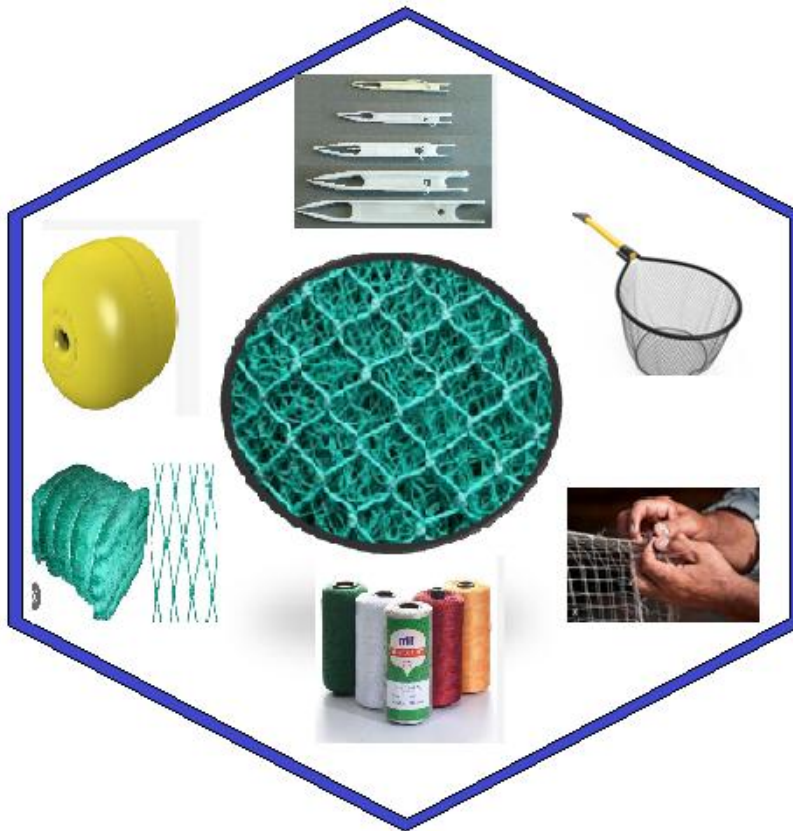


## **Fishery and Apiculture**

### **Level-II**

**Based on July 2022, Version-1 Occupational standard**



**Module Title: Making and mending fishing net**

**LG Code: AGR FAQ2 M03LO (1-4) LG (11-14)**

**TTLM Code: AGR FAQ2 TTLM 0123v1**

# Table of Contents

<b>Introduction to the Module .....</b>	<b>1</b>
<b>LO #1- Prepare for net making and mending .....</b>	<b>2</b>
Instruction sheet .....	2
Information Sheet 1 .....	3
Self-check 1.....	29
Operation Sheet -1 .....	30
LAP TEST-1 .....	31
<b>LO #2- make fish net.....</b>	<b>32</b>
Instruction sheet .....	32
Information Sheet 2 .....	33
Self-Check – 2.....	48
Operation Sheet -2.....	49
LAP TEST-2 .....	52
<b>LO #3- Mend fish net.....</b>	<b>53</b>
Instruction sheet .....	53
Information Sheet 3 .....	54
Self-Check – 3.....	62
Operation Sheet-3.....	51
LAP TEST -3.....	51
<b>LO #4- Complete make and mend fishing net .....</b>	<b>Ошибка! Закладка не определена.52</b>
Instruction sheet .....	66
Information Sheet 4.....	67
Self-Check – 4.....	72
Operation Sheet -4.....	73
LAP TEST-4 .....	74
Reference Materials .....	75

## Introduction to the Module

This module covers the required knowledge, skills and attitude to make, mend fishing nets and proper handling materials tools and waste disposal. The learning outcome is covers the prepare for net making and mending, make fishing net, mend fishing net, complete make and mend fishing net. Under these learning outcomes some important points are illustrated in each topics. Among them: Identifying Tools, materials and equipment; Types of fishing nets; Occupational health and safety(OHS) ; Attaching fish net components; Identifying damaged place of fishing net; Cleaning and storing materials, tools and equipment and Document and report work are required.

<b>LG #11</b>	<b>LO #1- Prepare for net making and mending</b>
<b>Instruction sheet</b>	
<p>This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:</p> <ul style="list-style-type: none"> <li>• Net making and repairing area</li> <li>• Identifying Tools, materials and equipment</li> <li>• Types of fishing nets</li> <li>• Occupational health and safety(OHS)</li> <li>• Net design and components</li> </ul> <p>This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:</p> <ul style="list-style-type: none"> <li>• Identify and organize net making and repairing area</li> <li>• Identify and organize tools, materials and equipment for net making and mending</li> <li>• Identify and understood types of fishing nets</li> <li>• Identify personal protective equipment (PPE) and Occupational health and safety(OHS) and prepared for use</li> <li>• Interpret and Identify net design according to the specification</li> </ul>	
<b>Learning Instructions:</b>	
<ol style="list-style-type: none"> <li>1. Read the specific objectives of this Learning Guide.</li> <li>2. Follow the instructions described below.</li> <li>3. Read the information written in the information Sheets</li> <li>4. Accomplish the Self-checks</li> <li>5. Perform Operation Sheets</li> <li>6. Do the “LAP test”</li> </ol>	

## Information Sheet 1

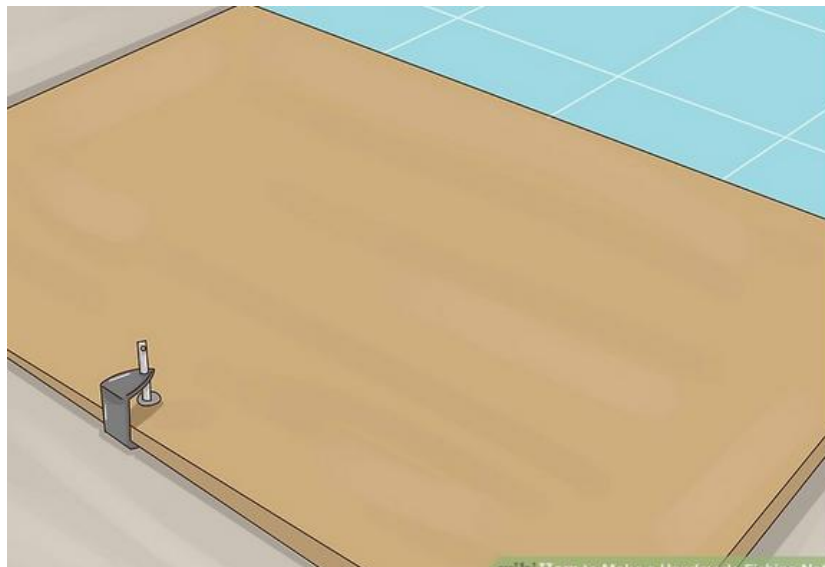
### 1.1 Net making and repairing area

- **Introduction**

Net making is characterised by the fact that the net maker uses only a few tools in his work. Other crafts have developed a wide range of tools and aids over time, which have helped increase efficiency, but this has not happened to the same extent with- in net making. Most nets are made by machines, but since the mending of these nets must be done by hand, this probably will remain always a part of the fisherman's work.

#### 1.1.1 Setting net making area

Ideally this will be a table large enough to fit your completed net, laying flat. Though it's not necessary, it'll come in handy when trying to rest the net in between steps. What you do need is a nail (or a clamp with the center screw facing upwards) in the edge of table on the far side away from you. This rod will serve as the starting point for your net.



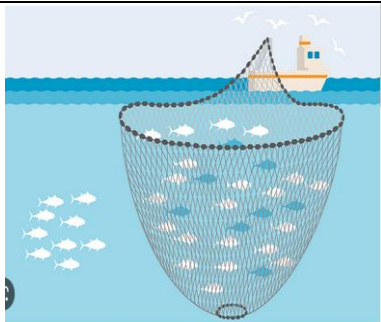


**Figure 1.1 setting net making and repairing area**

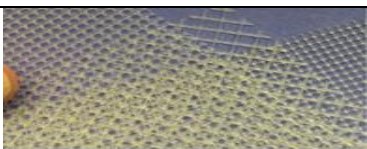






## 1.2 Identifying Tools, materials and equipment for net making and repairing







Net making and repairing tools are the specialized well work over and intervention tools that are mechanically operated and helps in the recovery or retrieval of other equipment or tools that are accidentally fallen into the wellbore or are left over inside the wellbore because of any uncertain reasons. Some of the materials, tools and equipments which are helpful for net making and mending are listed as follows.

**Table:1.1 Types of materials, tools and equipments used for net making and mending**

No .	Type of Equipment	Description	Figure
1	Gauge	Gauge is a rod upgrade. It is only available in Realism mode, and increases the strength of your fishing rod's line and used to gauge exactly how a fish farmer can determine that the fish are approaching a pre-critical level of stress, there has to be a set of behavioural indicators linked to measurable environmental parameters.	
2	Shuttle	Shuttles are a required tool for net making and net repair. Shuttles are used to store and dispense the twine as it is woven through the net and knots are tied.	
3	purse seine netting	A purse seine is a large wall of netting deployed around an entire area or school of fish. The seine has floats along the top line with a lead line threaded through rings along the bottom. Once a school of fish is located, a skiff encircles the school with the net.	



4	Polyamide (nylon)	Polyamide as a fibre for safety nets. Polyamides can be found in nature, like wool or silk, and can also be synthetic, like nylon or Kevlar. Polyamides such as nylon began to be used as synthetic fibres, although they have ended up being used in the manufacture of any plastic material.	 
5	polyethylene	Plastic netting extruded from polyethylene is softer and more flexible than polypropylene resin net mesh. Polyethylene is more durable in cold weather, and more resistant to cracking. Polyethylene plastic resin has high ductility and low friction.	 
6	Twine	Fishing Net Twine (spun Nylon) is specifically constructed for the use of hanging and tying off nets. Characterised by its fibrous appearance once knotted this twine will stay permanently bound. Available in 250g & 500g spools.	
7	Rope	A length of thick strong cord made by twisting together strands of hemp, sisal, nylon, or similar material.  They are used for the mooring lines, the grid system and for the netting frame (such as the rib-lines and down-lines, which distribute the forces on the cage net).	
8	Knife	A knife is an essential part of our equipment for the heart of our work , to cut various parts of net during mending.  Sharp knife that can cut cleanly through ropes and li- nes to avoid raw edges. The knife is also used to trim the knots in the individual sections of the net.	

9	Multifilament	A Multifilament Net is made of thin strands of filaments that are twisted or braided together like twine. The multifilament nylon netting is used for many different applications including fishing nets, sports nets and industrial nets.	
10	Tension device	Tensioning Devices are used to apply a constant mechanical load in catenaries (contact wire and messenger wire, together or independently) according to the variation of temperature and the length defined.	
11	Netting needle	A netting needle is a long needle made of metal with a pincer at each end. The thread for the netting is wound on lengthwise, between the two pincers.	
12	Buoy	A buoy is a floating device that can have many purposes. It can be anchored (stationary) or allowed to drift with ocean currents.	
13	Scissors	Scissors for cutting nets and ropes with serrated teeth steel blade with 145 mm long blade, ideal for cutting ropes up to 13 mm in diameter and nets of any type.	
14	Marlinspike	Marlinspikes is a round steel rod which is pointed at one end. The spike is used when splicing to open the strands of the rope/wire.	



### 1.3 Types of fishing nets

There are many types of fishing and with it many types of fishing nets to optimize every day at sea. Throughout history, different styles of fishing have been used, with increasingly resistant and larger meshes to be able to cover a greater number of fish. Of course, the more fish you catch, within the legal framework, the better the fishing business will do.

Fishing nets are used in a wide variety of configurations and designs, depending on the species being targeted. Modern nets are typically constructed from synthetic fibres, such as monofilament nylon for gillnets, and multiple twisted or braided polymer filaments for seine and trawl nets.

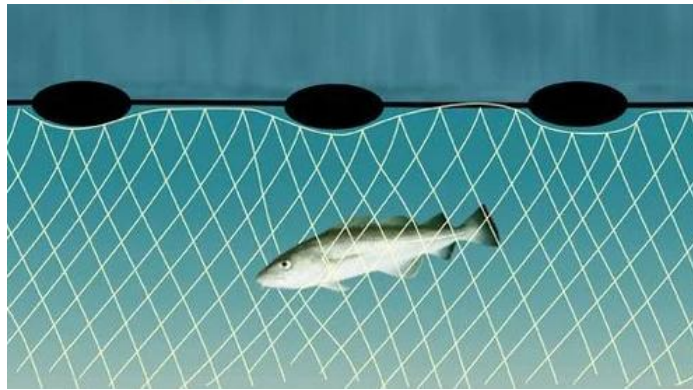
The top edge of the net is attached to a rope called the headline, float line or cork line. Floats are attached to the headline to provide buoyancy. The bottom edge of the net is usually attached by hanging twine to a rope called the footrope or lead line. Weights or sinkers made of lead or other materials are attached to the footrope and spread the net vertically in the water. The main types of fishing gear that use netting are gillnets and entanglement nets, surrounding net, seine nets, and trawls. The main components of nets are described below.

#### A. Gillnets

Gillnets and entanglement nets consist of a panel (or panels) of net held vertically in the water column, either in contact with the seabed or suspended from the sea surface. The size of the mesh in the net determines the size range of the species caught, as smaller fish are able to swim through the mesh. The legal net length and mesh size are set by individual jurisdictions. Gillnets and entanglement nets are used in offshore and inshore waters, and in rivers and estuaries.

Fish are caught in gillnets or entanglement nets in one of three ways:

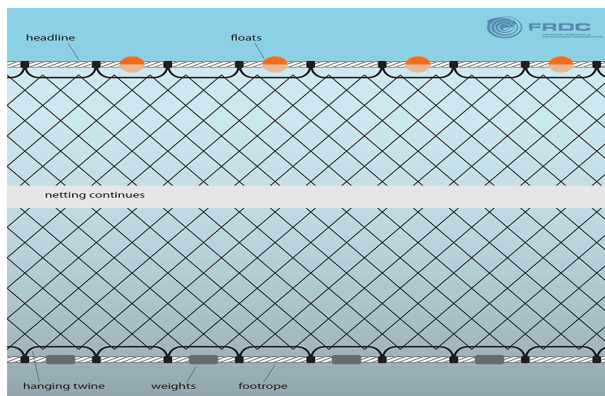
- **Gilled** - the fish tries to swim through one or more meshes; if it cannot pass through, it becomes caught behind its gill covers as it tries to back out of the net.
- **Wedged** - the fish is tightly held in the net around the body by one or more meshes
- **Tangled** - the fish is caught in the net by some part of its body, such as protruding fins or spines.



