

# MOORING OPERATIONS



SAFE WORKING PRACTICE

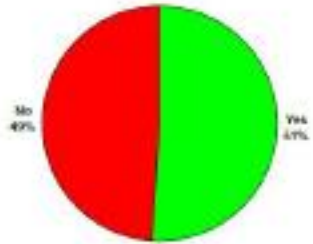
Hanza Marine Management, Training Centre

By Capt. Igors Sorokins

# Mooring incidents: Statistic

UK P&I CLUB

Are heave-in/slack-out directions clearly marked on winch handles?



Most ships do not have fully non slip decks



UK P&I CLUB

Less than 50% carry out annual brake tests



UK P&I CLUB

Which do you let go first ?



UK P&I CLUB

22% ropes not made up to bits correctly

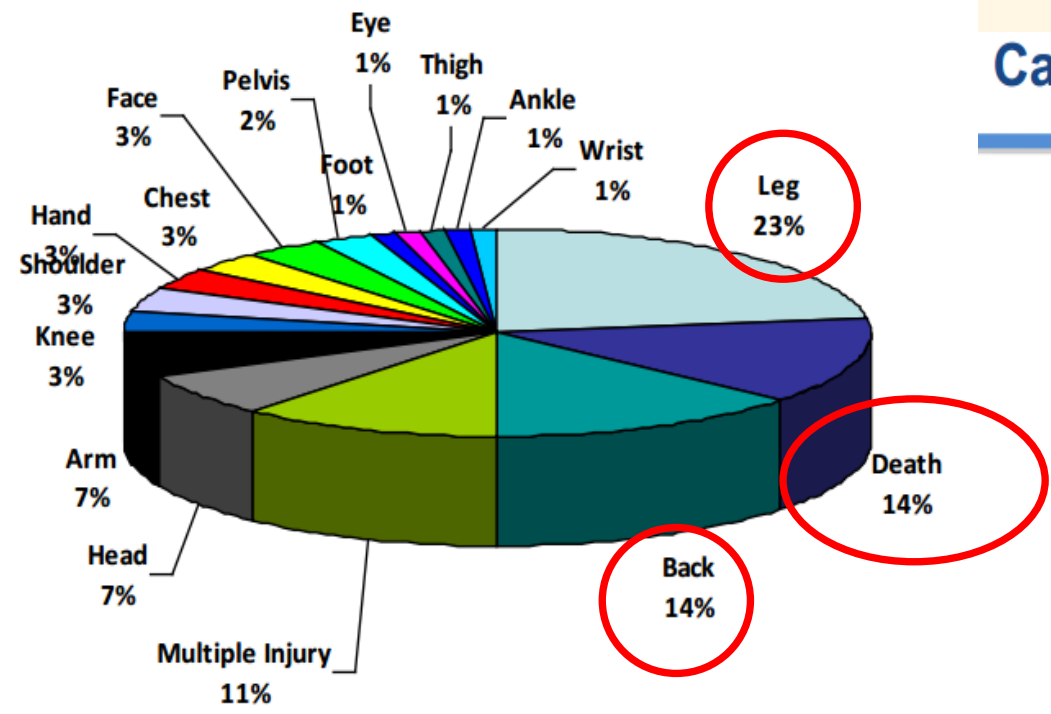


UK P&I CLUB

27% of vessels keep moorings on drum ends

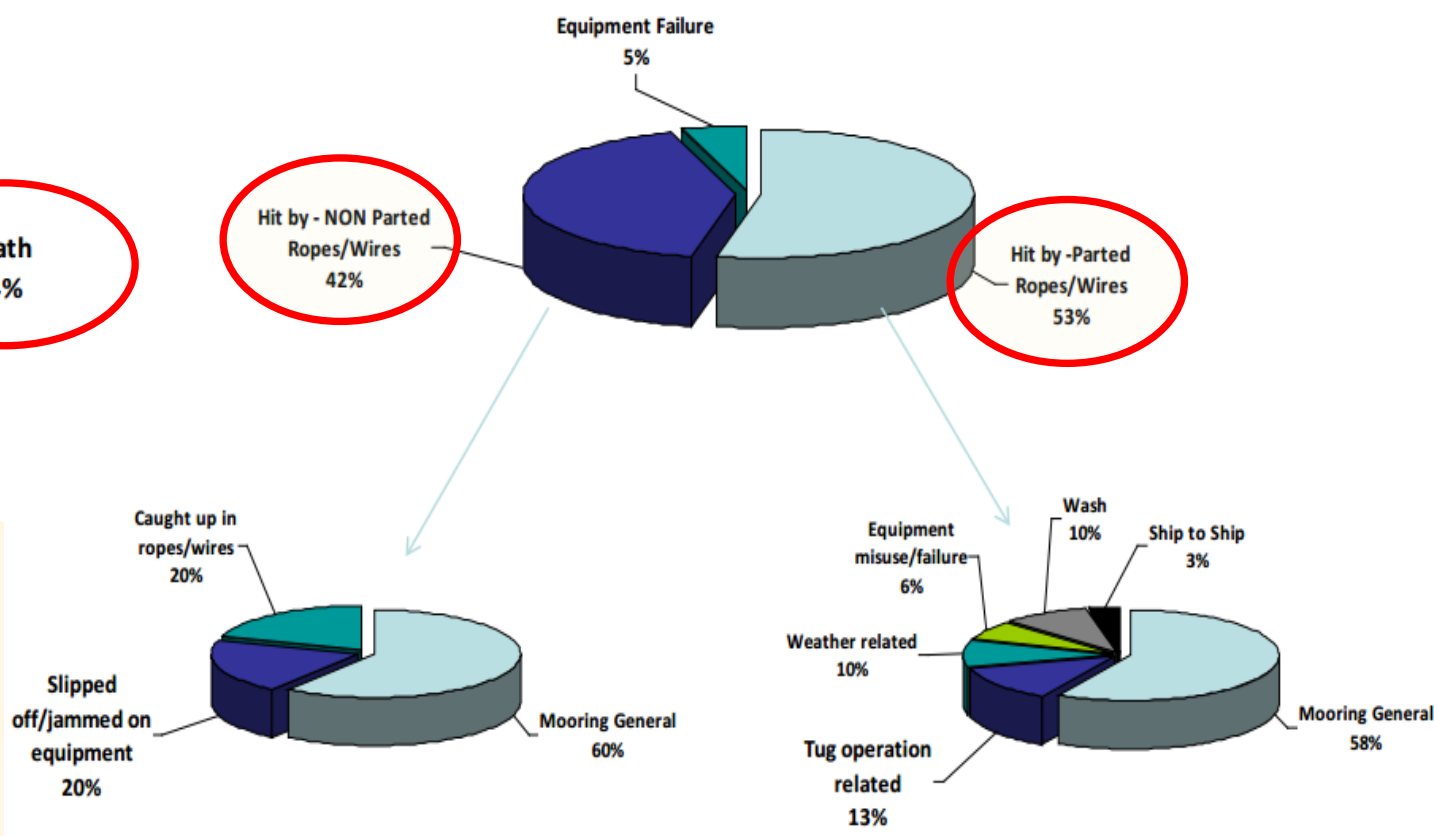


# Type of Injury From Mooring Incidents



Death = 14%  
 Legs = 23%  
 Back = 14%

## Causes in detail



parted ['pa:tid]

- 1) а) разделённый на части б) рассечённый до основания
- 2) 2) разлучённый, разъединённый

**We would like to remind about this:**

**Please watch Video on WEB page**



Then return to this presentation and continue...

# MARITIME : P&I inspectors concerned about mooring procedures

**Around 14% of inspected ships found to have unsatisfactory mooring arrangements, says UK P&I Club report**

Most equipment used in the mooring of the UK P&I Club's insured merchant vessels was in good condition while the procedures and practices involved in berthing and casting off were generally carried out satisfactorily, according to the Club's ship inspectors.

However, some vessels did not have appropriate procedures in place or carry out adequate working operations.

In some cases, crew were not properly trained or supervised; there was a dearth of non-slip mooring decks; mooring ropes were frequently stored on drum ends.

In the year to March 2010, the UK Club's in-house inspectors looked at the mooring arrangements, equipment and procedures on 373 ships, noted shortcomings and analysed reported mooring incidents.

The mooring arrangements on 14 % of vessels were “not satisfactory.”

7 %of ISM mooring procedures were found unacceptable.

A significant portion had some way to go to improve mooring procedures to an appropriate standard.

Within the last 24 months, only 4% of ships had reported a “near miss” relating to mooring operations.

There was concern about insufficient skilled personnel being deployed to moor a vessel safely and effectively.

## MARITIME : P&I inspectors concerned about mooring procedures

It was often difficult to grease the equipment on winches correctly.

Some vessels' split drums were not set up correctly:

There should be only 4 or 5 turns on the smaller drum with the rest of the rope on the larger one.

Some 51% of vessels inspected carried out annual break tests, **26 % did not**, and for 23 per cent, this was not applicable.

Although these tests are mainly a tanker requirement, they would improve safety for other vessels during high-risk mooring operations.

Nearly a quarter of the vessels inspected kept moorings on the drum ends instead of making them fast.

This is not good practice as ropes made fast on drum ends are more likely to jump and cause expensive damage to the drum end bearings.

Some 94 %of vessels had painted the drum ends where a build up of paint could cause rope damage. Drum ends should be smooth and coated with a thin layer of boiled linseed oil or other approved synthetic liquid for protection.

All ropes, wires and Tonsberg links used for mooring should be certificated.

Spare mooring ropes, wires and links should not be overstowed with paint, chemicals or other shipboard or general cleaning items.

Such equipment should be stowed clear of the deck, preferably on a pallet and in a dry ventilated position. Mooring ropes and wires stowed on deck during sea passages should not be exposed to sunlight, sea spray or funnel soot. Canvas or heavy duty polyethylene covers would prolong rope and wire life.

## MARITIME | P&I inspectors concerned about mooring procedures

### **Decks, bitts and ship**

Some 32 % of ships had fully non-slip decks while the same percentage had none at all.

About one-quarter had non-slip decks around bitts and drum ends.

Mixing sand or an approved non-slip aggregate into the paint can be very effective in helping to reduce mooring accidents.

Only 6% of vessels had painted snap-back zones on deck.

Many accidents occur because someone is standing in the wrong place at the wrong time. Well marked zones should reduce such accidents.

**The UK Club has seen a growing number of incidents when non-deck crew are employed during mooring operations!**

It is often crew with insufficient training who are seriously hurt when things go wrong, particularly in bights or snapback zones.

This highlights the need for all crew to be trained and familiar with bights, snap-back zones and prospective hazards.

Correct stoppers must be used with appropriate mooring ropes/wires. They should not be left around the mooring ropes once they have been made fast to the bitts.

Think: How these incidents could be avoided...

Please watch a Video on WEB page

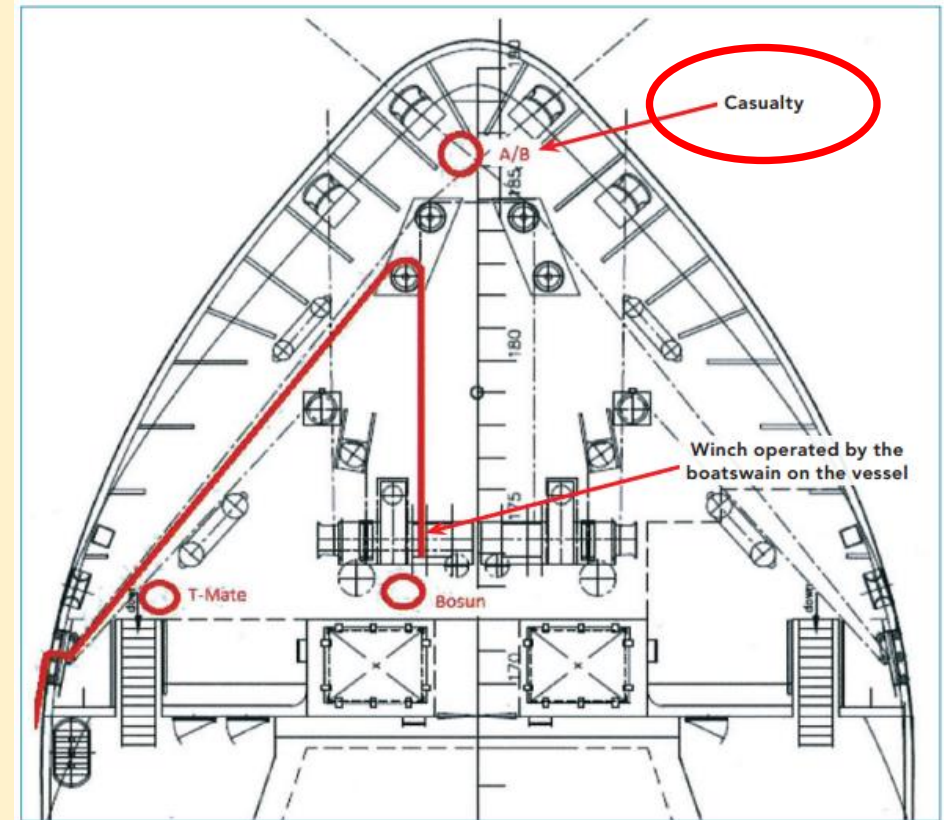


Figure 3: Location of the crew and the layout of the broken mooring line. (Source: shipping company Flinter)

At 12.34:20 the master communicated 'in position' to the deck crew via VHF. The ship was still sailing at around 0.7 knots at that time. As the master later explained, this order meant that the crew were to fasten the mooring line winch onto the strap brake. Almost immediately after the master had given his order, the mooring line broke. The ship's main engine was running at full astern at that time. The seaman, who had walked to the forecastle to grab hold of the heaving line, was standing in the mooring line snap-back zone. He was hit by the mooring line that had snapped back and, as later emerged, died instantly from his injuries. It was immediately clear to the crew on the forecastle and the boatswains on the quay that the seaman was severely injured.

They managed to quickly moor the ship. The lockmaster warned the emergency services and authorities. After the ship had moored, the pilot and engineer went to the forecastle to provide first aid assistance. The seaman, however, had already died by that time.



Here they are - the answers on questions:

How to avoid...  
How to reduce...  
How to be safe...

Lets read together:

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MARINE GUIDANCE NOTE

MGN 308 (M+F)

## MOORING, TOWING OR HAULING EQUIPMENT ON ALL VESSELS - SAFE INSTALLATION AND SAFE OPERATION

Notice to all Builders, Repairers, Owners, Operators, Masters, Skippers, Officers and Crew of Merchant Ships, Yachts (Motor and Sail) and Fishing Vessels.

This notice supersedes Merchant Shipping Notice M.718

### Summary

This Guidance Note provides updated advice on the safe installation, maintenance and use of mooring, towing and hauling equipment. It emphasises the importance of seeking expert advice on which cover potential d

RAETSMARINE INSURANCE B.V.

Monday, 14 February 2011

07/11 SURV

### SAFE PRACTICES DURING MOORING AND UNMOORING

This circular seeks to promote awareness among RaetsMarine's clients about best practices in the mooring and unmooring of vessels. These manoeuvres may be part of the routine of shipping life, but they hold inherent dangers for both vessel and crew. To guard against damage and to prevent injuries to crew members (sustained, for example, from snapped lines or unsecured cables during mooring) we advise that certain recommendations be carefully followed.

#### BEFORE THE MANOEUVER: ORGANISATION AND SAFETY

- The crew should be briefed on the mooring plan and division of labour.
- The crew should wear appropriate protective clothing, including reflecting overalls, helmets, safety shoes, safety goggles and gloves.
- The workspace should be carefully prepared for the manoeuvre.
- The communication equipment connecting the bridge and the mooring stations should be carefully tested.
- The manoeuvre should only be carried out by authorised persons.
- The supervision and operation of the winches should be entrusted to an experienced crew member.



- The officers in charge should have an unobstructed view of the situation at all times.
- All supervising officers should be familiar with the nature of the equipment to be used and have a working knowledge of:



D101

## Mooring and unmooring

This ARBO chapter is part of the Health and Safety by Book 1 for the shipping industry.

It is intended to help employers to comply with the requirements of health and safety legislation. It may be used as a checklist by employees.

It contains the necessary measures to be taken in order to safely carry out certain work-related activities.

Compliance with these regulations, or at least the regulations offering an equivalent level of protection, is essential.

This chapter contains health and safety regulations to ensure safe mooring and unmooring procedures.

#### Employees' checklist

- Always use an adequate number of crew when mooring/unmooring
- Make each other aware of unsafe situations
- Familiarise yourself with the equipment used in order to be able to spot any wear and tear at an early stage
- Provide supervision at stem and stern whilst mooring/unmooring
- Has the mooring plan been discussed?
- Use well-working communication equipment
- Do not carry out more than one aspect of the job at any one time (like manning winch and handling ropes)

This chapter contains the measures that must be taken to ensure the safe mooring and unmooring and to minimise potential hazards.

#### PPE to be used



#### Various factors in mooring/unmooring vessels:

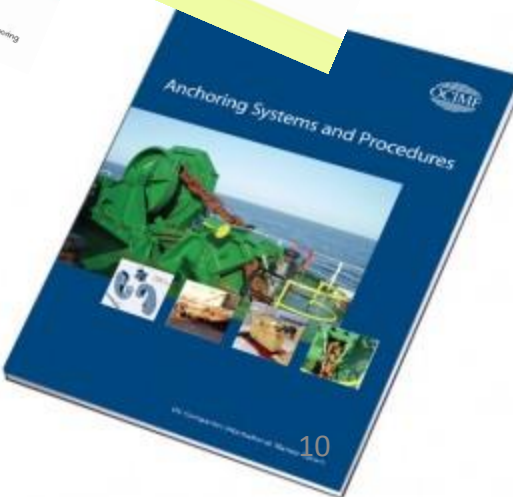
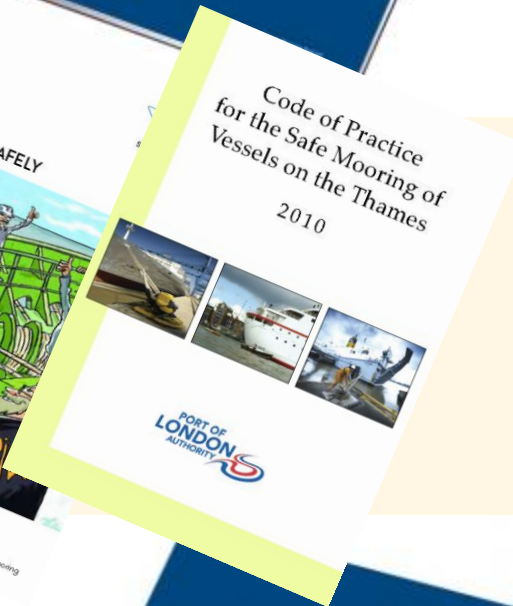
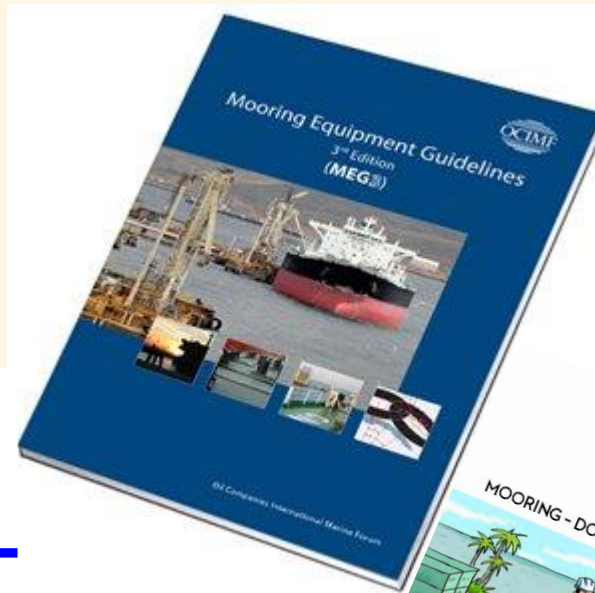
In order to safely moor/unmoor seagoing ships, a number of factors will have to be taken into consideration. In addition, equipment, experience and on-board organisation are vital in ensuring smooth mooring/unmooring:

- Availability of sufficient (experienced) crew
- Mutual supervision
- Preparation
- Communication
- Sound division of labour and appropriate supervision
- Maintenance of all equipment

#### Be vigilant

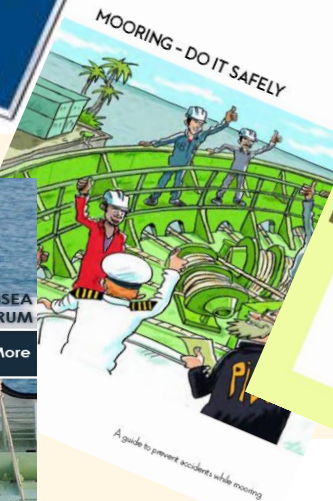
In many instances, accidents do not happen because of the complicated nature of a manoeuvre, but rather because of lack of care and attention whilst carrying out a (simple) job.

