PHYSICS OF DEFENCE SECTOR.

MADE BY :-PUNIT KUMAR

The Indian navy:-

- “To secure on land , we must be supreme at sea. ”
- It’s moto – “SAM NO VARUNAH”.
- Founded = 26 Jan 1950.
- Anniversaries’ = 4 December.

AIRCRAFT.

Aircraft:- Aircraft is a machine that can travel through the air and that is supported either by its own buoyancy (tendency of an object to float or to rise in a fluid when submerged.) or by the action of the air against its surface.

Ship:-

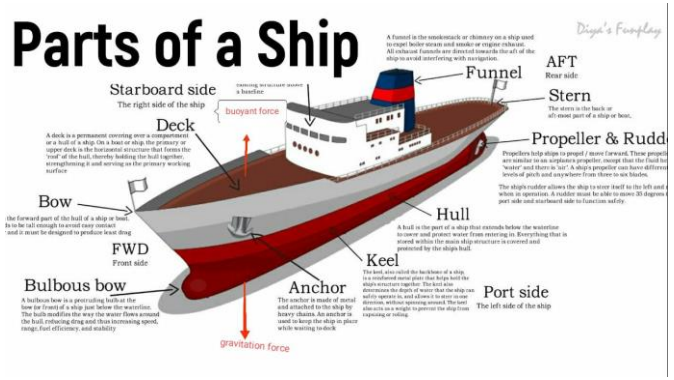
Ship:- A ship is a large watercraft that travels the world's ocean and other sufficiently deep waterways , carrying cargo or passengers or in support of specialized missions, such as defense, research and fishing .

Why ship does not sink ?

Here, there are two force act:-

1.Gravitational force → Which act downward.

2. Buoyant force → the upward force a fluid exerts on an object.



Hence, the Buoyant force acting on the ship is much greater than the gravitational force of the ship itself, Making it to float on water.

- If it is more dense than water, it will usually sink and if it less dense, it will float.
- The basic role is that an object will sink if it weight more than exactly then the same value of water.

How ship move and stop in the water?

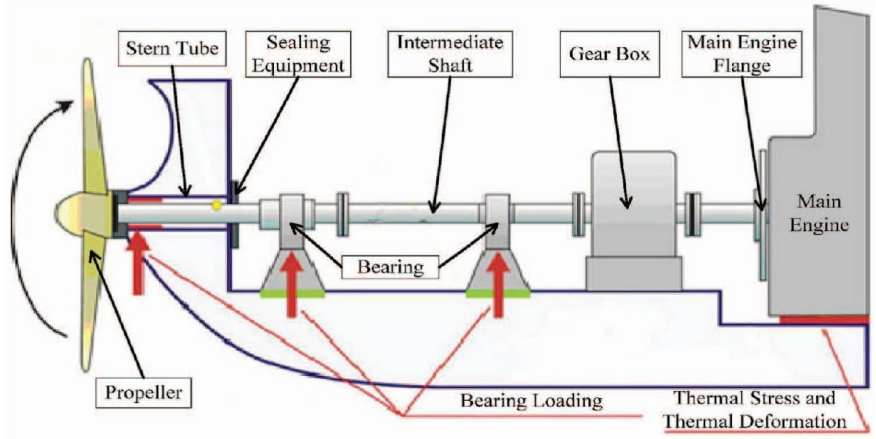
To move or stop of a ship, propeller is major work, Now How?

- Propeller ->

A propeller is a rotating fan- like structure whose diameter is up to 10 meter and weight 130 tons. Which is used to propel the ship by using the power generated and transmitted by the main engine of the ship. Propeller is set up on such way which acts force on water in the backwards direction, does it happen that, In backward direction, High pressure create and In forwards direction, Low pressure creates. So, Ship always moves High Pressure to Low pressure.