**Figure 1.2 Gill net**

### **I - Pelagic gillnets**

(also known as drifting gillnets or drift nets) are used in a number of jurisdictions including, Queensland and Northern Territory waters to target tropical sharks and mackerels. Pelagic gillnets are made up of individual net panels tied together, allowing easy removal or replacement of damaged sections. They are set in open water and can be set with the headline on the sea surface (positively buoyant) or suspended below the surface (negatively buoyant), with one end of the net often remaining attached to the vessel.

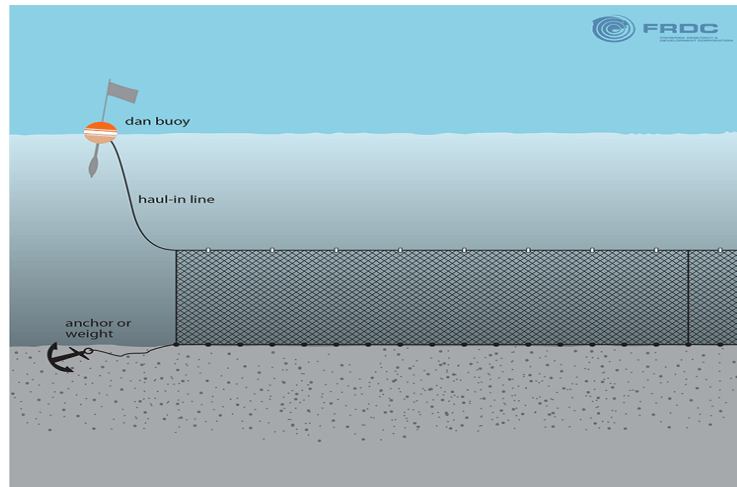


**Figure 1.3 Pelagic gillnets**

### **II- Demersal gillnets**

Demersal gillnets (also called bottom-set gillnets, shark nets, graball nets or mesh nets) are used to target Gummy Shark, in the Commonwealth-managed Gillnet, Hook and Trap Sector of the Southern and Eastern Scalefish and Shark Fishery. State-managed fisheries also use demersal gillnets to target finfish species. Demersal gillnets are similar to pelagic gillnets but are

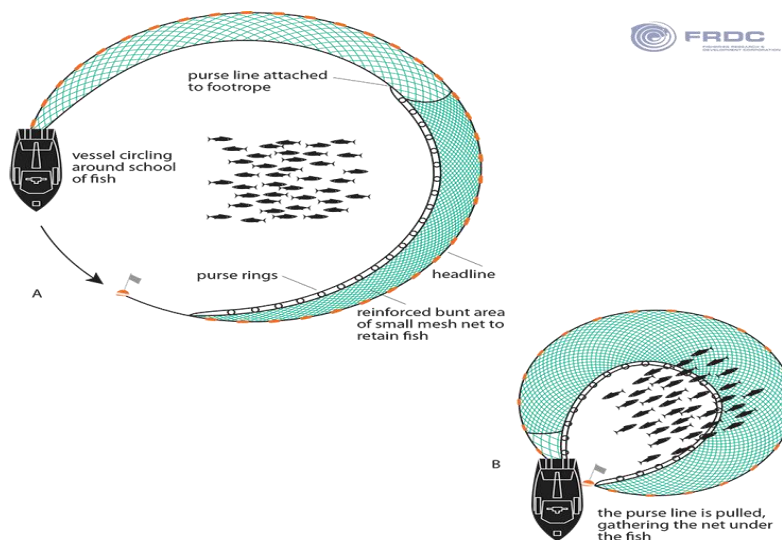
negatively buoyant and fish on the ocean floor. The boat does not remain attached to the gear, but may remain within a short distance of it.



**Figure: 1.4 Demersal gillnets**

### III - Ring nets

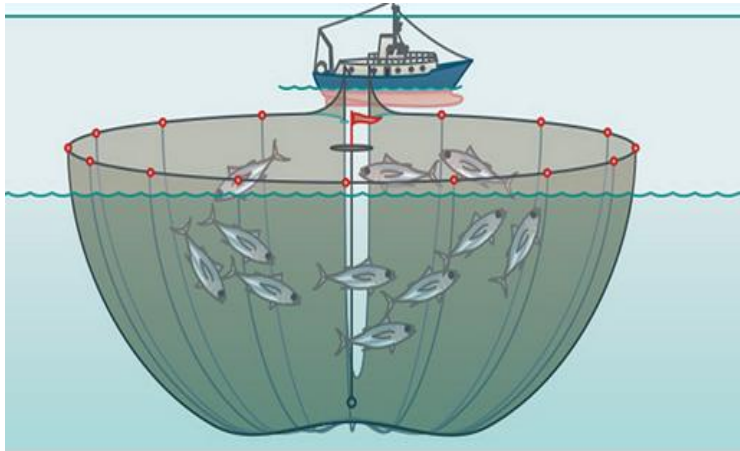
Ring nets (also called encircling gillnets, bull ringing, bunting nets, ring shots, power hauling, drain-off shots or round haul nets) are used in many parts of Australia to target species such as mullet, garfish, Australian Herring and whiting. They generally consist of a straight panel of netting (a pocket section may be incorporated) that is set around a school of fish sighted on the surface.



**Figure: 1.5 Typical ring net configuration**

## B. Surrounding nets

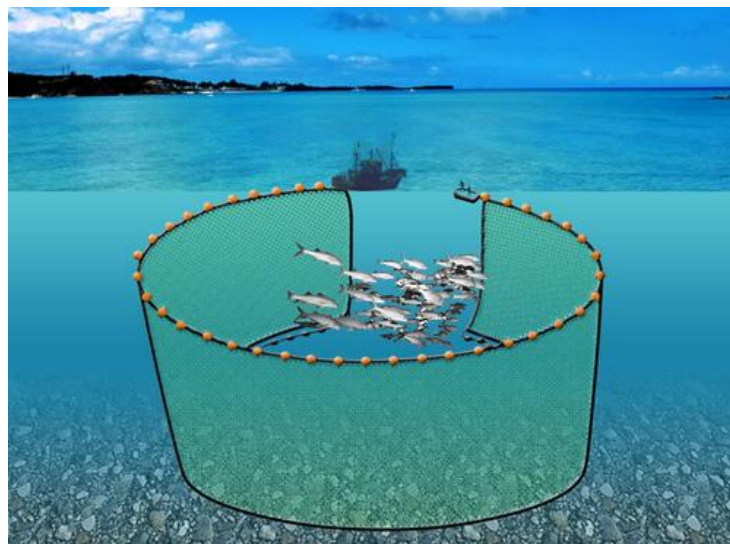
Surrounding nets take advantage of the shoaling behaviour of pelagic fish. The nets work by enclosing schools of fish within walls of netting that prevent the fish from escaping both outwards and downwards.



**Figure: 1.6 Surrounding nets**

## C. Seine nets

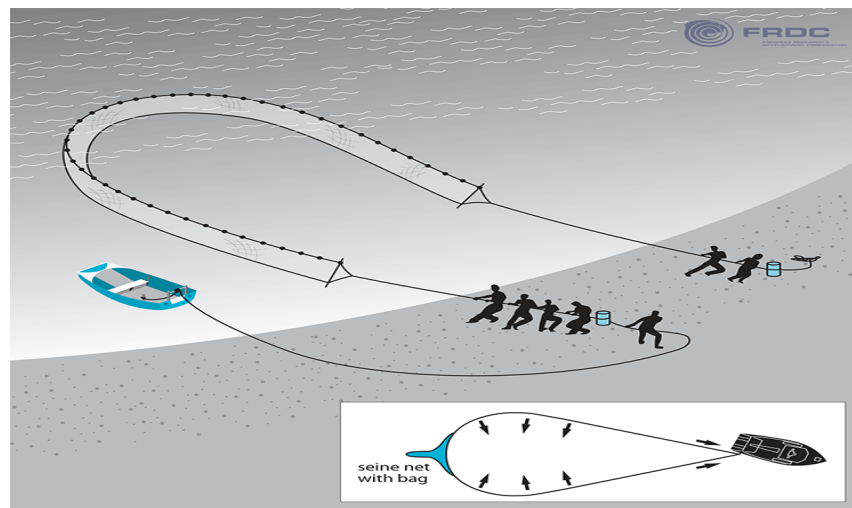
Seine nets usually have two long wings and a section that concentrates and retains the catch. Lengths of rope are added to the end of each of the wings. These ropes are negatively buoyant and extend the working area of the net while adding minimum drag to the hauling operation. The nets function on the principle that fish are reluctant to swim over a moving object in the water and instead try to swim in front of it.



**Figure:1.7 seine net**

## **I- Beach seine net**

Beach-seine nets (also called haul seines, pocket seines, baitfish seines, garfish seines, snapper seines, hauling seines, seines or estuary seines) are used Australia-wide to catch many species, including mullet, whiting, Australian Salmon, garfish, Tailor and bream. The net may have a loose section of netting acting as the bunt area for retaining fish, or may have a bag at one end of the net or in the centre. Beach-seine nets can be set around a sighted school of fish, or in an area where fish are known to congregate. The net is either set from a dinghy or can be walked out in shallow water, with the first length of rope being set perpendicular to the shore, the net set parallel to the shore, and the second rope set back to the shore. The ropes are then hauled onto the beach evenly, by hand, four-wheel drive vehicle or tractor, herding the fish into the net. Hauling continues until the net and fish are dragged onto the shore, with the fish are concentrated in the bag.

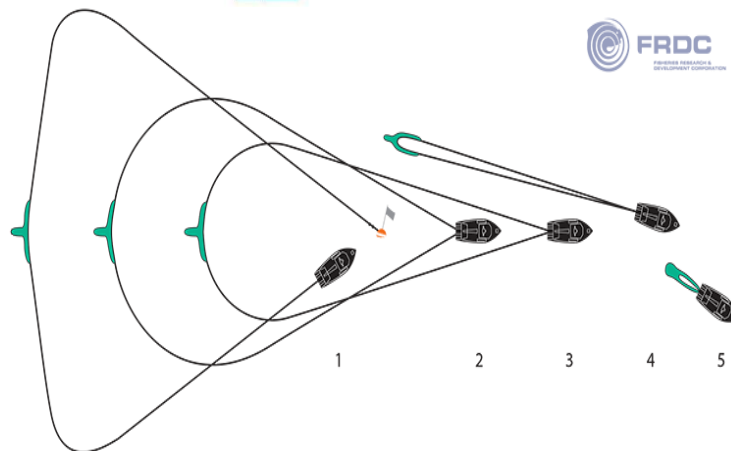


**Figure: 1.8 Beach-seine net**

## **II- Danish seine net**

Danish-seining is the main form of boat seine used in Australia. It is used in New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia to target a variety of species, including emperor, flathead, whiting and Redfish.





**Figure:1.9 Danish seine net**

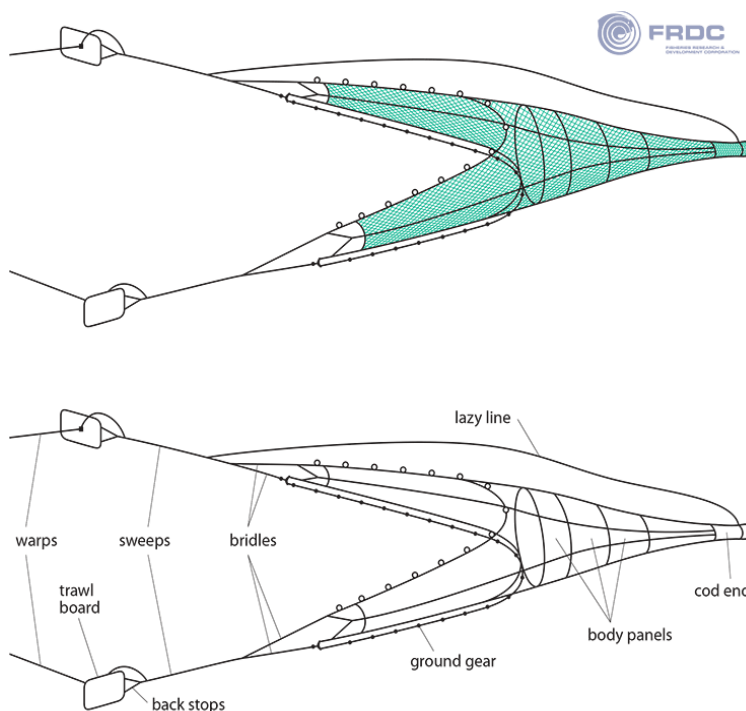
#### **D. Trawl**

Trawl is one of the most widely used commercial fishing methods in internationally. Trawling is performed in many ways, in depths of water ranging from just a few meter to 1600 m. The design of trawl nets is more complex than the basic nets discussed above. Trawls are made up of components that perform specialised functions, as described below:

- **Warps** are wire ropes connecting the trawl boards to the vessel. They are stored on **winch drums** for ease of operation.
- **Trawl boards** (also called otter boards or trawl doors) keep the net open horizontally by acting as hydrodynamic kites. They also provide weight, which is required to keep the trawl at the desired depth of operation.
- **Backstrops** are short lengths of wire or chain that connect the trawl boards to the sweeps.
- **Sweeps** are used on demersal otter trawls to connect the backstop to the bridle on each side of the net.
- **Bridles** connect the sweep on each side of the net to the headline and footrope on the wing ends of the net.
- **Ground gear** is a wire or chain that is attached to the footrope by short chain **droppers**. The ground gear may have several rubber or steel **bobbins** and **spacers** threaded along its length. The purpose of the ground gear is to reduce damage from snagging by lifting the footrope and net clear of the seabed.



- **Body panels** are the panels of net that make up the body of the trawl; they comprise upper and lower sections.
- The **codend** or bag is the last section of the net, where fish are collected and held during trawling operations. This area has the smallest mesh size, which determines the size of fish that the trawl will retain. The end of the codend is tied with a quick-release knot so that the fish can be easily emptied from the net.
- The lazy line is sometimes used to pull the codend on board so that it can be emptied.



**Figure: 1.10 Trawl net configuration**

**I- Beam trawls** (also called dredge nets, beam tide nets or push nets) are used in Queensland to catch school prawns and bay prawns. In northern Queensland and the Northern Territory, a beam trawl is sometimes used to sample the catch in demersal otter trawl prawn fisheries, both before the larger demersal otter trawl gear is set and during the trawl itself, to make sure the area being fished is still productive.

