BRIDGE WATCHKEEPING

2nd Mate written notes

IAMSAR,VTS,SRS,MANOEUVRING

By : Anupam Singh Rajput

: SMART MARINER(Please subscribe)

IF YOU HAVE ANY SUGGESTION FOR ME, PLEASE EMAIL IT TO: anupamsinghrajput8084@gmail.com

__/__/____

Smart Mariner Edition
for smart sailors

BRIDGE WATCHKEEPING

06/05/2021

Q.6. IAMSAR, VTS PROCEDURES, SHIP REPORTING SYSTEMS.

91 IAMSAR:-(1) Write short notes on IAMSAR and its purpose?

31, 92 (2) List the contents of IAMSAR VOL. III.

92, 93 (3) List the duties and responsibilities of on-scene coordinator as per IAMSAR?

93, 94 (4) As per IAMSAR, describe the 3 levels of co-ordination including the duties and responsibilities at each level

94, 95 (5) As per IAMSAR, define (a) Search & Rescue region (b) Track spacing.

95 to 98 (6) What are the various search pattern as per IAMSAR? Explain with sketches

98 (7) Describe National and Regional SAR system organisation.

98, 99 (8) List the precautions carried out on-board while en-route for carrying out a rescue operation for a vessel in distress as per IAMSAR.

99-10101 (9) Describe & state the advantage & disadvantage of following MOB patterns:
(a) Williamson Turn (b) Scharnov Turn (c) Anderson Turn.

102 (10) List out the immediate & subsequent action that should be taken in a MOB situation

103 VTS: (1) What is a function of VTS system? What are the different types of VTS system?

103, 104 (2) How does VTS enhances the safety of life at sea?

104 (3) What are the advantage & disadvantage of the VTS system.

105 (4) Explain the reporting procedure of VTS.

105, 106 (5) Write notes on various VTS services provided by shore? where you will get this information.

107 Ship's reporting system: (1) What is the objective of ship's routeing? How will you know weather a routeing system is mandatory or voluntary.

107 (2) State the elements of ship's routeing system.

108 (3) Describe the essential elements of ship's reporting system & types of report to be sent by vessel.

108, 109 (4) What is the importance of ship reporting system for safe navigation?

109 (5) Explain how the SRS provides the necessary information for SAR in case of distress.

109, 110 (6) Write short notes on INSPIRES with respect to Ship reporting System.

Q.9 MANOEURING

111 (1) Define & explain:- (a) What is squat? State the factor that affect squat?

111, 112 (b) What do you understand by term PIVOT point & it effect in various condition?

112 (c) What is bow cushion and bank suction effect.

113 (d) Sketch & describe "Transverse Thrust" in a vessel with RHP in restricted water

113, 114 (2) Draw a turning circle diagram & define below mentioned terms:-
(i) ADVANCE (ii) TRANSFER (iii) TACTICAL DIAMETER (iv) DRIFT ANGLE

114 (3) Why is turning circle of ship larger in shallow water?

115 (4) With simple diagram, describe briefly, w.r.t stopping distance, explain head reach & track reach.

116 (5) Describe the maneuvring data displayed in the wheelhouse poster.

10/05/2022

116 (6) List all the information you will get from Pilot card?

117 (7) What are the effects of following factor on the turning circle of a vessel?

117, 118 (8) Describe various shallow effect a vessel experience on entering a narrow channel

118 (9) What smells the ground? Explain how it affect ship maneuvring?

118 (10) List the factors to be taken into account when allowing for the UKC?

119 (11) What is the effect on a vessel moving close to a solid wall or bank?

120 to 123 (12) Sketch and describe interaction in a narrow channel when
(a) two ship is approaching each other on head
(b) one vessel is overtaking another.

06/05/2022

IAMSAR

Most so imp

Ques ①:- Write short note on IAMSAR and its purpose? (1 times)

Ans:-

- The International Aeronautical and Maritime search and Rescue (IAMSAR) manual is a manual for organisation and operation of maritime and aviation search and rescue.
- It is jointly published by IMO (International Maritime Organisation) and ICAO (International Civil Aviation Organisation).
- The IAMSAR manual is divided into three volumes:
  - VOL I:- organisation and management
  - VOL II : Mission coordination
  - VOL III : Mobile facilities.

Purpose:

- The purpose of IAMSAR manual is to provide guidance to those who require assistance or who may able to provide assistance during emergencies at sea.
- Another purpose is to aid the master of any vessel who might be called upon to conduct the SAR operation for person or ship in distress.
- It help government to implement SAR convention and provided guidelines.
- It encourages all coastal states to develop their organization on similiar lines, as to enable adjacent states to co-operate and provide mutual assistance.

Ques ②: List the contents of IAMSAR VOL. III (3 times)

Ans:-

IAMSAR Vol. III is mandatory to be carried on-board merchant ships.

Following are the contents of IAMSAR VOL. III :-

Section 1- overview

- Responsibilities
- SAR co-ordination
- SAR Mission co-ordinator.
- On scence co-ordinator.
- Ship's reporting system.
- AMVER.

Section 2 : Rendering assistance
- Initial action by assisting aircraft.
- Action/preparation while proceeding to a distress.
- Action by assisting aircraft.
- Search pattern
- On-scene communications
- Care of survivors.

Section 3 : On scene coordination
- Planning & conducting the search
- Co-ordination of search and rescue operation.
- On-scene communication
- Conclusion of search

Section 4 : On-board Emergencies.
- Ship's emergencies at sea
- Distress signal
- Manoverboard
- Medical evacuation
- Aircraft emergencies.

Appendices

Appendix A : Regulation V/33 of SOLAS 1974, as amended
Appendix B : Search action message B-1
Appendix C : Factor affecting observer effectiveness C-1
Appendix D : Standard format for search and rescue situation report (SITREP) D-1
Appendix E : SAR Briefing and Debriefing form E-1
Appendix F : Own emergency.
Appendix G : Rendering assistance.

Ques③: List the duties and responsibilities of the on-scene coordinator as per IAMSAR. (3 times)

Ans:- When two or more SAR facilities conduct operations together, the SMC (SAR mission co-ordinator) should designate an OSC (on-scene coordinator).

Duties of on-scene coordinator are as follows:-

3 • Co-ordinate operation of all SAR facilities on-scene.

1 • Recieve the search & rescue plan from SMC or plan the search & rescue operation, if no plan is available.

2 • Modify the search action or rescue action plan as the on-scene situation dictates, in consultation with SMC

4 • Co-ordinate on-scene communication.

5 • Monitor the performance of participating facilities.

6 • Ensure operation are conducted safely, paying attention for safe operation among all facilities, both surface and air.

7 • Make periodic situation report (SITREP) to the SMC. The SITREP format can be found in Appendix D.

• Maintain a detailed record of the operation:
- on scene arrival and departure time of SAR facilities.
- areas searched
- track spacing used.
- actions taken.
- result obtained

8 • Advice the SMC to release facilities which is no longer required.

9 • Report the number and names of survivor to the SMC.

10 • Request SMC for additional assistance (like medical evacuation of seriously injured survivors)

Ques ④:- As per IAMSAR, describe the 3 levels of co-ordination indicating the duties and responsibilities at each level.

Ans:- (a) SAR Co-ordinators. (2 times)

• SAR co-ordinators are top level SAR managers

• The SAR co-ordinator, therefore, does not have an operational response role at all.

• The SAR co-ordinator have overall responsibility for
- establishing, staffing, equipping and managing the SAR system.
- establishing RCC and rescue sub-centers
- providing or arranging for SAR facilities.

06/05/2022

- coordinate SAR training
- developing SAR policy.

