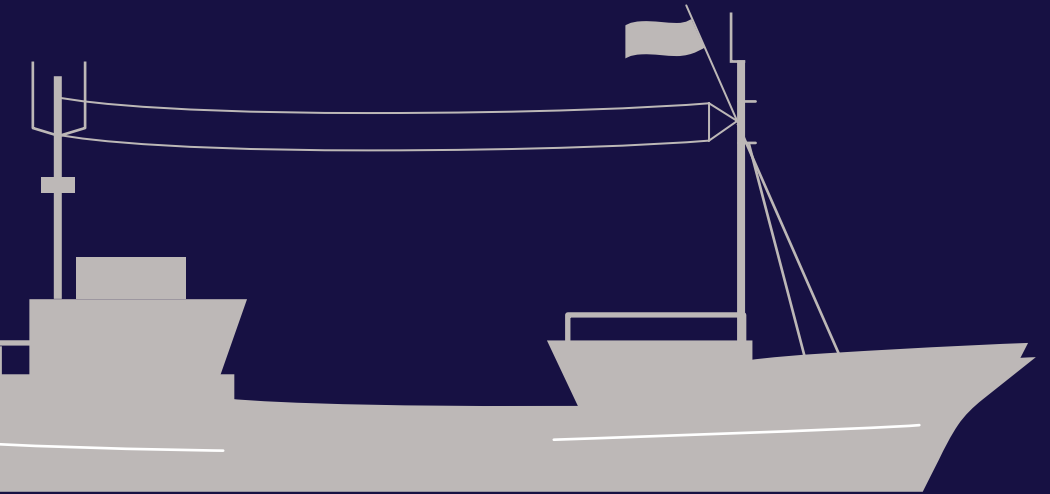


MCS PRACTITIONERS INTRODUCTORY GUIDE TO:

POLE AND LINE FISHING



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GLOSSARY OF TERMS

AIS	Automatic Identification System
FAD	Fish Aggregation Devices
°C	Degrees Celsius
GPS	Global Positioning System
GRT	Gross Registered Tonnes
IMO	International Maritime Organisation
IUUF	Illegal, Unreported and Unregulated Fishing
MCS	Monitoring, Control and Surveillance
RSW	Refrigerated Seawater
RFMO	Regional Fisheries Management Organisation
VMS	Vessel Monitoring System



This MCS Practitioners Introductory Guide has been developed by TMT in cooperation with the International MCS Network (IMCS Network). The guides in this series are intended to be used as a training tool to introduce common international industrial fisheries vessels and gear types, towards building knowledge in personnel working in all government agencies (Fisheries, Port, Coast Guard and Navy, Maritime etc.) who may play an operational role in fisheries monitoring, control and surveillance (MCS), as well as for use by broader interested stakeholders.

While this guide is a stand-alone tool focussed on fishing vessels that utilise trawl fishing gear, it has been developed as part of a series of similar introductory guides on other major industrial fishing methods and related operations, as well as complementary material on fishing vessel inspection considerations.

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OPERATIONAL OVERVIEW: TUNA POLE & LINE

Tuna pole-and-line fishing methods are used in tropical waters to catch tuna. Schools of tuna are targeted by attracting the fish to live bait that is thrown overboard by the catcher vessel. The catch method is very targeted and results in low bycatch, with the catch frequently being a high market-value product. Vessels deploying pole and lines can operate in both coastal and high seas waters.

HOW TUNA POLE AND LINE VESSELS CATCH FISH

As the name implies, pole and line fishing involves the use of fishing poles and lines with hooks. The method is generally used to catch tuna, but also sometimes other large pelagic species one fish at a time. It is a very selective fishing method with very low levels of bycatch and generally only catching the target species.

Pole and line vessels actively search for schools of fish. Once located, small bait fish are released from the vessel and the ocean surface is sprayed with water which imitates the action of a school of fish. This drives the tuna into a feeding frenzy. Fishing poles are generally manually handled by crews but sometimes automated. The poles use barbless hooks dropped into the school of fish. Once a fish is hooked it is hauled up and over the fisher's shoulder onto the deck of the boat where it is then preserved to maintain quality.



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HOW TO RECOGNISE A TUNA POLE AND LINE VESSEL

Pole and line vessels are vessels that range in size from 10-45 m in length. There are three general types of pole and line vessels, generally known as Japanese (or Indonesian), American and Maldives types.

Considerable space is needed for the angling crew to stand side by side and have a enough room to handle the poles. To accommodate this, Japanese and Indonesian pole-and-line fishing vessels have a long-extended bow. To simplify hauling in the catch these boats also have a low freeboard (i.e. their sides ride low above the water). Most of the crew fish from the railings around the bow (front) of the boat, however in some Japanese-type vessels some crew can also be in the stern (back). On American-type vessels the crew fish from platforms located around the stern of the boat, on special crew racks hung outside the ship over the water. On Maldives-type vessels all fishers are standing on an open deck at the stern. Both Japanese/Indonesian and Maldives type vessels are generally drifting while the actual catch operation is ongoing, while American type vessels will move slowly forward.



