



**Arrival at the port.  
Pilotage.**

**Prior to arrival**



**Entering TSS**



**Calling for a  
Pilot**



**Preparation for a  
Pilot's boarding**



**Embarkation  
of a Pilot**



**Pilot on the  
bridge**

**Documents**

**Equipment to  
check and to be  
prepared**

# **Prior to arrival**

**Consult**

**Pre-arrival  
exchange of  
information**



## **B3** Preparation for arrival in port

- In preparing the passage for arrival in port, has a pre-pilotage information exchange taken place? (see annexes A1 and A2)
- Has the passage plan been updated following receipt of the Shore to Ship Pilot/Master Exchange form and all latest navigational warnings?
- Has the ETA been sent with all relevant information required by local regulations (e.g. details of dangerous/hazardous goods carried)?
- Is it necessary to rearrange cargo/ballast?

Has the following equipment been prepared and checked?

- course and engine movement recorders
- clock synchronisation
- communications with the engine control room and mooring stations
- signalling equipment, including flags/lights
- deck lighting
- mooring winches and lines including heaving lines
- pressure on fire main
- anchors cleared away
- stabilisers and log tubes housed, if fitted
- Has the steering gear been tested, and has manual steering been engaged in sufficient time for the helmsman to become accustomed before manoeuvring commences?
- Have the engines been tested and prepared for manoeuvring?
- Has the Pilot Card (see annex A3) been completed and are the pilot embarkation arrangements (see annex A5) in hand?
- Have VHF channels for the various services (e.g. VTS, pilot, tugs, berthing instructions) been noted and a radio check carried out?
- Has the port been made fully aware of any special berthing requirements that the ship may have?



# Before entering port limits it is usually necessary to consult:

- the passage plan and any associated notebook;
- any special instructions from Owners/time Charterers;
- any information about the port
- port approaches charts and harbour charts
- relevant sailing directions ('pilot books')
- *Guide to Port Entry*
- *Admiralty List of Lights*
- tide tables and tidal streams atlases
- *Admiralty List of Radio Signals*

# Documents for boarding officials

- pilot card;
- check list for vessels carrying dangerous or polluting goods;
- master's (customs) declaration;
- crew (customs) declaration;
- cargo declaration or manifest
- (in some countries) stores declaration; bunker declaration;
- cargo documents, e.g. Bs/L, W/Bs, DGH;
- up-to-date crew list (several copies) on the official form;
- all statutory and class certificates (preferably in clean plastic pockets in a binder);
- check list for pilot and harbour master;
- customs clearance from last port;
- Maritime declaration of Health



# Equipment to be prepared and checked:

- - course and engine movement recorders;
- - clock synchronization;
- - communications with the engine control room and mooring stations;
- - signalling equipment, including flags / lights;
- - deck lighting;
- - mooring winches and lines including heaving lines;
- - pressure on fire main;
- - anchors cleared away;
- - stabilizers and log tubes housed, if fitted.

# Pre-pilotage information exchange

- Ship sends the **Ship to Shore Master/Pilot Exchange form**
- **ETA** with all relevant information required by local regulations
- Update the passage plan following the receipt of the **Shore to Ship Pilot / Master Exchange form** and all latest navigational warnings.



# SHIP TO SHORE Master/Pilot Exchange

## SHIP IDENTITY

Name  Call sign  Flag   
Ship's agent  Year built  IMO No   
Cargo type  Ship type  Last port

## ADDITIONAL COMMUNICATION INFORMATION

Fax  Telex  Other

## PILOT BOARDING

Date/ETA  (UTC/LT) Freeboard   
Boarding station (if there is more than one)

## SHIP PARTICULARS

Draught fwd  Draught aft  Draught amidships  (salt water)  
Air draught  Length  Beam   
Displacement  Dwt  Gross  Net

## ANCHORS

Port anchor  Stbd anchor  (length of cable available)

## MANOEUVRING DETAILS AT CURRENT CONDITION

Full speed  Half speed   
Slow speed  Min. steering speed   
Propeller direction of turn  left/right Controllable pitch  yes/no  
Number of propellers  Number of fwd thrusters  Number of aft thrusters

## MAIN ENGINE DETAILS

Type of engine  motor/turbine/other  
Max. number of engine starts  Time from full ahead to full astern

## EQUIPMENT DEFECTS RELEVANT TO SAFE NAVIGATION



# SHORE TO SHIP Pilot/Master Exchange

## SHIP REQUESTING PILOTAGE DETAILS

Ship Name  Call sign

## ORIGINATING AUTHORITY

Contact name  VHF channel

Other means of contact

## PILOT BOARDING INSTRUCTIONS

Date/arrival time at pilot boarding station  (UTC/LT)

Position pilot will board

Embarkation side  port/starboard/TBA Approach course and speed

Requested boarding arrangement

## BERTH & TUG DETAILS

Intended berth and berthing prospects

Side alongside  port/starboard Estimated transit time to berth

Tug rendezvous position  Number of tugs

Tug arrangement  Total bollard pull

## LOCAL WEATHER AND SEA CONDITIONS at the pilot boarding station on arrival

Tidal information  (heights/times)

Expected currents

Forecast weather

## DETAILS OF THE PASSAGE PLAN including abort points/emergency plans



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bridge**

# ENTERING A TSS

**Contact the TOS to :**

- get the clearance
- receive traffic
- navigational and meteo information/warnings.



**MV Friendship: N. Traffic Organization Service. (3 times) This is MV Friendship (3 times) ABPO (3 times) On VHF channel 16. Over.**

**NTOS: MV Friendship. This is N T O S. Change to Channel 14. Over.**

**MV Friendship: N T S This is MV Friendship. Changing to channel 14. Over.**

**NTOS: MV Friendship. This is NTOS. How do you read? Over.**

**MV Friendship: NTOS. This is MV Friendship. I read you four. Question. Is it permitted to enter Traffic Lane? Over.**

**NTOS: MV Friendship. This is NTOS. Answer. Positive. You are permitted to enter Traffic Lane at time: 14.00UTC, position \_\_\_\_\_. Information. Traffic clearance granted. Over.**

**MV Friendship: NTOS. This is MV Friendship. Received. Positive. I will enter Traffic Lane at time: 14.00 UTC, position \_\_\_\_\_. Information Received. Traffic clearance granted. Over.**

**NTOS: MV Friendship. This is NTOS. Readback is correct. Navigational information. Warning. A vessel is aground, position: near SN-2 buoy. Visibility is reduced by fog.**

**Advice 1. Proceed with caution.**

**Advice 2. Keep clear of the vessel aground. Over.**

**MV Friendship: NTOS. Information Received. Vessel aground, position: near SN-2 buoy. Visibility is reduced by fog. Advice 1. Positive. I will proceed with caution. Advice 2. Positive. I will keep clear of the vessel aground.**