(b) SAR mission co-ordinator (4-times)

- Each SAR operation is carried out under the guidance of an SMC.
- The SMC guides a SAR operation until a rescue has been done or it becomes apparent that further efforts would be of no avail
- The SMC should be well trained in all SAR processes and thoroughly familiar with all SAR plans.
- Other SMC duties include
  - Obtain and evaluate all data on the emergency
  - Remain informed of prevailing environmental condition
  - Plot the areas to be searched and decide on the methods and facilities to be used.
  - Develop the search and rescue plan, as appropriate.
  - Inform the RCC chief of the search action plan.
  - coordinate the operation with adjacent RCC when appropriate.
  - arrange briefing and debriefing of SAR personnel
  - Evaluate all reports and modify search action plan, if necessary.
  - Arrange for refueling of aircraft and, for prolonged search, make arrangement for accomodation of SAR personnel.
  - Arrange for delivery of supplies to sustain survivors.
  - Maintain an accurate and up-to-date record in chronological order.
  - Recommend RCC chief about suspending the search
  - Releasing SAR fascilities when assistance is no longer required.
  - Notify accident investigation authorities
  - Prepare a final report on the result of SAR operation.

(c) On-scene co-ordinator.

See page - 93 of this notebook.

Ques(5): As per IAMSAR, briefly defines

(a) Search & Rescue Region (SRR)

- It is an area of defined dimensions associated with a rescue co-ordination center (RCC) within which SAR services are provided.

06/05/2021

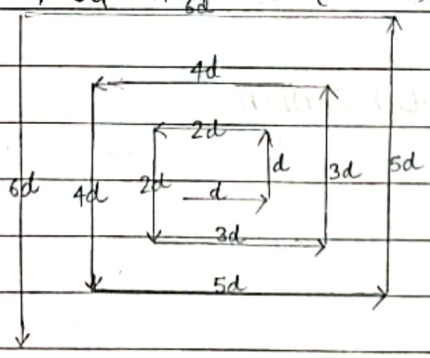
- Search and Rescue region defines that who has primary responsibility for coordinating the response to distress situation in an area of the world, but it doesn't restrict anyone from assisting person in distress.
- The International Civil Aviation Organisation (ICAO) depicts aeronautical seach & rescue regions (SRR)
- The International Maritime Organisation (IMO) depicts maritime search & rescue region (SRR)

(b) Track Spacing

- In search pattern, the distance between adjacent tracks is known as "track spacing"
- The appropriate changes to be made to track spacing based on the weather condition and no. of SAR facilities in use.
- The recommended track spacing (S) can be obtained by multiplying the uncorrected track spacing (Sw) by the appropriate weather correction factor (fw): $S = Sw \times fw$
- The SMC should ensure that all SAR facilities should maintain safe seperation from one another, both surface and air.

*** Ques ⑥:- What are the various search patterns as per IAMSAR? Explain with sketches. (10 times)

Ans:- (i) EXPANDING SQUARE SEARCH (3 times)



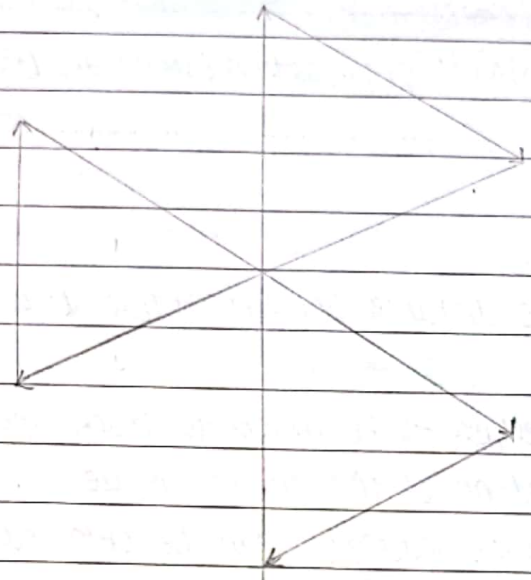
- To be used by a single ship during a search
- Most effective when location of the search object is known with relatively close limits.
- It is appropriate for vessels or small boats to use when searching

06/05/2022

for a person in water or other small object with little or no leeway.

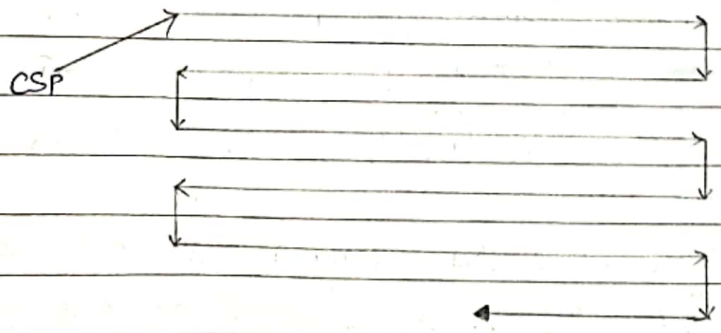
- Accurate navigation is required.
- All course alteration are of 90°
- The commence search point (CSP) is the datum position.

(ii) SECTOR SEARCH (3 times)



- To be used by only one craft at a time at certain location.
- Most effective when position of the search object is accurately known as the search area is small
- An aircraft and a vessel may be used to perform independent sector searches of the same area.
- A suitable marker may be dropped at the datum and used as a refrence point.
- The commence search point (CSP) is where the ship or aircraft enters the area to be searched.

(iii) PARALLEL SWEEP (TRACK) SEARCH



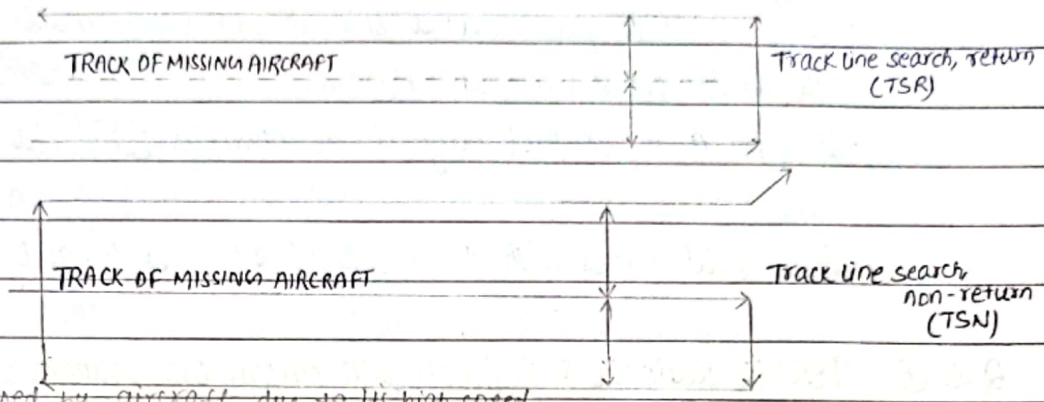
- To be used by multiple fascilities when a large area is divided into sub-areas.
- Most effective when position of the search object is uncertain and search

06/05/2022

area is large.

- Search legs are parallel to each other.
- The commence search point (CSP) is the one corner of the sub-area.

(iv) TRACK LINE SEARCH



- ~~To be used by aircraft due to its high speed.~~

It is most effective

- (To be used) when a vessel or an aircraft has disappeared without a trace along a known route.
- Used as a initial search effort.
- Search are along one side of the track of missing aircraft, and return in the opposite direction on the other side (TSR)
- Search are along the track of missing aircraft and once on each side, then search facilities continues on its way and does not return (TSN)

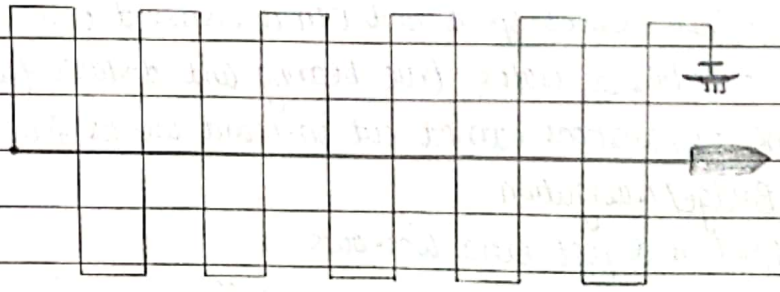
X

- Track line search are often used by aircraft due to their high speed.

(v) CONTOUR SEARCH

- To be used by aircraft
- Used around mountains and valleys when sharp changes in elevation make other pattern not practicable.

(vi) Co-ordinated vessel aircraft search pattern (2 times)



- To be used when on-scene co-ordinator is present to give direction and provide communications with the participating crafts.