- You have a legal obligation to point out unsafe routines and/or incorrect usage of protective equipment to the people you work with.



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Learn More



A guide to prevent accidents while mooring

# Let's open Chapter 25:

# Anchoring, mooring and towing operations

## Chapter 24 Painting

- 24.1 Introduction
- 24.2 General
- 24.3 Preparation and precautions
- 24.4 Use of paint spraying equipment

## Chapter 25 Anchoring, mooring and towing operations

- 25.1 Introduction
- 25.2 Anchoring and weighing anchor
- 25.3 Making fast and casting off
- 25.4 Mooring to buoys
- 25.5 Towing
- 25.6 Safe mooring of domestic passenger craft & ships launches to quays
- Annex 25.1 Mooring systems
- Annex 25.2 The full and safe Mooring Arrangements for small Domestic, Passenger Craft and Ships Launches illustrating potential 'Snap-Back' Zones

## Chapter 26 Hatch covers and access lids

- 26.1 Introduction
- 26.2 General
- 26.3 Mechanical hatch covers
- 26.4 Non-mechanical hatch covers and beams
- 26.5 Steel-hinged inspection/access lids
- 26.6 Access to holds/cargo spaces



## Chapter 25

# Anchoring, mooring and towing operations

- 25.1 Introduction
- 25.2 Anchoring and weighing anchor
- 25.3 Making fast and casting off
- 25.4 Mooring to buoys
- 25.5 Towing
- 25.6 Safe mooring of domestic passenger craft & ships launches to quays

## Annex 25.1 Mooring systems

## Annex 25.2 The full and safe Mooring Arrangements for small Domestic, Passenger Craft and Ships Launches illustrating potential 'Snap-Back' Zones

# First of all - Risk Assessment to be done !

## Risk assessments

A risk analysis helps you **identify risks** you may come across on board when mooring.

A pattern for your joint risk assessments:



# Five steps !



## CHAPTER 25 ANCHORING, MOORING AND TOWING OPERATIONS

### 25.1 Introduction

25.1.1 Based on the findings of the **risk assessment**, appropriate control measures should be put into place to protect those who may be affected. This chapter highlights some areas which may require attention in respect of anchoring, mooring and towing operations.

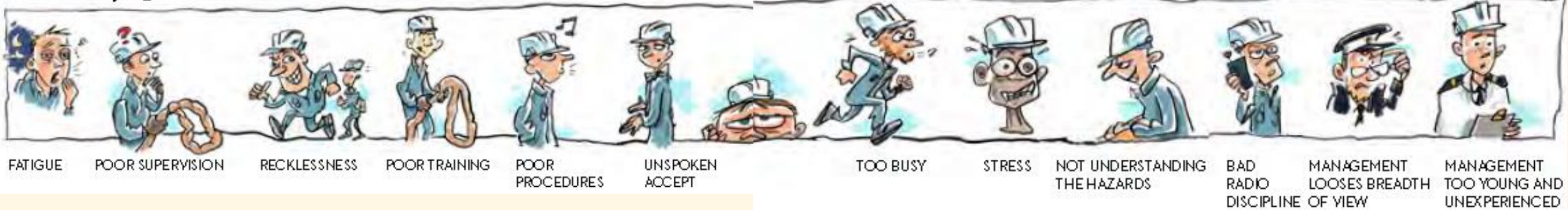
It is particularly important that the **risk assessment** considers the consequences of the failure of any element of the equipment.





# The underlying factors - Основные факторы

## The underlying factors



- **Fatigue** Усталость
- **Poor supervision** Слабый контроль
- **Recklessness** Неосторожность
- **Poor training** Плохое обучение
- **Poor procedures** Слабые методики
- **Unspoken accept** Необсужденное одобрение
- **Too busy** Излишняя занятость
- **Stress** Стресс
- **NOT understanding the hazards** Непонимание опасности
- **Bad radio discipline** Плохая радио дисциплина
- **Management loses breadth of view** Закостенелость управления
- **Management too young and unexperienced** Управленческий аппарат молод и неопытен

**These factors could cause the following risks – go to next page**

## 1 Poor overview

Плохой обзор

## 2 Stopper breaks

Обрыв стопора

## 3 Oil leak from winch - slip/injury

Подтеки масла с лебедки

## 4 Too cold

Холод

## 5 Crossing line

Перескрещивание швартовов

## 6 Sea rising

Подъем уровня воды



## 7 Lines in mess on mooring boat

Путаница швартовов на боте

## 8 Wires/ropes tight and slack/or different material, elasticity and breaking strength

Швартовы разных типов (эластичность и прочность) и неравномерно нагружены

## 9 Line thrown without telling docker

Подача выброски без предупреждения



11 Moving to and from  
Рыскание судна у причала

12 Standing in a bight  
Человек в петле швартова

13 Too many turns  
(on the drum)  
Излишние шлагги на барабане

14 Sitting on a line  
Человек сидит на швартове

15 Untidy lines  
Слабина швартовов

16 Wrong outfit  
Работа без защитных средств

17 Mess on the quay  
Беспорядок на причале

18 Line caught in fender  
Швартов зацепился за кранец

19 Telling off/bad communication  
Плохой обмен информации

20 Lines lying too long in sun & water  
Потеря прочности швартова  
от солнца и воды



21 Language confusion  
Языковой барьер

22 Bad lighting  
Плохая освещенность

23 Poor communication  
between pilot &  
captain & tug Плохая связь  
между судном и буксиром

24 Line 'singing' before  
it parts Швартовы трещат  
от напряжения перед разрывом

25 Wet paint Свежая покраска

26 Unaware of risk,  
being in snap back zone  
Незнание опасных зон

27 Standing on the line  
Человек становится на швартовы



28 Draught changed  
Изменение осадки

29 Line comes off bollard - steep angle  
Швартов соскакивает с кнехта (крутой угол)

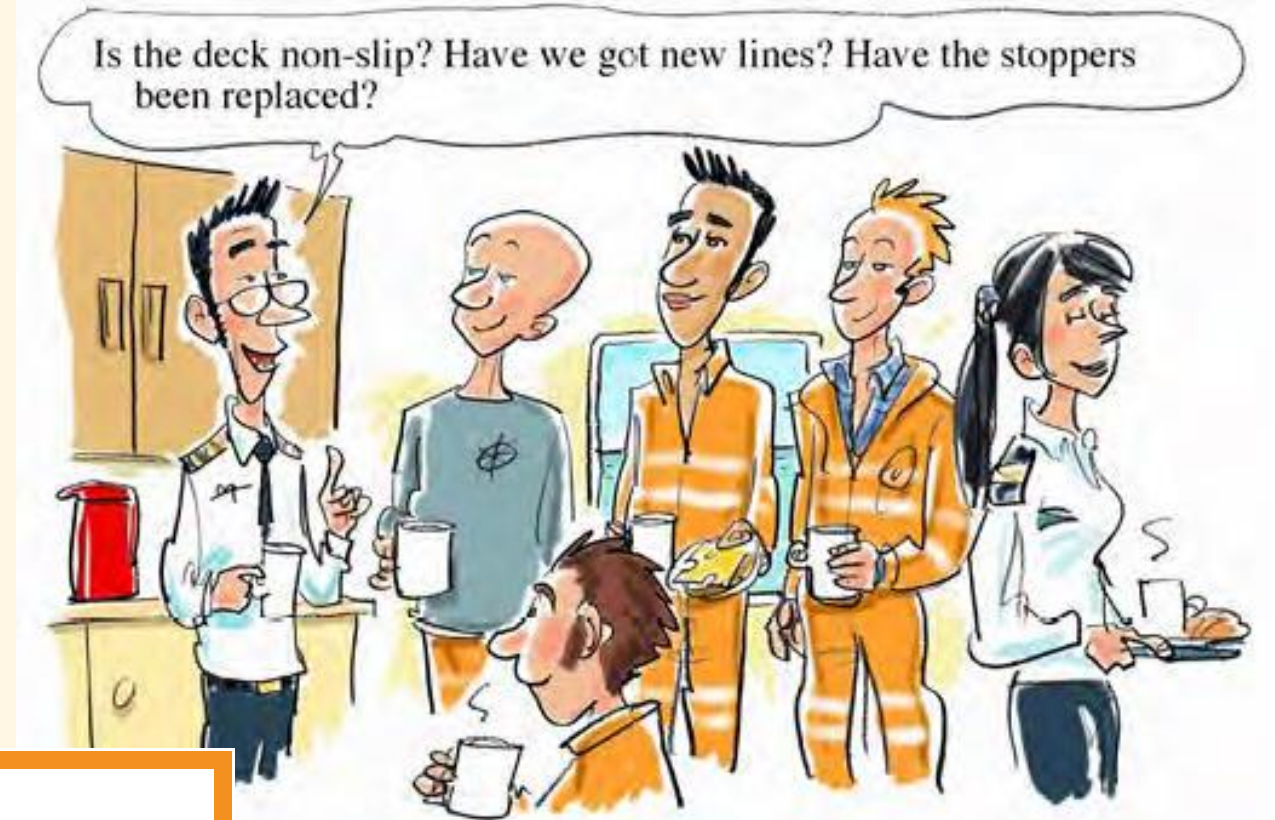
30 Line round propeller  
Швартов попадает под винт

31 Several lines on same bollard  
Несколько швартовов на одном кнехте



# Step 3 - Action plan

Have a **meeting** where you can talk through possible solutions to reduce the risks.



## THREE COMMON REASONS FOR ACCIDENTS

- Seamen standing in bights or snap back zones and when lines part, those involved are often injured.
- Insufficiently trained crew are used during mooring operations and they are often seriously injured if something goes wrong.
- The person supervising the mooring is also involved in the operation and is unable to carry out his role effectively.

## Attention!

“The person supervising the mooring is also involved in the operation and is unable to carry out his role effectively !!!!!”

# Step 4 - Risk assessment document

An officer should produce a document comprising what you have decided.

Afterwards it should be passed on to all the relevant people, who have helped identify the risks and those who take part in mooring operations.

Then use the document to remind you of what you have decided to do, and do just that.

The document could also be used to tell other crews what has been done and decided on since they were last on board.

INITIAL RISK ASSESSMENT					
Vessel: _____		Assessment Date: _____			
Work Area: _____		Masters Name & Signature: _____			
R.A. #	Work Activity / Operation undertaken in area	Hazards associated with activity	Controls already in place	Significant risks identified	Further assessment required (Y/N)
IS A DETAILED RISK ASSESSMENT REQUIRED?					No
<b>Declaration :</b> Where no significant risk has been listed, we as Assessors have judged that the only risks identified were of an inconsequential nature and therefore do not require a more detailed assesment.					
Risk Assesment Team :					
No.	Rank	Name	Duties at planned work	Signatures	
1		Name	In command		
2		Name	On communication		
3		Name	Conducting the job		
4		Name	Conducting the job		
5		Name	Stand by		
NS960 (Jun 13 Rev 6) (Submitted to Management Company: Not Required) (FILE: NSSSF/)					

1.0 Determine Risk (Refer to NS HSM & Norbulk Standard list of Risk Assessments)

A "Risk Assessment" is intended to be a careful examination of what, in the nature of operations could cause harm. This will allow precautions to be taken to limit or prevent harmful occurrences. The aim is to minimise accidents and ill health onboard the vessel.

**Key Terms**

**Hazard** - Source of potential harm or damage or a situation with potential for harm or damage

**Risk** - The likelihood that a hazard may occur and the consequences of the hazardous event

2.0 An effective and professional Risk Assessment will:

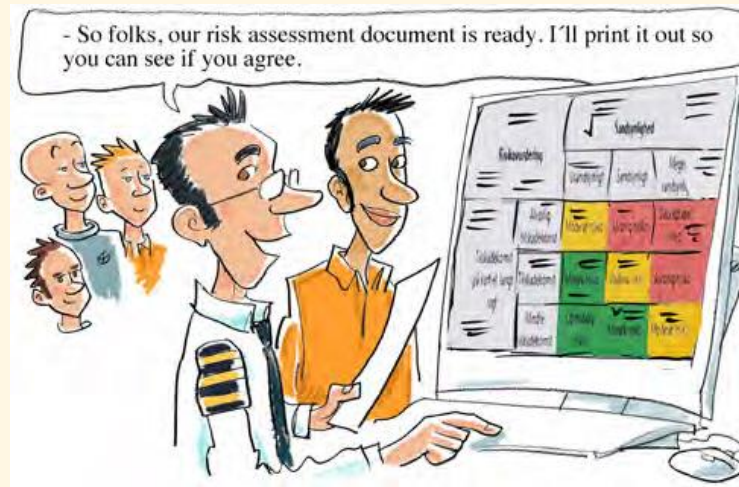
- Classify the work activity to be carried out
- Establish the hazards that are present at the place of work
- Identify areas of potential risk
- Identify risk controls
- Estimate the potential severity of the risk
- Establish controls to ensure the potential harm or damage associated with the work activity are as "low as reasonably practicable"
- Prepare risk control action plan (if required)
- Review adequacy of action plan
- Ensure risk assessments and controls are effective and up to date

3.0 Personnel involved in the Risk Assessment

The process of Risk Assessment should be carried out by suitably experienced personnel, using specialist advice if appropriate. The team should include as a minimum the Chief Officer and/or Chief Engineer, Head of Department of Work Area and any other relevant personnel involved in the work being carried out. The Risk Assessment is to be checked, verified and signed by the vessels Master.

4.0 What, where & When to assess

Risk Assessment should be seen as a continuous process. In practice, the task being carried out must be assessed before work begins if no valid risk assessment already exists. The Standard Risk Assessment as stated in "Norbulk Standard list" must be completed onboard and kept as a permanent record for future reference. Please use the corresponding Company Standard Risk Assessment Number when completing this form. A new assessment must be carried out if there has been any significant change in equipment, personnel or procedure. (Standard list of vessel Risk Assessments can be found attached HSE Bulletin)



# Step 5 - Follow-up

The officer should regularly check whether what you have decided is actually being done.

Please watch a Video  
on WEB page



# ONCE AGAIN - The most common risks in mooring

## Equipment:

- Use of old, damaged wire
- Poor equipment
- Poorly designed mooring system
- No overview of mooring area
- Hazard/tripping risk sites not highlighted

## Work processes:

- Lack of communication and planning
- Poor wire/line handling

## Crew qualifications:

- Lack of knowledge about the hazards of the job
- Unclear instructions
- Lack of information
- Lack of supervision (supervisor involved elsewhere)
- Small, untrained deck crew
- Ineffective on-board mooring training, without identifying and understanding the dangers associated with snap back zones

## Crew concentration:

- Stress and fatigue

## Ship's safety culture:

- Procedures not followed
- Shortcuts taken
- Standing in the wrong places (snap back zone)
- Standing/walking on a bight
- Walking over a wire
- Quick mooring versus safe mooring
- No risk assessment process prior to mooring operations
- Cluttered mooring area
- Cluttered deck

## Weather:

- Icy, slippery deck







**25.2.2** Where the means of communication between bridge and anchoring party is by portable radio, the identification of the ship should be clear to avoid misinterpretation of instructions from other users of such equipment.

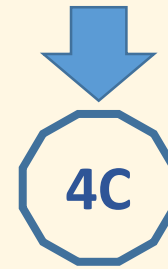
## Who is speaking?



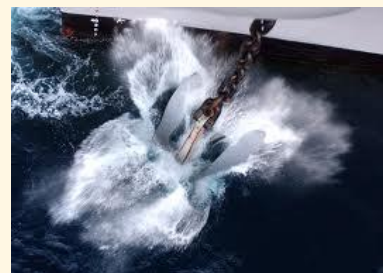
**Please watch Video on WEB page**

**25.2.3** Before anchors are let go, a check should be made that no small craft or other obstacle is under the bow. As a safety precaution it is recommended that the anchor is 'walked out' clear of the pipe before letting go.

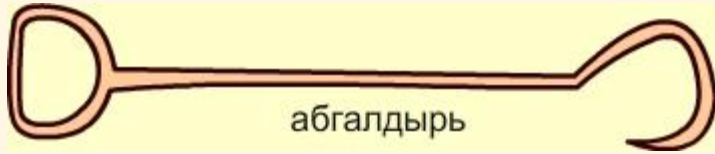
Say name of your vessel or your own name for identification !



## Who to whom?



For very large ships with heavy anchors and cables, the anchor should be walked out all the way to avoid excessive strain on the brakes (and on the bitter end if the brakes fail to stop the anchor and chain).



- Steel hook to work with chain in cable locker

Please watch a Video  
on WEB page



**25.2.4** Where the anchor is let go from the stowed position, if upon release of the brake, the anchor does not run, personnel should **NOT attempt to shake the cable**, but the brake should be re-applied, the windlass placed in gear, and the anchor walked out clear prior to release.

**25.2.5** Cable should stow automatically. If, for any reason, it is necessary for personnel to enter the cable locker, they should stand in a protected position and, as far as possible, have constant communication with the windlass operator.

**25.2.6** Anchors housed and not required should be properly secured to prevent accidental release.



Personnel engaged in mooring/unmooring of vessels must never carry out such work on their own. Under normal circumstances a mooring crew will consist of the persons prescribed in ship's Mooring Plan for each end of the vessel.

Officers assigned to mooring parties, who have responsibilities for communication and hazard watch must at all times maintain these functions so as to protect the work parties they have been assigned to and provide timely communications to the Master / Pilot in the bridge team. These communications to the bridge team should include updates on the status of issued orders and any problems that are delaying normal completion.

A responsible officer should be in charge of each of the mooring parties, and a suitable means of communication to the vessel's bridge team should be established. If VHF/UHF radios are used, then the ship's bridge and each group should be clearly identified by name to prevent confusion.



## 25.3 Making Fast and Casting Off

**25.3.1** During mooring and unmooring operations a **sufficient number of personnel** should always be available at each end of the vessel to ensure a safe operation.

A **responsible officer** should be in charge of each of the mooring parties, and a **suitable means of communication** between the responsible officers and the vessel's bridge team should be established.

If this should involve use of portable radio, then the ship should be clearly identified by name to prevent misinterpretation. **All personnel involved in such operations should wear suitable protective clothing** (see Chapter 4).

### tie up –

- 1) мероприятие
- 2) загружать работой (кого-л.)
- 3) швартоваться

### **NOTE! Always remember to bring along a VHF/UHF radio**

**The tie up should be supervised, where possible, by an officer, as laid out in STCW Chapter 25.**

### **UHF RADIO & COMMUNICATION**

1. Mooring personnel must always use UHF radio communication
2. Upon arrival at/departure from the quay, the vessel and mooring personnel must establish radio communication on the specified mooring frequency channel.
3. Mooring personnel must by radio communication make sure that secondary means of communication is in order (Public Address system, another VHF/UHF handset etc).