**Over.**

**NTOS: MV Friendship. This is NTOS. Readback is correct. Instruction.**

**Report at next way point \_\_\_\_\_ at time 14.30 UTC. Over.**

**MV Friendship: NTOS. This is MV Friendship. Instruction Received. I will report at next way point \_\_\_\_\_ at time 14.30 UTC.**

**Over.**

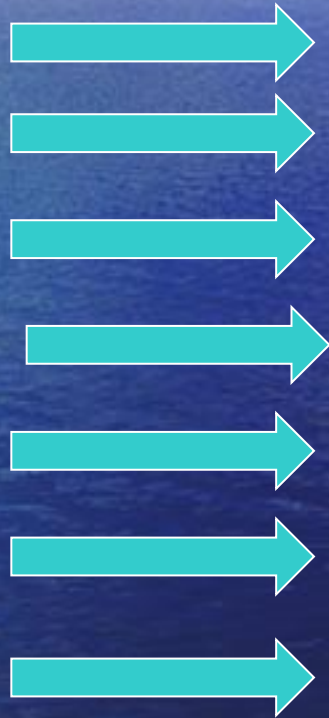
**NTOS: MV Friendship. This is NTOS. Readback is correct. Stand by on channel one four. Out.**



# Message Markers

## Message Markers

- Instruction
- Advice
- Warning
- Information
- Request
- Intention
- Question



## Responding message markers

- Instruction Received
- Advice Received
- Warning Received
- Information Received
- Request Received
- Intention Received
- Answer

# Message Markers

- **“Yes, ....”/“Positive .....** + the appropriate phrase in full. When the answer is affirmative
- **“No, ....”/“Negative,.....”** + the appropriate phrase in full. When the answer is negative



# Message Markers

- **“Stand by”** + the time interval within which the information will be available. When the information requested is not immediately available
- **“No information”** When the information requested cannot be obtained
- When an Instruction, an Advice or Request is given, if **in the affirmative**: **“I will / can ....”** + the instruction, advice or request respond, in full
- **“I will not / cannot ....”** + the instruction, advice or request respond, in full if **in the negative**

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# VTS

## Vessel Traffic Management

- provision of simple information messages
- extensive management of traffic within a port or waterway.

TM  
traffic management

means of TM :  
- Colregs  
- (TSS)

### 'passive' control

- written rules and regulations
- entering clearance into the VTS

Pilots have no basic objections

### 'active' control

'ad hoc' TM decisions' pilots do object unless specific procedures are followed

**Pilots - main users of a VTS**



**The task of pilots is  
to provide advice to a vessel  
whether on board a vessel or ashore**



# Calling for a Pilot

**Contact Pilot  
Station**

**Signals to be  
displayed for a  
pilot**

**Preparation for  
a Pilot's  
boarding**

**Informing  
ETA**

**In the Daytime**

**Confirmin  
g  
ETA**

**At night**

# THE USE OF ETA AND ETD IN PILOTAGE

- Proper ETAs and ETDs are essential for the operation of a pilotage service



- Human resources and technical means have to be planned quite a long time in advance (VTS, tugboats, linesmen, etc.)



# CALLING FOR A PILOT

- If pilotage is compulsory



- According to the "Guide to Port Entry" requirements



- 72/48/24 hours prior to arrival

# Signals to be displayed for a pilot

## In the Daytime:

- The International Code Signal "G"  
"I require a pilot"

## At night:

- The pyrotechnic blue light every 15 minutes.
- A bright white light, flashed or shown at short or frequent intervals above the bulwarks for about a minute at time.
- Signal "G" by flashing.



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**Pilot on the  
bridge**

- discharge, n – выпуск, спуск
- provision, n – условие
- access, n – доступ, проход, подход
- comply with, v – подчиняться (правилам)
- stiffness, n – жесткость, твердость, крепость
- durability, n – длительность, прочность, стойкость
- stanchion, n – стойка
- bulwark-stanchion, n – стойка фальшборта
- guard-stanchion, n – леерная стойка
- fall – лопарь (талей), ходовой конец (лопаря), фал
- bulwark, n – фальшборт
- slope, n – склон, наклон, скат
- attach, v – присоединять
- guard ring, – мерное кольцо
- guard rail, – поручень, наружный привальный брус
- adjacent, adj – примыкающий



Annex A 5  
Part A of  
ICS Bridge  
Procedures  
Guide

a pilot ladder

1 metre above  
water

bulwark ladder

loop

Handhold  
stanchions

equally spaced  
(about ladder steps)