- Creeping line search is often used.
- Most of the search is done by the aircraft, while the ship steams along a course at a speed directed by OSC, so that aircraft can use it as a navigational checkpoint.
- When aircraft passes over a ship, it can easily make correction to stay on the track of search pattern.
- It gives a higher probability of detection as compared to the aircraft searching alone.
- Ship speed varies with the speed of the aircraft and size of the pattern.

Ques ⑦:- Describe National & Regional SAR system organisation. (2 times)

Ans:- Many flag states have accepted the obligation to provide aeronautical and maritime SAR co-ordination and services on a 24 hours basis for their territorial seas and high seas (where appropriate)
To carry out these responsibilities, states have established national SAR organisation or joined one or more other states to form regional SAR organisation.

Ques ⑧:- List the preparation carried out on-board while enroute for carrying out a rescue operation for a vessel in distress as per IAMSAR (2 times)

Ans:-
- Once a decision has been made to assist, the following information should be transmitted to distress craft or coast station:
  - Own vessel's identity
  - Own vessel's position
  - Own vessel's speed and ETA to distressed craft.
  - Distressed craft's true bearing and distance from own ship.
- The preparations carried out on-board are as follows:

(a) Bridge/Navigation
- Brief and post extra look-outs
- Call or designate a communication officer.
- Operate radar, especially X-band 3 cm.
- Make sure binoculars are available.

06/05/2022

- Up-to-date weather information for the route and the distress position.
- Plot the position of own ship frequently.
- Make course adjustment as necessary to maintain the quickest route to the scene

(b) Communications

- Monitor all distress frequency.
- Try to maintain continuos contact with the ship in distress.
- Update RCC of any development
- Locate day light signalling lamp, search light, hand held radio and loud hailer
- Establish communication with emergency/deck team (rescue)

(c) Engine Room

- Advice to maintain maximum possible speed.
- Give notice to Engine room for engine stand-by & ready for manoeuvring
- Ask for other things in ample time like fire pump, power for deck machinery etc.

(d) Deck.

- Prepare rescue boat for launching if weather condition allows.
- Rig pilot ladder on both side with man rope.
- Rig scrambling net on both side
- Keep lifebuoys and lifejackets ready.
- Keep heaving line, messenger line and line throwing apparatus ready.
- Check cargo lifting appliances on both side with cargo net for recovery of survivors

(e) Medical Assistance.

- Stretchers
- Blankets
- Medical supplies like first aid kit, resuscitator and medicine.
- Dry clothing
- Food and hot drinks
- Hospital
- Shelter.

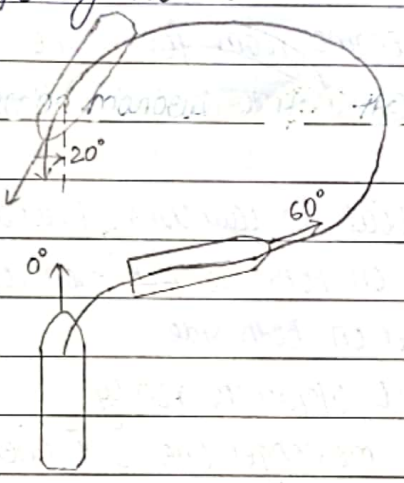
Ques ⑨:- Describe and State the advantages and disadvantages of following Man Overboard (MOB) pattern :

06/05/2022

(a) Williamson turn.

- Used as an immediate action manoeuvre just after the person fell.
- Put the wheel hard over to the side on which the person fell. This pushes the stern away from the person in water. Advantage
- When the ship has altered course by about 60° from its original heading, put the wheel hard over to other side.
- When the vessel is 20° short of the reciprocal course, put the wheel on midship and steady the course on reciprocal course.

Disadvantage: There is a chances that lookout person may loose sight of person over-board due to shift of focus, and so, extra lookouts should be posted on all sides, especialy the stern.



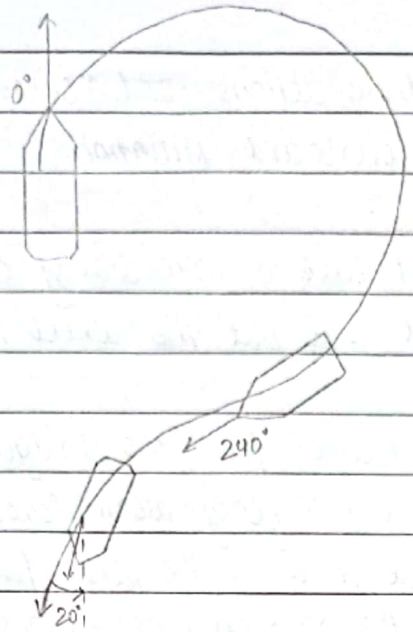
(b) Scharnov turn

- Used as a delayed action manoeuvre after the person has been reported missing.
- Put the wheel hard over to one side.
- When the ship has altered course by 240° from its original heading, put the wheel hard over to other side.
- When the vessel is 20° short of the reciprocal course, put the wheel on midship and steady the course on reciprocal course.

Advantage: It has the advantage of reducing distance loss during the manoeuvre.

diagram in next page.

06/05/2022



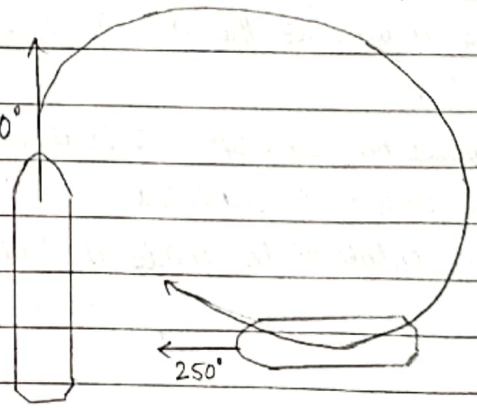
(C) Anderson Turn / Single turn

- Used as an immediate action manoeuvre.
- Stop engines and put the wheel hard over to side on which the person fell.
- When clear the person in water, go on ahead full, still using full rudder.
- When the ship has altered course by 240° from its original heading, put the wheel hard over to other side.
- When the target point is 15° off the bow, put the wheel on midship and back the engines as required.

It is used during SAR situations & used by ships with a very small turning circle.

Advantage:
- Fastest MOB recovery method
- Keep the person in water for least amount of time

Disadvantage:
- very difficult for single screw vessel
- Difficult because approach to person is not straight



06/05/2022

Ques (10):- List the "immediate actions" and "subsequent actions" that should be taken in a man overboard situation.

Ans:-

Immediate actions

- As an OOW, will have to immediately changeover the steering from auto to manual and put the wheel hardover to the side on which the person fell.
- Release the MOB marker from the bridgewing.
- Sound the general emergency alarm followed by announcement on the PA regarding the side on which the person fall.
- Thereafter, mark the MOB on GPS & ECDIS.
- Call Master & Engine Room.
- Post extra lookout to keep the person in water in sight.
- Commence the MOB recovery manoeuvre like williamson turn, Anderson turn depending on the situation.

Subsequent action

- Carry out the MOB recovery manoeuvre.
- Inform E.R and ask them to keep engines ready to manoeuvre.
- Broadcast urgency signal on VHF CH-16 which alert vessel's in vicinity and nearest coast station.
- Crew mustered.
- Rescue boat to be prepare with the crew & rescue gears.
- When close to the casualty, reduce the speed, lower the rescue boat and pickup the man. Once the man is picked up, first aid should be given in boat itself.
- The lifebuoy should be picked up and boat hoisted back on-board.
- Urgency signal should be cancelled.
- The appropriate entries to be made in Official Log Book.

06/05/2022

VTS

Ques①:- What is a function of VTS system? What are the different types of VTS system? (4 times)

Ans:-
- A vessel traffic service (VTS) is a marine traffic monitoring system established by port authorities.
- It came into existence somewhere in 1980s.
- It deals with monitoring and managing ship's traffic in confined and busy waterways, suggesting best route for a vessel and ensuring that no two vessels run into each other on congested routes.
- It even helps in keeping an eye on unauthorized cargo movement, smuggling etc, making water more safer and controlled.
- One more important role of VTS that it act as a vessel finder.