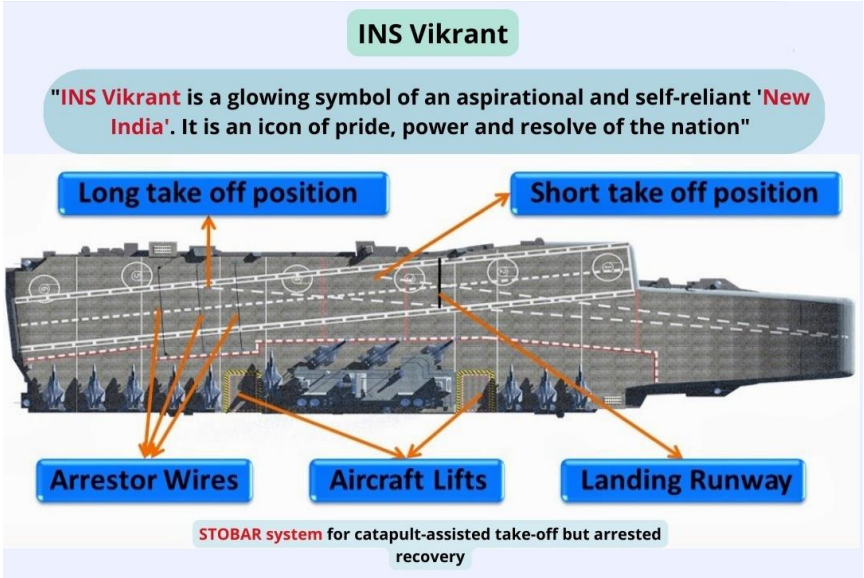
In way, ship is move in the water

To stop, the fuel supply is shutoff,
as the propeller automatically stop working. Due to water, ship is stop.



INS Vikrant.

INA Vikrant is a first in digamous aircraft carrier in service with India navy it was constructed by the cochin shipyard limited (CSL) in Kerala.



> Vikrant means –"courageous".

- It's motto - "जयेम सं युधि स्पृधः"
  - Means-"I defeat those who fight against me."

Character sticks.

Power = 1.10 lack Hp.

Length = 262m (860ft).

Beam = 62m.(203ft).

Speed = 50-55 km/P.

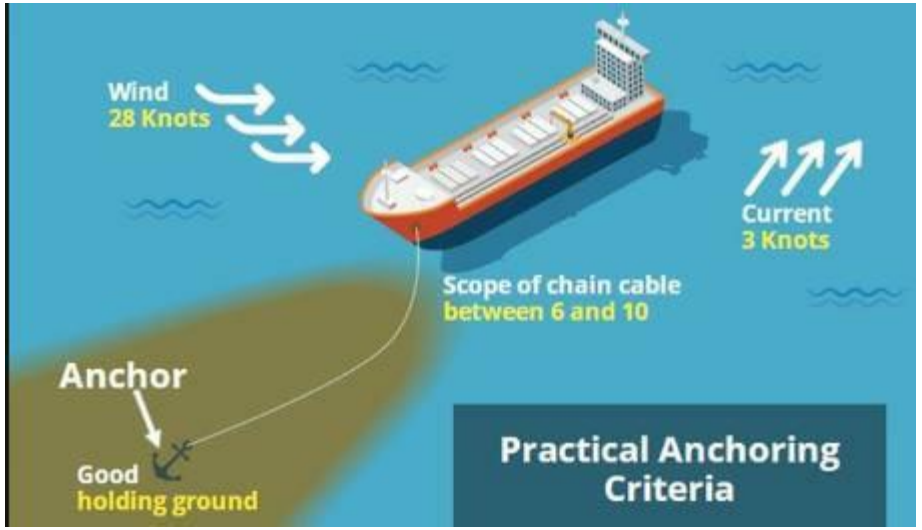
Displacement = 45,000 tones of loaded.

Crew = 196 officers, 1449 sailor.