# Personal protective equipment (PPE)

can be classified as follows:

## Type Examples

- **Head protection-** Safety helmets, bump caps hair protection
- Hearing protection Ear muffs, ear plugs
- **Face and eye protection-** Goggles and spectacles, facial shields
- Respiratory protective Dust masks, respirators, breathing equipment apparatus
- **Hand and foot protection-** Gloves, safety boots and shoes
- **Body protection-** Safety suits, safety belts, harnesses, aprons, high visibility clothing.
- Protection against drowning Lifejackets, buoyancy aids and lifebuoys
- Protection against hypothermia Immersion suits and anti-exposure suits

## 25.3 Making Fast and Casting Off

**25.3.1 ...All personnel involved in such operations should wear suitable protective clothing (see Chapter 4).**

The mooring watch must use the following clothes / equipment:

- Service uniform / work clothes
- Hard hat
- Gloves
- Safety shoes





25.3.2 Vessels' heaving lines should be constructed with a 'monkey's fist' at one end. To prevent personal injury, the 'fist' should be made only with rope and should not contain added weighting material.



25.3.3 Areas where mooring operations are to be undertaken should be clutter free as far as possible. Decks should have anti-slip surfaces provided by fixed treads or anti-slip paint coating, and the whole working area should be adequately lit for operations undertaken during periods of darkness.



Hanza Training Centre



# WIRES -MOORING LINES

## Repair and Maintenance

Owners, operators, masters and skippers should ensure that all mooring, towing and hauling equipment, including ropes and warps, are covered by a **regular maintenance programme**. Equipment should be regularly inspected for wear, damage, deflection and corrosion.

A programme of maintenance and inspection may help to prevent such failures or alternatively identify potential failure at an early stage such that repair is a relatively simple matter rather than a major task.

**Ropes, wires and stoppers** that are to be used in mooring operations should be in good condition. Ropes should be **frequently inspected** for both external wear and wear between strands. Wires should be regularly treated with suitable lubricants and inspected for deterioration internally and broken strands externally. Splices in both ropes and wires should be inspected regularly to check they are intact.

## Certification and Marking

It should be ensured that **the relevant certificate** has been obtained before putting a rope into service. The marking on the rope or its package should be verified and match the certificate. The certificate should be retained in a safe place for identification of the rope when carrying out subsequent periodic examinations in service.

25.3.4 All **equipment** used in mooring operations should be **regularly inspected for defects**. Any defects found should be corrected as soon as possible.

## Certificate of test and thorough examination of wire ropes



Certificate No.: LA4/  
Subcertificate of original No.: LA4/

Page 1 of 2

This certificate is to be issued by Germanischer Lloyd or by firms authorised by GL. The issuance by these firms will be acknowledged by GL provided conditions stated on reverse side are complied with.  
This certificate is based on the standard international form as recommended by the International Labour Office in accordance with ILO Convention No. 152.

### General Data

Name of ship	Code Letters
Date of test	GL-Register No.
mm	m
Nominal diameter	Length
Construction	Standard
Type of core	Surface finish of wires
Type of lay/direction of lay	N/mm <sup>2</sup>
	Nominal tensile grade of wires

A) Load and location at which rope sample broke: \_\_\_\_\_ kN  in the range of endtermination / Splice  
 free length

# Repair and Maintenance

Particular care should be taken when **repairing deck areas**, especially those fitted with bollards or equipment requiring a strong substantial base. Expert advice should be sought externally on an appropriate method of repair, including material selection and welding procedures.

Owners and operators should ensure that the person(s) carrying out the repair is/are appropriately qualified and experienced. Classification Societies should, where appropriate, be consulted.



**25.3.4** All **equipment** used in mooring operations should be **regularly inspected for defects**. Any defects found should be corrected as soon as possible.

## AMSA (Australian Maritime Safety Authority) Focused Inspection Campaign on Mooring Arrangements:

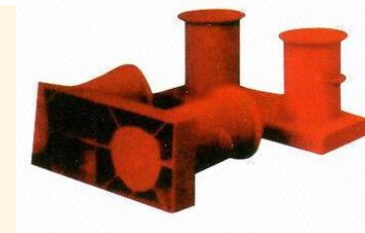
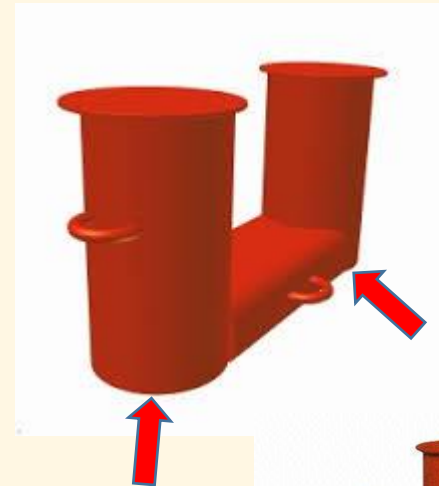
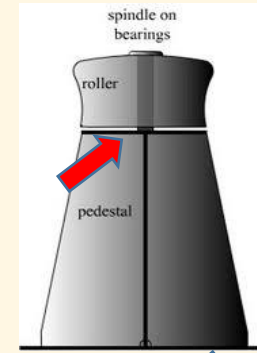
AMSA Surveyors recorded 62 deficiencies on 36 vessels with the deficiencies identified in the following areas:

- Windlasses and Winches 0
- **Bollards and Fairleads 19**
- Mooring lines 5
- **Procedures 38** **Total 62**

## PSC Deficiencies Related to FIC Matters:

- **Windlasses and Winches 20**
- Bollards and Fairleads 2
- Mooring lines 3
- Procedures 7 **Total 32**

25.3.4 All equipment used in mooring operations should be regularly inspected for defects. Any defects found should be corrected as soon as possible.



Below reflects the outcome of *Marine Accident Investigation Branch* accident investigations which have found the following failures of equipment:

(a). **Fracture of a roller pin** due to corrosion fatigue. The place at which the fracture occurred was located at a sharp change of section machined at the lower end. Because this was located just below the housing surface it was inaccessible for inspection and maintenance;

(b) failure of the **welding between a fairlead pedestal and the deck** due to inadequate preparation and poor welding; and

(c) **failure of a bollard** which together with its supporting pad piece was pulled out of the deck as a result of poor material selection and weld procedures during repairs and an inadequate supporting structure to cope with the service loads.



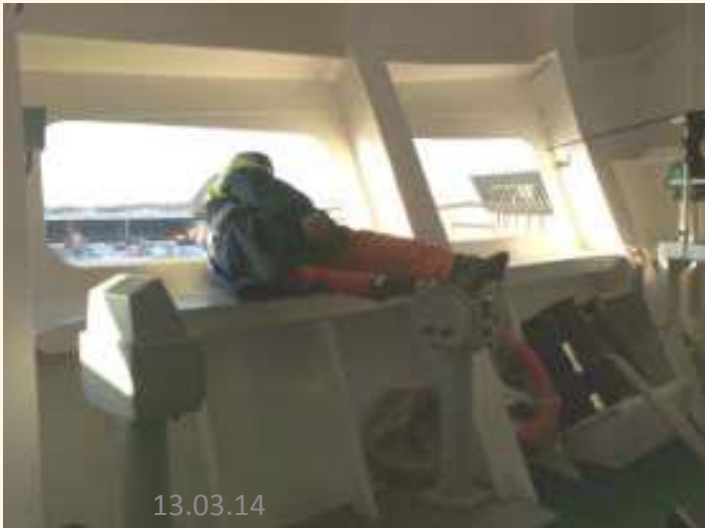


***Do not allow oil leaks from hydraulic winches to go unnoticed, it could be you that slips on that pool!***



#### 25.3.4

... Particular attention should be paid to the risk of **oil leaks from winches**, and surfaces of fairleads, bollards, bitts and drum ends should be clean and in good condition. **Rollers and fairleads should turn smoothly** and a visual check be made that corrosion has not weakened them.



13.03.14

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#### **SAFETY REMINDERS**

- ✓ Ensure that the **"heave-in"** and **"slack-out"** directions are clearly marked the winch handles and controls.
- ✓ Steam pipes in vicinity of an operator or rope handler must be lagged or adequately guarded against accidental contact.
- ✓ **Do not allow oil leaks** from hydraulic winches to go unnoticed, it could be **YOU** that slips on that pool.
- ✓ **Do not try to assess the tension in a line by kicking** or standing on it is dangerous as well as being futile.

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Particular attention is drawn to the need to ensure that **pedestal roller fairleads, lead bollards, mooring bitts** etc are:

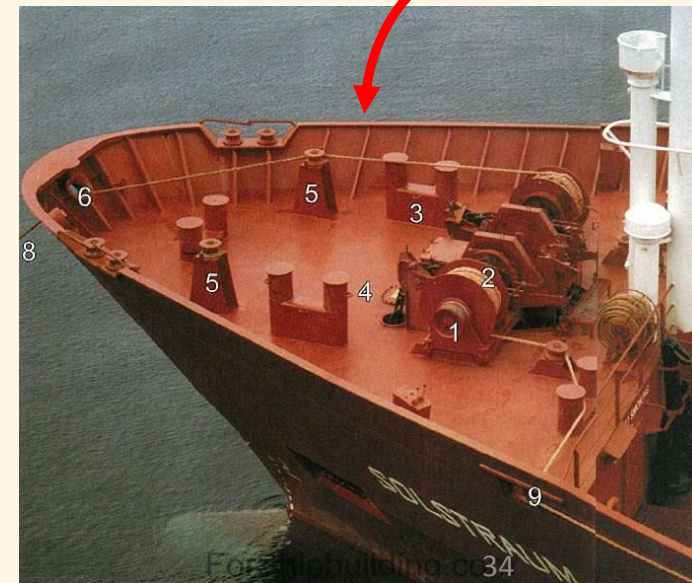
**Once again –  
Please, memorize...**

**Please watch a Video  
on WEB page**



Sharp objects can chafe mooring lines

(a) properly **designed** to meet all foreseeable operational loads and conditions,  
(b) **correctly sited**, and  
(c) **effectively secured** to a part of the ship's structure which is suitably strengthened.



# STEEL WIRE ROPES

## Construction of Wire Ropes

When a high **Minimum Breaking Load (MBL)** together with reasonable ease of handling is required, it is usual to select wire ropes.

A wire rope consists of a number of strands layed up around a central core of fibre or wire.

Each strand in turn consists of a number of wires layed up to form the strand.

**Lay** - the twisting of strands to form a rope, or wires to form a strand, during its manufacture.

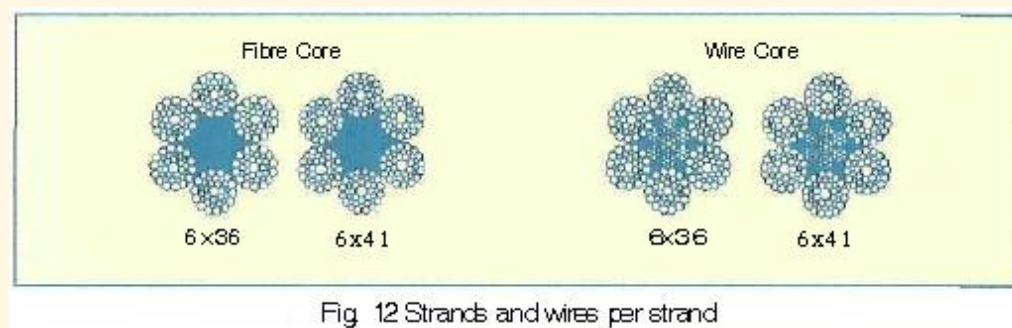
**Right-hand or Left-hand Lay** - the angle or direction of the strands relative to the centre of a rope.



Left-hand ordinary lay (LHOL) wire rope (close-up). Right-hand lay strands are laid into a left-hand lay rope.



Right-hand Lang's lay (RHLL) wire rope (close-up). Right-hand lay strands are laid into a right-hand lay rope.



Number of strands and Number of wires per strand: 6 x 36, 6 x 41

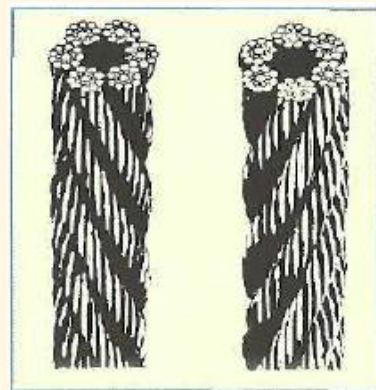


Fig. 15 Ordinary Lay

**Ordinary Lay** (Fig. 15) - a method of making a rope where the lay of the wires in the strand is opposite to the lay of the strands in the rope.

**Lang's Lay** (Fig. 16) - a method of making a rope where the lay of the wires in the strand is the same as the lay of the strands in the rope.

Although this construction has better wearing properties than ordinary lay, because it tends to untwist it has only limited use. It is not used for mooring lines.

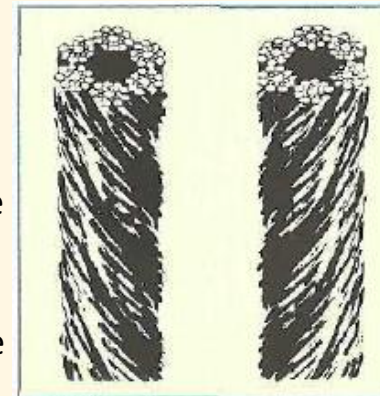
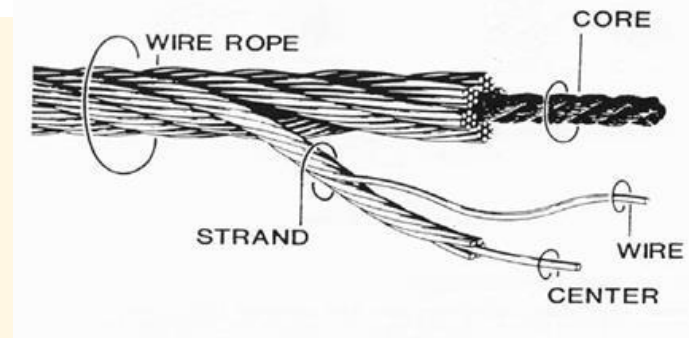
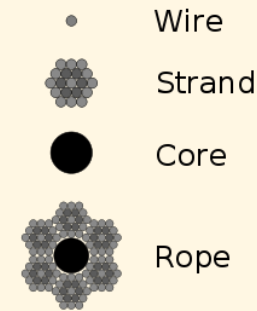
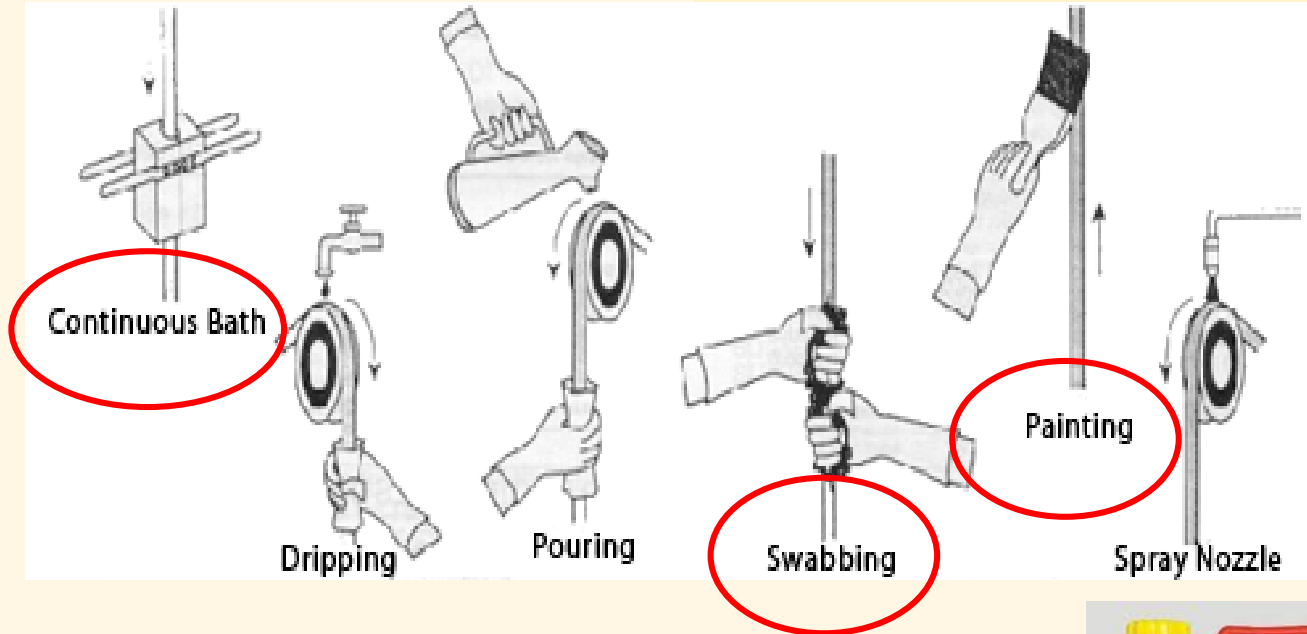


Fig. 16 Lang's Lay



**25.3.5 Mooring ropes, wires and stoppers** that are to be used in the operation should be in **good condition**, Ropes should be frequently inspected for both external wear and wear between strands. Wires should be regularly treated with suitable **lubricants** (see section 21.2.28) and **inspected for deterioration** internally and **broken strands** externally.

Wires should be regularly treated with suitable lubricants



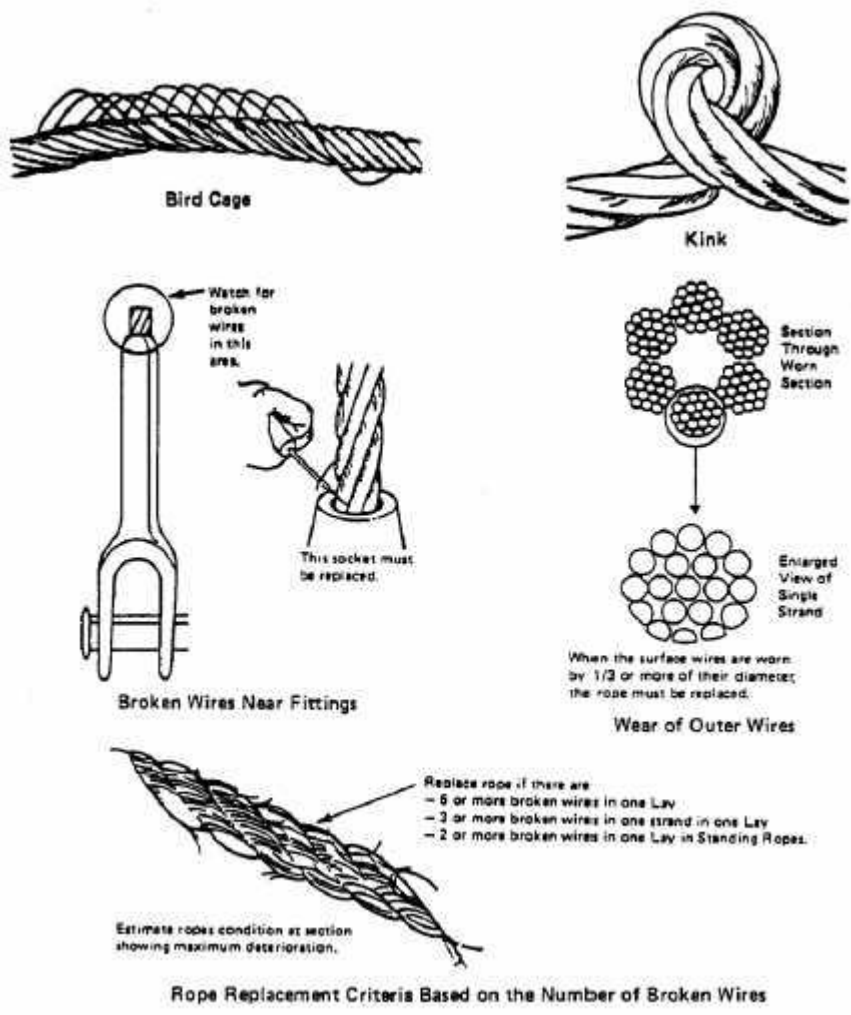
## Inspection of Wire Ropes

At routine intervals, the entire length of rope should be inspected by a competent person with particular attention paid to those sections that are proven by experience to be the main areas of deterioration.

Excessive wear, broken wires, distortion and corrosion are the usual signs of deterioration.