Japanese



Indonesian



Maldives



American



DESCRIPTION OF THE FISHING OPERATION

TARGETING THE CATCH AND GEAR DEPLOYMENT

Pole and line vessels actively search for schools of tuna. While there are several vessel configurations, once a school of fish is located there are some common features to all pole-and-line fisheries in the world.

Once schools of tuna are located, the vessel approaches at a slow speed, as the objective is to intercept a moving school and bring it to feed by the boat and not to run the school over. The fish are then attracted and kept near the vessel by throwing live bait overboard (commonly known as ‘chumming’).

Water is also sprayed onto the surface of the sea. This further helps to attract the tuna, as the action of the spray landing on the sea surface imitates a school of bait fish; it also helps camouflage the shadows of the vessel and crew from the fish. The combination of bait and spray aims to drive the school of tuna into a feeding frenzy, during which the tuna will snap at anything they see in the water. The poles are then used to drop hooks into the feeding school of fish. These can be baited, either with real bait, or artificial lures can also be used with hooks hidden in feathers. When the tuna is ‘hot’ (very eager to take the bait) then bait may not be necessary, as the fish will bite at bare hooks.



Pole and Line vessel in port with FADs visible on the front of the boat

The pole, generally made from bamboo or fibreglass, can be 2 to 10 metres long. Hooks of various sizes are used, and they are always barbless to facilitate both baiting and removing the captured fish. Once a fish is on the hook, it is hauled up and over the fisher’s shoulder onto the deck of the vessel. A well-practised crew will be able to maintain a constant action of placing hooks into the water, pulling fish from the water and on to the deck, and resetting the hooks into the water at a significant pace.

Depending on the size of the vessel, the crew may number 30 or more – an additional bonus of the fishing method as it creates employment. A large crew is needed, since fishing time may be limited, and the maximum possible number of rods must be utilised. Generally, each pole and line is handled by an individual crew member. However, if larger and heavier fishes are being targeted, two, three, or even four poles may be linked to a single hook. To hold onto the pole a “rod rest” is generally used, which is made of canvas, leather, or old rubber tires. In all cases the crew must cooperate closely to land the fish.

As well as manually handled pole and lines, some vessels utilise deck- and rail-mounted automated fishing poles which are operated hydraulically and electrically. The fibreglass rods are mechanically moved up and down, swinging the hooked fish onto the deck and removing the hook before swinging it back overboard.

POLE AND LINE BAIT

The bait used by pole and line vessels are generally small pelagic species of fish. These are kept on board the fishing vessels in special saltwater tanks which constantly circulate water to keep the bait alive. Bait is generally sourced ahead of the fishing operation directly by pole and line vessels, often using small purse seine nets and dip nets, primarily used at night with lights to attract the bait. Alternatively, bait can be supplied onshore or via at-sea transshipment from an external supplier.

PRESERVING THE FISH

Once the catch is on board, it needs to be preserved to maintain quality and value. With the majority of pole and line vessels, the catch is generally chilled whole in refrigerated seawater (RSW) without bleeding, removing the gills, or gutting. In bigger vessels fish may be brine frozen. Some smaller vessels carry ice in their fish holds.

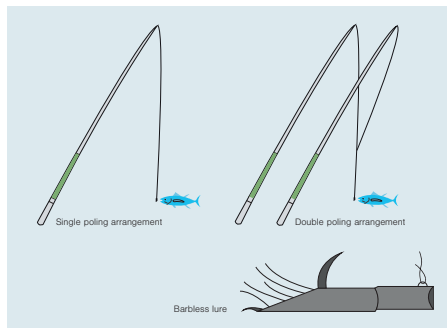
POLE AND LINE FISHING GEAR AND RELATED EQUIPMENT

FISHING ARRANGEMENT

Deck equipment is minimal on a pole and line vessel. The gear is made up of a pole, made of bamboo or fiberglass, a length of line, and a (usually baited) hook with no barb. Larger fish are caught using a double (or more) poling arrangement, operated by multiple fishers.

What is important is the distribution of crew either sitting or standing in the bow, stern, port and starboard. As fish are hooked, they are hauled over the fisher's shoulder onto the deck.

The deck itself is clear and clean so fish can "slide" to the storage area, sometimes aided with chutes.