**II-A beam trawl** is simple in construction and can be used by small vessels, especially in restricted areas such as lakes and estuaries. It is constructed with two curved, steel end plates; the height of the end plates determines the vertical opening of the net. A straight steel bar that connects the tops of the end plates acts as a solid 'headline' and also determines the horizontal net

opening. The top of the netting is attached to the beam, while the footrope is attached to the back of the end plates.

**III- Demersal otter trawling** for fish (also called stern trawling, bottom trawling, otter trawling or trawling) operates in south-eastern Australia, the south of Western Australia and the North West Shelf. A modified version (see semipelagic otter trawl, below) is used in some areas of the Northern Territory and Queensland. Australian trawl vessels also operate in Antarctic waters and on the high seas. Species taken in the southern fisheries include Blue Grenadier, Pink Ling, Silver Warehou, flathead and Redfish. In northern Australia, species taken include Snapper, emperor, rock cod and squid.

#### E. Cast net

A cast net is a fishing net which is designed to be thrown out into shallow water and then hauled back in with a payload of fish. People have been using cast nets for thousands of years, as mosaics from Ancient Greece, Rome, and China indicate, and they continue to be popular for recreational fishing. Cast nets are not widely used in the commercial fishing industry, because they are so labor intensive, but they are often on display in fishing museums and the headquarters of fishing companies as they are of historical interest.

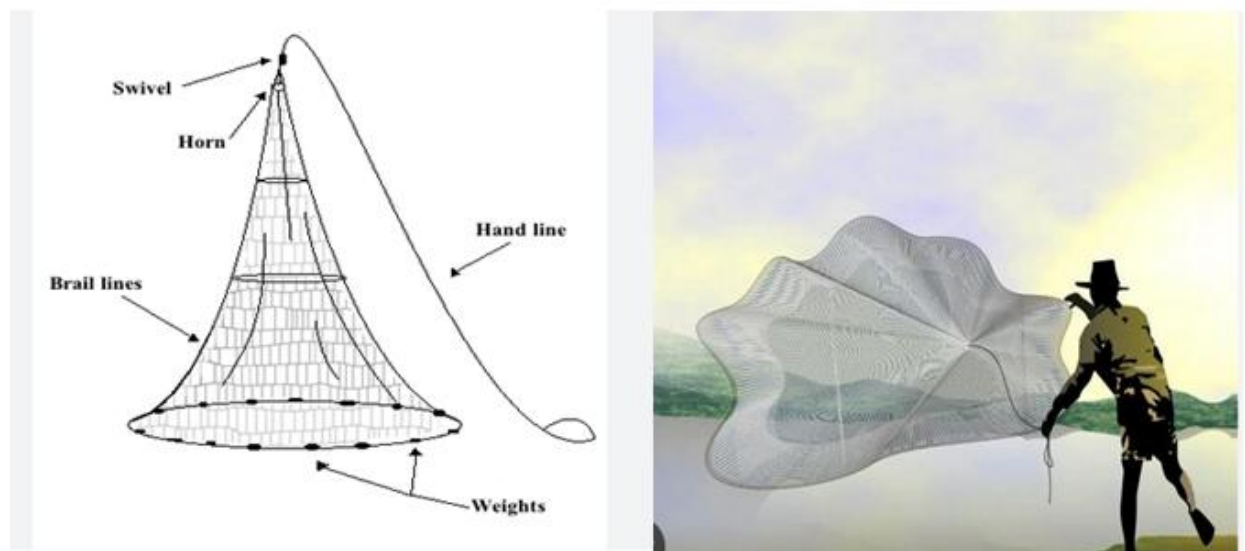
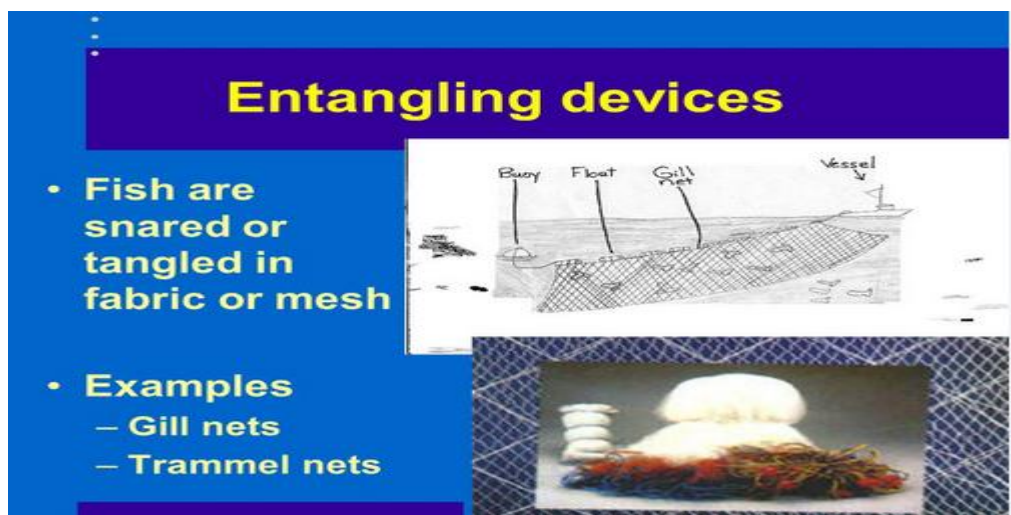


Figure: 1.11 cast net

## F. Entangling net

Gillnets and entangling nets are walls of netting that are designed to catch fish by gilling, capturing the fish in the mesh by it's head and gills, or entangling the entire body of the fish. These walls of nets may be set along the seafloor, anywhere in the water column, or at the surface. Entangling net means a drift net, trammel net, or any other net that captures finfish by causing all or part of the head, fins, or other body parts to become ensnared or entangled in the meshes of the net.



Info graph:1 Info-graph entangling device

## G Hand net

A hand net, also called a scoop net, is a fishing net or meshed basket held open on a rigid hoop, which may or may not be mounted to the end of a handle. A hand net with a long handle is often called a dip net. When it is used by an angler to help fetch out ("land") a hooked fish, it is called a landing net.



Figures; 1.12 hand cup

## H. Fish trapping nets

Fish traps, such as baskets and pots, are considered "passive" fishing gear. They have different shapes and materials, depending on the desired prey: for example, lobsters, crabs, shrimp or fish that live at the bottom of the sea.



**Figure: 1.13 Trapping net**

### 1.4 Occupational health and safety(OHS)

Occupational health and safety is one of the most important aspects of human concern. It aims an adaptation of working environment to workers for the promotion and maintenance of the highest degree of physical, mental and social well being of workers in all occupations.

Safety hazards exist in every workplace, but how do you know which ones have the most potential to harm workers? By identifying hazards at your workplace, you will be better prepared to control or eliminate them and prevent accidents, injuries, property damage, and downtime. First of all, a key step in any safety protocol is to conduct a thorough safety hazard assessment of all types of environments and equipment.

#### 1.4.1 Hazards and risks

**Hazards:** A hazard is any source of potential damage, harm, or adverse health effects on something or someone. The CCOHS says, “risk is the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard.”

**Risks:** Risks are described as a “probability or likelihood of developing a disease or getting injured, whereas hazard refers to the agent responsible.”

Page 16 of 79	Ministry of Labor and Skills Author/Copyright	Fishery and Aquaculture Level -2	Version -1 January, 2023
---------------	--	-------------------------------------	-----------------------------

The common workplace hazards are:

**Safety hazard:** These hazards play an effect on employees who work directly with machinery or on construction sites. Safety hazards are unsafe working conditions that can cause injury, illness, and death. Safety hazards are the most common workplace risks. They include:

- Anything that can cause spills or trips, such as cords running across the floor or ice
- Anything that can cause falls, such as working from heights, including ladders, scaffolds, roofs, or any elevated work area.
- Unguarded and moving machinery parts that a worker can accidentally touch.
- Electrical hazards like frayed cords, missing ground pins, and improper wiring
- Confined spaces.

**Biological hazard:** The definition of biological hazards, commonly known as biohazards, can be any biological substance that could cause harm to humans. Biological hazards include exposure to harm or disease from working with animals, people, or infectious plant materials. Workplaces with these kinds of safety hazards include, but are not limited to, work in schools, daycare facilities, colleges and universities, hospitals, laboratories, emergency response, nursing homes, or various outdoor occupations.

Types of things you may be exposed to for biological hazards:

- Blood and other body fluids
- Fungi/mold
- Bacteria and viruses
- Plants
- Insect bites
- Animal and bird droppings

**Physical hazards:** Of all the hazards in your workplace, physical hazards might be the least obvious. Despite their name, physical hazards aren't always something that you can see or touch. Physical hazards affect workers in extreme weather conditions or harmful working environments. Workers who are exposed outside in the sun for a prolonged period of time can

suffer physical hazards which can cause long-term effects to their health. Physical hazards can be any factors within the environment that can harm the body without necessarily touching it.

Physical hazards include:

- Radiation: including ionizing and non-ionizing (EMF's, microwaves, radio waves, etc.) materials
- High exposure to sunlight/ultraviolet rays
- Gases under pressure
- Temperature extremes – hot and cold
- Constant loud noise

**Ergonomic hazards:** Ergonomic safety hazards occur when the type of work, body positions, and working conditions put a strain on your body. They are the hardest to spot since you don't always immediately notice the strain on your body or the harm that these hazards pose. Short-term exposure may result in “sore muscles” the next day or in the days following the strain, but extended exposure can result in serious long-term issues.

Ergonomic Hazards include:

- Improperly adjusted workstations and chairs
- Frequent lifting
- Poor posture
- Awkward movements, especially if they are repetitive
- Having to use too much force, especially if you have to do it frequently
- Excessive vibration

**Chemical hazards:** Chemical hazards are present when a worker is exposed to any chemical preparation in the workplace in any form (solid, liquid or gas). Some are safer than others, but to some workers who are more sensitive to chemicals, even common solutions can cause illness, skin irritation, or breathing problems.

Chemical hazards can be present in the following:

Page 18 of 79	Ministry of Labor and Skills Author/Copyright	Fishery and Aquaculture Level -2	Version -1 January, 2023
---------------	--	-------------------------------------	-----------------------------



- Liquids like cleaning products, paints, acids, solvents – particularly if hazardous products are in an unlabeled container
- Vapors and fumes that come from welding or exposure to solvents
- Gases like acetylene, propane, carbon monoxide, helium, h<sub>2</sub>s gas
- Hazardous products and flammable materials like gasoline, solvents, and explosive chemicals
- Pesticides

**Work organization hazards:** Safety hazards or stressors that cause stress (short-term effects) and strain (long-term effects). These are hazards associated with workplace issues such as workload, lack of control and/or respect, etc.

Examples include:

- Workload demands
- Workplace violence
- High intensity and/or pace
- Respect (or lack thereof)
- Flexibility
- Control or say about things
- Social support or relations
- Sexual harassment

**Environmental hazards :** Last but definitely least are environmental hazards which are constantly changing with increasingly unpredictable and extreme weather and climate. The bad news is that they are mostly out of our control, but the good news is weather challenges and hazards are somewhat predictable with the change in seasons and advances in meteorology.

Examples include:

- Extreme temperatures (dangerous heat and cold)
- Extreme precipitation (rain and snow)
- Dangerous levels of noise
- Dangerous levels of radiation

- Pollution (air and chemical)
- Unstable infrastructure
- Biological hazards
- Violent members of the public
- Dangerous animals

#### **4.1.2 Conduct regular hazard assessments**

Remember that these lists are non-exhaustive. When you are completing a workplace hazard assessment, take into account these six larger categories to think of factors that may affect your workers in their particular circumstances. Remember to download our Hazard Assessment Guide for when you are conducting your own hazard assessment of your workplace. You can download it directly on the form below:

#### **4.1.3 Personal protective equipments**

The Personal Protective Equipment (PPE) is provided, used, and maintained in a reliable condition whenever it is necessary due to hazards from processes or in the work environment.

In the initial stages of designing your PPE Program, make sure that all steps have been made in the identification, elimination, substitution, engineering and administrative controls of workplace hazards.

##### **A. Select a PPE organiser**

This person will be a central source and should responsible for assessing the hazards and exposures that may require the use of PPE, determining the type of equipment to be provided, and purchasing the equipment. They will also be responsible for gathering information from management, supervisors, and employees with regard to the selection of PPE as well as enforcing the program at all levels. The success of the PPE program depends upon the cooperation and support of all those concerned.

##### **B. Identify workplace hazards and Perform a risk assessment**




- Review work practices, job procedures, equipment and plant layout.





- Use job hazard analysis techniques to integrate accepted safety and health principles and practice into specific operations.

### C. Selecting the right PPE for the task

- Select the PPE to match the hazard you're your industry standards.
- Get expert advice on the best products to meet your requirements.
- Trial the products with the team members who will be using it.
- Ensure the physical comfort of the PPE. (If it's not comfortable there is a chance it will get misused or not used at all).
- Evaluate cost considerations of PPE usage and look at the ROI.
- Ensure PPE meets all industry standards/certification.
- Fit PPE to each individual.

**Table: 1.2 Types of personal protective equipments used for net making and mending**

	Types of PPE	Description	Figure
1	Body protective	A number of pesticide labels demand protective clothing like long-sleeved shirts and pants, socks and boots. This clothing is typically made of tightly woven fabric and pesticide-free.	
2	Glove	Protects the hands against toxic substances with rubber gloves offering protection against electrical hazards.	
3	Mask	A full-face covering air purifying device which comes with a large chemical cartridge respirator to offer protection against toxic airborne materials.	

4	Chemical resistance hat	These are designed to offer protection when applying pesticides, especially those with an added wider brim.	
5	<b>Earplugs</b>	Many farmers must use equipment or machinery that generate a lot of noise. Both formable earplugs and large earmuffs work well to cut out noise by more than 80%.	
6	Eye goggle	Goggles not only protect protection against unexpected front and side impact but also against sudden chemical splashes from vapors or liquids.	
7	<b>Head and neck protection</b> (helmet)	The human head is highly absorptive and can easily suffer due to pesticide-related exposure. In fact, this absorption increases the more farmers sweat. PPE protection for the head typically includes face shields, chemical-resistant hats, protective goggles/glasses, etc.	