For a more detailed examination, special tools are necessary to facilitate internal inspection.

In cases where severe rope wear takes place at one end of a wire rope, the life of the rope may be extended by reversing the drum end with the load end, i.e. turning the rope 'end for end', before deterioration becomes excessive.



## Nature and Number of Broken Wires

If the number of visible broken wires found in a rope is **more than 4 over a length of 6 DIA, or 8 over a length of 30 DIA**, 'DIA' - nominal diameter of the rope, **the rope should be discarded.**

## Reduction of Rope Diameter Resulting from Core Deterioration

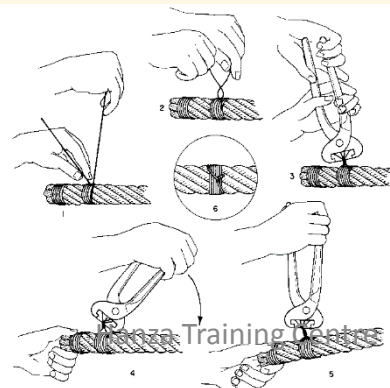
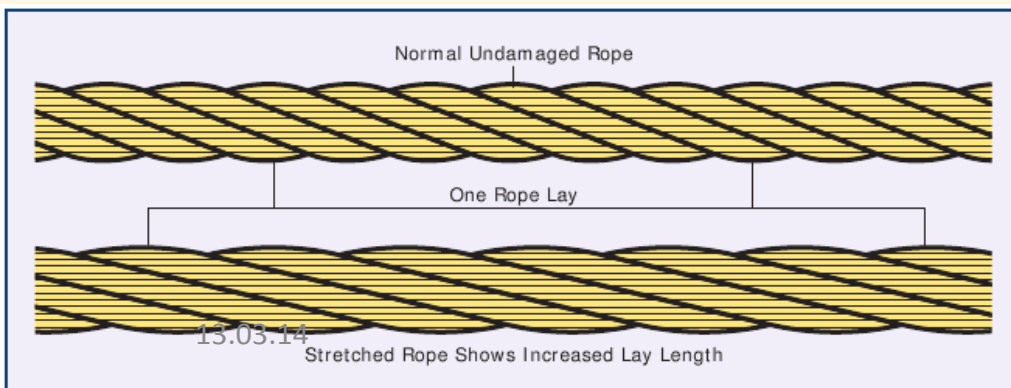
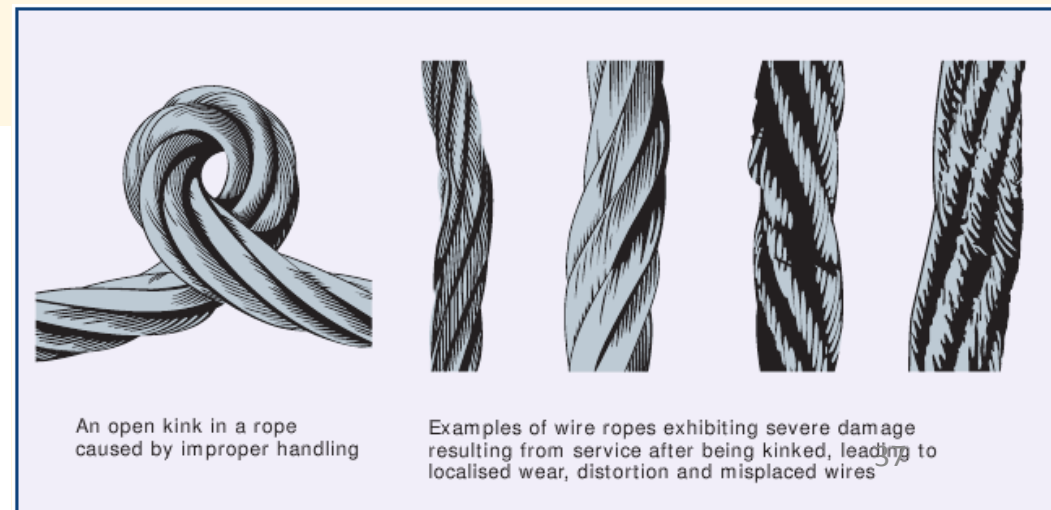
Reduction of rope diameter resulting from deterioration of the core can be caused by:

- Internal wear and wire indentation
- internal wear caused by friction between individual strands and wires in the rope. If these factors cause the actual rope **diameter to decrease by 10%, the rope should be discarded even if no broken wires are visible.**

Note: New ropes will normally have an actual diameter greater than the nominal diameter.

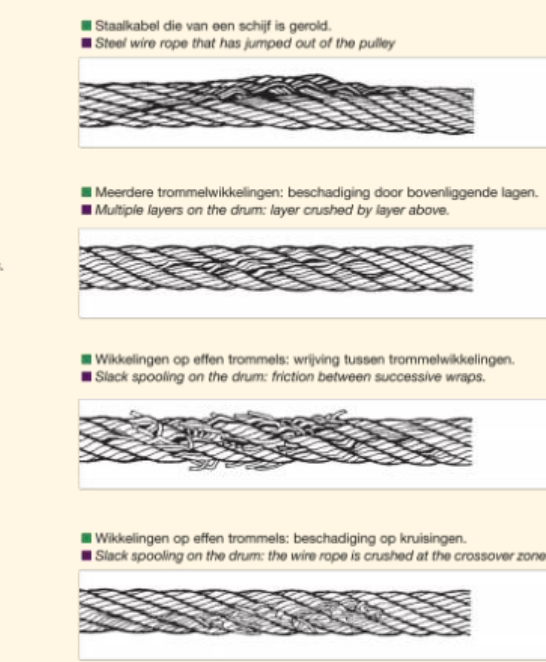
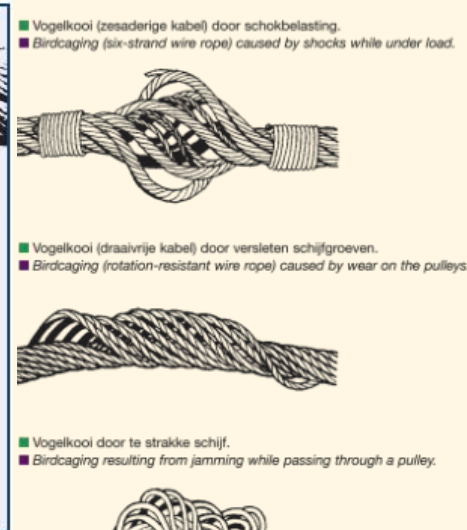
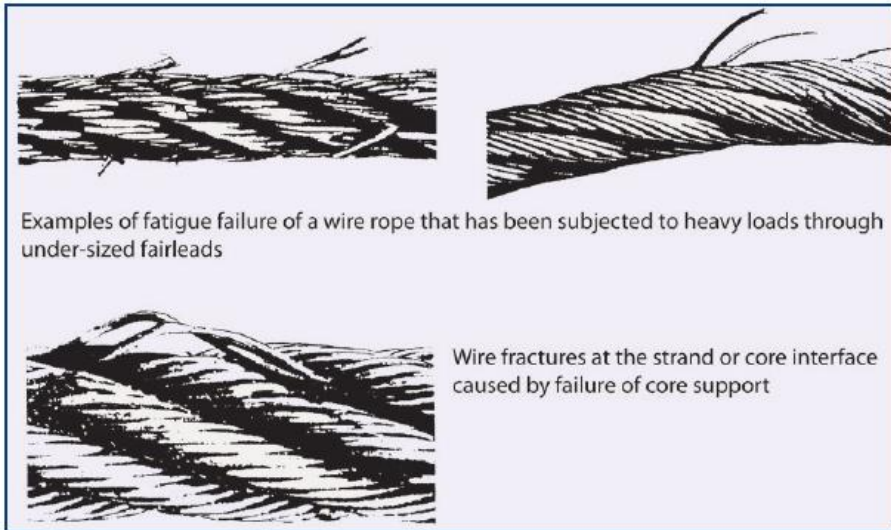
## External Wear

If the actual rope diameter has decreased due to external wear by **7% or more of the nominal rope diameter even if no wire breaks are visible, the rope should be discarded.**

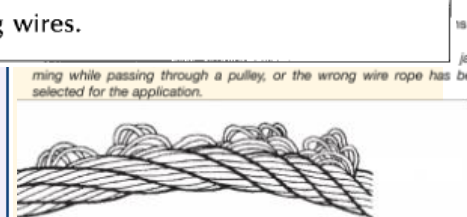
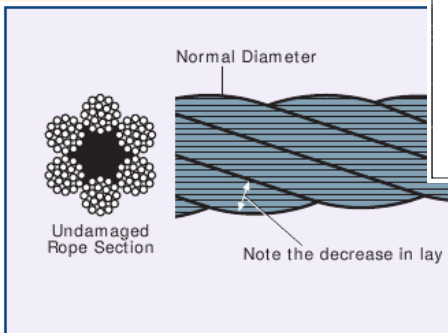


# SAFETY REMINDERS

- ✓ ALWAYS stand well clear of wire under load
- ✓ NEVER stand in the bight of wire
- ✓ ALWAYS wear gloves when handling wires



**SAFETY REMINDERS**  
 ALWAYS stand well clear of a wire under load.  
 NEVER stand in the bight of a wire.  
 ALWAYS wear gloves when handling wires.



	Section	Criteria	Discard Criteria
Visible Wire Breaks	C.3.2	Number in length of 6d or 30d	Discard if over 4 in length 6d or 8 over 30d
Wire Breaks at Termination	C.3.3	Evidence of broken wires	Remake termination or discard rope
Fracture of Strand	C.3.6	Strand fracture	Discard if present
Reduction of Rope Diameter	C.3.7	% reduction	Discard if diameter decreased by 10%
Abrasion of Outer Wires	C.3.8	Degree of deterioration (%)	Discard if over 7%

## External Corrosion

Corrosion of the outer surface of the wire can be detected visually. Wire slackness due to corrosion attack/steel loss is justification for immediate rope discard.

## Internal Corrosion

This condition is more difficult to detect. If there is any indication of internal corrosion, the rope should be subjected to internal examination carried out by a competent person.

**Confirmation of severe internal corrosion is justification for immediate rope discard.**

### 6.5.4 Methods of Connecting Tails

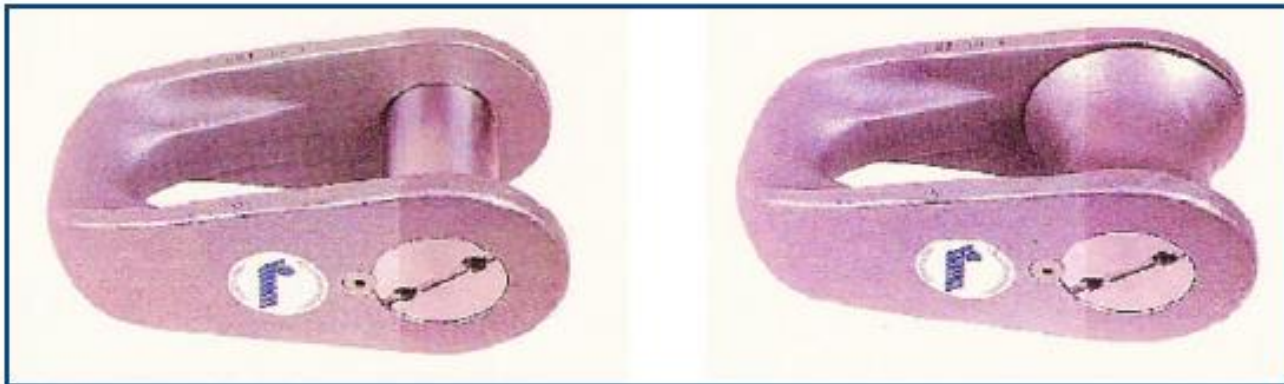
Tails should be connected to a wire mooring line using appropriate shackles, for example, those manufactured by Mandal, Tonsberg and Boss (Figure 6.8). The SWL of the joining shackle should be equal to, or greater than, the SWL of the mooring line to which it is attached.



a) Fibre rope in the bolt, wire rope around the body. Tonsberg



b) Wire rope in the sheave, fibre rope around the body. Mandal



c) Link supplied with bolt or roller. Boss

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**Figure 6.8: Typical Links for Connecting Lines with Tails**

### 25.3.5

... **Splices** in both ropes and wires should be inspected regularly to check they are intact. Where wire rope is joined to fibre rope, a **thimble** or other device should be **inserted in the eye of the fibre rope**.

Both wire and fibre rope should have the **same direction of lay**.

Cow hitch



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# FIBRE -MOORING LINES

The most common materials used for fibre mooring lines are **polyester**, **polyamide**, **polypropylene** and polyethylene. Some ropes are made of combinations of these materials.

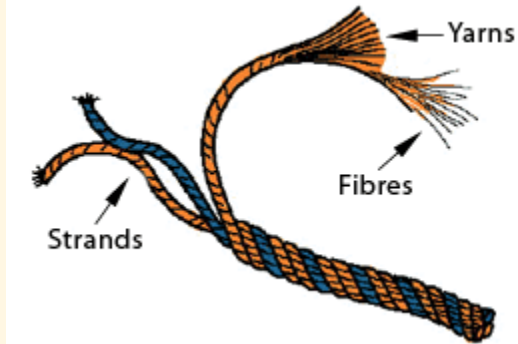


25.3.5 Mooring ropes, wires and stoppers that are to be used in the operation should be in **good condition**, Ropes should be frequently inspected for both external wear and wear between strands.

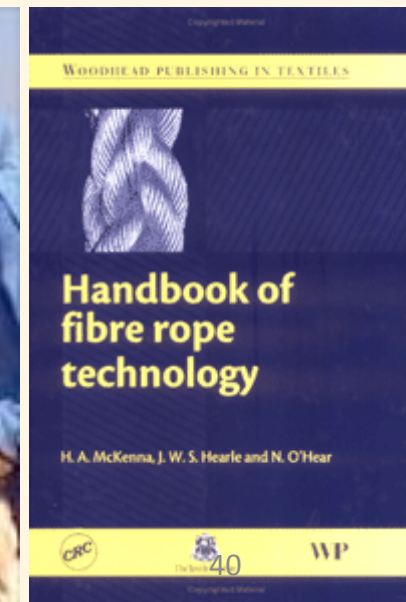
Material	Specific Gravity	Specific Modulus N/tex	Specific Strength N/tex	Dynamic Coefficient of Friction against Metal	Melt Point Deg. C	Other Characteristics
Polyester	1.38	10	0.84	0.12 – 0.15	256	Good wet internal abrasion resistance
Polyamide	1.14	4	0.84	0.1 – 0.12	218	10-15% Wet strength loss. Poor wet internal abrasion resistance
Polypropylene	0.91	8	0.73	0.15 – 0.22	165	Lighter than water. Low strength

## Selection Criteria:

- Strength
- Construction
- Elastic Elongation
- Coefficient of Friction



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## Polyester

Polyester is the **most durable** of the common materials. It has **high strength**, both wet and dry. It has good **resistance against external abrasion** and does not lose strength rapidly due to cyclic loading.

Polyester's low coefficient of friction allows it to slide easily around bitts. Its relatively high melting POINT (256°C) reduces the chances of fusion. Polyester is therefore useful for large and small ropes where strength and durability are important and where moderate elasticity is required.

## Polyamide (previously referred to as 'Nylon')

Polyamide rope **loses 10 15% of its strength when wet**. It has the highest elasticity of regularly used materials with good temperature and abrasion resistance.

## Polypropylene

Polypropylene rope has approximately the **same elasticity as polyester rope**.

Polypropylene has **limited temperature resistance** and has **poor cyclic loading characteristics**. **Prolonged exposure to the sun's ultraviolet rays can cause polypropylene fibres to disintegrate.**

Polypropylene is **lighter than water** and can be used for **floating** messenger lines.

**The use of moorings manufactured from 100% polypropylene is not recommended.**

However, suitable composites or melt mixes with other fibres such as polyethylene or polyester are available and acceptable for use as moorings.

The **melting point** (or, rarely, liquefaction point) of a solid is the temperature at which it changes state from solid to liquid

	Polyester	Polyamide	Polypropylene	
			Split mono Multi PP2	High Strength Multi PP3
	EN ISO 1141	EN ISO 1140	EN ISO 1346	
Ref Number	kN	kN	kN	kN
52	380	479	332	379
56	437	550	381	436
60	500	627	433	495
64	566	709	488	558
72	708	887	608	692
80	867	1,080	740	850
88	1,040	1,300	887	1,010
96	1,230	1,530	1,040	1,190

Table: **Minimum Breaking Forces** in kN of Synthetic Ropes (New, Dry Ropes, Unspliced)

Notes:

1. 'Ref Number' is the approx diameter in millimeters
2. A spliced test piece must achieve at least 90% of EN and ISO standard values

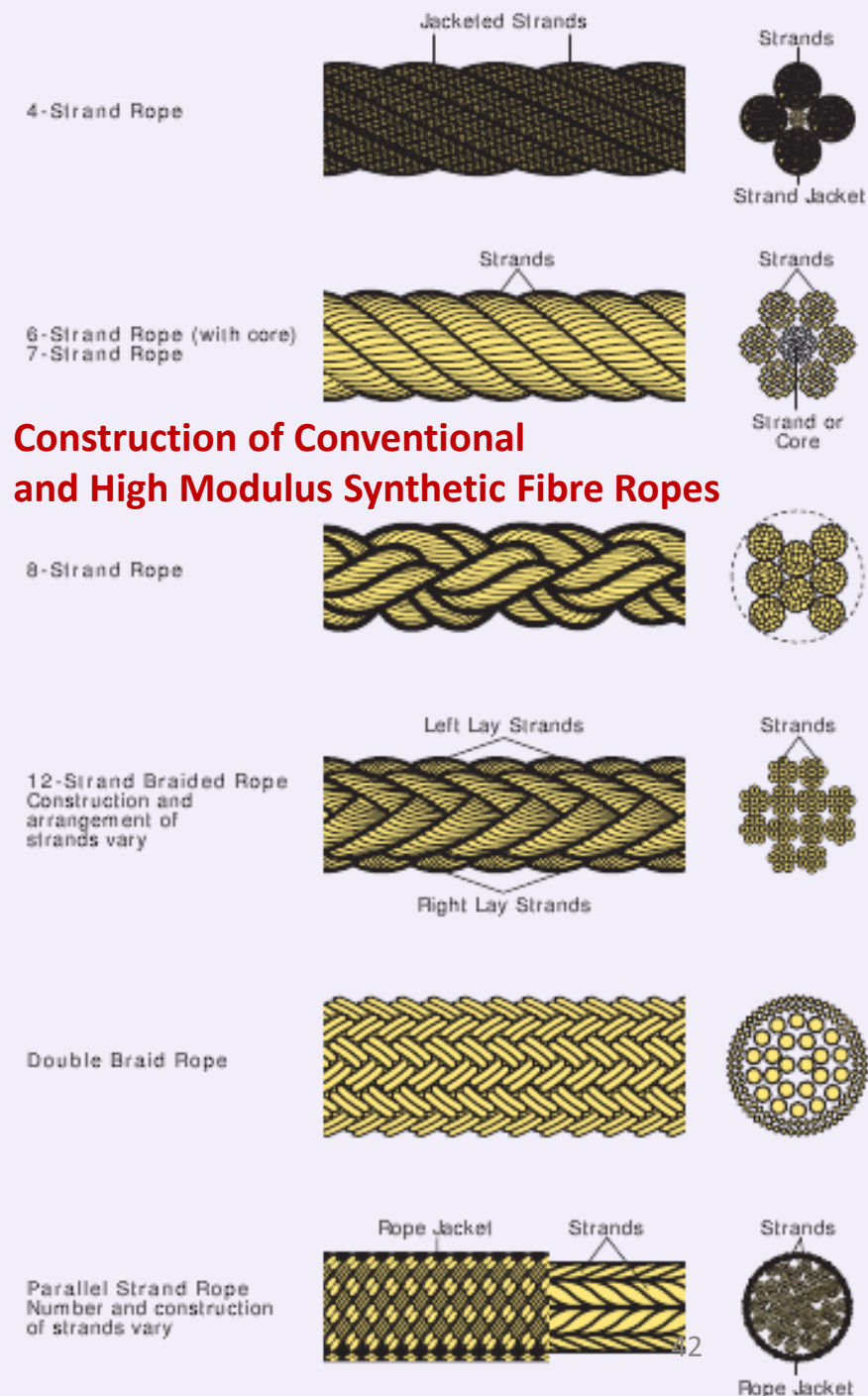
# Handling and Storage of Synthetic Lines

## Handling

- **Surging** of lines on winch warping drums is **not recommended** for synthetic lines.
- **Stoppers made of polyester are recommended.** They should be used in **double line configurations.**
- When holding and tensioning the line on the **warping drum**, capstan or bitt, the line handler **must stand** back and grasp the line **about 1 metre** from the drum or bitt.
- Synthetic lines are **not very resistant to cuts and abrasion.**
- Care should be taken when dragging synthetic lines along a deck. Contact with sharp edges and rough surfaces should be avoided.
- When **dirt, grit or rust - internal abrasion** will result.
- Twisted rope must be coiled in the proper direction. **Most lines are right-hand lay and should be coiled clockwise.**
- When removing new rope from a coil, the coil should be suspended on a shaft and rotated.
- Winch-mounted synthetic lines should be periodically **end-to-ended** to distribute wear.