There are two types of VTS system:

(i) Surveilled:
- It consits of land based sensors which include RADAR, AIS, CCTV which obtains important marine information.
- Signals from these sensors are sent to central location where trained VTS personnel analyze the information and manage vessel traffic movement.

(ii) Non-surveilled:
- It consist of one or more reporting points at which ship's are required to report their identity, course, speed and other data to the monitoring authority.
- Using this data, courses of various vessels are mapped out and then vessel traffic movement are managed accordingly to avoid any mishaps.

Ques②:- How does VTS enhances the safety of life at sea? OR, What are the benifits of implementing a VTS? (7 times)

Ans:-
- It allows identification and monitoring of vessels, strategic planning of vessel's movement in confined and busy waterways, suggesting best route for a vessel and ensuring that no two vessels run into each other on congested waters.
- It even helps in keeping the eye on unauthorized cargo movement, smuggling etc. making water more safer and controlled.

play an important role in maritime environment protection.

4. • It (can assist in reducing the risk of pollution) and if occur, it also co-ordinate in pollution response.

3. • It also act as a vessel finder. At VTS location, the data are stored and can be replayed. So, the crucial marine information can be make available which can be used to find a vessel if it goes missing.

5. • It decreases vessel congestion, critical encounter situations and probability of a marine casualty resulting in environmental damage.

8. • It informs vessels regarding any waterborne activities going onn in vicinity

6. • It also provides navigation assistance, if required.

9. • It improves the protection of offshore installation from possible adverse effects of martime traffic in given area

7. • It provides weather and navigational warning.

Ques ③:- What are the objective/advantage and limitation/disadvantage of the VTS systems? (3 times)

Ans:- Objective/Advantage of VTS

• The main purpose of VTS is to improve the safety and efficiency of navigation, safety of life at sea and the protection of marine environment

Same as in Q.2

• It allows identification and monitoring of vessels, strategic planning of vessel's movement in confined and busy waterways,

• It suggests best route for a vessel and ensure no two vessel shall run into each other in congested water.

• It helps in keeping an eye on unauthorized cargo movement, smuggling etc. making water more safer and controlled.

• It can assist in reducing the risk of pollution and if occur, it also co-ordinate in pollution response.

• It detects a developing dangerous situation and give timely warning of such dangers.

Limitation/disadvantage of VTS

• RADAR information available to VTS can have some errors, same as in shipboard RADAR.

• Ship Labels (Name of the ship) can switch echoes.

• VTS operator may not be trained properly.

07/05/2022

Ques ④: Explain the reporting procedure of VTS

Ans:- Today with the use of AIS onboard ship's, the ship's data is recieved by the VTS which reduced the work load associated with verbal reporting system.

But the non-surveilled VTS have reporting points where ships have to make verbal reporting.

The reporting procedure are as follows:-

(i) Pre-Entry Report

- Report on prior entering into VTS zone (10 miles before Reporting line):
  Vessel Name, Call Sign, Estimated time of passing the reporting line, Destination, Last port of call.
- Report on passing the reporting line:
  Vessel Name, Call sign, location, Time of passing, Destination, Estimated time to reach the destination
- Report on arrival on destination:
  Vessel Name, Call Sign, Location, Time.

(ii) Report on movement

- Report on expected movement (10 min before):
  Vessel Name, Call Sign, Location, Estimated time of movement.
- Report on movement completion:
  Vessel Name, Call Sign, Location, Time.

(iii) Report on Departure

- Report on expected departure (10 min before)
  VesselName, Call sign, Location, Estimated time of departure.
- Report on Departure.
  Vessel Name, Call sign, Location, Departure time, Next port of call.
- Repprt on passing the reporting line.
  Vessel Name, Call Sign, Time of passing.

Ques ⑤: Write notes on various VTS services provided by shore? Where will you get this information?

Ans:- A VTS is equipped & staffed to interact with marine traffic, respond to the developing critical encounter situations and provide specific services.

07/05/2022

A VTS may provide one of three types of service:

(i) Information service:

- All VTS centers provides an information service
- This include information on: Position, identity or intention of other vessel in VTS area, visiblity & weather conditions, status of aid to navigation.
- It provides any other information that could affect a vessel's safe transit.
- Vessels are provided information at regular broadcast interval, on request or whenever circumtances require.

(ii) Traffic Organisation service:

- VTS manages space in waterways.
- It allocate arrival or departure times, assign anchorage space, manage traffic in one-way zone.
- It employ other measures related to preplanning vessel movement.

(iii) Navigational Assistance service:

- The VTS can provide navigational assistance on request or if a vessel's navigation equipment is malfunctioning or if VTS deems it necessary.
- In navigation assistance, VTS gives advice to assist with on-board navigational decision making.
- This include: RangexBrg to a nearby danger or landmark, course to make good to a waypoint, course to steer etc
- The information to assist in navigational decision making must be provided in timely manner.

This informations can be find out for any given area by checking the Admiralty List of Radio Signals vol.6 or the Admiralty Sailing Direction.

07/05/2022

SHIP REPORTING SYSTEM

Ques①:- What is the objective of "Ships Routeing"? How will you know wether a roueting system is madatory or voluntary?

Ans:- • The objective of ships routeing is to improve the safety of navigation in converging areas and areas where traffic density is much higher.
• It also look into areas with restricted searoom, limited depth, unfavorable meteorological condition
• Ship's roueting system can be established to improve safety of life at sea, safety and efficiency of system, and the protection of marine environment.

The "IMO Ships Routeing guide" Part B Sec II contains mandatory routeing system for any given area. So, we can know whether the roueteing system is mandatory or voluntary.

Explain the various roueting measures being followed as per 'Ships Routeing Guide"

Ques②:- State the elements of Ship's Routeing System (2 times) Jan 19, Aug 16

Ans:- Traffic Seperation scheme: It is a routeing measure for the seperation of opposite streams of traffic which is done by establishment of traffic lanes.

Traffic lane: It is an area with defined limits in which one-way traffic is established. Natural obstacles, including seperation zone will form a boundary.

Seperation zone or line: It is a zone or line seperating the traffic lane in which ship are proceeding in opposite direction; or seperating a traffic lane from adjacent sea area; or seperating a traffic lane for particular classes of ship.

Roundabout: It is a circular seperation zone and circular traffic lane within defined limits.

Inshore traffic zone: An area between the boundary of a Traffic seperation scheme (TSS) and the adjacent coast.

Recommended route: A route of undefined width, for the convenience of ships in transit, which is often marked by centreline buoys.

Deep water route: A route of defined limits for deep draft vessel where depth of the water is accurately surveyed.

Precautionary area: A route of defined limits where ships must navigate with particular caution and with the direction of flow.

Area to be avoided: An area of defined limits in which navigation is hazardous.

Ques③:- Describe the essential elements of ship reporting system and types of reports to be sent by vessel. (5 times)

Ans:- The essential elements of ship reporting system are:-
- to provide upto date information on shipping for search and rescue.
- For effective vessel traffic management service.
- For weather forecasting
- For prevention and containment of marine pollution.

Types of reports are as follows:
- Sailing Plan(SP): Before or as near as possible to the time of departure from a port.
- Position report(PR): When necessary to ensure the effective operation of the system.
- Deviation report(DR): When the ship's position varies from the position that would be predicted from the previous report; when changing the reported route as decided by master.
- Final report(FR): On arrival at destination and when leaving the area covered by a system.
- Dangerous good report(DG): When an incident takes place involving the loss of package dangerous goods including freight container, shipborne barges etc.
- Harmful substance report (HS): When an incident takes place involving the discharge of oil.
- Marine pollutant report(MP): When an incident takes place involving the marine pollutant identified in IMDG code.
- Any other report: Any other report should be made in accordance with the system procedures as notified in accordance with paragraph 9 of the General Principles.

Ques④: What is the importance of Ship Reporting systems for safe navigation?

