CHAPTER 2

PREPARING A TROLLING BOAT

A. GENERAL VESSEL CONSIDERATIONS - Fishing positions - Gear storage - Stern gear - Steering - Balance and trim - Deck equipment

B. FISH CONTAINERS - Fish containers - Keeping fish cool - Purpose-built killing box

C. ICE BOXES - Ice containers - Built-in ice boxes - Deck ice box

D. TROLLING BOOM CONSTRUCTION - Materials - Length - Boom tips

E. TROLLING BOOM MOUNTING - Rigid mounting - Vertical joint mounting - Universal joint mounting - Stays - Solid stay

F. HANDREELS FOR TROLLING

G. HAND REEL MOUNTING - Mounting - Mounting direction - Reinforcing - Comfort - Using cable mainlines

H. GAFFS, NOOSES, AND NETS - Landing nets - Gaffs - Making a good gaff - Safety rope - Gaff points - Shark noose - Fish club

I. TWO COMMERCIAL FISHING ARRANGEMENTS - 8.5m (28') 'alia' catamaran - 8.5m (28') monohull
Troll fishing is an active and potentially dangerous occupation. When a fish strikes, a quick response is required from the fisherman to ensure that it is hooked and landed without escaping. On a badly organised vessel, fish will be repeatedly lost because equipment is in the wrong place, because of confusion about whose job is to do what, etc. Some careful thought about the arrangement of the boat will pay dividends in more efficient and comfortable fishing and higher catches.

**Fishing positions**

If handreels (see sections 2F, 2G, 3M and 3N) are to be mounted on the boat, ensure that they are far enough apart not to interfere with each other, and that the crew using them are not obstructed by deck equipment. Badly positioned or mounted reels can cause severe muscular pain.

Each fisherman should know his spot on the boat, and this is the point from where he should handle his lines, bring aboard fish, etc. Ideally, there should be one crewman for each trolling line, as well as the steersman. For the small boats (under 30', or about 10m) we are talking about in this book, five lines will probably be the maximum number which can be realistically trolled.

**Gear storage**

Keep potentially dangerous pieces of often-used deck equipment —such as gaffs, knives, and spare lures—in an accessible but safe place. Store them in a box or choose a particular spot where they should be hung. Never leave them lying around on deck, where they are sure to cause injury.

**Stern gear**

On many vessels, the transom or stern seems the natural place to boat fish. However, in some cases the propeller and tiller, or outboard motor, can obstruct easy fishing and may become fouled by the fishing lines. If this is the case, plan to land fish further forward over the side of the boat.
CHAPTER 2: PREPARING A TROLLING BOAT
SECTION A: GENERAL VESSEL CONSIDERATIONS

Steering

The steering position, or helm, of the boat is very important. For a boat operating in coral-bound waters or where there is plenty of boat traffic, good visibility is essential and it is usual to have the steering controls well forward. For a fisherman operating alone, however, the steering position is best at the stern, where he can keep a watch on all his lines. Some fishermen install two sets of controls, so that they can steer from either position.

![Forward Helm Should Allow Complete Vessel Control]

Balance and trim

Locate heavy items low down and centrally so that the boat is not unbalanced in any direction. The icebox may be the heaviest item on board when full. Second will probably be the engine(s), and third will be the combined weight of the crew. Try to plan for an even distribution of weight, especially when the boat is underway.

![Proper Distribution of Weight in the Boat]

Deck equipment

If you use a killing box or bin (see Section 2B) locate and secure it in an accessible place where all the crew can land their fish into it without difficulty. The ice box (see Section 2C) will be the bulkiest item on board. If possible, locate it so that it does not block off access from one part of the boat to another.
CHAPTER 2: PREPARING A TROLLING BOAT

SECTION B: FISH CONTAINERS

In a small vessel, a troll fisherman often lands his fish directly into the boat. Doing this presents a number of possible dangers and problems. The tail and teeth of a thrashing fish can cause injury, and so can any hooks or wire lines to which the fish is still attached. Slime and blood will make the deck slippery and dangerous. The fish may beat against frames or items of deck equipment, cutting or bruising itself and lowering the quality of the flesh.