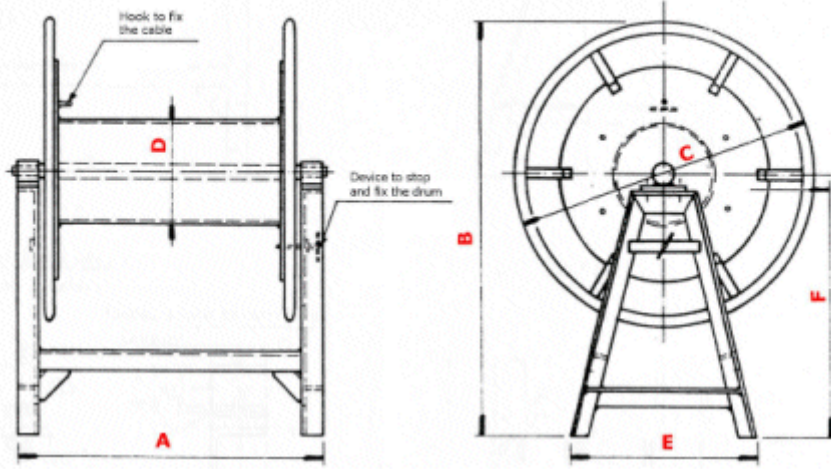
## Storage

- Should be stored **in clean and dry** surroundings. Excessive heat can damage synthetic fibres, especially polypropylene and polyethylene.
- **Ultraviolet** rays from sunlight can **damage fibres.** (Polypropylene and polyethylene). Small ropes should never be stored in direct sunlight.
- **Chemicals, oil and petroleum products damage most synthetic lines if they are stored in paint lockers or near paints and paint fumes.**
- If a line becomes oily or greasy, it should be scrubbed with fresh water and soap.



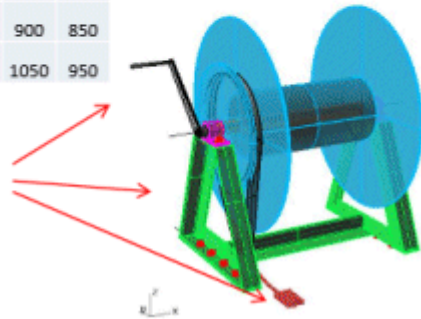
**25.3.6** Ropes and wires which are **stowed on reels** should not be used directly from stowage, but should be **run off and flaked out on deck** in a clear and safe manner, ensuring **sufficient slack** to cover all contingencies. If there is doubt of the amount required, then the complete reel should be run off.

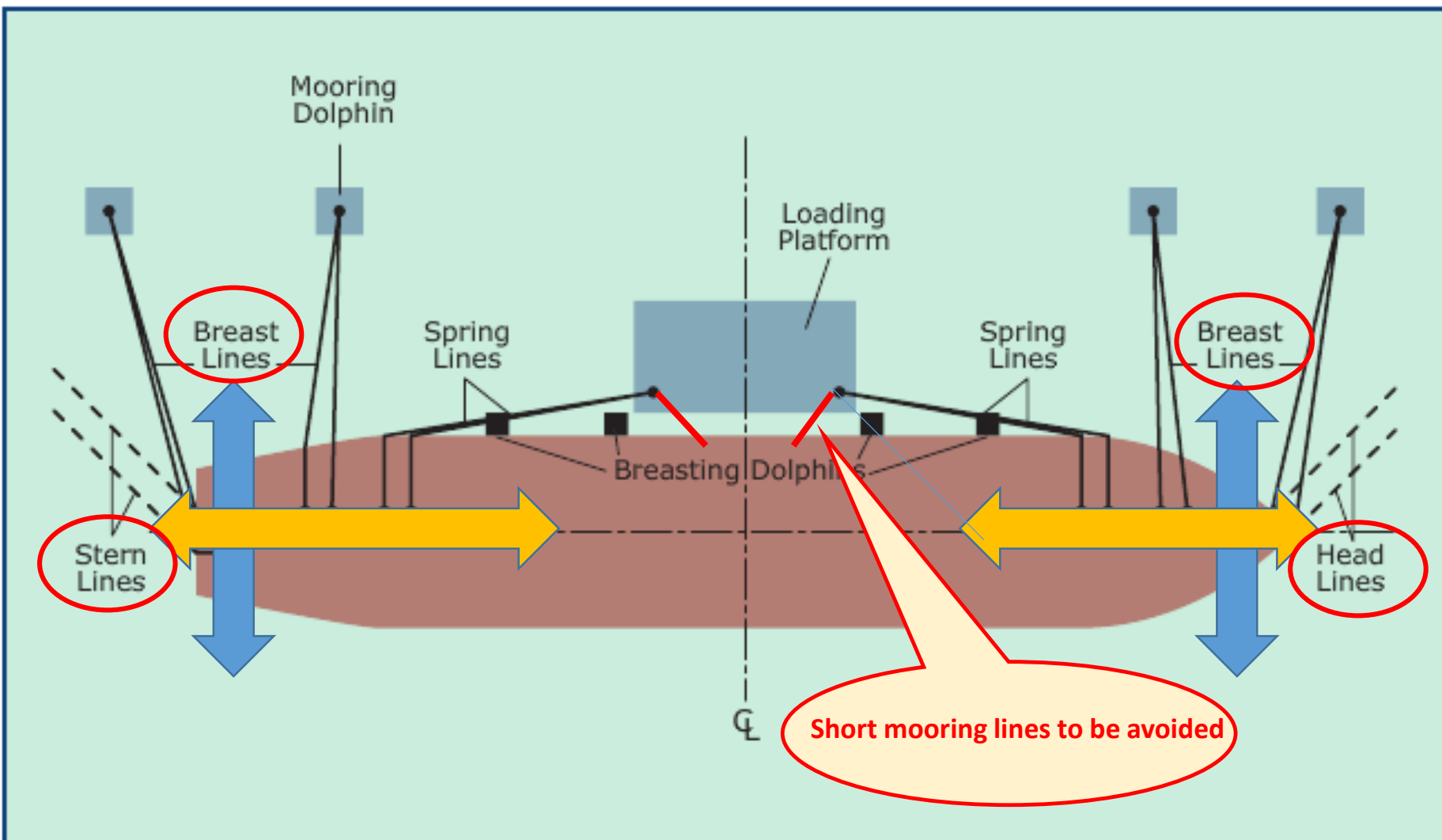
## Hand – Operated Rope Reel



Nominal Size	For Rope diam.	Drum Capacity	A	B	C	D	E	F
Type	mm	up to Meters						
1	up to 25		1005	1255	810	25	720	800
2	26 - 35	200	1050	1405	1010	350	800	850
3	36 - 45		1085	1505	1210	450	900	850
4	46 - 55		1310	1665	1330	550	1050	950

Custom Rope reel can be supplied in accordance to requested sizes. Pedal brake, Left or right Handle can be offered on request. Standard execution over painting or HDG





**25.3.7** It is often difficult to achieve an ideal mooring layout. Ship's equipment can be employed to the best advantage if the following general principles are remembered:-

(a) **breastlines** provide the bulk of athwartships restraint;

(b) **backsprings** provide the largest proportion of the longitudinal restraint;

(c) **very short lengths of line should be avoided** when possible, as such lines will take a greater proportion of the total load, when movement of the ship occurs.

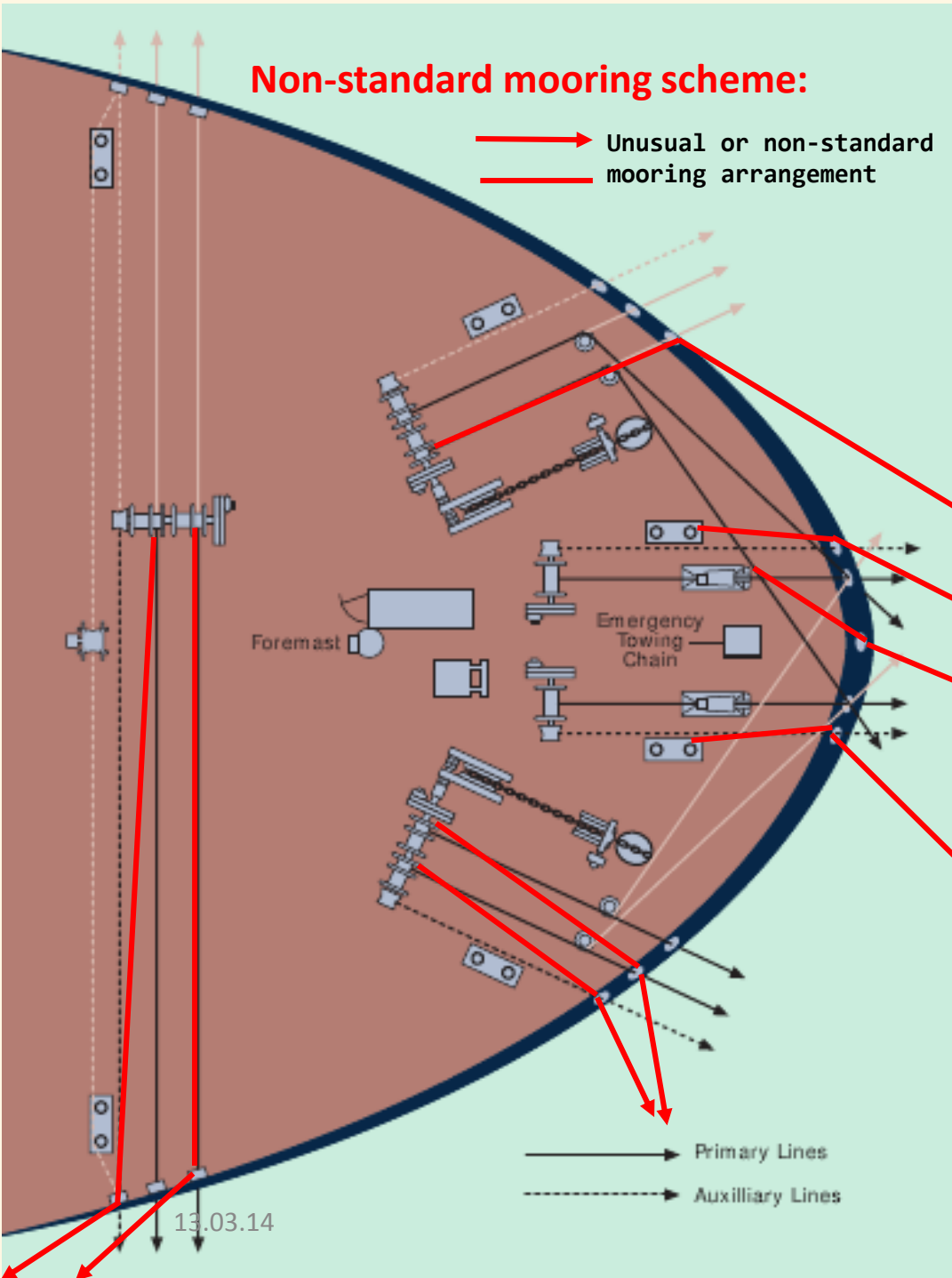
### Forces Acting on the Ship

The moorings of a ship must resist the forces due to the following factors:

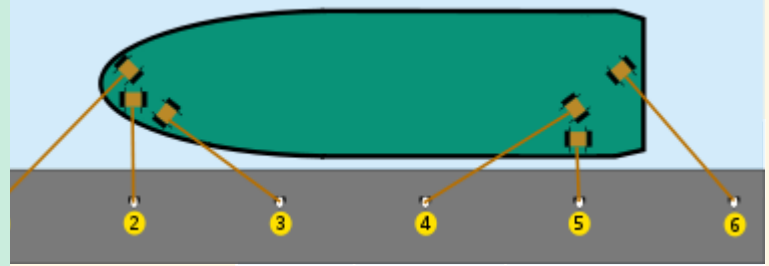
- **Wind + current + tides**
- **surges from passing ships**
- **waves + swell + seiche**
- **ice**
- **changes in draft + trim + list.**

### Non-standard mooring scheme:

→ Unusual or non-standard mooring arrangement



### A typical mooring scheme:



Number	Name	Purpose
1	Bow line	Prevent backwards movement
2	Forward Breast line	Keep close to pier
3	After Bow Spring line	Prevent from advancing
4	Forward Quarter Spring line	Prevent from moving back
5	Quarter Breast line	Keep close to pier
6	Stern line	Prevent forwards movement

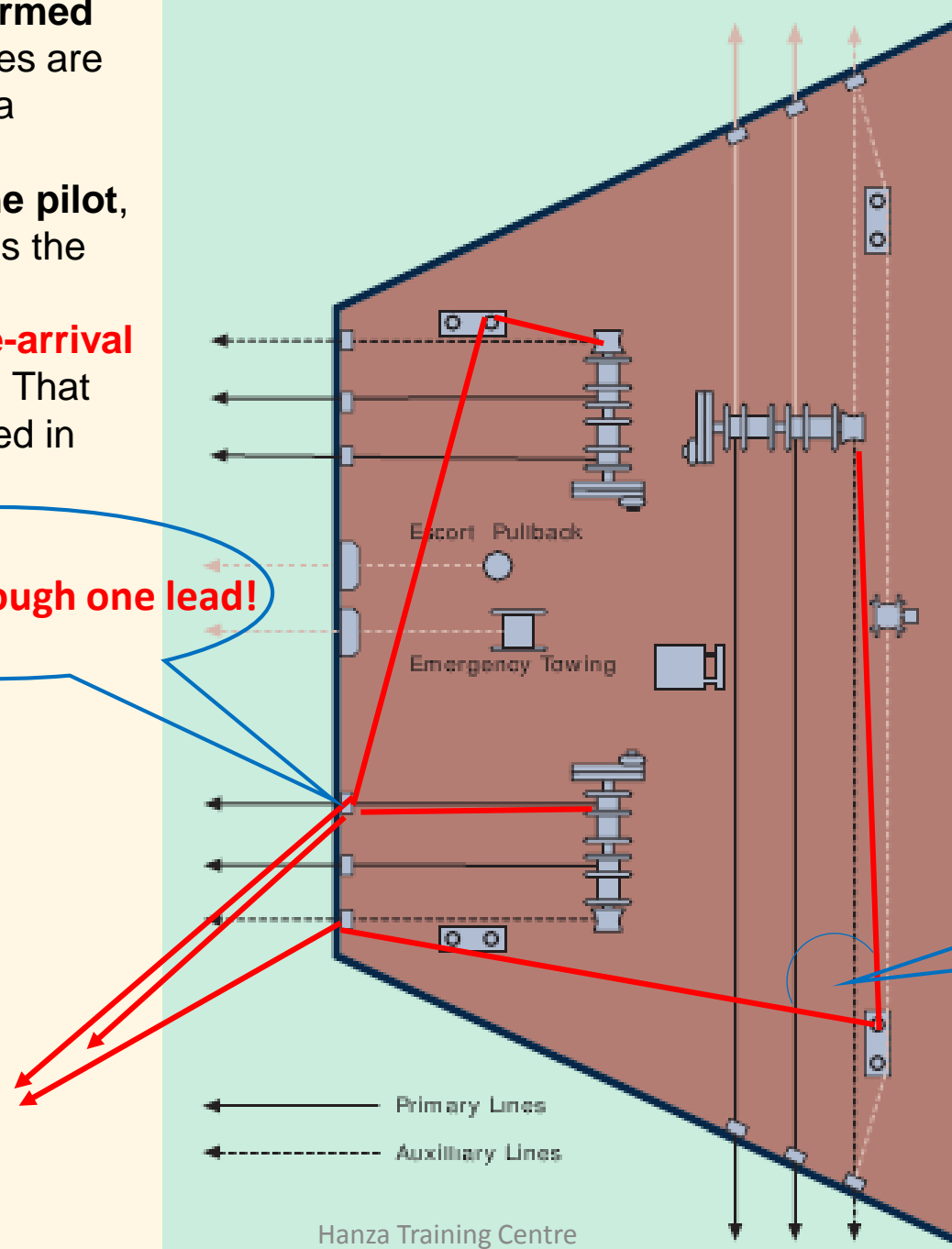
**25.3.8** Careful thought should be given to the layout of moorings, so that leads are those most suited without creating sharp angles, and ropes and wires are not fed through the same leads or bollards. Pre-planning of such operations is recommended and a risk assessment of the operation should be completed, especially in cases where the ship is having to use an unusual or non-standard mooring arrangement.

In some ports, the **mooring team is informed quite late** about which and how many lines are going to be used and about the need for a tugboat.

This information is usually provided **by the pilot**, who then informs the captain, who informs the mooring teams fore and aft by radio. It is therefore a **good idea to carry out a pre-arrival meeting** (some call it a toolbox meeting). That alternative arrangements can be discussed in good time without any rush.



Two ropes through one lead!

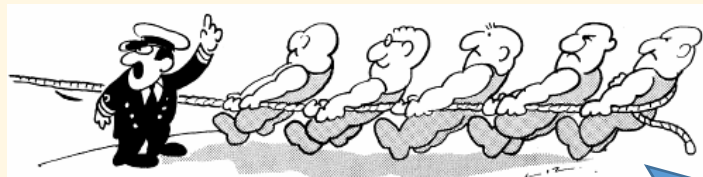


**25.3.8** Careful thought should be given to the layout of moorings, so that leads are those most suited without creating **sharp angles**, and ropes and wires are not fed through the same leads or bollards. Pre-planning of such operations is recommended and a risk assessment of the operation should be completed, **especially in cases where the ship is having to use an unusual or non-standard mooring arrangement.**

Sharp angle!  
Something's wrong, guys!!!



**Operator of winches should be competent personnel!**



'a heaving system of some kind'



**25.3.9 Personnel should not in any circumstances stand in a bight of rope or wire. Operation of winches should preferably be undertaken by competent personnel to ensure that excessive loads do not arise on moorings.**

**bight** [bait] - шлаг (троса) , бухта троса 4) угол Syn: angle

**Remember – bights do not always look like bights!**

**THE BEST WAYS TO AVOID ACCIDENTS DUE TO BIGHTS OF LINE ARE:**

- The crew must at all times be aware of where they are standing while handling lines or when near them.