Ans:-
- Ship reporting system contributes to safety of life at sea, safety and efficiency of navigation and the protection of marine environment.
- Ship reporting system also aims to control any unauthorized cargo movement. It helps to

07/05/2022

Keep a vigilant eye on the sea traffic

- The ship reporting system enables the SMC to identify vessels in the vicinity of a distress vessel including their position, course and speed.
- It also play a key role in environment protection.
- Ship reporting system enhances the maritime security. It helps to locate the vessel even when ship goes completly off on the basis of previous report.
- It allows the government to keep the track of all the vessels entering or leaving their sea areas.

Ques ⑤:- Explain how the ship reporting system provides the necessary information for search and rescue in case of distress.

Ans:-

- A ship reporting system enables the SMC to quickly:
  - identify vessels in the vicinity of a distress vessel including their position, courses and speed.
  - be aware of other information about the vessels, which may be valuable (whether a doctor is aboard etc.)
  - know how to contact the vessels.
- AMVER is a worldwide reporting system which support in Search & Rescue and make information available to all RCCs.
- It reduce response time to provide assistance.
- It reduce number of calls for assitance to vessels in distress.

Ques ⑥:- Write short notes on INSPIRES with respect to Ship Reporting System.

Ans:-

- The main objective of INSPIRES (Indian Ship position and information reporting system) is open ocean vessel management for security of all vessels navigating in the Arabian Sea/ Bay of Bengal.
- Indian Naval Communication center at Mumbai and vishakhapatnam in co-ordination with the DG shipping are functioning as a shore station for recieving the INSPIRES messages from all vessels.
- INSPIRES was introduced in 1986 for all Indian flagged vessel over 300 GRT and for all foreign flagged vessel over 100 GRT.
- All offshore vessels operating in offshore development area (ODA) in the

07/05/2022

Arabian Sea and Bay of Bengal having valid security clearance issued by DDAG and less than 20 years of age without any detention from PSC during the past one year may not require to send such report but are encouraged to participate in this system.

- The format of this report are prescribed in IMO resolution A.851(20) and special edition of Indian Notices to Mariners No 8.

Types of reports to be sent are as follows:

same as in Q.3.

08/05/2022

MANOEUVRING

Ques ①:- Define and explain

@ What is squat? State the factor that affect squat? (3 times)

Ans:- When ship proceeds in water, bow displaces the water ahead of her. In order to fill that place, the volume of water must return down the sides and under the bottom of the ship. This streamlines of return flow causes drop in pressure and reduction of buoyancy, resulting in the ship dropping vertically in water i.e. ship trim fwd & aft.

So, the overall decrease in static under keel clearance is called ship's squat

The factor which affect the squat is speed of the vessel & block coefficient

Squat is directly proportional to the square of the speed.

Squat is directly proportion to the block coefficient

$$\text{Squat} = \frac{C_b \times V^2}{50 \text{ (or } 100)}$$

(in confined water ← 50, 100 → in open water)

where, $C_b = \frac{\text{disp. of ship}}{L \times B \times D}$

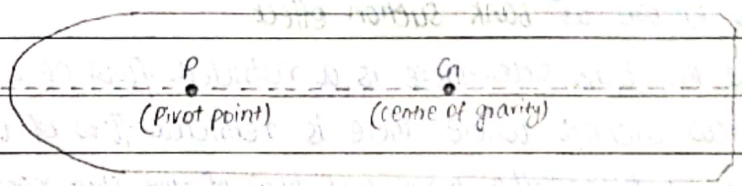
⑥ What do you understand by the term "PIVOT POINT"? (4 times)

Ans:- The pivot point is a point at which the ship rotates. It is a point at which turning effect of the vessel takes effect.

When a vessel is stopped, the pivot point normally lies at the ship's centre of gravity which is generally amidships, (assuming the vessel is on even keel and in calm weather)

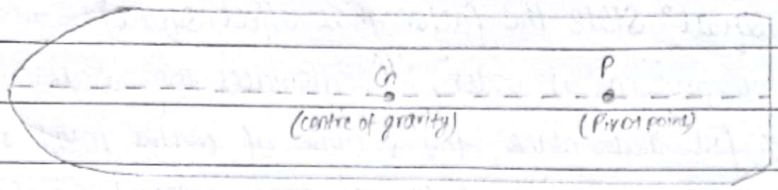
How does pivot point effect maneuvring of a vessel in following condition:

(i) When going ahead.



As the vessel moves forward using engine power, the pivot point will be pushed forward to the forward extreme of the vessel with the momentum of the vessel. However, due to the resistance faced by the water ahead, the pivot point will be pushed behind and it will come & settle at approx 0.25L from the forward.

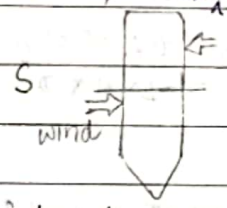
(iii) When going astern.



Similarly when the vessel is moving astern, the stern motion will cause the Pivot point to move aft & settle at a position approx 0·25L from the aft.

(iii) When effect of wind when vessel stopped.

- The effect of wind on a stopped vessel is different in different vessels. It depends on the exposed windage area (superstructure), loaded or ballast condition & trim of the vessel.
- A stopped vessel is affected by a beam wind. The wind will cause the vessel to drift to leeward. The hull will meet underwater resistance. If the vessel is trim by astern, the centre of resistance will be abaft midship.



* Effect of wind when moving ahead
When moving ahead, the pivot point is shifted forward, depending on wind strength, the bow will swing into the wind.
* Effect of wind when moving astern
When moving astern, the stern will swing into the wind.

(iv) When anchored.

When a vessel is at anchor, the pivot point moves right forward and effectively settles at a hawse pipe.

(c) What is bow cushion and bank suction effect?

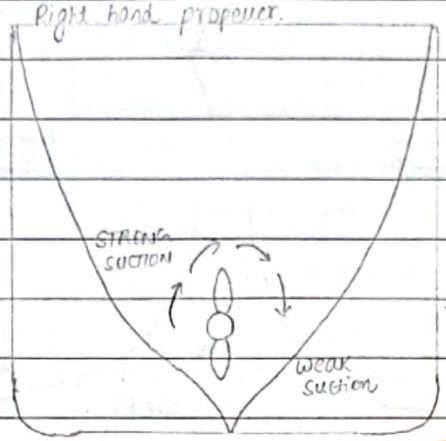
Ans:- In a narrow channal, when the ship moves near the bank, the bow of a ship is pushed away from the bank which is known as **bow cushion**. and the vessel is bodily attracted toward the bank, which occurs at the stern is known as **bank suction effect**

Since at the bank side, there is a restricted flow of water. As the ship enters the narrow channel where there is restricted flow of water, a high pressure is buildup between the bank and bow of the ship resulting in **bow cushion** & low pressure and increase in velocity of water in narrow channel between the vessel and the bank result in **bank suction effect**

08/05/2022

(d) Sketch and describe "transverse thrust" in a vessel with a right hand propelled in restricted water (6 times)

Ans:-



Transverse thrust is the tendency of a forward or aft running right handed propeller to move the stern to starboard or port.

When moving ahead:

- The effect of transverse thrust when moving ahead is very less in compare of when moving astern. It is very less noticeable.
- When moving ahead, transverse thrust is directed to starboard and the ship's turn to port i.e. stern moves to starboard and bow swings to port.

When moving astern

- Since the water pressure in the starboard will be higher than in the port because the water from the propeller blades is thrown upward in the starboard side and downward in the port side.
- So, when moving astern, transverse thrust is directed to port and the ship will turn to starboard i.e. stern moved to port and bow swings to starboard.

When turning: The vessel with a right hand turn propeller, if making a turn to port, will have a small turning circle than when turning to stbd due to transverse thrust.