Fish containers

Most of these problems can be solved by landing the fish into a box or bin. For small boats, the simplest way is to carry a plastic or wooden fish container big enough to accommodate the size of fish being caught without bending them. If possible, this should be watertight, to allow washing of the fish without blood or slime running on deck.

FISH CONTAINERS SUITABLE FOR SMALL BOATS

Keeping fish cool

If the fish will be left in the box for some time, they should be washed to remove blood and slime, then kept shaded and cool to prevent spoilage. The best way to do this is to cover the fish with wet sacking or other cloth. This keeps the fish moist and prevents them drying out, and has a cooling effect as water evaporates from the surface of the sacking.

KEEPING FISH COOL WITHOUT ICE
**Purpose-built killing box**

For larger boats, or for serious full-time fishing, it may be worthwhile to install a purpose-built killing box. This should be:
- big enough to accommodate the size of the largest fish being caught, without bending them and without them jumping out.
- located in a position where fish can be easily lifted straight into it from the water.
- fixed or secured to prevent its moving.
- fitted with a drain pipe which empties through or over the side of the boat.
- built up on legs or in such a way so that the bottom of the box is just above the waterline. The box should not be built higher than absolutely necessary for proper drainage, or it may make the boat unstable. Also, the higher the box, the harder it will be to lift large fish into it.
- fibreglassed or painted to ensure it is watertight and easy to clean.

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*A PURPOSE-BUILT KILLING BOX*
CHAPTER 2: PREPARING A TROLLING BOAT

SECTION C: ICE BOXES

Where ice is available, most fishermen will find that its use pays dividends. Ice keeps fish in good condition for longer, so fishermen can stay out at sea fishing for longer periods, and can often get a better price for their fish because it has stayed fresher.

Ice containers

To get the best value out of ice, an on board ice container is needed to stop it melting away. For small vessels, domestic chill bins or "eskees" may be suitable, although expensive. On larger boats, old domestic refrigerators or freezers may be used. These are usually cheap or free, but are not very good, as they are heavy, poorly insulated and rust rapidly, leaving dangerous ragged corners. Insulated 'ice bags' are becoming available in some countries. These are quite expensive, lightly insulated and hard to handle when filled with small fish and ice. However they are useful for the odd very big fish which will not fit into the ice box, and for canoes or other narrow types of boat, due to their shape. (They also make good sleeping mattresses when empty).

 Built-in ice boxes

In some boats, limited deck space or a particular design feature of the hull or working area encourages the builder to construct the ice box as an integral part of the boat's hull. In some boats this works well and results in real savings in space, or in extra convenience for the crew. Built-in ice boxes can double as comfortable seats or bunks, and can convert unused corners or sections of the hull into valuable ice or fish storage space.

In many cases, however, built-in ice boxes lead to real problems, especially in plywood or wooden boats. The boxes cannot be moved if they turn out to have been badly positioned. Damage to the ice box or water penetration into the insulation may be impossible to repair. If the insulation becomes waterlogged it may in turn lead to waterlogging and rot in the hull timbers, or may cause delamination of any external fibre glass sheathing. If the hull is holed in the location of the ice box, repair is made more difficult. Proper drainage and cleaning of the ice box may be impossible.

In fibreglass boats, these problems can be kept to a minimum because fibre glass is a waterproof material. Wood, on the other hand, will readily absorb water, and because of this property built-in ice boxes can cause serious problems in wooden boats. If a boat owner wants to take advantage of unused hull space, he should consider fitting 'drop-in' ice boxes which can be removed when necessary, or the use of insulated ice bags (see above) as alternatives. Removing a built-in ice box is usually a lot more difficult and time-consuming than building it in the first place.
CHAPTER 2: PREPARING A TROLLING BOAT
SECTION C: ICE BOXES

*Deck ice box*

Where deck space permits, on-deck ice boxes are a better choice, provided they are the proper size and shape and do not interfere with fishing or the boat’s operation.

These are the important points to keep in mind when buying or building an ice box.

- **INSULATION** should be at least 5cm (2 inches) thick, and preferably 7.5 to 10cm (3 to 4 inches).

- **MATERIAL** - the box should be completely waterproof (to keep insulation dry) and smooth for easy cleaning, painted white or a light color. Fiberglass is the most waterproof and durable material, but many ice boxes are made of plywood, well-painted or coated with waterproof resin. The wood will absorb water if not properly coated.