man ropes

# Preparation for a Pilot's boarding

keep ready  
for use

lifebuoy

self-igniting light

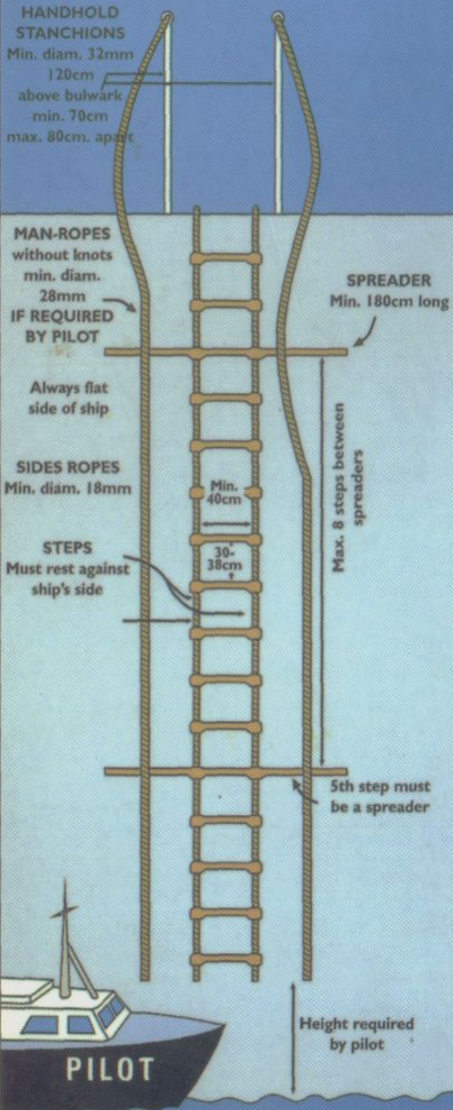
safety line

proper  
illumination

torch

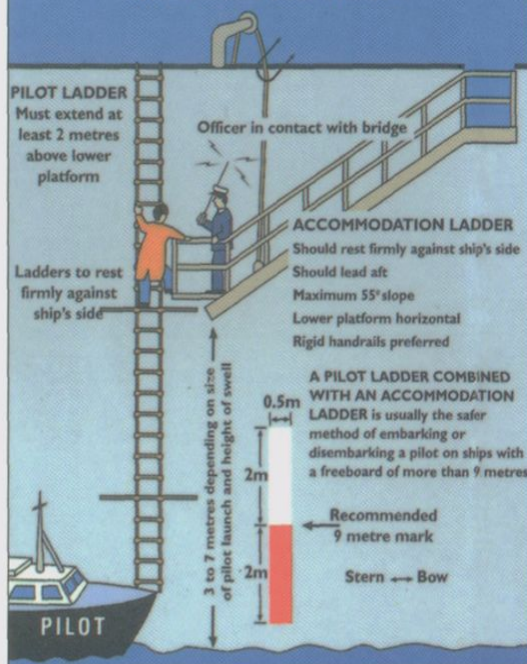


## RIGGING FOR FREEBOARDS OF 9 METRES OR LESS

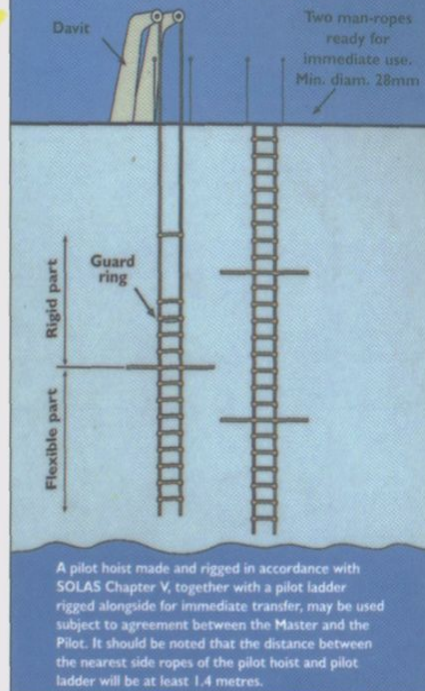


## SHIPS WITH HIGH FREEBOARD (MORE THAN 9M)

When no side door available



## MECHANICAL PILOT HOIST



**NO!**

No shackles  
No knots  
No splices

**NO!**

The steps must be equally spaced

**NO!**

The steps must be horizontal

**NO!**

Spreaders must not be lashed between steps

**NO!**

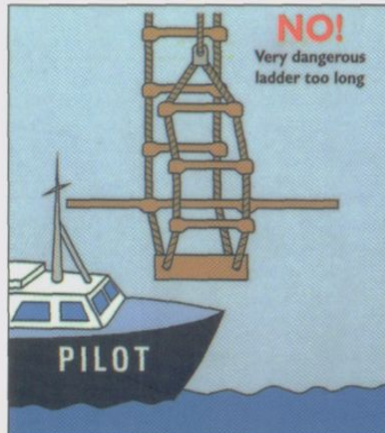
The side ropes must be equally spaced

**NO!**

The loops are a tripping hazard for the pilot and can become foul of the pilot launch

**NO!**

Very dangerous ladder too long

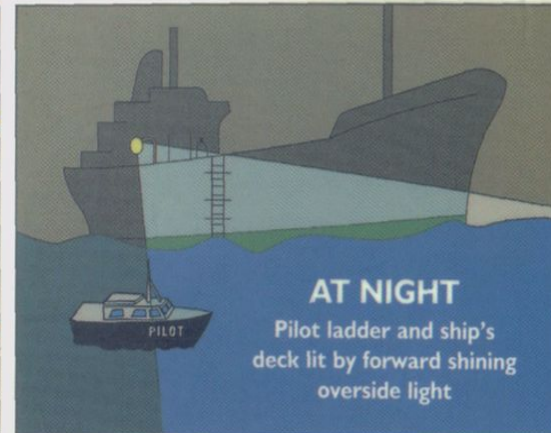


Two handhold stanchions rigidly secured to ship's structure



**AT NIGHT**

Pilot ladder and ship's deck lit by forward shining overside light





# Pilot ladders

- positioned and secured clear of any discharges from the ship
- each step rests firmly against the ship's side
- The steps should be of equivalent strength, stiffness and durability
- secured horizontally
- equally spaced not less than 300mm or more than 380mm apart
- If more than five steps ---- spreader steps not less than 1.80m long

# Ropes

- The side ropes should consist of two ropes not less than 18mm in diameter on each side
- Two man-ropes not less than 28mm in diameter properly secured to the ship should be kept at hand ready for use



# Accommodation ladders used in conjunction with pilot ladders

- the lower end of the ladder should rest firmly against the ship's side
- The length of the accommodation ladder should be sufficient to ensure that its angle of slope does not exceed  $55^{\circ}$ .
- The lower platform should be in a horizontal position
- The ladder and platforms should be equipped on both sides with stanchions and rigid handrails
- The pilot ladder should be rigged immediately adjacent to the lower platform of the accommodation ladder
- the upper end should extend at least 2m above the lower platform.

# Mechanical pilot hoists

- Should be of a type approved by the Administration
- Should be designed to operate as a moving ladder
- Two separate wire falls should be used
- The rigid ladder part should be not less than 2.50m in length
- Below the rigid part a section of flexible ladder comprising eight steps should be provided



# Associated equipment

- A lifebuoy equipped with a self-igniting light
- A heaving line should be kept at hand ready for use.
- Lighting should be provided so that both the pilot ladder over side and the position where the pilot embarks or disembarks are adequately lit.



## B4 Pilotage

Immediately on arrival on the bridge, has the pilot been informed of the ship's heading, speed, engine setting and draught?

Has the pilot been informed of the location of lifesaving appliances provided on board for his use?

Have details of the proposed passage plan been discussed with the pilot and agreed with the master, *including*

radio communications and reporting requirements

bridge watch and crew stand-by arrangements

deployment and use of tugs

berthing/anchoring arrangements

expected traffic during transit

pilot change-over arrangements, if any

fender requirements

Has a completed Pilot Card (see annex A3) been handed to the pilot and has the pilot been referred to the Wheelhouse Poster? (see annex A4)

Have the responsibilities within the bridge team for the pilotage been defined and are they clearly understood?

Has the language to be used on the bridge between the ship, the pilot and the shore been agreed?

Are the progress of the ship and the execution of orders being monitored by the master and officer of the watch?

Are the engine room and ship's crew being regularly briefed on the progress of the ship during the pilotage?

Are the correct lights, flags and shapes being displayed?

