Practical guide to the attention of agents in charge of nautical surveillance of Marine Protected Areas

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Practical guide to the attention of agents in charge of nautical surveillance of Marine Protected Areas

This guide aims to agents using powered vessels for nautical surveillance of fluvial, lake or marine areas.
It has as an objective to make easier their job, guiding them through the different operation phases of nautical surveillance missions.

PRCM

Programme Régional de Conservation de la Zone Côtière et Marine

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PREAMBLE

Until very recently, the majority of people were defending the idea that marine resources were inexhaustible, when considering the extent of the oceans and the enormous capacity of reproduction of the majority of the fish species. A great number of naturalists even shared this conviction until the beginning of the last century. The words "harvests" and "stocks" were used to indicate the activities of fishing as if it acted, in fact, on farming or breeding.

The knowledge of marine ecosystems was much more limited than today and nobody could imagine that afterward years of trawling there would remain only "ghost" sea-beds, populated with the remainders of animal and vegetable degraded communities whose chances of reconstitution were very slim.

The total failure of the traditional systems of fishing management led to the reduction of the biomasses and a cut in biodiversity resulting in an increased instability of the ecosystems. The increase in the number of interest disputes and the fall of the yield have been witnessed, and their consequences from a social and economic point of view are serious.

One of the major recommendations of the Johannesburg Summit (2002), of the last IUCN World Parks Congress, Durban South Africa (2003) and of the last Geelong's Congress (2005) particularly aims at the creation of representative networks of Marine Protected Areas –MPA- able to contribute to maintaining or restoring the most threatened or degraded marine and coastal ecosystems. **Currently, less than 1% of the surface of the world ocean is in reservation and the majority of the MPA are confronted with a terrible lack of financial and human resource.**

Generally and according to their characteristics, the MPA may have several effects:

- Restoration of the halieutic potential by diffusing fish eggs, larvae, youths and adults into the fishing zones;
- Resistance to overexploitation by the conservation of the reproductive individuals;
- Prevention of the destruction and the restoration of degraded habitat;
- Protection of the species more vulnerable to fishing;
- Maintenance of high trophic levels and of the stability of the systems;
- Increases in the economic benefit from fishing and tourism activities.

According to their management mode, the MPA can also contribute:

- With the improvement of competences of the various users within the framework of co administration processes;
- With the experimentation and the validation of systems of management based on a territorial and participative approach;
- With the maintenance of the local activities and traditional know-how;
- With the development of durable techniques of extraction and practices of responsible fishing;
- With scientific, socio-economic research and biophysics;
- With the development of good governorship practices and durable management of the resources.

More precisely, the effects of the MPA on the halieutic resources and fishing have been conceptually and practically analyzed by several teams in the world. They have been the subject of a recent synthesis which researches the following phenomena:

- **In the short term,** the no-fishing zones locally increase the longevity of individual fish
- **In the medium term,** this increase in the individual lifespan leads to the increase in the average age of the population and

the densities of fish. All of these factors contribute to the increase in the total biomass, particularly the reproductive one. Generally, this biomass increase results in an export of parents out of the limits of the MPA and thus contributes to the renewal, even with the increase, in the resources of peripheral fishing zones. These phenomena are all the more reinforced, that the stop of fishing, in particular the abandonment of the aggressive active machines (trawlers and seines) allows a restoration of the habitats necessary to the successive biological phases of the subjects. The increase in the reproductive activity and its efficiency allows an improvement of the reproduction results and consequently a diffusion of larvae towards the fishing zones.

- **In the long term,** theoretically this results in a restoration of the natural demographic structures within the population and in a restoration of the diversity of the settlements, inside the no-fishing zones. Now, biological and genetic diversity is at the root of the ecosystems' resilience and robustness in view of the environmental changes (replacements of species for example) and to the other pressures like pollution or fishing.

These results of "better health of the ecosystems" in the MPA certainly prove that these protected zones are effective management' tools for the fisheries.

The MPA contribute to a greater diversity of species, to their demographic growth, the increase in their average size and biomass in general. They also have a dominating part in the rehabilitation of the habitats.

The West Africa 's sub-area has 24 million inhabitants of which 65% live at the coastal area, and 1 million working people are directly employed in the fishing sector, which produces approximately 1.300.000 tons of fish per year (artisan and industrial fisheries). They contribute up to 40% to the public revenue of amongst the poorest lands in the World. These economies and societies are thus extremely dependent on the integrity of the marine and coastal environment.

The enhancement of surveillance and control is essential to face the increase in external pressures of fishing activities and to ensure the conservation of a remarkable biomass, still available in West Africa.

The MPA have an irreplaceable part, so much for the conservation of the halophilous flora, whose mangroves are the most representative example in the sub area, as for the conservation of the birds, the mammals and the sea turtles.
The existence of an equipped and effective MPA network in West Africa contributes, unequivocally, to show the respect of international engagements of the various countries represented at the Sub Regional Commission of Fishing (SRCF) in the environment field.

The network, indeed, is naturally in line with the global strategy which has been consolidated since the Rio Summit (1992) and successively the Johannesburg (2002) as well as the last World Parks Congress of Durban (2003) and the last MPA Geelong's Congress.

Within this framework, MPA staff training in the field of marine surveillance, observation and illicit fishing control, is a priority. It remains essential so that the marine and coastal preservation areas fully act, serving the sustainable development.

The regional network of MPAs in West Africa (Réseau Régional d'Aires Marines Protégées en Afrique de l'Ouest, RAMPAO) was officially founded by the Constituent Assembly meeting held at Praia, Cape Verde in April 2007.

RAMPAO's aim is to **"ensure the maintenance of a coherent ensemble of critical habitats necessary for the dynamic functioning of the ecological processes indispensable for the regeneration of natural resources and the conservation of biodiversity providing services to societies."**

More specifically, RAMPAO's objectives are to:

- promote the exchange of experiences and mutual learning;
- create synergies between MPAs on subjects of common interest;
- ensure that the region's MPAs are functional and operational;
- reinforce mutual capacities for advocating, representing and defending the interests of the region's MPAs at international level.

Some thirty Marine Protected Areas (MPAs) have been officially created in six of seven countries up the sub-region. 25 MPAs in 5 countries are member organisations of RAMPAO, notably: 11 national parks, 1 natural park, 6 natural reserves, 2 community-managed MPAs and one community heritage area.

Maritime surveillance is an essential component of the effective management of Marine Protected Areas in West Africa. For all the MPAs, compliance with management rules and access rights is directly dependent on the efficacy of the surveillance.
Since 2004, with a view to improving the level of surveillance, the MPAs of the sub-region have received a range of support on the part of their development partners in the form of equipment, training and pedagogical tools. This support has led to the emergence of local skills, with surveillance teams made up of state employees and members of local communities. These teams, with their complementary skills, are capable of dealing

with the various aspects of maritime surveillance, from controlling the vessel to mechanics, safety issues and onboard communication.

This guide, published by the FIBA, will enable the maritime MPA surveillance teams of the sub-region to carry out their activities in complete safety on the basis of common procedures.
To find out more about the maritime surveillance skills focus group, contact **secretariat@rampao.org**


PARQUE NACIONAL

I) PREPARATIONS FOR NAUTICAL MISSIONS

Whatever the initial objective, every mission, even if it's not a surveillance mission, can lead to a police operation when an offence is observed.

Warning! *Having on board material or people not designated for police interventions can render such interventions impossible because, of course, taking the slightest risk with such people is unacceptable.*

It is the responsibility of the captain to decide whether to intervene or not, based on the circumstances. There is always the possibility of gathering as much evidence as one can (by taking digital photographs, for example), which can make it possible to arrest the lawbreakers at a later time, or of calling upon another team to intervene.

Identifying the Nature of the Mission

It is important that the captain and the crew understand the nature of the mission to be performed.

Kinds of missions:

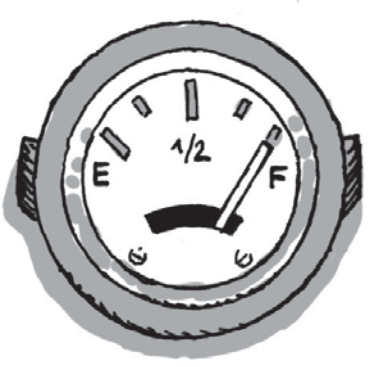
- **Surveillance missions:** every mission the purpose of which is to verify that the regulations concerning the Marine Protected Area (MPA) are strictly respected. They always have 3 elements: Intelligence, deterrence, and suppression ·
- **Technical mission:** can be the checking of signs or notice boards
- **Logistical mission :** for example, the transportation of equipment and/or personnel
- **Scientific expedition:** any mission related to the conduct of a scientific experiment: data acquisition, the collection of samples...
- **Liaison or communication mission :** for example, organizing tours of the MPA for important persons or journalists

- **Assistance and sea rescue mission:** the crews of surveillance ships, of course, have a constant obligation to render assistance to and participate in rescue at sea within the territory of an MPA and even outside of an MPA, if necessary. These missions can be performed during one of the other types of missions previously cited (in which case, the rescue takes priority), or can be specifically organized after an accident or disappearance.

The Captain's Responsibilities

In order to organize the mission, the captain must:

- know the sectors in which it will take place and notify the person in charge ashore before departure
- estimate the projected length of the mission, whatever its nature: for which, he must:
    - measure on the sea chart the maximum distance to be covered
    - estimate the number of navigation hours, which will be different from the total duration of the mission (which would include surveillance stops, taking samples, loading and unloading equipment, etc.)
    - estimate the average speed, which will enable him to calculate fuel consumption,
    - calculate fuel consumption, ensuring a quantity of fuel sufficient for a round-trip to the furthest point in the mission,
    - calculate the required amount of food and water: based on the estimated duration of the mission and the number of people on board.



Loaded Equipment

It is the captain's responsibility to ensure, ticking off on the checklist (in appendix), that the armament equipment and safety gear required for the mission are on board.

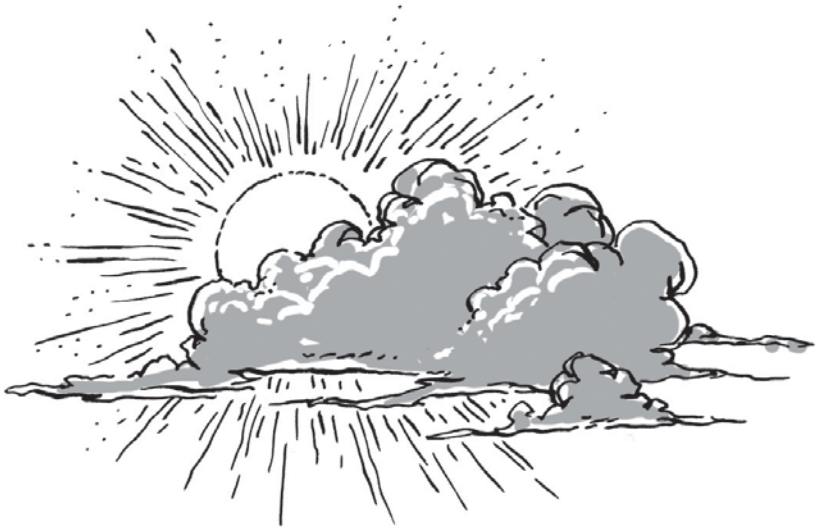
- **Fitting out equipment (anchors, etc.) and safety :** the equipment noted on the list (page 37 of the appendix) as well as the equipment required by national regulations (if they are not already on the guide list) must be loaded aboard.

- **Personal gear for the nautical mission**
- rain coat, warm clothing
- food and water: It is necessary to load 3 litres of water for each person on board per day, and a sufficient quantity of food

- **Additional equipment necessary for the mission**
  - In accordance with the operative procedures of the country on whose territory the MPA is located: official reports or finding notebook
  - Binoculars, pen, notebook,

And possibly, based upon the mission:
  - Sampling material, tools, etc.

Expected Weather during the Mission



It is essential that the captain responsible for the mission obtain information about the weather before leaving and posts this information on the board sheet. Depending upon the specific country and the means available locally, weather reports may be obtained by listening to television or radio news or from the Internet.

In the appendix: weather codes, scale of sea states

II) SAFETY

Essential safety equipment (reminder)

Before starting a mission , ticking off the items on the checklist (see appendix) one by one, the captain must absolutely ensure that the all of the safety equipment is on board.

VHF Safety Procedures

Channel 16 (the channel monitored by all ships) is the channel used for VHF safety procedures.

The procedures comprise three levels, according to the gravity of the situation: Safety, Pan and Mayday. These procedures are used by repeating 3 times the safety, emergency or distress message.