- **LID** should be large to give good access and should seal or fit well.

- **DRAIN** should let out meltwater, overboard if possible, into bilge otherwise. Ensure the drain is clear, not blocked by other items of deck equipment, and is big enough not to be blocked by fish scales. To prevent heat entering the ice box, keep the drain plugged most of the time. Unplug it for a few minutes every few hours to release any meltwater which has built up.

In many ice boxes the drain is not properly sealed and allows water to leak around it and into the insulation, which is quickly ruined. If you have doubts about the drain being watertight, seal the edges with a heavy layer of resin or glue. Rather than risk spoiling the insulation, some fishermen prefer ice boxes without drains, even though these will collect meltwater during use and are more difficult to clean out.

- **SIZE** should not be so big as to obstruct access on boat. When empty two or three people should be able to lift it off the boat. If it is too deep, the fish stored at the bottom of the box will be crushed by those at the top. Choose two smaller ice boxes in preference to one very big one.

**Features of a Good Ice Box**

- Large well-fitting lid
- Thick insulation – at least 2 inches (5cm)
- Fibreglassed, resin-coated or properly painted surface to prevent waterlogging
- Ropes make it easier to move or tie down
- White color – stays cooler
- Smooth surface for easy cleaning
- Large well-seated drain with plug
- Long enough for large fish (no cutting fish in half for icing)...
  ...but not too big for the deck space available
- Drain should be...
  ...properly sealed – no water seepage into insulation
  ...wide enough not to become blocked by fish scales
- Bung or plug left in place most of the time
The function of a trolling boom is to allow the lines to be spread further apart, away from each other and from the boat. This reduces the chances of the lines becoming tangled, allows more lines to be used, and increases the area of water covered by the trolling gear.

This section gives details of trolling boom construction, while section 2E covers trolling boom mounting and staying.

**Materials**

Materials suitable for trolling booms include sawn or unsawn timber, laminated wooden strips, metal piping and tubular fibreglass or other plastics. The best materials are those which are strong, moderately flexible, lightweight, corrosion resistant, and cheap.

**SUITABLE TROLLING BOOM MATERIALS**

- **Bamboo**
- **Sawn timber**
- **Fibreglass pole**
- **Straight sapling**
- **Laminated plywood**
- **Metal piping**

**Dimensions**

- Diameter: 5cm
- About 5cm (2") each way

**PARTS OF THE TROLLING BOOM**

- **Base (inboard end)**
- **Attachment point for stays** (see Section 2E)
- **Mounting** (see Section 2E)
- **Tip (outboard end)**
- **Attachment point for trolling line**
**Length**

The length of the booms depends on the strength and weight of the material being used, the effectiveness of the staying system (see Section 2E), the size of the boat, the number of lines to be trolled, and the way in which the booms will be stored. With good and careful staying it is possible to use a boom the same length as the boat. However, as a general rule, the boom should be about half the length of the boat and not more than two-thirds. If several lines are to be attached to a boom, they should be at least 1.5 m (5 feet) apart.

**Boom tips**

The type of fitting needed on the tip of the boom depends on whether it will be used with a fixed line (see Section 3L) or a handreel (see Section 3N).

For fixed lines an attachment point is needed, onto which the line can be tied or clipped. This can be a rope eye, shackle, or similar fitting. Alternatively, if a hole is drilled through the boom, a piece of rope can be run through and secured by a stopper knot. This rope can then act both as the forestay (see Section 2E) and the backing cord (see Section 3L).

When using handreels, the boom must have an eye through which the line can run freely when being reeled in and out. This should be smooth and non-abrasive to prevent chafing of the line. Porcelain electrical-type spike isolators, glass rings, large diameter stainless steel shackles, etc. are adequate.

None of these end fittings are suitable if the handreel has a wire or cable mainline, as they will cause it to curl. For wire or cable, a pulley, preferably nylon or plastic, and ideally at least 8cm (3 inches) in diameter should be used.

### SUITABLE TROLLING BOOM TIPS

- **Rope eye**—for fixed lines
- **Shackle**—for fixed lines
- **Hole through boom**—for fixed lines
- **Pulley for handreel**—when used with cable or wire lines
- **Ceramic insulator**—for handreels with monofilament lines
- **Cap ring**—for fixed lines
Booms are generally mounted fairly well forward on the boat by fixing down the inboard end in one of a number of ways.