Other checks:



# PILOT CARD

## SHIP'S PARTICULARS

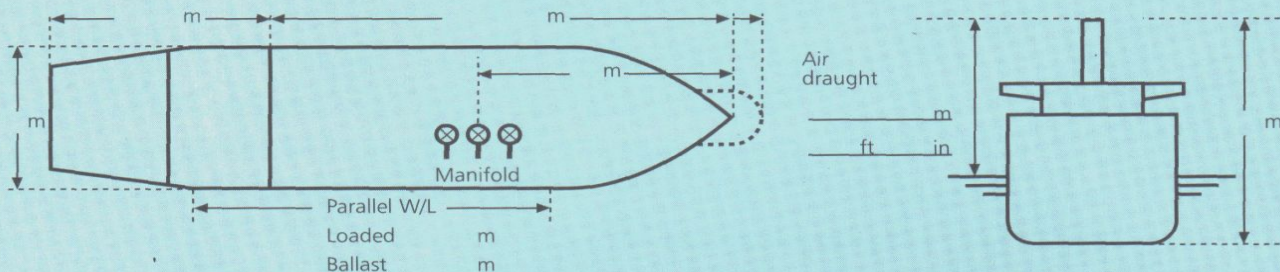
Name  Call sign

Displacement  (tonnes) Deadweight  (tonnes) Year built

Length OA  (m) Breadth  (m) Bulbous bow:  yes/no

Draught fwd  (m) Draught aft  (m) Draught amidships  (m)

Port anchor  (shackles) Stbd anchor  (shackles) (1 shackle=27.4 m/15 fathoms)



## ENGINE

Type of engine  Maximum power  (kW)  (HP)

	rpm/pitch	loaded speed	ballast speed
Full ahead	<input type="text"/>	<input type="text"/> (kts)	<input type="text"/> (kts)
Half ahead	<input type="text"/>	<input type="text"/> (kts)	<input type="text"/> (kts)
Slow ahead	<input type="text"/>	<input type="text"/> (kts)	<input type="text"/> (kts)
Dead slow ahead	<input type="text"/>	<input type="text"/> (kts)	<input type="text"/> (kts)
Dead slow astern	<input type="text"/>		
Slow astern	<input type="text"/>		
Half astern	<input type="text"/>		



## STEERING

Rudders  (number)  (type) ° (maximum angle)

Time hard-over to hard-over  (sec) Rudder angle for neutral effect °

Propellers  (number) Direction of turn  left/right Controllable pitch  yes/no

Thrusters  (number) Bow power  (kW/HP) Stern power  (kW/HP)

Steering idiosyncrasies

## EQUIPMENT CHECKED AND READY FOR USE

Anchors  Cleared away  yes/no

Whistle

Flags

X-Band radar  ARPA  yes/no

S-Band radar  ARPA  yes/no

Speed log   Water/Ground  single axis/dual axis

Echo sounder

Electronic position-fixing  Type

Compass system  Gyro compass error °

Steering gear  Number of power units in use

Rudder/RPM/ROT indicators  Engine telegraphs

VHF

Mooring winches and lines

## EQUIPMENT OPERATIONAL DEFECTS



# WHEELHOUSE POSTER

Ship's name..... Call sign.....Gross tonnage.....Net tonnage.....

Max displacement.....tonnes, and Deadweight.....tonnes, and Block coefficient.....at summer full load draught

Draught at which the manoeuvring data were obtained

Loaded	Ballast
Trial/Estimated	Trial/Estimated
___m forward	___m forward
___m aft	___m aft

## STEERING PARTICULARS

Type of rudder(s) \_\_\_\_\_  
 Maximum rudder angle \_\_\_\_\_ °  
 Time hard-over to hard-over \_\_\_\_\_ s  
 with one power unit \_\_\_\_\_ s  
 with two power units \_\_\_\_\_ s  
 Minimum speed to maintain \_\_\_\_\_ knots  
 course propeller stopped \_\_\_\_\_ knots  
 Rudder angle for neutral effect \_\_\_\_\_ °

## ANCHOR CHAIN

	No. of shackles	Max. rate of heaving (min/shackle)
Port		
Starboard		
Stern		

(1 shackle = \_\_\_mV\_\_\_ fathoms)

## PROPULSION PARTICULARS

Type of engine _____ kW (___ HP). Type of propeller _____		Speed (knots)	
Engine order	Rpm/pitch setting	Loaded	Ballast
Full sea speed			
Full ahead			
Half ahead			
Slow ahead			
Dead slow ahead			
Dead slow astern		Critical revolutions ___rpm Minimum rpm ___knots	
Slow astern		Time limit astern ___rpm Time limit at min. rev. ___rpm	
Half astern		Emergency full ahead to full astern ___s Stop to full astern ___s	
Full astern		Astern power ___% ahead Max. no. of consecutive starts ___	

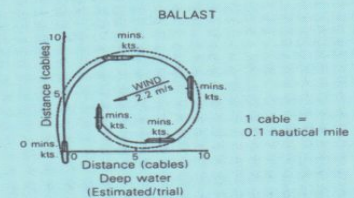
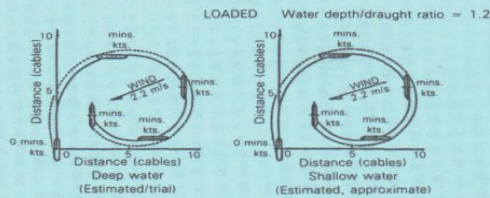
## THRUSTER EFFECT at trial conditions

Thruster	kW (HP)	Time delay for full thrust	Turning rate at zero speed	Time delay to reverse full thrust	Not effective above speed
Bow		s	*/min	min s	knots
Stern		s	*/min	min s	knots
Combined		s	*/min	min s	knots

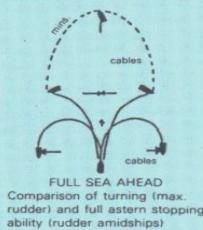
## DRAUGHT INCREASE (LOADED)

		Estimated Squat Effect		Heel Effect	
Under keel clearance	Ship's speed (knots)	Max. bow squat estimated (m)	Heel angle (degree)	Draught increase (m)	
m			2		
			4		
			8		
m			12		
			16		

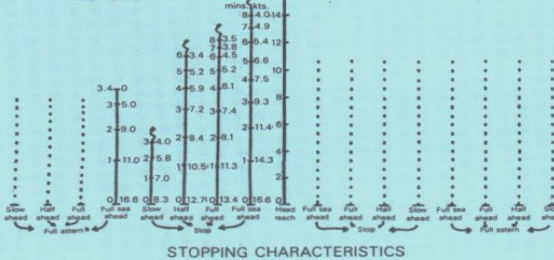
## TURNING CIRCLES AT MAX. RUDDER ANGLE



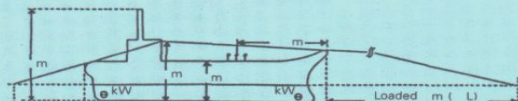
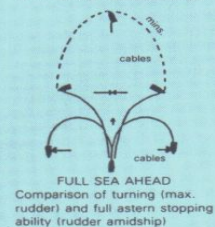
## EMERGENCY MANOEUVRES