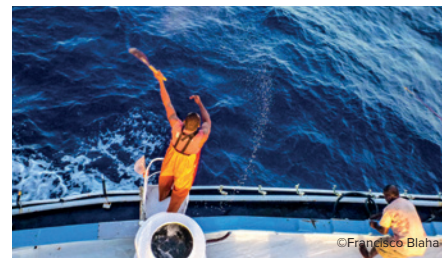
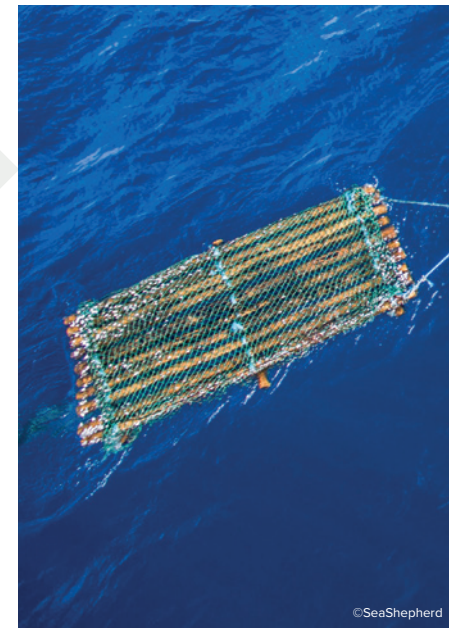
CATCH STORAGE ARRANGEMENTS

Pole and line vessels are equipped with tanks to hold live bait and water spray systems that can be used to attract fish by mimicking the activity that a bait school produces when it breaks the sea surface.

Larger vessels may have a refrigerated holds and use RSW or frozen brine which allows them to preserve the fish and remain at sea longer.

FISH AGGREGATION DEVICES (FADS)

FADs are floating objects, either natural or artificial, that are used by some pole and line operations (and other fishing methods) to attract schools of tuna and make them easier to catch. There are two basic designs of FADs: those that are anchored in place and those that are untethered and free to drift on the ocean surface. FADs supporting industrial fisheries will include a transponder that includes sonar and GPS that transmits to the fishing vessel its position and the amount of fish under the FAD (in which case the FAD can be known as an electronic or eFAD).



CHUMMING

When a school is sighted, live bait is thrown overboard and water is sprayed from pipes around the vessel as to imitate the activity of a small fish school.

MINIMAL BYCATCH

In general terms the bycatch incidence in pole and line operations is the lowest of all pelagic fishing methods. Very limited interaction with protected species such as sharks, marine mammals and birds has been documented worldwide. If undersized or unwanted fish are caught, because the hooks are barbless, when tension of the line is loosed the hook can be easily disengaged and if such a fish lands on deck, it can be returned to the water almost instantly. As such, pole and line is considered the most selective and low impact type of tuna fishing, and therefore often commands a premium price in the market place.

TUNA POLE AND LINE VESSEL POSITIONAL TRACKING (AIS AND VMS)

HOW VESSEL MANOEUVRING APPEARS ON VMS AND AIS TRACKS

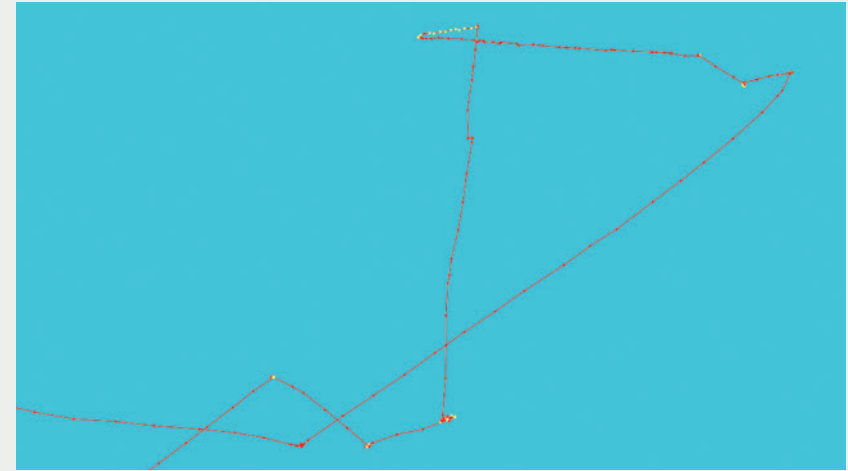
The ability to get a clear indication of what gear type is being used by an individual fishing vessel, based on vessel movement patterns from remote monitoring sources such as AIS and VMS varies considerably across gear types, the length of the fishing operation, and the frequency and availability (temporal/spatial resolution) of the position signals. However, in general it is important to understand that vessels that use different gear types do generally have distinctive positional movement patterns. The longer that fishing operations go on, the more likely the vessel can be identifiable by fishing method due to the likelihood of an increased number of vessel positions being received. One characteristic that is common to all fishing operations is that there is always a stop or drop in vessel speed at some point in the fishing operation.