**Rigid Mounting**

The booms are slotted into sockets on the boat and may be fixed in place with a pin to prevent them falling out. This type of mounting is simple to make but the booms may dip in the water as the vessel rolls, and must usually be taken down for storage.

**Vertical Joint Mounting**

The boom bases are fitted into a hinged socket or mounted on a pin in a way which enables them to swing vertically. This system allows adjustment of the boom angle to prevent dipping in rough seas, and the booms can be stored vertically when not in use, without the need to disconnect them.

**Universal Joint Mounting**

The boom bases are attached to a simple universal joint which allows movement both vertically and horizontally. The booms can be laid flat or tied upright for storage without the need to disconnect them.
Stays

Stays are very important load-bearing ropes or cables which prevent the booms from swinging about, bending or breaking. They should be attached to the boom by tying, lashing or clipping on. A fully stayed boom has one or more forestays, a backstay, a top stay and a bottom stay.

FORE STAY- this is the most important as it takes the load when a fish strikes or the boom tip dips into the sea during a roll. Without a forestay, the boom will bend and may break under heavy load.

All trolling booms require forestays. There should be one for every trolling line attached to the boom. The forestays should be fixed to the boom close to or at the attachment points of the lines.

TOP STAY (also called the GUY) -this takes the weight of the boom itself, and permits the boom angle to be adjusted to prevent dipping into the water in rough seas. If the boom is being used with a handreel, the topstay ends up taking more and more of the weight as the fish is reeled in. A top stay is recommended for rigidly mounted booms and is essential for other types. It should be attached as far out along the boom as leverage will allow.

On some boats, there may not be a fixed point high enough to anchor the topstays to. A solution is to tie each end of a length of rope to the topstay attachment points on each of the booms, then tighten it up by jamming a 30-60cm (1-2 feet) wooden spreader hard underneath it. This method is most suitable for rigidly mounted booms, but can be used anywhere provided that the other stays give a firm resistance for the spreader to work against.

BACK STAY -this prevents the boom whipping forward, particularly after a strike. It also prevents the boom from bowing too much in the middle when a heavy load (such as the weight of a striking fish) is placed on the end.

A backstay is needed for booms mounted on universal joints and is recommended for other types of mounting. It should be attached about halfway along the boom.

BOTTOM STAY -this prevents the boom bouncing up when the vessel rolls or a fish strikes. A bottom stay is not necessary for rigidly mounted booms but is essential for other types.

Solid stay

If the boom is mounted low and a bottom stay cannot be attached, a solid stay made of wood, steel pipe, etc. can be fixed between the boom and a point on the boat to serve the same purpose. Because it works in both directions, a single solid stay acts as both topstay and bottom stay.
CHAPTER 2: PREPARING A TROLLING BOAT
SECTION F: HANDREELS FOR TROLLING

Many commercial or semi-commercial troll fishermen find handreels to be an efficient trolling tool. They reduce the chance of line tangles and increase the speed at which fish can be recovered and the line returned to the water. However, to be fully effective handreels must be strongly constructed, properly adjusted, and arranged efficiently on the boat.

Many varieties of fishing reel are available commercially, and several are suitable for trolling. These are usually fitted with friction brakes and an easily adjusted mounting system, and most are robust and constructed from materials which will last for a long time even in the marine environment. However, they are usually expensive (typically US$300-600) and of limited availability in the Pacific region.

More widely used is the wooden cross-reel shown below. This was first introduced into Western Samoa in 1975 by FAO, and has since been promoted by the SPC Deep Sea Fisheries Development Project. Many Pacific Island Fisheries Departments are now making these reels from locally available materials, and they can also be constructed by private individuals.

Although quite simple in appearance, a lot of care must be taken when constructing this reel if it is to work properly. A badly made reel will cause much frustration and reduce the effectiveness of fishing operations, and may break at the most important moment—that is, with a large fish on the line. For these reasons, the SPC has produced a separate handbook which gives detailed instructions and plans to enable proper construction of the FAO Samoan reel. This is called SPC Handbook No 25: Notes on the construction of the FAO wooden handreel and is available from the South Pacific Commission (address in front of this handbook).