**The supervisor must concentrate on others' actions and should not get involved in operations as a working hand !!!!**

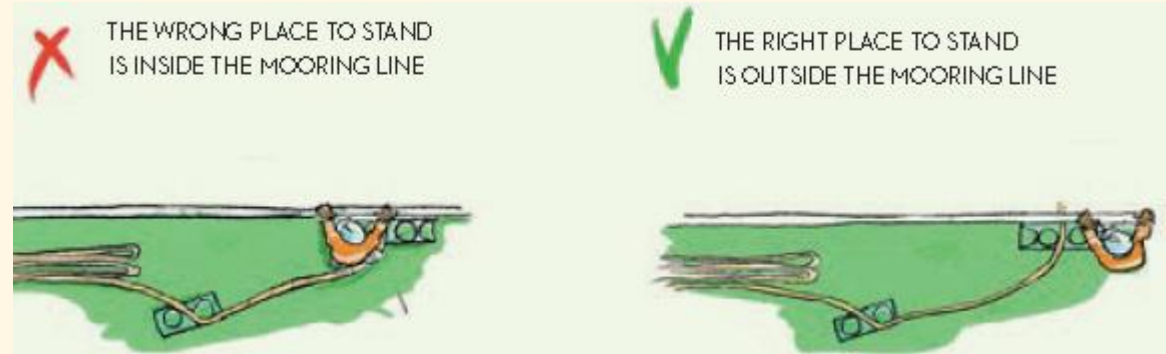
- Inexperienced crew such as cadets and fresh ratings should only be allowed to handle lines under supervision.

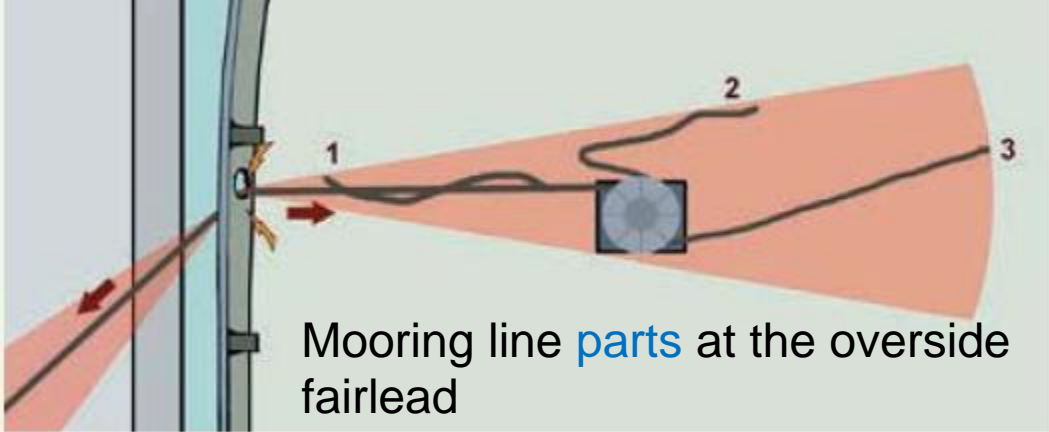
- Only the crew required should be present at the mooring station. Persons not actively involved in the mooring operation (engine or off-duty crew coming on deck) have often been seen visiting the area of the mooring station. So a restricted entry notice should be posted.

- Sufficient deck hands are to be present at the mooring station to perform the operation smoothly.

**Caught by a bight**

Watch out for bights. It is very dangerous to stand in a bight of line or wire. It is extremely important that competent personnel are used to operate winches to ensure that mooring, towing and hauling lines are not subject to sudden, excessive loads.





## THE DRAWINGS ILLUSTRATE SNAP BACK ZONES IN DIFFERENT SET-UPS

THE FIGURES SHOW THE ROUTE OF THE LINE

**25.3.10** When moorings are under strain **all personnel** in the vicinity should remain in positions of safety, **i.e. avoiding all 'Snap-Back' Zones.**



### The killing force of a broken line:

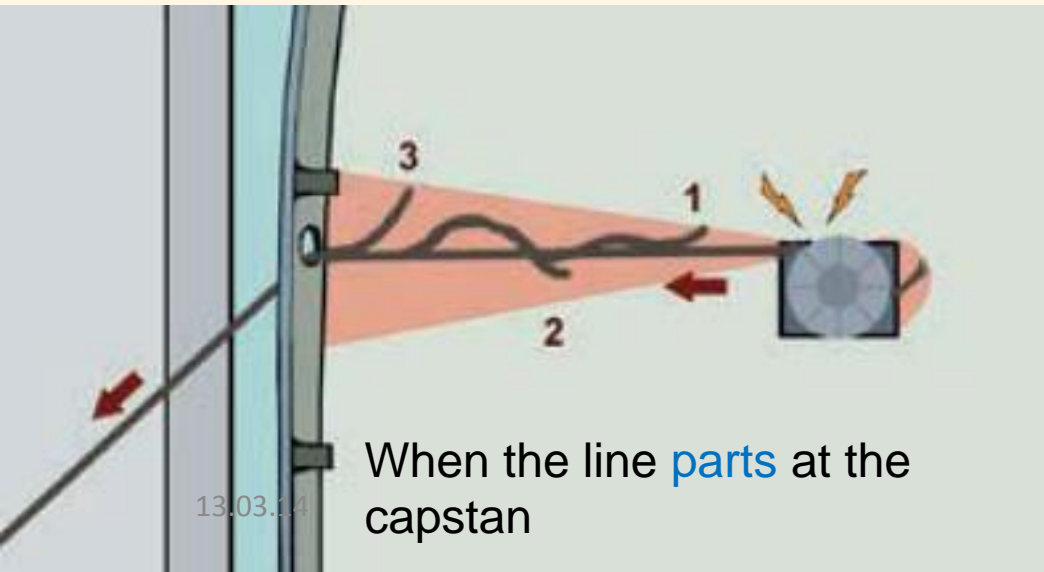
**The area travelled by a parted line with enough force to kill someone on its way is known as the snap back zone.**

If any line parts with a bang, then its **broken ends are moving faster than 690 knots** which is the speed of sound in air.

**1, 2, 3 – position of broken rope (line)**

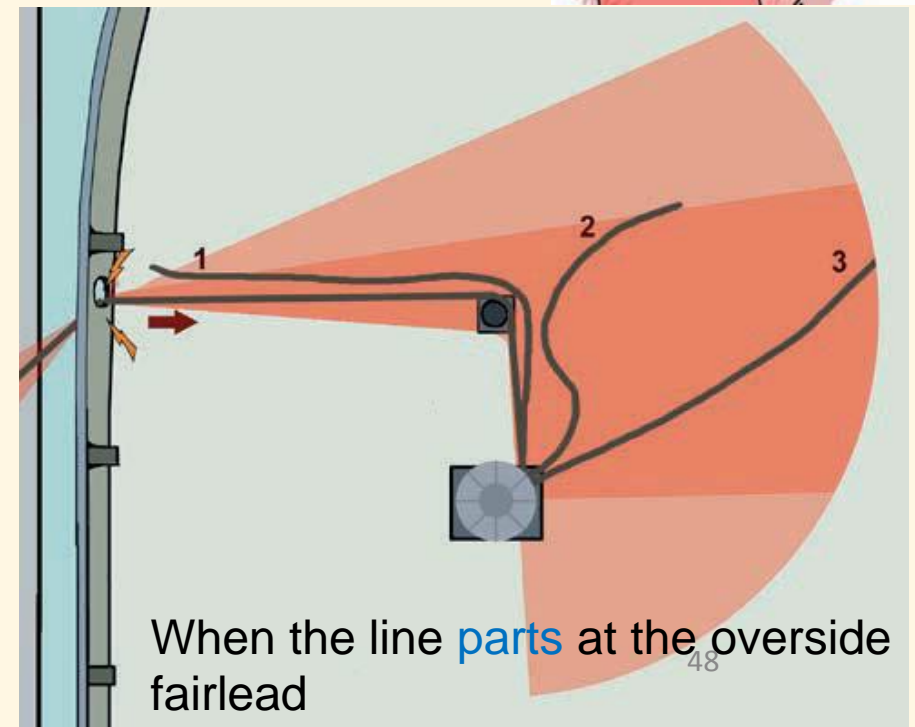


**- Point of rope break (burst)**

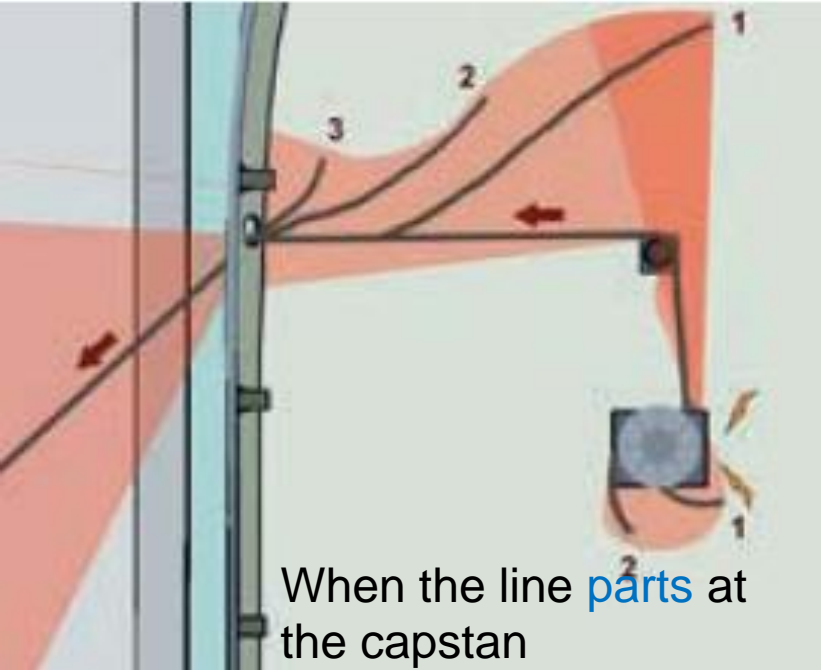


**snap back** - отскок, резкое раскручивание

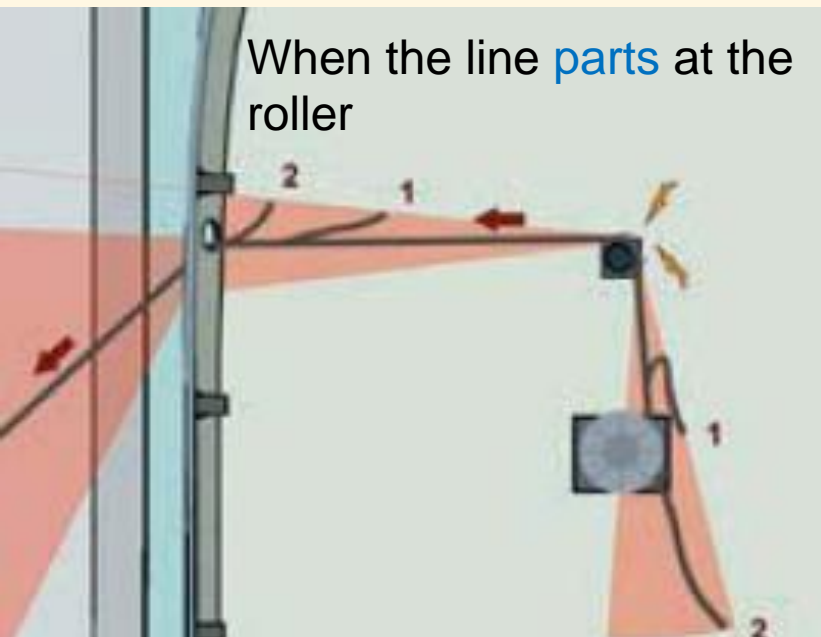
**part** – гл. а) разделяться, разрываться, раскалываться; б) разделять, разрезать, разъединять. Syn: divide , break ,







When the line parts at the capstan



When the line parts at the roller

The most serious danger from synthetic ropes is "snapback" which is the sudden release of the energy stored in the stretched synthetic line when it breaks.

The primary rule is to **treat every synthetic line under load with extreme caution; stand clear of the potential path of snapback whenever possible!**

Synthetic lines normally break **suddenly** and **without warning**.

Unlike wires, they **do not give audible signs** of pending failure and they may not exhibit any broken elements before completely parting.

When a line is loaded, it stretches. Energy is stored in the line in proportion to the load and the stretch.

**When the line breaks, this energy is suddenly released.**

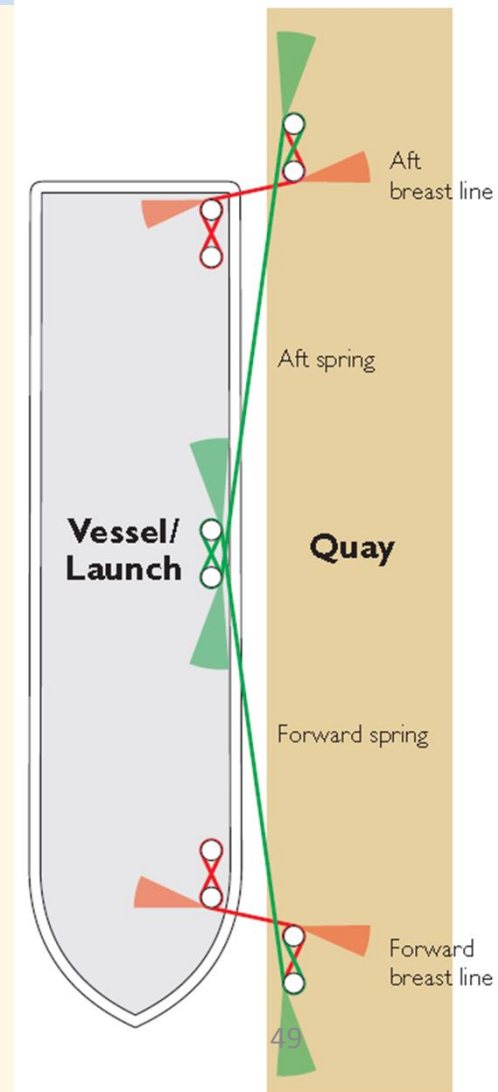
**The ends of the line snap back striking anything in their path with tremendous force.**

This snapback is common to all lines. Even long wire lines under tension can stretch sufficiently to snap back with considerable energy.

**Synthetic lines are much more elastic, and thus the danger of snapback is more severe.**

The potential path of snapback extends to the sides of and far beyond the ends of the tensioned line.

**25.3.10** When moorings are under strain **all personnel** in the vicinity should remain in positions of safety, **i.e. avoiding all 'Snap-Back' Zones**.



**Stand well clear of the potential path of snapback !**

# Marking of snap-back zones on mooring stations:

## Wrong marking can lead to incident!

### Are they correct ?

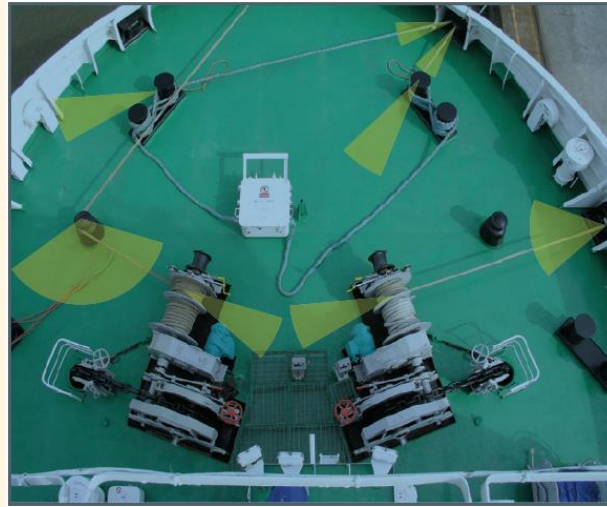


# RECOMMENDED:

1. Make a picture or take a drawing of mooring arrangements

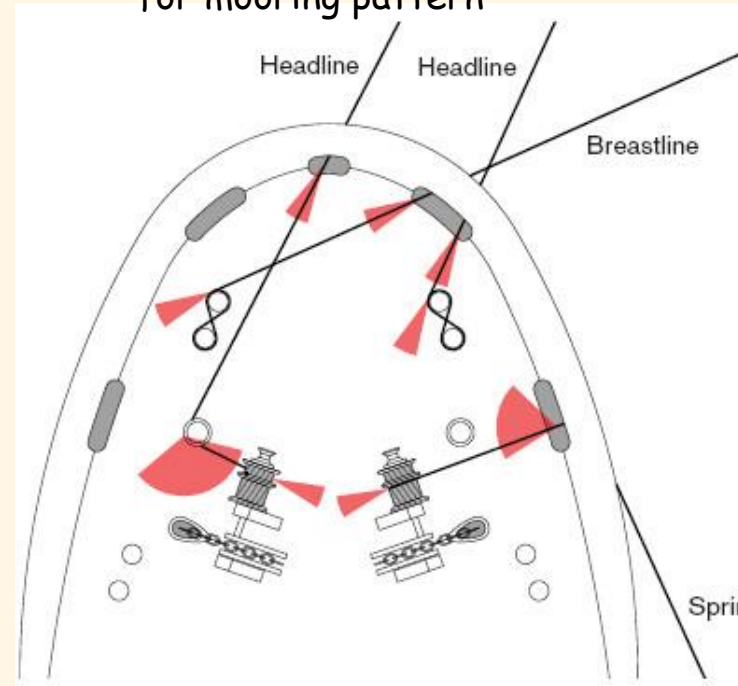


2. Identify danger areas

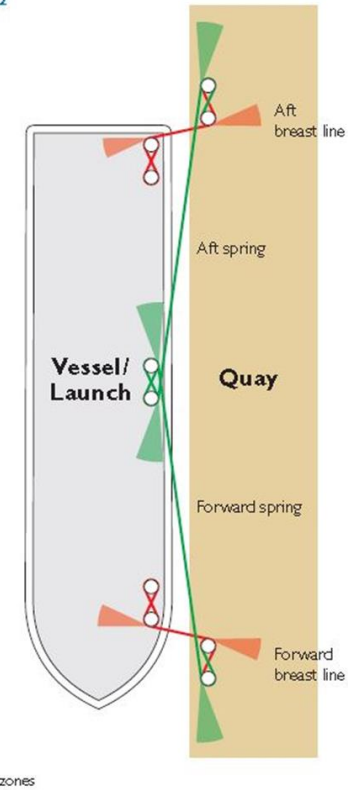


25.3.10 It is strongly recommended that a **bird's eye view** of the mooring deck arrangement is produced (an aerial view from a high point of the ship can be utilised) to more readily identify danger areas.

3. Make a snap-back zones scheme for mooring pattern



Annex 25.2



The full and safe Mooring Arrangement for small Domestic, Passenger Craft and Ships Launches illustrating potential 'Snap-Back' Zones

Annex 25.1 contd.

ANNEX 25.1

Diagrams of simple and complex mooring systems and an example of an actual mooring deck arrangement, illustrating the associated 'snap-back' zones.