## STOPPING CHARACTERISTICS



## EMERGENCY MANOEUVRES



## MAN OVERBOARD RESCUE MANOEUVRE

- SEQUENCE OF ACTIONS TO BE TAKEN
- TO CAST A LIFEBUOY
  - TO GIVE THE HELM ORDER

# Use of Tugs in Pilotage Operations

**Types of  
Tugs**

**Use and  
Effectiveness**

**Methods  
of tug  
assistance**



# Types of tugs depend on:

- the sort of port
- the future developments
- the geographical environmental conditions
- the type of ships calling at the port
- the services required in and around the port

# Types of tugs

- **single-screw tugs** -less manoeuverability
- **twin-screw tugs** - better manoeuvrable
- **tractor-type tugs** – with propellers under the fore end of the tug
- **tugs with Z-pellers aft** - have better manoeuvrability, suitable for towing on a line and for the push-pull method



# Methods of tug assistance

- **towing on the hook, bitt or winch;**
- **pushing;**
- **push-pull;**
- **towing alongside.**

# HYDROGRAPHIC SURVEYING IN PORT AREAS

- confined, adj – ограниченный, тесный, узкий, заключенный
- stem, v – удерживать судно на курсе против течения или ветра
- bathymetric, adj – батиметрический, глубинный
- bathymetry, n – батиметрия, измерение глубин
- scope, n – диапазон, область действия, протяженность
- siltation, n – засорение илом
- dissemination, n – распространение, рассеивание, разбрасывание
- sheer, n – кривизна, изгиб, рыскание, резкое отклонение от курса
- imply, v – заключать в себе, значить, подразумевать, намекать
- assimilate, v – уподоблять, приравнивать, сравнивать
- sheet, n – шкот, широкая полоса, обширная поверхность воды
- thrust, v – толкать, пробивать, протискиваться, взрывать
- derive, v – происходить, производить, получать, извлекать
- fluid, adj – жидкий, текучий
- distinctive, adj – отличительный, характерный



# HYDROGRAPHIC SURVEYING IN PORT AREAS

The main objective:

to keep pilots informed  
of the latest changes in depths and  
other hydrographic matters

# **The frequency of surveys depend on**

- **the size of the port,**
- **the pattern of traffic**
- **stability of the sea bed within the  
area**



# Surveys to be carried out:

## Essential information

- Bathymetry
- The height of tide
- The set of currents
- The position and scope of buoys
- The topography of jetties and other berths

## To be concerned but not directly

- wreck investigation
- dredging
- accident investigation
- environmental matters such as siltation and pollution

# UNDERKEEL CLEARANCE

- swell, n – зыбь, накат ветровых волн, волнение
- squat, n/v – увеличение осадки кормой на ходу, садиться кормой на ходу
- yawing, n – рыскание, рыскливость
- heaving, n – вертикальная качка
- swaying, n – поперечно-горизонтальная качка, поперечное рыскание, боковой снос
- surging, n – продольно-горизонтальная качка, продольное рыскание, продольный снос
- trim, n, v – дифферент, дифферентовка, удифферентовывать
- longitudinal, adj – продольный, продольное сечение
- (centre of) buoyancy – плавучесть, сила плавучести, архимедова сила
- equal, v – равняться, быть равным (*мат*)
- heel, n – пятка киля, (статический) крен, угол крена
- crest, n – гребень (волны)
- trough, n – впадина



# UNDERKEEL CLEARANCE

**Reduction  
Factors**

**Sheltered-Water  
Effects**

**Non-Sheltered-  
Water Effects**

**Squat**

**the ship under way does not  
respond to the sea or swell**

**change of  
density**

**Heel  
due to  
windage**

**Heel  
when  
turning**

# Sheltered-Water Effects

- **Change of density** is associated with bodily sinkage and a change of trim when the ship moves from salt to fresh water
- **Squat** is associated with shallow water, involving bodily sinkage and change of trim
- **Heel** when turning is proportional to speed<sup>2</sup> and inversely proportional to the radius of turn. Associated with fast container ships and ferries.
- **Heel due to windage** –ships with high windage area and small righting moment may be expected to heel over like sailing ships in a strong wind.



# Non-Sheltered-Water Effects

- the effects of the rotations and translations of the ship's null point in response to the sea, are observed in severe weather in waves of length about the ship' length in the larger ships or spending some time 'cruising' on smaller boats.

# ANCHORING

## Documents

Anchoring Plan

Anchor Watch  
Check List

## Equipment to be ready and checked

Anchors

Chains

## At anchor

Lights and  
shapes

Anchor watch



# Documents to be prepared and worked with

- **Anchoring and Anchor Watch Check List** contains recommendation for preparing anchoring plan and actions and responsibilities of the OOW while at anchor
- **Anchoring Plan** contains information on:
  - A. RPE-OP MAINTENANCE
  - B. PRE-OP PLAN - ENVIRONMENT
  - C. PRE-OP PLAN – TRAINING
  - D. THE APPROACH TO THE ANCHORAGE
  - E. THE ANCHORING OPERATION – AIDE MEMOIRE

# Anchoring checklist

<b>A. RPE-OP MAINTENANCE</b>	Yes	No
<p>1. Has the windlass been tested within the last 30 days? <i>If NO, then extra care needs to be taken.</i></p> <p>2. Has maintenance been done as per the maker's instruction book? <i>If there are NO instructions, do the following:</i></p> <ul style="list-style-type: none"><li>)Ensure the brake lining is 7mm or more.</li><li>)Ensure the brake drum is smooth, with no build up of rust or resin.</li><li>)Ensure ALL bearings and joints are FULL of grease, with no grit or rust in.</li><li>)Ensure that hydraulic oil is at the correct level (if applicable).</li><li>•Ensure hydraulic are clean, with no metal particles in.</li><li>•Ensure the brake lead crew and nut are clean and greased.</li></ul> <p>3. Have the owners' managers' instructions been read?</p> <p>4. These instructions should be in accordance with the maker's instructions. Are they?</p> <p>5. Are the brake adjustments in the middle of the range? <i>If NO, then operation is near the edge of permissible limits.</i></p>		



# B. PRE-OP PLAN - ENVIRONMENT

1. Is the depth less than 82 metres absolute maximum/  
Unless your ship is specially equipped, this is the class limit.
2. Is the depth less than the owners stipulated depth for using the brake?  
If more than owners stipulated depth then walk back, using the brake also.  
*Never walk back without using the brake also*  
*If no instructions, regard 60 metres as the limit for brake only*
3. Is the nearest grounding line more than 1 mile away?  
*Allowing for the tide go down*
4. Is the weather/tide NOT onshore? or drag will result in grounding.  
*If the weather is onshore and anchorage close, do not anchor.*
5. Is the sea bed suitable? *Not rock or coral, e.g. Tokyo Bay.*
6. Is there enough room to turn 180<sup>0</sup>/360<sup>0</sup>?
7. Is the wind less. than 28 knots?  
Is the current less than 3 knots?  
*These are Classification Society limits. You may trade wind for current: i.e. 1 knot current = 9 knots wind.*
8. Is the sea sufficiently calm? *Excess motion of the hull.*