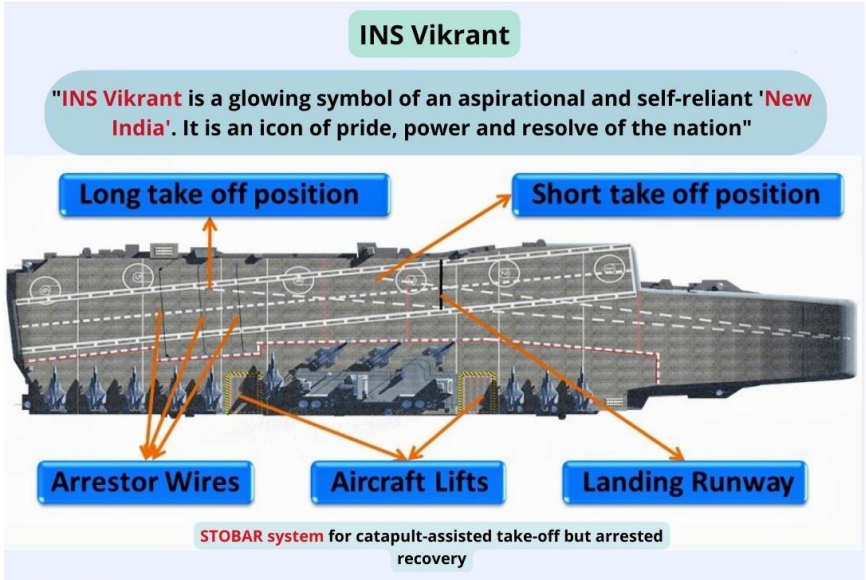
Aircraft Carrier = 36 Aircraft.

Working of INS Vikrant :-

1. Anchor – Anchor is a heavy metal device, Which attached to a ship by a cable or chain. It is use for emergency break and turn it's route.



2. **Aircraft lift.**



Some radar use.

(A). Tacan :– Provide the user with bearing and distance and fit an angle to a group or shipborne stations.

(B). MF-Star :- Is a multiple function star radar to save the ship.

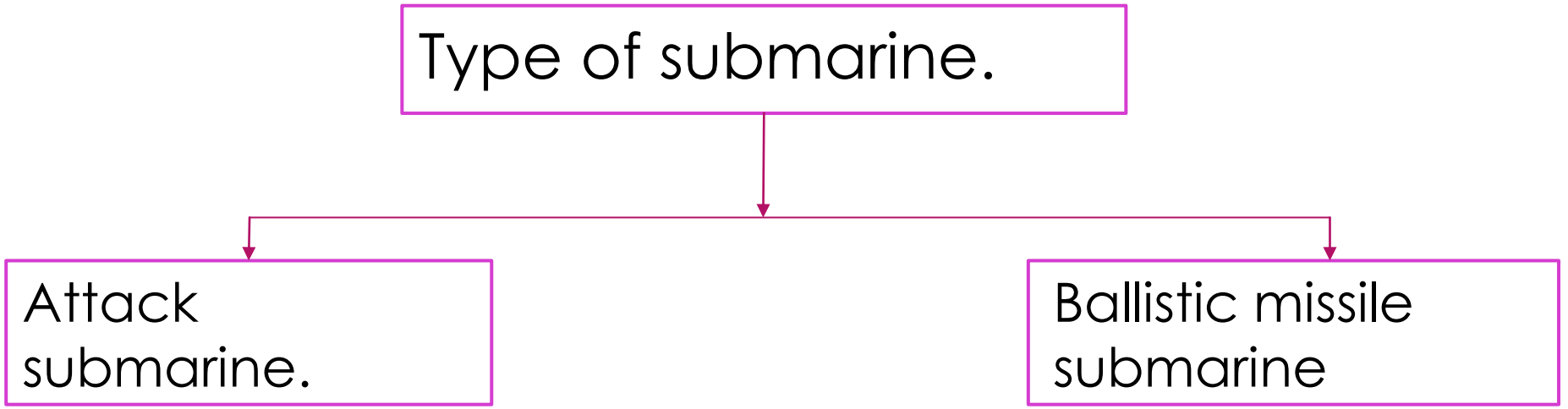
(C).Weather Radar :- To give information about weather.