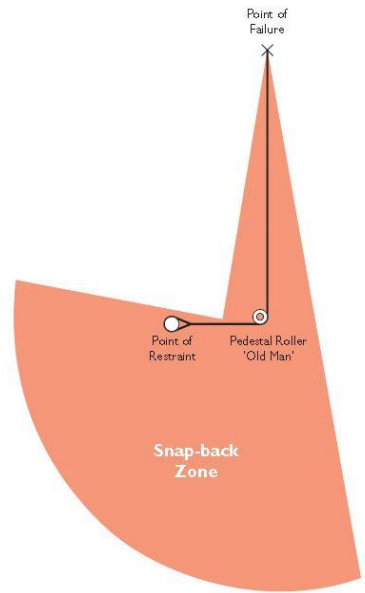


Diagram 2 - A Complex Mooring System Illustrating The Potential "Snap-Back" Zone Area

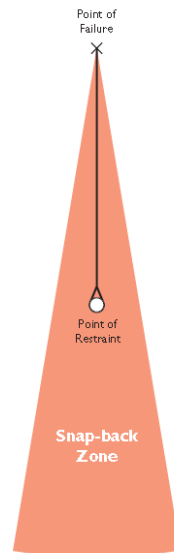


Diagram 1 - A Simple Mooring System Illustrating The Potential "Snap-Back" Zone Area

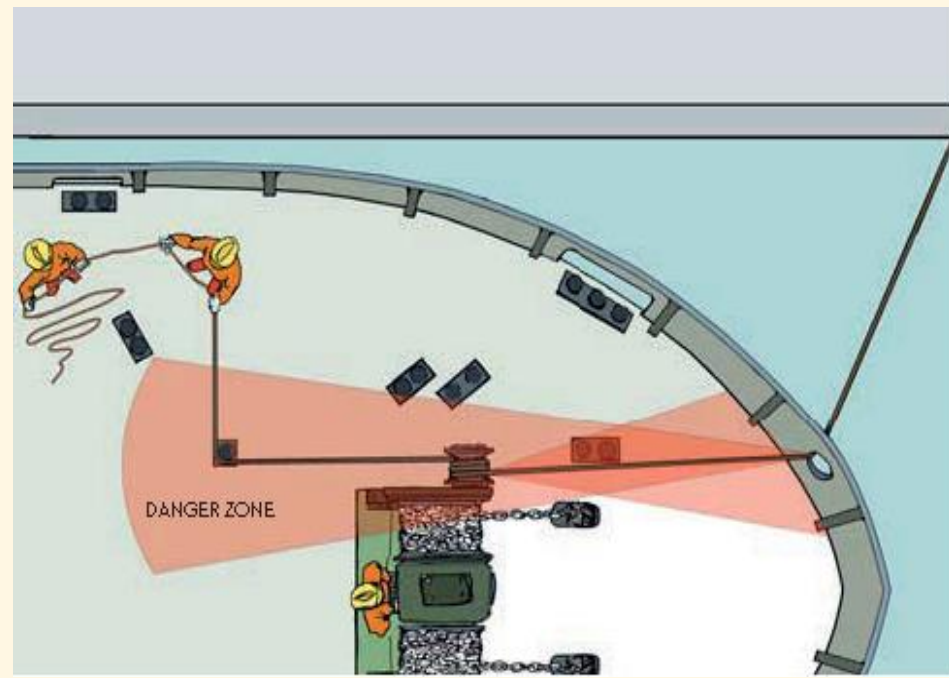
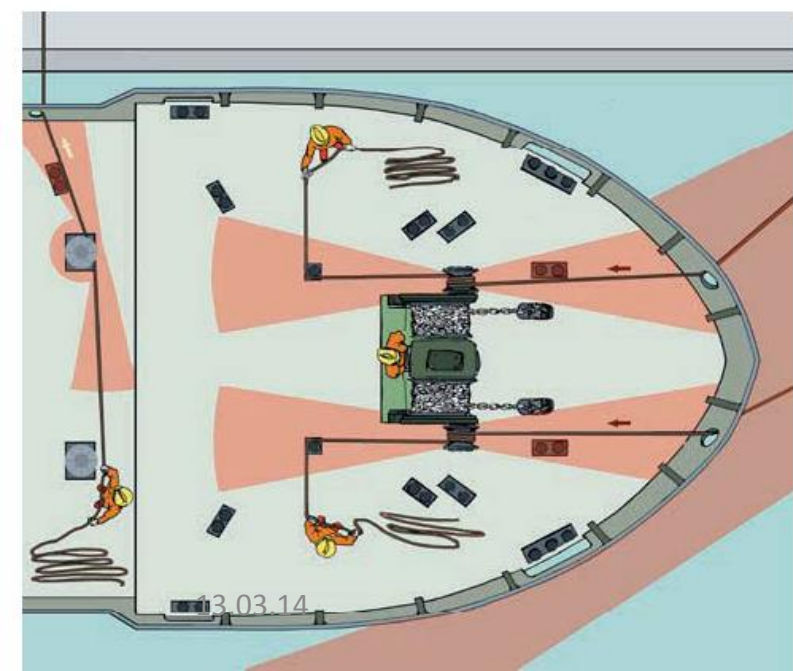
**X** IT IS IMPOSSIBLE TO WORK THE LINES WITHOUT THE CREW STANDING IN SUCH LARGE SNAP BACK ZONES.



# Can you identify snap-back zones and assess a risk looking on these pictures?

**CREWMEN ARE CLEAR OF THE DANGER ZONE**

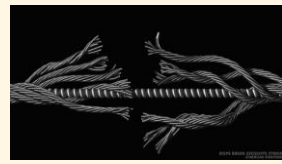
**THE CREW CAN WORK THE LINES WITHOUT STANDING IN THE SNAP BACK ZONES.**



**25.3.11** Annex 25.1 shows diagrams of simple and complex mooring systems, as well as an example of an actual mooring deck arrangement, illustrating the associated 'Snap-Back' Zones.

**25.3.12** Further information on 'Snap-Back' Zones can be found in section 6.3.5 of the Oil Companies International Marine Forum (OCIMF) publication "Mooring Equipment Guidelines".

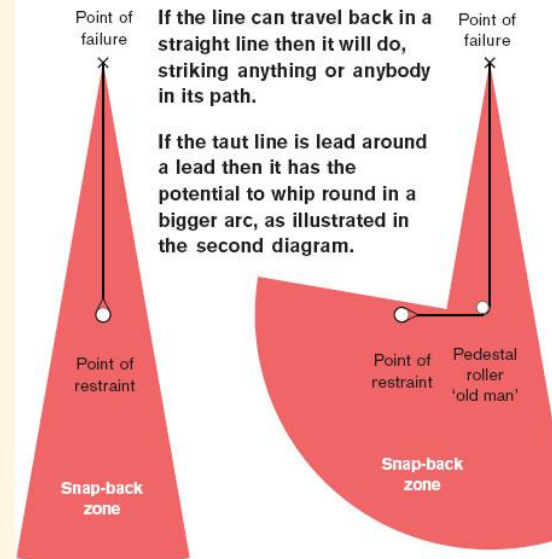
## THE BEST WAYS TO AVOID BEING HIT BY BROKEN LINES:



- Keep a close eye on your workmates and **alert** them immediately **if any of them are in a snap back zone.**
- **Treat every line under load with extreme caution** and remember to **stay clear** of the potential path of a **snap back.**
- Experience shows that the first lines ashore, such as spring lines, have the greatest potential of breaking as they are the only lines holding the ship. So **be extra aware where you stand when handling the first line.**
- When lines are subject to a straight pull, the snap back zone is minimal, but **if the lines are angled round a bollard or roller, then the snap back area increases.**
- The crew performing the operation must be thoroughly trained and **qualified to appreciate snap back zones.** This could be done by a constant focus at **pre-arrival meetings and in risk assessment processes.**
- Be aware of the risk of a **line snapping back onto the deck** if it parts outboard of the ship's side, particularly if the deck is protected only by open railings.



Reproduced with the kind permission of the Cayman Islands Shipping Registry



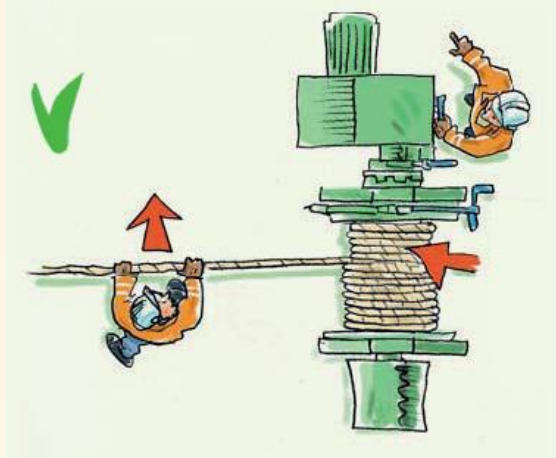
**25.3.10 Immediate** action should be taken to **reduce the load** should any part of the system appear to be **under excessive strain.**



**Once again - Watch, please video to  
memorize...**

**Please watch a Video on WEB page**





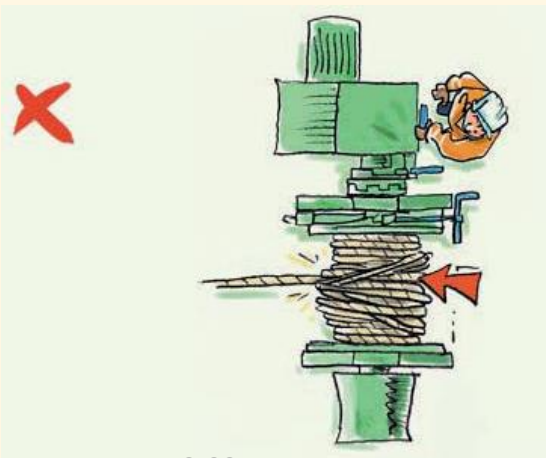
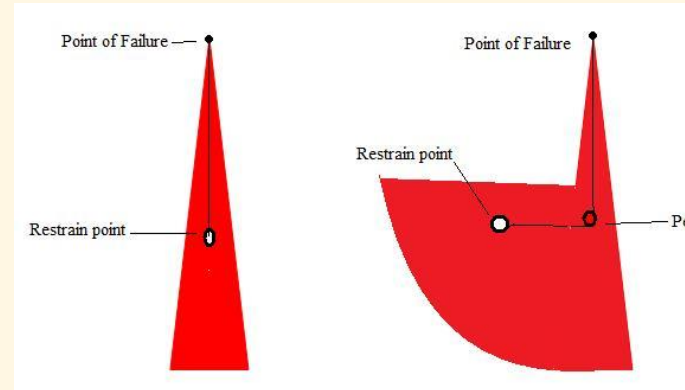
25.3.10 Care is needed so that ropes or wires will not jam when they come under strain, so that if necessary they can quickly be slackened off.

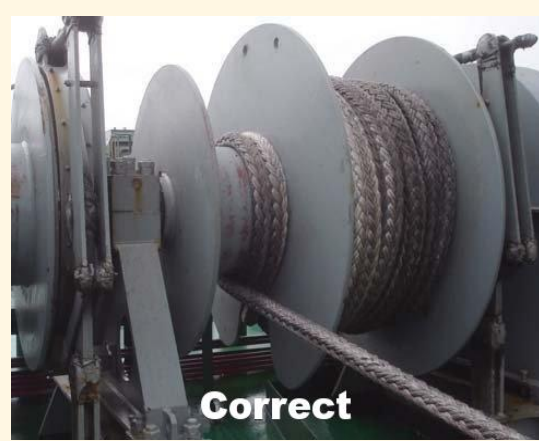
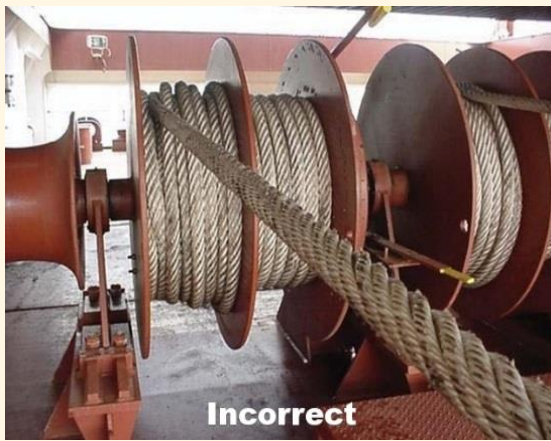
Where a mooring line is led around a pedestal roller fairlead, the 'Snap-Back' Zone area will change and increase in area.

Where possible, lines should NOT be led round pedestals except during the operation of mooring the ship, thereafter lines should be made up on bits, clear of pedestals if at all possible.

In bad spooling, riding turns trap the line in gaps in lower layers.

Poorly spooled lines should be manually re-spooled properly before each berthing.





**25.3.13** Where moorings are to be heaved on a drum end, one person should be stationed at the drum end, backed up by a second person backing and coiling down the slack. In most circumstances **three turns on the drum end are sufficient** to undertake a successful operation. A wire on a drum end should never be used as a check wire.



**25.3.14** A wire should never be led across a fibre rope on a bollard. Wires and ropes should be kept in separate fairleads or bollards





## ONCE AGAIN -

### Samples of bad practice

#### Mooring line chafing against winch structure

Lines not paid out properly may rub on the ship's structure (winch frames, platforms, etc.) involving a considerable risk of damage through chafing, abrasion or cutting.



Synthetic mooring line heaved tight on the storage section of a split-drum type winch.



Fairlead rollers being "strangled" in order to improve the incoming angle on the winch drum  
Strangling the roller causes the mooring line to chafe.



### **Improper spooling of wire line**

Wire mooring line irregularly/unevenly spooled onto the winch drum.

Note crossed wires in underlying layers which are severely damaged or crushed by upper layers of the wire.



**ONCE AGAIN -**

## **Samples of bad practice**



### **Abrasion damage to mooring lines from frozen fairleads**

Chafing between a mooring line and other equipment such as cocks and fairleads causes surface abrasion.

Rust or evidence of wear may be an indication that the rollers do not rotate freely.



### **Mooring wire and lines through same Panama lead**

Friction or chafing between mooring lines and mooring wire causes damage from surface abrasion and contamination of the line.

The lubricated mooring wire leaves grease deposits on the Panama lead and stains mooring lines with grease residues.

## DO NOT DO LIKE THIS !

Stopper left on lines after they have been secured. It may also result in the stopper rope tightening to the point where it can't be released.



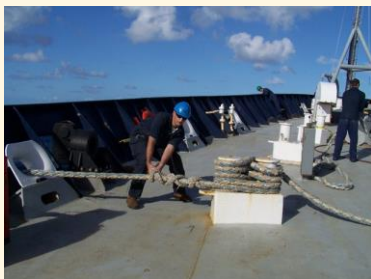
Only rope stoppers should be used with rope mooring lines; chain stoppers are for use with wires.



Use an approved method !



Do not stay too close !



Do not forget PPE even in training !



### Extreme wear and grooving on rollers

Grooving over part of the surface of the roller indicates that the roller is frozen and that the line/wire is always chafing against the roller in the same area.

Grooving or corrosion and scale accelerates damage to the mooring lines/wires.

Generally, and when under tension, lines/wires will tend to settle in the groove which will cause further/accelerated wear to the grooved surface.



### Extreme grooving in button type roller fairlead

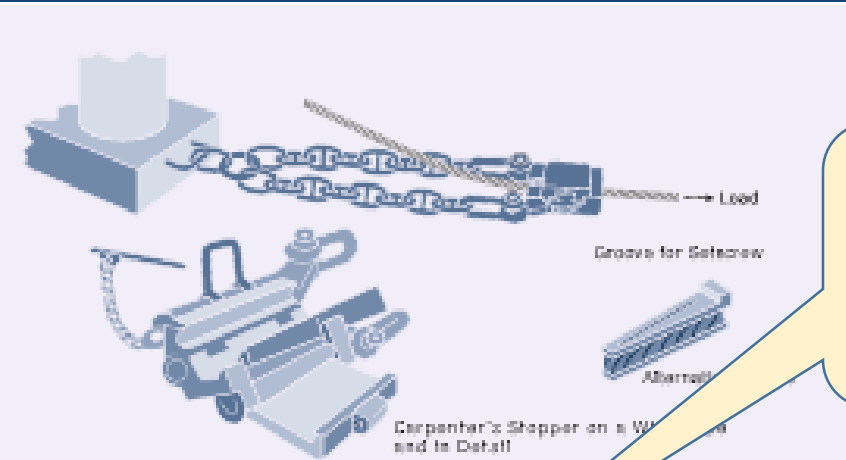
The depth and size of the groove indicate that it has previously been used for wire lines, which might cause bird caging or corkscrewing when new wires are installed.

If the fairlead is subsequently used for lines with a different diameter, the sharp edges of the groove will damage the line through abrasion and chafing.

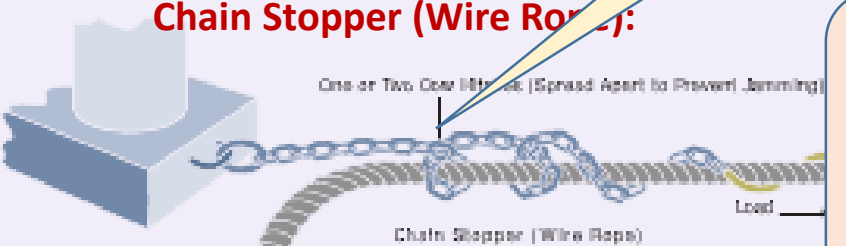


Eye screw pin of D-shackle for connecting the line stopper to the stoppering eye/lug not properly fitted.

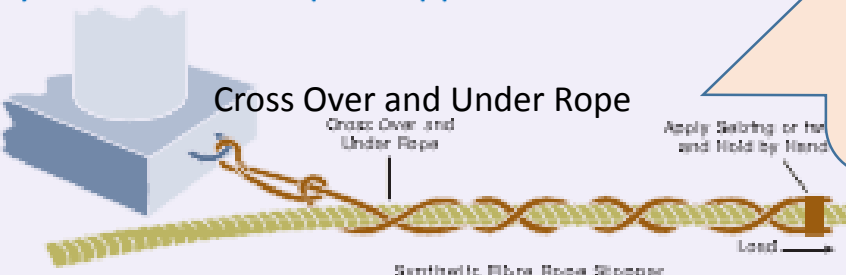
# Unsafe or damaged equipment



**Chain Stopper (Wire Rope):**



**Synthetic Fibre Rope Stopper:**



**Natural Cordage Stopper:**



...COW hitch, suitably spaced...

The double stopper technique is stronger, more reliable, and less likely to twist the Mooring Line.

Experience has shown that the ideal rope for shippers should satisfy the following requirements:

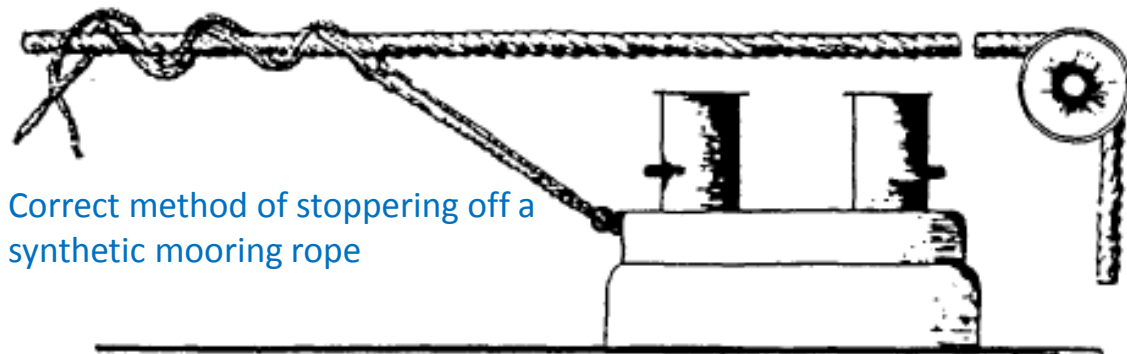
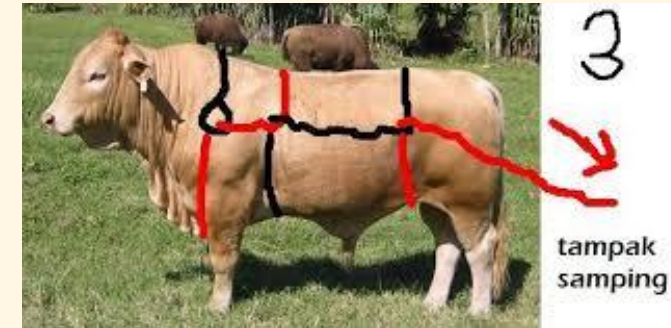
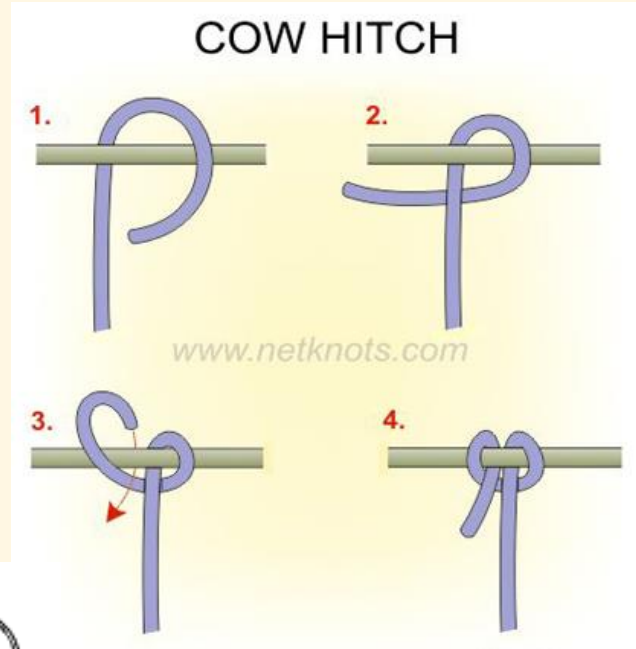
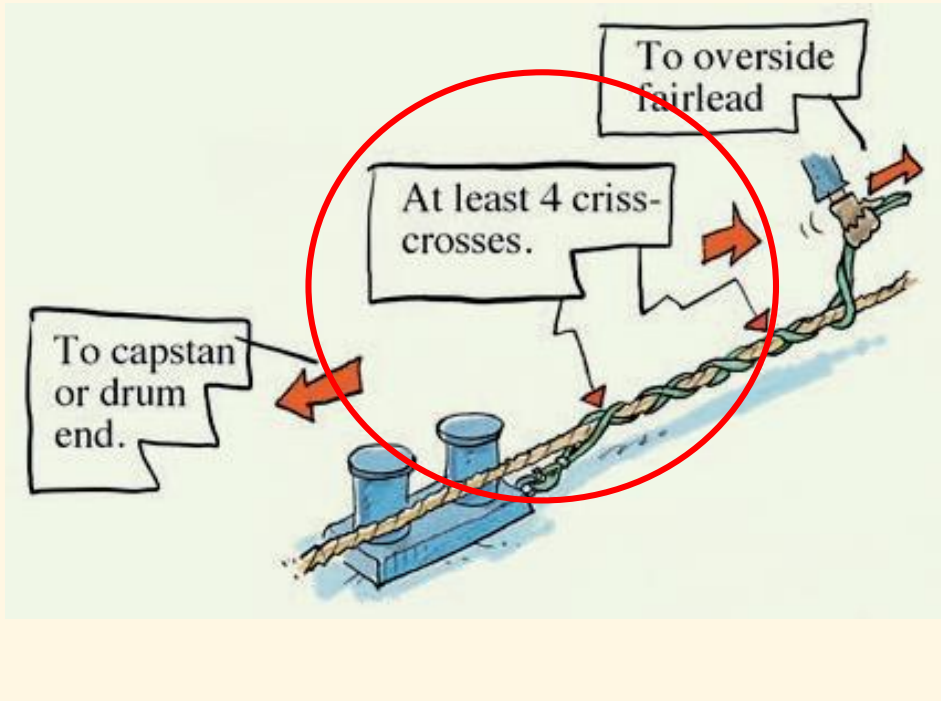
- (a) The stopper should be a synthetic fibre rope.
- (b) The stopper should be used "on the double".
- (c) The stopper should be very flexible and the size should be appropriate for the size of moorings, that is, about 50% of the rope diameter.
- (d) The stopper rope should be of low stretch material.
- (e) The man-made fibre ropes used for the stopper should be made from high melting point material, i.e. polyester or polyamide (?).
- (f) The double rope used for the stopper should, where possible, have a combined strength equal to 50% of the breaking load of the mooring rope on which it is to be used. There is no requirement for fibre handling tail ropes to be proof tested.