"Safety, Safety, Safety" : **A safety procedure used to announce an encountered problem, an imminent danger to other ships;**

Example: "Safety Safety Safety; this is Sterne 2, Sterne 2, Sterne 2 (name of the ship that is calling) calling all ships, reporting a submerged container presenting a danger to navigation which drifting southward, position 47 degrees 20 minutes north latitude, 02 degrees 43 minutes west longitude. I repeat: Safety Safety Safety: This is Sterne2, Sterne2, Sterne2, reporting a submerged container.... "

"Pan Pan Pan" : This emergency procedure is a request for immediate assistance but not a distress situation; it is used to announce an immediate real danger, for example a man over board, a danger for the ship you are skippering, taking on water, an engine failure and the ship is adrift, or to warn of a ship in danger. The danger is real, but the safety of the passengers is not yet threatened.

Example: "Pan,Pan, Pan: This is Stern 2, Stern 2, Stern 2, position 48 degrees north latitude, 03 degrees 43 minutes west longitude, engine failure; request assistance of all ships. I repeat: "Pan,Pan, Pan; This is Stern 2, Stern 2, Stern 2, position..."

"Mayday, Mayday, Mayday" : This is the distress procedure to announce an immediate serious danger encountered by the ship and its crew (taking on large amounts of water, fire, etc)... Ships receiving this call must divert to rescue if they are in the area.

Example.: "Mayday Mayday Mayday; This is Stern 2, Stern 2, Stern 2; position 49 degrees 23 minutes north latitude, 04 degrees 32 minutes west longitude; Taking on large amount of water following a collision with floating object; asking assistance of all ships. I repeat: Mayday, Mayday, Mayday; this is Stern 2 Stern 2, stern 2, position... "

Warning: Do not endanger the rescue ship while helping the ship in distress (overload, imbalance on board...).

FIRST AID: Basic Knowledge

Don't forget to protect yourself, the victim, and other people on board from the post-accident risks when recovering the victim (for example: capsizing the ship, allowing everyone to lean over the same side while recovering a person who has gone overboard).

First case:
The victim is conscious: Lay him down, question him, forward information

- Ask simple questions and issue simple instructions: “Do you hear me? What is your name? Squeeze my hand."
- Check for signs of faintness (pains constricting the chest, sweats, difficulty in speaking, partial paralysis, distorted mouth...)
- Take off every thing that can restrict breathing (tight collar, belt, slicker, or tight clothing)
- Lay the victim down (if this interferes with breathing, put him into a half-seated position)
- Ask him questions about what occurred
- Get information about his state of health (and transmit this information to the rescue team)
    - How long have you had this faintness? Is this the first time?
    - Do you take any medications? Have you been seriously ill? Hospitalized?
- Alert or have someone alert the rescue team.
- Cover the victim in order to warm him and to prevent hypothermia
- Watch over and comfort the victim until the arrival of the rescuers,
- Help the victim to take his medications if he has to take them; give him sugar if he asks for it.

2nd case: The victim is unconscious: Is he breathing?

Instructions to check for breathing:

- Take off everything that can restrict breathing (tight collar, belt, slicker or tight clothing)
- Carefully tilt his head back to help breathing
- Ensure that the victim does not have anything in his mouth that can obstruct breathing
- Check that the victim is breathing by placing your cheek above his mouth or nostrils (so as to feel on the cheek the air which leaves the mouth), looking to see whether the chest is moving.

If the victim is left on his back, the fall of the tongue backwards and the flow of liquids present in the throat, can obstruct the air passage and prevent breathing!

- **The victim is breathing normally:**
  - Gently place him on his side (lateral safety position or PLS) to prevent the tongue from falling in the throat and secretions from flowing down the throat.
  - Cover the victim to warm him; comfort him.
  - Alert or have someone alert the rescuers.
  - Until the arrival of the rescue team, check regularly that he is breathing.

- **The victim is not breathing (take 10 seconds to check thoroughly)**

  The victim is not speaking, does not react to a simple order, no movement of the chest or abdomen is noted and no noise or breath is detected:

Unless first aid is administered,
the victim may die.
You must immediately give him mouth-to-mouth
or mouth-to-nose resuscitation .

- Pinch the nose, place your mouth largely open around it, blow steadily and deeply
- Come up to breathe while unpinching his nose and see whether the victim's chest and abdomen move, which proves that the air is flowing through the lungs
- If the chest and abdomen do not move, check that the head is tilted back and that nothing remains in the mouth
- Blow two more times; each breath should produce a slight movement of the chest
- After every two exhalations, stop and see whether the victim "has caught his breath."

- **The victim is once again breathing :**

  Administer one minute of mouth-to-mouth (frequency: 10 to 12 per minute), place him in PLS and watch over him while awaiting the rescuers.

3d case: The victim still is not breathing: Is his heart beating?

Instructions to verify whether the heart is beating:

- Continue administering mouth-to-mouth.
- Between your exhalations, check whether the heart is beating (placing three fingers, thumb excepted, on the throat).
- If you do not feel anything after 10 seconds, it is necessary to begin heart massage in alternation with mouth-to-mouth

Warning ! Heart massage should be practised only by rescuers having had specific training. If you are not well-versed in this procedure, avoid practising it

Reminder for specialists: *1 cycle comprises 15 heart massages and 2 exhalations per minute (check for breathing every 5 cycles).*

Wounds with serious bleeding: compress

- Lay the injured person down
- Place a plug (cloth or clean paper) under your hand
- Strongly press with your hand on the site of the bleeding
- If there is an object in the wound, do not pull it out (because it reduces the bleeding)
- Do not use a tourniquet if you can continue to press with your hand until the arrival of the rescue team.

Back/head/neck aches after a fall or blow: immobilize

- Do not move the victim and advise him not to move
- Alert or have someone alert the rescuers
- Hold the victim's head by placing your hands on each side of the head. The rescuer is on his knees behind the victim. If there are only two of you, steady the victim as well as possible to prevent movement of the top of the body, including the head.
- Watch over, cover and comfort·

Trauma to a limb: immobilize

- Prohibit any movement of the injured limb
- Fix the limb in the position in which you found it (with clothing, slicker...)
- Alert or have someone alert the rescuers
- Watch over, cover and comfort·

Burn, sting

- Immerse the burned part in fresh water for 15 minutes if possible
- Jellyfish sting: urine on the sting

Survival at sea

In the event of serious damage, the survival of the crew depends much on its preparation and on the preparation of the mission:

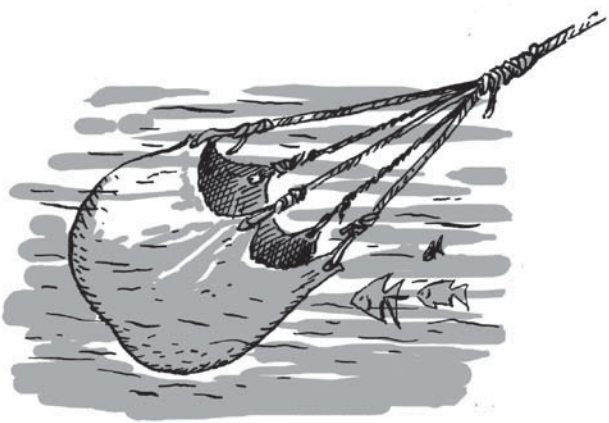
- **In all the cases, the lifejackets must be on board** (see checklist); it's the responsibility of each member of crew to decide if he wishes to carry a waistcoat or not, during the mission. However he should not wait until the sea becomes bad to wear it on. In the same way, during night mission, and especially by moderate sea, it is recommended wearing it.

- **It's the captain's responsibility to initiate a distress call,** noting its position (with the G.P.S), with the clearest and calmest voice as possible (that will also secure the crew). If the G.P.S is out of order, he must be able to calculate its approximate position with his average speed and course steered since the last known point. He also must indicate the number of people on board to make easer the rescue task.

  If the VHF does not work any more, keep on you an reflect ant object (mirror, glass, glasses) for luminous signals to the rescue.

- **The captain makes put the life jackets (if they were not already wearied)** if the crew is normally involved, this operation must be done quickly and in calms, in the contrary case, that could be one moment of irritation and of panic reducing the chances of survival for every one...

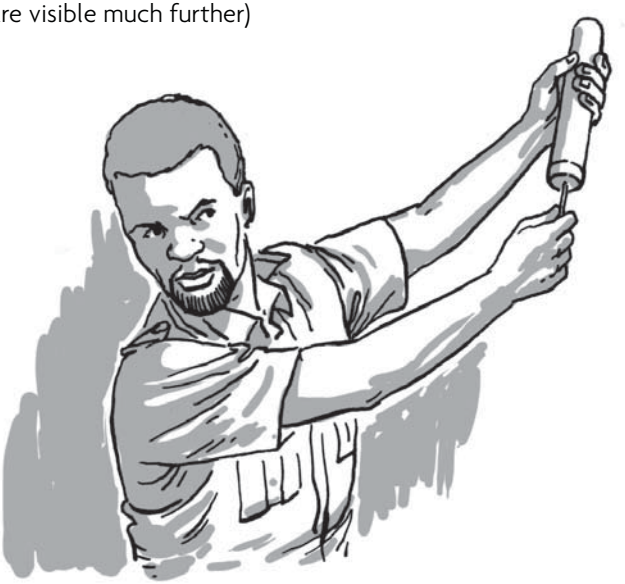
- **If the boat would be deriving without any possibility of stopping it** (loss of the ground tackle), it is necessary to make an emergency anchor which will limit the drift and which will be able to point the prow of the ship towards the waves, making the drift more comfortable and safe (to avoid beam breached breakers). The emergency anchor can consist of a pack of clothes tied together, a bucket, a tip of chain or ropes, finally all that can oppose a water resistance.



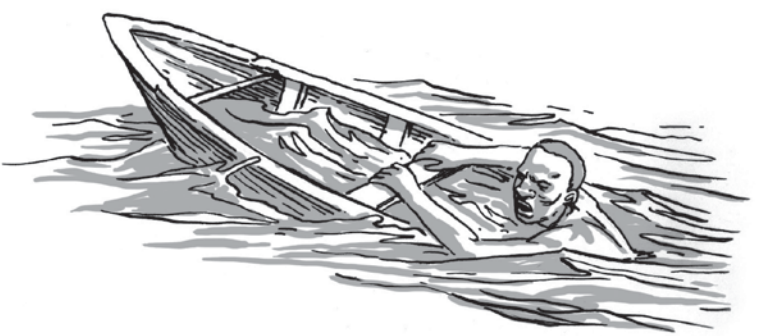
- **A sufficient quantity of water and food** must be enloaded (3 litres of water minimum for one person and one day).

- **Hot clothing,** in these circumstances will become helpful, especially the night. By day, don't forget to protect yourself from the sun. Wearing sunglasses is advised

- **The signal rockets should be shooted only at the time they have a chance to be seen:** when the rescue team is arriving, when a close vessel (or it's light) is seen or if the boat is sinking and that it will not be possible any more to use them then (the rockets, of course, are more effective the night because they are visible much further)

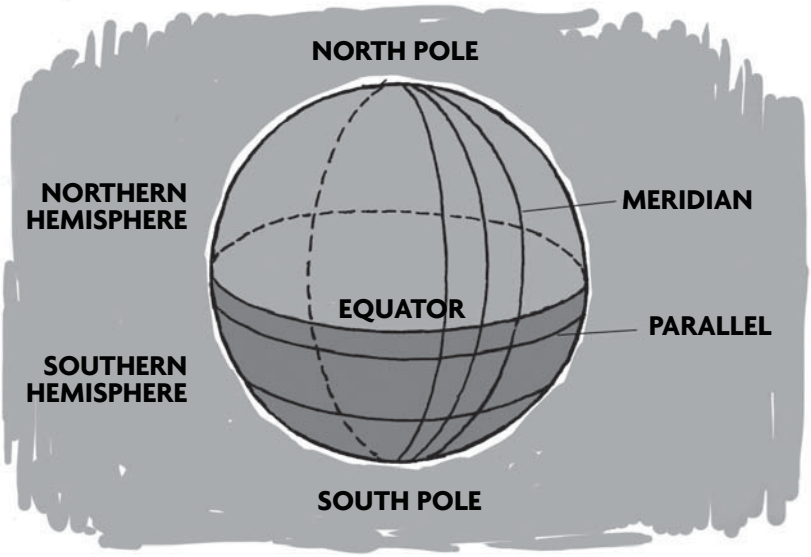


- **In all the cases, stay on the boat** (if not sinked), or be fasted on the wreck (if it floats). This is the surest way to be located by the helps.