The most common fault in making these handreels is poor alignment of the line, which causes it to ‘miss’ the reel when being wound in. To ensure good alignment it is very important that the holes for the reel shaft and the lever arm are cut straight and accurately. Only limited adjustment is possible by adjusting the insulator position or adding more spacing washers to the reel shaft.
PARTS OF THE WOODEN HANDREEL
CHAPTER 2: PREPARING A TROLLING BOAT
SECTION G: HAND REEL MOUNTING

This section concerns mounting the FAO/ Samoan wooden handreels discussed in Section 2F.

Mounting

Wooden reels are usually mounted by drilling holes through the stanchion posts and bolting them to the frames of the vessel, or to other suitable points. The posts should be bolted in at least two places, to ensure they are secure and will not move under load. Alternatively the posts can be lashed down, although this is less suitable.

Mounting direction

Reels can be 'side-mounted', that is with the reel-arm sticking out over the side of the boat, or 'stern-mounted', in which case the reel-arm points toward the stern or transom. Reels which are used for trolling through a boom should be side-mounted. Reels used for trolling without a boom can be stern-mounted. These mounting arrangements prevent the reels being subjected to too much twisting force when a fish strikes. However, the ideal arrangement may not be possible because of restricted deck space, or because a different arrangement may be needed to enable the boat’s use for other types of fishing.

For those fishermen who need to regularly change the mounting position of a reel, or dismount it completely from the boat, it may be preferable to mount it using square wooden or steel brackets screwed to appropriate points on the frames or other parts of the boat. To do this, it is also necessary to increase the thickness of the stanchion post at the point where it fits in the bracket, by screwing on pieces of timber to make the post square in cross-section. The post can then easily be inserted into the brackets, where it will stay firm in either the side-mounted or stern-mounted position.
The reels should be mounted as far apart as possible, in places where they are accessible and free from obstruction, and where they themselves will not obstruct other aspects of the fishing operation.

If using cable mainlines

Reinforcing

When a reel is side-mounted and used for trolling directly (that is, not rigged through a trolling boom), the force of a striking fish tends to twist the reel. This can pull the insulator out of line with the reel, making it awkward to wind in the fish. With big fish, the stanchion post may split or break.

Reels mounted in this way should therefore be reinforced by adding a backing plate. This replaces one of the two small lever arm rockers normally fitted (see Section 2F). In fact, it is a good idea to reinforce all reels in this way, regardless of their intended use.

Comfort

When mounting the reels, remember the fisherman’s comfort. Badly placed reels can cause severe muscular strain to the user. Mount the reel so that the shaft is about level with the user’s stomach, and the post follows the midline of the body when the user is standing comfortably in front of it.

If possible, position the reels so that the users face the stern of the boat. This will avoid them being drenched with drops of water from the line every time they wind it in. The wind usually blows from ahead or abeam of a moving boat and will carry any water spray away from the user of a reel facing backwards.

If using a wire or cable line on the reel...

...change the insulator line guide for a pulley

...always add a backing plate to strengthen the post

REINFORCEMENT

Pull from striking fish

When a fish strikes there is a lot of twisting force on a reel mounted sideways...

COMFORT

Mount reels well apart

Have reel users facing stern of boat – this helps them stay dry

Reel shaft should be about level with users stomach when he is standing naturally

CHAPTER 2: PREPARING A TROLLING BOAT
SECTION G: HAND REEL MOUNTING
CHAPTER 2: PREPARING A TROLLING BOAT
SECTION H: GAFFS, NOOSES AND NETS

The time when a troll-caught fish is most likely to break loose or become unhooked is the moment when it is being hauled from the water into the boat. Gaffs and other fish landing tools are used to reduce this risk.

Landing nets

Landing nets are most suited to small fish (5 kg (about 11 lb) and under). Netting small fish is much more sensible than gaffing them, and causes less physical damage.

A landing net can be bought, or made by tying a piece of netting onto a stiff frame of wire, metal rod or piping. The netting should be knotless if possible and of small mesh size to avoid tangling the fish. A triangular frame is the easiest to construct and use. The frame should be lashed onto a strong handle. Handle length is normally between 0.5 and 2.5 m (about 2-8 feet), depending on the height of the boat above the water.