# C. PRE-OP PLAN – TRAINING

1. Have the foc'stle crew had training and are they certificated through the company's training scheme? *Windlass = primary lifting gear.*
2. Has a pre-op briefing been held so that they understand that:
  - a) There should be 2 men on the controls, particularly the brake.
  - b) One man to apply grease to gears when heaving.
  - c) The orders that will come from the bridge.
  - d) The cable will be walked back when at 2 knots to just above the bottom = the DIRECT method by 'U'-turn,  
OR

When stopped to just touch the bottom = the TENTATIVE method.

- e) The cable will be veered in one go. *On the beam, 90<sup>0</sup> to the fore and aft line, Because forces on the windlass are 20 times less this way, Approximately 3.5 times for inertia and 6 times for added scope.*
- f) The stopper will be put on and securing pin engaged whilst the cable is still up and down. Because this is the windlass makers and class requirement.



# D. THE APPROACH TO THE ANCHORAGE

1. Are there any other ships at anchor to indicate tide/wind?
2. Is there a suitable anchoring space, not in the fairway?
3. Is there a clear, safe passage to the space?
4. Is the space clear of the fairway? (e.g. Sheldt, Ulsan are not good)
5. If the anchorage is empty with a strong current, do you know the direction of the current? (e.g. Withnell Bay, West Australia)
6. Is the chosen space accessible for bunker barges/launches/etc?

# E. THE ANCHORING OPERATION – AIDE MEMOIRE

1. Choose a suitable speed of approach for the traffic/sea room.
2. If 'U' turn, approach at  $180^0$  to the final heading.

## **The 'U' turn method**

**3(u)** 'U' turn – start the turn when the bow is abreast of the planned bow final position, full rudder. Speed is not important.

**4(u)** Once the turn is started, stop engine.

**5(u)** When speed is 2 knots, start to walk the anchor out to above the sea bed. Use the anchor on the inside of the turn.

**6(u)** When the ship has canted  $135^0$  she will be virtually stopped. Adjust the angle to the weather to suit the strength of the tide and wind.

**7(u)** With the bow moving slowly sideways, let go/walk back with the brake to 3.5 to 4 times the depth, 5 times if possible.

**8(u)** Put the stopper on and engage securing pin with the cable up and down. Do not attempt to bring the ship up on the motor – doing so is against the maker's and class limits.

**9(u)** Ensure the ship is brought up with the cable abeam before allowing the cable to draw ahead



# The 'tentative' method

- |   |  |  |
|---|--|--|
| <p><b>3(t)</b> Approach the anchorage slowly, angling to the weather 20 - 90<sup>0</sup></p> <p><b>4(t)</b> Start walk back at 2 knots, to avoid the anchor banging on the hull. Use the anchor on the weather side, not the lee side.</p> <p><b>5(t)</b> When the ship is stopped, walk back the anchor to just touch the sea bed. The foc'stle crew observe the lead, informing the bridge when leading out on the beam and clear of the hull.</p>  |  |  |
| <p><b>6(t)</b> When the cable is leading in the desired direction, let go/walk back to the required scope – 3.5 to 4 times the depth, 5 times if possible.</p> <p><b>7(t)</b> Put the stopper on and engage the securing pin with the cable up and down.</p> <p>Do not attempt to bring the ship up on the brake or the motor – doing so is against the maker's and class limits.</p> <p><b>8(t)</b> Ensure the ship is brought up with the cable abeam before allowing the cable to draw ahead, for inertia and scope reasons, the same as for the 'U' turn.</p> <p>In both cases, when the depth is shallow and the bottom is soft, practice letting go the anchor from the hawse pipe. In an emergency you will have to.</p> |  |  |

# B8 Anchoring and anchor watch

- *Has an anchoring plan been prepared taking into account*
- speed reduction in ample time
- direction/strength of wind and current
- tidal stream when manoeuvring at low speeds
- need for adequate sea room particularly to seaward
- depth of water, type of seabed and the scope of anchor cable required
- Have the engine room and anchor party been informed of the time of 'stand-by' for anchoring?
- Are the anchors, lights/shapes and sound signalling apparatus ready for use?
- Has the anchor position of the ship been reported to the port authority?



# B8 Anchoring and anchor watch

## While at anchor, the OOW should

- determine and plot the ship's position on the appropriate chart as soon as practicable
- when circumstances permit, check at sufficiently frequent intervals whether the ship is remaining securely at anchor by taking bearings of fixed navigation marks or readily identifiable shore objects
- ensure that proper look-out is maintained
- ensure that inspection rounds of the ship are made periodically
- observe meteorological and tidal conditions and the state of the sea
- notify the master and undertake all necessary measures if the ship drags anchor
- ensure that the state of readiness of the main engines and other machinery is in accordance with the master's instructions
- if visibility deteriorates, notify the master
- ensure that the ship exhibits the appropriate lights and shapes and that appropriate sound signals are made in accordance with all applicable regulations
- take measures to protect the environment from pollution by the ship and comply with applicable pollution regulations

# Anchoring


- Anchoring to a single anchor
- Amount of cable to use
- Duties at anchor
- Dragging anchor
- Weighing anchor
- Anchoring near a danger
- Anchoring on a shoal
- Choosing a Position in which to Anchor
- Anchor Watch



# Anchors and chains

- Anchor fluke chock- якорная подушка
- Bitter- шлаг троса, обнесенный на кнехт
- Bitts- кнехт, битсы
- Chock – подклинивать, заделывать чаками
- Embed – вставлять, врезать
- Fluke – лапа якоря
- Shank- веретено(якоря)
- Slot- паз, щель. канавка
- Snug- гнездо (в цепном барабане)
- Spile-плазовая рейка с карандашом
- Stud- распорка(звена, цепи)
- Tensile strength-предел прочности на разрыв
- Tripping palm- прилив для разворота лап якоря

# Anchors and chains

- stocked anchor
  - stockless anchor
  - Sea going vessels are usually *equipped* with *stockless anchors*: two *bower anchors*, a stern anchor for manoeuvring the ship when she is "*dredging anchor*", and a spare anchor.
  - shackles
- 
- stud-links
  - open links