III) CONCEPTS OF NAVIGATION

Geographical Coordinates



They are given in latitude (L) and longitude (G) and make it possible to locate any point on a map.

The planet is covered by a grid which is used as reference each time one wants to give his geographical position.

The earth is divided into two hemispheres (North and South), by a circle called the equator.
90 horizontal circles radiate from the equator and decrease (in size) towards the poles: (these are) **the parallels.**

Lines run vertically between the equator and the poles, with, 1° of arc separating them (they each form a 90° angle with the parallels); they divide the earth like orange sections.

These angular measurements are on the map where they form **the latitudes** scale on the left and right of the map.

Let us separate now the terrestrial sphere into two hemispheres but this time, in the vertical direction. We obtain one Western hemisphere and one Eastern hemisphere. The half-circle which crosses the town of Greenwich (near London) is called the Greenwich Meridian and is used as the meridian line of reference (the Zero Meridian). **The meridian** lines extend from 0° to 180° to the right and on to the left of the Greenwich Meridian. They define East and West **longitudes** in the form of angular values which can be found at the top and bottom of the map. (See on a sea chart).

- One degree of longitude is divided into 60 minutes; these 60 minutes are divided into 60 seconds (marked in tenths, see chart).

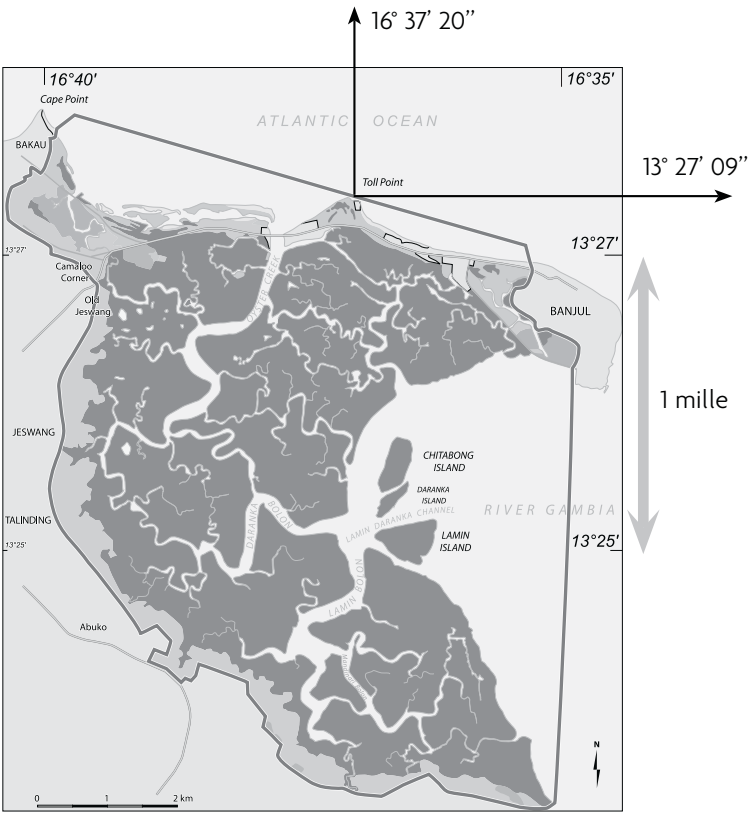
- One degree of longitude is equal to 111 km which, divided into 60 minutes, equals 1852 meters; Thus was calculated the value of the nautical mile (see chart).

Navigation instruments and aids (GPS, maps) are always associated with a geodetic system. A geodetic system provides a more accurate representation of the Earth's surface than the spherical or ellipsoidal approximations used when less precision is required. It is defined in such a way that it corresponds more accurately to the "true" surface of the Earth.

The geodetic system currently used, which is hence the most accurate, is WGS 84. Users of GPS navigation devices and maps need to ensure that the datum used by their equipment (in particular GPS devices) is set at WGS 84.

You should also make sure that the GPS coordinates are displayed in degrees, minutes and decimal minutes (ddd°mm. mmm') rather than degrees, minutes and seconds (ddd°mm'ss"), which can lead to calculation errors.

Determining a geographical point on a sea chart



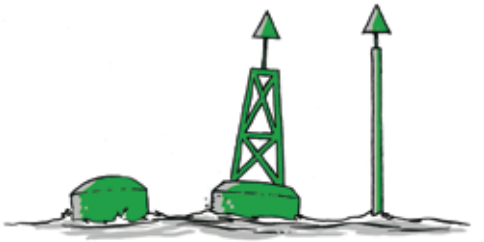
Toll Point's position:
13° 27' 09" northern latitude
16° 37' 20" western longitude

IV) PILOTING

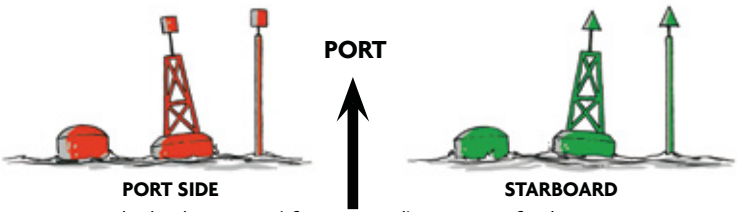
Beaconing - basic concepts (reminder)

Lateral marks:
They mark a protected channel: port entrance, pass between two islands or an island and the continent, etc.
Caution: for the America part (known as B zone), the colours are reversed

PORT SIDE: red and cylindrical



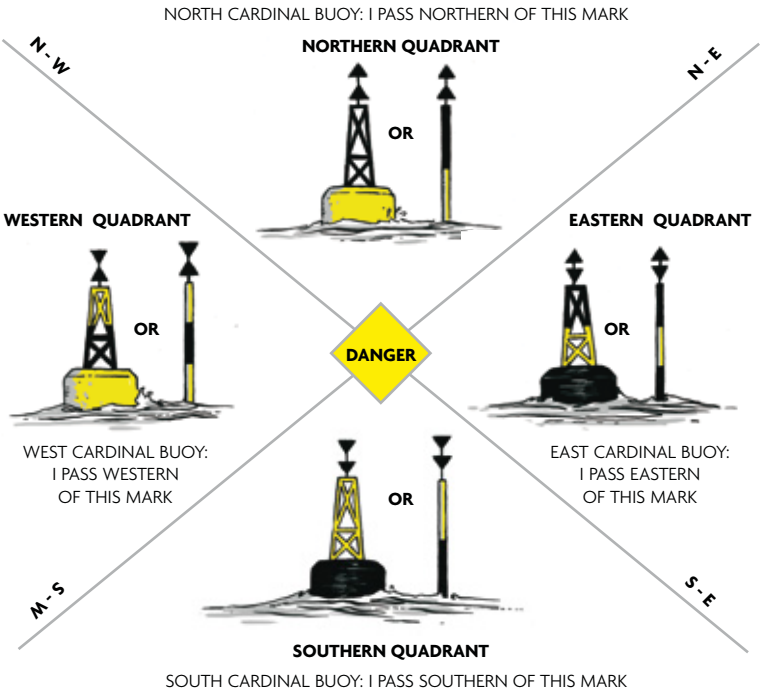
STARBOARD: green and conical



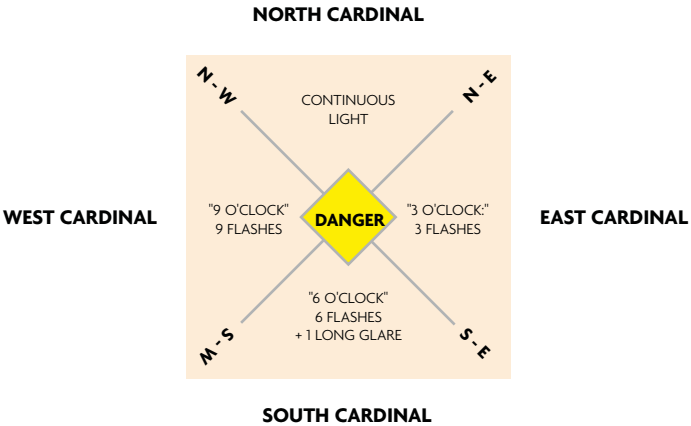
Flash character (if equipped): unspecified rate

The cardinal buoys

They are used to indicate a danger zone that must be avoided by the navigator:



A mnemotechnic to remember the flash groups of the cardinal buoys:



Special buoys:

They are used to mark out a protection zone: it can be a bathing spot, a race course or an access to a hold. These marks are also used for Protected Marine Surface beaconing.

Yellow colour and arbitrary shape.
Lights (if equipped): yellow and with unspecified rate

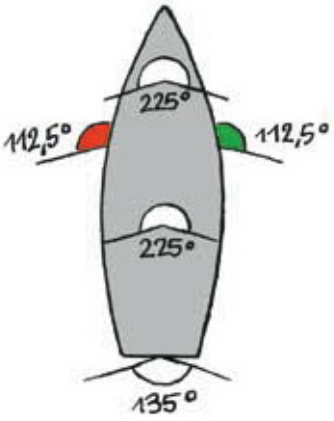
Ships' Lights and Markings

Lights and markings for ships under way

- **Lights description**

Masthead light:
for motor ships which are under way
White, and along the ship's axis

Sidelights:
Red, on port



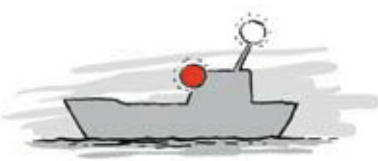
Sidelights:
Green, on starboard

Sternlights: White, astern

- **Lights and markings of principal ships under way near MPA waters**
  - **Mechanical propulsion ships under way**

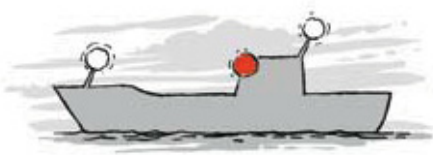
Port view

Less than 50 m



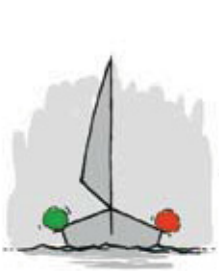
Possibility of only one headmast light (white)

50 m and more

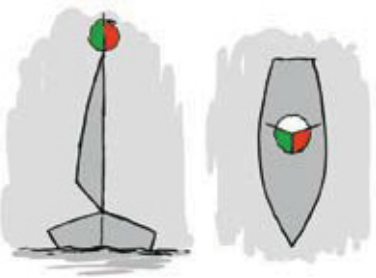


• **Sails boat when under way, (most common case):**

Bow view



Sidelights and stern light



3 lights can be joined together on headmast for a sail boat of less than 20m

• **Trawler dragging a net:**

2 superimposed lights, green on white

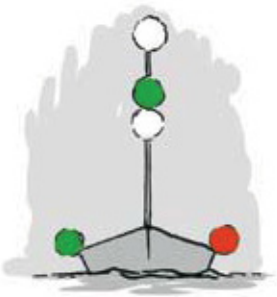
1 white headmast light (exemption for less than 50m)

Day marking

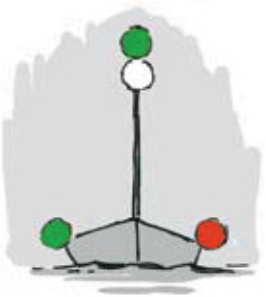
headway

Sidelights : red and white

Stern light, white



≥ 50 m headway



‹ 50m headway

Day mark

Footnote: When the trawler is designed for fishing from the side, it must show, on top of the light previously cited:

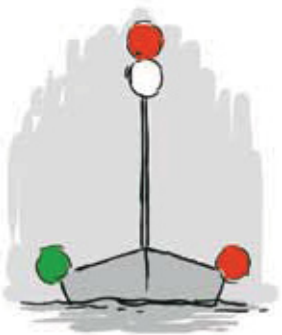
• **Side where the net is:**

2 superimposed white lights when the net is lowe-red
1 white light on a red light at the time the net goes up
2 superimposed red lights if the net is hung

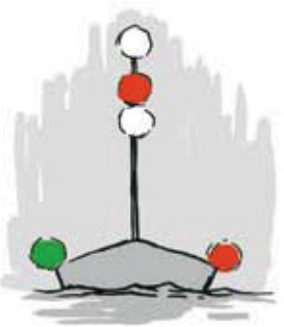
• **Other fishing boats:**

2 superimposed lights, red on white
1 white headmast light (exemption for – less than 50m)
A day mark