Large scale tuna pole and line operations leave distinctive vessel movement patterns when analysed through use of AIS and/or VMS. The main fishing operation is conducted during daytime, identified by a vessel's drift at low speed over a relatively short timeframe and distance. Between catch operations, pole and line vessels move in transit patterns searching for schools of fish or moving between FADs. At night, pole and line vessels will sometime conduct bait fishing if they are using lights to attract the bait fish.

It is important to be aware that while in most cases a drift event by a pole and line vessel is likely to be fishing activity, it could also be an indicator of a number of other activities, including maintenance stops, transhipment or rest periods.

When examining VMS or AIS tracks to identify pole and line vessels and their fishing operations, key identifiers may include:

- 1) Transits at higher speeds followed by breaks of drifts or slow speed patterns during daytime.
- 2) Drifting or steaming during night-time.
- 3) Occasional circling patterns over large shoals of fish.



The track of a Pole and Line vessel. Red lines represent passages sailed with higher speed, indicating the vessel is searching for fish, or is in transit to and from FADs. Yellow points in the track indicates periods of lower speed, or stops, where the vessel prepares for and engages in the actual fishing operation

TRIP DURATION

The duration of a fishing trip for a pole and line vessel is dependent on many variables. Two important variables are the period that the vessel can operate on one load of fuel or the amount of food required to feed the crew (its 'autonomy') and the size and type of frozen fish holds on board. Pole and line vessels that preserve catch using ice, Refrigerated Sea Water (RSW), or slurry (seawater and ice) are limited to a maximum of 2 weeks of operation before returning to port. Vessels that freeze and chill as a strategy may freeze the first few weeks of catches and preserve in ice or RSW for the last 2-3 weeks of a fishing trip. Freezer vessels trip duration will then depend on the hold size. The opportunity to bunker fuel at sea, tranship the catch, and generally re-supply at sea will also extend trip duration. The final important factor is of course how successful the vessel is at catching fish!



TUNA POLE AND LINE VESSEL INSPECTIONS - WHAT TO LOOK FOR

For an overview of the general needs and considerations for the inspection of all fishing vessels, please refer to the brief the *MCS Practitioners Introductory Guide to Industrial Fishing Vessel Inspections*. Specific considerations for in port and at sea inspections of pole and line fishing vessels include the following:

CATCH RELATED

In most pole and line fisheries, licensing conditions specify the target species, and in some cases include minimum sizes to reduce catch of juveniles. Inspection should include storage holds for species composition, and evaluating if the volumes found are in a similar ratio as in the logbooks / catch declarations, etc. Other licensing conditions that may be in place should also be inspected such as, for example, whether the vessel is allowed to fish using FADs. If not, it is important to inspect for evidence of FADs or transponders on board, or the transponder receiver. It is also important to determine the vessel's authorised gear type and whether the vessel is authorised to use lights to catch bait. If not, it is important to inspect the gear and for lights.

EVIDENCE OF ILLEGAL TRANSHIPMENT

Transshipment is highly regulated in most jurisdictions and associated with conditions and authorizations normally found in licensing conditions. If the vessel does not have this authorisation, and analysis of VMS/AIS based proximity conducted as part of the Advance Request for Entry to Port (AREP) assessment indicates that the vessel has spent time at sea in close proximity to another vessel (generally 4+ hours) at the low speed required for transshipment (generally less than 2 knots), then the possibility of an illegal transshipment should be investigated as part of an inspection. In this case, logbooks, temperature variations on the cargo hold, and estimates of volumes and catch composition in the fish holds in comparison to those recorded in documents can be used to determine if a non-authorised transshipment took place.

However, it needs to be considered that operationally there are many other valid reasons for which two vessels manoeuvre alongside one another that do not imply transshipment, for example provision of food, new gear, crew, parts, oil, etc.

CREW CONDITIONS

Crews working in any fishing vessel commonly have extremely difficult working conditions. The injury and fatality rates are higher in fisheries than any other sector. The use of pole and line gear is the most physically demanding fishing method for crew, as fish is manually pulled on board. When not involved in fishing roles during active fishing manoeuvring, the crew are typically involved in conducting maintenance and deck cleaning. Living conditions on pole and line vessels can be also seen as difficult since these vessels carry substantial amount of crew in comparison to other vessels of the same size. As vessels have an open deck, it is not uncommon to see crew spending the night sleeping on deck.

Crew labour conditions will vary considerably based on flag State (and increasingly coastal State) requirements, and it is important to understand that what may be seen as poor condition according to the standards set by one country are standard for another. Nonetheless, all crew should be working under reasonable conditions, and any indications otherwise should be further investigated by the relevant national labour agency.

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The tools are also supported and made available by the cooperating organisations of the Joint Analytical Cell (JAC)
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