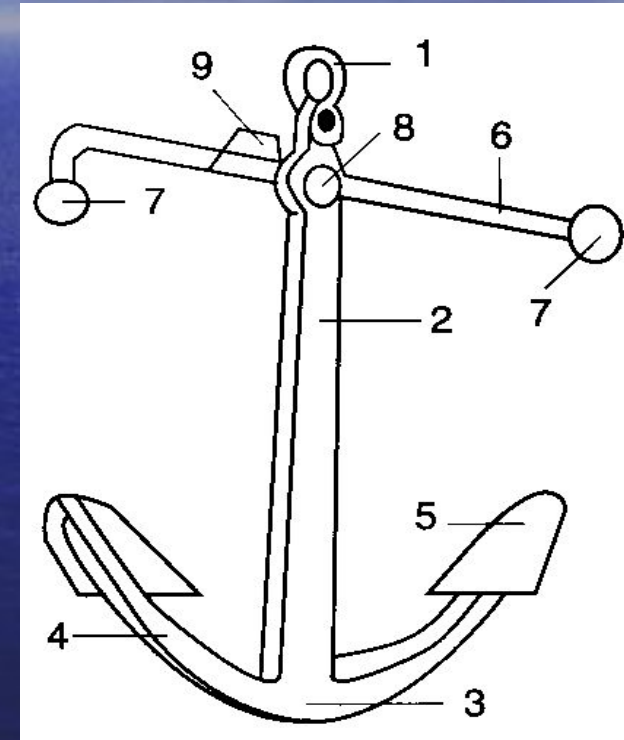


# Anchors and chains

- The **stocked anchor** consists of a *puddening* (1), a *shank* (2), a *crown* (3), *arms* (4), *flukes* (5), a *stock* (6), *anchor nuts* (7), *breastpiece* (8) a *forelock* (9).

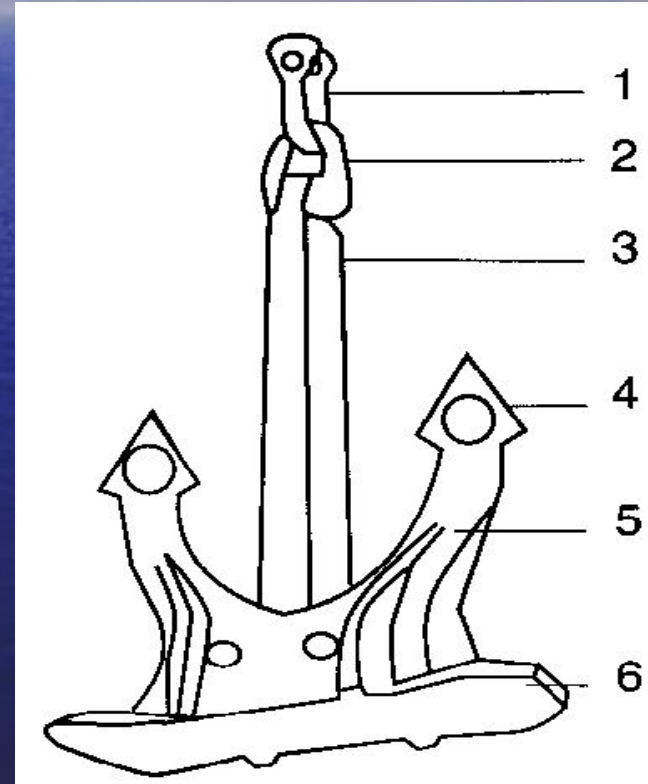
## The disadvantages of a stocked anchor:

- it cannot be stored in the vessel's *hawse* because of the stock;
- one of its flukes will always point upwards, which makes this anchor very *vulnerable* to being *fouled*.



# Anchors and chains

- The **stockless anchor** consists of an anchor *shackle* (**1**), a *puddening* (**2**), a *shank* (**3**), *flukes* (**4**), *arms* (**5**), and *shoulders* (**6**).
- can be stored in the vessel's hawse.
- both flukes will bite the seabed.

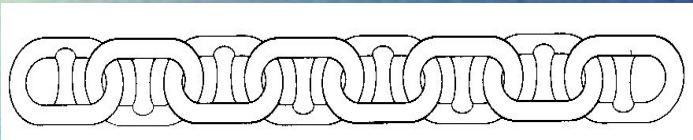




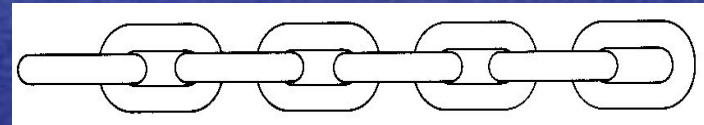
# Anchor chains

Made up of lengths of 15 fathoms each  
"shackles" →

- Stud-link chain



- Open-link chain



- for strength and prevent the cable from turning (kinking).

The joint between two lengths of 15 fathoms is also called a **shackle.**

# ANCHORING

- When the vessel is *approaching* the *anchorage* or her *designated berth* the *anchor gear* must be checked and prepared:
- *windlass* and *hinging parts* - *grease*,
- *handbrakes* - *test*,
- *hawse pipe-closing plates* - *remove*



# AMOUNT OF CABLE TO USE

- **Scope of cable** - the length of cable laid out, measured from the hawse pipe to the anchor, divided by the distance measured vertically from the hawse pipe to the sea-bed

# The scope used depends upon

- -The nature of the holding ground. Stiff clay, rock, shells, and stones - **poor holding ground.**
- Sand or shingle - **good holding ground**
- - The amount of swinging-room available for the ship
- - The degree of exposure to bad weather at the anchorage.
- - The strength of the wind or stream.
- - The duration of stay at anchor.
- - The type of anchor and cable.



The minimum scope of mild steel cable to use according to depth of water is roughly:

- Below 20m 6 to 8
- 20m to 40m 4 to 6
- Over 40m Less than 4

# **ANCHORING TO A SINGLE ANCHOR**

**In water of  
over 20 m**

**In a tideway**

**In a wind**

**In calm  
weather**

**In waters up  
to 20 m deep**

**In very deep  
anchoring  
depths,  
100 m and over**



# In calm weather

- -the anchorage is approached at slow speed
- -the anchor is let go while the ship has either headway or sternway
- -the cable is laid out
- -engines are used to relieve stresses in the cable just before the vessel brings-to.
- -the engines are kept going dead slow astern as the anchor is let go.
- -Engines are stopped almost immediately
- - the vessel drifts astern laying out her cable.
- - Just before the required scope is out, the engines are *touched* ahead.

# In waters up to 20 m deep

- -the anchor and cable should be let go on the run
- -with the weight of the anchor off the cable, it sometimes happens that when the brake is released the cable will not render itself.
- - By surging the cable initially, the anchor has a chance to embed itself before the cable tightens.
- There is little risk of a stockless anchor being fouled in this way.