Headway **Red and white sidelight**
White sternlight



‹ 50m headway



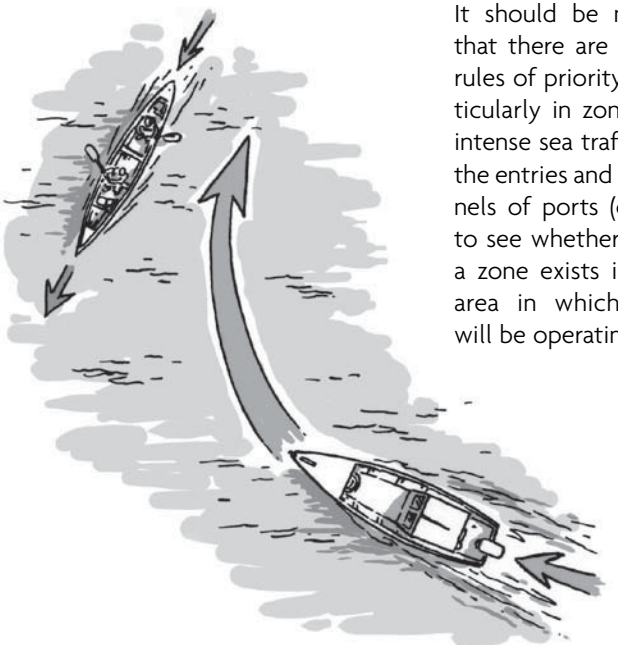
≥ 50 m headway

Daymark

Rules of the Sea Lanes

At sea, when two ships are travelling on a collision course, there are two rules of priority:

- **The less manoeuvrable ship has right-of-way.** For example, a sail boat and a motor boat are on a collision course: The sail boat has right of way.
- **When the vessels are equally manoeuvrable: The one to the right (to starboard) of the other has right of way.** That is the reason it is advised to board a boat from the starboard side (in the event of shock or a collision, your boat will have had the priority. For example, if a ship deliberately strikes you when boarding and you approached it on its starboard side, the fact that you had right of way should be cited in the sea report and could be used in court, in addition to the other ship's dangerous manoeuvre.



It should be noted that there are other rules of priority, particularly in zones of intense sea traffic, in the entries and channels of ports (check to see whether such a zone exists in the area in which you will be operating).

Preparation for Departure

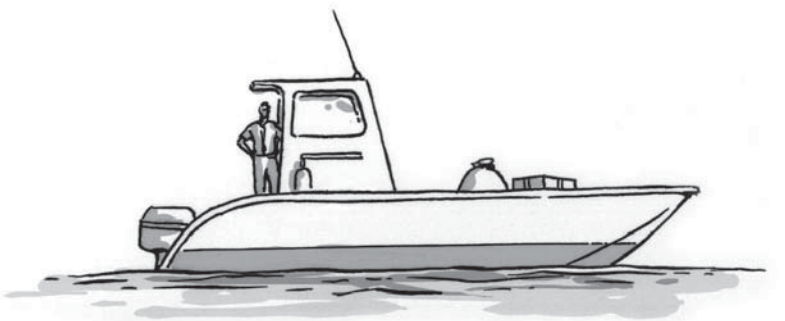
1 - Ensure that tanks are full (fuel and mixture oil)
2 - Open the air intakes on the feed tanks
3 - Check the strainers and propellers
4 - Put the circuit breaker in place
5 - Put the base plates inside the water (manually or with the trimmer)
6 - Start the engine (s)
7 - Check the cooling gauge (frequently check this gauge during the mission).
8 - Check the operation of the VHF (radio), the GPS device, and the electronic instruments on board
9 - Test the clutch (forward and backward)
10 - Test starboard/port steering
11 - Attach the deadman switch to the leg of the pilot
12 - Let the engine turn for 2 minutes before releasing the mooring ropes

The mooring ropes can be released

Footnote: For a boat with an inboard engine, the preparations are slightly different, in particular items 2, 3, 4, 5.

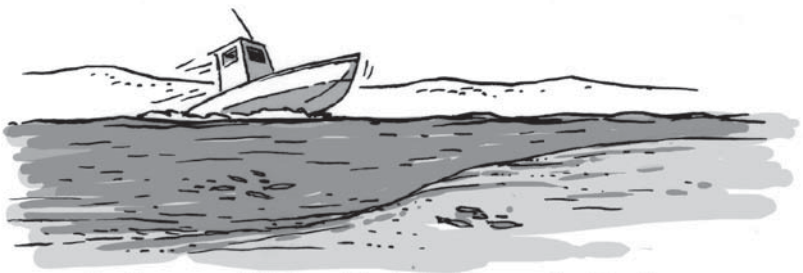
Piloting

Checking of the balance of the loads in the ship
Before departure, it is the captain's responsibility to ensure that the deck is clear, and that the objects and materials on it are well distributed and lashed down; if the sea becomes rough the crew will have a lot else to do (keeping the ship upright, among other things)
A boat overloaded at the front or on a side can take on a great quantity of water abruptly and endanger the safety of the occupants. Moreover, a well balanced ship will plane better and more quickly, taking strain off the engines and limiting fuel consumption while making the crew more comfortable.



- Gently push the throttle until the boat planes;
- When the boat is planing, set an appropriate cruising speed: (an engine speed of 4000/4500 rpm = less fuel consumption and noise)

- In a high sea bed zone, slow down, and trim the engine while taking care to keep the cooling strainers in the water. If necessary, cut off the engines and leave the zone using the oars

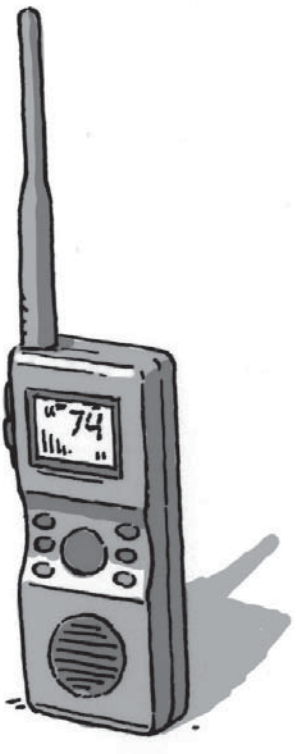


Danger! Reduce speed!

- When the sea is choppy, avoid encountering the waves head on; take them at 3/4, while tacking. Try to keep the boat planning in order to reduce fuel consumption and reduce strain on the engine(s)
- If necessary, redistribute the loads and/or the people embarked on the ship to give it a suitable stability.

V) USING THE ELECTRONICS

The VHF (very high frequency) radio



- **The VHF radio is the radio communication instrument used at sea:** It makes ship-to-ship and ship-to-shore communications possible. Its waves move in straight line, it is thus necessary that there be no obstacle between the two antennas, which explains why its range depends not only of the transmitter power, but also, because of the curve of the earth, of the height of the transmitting (as well as the receiving) antenna.
  Considering these parameters, a fixed VHF radio (normally with a power output of 25 Watts) has a 20 to 50 mile range.

- **Two VHF radios must be on board, one fixed and one portable (the portable VHF radio** will be used in the event of breakdown of the fixed radio, or could be used by the crewman of crew who boards a ship that has been seized).

VHF transmission sessions principally involve exchanges of a professional nature and should be brief so as to avoid interfering with other calls.

GPS (Global Positioning System)

GPS makes it possible to locate with precision one's position. It is a radio-positioning receiver that operates with signals emitted by satellites. It is an essential instrument for a MPA surveillance ship, for it is used to know the precise point at which a ship was boarded, the boundaries of an MPA, the location where species were taken or where contact was made, etc.

Two GPS units must be on board: a fixed unit and a portable one

- **The "Position" key** constantly gives the boat's position in latitude (L) and longitude (G) in degrees, minutes, tenth, hundredths (and even in thousandth according to the device...)

- **The "Navigation" key** displays speed in knots (miles per hour) and the course (direction in degrees).

- **To plot a course,** one can enter the geographical coordinates taken from the sea chart to obtain the coordinates of the places crossed along the way. Or one can engage the "Plotter" function, which plots the course already covered and shows the location of the ship.

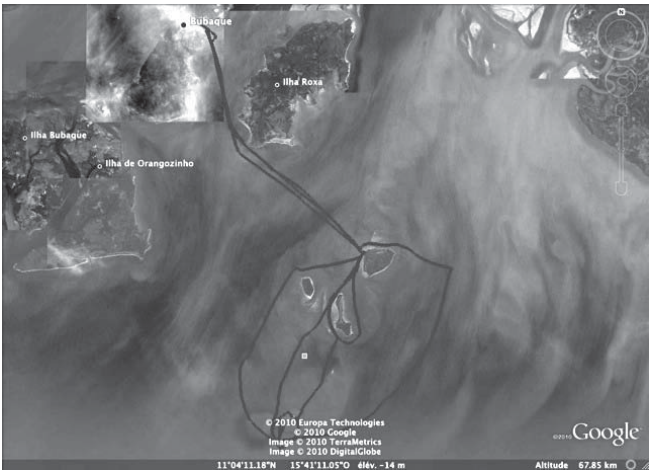
- GPS also has a great many other functions, including **MOB (Man Overboard),** in an emergency, this function instantly records a position and shows the course that will allow for a return to that spot as quickly as possible.

At the end of a maritime surveillance mission, the **mini GPS tracker** enables you to obtain a precise plot of the mission carried out, on either Google Earth or other mapping software. This function also exists in standard GPS applications, but is rather limited by the battery life and memory capacity of the device. Using a mini GPS tracker is advantageous for maritime surveillance in West African MPAs for the following reasons:

- its battery life: at least 3 days
- its low cost: from €34
- its user-friendliness
- the simple and accessible exploitation of data using free-of-charge software, Google Earth.

Plots of maritime surveillance missions, if systematically recorded and processed, are not only a way to check the work done by the crew, but also a monitoring tool that enables the surveillance strategy to be adjusted and developed.

The model of GPS tracker used by the Banc d'Arguin National Park is **CatTraq.**



Other electronic devices

- **Radar:** it gives the position and the distance of an obstacle according to the size of the ship and in particular the presence of a cabin.

- **Sounder:** makes it possible to know the depth of water under the ship: It's an invaluable instrument for the safety of navigation, particularly in a MPA with turbulent water, but also to better understand the composition of the seabed.

- **Digital camera** can prove extremely invaluable in the surveillance operations in a PMA; pictures of the interventions and infringements may bring an important plus to the procedures. It may also be useful in daily management of the PMA, though photographing particular zones, (to keep a record of their state on a specific date) or species, (to a prove their presence or for a formal identification).

Footnote: *Because of the cost of the electronic material on board, of its importance as regards crew safety and the effectiveness of the missions, this material is placed under the financial responsibility of the captain. It is his responsibility to ensure that the equipment is constantly well maintained, that the proper precautions are taken when it is transported and used, and that it is securely stored; in the event of equipment failure, the captain will submit to his superiors a detailed report on the conditions under which the equipment broke down and on the reasons identified for the breakdown. If necessary a subsequent investigation will determine whether the captain bears some responsibility in this failure.*

VI) LOGBOOK – SEE REPORT

Logbook

Whatever the nature of the mission, it is obligatory to maintain an onboard register (or Logbook) in which for every sortie there must be a number of specified data points (listed in the appendix). Onto this form will be entered the zone covered and all the events relating to mission (boat boarding, engine problems, etc). This form serves as a report of mission

An example of a logbook sheet appears in the appendix.

Regulations and Texts

Fishing for or destroying certain species, such as sea turtles or cetaceans, is forbidden everywhere, as is fishing using explosives or chemical substances. Moreover, fishing industrially around a near shore area is banned.
In addition to this general prohibition, specific regulations apply to each PMA.
So that the agents in charge of the surveillance are always able to establish whether an observed activity is legal or not, the various texts regulating the activities inside a PMA must be on board. (Acts, orders, implementation orders, portions of management plans that state prohibitions, rules of procedure, sections of the law on fishing).

Ship's Protest or marine report

When a severe accident occurs (fire on board, leaks requiring rescue, an accident at sea (serious injury to a member of the crew, loss of an agent)), the captain or the captain must write a ship's protest (or marine report or master's report), to the authorities or to his superiors, so that the latter can present it at any

judicial hearing, or use it for insurance purposes, etc. This report explains in great detail, the circumstances of the incident..

In the appendix: Pointers for drafting a ship's protest

VII) MARITIME SURVEILLANCE OPERATIONS

Surveillance operations in a PMA should never be routine operations: they must always be prepared with the same seriousness and professionalism; the safety of the crew and the effectiveness of the surveillance depend of the quality of the preparation and the serious way in which the interventions are carried out .