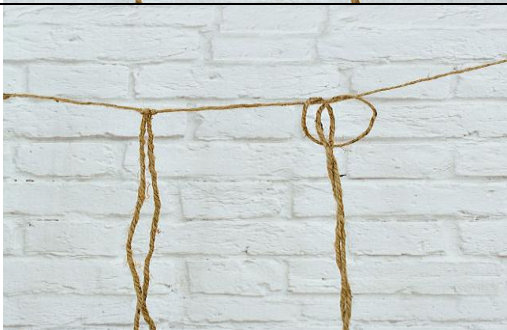
## 1.5 Net design and components

### 1.5.1 Net design

Designing of net making started with painting and their are some steps of designing net, these are;






- Cut a length of jute to your desired width.
- Cut lengths of jute 2 ½ times longer than your desired length.
- Create a loop and feed two equal lengths through.
- Pull tight.
- Grab one string from one length, and another from the one next to it; forming a triangle.
- Knot together.

**Table: 1.3 procedure of net designing**


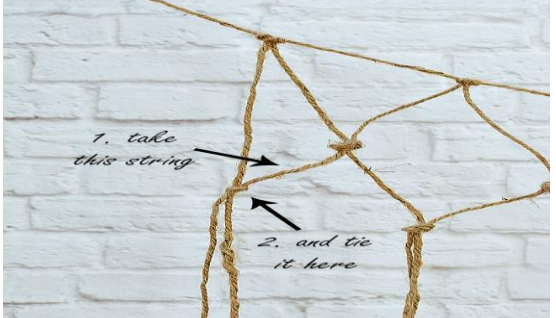

No.	Procedure of net designing	Design in figure
1	Cut a length of jute to your desired width. String it up horizontally among two points.	
2	Cut lengths of jute 2 ½ times longer than your desired length. Fold each piece in half over the horizontal piece so you have two equal lengths.	
3	Create a loop and feed two equal lengths through.	





4	Pull tight	
5	Grab one string from one length, and another from the one next to it; forming a triangle.	
6	Knot together	
7	Continue this process along the top row.	
8	For the next row, grab a length of jute from opposite strings, forming a diamond pattern. Knot together.	



9	Continue along second row.	
10	When you reach the end strings, follow the instructions above.	
11	Continue along row by row until you reach your desired fishnet length.	

<https://www.youtube.com/watch?v=ktiOUXeoMUA> Accessed date 23/01.2023

### 5.1.2 Net components

There are many types of net components, among them some are listed as follow;

#### A. Floater

A fishing float or bobber is a lightweight buoy used in angling, usually attached to a fishing line. Floats are light in weight, have very high tensile strength and do not absorb any water. The outstanding elasticity of the Bacell material provides floats that have the highest resistance to shrinkage, permanent deformation and breakage. A float can serve several purposes.

- firstly, it serves as a visual bite indicator that helps the angler assess underwater status of the baited hook and decide whether to start retrieving the line;

- secondly, it can suspend the hook and bait at a predetermined depth, which helps the angler target specific fishes;
- thirdly, as a terminal tackle, it adds mass and allows the hook and bait to be cast farther against air resistance;
- and lastly, due to its buoyancy, it can carry the baited hook to otherwise inaccessible areas of water by drifting along the prevailing current.



**Figure: 1.14 floater**

### **B. Sinker**

A sinker is a weight attached to your fishing line about 6 - 10 inches above the hook. It forces a hook with bait to sink and keeps your bait down near the lake or river bottom, where most fish swim. For most shore fishing, pinch on one or two small split-shot sinkers on your line. Use only enough to sink the bait. If the fish feels too much weight it will quickly drop the bait.

Traditionally, sinkers have been made of lead because it is inexpensive, easily molded and dense. When sinkers are lost through broken line or other means, birds can inadvertently eat them. Water birds like loons and swans often swallow lead sinkers when they scoop up pebbles from the bottom of a lake or river to help grind their food. Eagles ingest lead by eating fish which have themselves swallowed sinkers.

<https://www.dnr.state.mn.us/eco/nongame/projects/leadout.html> /Accessed date 20/12/2023/

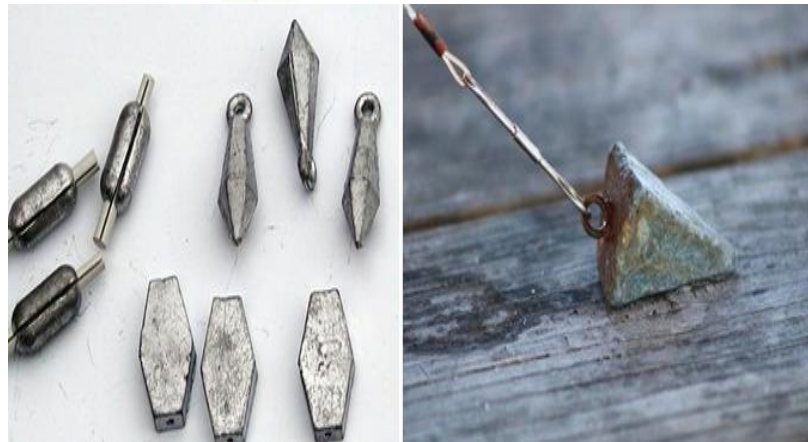
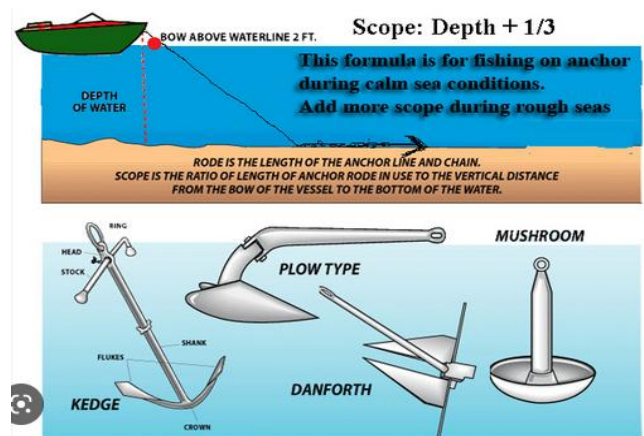


Figure:1.15 sinker

### C. Anchor

An anchor is a device, normally made of metal, used to secure a vessel to the bed of a body of water to prevent the craft from drifting due to wind or current. The word derives from Latin *ancora*, which itself comes from the Greek. Anchors can either be temporary or permanent. Permanent anchors are used in the creation of a mooring, and are rarely moved; a specialist service is normally needed to move or maintain them. Vessels carry one or more temporary anchors, which may be of different designs and weights. A sea anchor is a drag device, not in contact with the seabed, used to minimize drift of a vessel relative to the water. A drogue is a drag device used to slow or help steer a vessel running before a storm in a following or overtaking sea, or when crossing a bar in a breaking sea.



Info graph 1. 2 Anchor

#### D. Rope

Commercial fishing rope suitable for general purpose and commercial use. Polysteel fishing rope is used for potting and general fishing applications. Leaded Polysteel is used for fishing gear and is also ideal when a sinking line is required.

A fishing line is a flexible, high-tensile cord used in angling to tether and pull in fish, in conjunction with at least one hook. Fishing lines are usually pulled by and stored in a reel, but can also be retrieved by hand, with a fixed attachment to the end of a rod, or via a motor. Fishing lines generally resemble a long, ultra-thin rope, with important attributes including length, material, weight and thickness.



**Figure 1.16 Rope**

Self-check 1	Written test
--------------	--------------

Name..... ID..... Date.....

**Directions:** Answer all the questions listed below.

**Test I: Choose the best answer**

1. A device made of metal, used to secure a vessel to the bed of a body of water to prevent the craft from drifting due to wind is;

- A. Sinker
- B. Anchor
- C. Floater
- D. Rope

2. One is a fishing net which is designed to be thrown out into shallow water and then hauled back in with a payload of fish;

- A. Cast net
- B. Hand net
- C. Trap net
- D. gill net

**Test II: Short Answer Questions**

- 1. What is net making?
- 2. What is net mending?
- 3. List the different types of net components?
- 4. List personal protective equipments used for net making?



## Operation Sheet -1

- **Techniques of designing net making**

### A. Tools and equipments

- Suitable PPE
- Knife
- Rope

### B. Steps of constructing local transitional hive

- Wear appropriate PPE
- Cut a length of jute to your desired width.
- Cut lengths of jute 2 ½ times longer than your desired length.
- Create a loop and feed two equal lengths through.
- Pull tight.
- Grab one string from one length, and another from the one next to it; forming a triangle.
- Knot together.





**LAP TEST-1**

**Performance Test**

Name..... ID.....

Date.....

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within **2** hour for each task. The project is expected from each student to do it.

**Task- 1.** Perform designing net making:

<b>LG #12</b>	<b>LO #2- Make fishing net</b>
<b>Instruction sheet</b>	
<p>This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:</p> <ul style="list-style-type: none"> <li>• Set up fish net making</li> <li>• Net making</li> <li>• Attaching fish net components</li> </ul> <p>This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:</p> <ul style="list-style-type: none"> <li>• Set up fish net making and by prepare shuttle and gauge</li> <li>• Net making are started by loading shuttle and make a loop with an over hand knot</li> <li>• Attach net components</li> </ul>	
<b>Learning Instructions:</b>	
<ol style="list-style-type: none"> <li>1. Read the specific objectives of this Learning Guide.</li> <li>2. Follow the instructions described below.</li> <li>3. Read the information written in the information Sheets</li> <li>4. Accomplish the Self-checks</li> <li>5. Perform Operation Sheets</li> <li>6. Do the “LAP test”</li> </ol>	

## Information Sheet 2

### 2.1 Set up fish net making

- **Introduction**

Generally setting up fish net making is takes performed by choosing string and by preparing shuttle and gauge. Net making string material consisting of threads of cotton, hemp, or other material twisted together to form a thin length or a set of things tied or threaded together on a thin cord. Gauge is an instrument that measures and gives a visual display of the amount, level, or contents of something.

#### 2.1.1 Choosing string for net making

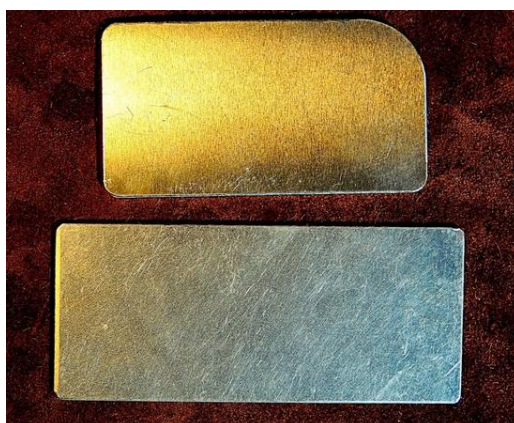
The first thing you need to acquire in your quest to net (and, in fact, the only thing that is absolutely necessary to net-making) is string, defined for our purposes as the linear, flexible stuff from which the netting is actually constructed. In practical terms, “string” can be rope, twine, yarn, thread, floss (embroidery or dental), wire, fabric strips, un spun wool roving, etc. In less practical terms, it can cover things like strips of newsprint, or knotted-together rubber bands. As a rule of thumb, if it is possible to knit it, it’s possible to net it.



**Figure: 2.1 String for net making**

### 2.1.2 Preparing gauge for net making

The net card or net Gauge determines the size of the mesh (hole) that you want in your fishing net. A credit card would do well or you could even make some up from old bits of wood. The bottom one is 13cm x 5.5cm. On the top one you notice that there is a curved edge. Some people like this as it allows the net to be slipped off easier.



**Figure:2.2 Net gauge or net card**

### 2.1.3 Preparing Shuttles for net making

One of the most useful tools for net making is to have is a shuttle. The shuttle holds your excess string out of the way for you in a fashion that makes it easier to pass the string through small loops to make knots. Shuttles can be made of wood, metal, plastic, or any rigid, but not brittle material. Netting shuttles are sometimes referred to as netting “needles”.



**Figure: 2.3 shuttles for net making**

#### 2.1.4 Preparing mesh sticks for net making

The other really useful tool to have is an assortment of mesh sticks. These are used to keep your loops evenly sized as you're constructing the net. Nearly anything can be used as a mesh stick, so long as it's a fairly consistent size. In addition to smooth plastic mesh sticks.



**Figure: 2.4 Mesh sticks for net making**

### 2.2 Net making

Originally, all nets were made by hand. Construction begins from a single point for round nets such as purse nets, net bags, or hair nets, but square nets are usually started from a head rope. A line is tied to the head rope at regular intervals, forming a series of loops. This can be done using slipped overhand knots or other knots, such as clove hitches. Subsequent rows are then worked using sheet bends, as shown in the diagram, or another knot. Some nets, such as hammocks, may be looped rather than knotted.

#### 2.2.1 Over view of net making

Before you can even begin to work with a line and rope, you need to know the right terminology. The technical terminology used about ropes and how to work with them was developed on board the old sailing ships where very accurate terminology was needed: The ship's and the crew's safety could depend on whether the right fastening was used in the right places. Basically, there are some general terms for the rope and its most simple bends. Net making is characterized by the fact that the net maker uses only a few tools in his work. Other crafts have developed a wide range of tools and



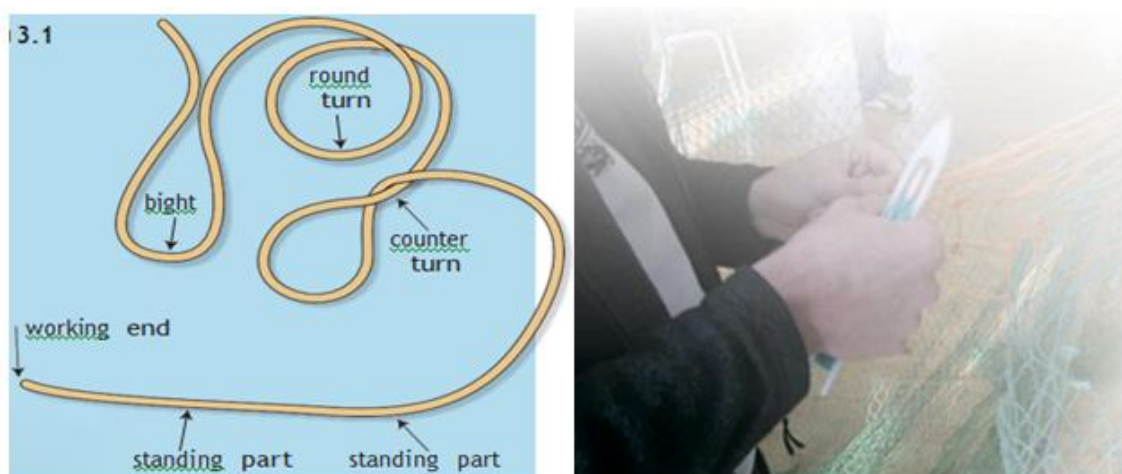
aids over time, which have helped increase efficiency, but this has not happened to the same extent with- in net making.