# In water of over 20 m

- -the anchor should first be walked back to within say 4 or 5 m from the sea-bed,
- and let go from there.

This ensures:

- the anchor will not damage itself falling a considerable distance on to a hard bottom,
- the cable will not *take charge* and run out so rapidly that it becomes extremely difficult to hold it on the brake.

# **In very deep anchoring depths, 100 m and over**

- - the entire operation of anchoring should be done under power.
- - the gypsy should not be taken out of gear at all, because the heavy weight of cable
- between sea-bed and hawse pipe will undoubtedly take charge.



# In a wind

It is better to approach the anchorage heading upwind. The ship is more easily controlled and will make little leeway.

## *If the wind cannot be brought ahead*

- the ship can let go the anchor in the usual way
- use her engines to relieve stresses on the cable
- swing head to wind as she brings-to.
- the weather anchor is used to avoid nipping the cable round the stem.

## *If the vessel is heading dead into the wind's eye*

- -she should have her head cast off one way or the other before letting go the weather anchor.
- -The cast should not be excessive, because the ship will rapidly seek to lie across the wind and develop a sharp swing to leeward.
- -Correcting helm and bold use of engines should be used if the cast develops into a swing.

# In a tideway

- -the vessel should stem the tide and again anchor with headway or sternway
- Her helm will be of use even while making no way over the ground due to the tidal stream running past her.
- If the tidal stream cannot be stemmed the cable should be rapidly laid out slackly *across* the axis of the stream



# Vessel at anchor

According to Rule 30 of ColRegs

- (i) in the fore part an **all round white** light or one black ball;
- (ii) at or near the stern and at a lower level than the light prescribed in sub-paragraph (i), an **all-round white light**.

# DUTIES AT ANCHOR

- - Cross-bearings are usually taken as the anchor is let go
- -Anchor watches should be set
- - bearings frequently checked.
- -A rough circle of swing can be drawn on the chart.
- -Beam transit-bearings, use of the echo sounder, and radar will all help to detect dragging.
- -In a tideway the vessel may be steered by her rudder.
- -The shore signal-station should be watched at all times
- -The officer of the watch should at all times have a rough idea of how his cable is lying to warn other vessels which try to anchor across it.

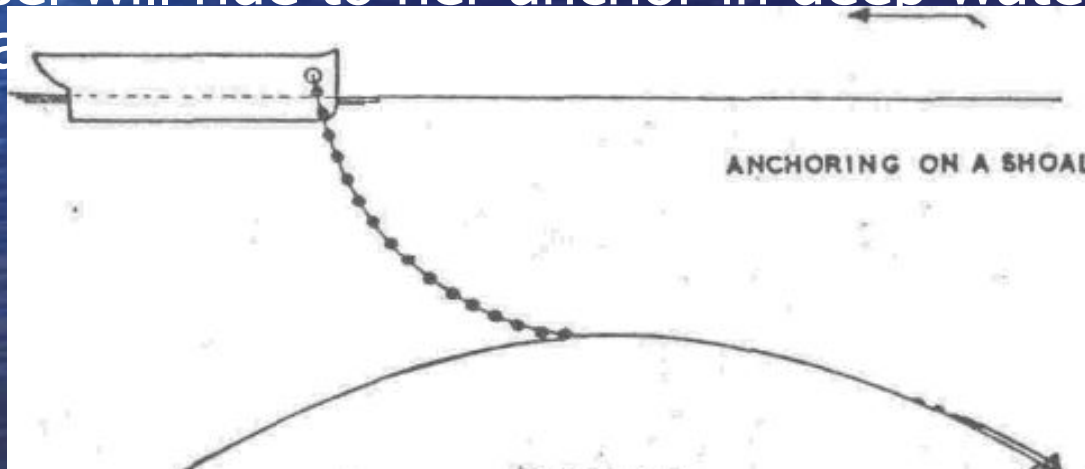


# ANCHORING NEAR A DANGER

- when anchoring near a danger, the offshore anchor should be used.

# ANCHORING ON A SHOAL

- head into the wind
- cross the shoal
- take soundings. Decide in which depth the anchor is to be let go.
- The anchor is walked back to this depth
- the vessel moves astern across the shoal.
- As soon as the cable grows ahead - cable is veered and laid out across the shoal
- the vessel will ride to her anchor in deep water beyond the shoal



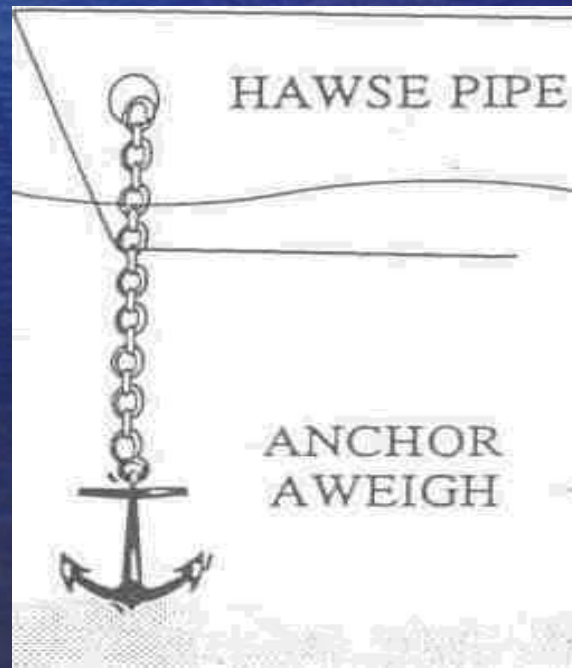


# DRAGGING ANCHOR

- (1) Let go the second anchor underfoot at the centre of yaw. If the first anchor starts to drag the second will bite and its cable will render itself.
- (2) Let go the second anchor at the extremity of yaw and veer both cables so that the ship rides comparatively quietly to her two anchors.
- (3) Steam up to the first anchor, sheer away, and let go the second anchor.

# Supporting vocabulary

- **Anchor** – Heavy iron implement used to hold the ship to a particular place in shallow water.
- **Aweigh** – Said of an anchor when it is broken out of the ground and the anchor chain is leading/hanging straight up-and-down.





# Supporting vocabulary

- **Bollard** - Strong single post for taking mooring lines
- **Capstan** - Vertical barrel used for hauling mooring ropes
- **Chain Locker** - Space in the bow above the fore peak, used to house the anchor cable
- **Devils claw** - A two pronged hook. Used for securing the anchor cable while the vessel is at sea
- **Gypsy** - A sheave with interior lugs into which a chain will fit
- **Hawse pipe** - Tube through which the anchor cable goes to the anchor
- **Labour** - That side of the wind is blowing away from
- **Leeward** - Away from the wind
- **Panama lead** - Fairlead with a closed top. Used in the Panama Canal