Organizating the mission

- A surveillance mission implies a crew trained for this kind of mission
- It must be seriously trained and to do that, the operation must have been envisaged down to the smallest detail. Meticulously following the checklist is an invaluable help for the captain and his crew.

Safety of the mission

The safety of the crew and the equipment during the mission are the responsibility of the captain. In addition to the mission preparations (the importance of which we have seen as regards safety), it is useful, whenever possible, **to send a VHF message every hour to an identified correspondent** (using a code to avoid being located by ships monitoring VHF broadcasts). It is a safety practice that reassures the crew and the cover teams. It could allow, if necessary, the launching of a rescue mission very rapidly and to circumscribe the search area.

Boarding a boat

An infringement is noted or there is suspicion of infringement and it requires boarding the suspected boat:

List of recommendations for carrying out a boarding:

- **Position oneself to board** the boat from the starboard or larboard side - preferably on the starboard side to be able to raise a point of priority in case of a collision.

- **Define the role of each person:**
  - **The person who will be the primary to intervene,** to board the ship.
  - **The person providing protection must observe all that happens,** in particular outside the field of view of the man who is intervening
  - **The person who will ensure contact** will use the VHF radio or the phone to show that there is a permanent communication with the on-shore base. Even when such contact is not possible, it is recommended that one pretend it exists, in order to show the offender that you aren't out of contact. If there are only two agents, the pilot will perform both protection and communication functions.

- **Weapons :** If the crew has one or more weapons, get it/them ready and make them visible so as to impress the offenders.

- **Note down the characteristics of the boat and its position** (coordinates read off of the GPS device), the number of people on board, the boat's registry number or those of its characteristics and details that will allow a later identification if necessary .

- Closely **monitor the behaviour of the people** taken into custody before and during the intervention

- **If possible, take pictures** before and throughout the entire intervention (several will be enough). Warning! The person taking the pictures must not allow himself to be distracted by what he is doing and must remain concentrated on the intervention and the surveillance of the people arrested. Take care as well that the photographing does not aggravate the situation by agitating the offenders.

- **Show that one is in permanent radio contact with another team** (ashore or at sea); report via radio on the intercepted boat, its crew, etc to show to the offenders that it will be possible to find them should they try to get away from the agents

- **Order the pilot to shut off his engine(s)** (except in the presence of a current that could carry the boat towards a danger In which case, leave the engine running, even engage the clutch in idle speed until having left the danger area)

- **Tie the intervening boat to the hailed ship,** to the aft third of its hull, so as to have the boat and its occupants in permanent field of view.

- **Once the situation is under control** and stabilized, start to question the occupants, take any information necessary to the proceedings

Securing a mission

- **If it is necessary to institute the seizure of a boat:** According to the context there may be several possibilities:

- Have an agent of the crew board the seized ship and stay aboard until reaching the destination planned for the ship's storage
- If possible take a member of the hailed crew aboard the control ship, (after having checked that it does not have any weapon and putting him under tight surveillance
- Order the pilot of the hailed boat to follow the control boat, telling him, that any attempt to escape will worsen his situation
- If the hailed ship has broken down: pass a towing rope and tow the ship
- If there are several ships to be intercepted, according to their speed, note all the identification numbers or characteristics to allow their later identification. Take pictures if possible.

- Once the hailed boat is under control, it is necessary to not relax vigilance and to make sure that the crew does not have any evil intentions. To do that:

    - If the intercepted crew shows signs of aggression, talk to them but stay firm, communicate by radio with the shore-based station, telling them what is going on (or pretend to do so if the connection is not possible), if the intervening crew has one or more weapons, show that they are ready to be used if required: for example, operating the slide always emits an impressive sound that has calming properties on the offender.

    - When it is necessary that the intervening agent board the hailed ship, firmly order the crew to gather at one end of the ship, and to keep the hands visible; never allow people to remain lying down (there can be weapons under the mattresses or covers).

- Make sure that there are no weapons, or any objects that may be used as such , within reach of the occupants of the hailed boat (knives, boat hooks...) If there are such items, seize them or make them give them up and transfer them to the intervention boat. These items can be returned to their owners if it turns out that there was no infraction. Otherwise, note this seizure in the official report (and according to the laws of the country).

Seizing and towing a boat

- If the boat is seized following a boarding, it may be several possibilities:

  - The operator of the seized boat agrees to follow the intervention boat to the place his ship will be kept. One should lead him, staying very close to him (preferably behind him to monitor him permanently).

- The operator of the boat declares that his engine has broken down: After having ensured the security of the boat as previously indicated, have an agent, with mechanical skills, if possible, board the ship to try to locate the cause of the breakdown.

- As a last resort, pass a towline with sufficient length so that the two ships are always on the same side of a wave. Tie the towline in a Y form, to the back of the towing boat to prevent it from becoming unstable. The tow must be in a straight line in order to be as little trouble as possible.

- There is also a possibility of coupling the boats, but there are risks of damage caused by the scraping of the two hulls.

VIII) MECHANICS

Engines for boats used to survey protected areas

The speed boats used for surveillance can be equipped with either onboard (gas oil) or outboard (gas oil) engines.
While it is recommended to choose onboard gas oil engines for reasons of operating costs and life span (lower fuel costs, lifespan 5 to 10 times longer than outboard petrol engines, and lower maintenance costs) the difference in purchasing price of this type of engine is such that managers are usually obliged to opt for outboard petrol engines.

Given that these outboard engines are used in protected areas, managers should be exemplary in their choice of model, ensuring that they are equipped with sufficiently recent technology (auto lube, for example) to limit hydrocarbon emissions and save on fuel consumption, while bearing in mind that obtaining spare parts on a local basis should not be too complicated.
Whatever the model chosen, complying with the following recommendations will enable managers to considerably increases the engines' lifespan, and also reduce maintenance and repair costs.

Description of an outboard motor

(see diagram in appendix)

Engine Maintenance

(see standard card in appendix)

- Maintenance after each exit from the water
- Weekly maintenance
- Monthly maintenance

Various questions concerning the maintenance and correct utilisation of outboard motors

- **The importance of running-in**

Running-in is very important for the lifespan of motors.
For two-stroke outboard motors, you should run the motor in for at least 10 hours and avoid fatiguing the motor (for example by using it immediately at full throttle). During this time (above all the first 5 hours), you should absolutely avoid using it at full throttle for prolonged periods.
During running-in it is important to check for any leaks and unusual noises. And after running-in you should clean the spark plugs.
Don't forget to change the gear oil in the lower unit (draining the oil provides a visual check for leaks) and to see if there are any anomalies such as the presence of a significant quantity of filings on the drain plug.

- **What percentage of two-stroke oil should be used for Yamaha Enduro 40, 60, 75 and 200 hp two-stroke motors after running in?**
    - 2% TCW2 2T (2-stroke) engine oil (2 litres of oil for every 100 litres of petrol)
    - TCW means "Two-Cycle Water-cooled" and indicates the presence of additives that ensure that the oil burns at the correct temperature in water-cooled two-stroke engines (internal exhaust temperature between 80 and 90° C). The oil needs to burn at 90° and remain fluid: if not there is a risk of carbon build-up and the creation of abrasive particles. TCW2 2T oil has all these properties, which explains its higher price.

- **What are the risks of adding more oil (3% for example)? If in doubt, is it better to use a 1.5 % mixture?**

There are multiple risks:

- **Detonation ("knocking"):** the risk of an explosion in the combustion chamber before the piston is in its normal position. This premature explosion leads to the destruction of the piston, bending of the piston rods and damage to the crankshaft.
- **Backfire:** a significant risk of an explosion in the exhaust due to the accumulation of oil. Emission of fumes and pollution.
- **Production of a lacquer type residue on the piston skirts,** creating a barrier preventing thermal exchange between the piston and the piston sleeve (seizing).
- **Sticking of piston rings,** leading to a loss of compression.

You should avoid using a 1.5% mixture but it is less dangerous than 3% (it remains essential to use high-quality oil).

- **What are the risks of using "cheap" 2-stroke oil?**

The risks are the same as those described above, together with poor dilution producing a low-quality mixture, leading to:

- poor carburetion,
- reduced temperature resistance,
- poor performance over time,
- rapid degradation of its fuel and lubricant qualities.

For example, using motorbike or chainsaw oil: this oil burns at 145°C rather than 85°C like TCW2, leading to the accumulation of quantities of unburned residues in the motor. The consequences are the same as those described above.

- **What are the risks or consequences of using the wrong spark plugs?**

The main risk: a hole in the piston.

The wrong spark plug heat index leads in particular to poor

ignition timing, and thus to a risk of detonation, etc.
The wrong electrode length leads to poor ignition and idle speed, with the risk of flooding and, if the electrode is too long, of being damaged by the piston.

- **Which spark plugs should be used with a two-stroke Yamaha Enduro engine?**
    - **40 hp (E40G): NGK B7HS, E 40X BI CYL B7HS or BR7HS10 (the R and 10 indicate that the spark plug has a burn-off resistor,** indispensable for avoiding interference if a radio or telephone is run from the battery). Choose the same spark plugs for the -cylinder **40 hp** 3 engines.
    - **60 hp (E60H-E60J): B8HS10**
    - **75 hp (E75B): B8HS10 75A BR8HS10**
    - **200 hp: B8HS10**

- **At what engine speed should an Enduro 2-stroke engine be run?**

Optimum running speed: 5000-5500 revs/minute.

- **What are the risks of using a propeller the wrong size for the boat?**

Propeller too small or worn: the motor runs too fast, which may lead to: melting pistons, burnt valves, broken piston rings or crankshaft damage (broken crankshaft cone)

Propeller too big: the motor "labours", risk of **DETONATION,** which may lead to: holes through pistons, cracked piston skirts, damage to connecting rods or the crankshaft, a broken steering wheel cotter pin, or a blown exhaust casing
The propeller is the right size when, under normal operating conditions (full fuel tank, usual load and number of persons on board), the motor runs at more than 5000 rpm (and less than 6000 rpm!) at full throttle.

General Conclusions:
Using the wrong propeller, poor-quality two-stroke oil or a mixture different than the recommended 2% are the most frequent causes of motor breakdowns and shortened lifespan.

Analysis and Identification of Breakdowns

When an engine failure occurs, there are three different systems to check: the fuel supply, the electric system, and the coolant system.

1st scenario: the engine refuses to start or has stalled out and refuses to start again:

It 's a fuel supply or an electric problem:

a) Check the circuit breaker: it is the most frequent "breakdown"!

b) A problem with the fuel system:

the procedure for diagnosing the problem must be logical, starting with the fuel tank and working towards the engine, systematically eliminating each possible cause of the problem as one goes along.

The Diagnostic Process

Before removing the engine cowling:

- **Checking the amount of fuel in the tank, and the air intake opening and connections**
  - check the fuel level.
  - check the air intake of the tank, it is perhaps closed.
  - check whether the hose connections are tight (by tugging them gently).

- **Checking the lines**
  - check that the fuel supply line is not pinched or punctured.
  - check the handpump, it may be defective or poorly connected.

- **Checking the filling prefilter and removing water if necessary**
  - check that the prefilter is full of gasoline and that there is no water inside.
  - check that the prefilter is not plugged.

Remove the engine cowling (Warning! Put it in secure place in the cockpit, for it can fly off and it will sink)

- **Verify that the gasoline filter is not plugged (re-install it carefully, pay attention to the air intakes... new breakdown!)**

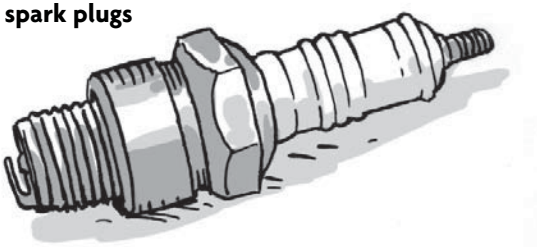
- **Verify that the fuel pump is not defective**
  - *Does the hand pump become stiff?*

  No : disconnect the hose connection at the engine. If the pump still does not become stiff, the problem lies between the fuel tank and the engine.

  Yes : disconnect the hose where it enters the engine and press on the ball while pumping, the gasoline must squirt ; the problem is then in the engine (the supply hose within the engine, the connections, pump membranes, or a problem with the carburator)

- **See whether a leak can be seen while pumping (if so, plug it and repair)**

- **Take out the spark plugs**



  - **If they are wet:** that means that gasoline is being delivered, so, it is not a problem of supply, the engine is simply flooded (frequently the case): Disconnect the supply hose from the engine, fire the engine a dozen times, push the accelerator, screw the spark plugs back in, then reattach the fuel supply line, and restart the engine
  - **If they are dry:** that means that gasoline is not being delivered. Disconnect the exit hose connection of the gasoline filter and pump: if the gasoline squirts, the breakdown is located elsewhere.