Anti Rader:- It is use to divert the target of enemy from the ship.

SATCOM Radar:- is use for commination.

Submarine

- The submarine is a watercraft that is capable of travelling and operating under water.
- Usually, submarines are large crew vessels and can remain submerged for several weeks and even months.
- The use of submarines by the Navies became widespread during the first world war when several Navies adopted submarines in their fleet.
- The military use of submarines includes attacking enemy ships, attacking other submarines, protecting Aircraft carriers, creating choke point for the enemy attacking land targets, carrying ballistic missiles for second Nuclear strike capability etc.
- First Submarine the world was German U-Boat, which used in first world war(1914-1918).


Type of submarine.
Attack submarine.
Ballistic missile submarine

An Intro

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Types of submarines

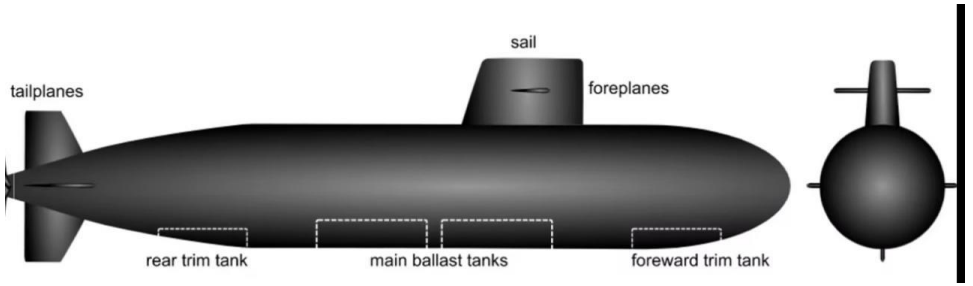
- Attacking submarines(For shortest distance):- An attack submarine or hunter-killer submarine is a submarine specifically designed for the purpose of attacking and sinking other submarines, surface combatants and merchant vessels. They can also to protect friendly vessels.

- Ballistic missile submarine(For long distance): - These submarine are used for carrying long range ballistic missiles that have the capability to carry nuclear warheads. The submarine provide seconds attack capability against a nuclear attack by the enemy state.

How Submarine submerge in water ?

-> By using ballast tanks.

There are three ballast tanks attach bellow the



Submarine –

1. Foreword trim tank.
2. Main ballast tank [In middle].
3. Rear trim tank.

First of all, Fill the water in main ballast tank, so that the density of submarine is greater than the density of water.

So, submarine submerse/ sinks on the water/sea.

And two other tanks[Foreword, Rear trim tank] is used to Balanced to the submarine.

If rear trim empty[without water], the density of foreword part is greater so that it is move down

up direction. By using ballast tanks, submarine submerse or move in the water.

How submarine come to surface?

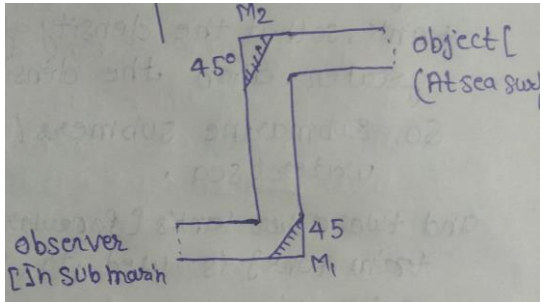
In order to control buoyancy, the submarine relies on special tanks that can be filled with water or air. To return to the surface, the tanks are filled with air. This makes the submarine less dense that the water around it, causing the sub to float to the surface.

How to check outside activity of submarine in water ?

Ans : Periscopes is used in many ways beyond seeing above water from a submarine.