### 2.2.1.1 Knife for net making

First of all, you need a good, sharp knife that can cut cleanly through ropes and li- nes to avoid raw edges. The knife is also used to trim the knots in the individual sections of the net. In particular, the steel needs to be of a high quality to ensure that the knife can always be sharpened to make it really sharp.

### 2.2.1.2 Net making and mending needle

The net making and mending needle is a special type of needle with an “inner” tongue. The tongue holds thin line or thread so it is easy to pull the thread through the meshes and unwind as it is used. Needles come in many sizes, and it takes some practice to use a needle correctly. First of all, it is important to learn how to replenish the thread or line – if it is not done correctly, the line will start twisting and turning during the work, which is both time - consuming and annoying!



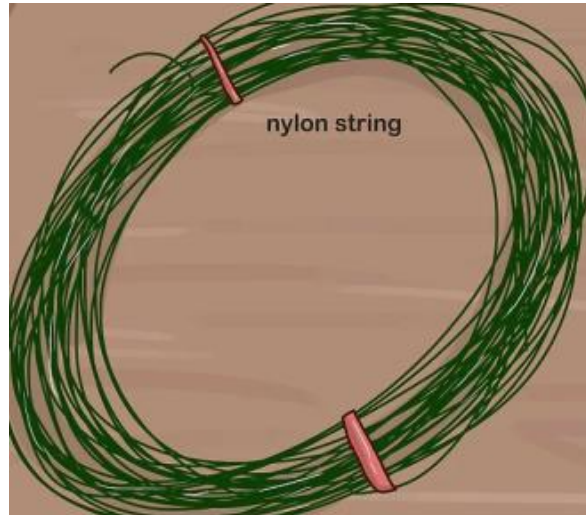
**Figure:2.5 net making activities**

## 2.2.2 Making hand fish netting

### I- Setting up

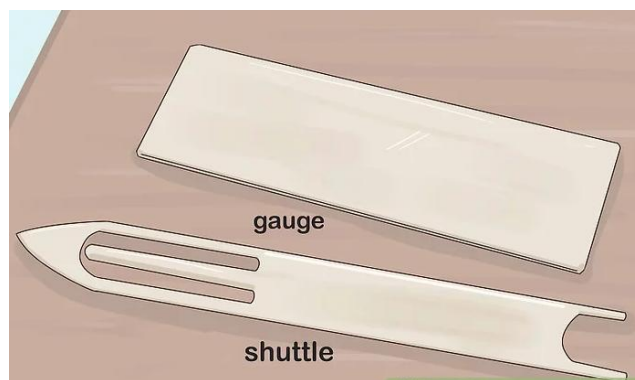
**A. Choosing string.** In theory your fishing net can be made of any string or twine. Think about what species you're trying to catch, and how it's size might affect the strength of the string used. It's recommended that you use a bonded nylon string for strength. Of all contemporary twine it is

the most durable and reliable. If you don't have any nylon on hand or are unable to get any, consider practicing with whatever string you might have around:



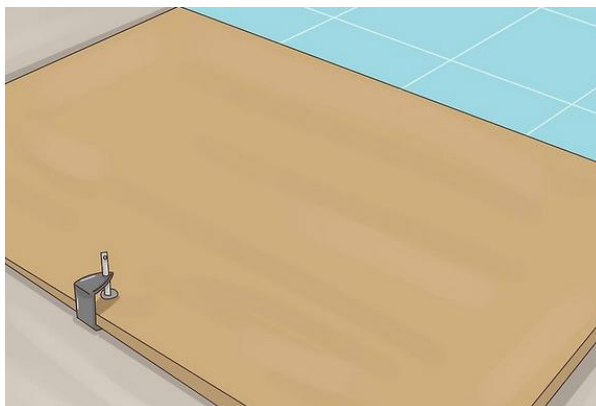
**Figure:2.6 nylon string**

**B. Shuttle and gauge:** The two essential tools for the net making process will be your shuttle (or netting needle) and gauge (or sizing card). Both shuttle and gauge can be found at your local craft or sporting goods store. The width of your gauge will determine the size of your finished net's mesh. The diagonal of each mesh square will be equal to the width of your gauge. The shuttle is the needle with which you will weave the net, and needs to be smaller in width than your gauge so as to pass through the holes made for the mesh.



**Figure: 2.7 gauage and shuttle**

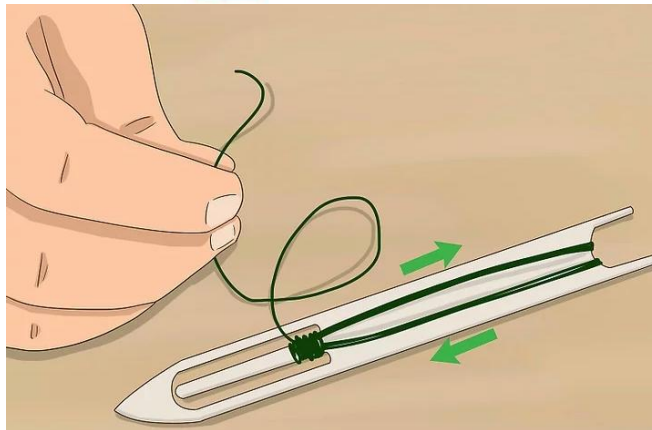
**C. Setting up net-making area:** Ideally this will be a table large enough to fit your completed net, laying flat. Though it's not necessary, it'll come in handy when trying to rest the net in between steps. What you do need is a nail (or a clamp with the center screw facing upwards) in the edge of table on the far side away from you. This rod will serve as the starting point for your net.



**Figure: 2.8 Table of making area**

## **II- Beginning the hand net**

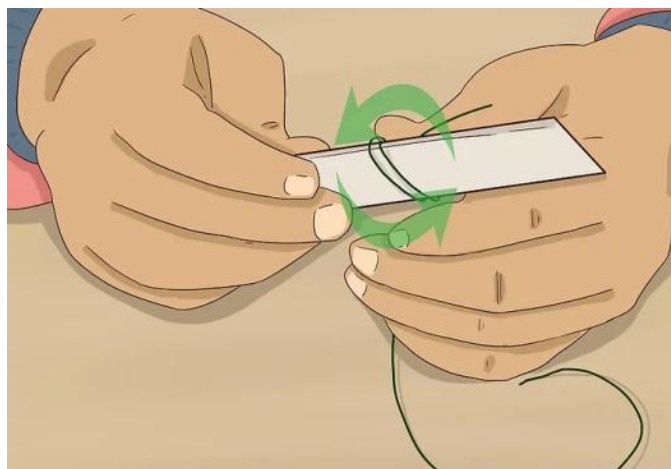
**A. Loading shuttle:** To begin, you'll need to wrap your twine around the shuttle you'll use for your net. If you run out of twine before the shuttle is full, tie the end to another spool of twine. Cut the tags that remain on the knot and continue loading. Lay your shuttle flat in your hand and lay the end of the twine flat along the top, facing you. Take the twine and loop it around the center peg of the shuttle so it comes back towards you. Lay the string down on the same side parallel to the end strand, and run it down the shuttle and flip it over and run it up the other side. Loop this piece around the center peg and back down facing you, and repeat the process until you're out of twine or the shuttle becomes too full to handle.



**Figure 2.9 loading shuttle**

**B. Making loop with an overhand knot:** The loop you make in this step needs to be close to the width of your gauge so that your shuttle may pass through it. Don't worry too much about the precision in size; so long as the shuttle can pass through, it's fine. This loop will hang extraneous at the edge of your net when completed.

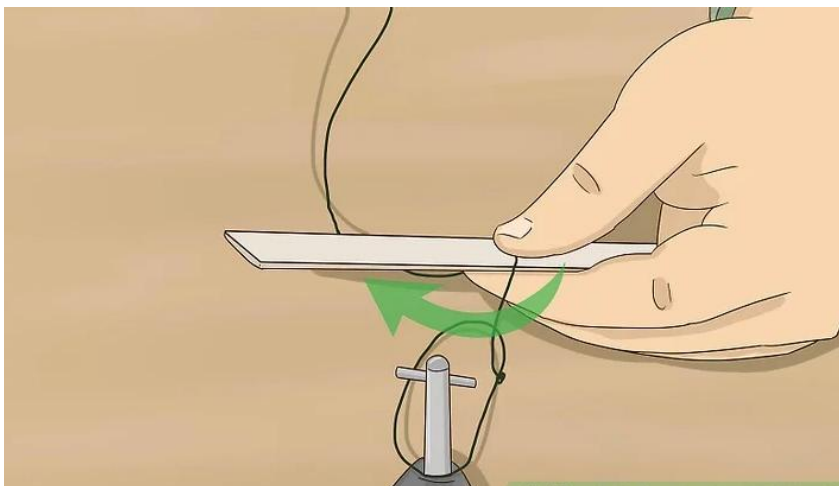
- The overhand knot is the one most everybody is familiar with: you make a loop and pass the end of the line through the loop, pulling both ends to tighten.
- Take the loop that has formed from the knot and put it around the peg you're using.



**Figure:2.10 making loop**

**C. Placing gauge:** As mentioned above, gauge will determine the eventual size of the net holes in the finished net. Every net you make will begin with one square, the sizing of which starts here.

- Slide your gauge up underneath the string attached to the loop just created. The loop should be situated on the peg so that it's knot is closest you; have the gauge pushed up to the knot so that the knot touches the gauge's top edge.
- Hold the string with your thumb atop the gauge, using the hand opposite the one which will use the shuttle.

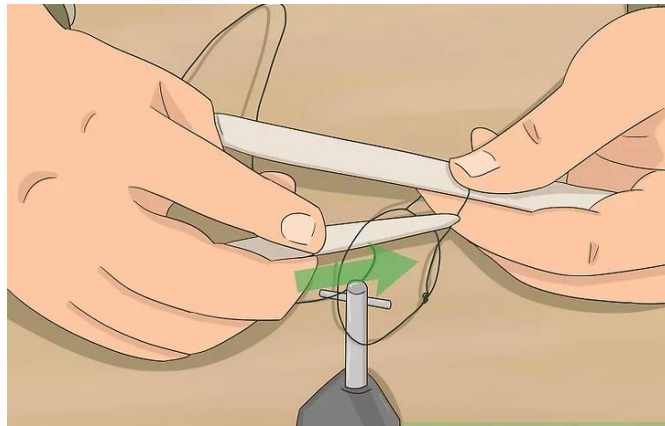


**Figure:2.11 placing gauge**

**D. Pulling the shuttle up through the loop:** At this point you're looking to tighten the string around your gauge, which is accomplished in this step. You'll look to recreate the tightness with which the string grips the gauge in this step as you continue; uniform tightness will mean evenly-sized net squares once complete.

- The shuttle should be to the right of your peg, loop, and gauge; from the right, pull the shuttle up through the loop (through the V made by the peg, twine, and gauge).
- Then, pull it down towards you, cinching tight around your gauge. Place your thumb on top on the knot and string to hold it.

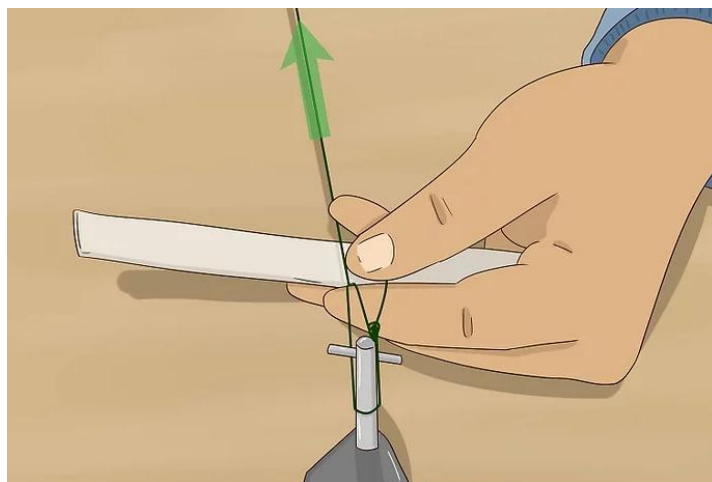




**Figure:2.12 Pulling the shuttle**

**E. Making another knot with shuttle.** Repeating the knot is important for the eventual strength of your finished net. The more knots, the sturdier the net will be.

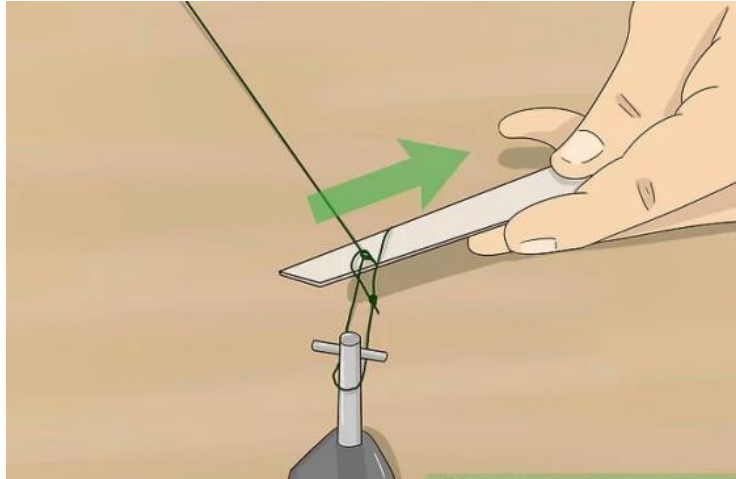
- Take your shuttle, which should be on the right of your peg and loop, and pass it under the loop and back over. There should now be a slackened loop hanging under the taut loop.
- Pass the shuttle under this loop and up to the right of the taut loop; continue pulling the shuttle and twine up until the knot formed is tight around the gauge. Then repeat this step one more time.



**Figure: 2.13 making knote**

**F. Removing gauge.** You should be left with two loops emerging from the original loop hung on the peg, along with the rest of your string attached to your shuttle.

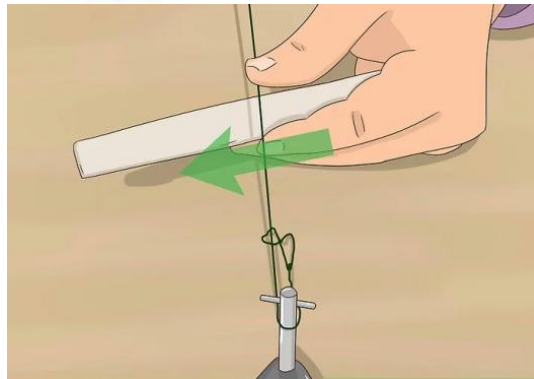
- You'll need to choose one of these two loops to continue with the process, and it doesn't matter which one. Both will be dealt with by the time your net is made.