Ques ②: Draw a turning circle diagram & define below mentioned associated terms:

(i) Advance

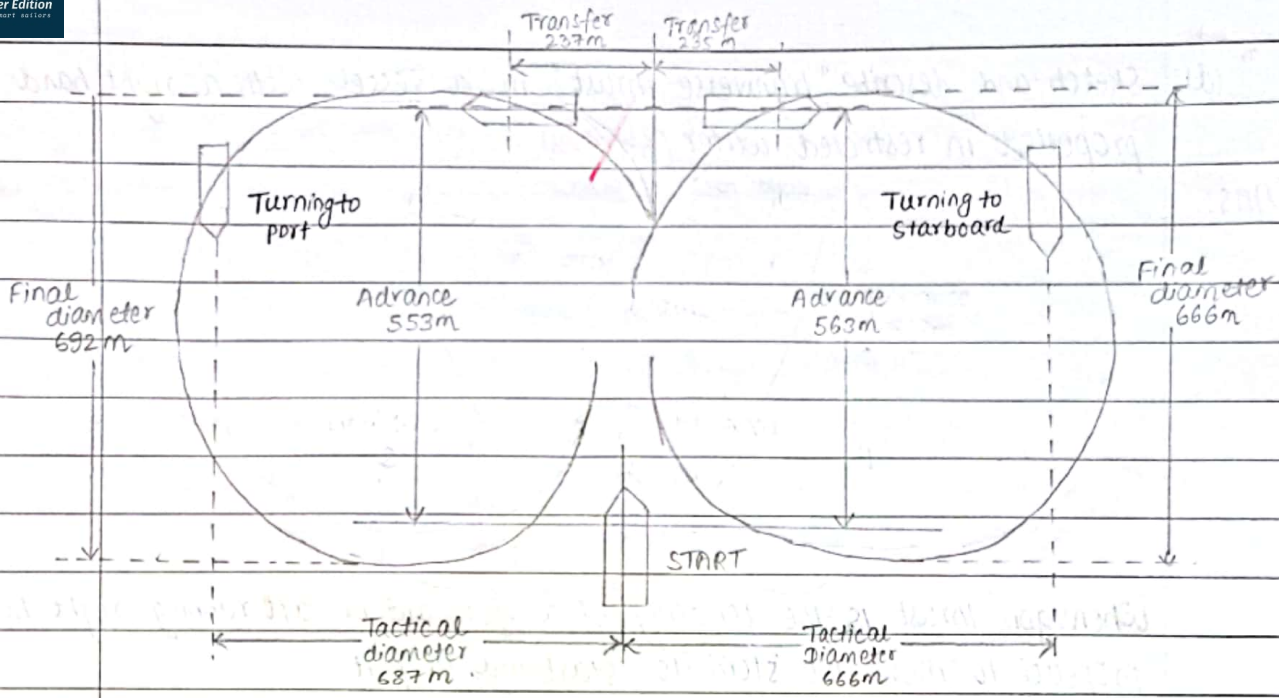
(ii) Transfer

(iii) TACTICAL diameter

(iv) Drift angle.

Ans:-

08/05/2022



Advance: It is the distance travelled by ship in the direction of original course from the position at which helm order is given to the position at which heading is changed by 90° from its original heading.

Transfer: It is the distance travelled by ship measured from original course line to the point at where the vessel has altered her course by 90°

Tactical diameter: It is the distance travelled by ship measured from original course line to the point at where the vessel has altered her course by 180°

~~When the vessel is trimmed by the stern, the tactical diameter of the turn is increased & vice versa.~~

Drift angle: This the angle between the ship's fore and aft line and the tangent to the turning circle (path on which it is turning). We can also say, it is the angle between the heading and the track.

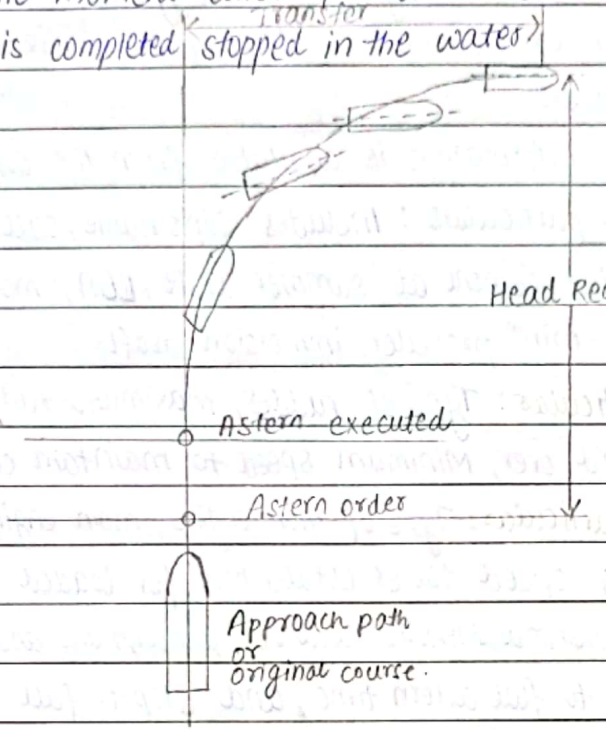
Ques ③:- Why is turning circle of a ship larger in shallow water? (2 times)

Ans:- The turning circle of a ship is larger in shallow water because shallow water causes an interaction between the hull and the seabed causing the vessel's head to yaw and it becomes difficult to steer. Shallow water affects the response time and hence it will increase the advance & transfer of turning circle.

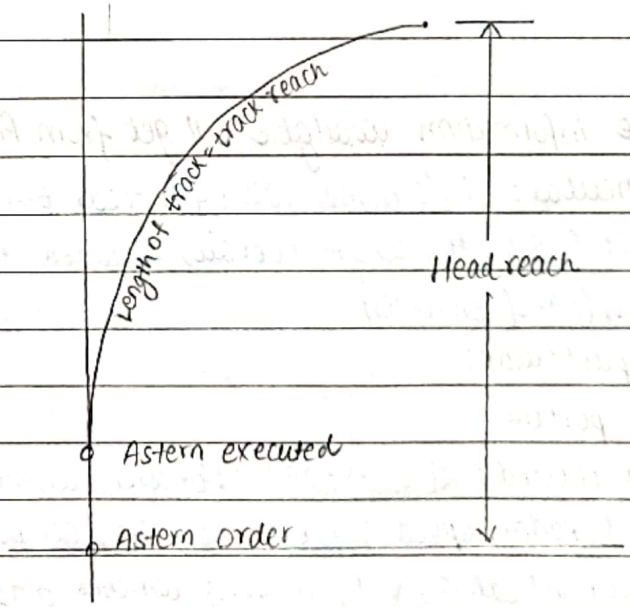
Ques ④:- With simple diagram, describe briefly, with respect to stopping distance, explain head reach & track reach. (3 times)

09/05/2022

Ans:- Head reach is the distance measured along the direction of the course from the moment when "full astern" command was given until the vessel is completed transfer stopped in the water.



Track reach is the distance measured along the vessel's track from the moment when "full astern" command is given until ahead speed changed sign.



Based on the IMO requirement, track reach should not generally exceed 15 ship length (measured along the path) by using full astern crash stop manoeuvre).

However, in low-powered large displacement vessel, this value may be modified but in no case should exceed 20 ship length.

08/05/2022

Ques(5):- With simple diagram, describe briefly: Maneuvring data displayed on the Bridge- (OR), Describe the maneuvring data displayed in the wheelhouse poster (6 times)

Ans:- The ship's maneuvring data is displayed in the wheelhouse known as wheelhouse poster.

The following information is available from the wheelhouse poster :-

- Ship's general particulars : Includes ship's name, call sign, gross tonnage, net tonnage, displacement at summer draft, LOA, moulded breadth, summer draft and min^m propeller immersion draft.
- Steering particular: Type of rudder, maximum rudder angle, time from hard over to hard over, Minimum speed to maintain course.
- Propulsion particular: Type of main engine, main engine power, type of propeller, maneuvring speed tables established for loaded & ballast condition with RPM for each movement, critical RPM, maximum and minimum revolutions, Full ahead to full astern time, and stop to full astern time.
- Turning circle at maximum rudder on either side for both loaded & ballast condition and in deep water as well as shallow water.
- Stopping capabilities including track reach and time taken for various ahead speeds.