Gaffs

Gaffs are used for bigger fish, over about 5 kg (10-11 lb). They require more skill on the part of the user, and result in damage to the fish, particularly if badly handled. They can also be dangerous.

The two main types are the ‘L-gaff’ and the ‘J-gaff’, which have different shapes. Their actions are shown in section 6F. A small gaff with a wide-open bite is good for smaller-sized fish. A larger gaff with a narrower bite is more common and is better for larger, heavy fish.

Making a good gaff

The gaff head is usually bought ready made but can be home-made if necessary by bending and filing a stainless steel or other metal bar. On many commercially made heads, the bite is too small, and needs to be bent further open for normal commercial use. Make sure the base of the head shaft is turned over at right angles to prevent twisting.

The handle is usually wooden, and should be grooved to accommodate the head shaft. Attachment is by tight binding, preferably using wire, which will not be cut by the sharp teeth of fish. The other end of the handle should be wrapped or wound with cord to ensure a good grip.

The length of the gaff handle depends on the normal distance between fish and fisherman at the time of gaffing. A long handle can be very dangerous if the fisherman loses his grip on it when gaffing a thrashing fish. In general, handles should be kept as short as is reasonably possible. Many boats carry both a long-handled and a short-handled gaff.
**Shark noose**

This is a simple length of strong rope which should preferably sink, and be hard-laid. Ordinary 6 mm (1/4 inch) diameter Kuralon longline cord is ideal.

The rope is usually passed around the fishing line on which the shark is hooked, made into a noose by use of a bowline or similar knot, then manoeuvred around the shark's body and pulled tight.

**Fish club**

This is used to subdue violently active fish once they are in the boat. A good club is about 50 cm (18 inches) long, and 5 cm (2 inches) in diameter at the business end, made of heavy wood and having a handle lashed with cord to ensure a good grip. An old chair leg will often be found suitable.
CHAPTER 2: PREPARING A TROLLING BOAT
SECTION I: TWO COMMERCIAL FISHING ARRANGEMENTS

The most important points to think about in preparing a boat for commercial or semi-commercial trolling have been discussed in the preceding sections. This section shows examples of how these principles can be applied in rigging up two types of vessel, both in common use in the region -the 8.5 metre (28-foot) outboard-powered 'alia' catamaran, and the 8.5 metre (28-foot) inboard diesel-powered V-bottom monohull, both designed and promoted by FAO.

The 'alia' is shown fitted with handreels and rigid-mounted trolling booms, the 'V-bottom' with fixed lines and flexibly mounted booms. There is no reason why these should not be the other way round, or why other types of vessel could not be modified to incorporate the useful features shown.

8.5m (28') 'alia' catamaran

The 'alia' was designed specifically for the Western Samoan skipjack trolling fishery, in which local fishermen generally make two trolling trips a day -one in the morning and one in the evening -to one of several offshore fish aggregation devices (FADs).

To chase the skipjack schools, the 'alia' is designed to be light and fast. Its main disadvantage is that it is unable to carry much weight without losing a lot of its speed. In particular, it is not feasible to carry a large, heavy ice box with a full load of ice and fish on an 'alia'.

Due to its open nature, limited accommodation and fuel-hungry outboard propulsion, this is a short-trip vessel (1 to 2 days maximum).

Earlier models were made of plywood but modern versions are mainly aluminium. The aluminium versions have proved to be lighter and faster (the original plywood boats were prone to waterlogging, which added a lot to their weight, reduced their speed and increased their fuel consumption) as well as being less work to maintain. Many of the load-carrying problems of the wooden version are much reduced in the aluminium 'alia'.

Because of the use of handreels, a crew of at least 2, preferably 4, is required on a boat rigged up as shown in the drawing.
This boat has more comfortable accommodation and is better suited for longer trips of several days. It has a much larger carrying capacity and can be loaded up with one or more heavy ice boxes. The usual engine unit is a Yanmar 2QM20 (20 horsepower) or 3QM30 (30 horsepower) inboard diesel, which is reliable and economical. With a 200 litre (45 gallon) fuel tank this boat has a fishing range of several hundred kilometres (or miles).

Rigged with two steering positions as shown, one man can comfortably operate and fish this boat alone if necessary.
A home-made rack for storing lines on handcasters

Straightening out a line tangle