**Figure:2.14 Removing gauge**

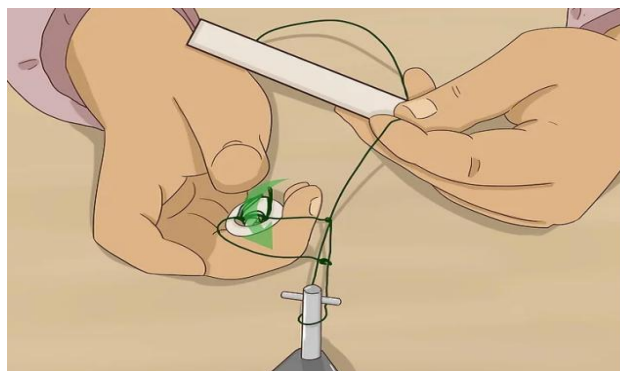
### **III- Finishing the hand net**

**A. Replace gauge.** Continuing your net will simply be a matter of repeating (with some alteration) the steps just completed. Here, for example, you'll be placing your gauge much in the same way you placed it originally. Slide your gauge back under the single string coming from the two loops. Going under your gauge, slide your shuttle through one of the two loops just formed. You should be able to pull the knot tight and the gauge closer to the knot by bringing the shuttle upwards through the loop.



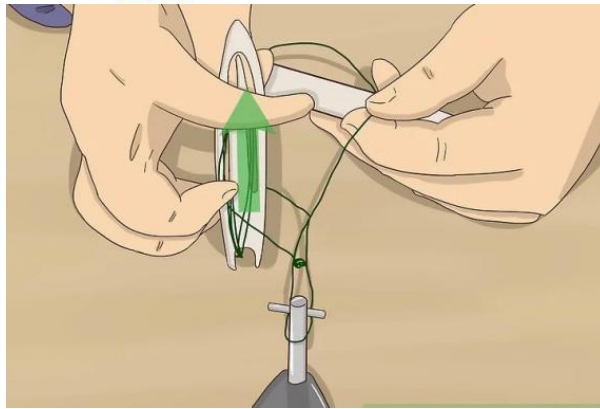
**Figure:2.15 replacing gauge**

**B. Bringing shuttle under and over the loops:** Again, you're looking to tighten the string around the gauge by creating another knot. Be sure with each knot made that it's as tight as it can be. Once you bring the shuttle under and over, there should form another slackened loop with your shuttle back to the right, pull it through this loop from underneath and back towards you to create another knot. This knot should be tight against the edge of gauge farthest from you (closest to the peg).



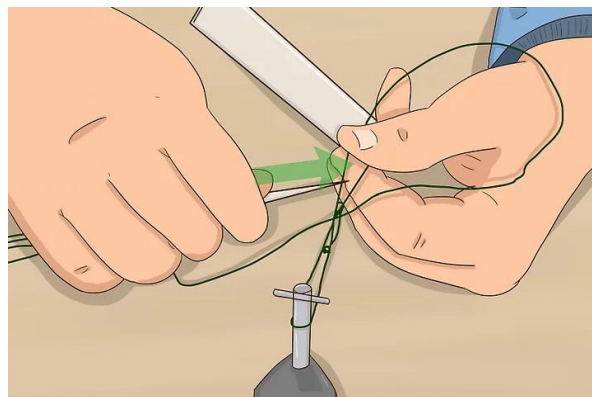
**Figure: 2.16 Bringing shuttle**

**C. Looping shuttle through the second loop.** After making a knot from the first one, repeat the process with the second loop formed earlier (whichever you chose not to start with). Pull the shuttle through the loop from under and back towards you to make a knot at the edge of the gauge. There should now be a “V” shape formed by the two loops pulled tight against your gauge (the point of the “V” should face the peg).



**Figure:2.17 Looping shuttle through the second loop**

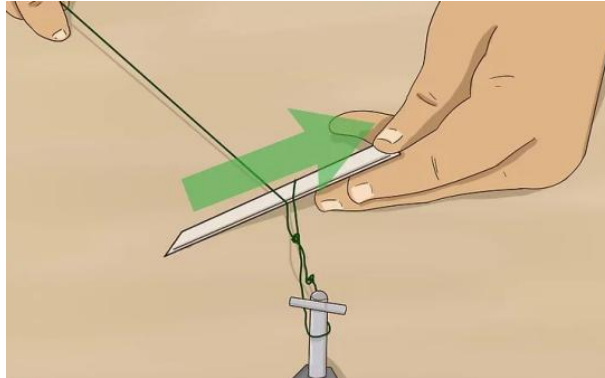
**D. Pulling the shuttle up through the loop.** At this point you're looking to tighten the string around your gauge, which is accomplished in this step. You'll look to recreate the tightness with which the string grips the gauge in this step as you continue; uniform tightness will mean evenly-sized net squares once complete. The shuttle should be to the right of your peg, loop, and gauge; from the right, pull the shuttle up through the loop (through the V made by the peg, twine, and gauge). Then, pull it down towards you, cinching tight around your gauge. Place your thumb on top on the knot and string to hold it.



**Figure:2.18 Pulling the shuttle up**

**E. Removing the gauge and start again.** Once you've removed the gauge, you should have the first square of your net, with a loop coming out of either side (to the left and right). Repeating these steps should increasingly widen the net as you continue to make loops and knots; every

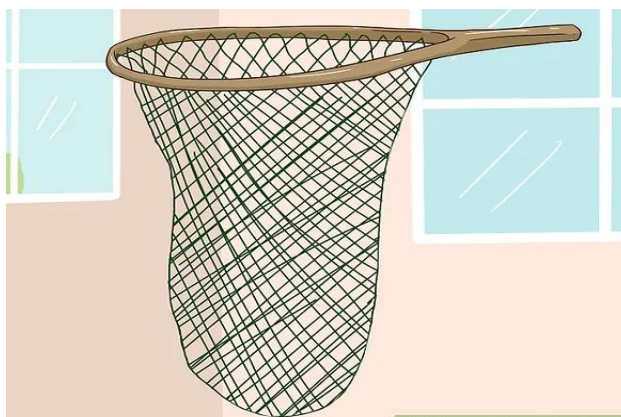
new square will have two attached loops with which to continue. Once your net has reach desired length, you will ignore one of these two loops to narrow the net back down.



**Figure 2.19 removing gauge**

**F. Completing hand net with frame or weights:** Depending on how you plan to use this net, you may want to attach it to a wooden frame you have, or make a casting net by attaching a long rope and weights. No matter which you choose, be sure to store your net in such a way that it doesn't get tangled. In either case, it's acceptable to use extra bits of string to fasten whatever you need to the net, or to fasten the net to a frame. For more durability (if you're less picky on the condition of the wood), use heavy duty staples to attach the net.

<https://www.google.com/search?q=how+to+make+fishnet&client=firefox-b>-Accesseddate  
21/1/2023



**Figure:2.20 completed hand net**



## 2.3 Attaching fish net components

### 2.3.1 Steps of attaching a hook to a fishing line

- Start by folding over your fishing line to make a loop. Thread the loop through the hook's eye.
- Make an overhand knot with slack.
- Move the loop portion around the end of the fish hook.
- Pull and tighten the line to fasten the knot.

<https://www.youtube.com/watch?v=6tSxEGCWKkc> /Accessed date 21/1/2023

### 2.3.2 Attaching a loaded float to the line

Float stops come mounted on a loop of wire. Pass an inch or two of line through the loop and pull the first float stop off the wire and onto the fishing line. Next thread the float onto the line, then a second rubber float stop. The stage of the tide is also an important factor to take into account when float fishing. A rock mark that provides five or six metres of water to cast into at high tide will give substantially less depth than this when the tide is out, and some marks can be high tide only for float fishing as there is simply not enough water present at low tide. The stage of the tide can also dictate the depth at which the float is set.

<https://www.youtube.com/watch?v=MvhTkEGmF8c> /accessed date 21/2023/

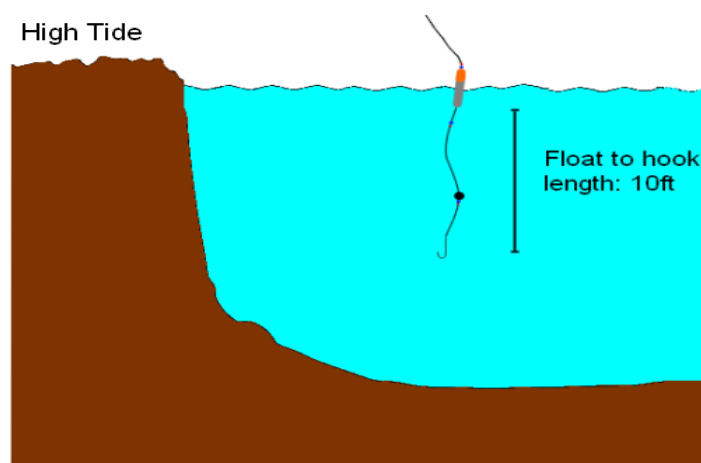


Figure:2.21 attaching float to line

### 2.3.3 Attaching sinker on the line

Page 46 of 79	Ministry of Labor and Skills Author/Copyright	Fishery and Aquaculture Level -2	Version -1 January, 2023
---------------	--	-------------------------------------	-----------------------------

Sinkers are one of the most important elements of your fishing tackle. Choosing the best sinker for a given scenario--whether a traditional split shot, convenient rubber core or more sophisticated tied sinker--involves many factors. Press the fishing line into the groove of the split shot sinker. The placement of the sinker can vary. Common arrangements include a single sinker between the hook and bobber for bait fishing, as well as a series of sinkers with different weights to control drift below a float.



**Figure: 2.22 attaching sinker on the line**

#### **2.3.4 Attaching anchor**

The tail twice around the post or through the anchor ring. But keep the second turn slack pass the tail over the standing end and then up through the original slack turn to tie the first half hitch. The recommend is wetting that with a little saliva there and then pulling that tight. And that's all there is to that knot.

Self-Check – 2	Written test
----------------	--------------

Name..... ID..... Date.....

**Directions:** Answer all the questions listed below.

**Test I: Choosing the best answer**

1. One of the following is an instrument that measures and gives a visual display of the amount, level, or contents of something.

- A. Gauge
- B. String
- C. Shuttle
- D. Rope

**Test II : Short Answer Questions**

1. Write the Steps of attaching a hook to a fishing line?
2. How to set up fish net making?
3. what is net making area?
4. List the string materials which are used for net making?

## Operation Sheet -2

### 2.1 Setting up fishing net making

#### A. tools and materials

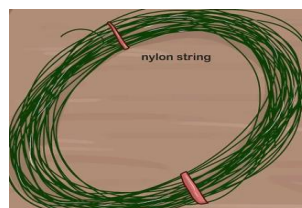
- String
- Shuttle
- Gauge
- Tension device
- Knife
- Scissors
- Suitable PPE
- Knife

#### B. methods of setting up fishing net making

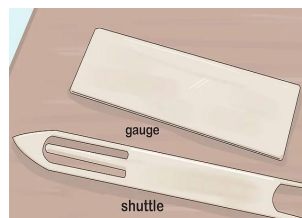
##### I. Wear appropriate PPE



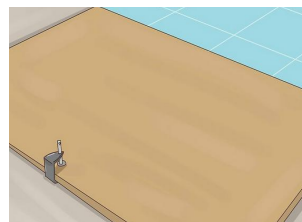
##### II. Choose your string



##### III. Have your shuttle and gauge.



##### IV. Set up your net-making area

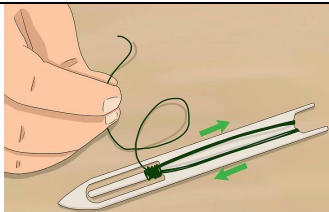
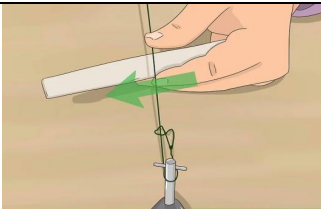
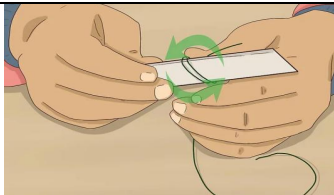
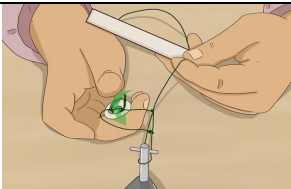
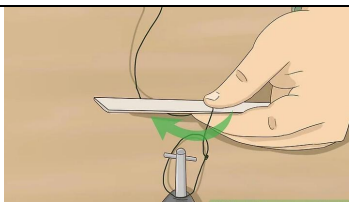
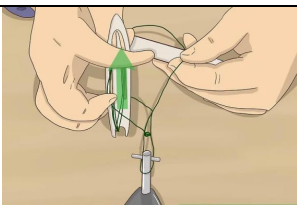


## 2.2 Methods of making hand made fish netting

### A. Tools and equipments

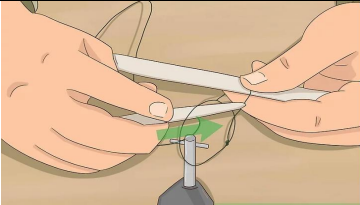
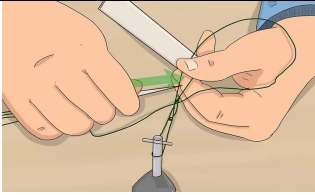
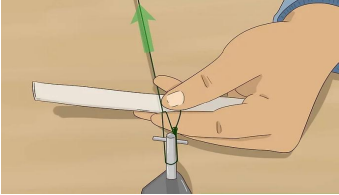

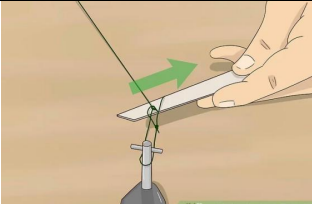
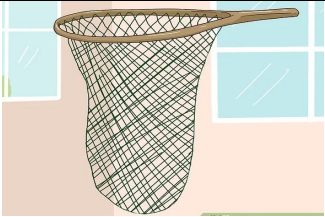
- String
- Shuttle
- Gauge
- Tension device
- Knife
- Scissors
- Suitable PPE
- Knife

### B. Steps of making hand made fish netting

a	Load your shuttle	g	Replace your gauge
			
b	Make a loop with an overhand knot	h	Bring your shuttle under and over the loops
			
c	Place your gauge	i	Loop your shuttle through the second loop
			
d	Pull the shuttle up through the loop	j	Pull the shuttle up through the loop





			
e	Make another knot with your shuttle	k	Remove the gauge and start again
			
f	Remove your gauge	l	Complete your net with frame
			



**LAP TEST-2**

**Performance Test**

Name..... ID.....