Ques(6):- List all the information that you will get from Pilot card. (3 times)

Ans:-
- Ship's particular: Ship's name, call sign, year build, deadweight, displacement, draught fwd & aft, length overall, moulded breadth, anchor chain details (no. of shackles)
- Steering particular: Same as above
- Propulsion particular:
- Equipment checked: Ready for use: anchors, whistle, flags, X-band radar, S-band radar, speed log, echo sounder, compass, steering gear, rudder, RPM/ ROT indicators, VHF, mooring winches and lines.
- Equipment operational defects.
- Other important details.
- Master's name, date & sign.

Ques⑦:- What are the effects of following factor on the turning circle of a vessel.

ⓐ Draught

Ans:- The deeper the vessel is loaded more sluggish will be her response to the the helm. The vessel in light condition, at a shallow draught have the superstructure more exposed and more influenced by wind.

ⓑ Trim

The trim of the vessel influence the size of the turning circle. Ship usually keep trim by stern for the ease of handling purpose but if there is a trim by head, the turn circle would be less.

ⓒ List

When turning, a vessel is expected to make a larger turn when turning towards the list side. When turning away from the side of list, it makes a small turning circle.

ⓓ Speed

The turning circle will not be increased by a great margin with an increase in speed.

Shallow water effect

***

Ques⑧: Describe various shallow water effect a vessel experience on entering a narrow channel. (6 times)

Ans:- Shallow water means depth of water is less compared to the draft of the vessel. The effects on ship handling will be more when depth of water is less than 1.5 times of draft of the ship.

Those effects are as follows:

1. Maximum ship squat increases & ship will have some extra trim due to the squat effect.
2. Bow wave increases
3. The load on the engine increases.
6. The effectiveness of rudder helm decreases & ship become more sluggish to maneuvre.
4. The speed over water reduces.
5. Stopping distance and stopping time increases.

09/05/2022

- The turning circle diameter increases
- Rolling, pitching and heaving motion reduces as ship moves from deep water to narrow channel because of the cushioning effect
- The ship may start to vibrate suddenly.
- The appearence of mud could suddenly show in the water around the ship's hull

Ques⑨:- What smells the ground? Explain how it affect ship maneuvring?

Ans:-
- This occurs when a ship is near an extremly shallow depth of water, such as a shoal.
- The ship is likely to take a sudden sheer.
- The sheer is first towards the shallow, then violently away from it.
- The movement of ship suddenly becomes sluggish.
- These effects are called smelling the ground.

Ques⑩: List the factors to be taken into account when allowing for the UKC? (2 times)

Ans:-
- Hull sinkage and change of draft/trim
  - When going from sea water to dock water, the density of the water changes, which will cause change in mean bodily sinkage of ship.
  - The squat effect which will cause change in trim.
  - Increase in draft due to heaving, pitching and rolling motion.
- Company policy.
  The minimum requirement for UKC as per company SMS should be taken in account.
- Depth of water.
  - the least charted depth available to be checked.
  - accuracy of charted depth to be taken in account. - CATZOC
  - height of tide at the time of transit.
- Meteorological & oceanographical condition.
  - One millibar rise in atmospheric pressure increases water level by approx. One centimeter.
  - state of sea and swell.
  - the nature and stability of seabed

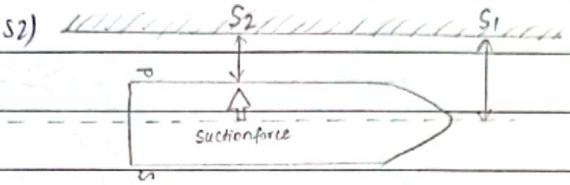
09/05/2022

Interaction effects

Ques (11): What is the effect on a vessel moving close to a solid wall or bank? Explain with neat sketches.

Ans:-

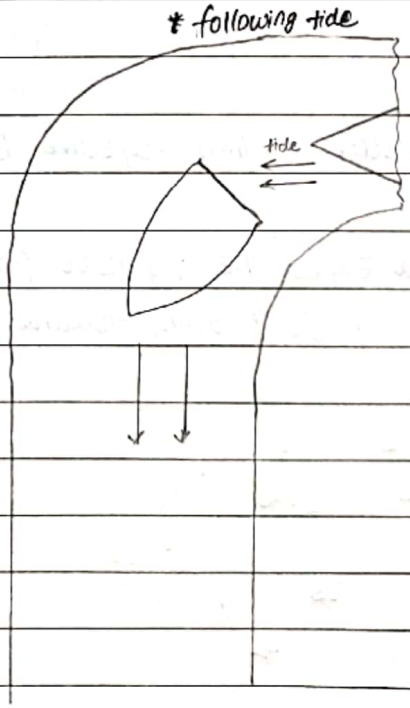
- When the ship is moving close to a solid wall or bank then there is a reduction of the flow cross section area between the ship and the bank (from S1 to S2)

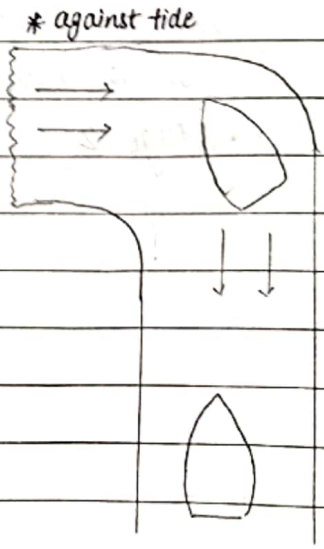


- the positive pressure along the bow of the vessel will cause bow to pushed away from the bank, even without using the helm. This effect is known as Bow cushioning effect
- Then there is suction force acting on a vessel which is directly proportional to the speed of the vessel and inversly proportional to the distance from the bank. (bank suction effect)

We use this suction force to the advantage

When executing a bend in a narrow channel with a following tide, it is advisable to keep the vessel to the inner (outer) bend, thereby making the (against) bank suction effect ineffective and bow cushion effect will keep the bow off the bank.





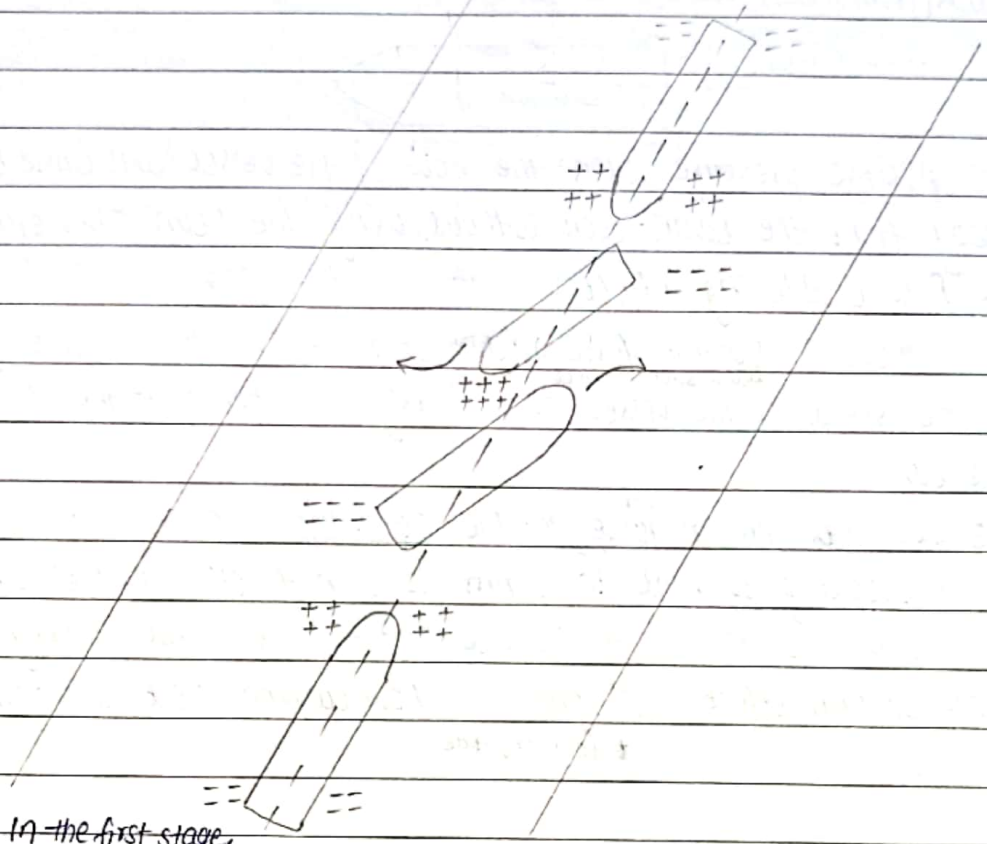
09/05/2022

Ques (12) :- Sketch and describe interaction in a narrow channel when

(a) two ship is approaching each other on head.