Periscope – The periscope uses two plane mirrors inclined at an angle of 45 degrees as shown in figure. When light falls on one mirror and gets reflected to the observer's eyes. It helps to view over, around or through an object.

periscope →



How to submarine communication work or system ?

How it works. Submarines use very low frequency radio waves for communication when Submerged. Radio waves are absorbed quickly by seawater, and the deeper a submarine Travels, the more water those radio waves need to get through. Very low frequency radio waves can only travel a few tens of meters.

How many types of engine in submarine?

There are two types of submarine.

1. Diesel electric submarine.
2. Nuclear power submarine.

Diesel electric submarine: These submarines are powered by an internal combustion engine using diesel as its fuel. These submarines use electric batteries for operating underwater which are charged from the power provided by the internal combustion engine power by diesel fuel. These submarine are very difficult to track especially when operating on their battery.
It is work only 48hr after that submarine come to surface of recharge the batteries.

Nuclear power submarine.. These submarine use nuclear reactor for powering the submarine. These can operate underwater for several months in the ocean.

Indian submarine:

1. Arihant class submarine.
2. Akula class submarine.
3. Kalvari class submarine.

Scorpene class or kalvari class submarine.

-> Kalvari means ‘a deep sea tiger shark’ in the Malayalam language.

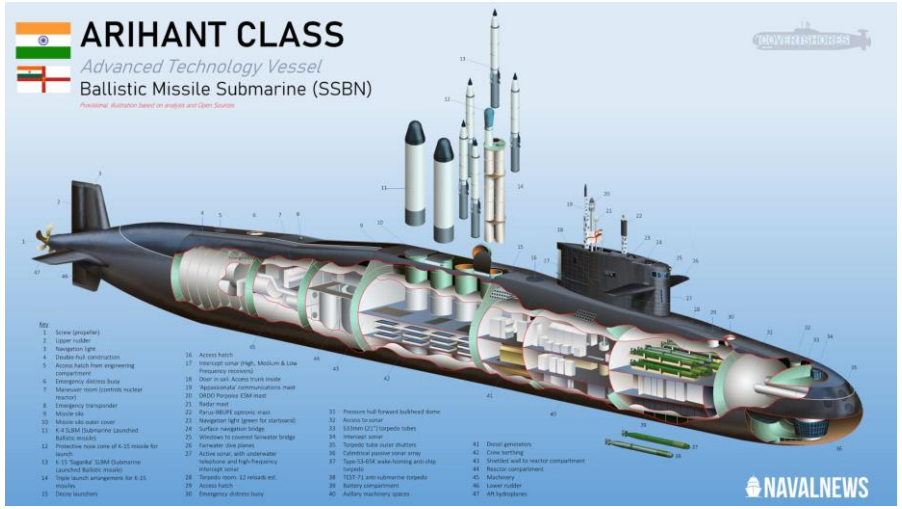
->INS Kalvari is **the first of the six Scorpene class diesel electric submarines** built under project 75.

-> INS Kalvari is an indigenously built submarines. The submarine was built by Mazagon Docks Limited, located in Mumbai, Maharashtra with technology transfer and assistance from DCNS (French industrial group specialized in naval defense and energy).

Scorpene-class or kalvari-class submarine.

Arihant class nuclear powered ballistic missile submarines

- They were developed under the Rs.90,000 crore Advanced technology vessel(ATV)project to design and build nuclear-powered submarines.
- It is build by Navy shipbuilding Centre, Visakhapatnam.
- The lead vessel of the class, INS Arhant was launched in 2009 and after extensive sea trials, was confirmed to be commissioned in August 2016.
- Arihant is the first ballistic missile submarine to have been built by a country other than one of the five permanent members of the United Nations Security Council.
- India has planned 4 in all 1 in service, 3 under construction.



Builders –

Navy Shipbuilding Centre, Visakhapatnam[2].