Date.....

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within **3** hour for each task. The project is expected from each student to do it.

**Task 1:**Setting up fishing net making:

**Task 2:**Perform making hand fish net:

<b>LG #13</b>	<b>LO #3- Mend fishing net</b>
<b>Instruction sheet</b>	
<p>This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:</p> <ul style="list-style-type: none"> <li>• Identifying damaged place of fishing net</li> <li>• Tying knots</li> <li>• Joining the existing and replacing materials</li> </ul> <p>This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:</p> <ul style="list-style-type: none"> <li>• Identify damaged place and twines to the net according to net repairing procedure</li> <li>• Tie knots that make meshes to resemble original netting</li> <li>• Join the existing and replacement materials using twine and knots/ lacing to resemble original netting</li> </ul>	
<b>Learning Instructions:</b>	
<ol style="list-style-type: none"> <li>1. Read the specific objectives of this Learning Guide.</li> <li>2. Follow the instructions described below.</li> <li>3. Read the information written in the information Sheets</li> <li>4. Accomplish the Self-checks</li> <li>5. Perform Operation Sheets</li> <li>6. Do the “LAP test”</li> </ol>	

### Information Sheet- 3

#### 3.1 Identifying damaged place of fishing net

Net mending has been practiced by fishermen for centuries. There are many known methods of mending nets throughout the world but all are basically similar. In otter trawl fishing, the crew must mend the nets night and day under the difficult conditions of cramped space, awkward positions, rolling seas, decks awash, rain, snow, and bitter weather.

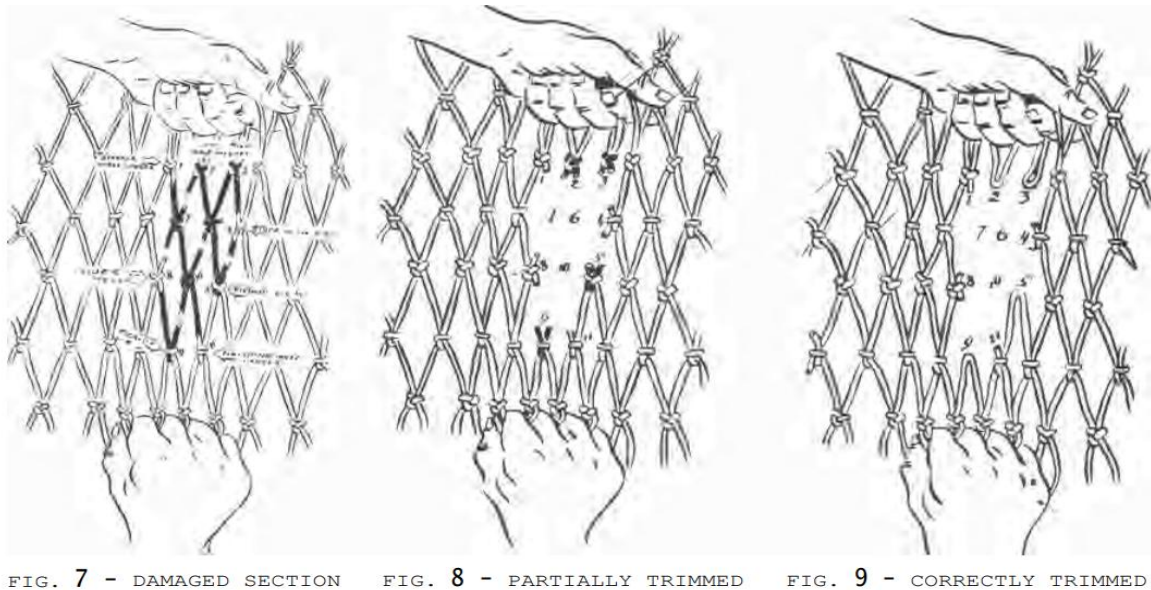
Whenever a tear is found, which usually occurs every time the net is hauled in, it must be mended. Because of these conditions, a mending method suited to trawl fishing has been developed. Most nets are made by machines, but since the mending of these nets must be done by hand, this probably will remain always a part of the fisherman's work.

##### •Terms used in net mending

- ✓ **Fish netting or webbing** is a sequence of loops, known also as bights or half Leashes, which are interwoven by knots. These form a series of meshes. The knot is known as the sheet-bend-hitch, weavers' knot, fishermen's knot, or mesh knot. In net repairing, the knot is referred to by name, according to the position it has in the damaged area.
- ✓ **Net size Netting** is designated by the size of the mesh in a stretched form and is measured by the number of meshes in length and in depth.
- ✓ **The length** is often expressed in feet or fathoms when a large quantity is ordered. The stretched mesh size is a recognized method of measuring by the manufacturers. The length of the bar, leg, or strand the actual inside opening of the mesh and the size of knot are units of measure which are sometimes used in netting specifications.

### 3.1.1 Net damage inspection

The first step in repairing damage to a net is to determine the type and the extent of the damage, so that the best mending procedure can be decided upon. The proper procedure allows the mender to restore the meshes by weaving in an uninterrupted sequence. The next step is to determine the trimming necessary. To do this, the damaged section of the net is stretched so that the strands line up easily. This is referred to as "straight twine".



**Figure: 3.1 a damaged section with several broken strands (dark section).**

[https://www.youtube.com/watch?v=Hxd-3XaK4\\_4](https://www.youtube.com/watch?v=Hxd-3XaK4_4) /accessed date 23/1/2023/

### 3.1.2 Steps to mending net and securing twins

#### A. Determine the damage

The first step in repairing your net is finding out the type and extent of the damage. This will give you the information you need to perform the right repairs. The best way to restore the mesh is to weave in an uninterrupted sequence. Determine if any trimming is necessary by stretching the damaged part of the net so the strands line up easily and become a “straight twine.”

#### B. Arrange netting correctly

Page 55 of 79	Ministry of Labor and Skills Author/Copyright	Fishery and Aquaculture Level -2	Version -1 January, 2023
---------------	--	-------------------------------------	-----------------------------

To repair your net correctly, you need to make sure the knots are all running in the same direction as when it was constructed. The knots must be in a perfect line. Depending on what the damage is, you will need to support the mesh while mending.

### **C. Support the net**

There are a few ways to support the net as you mend. You can ask someone to hold the net above where it is being mended or you can hook a few meshes in the same row.

You could also try weaving a bar or stick throughout the mesh. If you do this, you need to make sure all the meshes are in the same row and are supported equally at both ends.

### **D. Start the first knot**

When mending a net you will need to make the first knot. To do this, pass the needle up through the mesh until a short tail of twine is below the knot. Twist this tail around the two bars of mesh above the twine and leading to the needle. Then throw the loop of the twine to the left to form a sheet before bending and pulling tight.

### **E. Create more knots**

Depending on the type of damage, you will have to choose different knots to add to the mesh. Some examples are:

### **F. Finishing knot**

Once you have completed the job, finish it off with a final knot. Form a sheet bend in the same way as you formed a pick up knot. Then tie a half hitch around the bar opposite the last bar that was formed and pull tight.

<https://www.youtube.com/watch?v=hHdWLAN-oiQ> Accessed date 23/1/2023

## **3.2 Tying knots**

Fishing knots are designed to be tied in monofilament or braided fishing line and to run through the eyes and rings of a fishing rod or rig. Fishing line is cheap. The emphasis, therefore, is on compactness and reliability with no interest in being able to untie them. Many fishing knots employ multiple, tightly wound turns. The structure of such knots changes under load – outer wraps are pulled into the knot and the inner line becomes outer wraps.



**Mesh knot:** Referred to as a half-mesh knot; that is, in making a half mesh a mesh knot is tied.

**Pick-up knot:** a knot tied to a half mesh on the base or the lower part of the damage. Tying the lower mesh forms the pick-up knot on the pick-up mesh.

**Sider knot:** Refers to a knot of two separate strands. These are only found on the sides of the damage; that is, on either side of the webbing when held or hung straight. Sider knots are of two types, called "sider on the left" or "sider on the right" depending on which side of the damage they are located.

**Starter three-legger:** a knot having three strands intact and only one strand cut off.

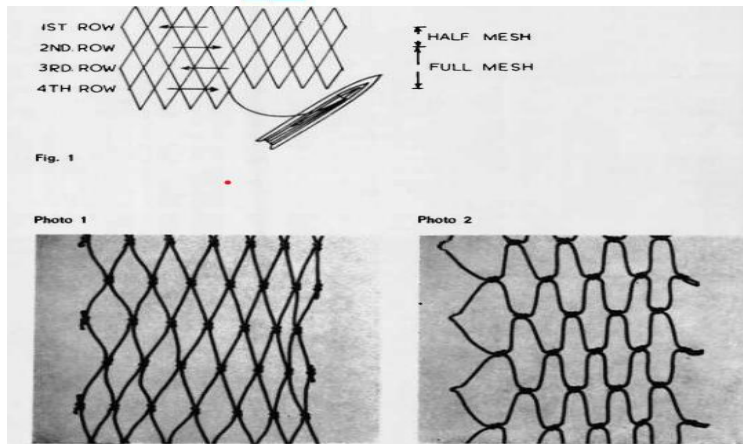
**Finishing three legger:** a similar type knot to the starter three-legger. The importance of the three-legger knots is that the mending is started and finished on those knots.

### 3.2.1 Arranging the net for mending

Netting is made by machine or hand. It is a series of knots, each knot completing a mesh and each row of knots increasing the length of the piece of net by half a mesh. It will be seen that each row must be completed before the next can be started, the arrows show the direction in which each successive knot is made. When mending a piece of net the first step is to arrange the netting so that the knots run in the same direction as when it was constructed so that the rows of knots are in line.

The most common ways of supporting a piece of net whilst mending are:

- Have an assistant hold the net by several meshes in the same row, directly above ' the point at which the net is being mended.
- Hook a number of meshes in the same row (two feet or more above the hole being mended) over a nail or onto a hook supported at a suitable height.
- If it is convenient to sit down a number of meshes in the same row can be looped over the toes.
- Weaving a bar or stick through the meshes, making sure that all meshes are in the same row, and then supporting the bar at both ends. This is one of the best methods. .



**Figure: 3.2 Phases of net mending**

### 3.2.2 Net mending and patching

Mending is a straight forward procedure once the hole has been prepared by cutting out. However, there are five simple rules to follow and it is essential that the mender does not deviate from them.

The most common procedure of repairing damaged net are the following

- Net Making Knots
- Left-Side Knots
- Pick Up Knots
- Right-Side Knots



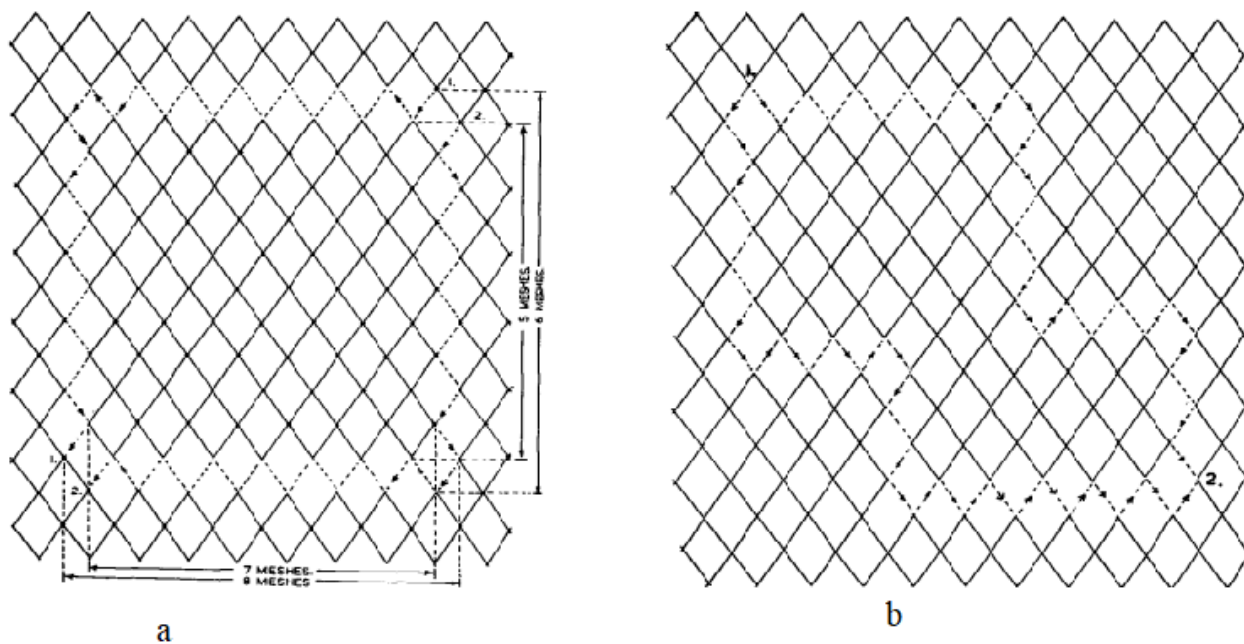
**Figure:3.3 Mending fishing net**

<https://www.dreamstime.com/photos-images/fisherman-mending-his-fishing-nets.html>  
 /accessed date 24/1/2023/

- **Patching**

The patch is cut one mesh smaller in depth and width than the hole to allow for the half mesh formed on each side when sewing it into the hole. Starting in the top right hand corner at 1 and 2 work around the patch to finish at 1 and 2 in the bottom left hand corner. If two men are available one can work in each direction and so save time. When putting in a patch it is not essential to cut out a square or rectangular hole and then a patch to fit it.

The most commonly used method of patching is to cut out part of the hole and then part of the, patch to fit. Join this in, then cut out a further section of the hole and a corresponding section of patch to sew to it. Continue cutting the hole, cutting the patch and joining until the job is completed. The completed patch can be any shape so long as each corner turned during cutting out the damaged netting is a right angle (Fig. 3.4). Figure also shows a different method of starting and finishing. As there are two starting knots being tied at (1) in the top left hand corner and two finishing knots being tied at (2), bottom right, the hole and the patch can Fig. 3.4 a Fig. 3.4 b be cut out with two bars to each knot all the way round.