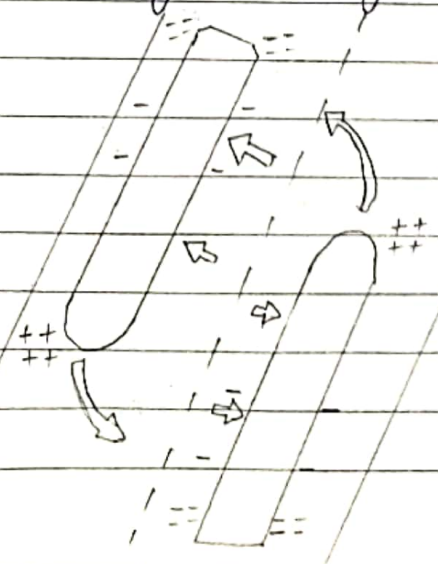
Ans :- Where two vessels are meeting head on in a narrow channel, there are three stages.

- Stage 1



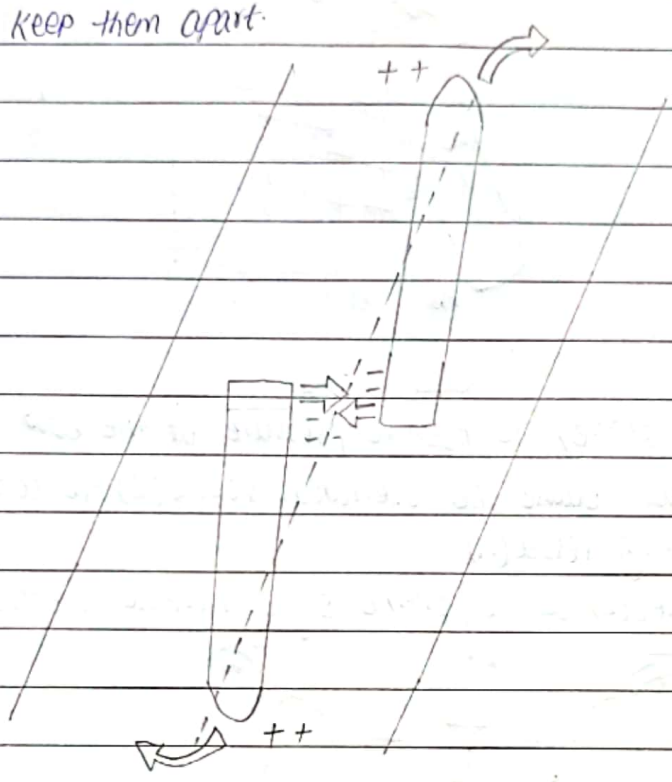
In the first stage,
Due to the positive pressure at their respective bows, both the vessel push each other away.
Both the vessel should expect the repulsive force and apply counter helm to ensure that they don't swing towards the bank.

- Stage 2



In the second stage, when both the vessels are abeam to each other, due to negative pressure along the midbody of both the vessel, they tend to get drawn close to each other. Hence, both the vessel's need to apply corrective helms to keep them apart.

• Stage 3



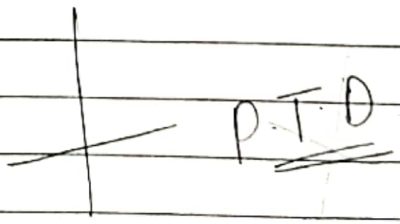
In the third stage, when stern of both the vessel are next to each other, due to the positive pressure at their sterns are tend to push them away from each other, resulting in their bow swinging back to the centre of the channel.

* These interaction is usually felt over a short duration of time when passing head on and the OOW need to be alert for quick response.

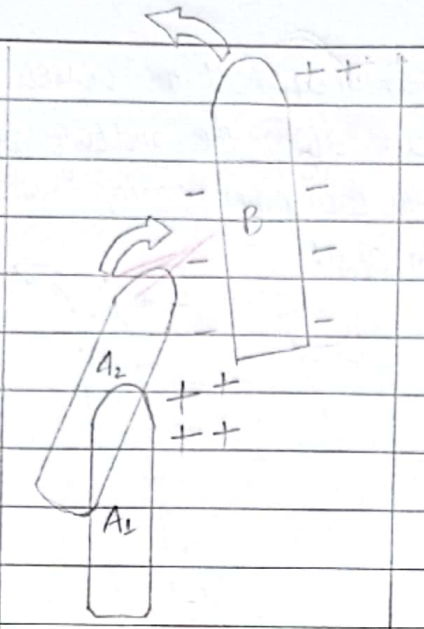
(b) one vessel is overtaking another (2 times)

Ans:- When one vessel is overtaking another vessel in a narrow channel, there are 3 stages.

• Stage 1

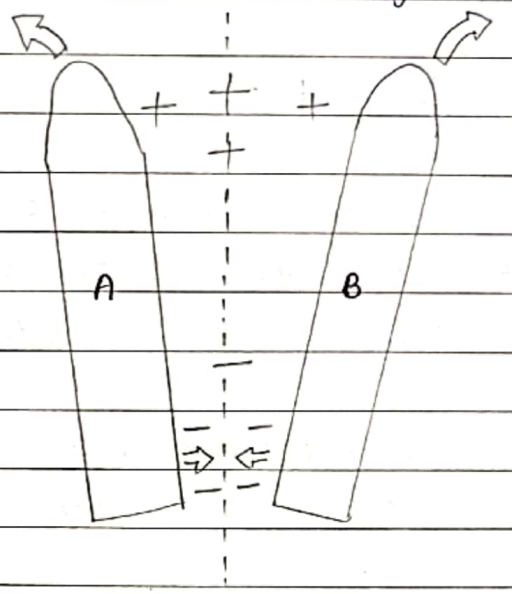


09/05/2022



In the first stage, the positive pressure at the bow of the overtaking vessel(A) will cause the overtaken vessel(B) to come into the path of the overtaking vessel(A).
Also the vessel(B) will experience slight increase in speed.

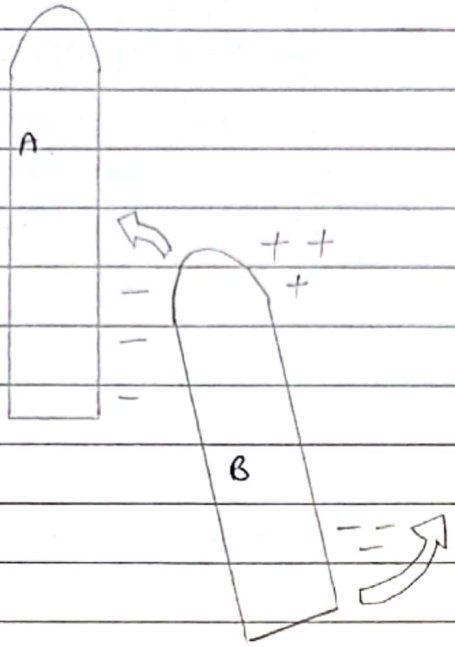
• Stage 2



In the second stage, when both the vessel are abeam to each other, the effect of the negative pressure along their body will be greater than when vessel is head on. Thus, the stern quaters gets attracted to each other resulting in bows getting pushed away from each other.

09/05/2022

• Stage 3



• In the third stage, when the overtaking vessel(A) is close to the forward end of overtaken vessel(B), the positive pressure at the bow of overtaken vessel(B) will cause the overtaken vessel(B) bow to come closer to overtaking vessel(A). The overtaken vessel(B) will also sense a bank effect.

• Also the vessel(A) will experience a slight increase in speed.