIVERY TIME

- 2 - 4 hours

TEACHING MATERIALS

- Whiteboard or Blackboard
- OHP
- Set of Tools
- Used, worn or rusted parts (blocks, rusted moving parts such as hatch dogs or door locks)

LESSON PLANNING

- It should be possible to teach this module in 1 or 2 lessons with a total duration of 2 - 4 hours. The duration of the lessons will depend on what practical exercises and assessment are included.
- The purpose of the module is to ensure that students are fully aware of the responsibilities and tasks of a deckhand in relation to general vessel deck maintenance and to understand the importance of regular maintenance as a part of overall vessel safety.

POINTS TO NOTE AND TEACHING HINTS

- This module can be delivered as a student exercise. Tutors can commence the lesson with a general discussion about the importance of deck maintenance and cite examples of situations where poor maintenance, such as inattention to worn blocks or rigging, has resulted in an accident.

- The lesson can be conducted by asking students a series of questions and then guiding discussions to list the correct answers on the whiteboard. Start with the question 'why is good maintenance important?' Follow this with questions relating to what sort of maintenance should be undertaken and what the role of the deckhand should be.

- This allows the students to develop a maintenance schedule with tutor guidance to emphasis important aspects. This module can be used to make the students think for themselves, rather than listen to the tutor talk. Let the students do the work of making the checklists. They will be more likely to remember a list prepared by the group than a list written on the board by the tutor.

- It is important to emphasise that deckhands need to play an active role in vessel maintenance and that this role is a part of their daily work.

- For vessel crew whose wages or salary is dependant on catch, the undertaking of tasks not directly involved in the fishing process may be difficult to appreciate but it is important that they understand that regular maintenance is required to ensure that deck equipment functions correctly and safely during the fishing process.

PRACTICAL EXERCISES

- Apart from the classroom exercises designed to have the group prepare checklists for deckhands as outlined above, the use of additional practical exercises for this module will depend on the available time.

- If time permits and the training venue is accessible to a harbour or port, a group visit to observe the overall condition of fishing vessels in port may be useful.

- Such a trip can be undertaken prior to the classroom lesson. In this situation, have the group prepare a list of maintenance needs on vessels and maintenance activities in progress while the vessel is in port. This list can be used as a basis for the extended preparation of maintenance schedules in the classroom.

- If the port visit is undertaken subsequent to the delivery of the classroom lesson, use the visit to reinforce the schedules prepared in the classroom. This may also be an opportunity to observe safe (or unsafe) working practices in aspects of deck operations and maintenance activities.

- If the tutor has access to old pieces of deck equipment which are either worn out, rusted or seized up, these can be used to show the students the cumulative effects of poor maintenance. If time permits, students can be assigned the task of re-vitalising some old pieces of equipment and preparing them in the correct manner.