- *When the exit port on the filter is blocked with the finger, does the pump become harder to work?*

No : Check to see whether the failure lies in the hose connection, located between the fuel hose and the exit port of the filter.

yes : Let's go on: Disconnect the fuel hose from the exit port of the fuel pump and give the ignition a few turns (the gasoline must be expelled by strong jerks)

If the gasoline does not squirt, an" operation" on the pump is necessary , (on land and in a clean place), having remembered to check the hose connection between the filter and the pump (it would be simply stupid to be blocked by so simple a breakdown).

If the gasoline squirts, the breakdown is located further.

If everything checked thus far is operating normally, there is nothing left but to disassemble the carburetors, on the land, because, on the water, it would be extremely tricky!

c) A Problem with the electric circuit

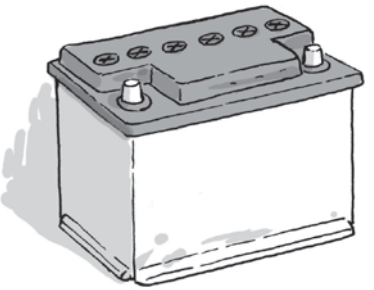
My engine does not start, and after checking, the source of the breakdown is not in the fuel system

Finding the Source of the Breakdown:

Before removing the engine cowling

- **Check the circuit breaker**
  - is the circuit breaker well attached? (a very frequent cause of "breakdowns"...)
  - is it the correct one? (there is a different thickness for each brand)
  - the circuit breaker itself can seize up; flip it back and forth several time;, disconnect it (a white wire on a Yamaha)

- **Check the battery**



  - With an electric starter, make sure that the battery main switch (if the boat is equipped with it) is not on "OFF"
  - Is the battery charged? Is there water inside?
  - Are the thimbles quite tight, clean and are they lubricated?

Not until this point should you remove the engine cowling (Warning! Put it in secure place in the cockpit, for it can fly off and it will sink)

- Shunt off the circuit breaker in order to see whether it is the source of the problem, **but** *WARNING! DANGER! There will be no engine shut-off in the event the pilot falls into the water . Don't forget to replug it afterward*
  (For a a YAMAHA. disconnect the white wire coming from the circuit breaker)

Warning: Never operate the engine without a circuit breaker

- Remove the spark plugs, one by one, to see whether there is an electric arc between the electrodes of each spark plug .To do that, make a connection between the electrode and a mass (the engine block) and give the ignition a small turn .**Take care that there is not too much gasoline or gasoline fumes nearby,; there is a risk of explosion!**

If one spark plug is defective, replace it with a functioning one to see whether it is a problem with the spark plug itself or whether the breakdown is located on the suppressor connection, the high voltage cable, or the reel.

If no spark plug gives this electric arc, the problem lies with the TDCI (electronics box) or simply, a problem with the connections. But in any case, the search must be exacting. Check that there is nothing at the bottom of the suppressors (piece of newspaper or any thing else); that is one way in which and engine can "break down."

Apart from these few simple checks, you cannot do much without the help of a mechanic.
A word of advice: in the event you have to replace a TACIT (Computer Discharge Ignition), keep the old one and have it tested.

d) A Problem with the coolant system

Water isn't flowing to the cooling control (washing bottle). What is causing this?

Answer: A dirty base plate, blocked strainers -blocked cooling control - defective water pump - coolant circuit blocked

Bonus Question: Is the engine lowered enough?

Answer: The engine must be lowered until the strainers are submerged in the water

Procedure for Finding the Source of the Problem:

(once the boat is safely in port and the engine off)

Before removing the engine cowling:

- **Check the suction strainers** by raising the engine
- **Check the washing bottle** from outside, clearing it with a large fishing line, a small piece of wire, etc. If the water squirts, the problem is fixed.
- **Disconnect the hose** from the cooling control and see whether it dribbles at the exit from the motor head.
  - **Yes :** There is nothing more to do but blow into the tube which crosses the top of the sleeve.
  - **No :** This is serious: It is a problem with the water pump (you will have to call a mechanic)

Some other scenarios:

e) Problems with the spark plugs

An examination of the spark plugs provides good leads for diagnosing output and motor working problems.

• **If the spark plugs are being flooded (they will look black and wet), what should one do?**

There are several possible causes:

- **The air/fuel mixture at the intake is too "rich":**
- Check the choke: on recent Yamaha engines equipped with the Prime Start automatic choke system, you will need to look for the small red lever located on a side of the carburettor incline. It makes it possible to switch between automatic choke, open choke (ONE) and closed choke (OFF). If the problem is solved once the lever is in the OFF position, then the Prime-Start system is defective. Eventually provide to clean the thermostat.
- Adjusting carburetion: Warning! Carefully evaluate your competence in such matters (before attempting).

- **Bad combustion of the mixture**
- Spark plugs are too cold: Ensure that the model number of the spark plug corresponds with that specified by the manufacturer. Also check to see whether the spark plug gap was incorrectly set, by a "specialist" using the point of the knife!
- Bad fuel, prolonged storage involving a loss in the octane ratmg.
- Under-performance of the engine (badly adapted propeller, boat in overload...) The engine must crank out 5200-5400 rpm at full speed.
- Then, the next stop is: the mechanic's, who can look for bad timing, bad engine compression (segmentation), or a problem with the thermostat (engine too cold).

- **If the spark plugs "heat" and look burned and white, what should one do?**
    - One can look for a fuel supply failure (see beginning of the chapter: Fuel Supply Problems)
    - Is this the right model of spark plug? Did the same "specialist" who used the point of his knife forget his tool and pound on the electrode to tighten it "by eyeball?" In this case, install the new spark plugs that are required to be on board, and mention the breakdown to the mechanic.
    - Perhaps the engine is red-lining; it may be that you do not have the correct propeller or that it is worn, in which case there is risk of premature wear or that the engine will be damaged: Check the tachometer if possible.
    - If the problem persists: Go see a mechanic.

- **Do all the spark plugs display the same symptom?**
    - If not, you can more easily locate the problem. First, see whether the problem spark plug is really the same type as the others. If the problem persists problem may lie with the carburettor induction valve of the that particular cylinder = Go see a mechanic.

    - the lower cylinder is most frequently implicated. Why? Well, just because it is below, and by gravitation or decanting, the sources of problems tend to go down. If your engine is splashed by water, that water will run down and have more chance to be sucked in by the air intake of the lower carburettor, which will cause the loss of output or the breakdown of the corresponding cylinder.

Note: This type of breakdown can have as its cause incorrect positioning of the engine . Placed too low on the rear platform, it may cause splashed water to be sucked into the engine.

f) The Engine Goes into Automatic Safety Mode

On autolube engines, if the oil level is too low, or if the injection of oil is blocked, or if the oil pump has a problem, the engine automatically slows down with vibrations or sputtering.
Fill the oil tank if necessary. If the tank is sufficiently full, the problem is elsewhere: Put oil (2%) in the tank and go back to shore.
The same phenomenon can occur if the engine heats: Check the cooling.

g) The engine "is not turning over very well"

The simplest cause can be a spark plug that is not firing. Ensure that the suppressor is well seated (a very frequent cause of breakdown!), that no spark plug is loose, and that none of them is not defective.

Do not forget that any work on the engine requires special attention:
It can restart abruptly; it can catch fire; you can be splashed in the eyes with gasoline or acid... Do not forget, if you are working on a propeller, to remove the circuit breaker in order to avoid having a finger cut off by an unexpected restarting of the engine.

IX) KNOTTING

Sailors have their own language, which provides many terms that someone needs to speak about the nodes. The sailor *splices* **a rope,** *he belays* **or** *rigs* **a lashing: he joins together 2 ropes by a** *carrick bend, he turns round, he stops, slacks, veers out, cases or casts off moorings.*

PRESENTATION OF THE MOST USED FIBRES

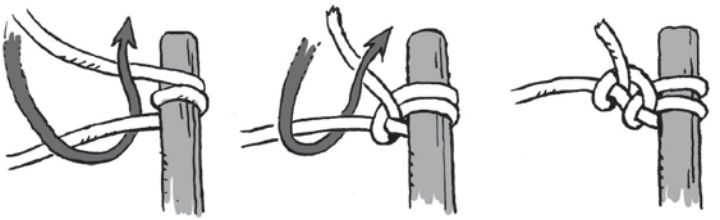
a) nylon : great elasticity and strength, it is appropriate for dampings and mooring ropes.
b) Dacron or térylène (tergal in France): very good rope for every use.
c) polypropylene: as it floats, it usually ends into the propeller.
d) polyester : good resistance, very flexible, generally plaited

Moorings knots

They are knots usually used to attach a rope to something else

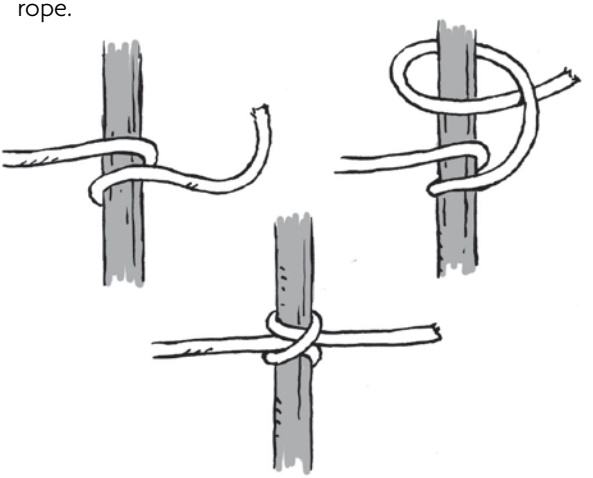
a) roundturn and 2 halfhitches

It is the easiest way to moor a boat with a bollard. It can be made around an attachment point (bar of scale, ring, etc).



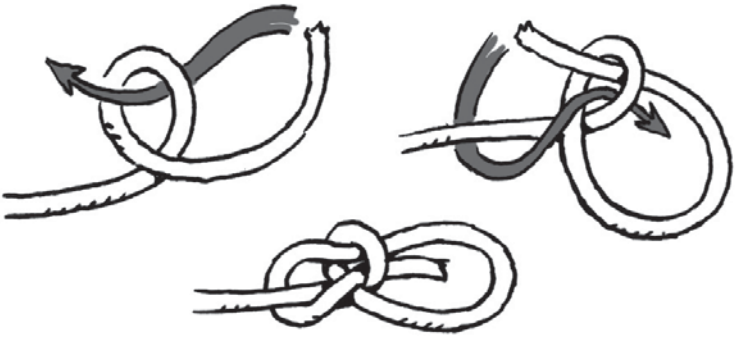
b) Clove hitch

Simple, fast but less secure than preceding. It may slip, better safe it by one or two half-hitches on the dead rope.



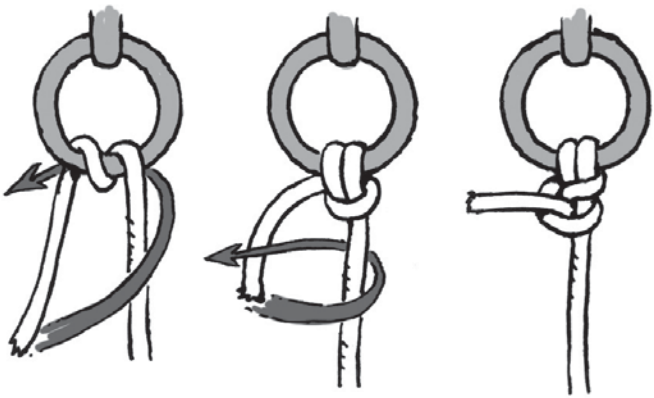
c) Bowline knot

the knot you must remember, essential, it is used to make an eye at a the tip of a hawser to belay aside a quay. May replace a snap hook, and allows to make safe the ground tackle on the of anchor. Be able to do it one's eyes closed!



d) grapnel bend

It is used to bend the mooring hawser with the anchor ring when there is no chain cable in-between (only for the tenders).