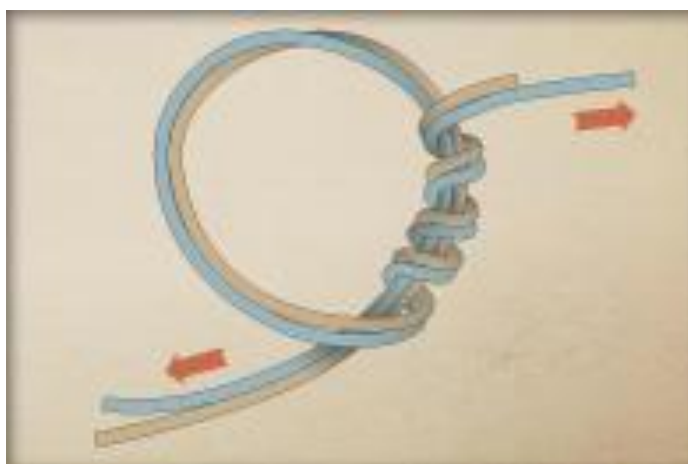


**Figure:3.4 (a and b) Patching fish net**

### 3.3 Joining the existing and replacing materials

#### 3.3.1 Fishing line joining knots

The first thing to know about line joining knots is that there is generally more than one option for the result you are trying to accomplish. For example, if you were taught how to tie Albright knots for connecting backing to fly lines, that is a perfectly acceptable substitute for a backing knot. If you know how to make a Surgeon's knot, making a Double or Triple Surgeon's knot is simply a matter of making one or two additional twists, respectively, in the line before tightening. The below knots are tested and reliable for joining two pieces of fishing line.



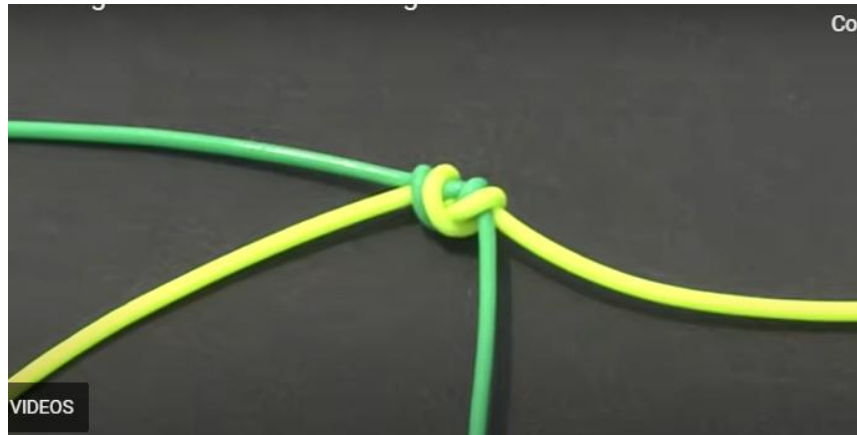
**Figure:3.5 joining Surgeon's knots**

<https://www.takemefishing.org/how-to-fish/fishing-knots-and-rigs/line-joining-knots/> Accessed date 24/1/2023

#### 3.3.2 Double surgeon's knot

Are popular fly fishing knots. Not only is this knot easy to tie, it also happens to be one of the strongest line-to-line knots you can use. The number of twists you make in the knot determines what type of surgeon's knot it is. One loop around is a single, two, a double, and three loops around is a triple knot. This knot makes it easy to join two lines, but one line must be short enough to thread the end through the formed overhand loop. As with other lines, use a lot of overlapping line so that you can pull on all four ends to make it properly tight. Work with both lines together as you tie this, and make sure both loops are the same size to assure a strong knot.

Page 60 of 79	Ministry of Labor and Skills Author/Copyright	Fishery and Aquaculture Level -2	Version -1 January, 2023
---------------	--	-------------------------------------	-----------------------------



**Figure:3.6 Joining double surgery knot**

Self-Check – 3	Written test
----------------	--------------

Name..... ID..... Date.....

**Directions:** Answer all the questions listed below.

### Test I: Multiple choice

- One of the following is a straight forward procedure once the hole has been prepared by cutting out;
  - patching net
  - .mending net
  - Knotting net
  - Sider knot
- one of the following is referred to as a half-mesh knot; that is, in making a half mesh a mesh knot is tied.
  - mesh knot
  - sider knot
  - Pick-up knot
  - Finishing knot

### Test II: Short Answer Questions

- what are the steps to mending net and securing twins?
- What is net patching?
- Joining the existing and replacing materials?



## Operation sheet 3

### 3.1 Methods of net mending

#### A. materials and used for net mending

- Scissors
- Sewing needle
- Knife
- Threads
- Suitable PPE

#### B. Step/procedure of net mending

- Wear appropriate PPE
- Net Making Knots
- Left-Side Knots
- Pick Up Knots
- Right-Side Knots

### 3.2 Identify damaged place of fishing net and secured twines

#### A. Tools and equipment

- Hand glove
- Body suit
- Eye goggle
- Boot

#### B. Steps /procedures

- Determine the Damage
- Arrange netting correctly
- Support the net
- Start the First Knot
- Create more knots
- Finishing Knot

## LAP Test

Name..... ID.....date-----

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within **1** hours. The project is expected from each student to do it.

**Task 1:** Perform net mending

**Task 2:** Identify damaged net

<b>LG #14</b>	<b>LO #4- Complete make and mend fishing net</b>
<b>Instruction sheet</b>	
<p>This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:</p> <ul style="list-style-type: none"> <li>• Handling waste materials</li> <li>• Cleaning and storing materials, tools and equipment</li> <li>• Documenting and reporting work</li> </ul> <p>This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:</p> <ul style="list-style-type: none"> <li>• Handle waste material during net making and repairing according to industry guidelines.</li> <li>• Clean and store materials, tools and equipment at the appropriated place</li> <li>• Document and report work at completed</li> </ul>	
<b>Learning Instructions:</b>	
<p>7. Read the specific objectives of this Learning Guide.</p> <p>8. Follow the instructions described below.</p> <p>9. Read the information written in the information Sheets</p> <p>10. Accomplish the Self-checks</p> <p>11. Perform Operation Sheets</p> <p>12. Do the “LAP test”</p>	

## Information Sheet -4

### 4.1 Handling waste materials

There is more to waste management than collecting rubbish and dumping it at a landfill. Waste management is the process of treating wastes, and it offers a variety of solutions for recycling items that don't belong in the trash. Waste management disposes of the products and substances that you have used in a safe and efficient manner.

Net making and mending activities use hazardous materials such as shuttle, needle and knife that, when improperly handled, pose a threat to human health and the environment. During identification and evaluation of environmental aspects, you will determine what wastes are emerging in your processes, and with operational controls you will define how the waste will be treated.



**Diagram: 4.1 waste management system**

#### 4.1.1 Steps and procedure of handling waste materials

**A. Evaluate your waste:** To be able to handle the waste properly, first needs to determine whether the waste is hazardous or not, and whether handling of that particular waste is regulated by legislation

**B. Store your waste:** Depending on the type of waste, there will be different requirements in terms of storage facilities. Waste can be in solid or liquid form, so it is important to store it according to its characteristics. Hazardous waste must be stored in a sturdy, leak-proof container that is kept closed when not adding or removing waste. Different kinds of waste may require different types of storage containers. The container must be labeled with the words “Hazardous Waste“, a clear description of the contents, and the date when the waste is first placed in the container. Containers must be stored on an impermeable surface with enough aisle space to allow for weekly container inspections.

**C. Label the waste** – nonhazardous waste doesn’t have to be labeled in any special way. On the other hand, hazardous waste labeling is often prescribed by law and in most countries, the company must obtain a license for even generating some kinds of hazardous waste. The label for marking packed hazardous waste usually contains the following information:

- Warning: hazardous waste
- Information about the waste owner who packed the waste: name, address, telephone, date of packaging, name and surname of the person qualified to be responsible for that job
- Physical characteristics of the waste: powder, solid, viscous substances, pastes, sludge, liquid substance, gaseous substances

**D. Transport and dispose your waste properly:** To help ensure that hazardous waste is transported and disposed of properly, and to reduce your liability, choose a transporter that fulfils the following requirements:

- Has a hazardous waste identification number
- Is currently licensed or permitted as a hazardous waste transporter
- Has fulfilled specific training requirements
- Maintains adequate liability insurance



- Carries credentials in the vehicle
- Transports the waste to a permitted hazardous waste facility

**E. Plan for emergencies:** Handling hazardous waste leaves room for emergency situations caused by mistreatment of the waste or any other cause. Plan for emergencies in the following ways:

- Maintain spill and appropriate emergency response equipment in an accessible area.
- Train employees in the emergency response procedures that are appropriate for your site.

**F. Train personnel:** Training all employees who have any role in handling, storing, or otherwise managing hazardous waste is a necessary step for ensuring compliance with hazardous waste rules. Personnel must be familiar with each waste's hazards, appropriate safety procedures, and all aspects of compliance.

For each of the employees who will be engaged in any segment of the waste management system, it is necessary to provide adequate training and working conditions. The training should include an introduction to:

- basic procedures for waste management;
- human and environmental risks;
- measures of precaution in waste management; and
- Responsibilities and authorities.

**G. Keep records:** The purpose of keeping records is to provide evidence that the waste is stored according to the procedures. The usual records to be kept are the ones of generated waste by type and amount, and records of waste deployed to an authorized organization.



**Diagram:4.2 steps of handling waste**

#### 4.2 Cleaning and storing materials, tools and equipment

Cleaning materials means any washes, cleaners, solvents, or rejuvenators that are used to remove excess printing inks, oils, and residual paper from a press.

Stored Materials means materials or equipment stored safely off-Site in a secure warehouse or on the premises of a fabricator or some other secure facility reasonably acceptable to the Owner and not yet incorporated into the Work. Choosing the safest location for each material, stools and equipments should also be part of your chemical safety program. Some specifications of your storage space should include:

- Store in a clean, cool, dry space. Some cleaning chemicals can have hazardous reactions when they experience extreme temperature fluctuations or high levels of humidity.
- Store in well-ventilated areas, away from intake vents. This helps prevent any fumes from spreading to other areas of the facility.
- Store no higher than eye level, and never on the top shelf of a storage area.
- Do not overcrowd shelves and include anti-roll lips to avoid falling containers.
- Never store cleaning chemicals on the floor, even temporarily.

### 4.3 Document and report work

A work report is a formal document that discusses information about a specific topic related to an aspect of your job. Most work reports are addressed to a particular audience, such as a manager. Depending on the type of work report, you may be given a report brief that outlines what you should include in your report. Most reports should be written in a structured format to clearly demonstrate what the report is trying to convey.

Writing effective work reports takes practice and requires good communication skills. The more reports you write, the more efficient you will be in composing them. The following are steps you can take to write a professional report in the workplace:

- Identify your audience.
- Decide which information you will include.
- Structure your report.
- Use concise and professional language.
- Proofread and edit your report.

Self-Check – 4	Written test
----------------	--------------

Name..... ID..... Date.....

**Directions:** Answer all the questions listed below.

### Test I: Multiple choice

1. One of the is the process of treating wastes, and it offers a variety of solutions for recycling items that don't belong in the trash.

- A. Waste management
- B. Cleaning
- C. Disposing
- D. Storing

2. One of the following is a means any washes, cleaners, solvents, or rejuvenators that are used to remove excess printing inks, oils, and residual paper from a working area and materials.

- A. Storing materials
- B. Cleaning materials
- C. Transportation materials
- D. Evaluate materials

### Test I: Short Answer Questions

1. What is documenting and reporting for net making and mending?
2. List the steps and procedure of handling waste materials?

## Operation Sheet -4

### Applying waste materials handling procedures

#### A) materials and tools used for reporting

- Body suit
- glove
- mask
- wheel barrow
- fire
- eye goggle
- boot
- brush room
- water
- sun hat

#### B) Steps in report writing

- Wear appropriate PPE
- Evaluate your waste
- Store your waste
- Label the waste
- Transport and dispose your waste properly
- Treat the waste
- Re use and recycled the waste



**LAP TEST-4**

**Performance Test**

Name..... ID.....

Date.....

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within ½ hour for each task. The project is expected from each student to do it.

**Task 1:** Apply waste materials handling procedures:



## Reference Materials

### Books:

Anon.(1997) BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, 26 (5), 5.

Bettoli, P.W. and Osborne, R.S. (1998) Hooking mortality of striped bass following catch and release angling. North American Journal of Fisheries Management 18, 609–15.

FAO (1996) Precautionary Approach to Capture Fisheries and Species Introductions. FAO Fisheries Department Technical Guidelines for Responsible Fisheries, No. 2. Rome: FAO.

### Web addresses

- <https://www.google.com/search?q=how+to+make+fishnet&client=firefox-b->  
Accessed date 21/1/2023
- <https://www.youtube.com/watch?v=6tSxEGCWKkc> /Accessed date 21/1/2023
- <https://www.youtube.com/watch?v=MvhTkEGmF8c> /Accessed date 21/2023/
- <https://www.youtube.com/watch?v=hHdWLan-oiQ> /Accessed date 23/1/2023
- <https://www.youtube.com/watch?v=kti0UXeoMUA> /Accessed date 23/01.2023
- [https://www.youtube.com/watch?v=Hxd-3XaK4\\_4](https://www.youtube.com/watch?v=Hxd-3XaK4_4) /accessed date 23/1/2023/
- <https://www.takemefishing.org/how-to-fish/fishing-knots-and-rigs/line-joining-knots/>  
Accessed date 24/1/2023
- <https://www.youtube.com/watch?v=hHdWLan-oiQ> Accessed date 23/1/2023

## AKNOWLEDGEMENT

**Ministry of Labor and Skills** wish to extend thanks and appreciation to the many representatives of TVET instructors and respective industry experts who donated their time and expertise to the development of this Teaching, Training and Learning Materials (TTLM).

**The experts who developed the learning guide**

No	Name	Qualification	Educational background	Institution	Phone number	E-mail
1	Gashaw Assefie	A	Animal Production	Agarfa ATVET College	0914068274	<a href="mailto:lakomelzajournalist@gmail.com">lakomelzajournalist@gmail.com</a>
2	Addise Desta	A	Animal production	Wolaitasodo ATVET College	0913270120	Addiserahel2701@gmail.com
3	Hussen Ebrahim	A	Animalproduction and Techinology	G/Wenget Poly Tech College	0920188426	Hussienibrahim701@gmail.com
4	Mezigebe Abate	A	Biotechninlogy	Woreta ATVET College	0937705931	Mezgebuabate16@gmail.com