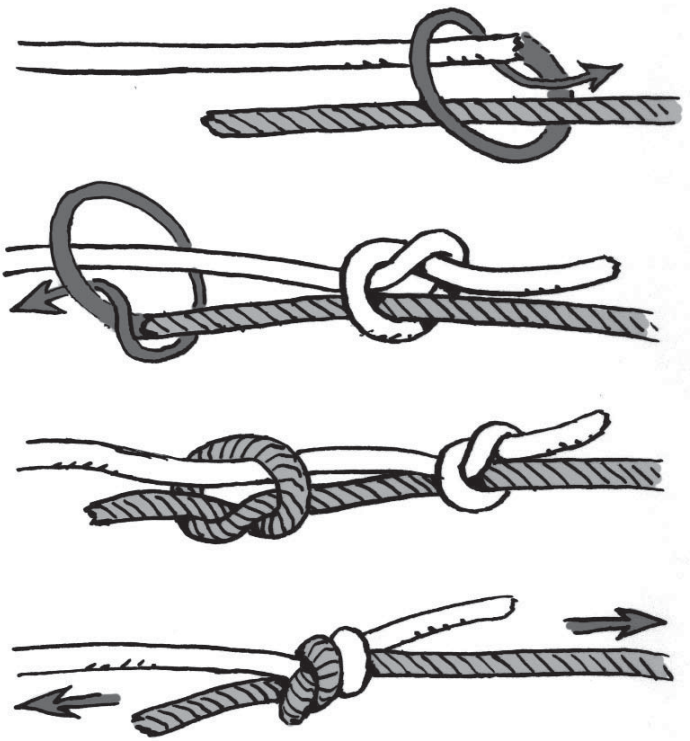


Carrick bents

They are used to add a rope to another.

a) Fisherman's knot

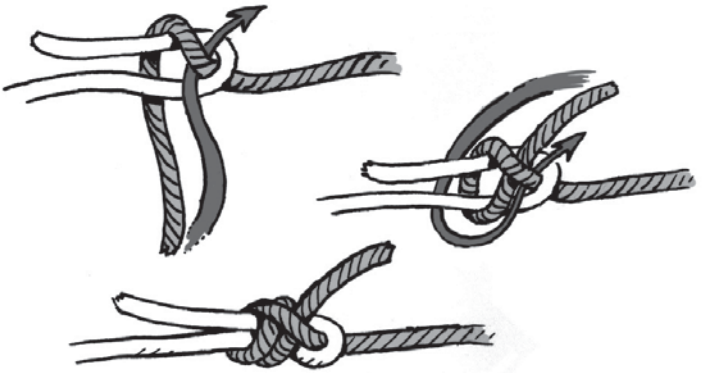
Very useful insofar you don't need to undone it: that's impossible when it is strong bended! Well tighten the overhand knots before and after the slip, let a good length from the running part



b) becket hitch

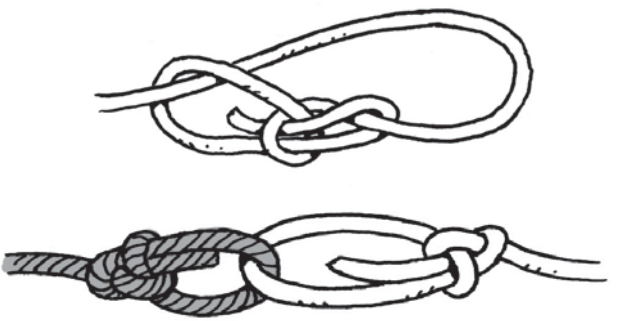
Simple and fast, it is used to join together two ropes rather different diameters. Requirement: the traction must be continuous to hold it.

Becket hitch



c) two bowlines

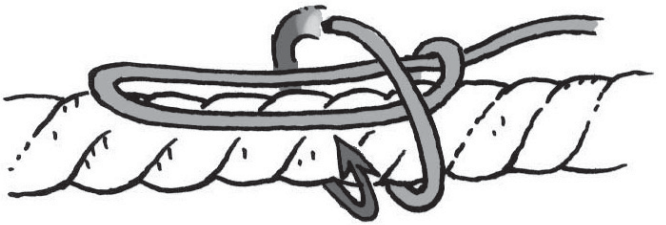
It is the perfectly sure node: it cannot slip, it can join ropes of very different diameters, may be undone easily after use. It is made of 2 bowling knots (see higher) whose loops are one in the other.

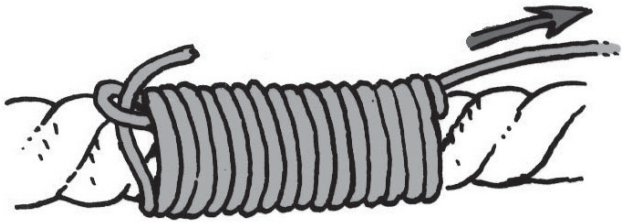


Stoppers Knots

a) hiping

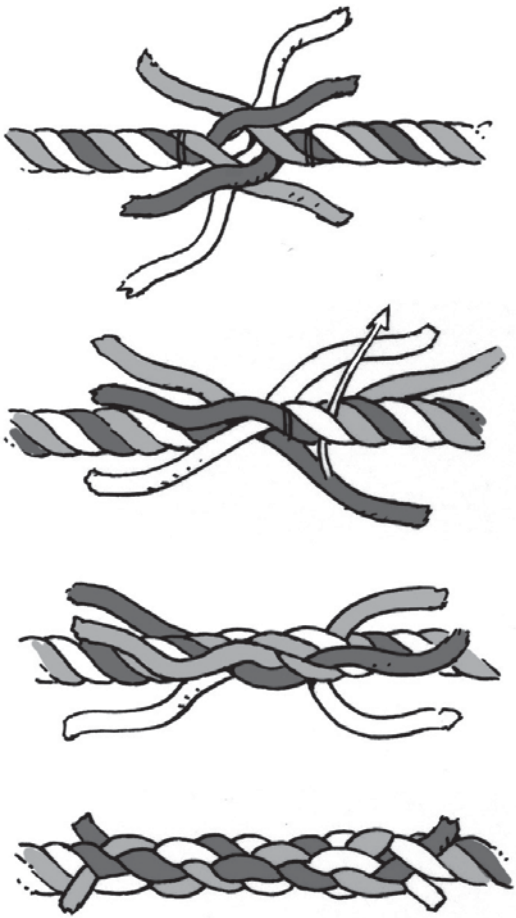
A rope that you buy was probably cut by using an electric resistance. The wire are welded together CAUTION it will not take a long time before a strand will disjoin the others. To avoid that, whipping is needed at the end of the ropes. Use a fine and resistant wire





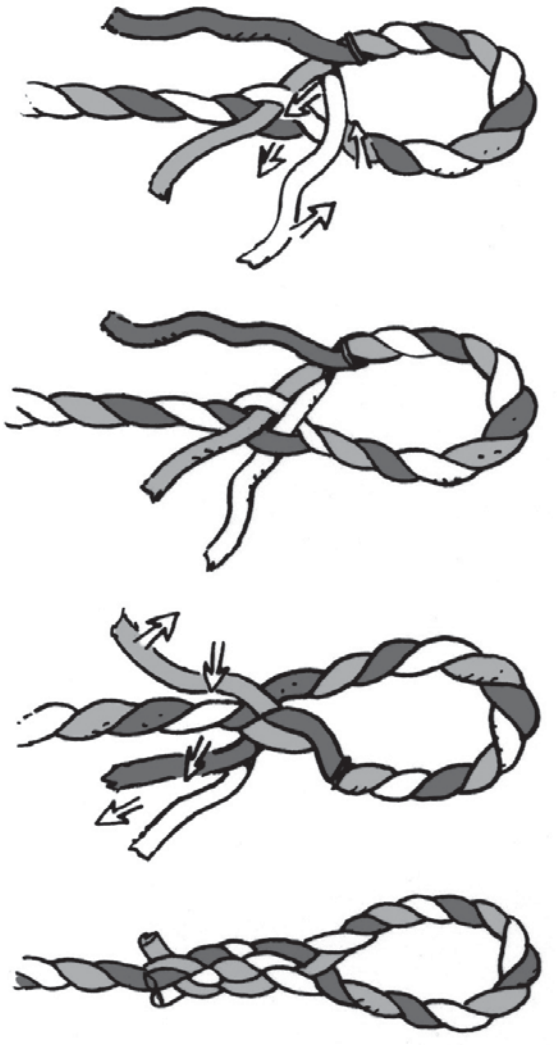
b) Splice

A way to join two cords with not - or not great - different diameter .
To ensure it, you must imperatively interweave the strand at least 3 times over and down the plaited rope, especially if the knot receives surged tensions.
If not, it may easely be disjoined.



c) Eye splice

A splice formed by bending a rope's back and splicing it into the rope so that a loop is formed.



VOCABULARY

Anthropical : pertaining to the effect of human beings on the natural world
Biomass : amount of living matter in a unit area or volume of habitat
Biodiversity : diversity of living matter
Fish density : amount of fishes in a unit area zone.
Ecosystem : group of animal and vegetable being functioning and reacting one with each other, and with their environment.
Halophilus flora : plants adapted to a salt environment
Genetic : study on heredity
Hypothermia : abnormally low body temperature
Longevity : length of life
Beat to : sail into the wind following a zig zag course with repeated tacking
Trophic levels : states of the food chain. Succession of beings, feeding each other in a clearly defined order.
Halieutical resource : fishing resource
Resilience (of an ecosystem): capacity of recovering quickly or not from a disturbance,

TRIM : hydraulically jack to jack up the engine

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APPENDIX

- Pro departure check- list of a nautical mission
- Diagram of an over craft engine
- Ship's log sheet
- Ship's protest or marine report
- Meteorological codes
- Maintenance sheet
    - Every setting out
    - Every 15 days
    - Every month
    - Every 6 months
- Formulas for calculating journey times/fuel consumption

NAUTICAL MISSION DEPARTURE CHECKLIST

1. Nautical equipment onboard	☐
Anchor + mooring line (main mooring line plus a spare line)	☐
Pair of oars or paddles	☐
Boathook	☐
Sufficiently long docking line (at least 20 m)	☐
Torch (waterproof if possible) in good working order (with batteries)	☐
Tool kit (spark plug wrench, set of wrenches, pliers, oil spray can)	☐
Set of new spark plugs	☐
Spare propeller with nut and pin	☐
Searchlight (be sure it is in good working order)	☐
Check the navigation and mooring lights	☐

2. Safety equipment onboard	☐
Lifejackets (1 per person), undamaged	☐
Lifebuoy (accessible and in good working order)	☐
First aid kit	☐
Rocket flares (at least 3, check expiry date)	☐
2 smoke signals	☐
3 handheld flares	☐
Appropriate clothing	☐
Water – food supplies	☐
Survival blanket	☐

3 . Navigation equipment onboard	☐
Steering compass	☐
Map/chart of the zone + navigation ruler + navigation dividers	☐
GPS (check batteries, on-off and satellite reception before departure)	☐
Mini automatic GPS tracker	☐
VHF radios (2: one fixed and one mobile) Check they work after starting engine	☐

Tide tables	☐
Binoculars	☐
Camera	☐
Sounder-radar	☐
Notepad - pen	☐

4. Full refuel (forecast consumption + reserve) ☐

Engine requiring fuel mix (2% oil)	☐
Auto-lube engine: check oil is topped up (lift hood)	☐
Spare can of 2-stroke oil (2 litres)	☐
4-stroke engine: check oil level	☐

5. Check propeller(s) and rose box(es) ☐

6. Set up cut-out switch(es) ☐

7. Start engine(s) ☐

8. Check cooling system warning light for each engine ☐

9. Check the VHF radios are working correctly ☐

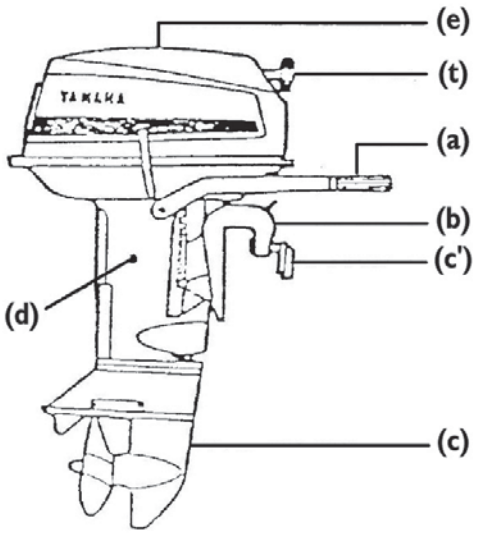
10. Check the GPS is working correctly ☐

11. Check the sounder is working correctly ☐

Observations

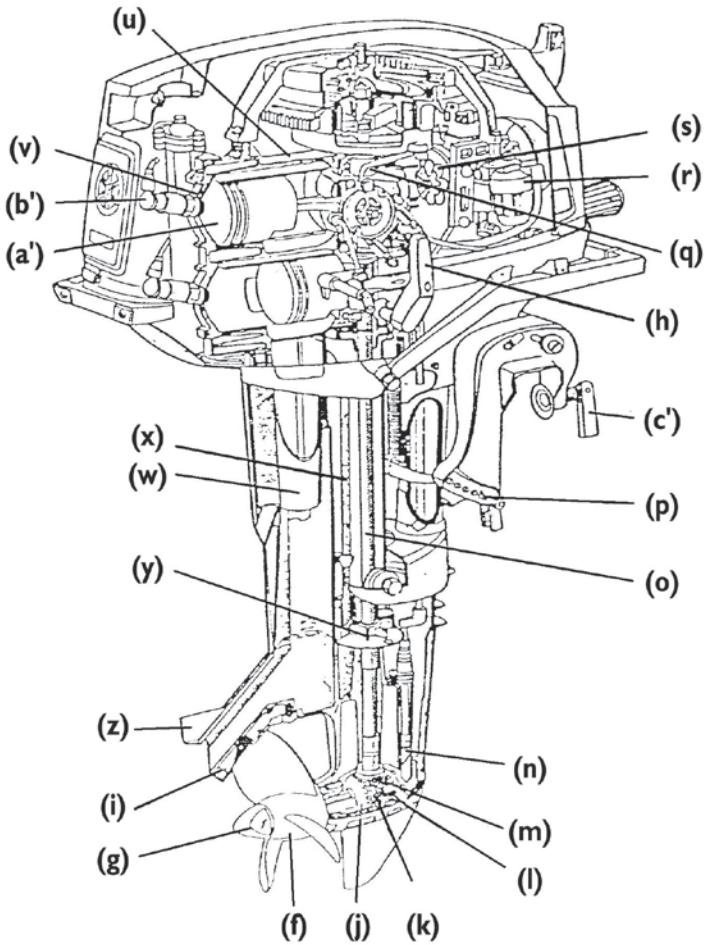
Date and signature of person in charge:

DIAGRAM OF AN OUTBOARD MOTOR



(a) throttle handle
(b) thrust base
(c) gear case
(d) hollow shaft
(e) cowling
(f) propeller
(g) propeller nut
(h) shift handle
(I) water inlet
(j) pinion (forward)
(k) clutch dog
(l) pinion (reverse)
(n) shift cam
(o) motor shaft
(p) tilting spindle
(q) crankshaft
(r) fuel filter
(s) inlet valve
(t) starter handle
(u) cylinder
(v) head cylinder
(w) exhaust pipe
(x) water tube
(y) water pump
(z) anticavitation plate

(a') piston
(b') spark plug gap
(c') thrust screw


(u)
(v)
(b')
(a')
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SHIP'S LOGSHEET

Unit	hip n°		date : _ _ /_ _ /200_
n° of mission : _ _ _ /200 _			
Nature of the mission			
tide :	*reference port :*		*Current port :*
High tide:		*Low tide:*	
Water height:		*Water height:*	
Weather	*Barometric pressure*	*Weather forecast*	
	Wind/direction		
Navigation	Leaving from	Heading to	
check-list departure controlled:		**yes** ☐	**no** ☐

Time	Position *latitude (L).longitude (G)*	*Monitored sectors, observations, events, encountered ships, boarding etc..* *Behaviour of the offenders: correct attitude , insults, attempt break away, threats – did they use violence (weapons or anything else..) etc.*

Time of departure :	*Return time:*		*Total duration of the mission:*
Engine hour	*Departure :*	*Fuel*	*Last full tanking (in litres):*
	Arrival :		*Total engine hours:*
	Total :		*Consumption/H:*

Captain: **Crew:** **Passengers:**	**Captain 's signature**

Time	Position *latitude (L).longitude (G)*	*Monitored sectors, observations, events, encountered ships, boarding etc...* *Behaviour of the offenders: correct attitude , insults, attempt break away, threats – did they use violence (weapons or anything else..) etc.*

Captain:

Captain 's signature:

SHIP'S PROTEST or marine report

The ship's protest is a report of accident or serious incident that happened during a nautical mission. Written by the captain, the ship's protest must faithfully report the events which took place on board, before, during, and after the accident or incident. It is an official act which is transmitted to one's superiors, and which must be provided to law enforcement agencies if the seriousness of the facts demands that the matter be turned over to them (loss of a man at sea, serious violence on the part of delinquents rising in rebellion, for example.).
The report must include the following points:

- Day, place (geographic coordinates if possible) and time
- The nature of the mission, its history (why was it planned?), its duration
- The composition of the crew (indicate clearly who was in charge: i.e. the person writing the report or dictating it to somebody who writes it); the role envisaged for each member of crew (one is second in command and helps during the navigation or the operations, another one is the navigator etc.)

- The weather (the weather was very nice, weak wind, or the sky was grey with wind gust (strength ...).
- The sea state (calm, rippled, smooth, with troughs ...)
- Visibility (good visibility, reduced visibility- number of miles)
- The circumstances of the accident: describe the facts chronologically
- The part played by each members of crew: who tended to the injured, who rescued, who launched a mooring rope, bailed out the ship... finally any action which is connected to the accident
- Measures taken by you to minimize the consequences of the accident, to return the injured to shore, to bring the ship back in, to save the crew of the other ship, etc
- On occasion, lessons to be drawn from the accident and proposals to improve safety

Do not forget to date and sign.

METEOROLOGICAL CODES

Beaufort wind scale

Wind strength	Terms	Speed (knot)	Speed (km/h)	Seastates
0	**Calm**	‹ 1 N	‹ 1 km/h	Glossy like a mirror
1	**Light airs**	1 to 3 N	1 to 5 km/h	Several ripples
2	**Light breeze**	4 to 6 N	6 to 11 km/h	Small unbreaking waves
3	**Gentle breeze**	7 to 10 N	12 to 19 km/h	Whitecap appearance
4	**Moderate Breeze**	11 to 16 N	20 to 28 km/h	Small waves, with many «whitecaps»
5	**Fresh breeze**	17 to 21 N	29 to 38 km/h	Medium waves, whitecaps and, sea sprays
6	**Strong Breeze**	22 to 27 N	29 to 38 km/h	Billow, sea sprays, wave crests with white foam
7	**Near gale**	28 to 33 N	50 to 61 km/h	Breaking billows with foam streak
8	**Gale**	34 to 40 N	62 to 74 km/h	Foamgyre on the wavecreast, foamstreak
9	**Severe gale**	41 to 47 N	75 to 88 km/h	Large billows, combers
10	**Storm**	48 to 55 N	89 to 102 km/h	Large breaking wave, poor visibility caused by the water sprays
11	**Violent storm**	56 to 63 N	103 to 117 km/h	Enormous breaking waves, very poor vsibility caused by the water sprays
12	**Hurricane**	≥ 64 N	≥ 118 km/h	White sea...

NB: 1 knot (kt) : 1 mile/hour 1 mile (M) : 1852 meters the speeds: the average speed of the wind(not the wind gusts)

Sites internet de prévisions météorologiques :
www.wunderground.com
www.buoyweather.com

Seastates scale

States	Qualifier	High of the waves
0	**Glossy**	0 m
1	**Rippled**	0 to 0,1 m
2	**Smooth**	0,1 to 0,5 m
3	**Slight**	0,5 to 1,25 m
4	**Moderate**	1,25 to 2,5 m
5	**Rough**	2,5 to 4 m
6	**Very rough**	4 to 6 m
7	**High**	6 to 9 m
8	**Heavy**	9 to 14 m
9	**Phenomenal**	≥ 14 m

MAINTENANCE SHEET:
Every setting out

To be done by the crew

- **Before the departure**
    - **Check :**
        - propellers
        - feed plug
        - full tank
        - oil full tank
        - close the bonnet
        - run the bilge pump (if there is one)
    - **Check complement equipment**
        - spar plug set
        - manual start drive
        - propeller with swivel + pin
        - tools
    - **Instruments working (after setting on)**
        - VHF
        - GPS
        - ship's lights
        - warning light of water system
        - tests
            - forward
            - backward
            - steering
    - **Before every night or evening setting out**
        - Test the good working of the searchlight

- **After every setting out**

    - soft water rinsing : gear head + outside base (using a hand sprayer f.e.)
    - control the state of the propellers
    - fuelbowl water drain
    - sea water rinsing : the deck
    - soft water rinsing (using a damp rag for the electronic equipment)
        - electronic equipment on the console(VHS, GPS, dials)
        - switch board
        - every splashed metalical part
        - tools

- **Note down on the notebook the maintenance done.**

- **Note down on a sheet,** every no urgent little problem or the work to be done and reported to the mechanical before he comes. (by radio, phone, fax or mail)

MAINTENANCE SHEET: every 15 days

To be done by the crew

- **Setting out the boat (if possible)**

    - Run each engine in sweet water (jug or any other possibility).

    - Sweet water rinsing (using a hand sprayer f.e.)
        - let dry well
        - spray waterproofing protective (WD40)
            - gear head
            - every external part of the engine

    - Clean the strainer of the hold pump.

    - Remove seaweed (or algae) and sand from the hold.

    - The instrumentation
        - sweet water rinsing
        - dry

    - Rinse each used tool with sweet water; protect it with a waterproofing product.

MAINTENANCE SHEET: every month

To be done by the mechanical

- **Control of general condition of the boat and of the engines**

- after servicing by the crew's

    - Batteries
        - level
        - lug cleaning
        - clamping
        - Lubrication

    - Spark plugs
        - cleaning
        - electrodes controll
        - check the spark plug gap
        - in case of wear
            - change (but not systematically)
              If there is any problem in a repair visit period , the crew may change it by itself (a new spark plug kit is necessary on board)
            - At least once a year.

    - Oil change of the base plate (every 200 hours)
        - check the base oil by the upper screw
        - Check the oil appearance
            - If it looks like "mayonnaise": dhange the O-ring and check again after next use.
              If it has again a" mayonnaise" look, there is a lake in the base: let the mechanic proceed

- Check the propeller and the pins.
- Fuel filter cleaning.
- Helm
    - check the oil of the hydrolique system
    - bleed power cylinders if necessary
- Clean with an antioxidant
    - stern well deck
    - cables
    - jack
        - then lubricate again with silicone grease
- Do the repairs required by the crew (by radio).
- Replacement, of the pieces of the on-board equipment used by the crew
    - spark plug, propeller, filters, etc.

MAINTENANCE SHEET: every 6 months

To be done preferably by a professional and specialist

- **Remove the electronic control console**

- **Check every connection**
  - spray a product for electrical contact.

- **Remove the fusible distribution panel board**
  - clean the electrical contacts
  - spray a product for electrical contacts

To be done by the mechanic

- **If the control handle become stiff**
  - remove
  - grease
  - lubricate the cables

- **Check the bolting on board.**

- **Lubricate the locks.**

- **Global control of the mecanic system.**

FORMULAS FOR CALCULATING JOURNEY TIMES AND FUEL CONSUMPTION

D = total distance
Vm = mean velocity/h (average speed)
Cm = mean consumption/h (average fuel consumption)
C = total fuel consumption
T = total journey time in minutes
R = fuel reserve (to provide a safety margin)
Q = total quantity of fuel required for the mission

Formula for calculating the journey time in minutes:

$$T = \frac{60 \times D}{Vm}$$

Formula for calculating the total fuel consumption:

$$C = \frac{Cm \times T}{60}$$

Formula for calculating the fuel reserve:

$$R = \frac{C \times 30}{100}$$

Total quantity of fuel required for the mission:

$$Q = C + R$$

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Practical guide to the attention of agents in charge of nautical surveillance of Marine Protected Areas

Marine protected areas have a cardinal importance by maintening the biodiversity on West African coasts. The economy of the countries strongly links to the exploitation of the sea resources and a break of these resources would be disastrous for the populations. One of the objectives of the Regional Coastal and Marine Conservation Programme for West Africa (PRCM) aims to show the importance of protected marine areas to the renewal of the stocks and the conservation of the habitats related to. This initiative needs a strong envolvement of the populations living in MPA into preservation and supervision of the areas on which they depend.

It is in this context that FIBA supports the creation and management of MPAs through capacity building of their human, materiel and institutional resources, setting up effective surveillance systems designed in function of their needs.

Since 2004, this reinforcement proceed in a regional program of training of agents in charge of surveillance, supply of monitoring equipment and support with inter-institutional collaboration between the MPA and the other leaders implied in the marine and coastal resources management.

This guide mainly aims to support the practical training, to strength the instruction, to bring emergency solving and to supervise the regional MPA on a common procedure basis.This technical base will thus make it possible the agents to do their job in a most safe and effective way.

LOUIS GÉRARD D'ESCRIENNE
ANTÓNIO ARAÚJO

FIBA

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