25.3.15 When stoppering off moorings the following applies:

- (a) Natural fibre rope should be stoppered with natural fibre.
- (b) Man made fibre rope should be stoppered with man made fibre stopper (but not polyamide).
- (c) The 'West Country' method (double and reverse stoppering) is preferable for ropes.
- (d) Wire moorings should be stoppered with chain, using two half hitches in the form of a cow hitch, suitably spaced with the tail backed up against the lay of wire, to ensure that the chain neither jams nor opens up the lay of the wire.

# Once again - About stopper...

# How to tie Cow Hitch?

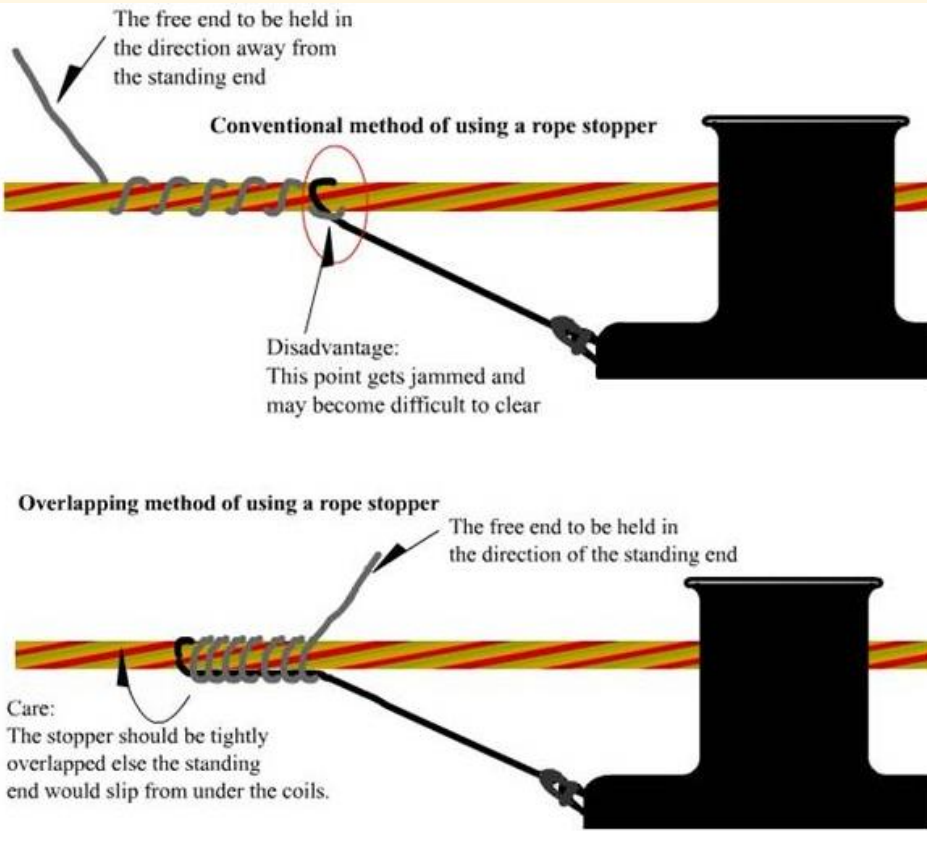


Correct method of stoppering off a synthetic mooring rope



Cow hitch

## Conventional and overlapping method



## Rat-Tail Stopper Tying:

The two ends are then wrapped around the Mooring Line.

The two ends alternately pass over and under each other.

After several complete turns have been made, the ends are secured with a Square Knot (Video) ↓

The abbreviated name "**Stopper**" is commonly used. In technical publications several names are used including:

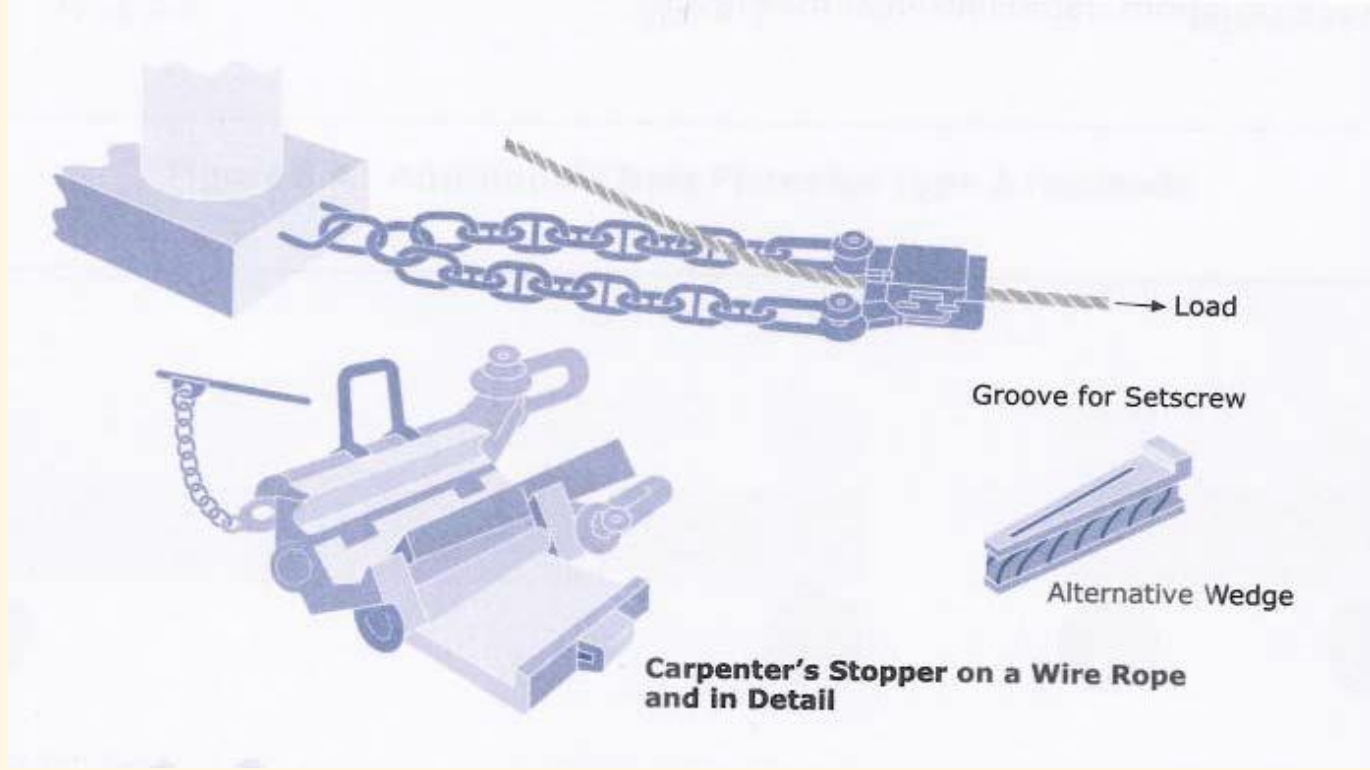
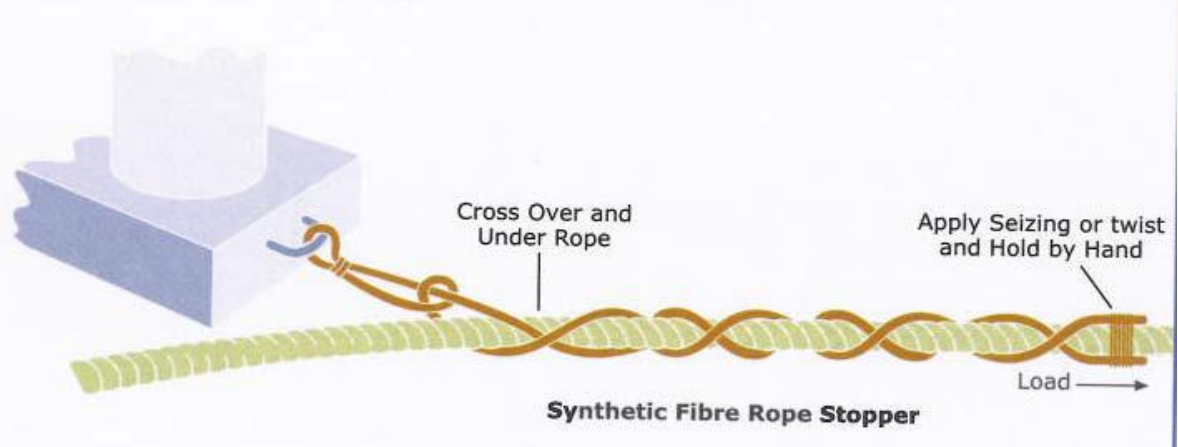
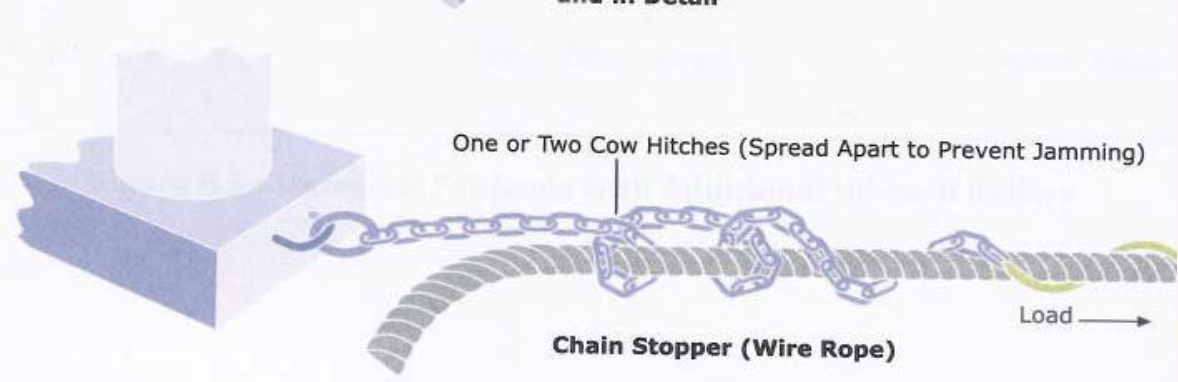
Mooring Line Stopper;

Rat-Tailed Stopper and

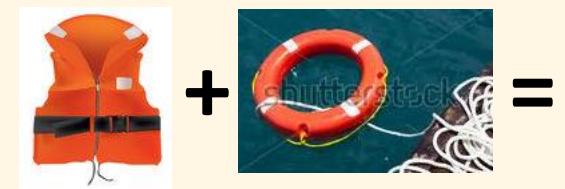
Rat Tail Stopper

Please watch a Video on WEB page





25.4.3 Where mooring to buoys is undertaken from the ship, a lifebuoy with attached line of sufficient length should be available for immediate use



## 25.4 Mooring to buoys

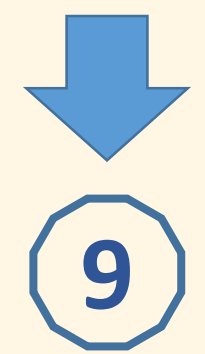
25.4.1 Where mooring to buoys is undertaken from a ship's launch or boat, personnel engaged in the operation should wear lifejackets and a lifebuoy with attached lifeline should be kept readily available in the boat.

25.4.2 Means should be provided to enable a person who has fallen into the water to climb back on board the launch or boat. If a boarding ladder with flexible sides is used, it should be weighted so that the lower rungs remain below the surface.



# Single Point Mooring (SPM):

Please watch a Video on WEB page





**Slip Wire** A bight of wire rigged to pass through the ring of a mooring buoy. It is always the last mooring out, once the vessel is secured to buoys and designed to be the last mooring released. The purpose of the slip wire is to allow the ship's personnel to control the time of departure and not be dependent on shoreside linesmen. They are rigged from each end of the vessel using a messenger and mooring boat, when the ship is secured to buoys.

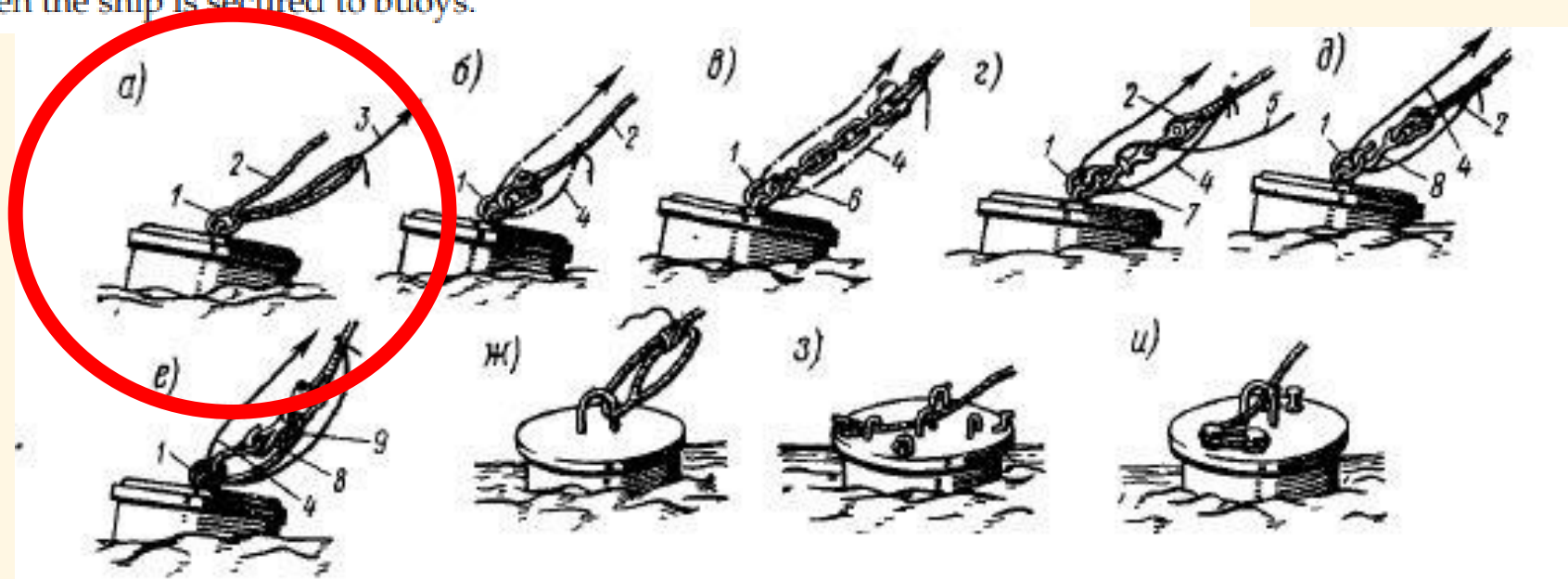


Рис. Способы крепления швартовых тросов на бочках:  
 а — дублинем, б — такелажный способ, в — глаголь-гаком, г — самовыкладывающимся глаголь гаком, д — гаком с защепкой карабином, е — карабином с дополнительным стопором, ж — полудублинем, з — за гаки на бочке; и — за кнехты, 1 — рым, 2 — швартовый трос, 3 — проводник, 4 — заводной трос, 5 — стальной тросик чеки разъемной наметки, 6 — глаголь-гак, 7 — самовыкладывающийся гак, 8 — гак с защелкой, 9 — строп

**25.4.4** When slip wires are used for mooring to buoys or dolphins, the eyes of the wires should never be put over the bitts, as at the time of unmooring it may not be possible to release the load sufficiently to lift the eye clear. To prevent accidental slippage of the wire eye(s) over the bitts or other obstruction the eyes should be seized, partially closing the eye.

### Slipping a Mooring

For this maneuver, a strong line or flexible wire is run through the buoy ring and back on deck for use as a slip rope. A strain is taken on it, and the chain is unshackled. Should the ship be riding to a bight of the chain, an easing-out line is used to ease the chain through the ring while the chain is being hauled in. The ship now rides to the slip rope, and unmooring is completed by letting the end of the slip rope go and reeving it through the buoy ring.



IMPORTANT NOTE: IF A DOUBT EXISTS AS TO THE INTEGRITY OF A ROPE IT SHOULD BE REPLACED, IMMEDIATELY.



## 25.5 Towing

**25.5.1** A number of accidents to persons have occurred during the relatively simple operation of making fast and letting go of tug's tow lines.

The common factor was that, for various reasons, the tow lines became taut, causing, for instance, messengers to part and strike ship's crew, and seamen's hands to become trapped, all of which resulted in major injuries.

**25.5.2** Equipment used for towing should be adequately maintained and inspected before use, as during towing operations excessive loads may be applied to ropes, wires, fairleads, bitts and connections.

## INSPECTION !

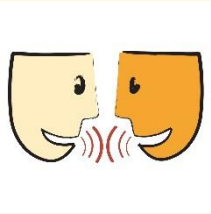


13.03.14



Lighter towing lines with higher SWL are needed.

Hanza Training Centre



# COMMUNICATION !

Communication Breakdown: **Standardized Commands** Will Improve Tractor Tug Performance & Minimize Errors

**Proper communication** needed **between tug and crew** regarding securing towlines.

Tug boat crew should be receptive to communication while heaving and lowering towline.



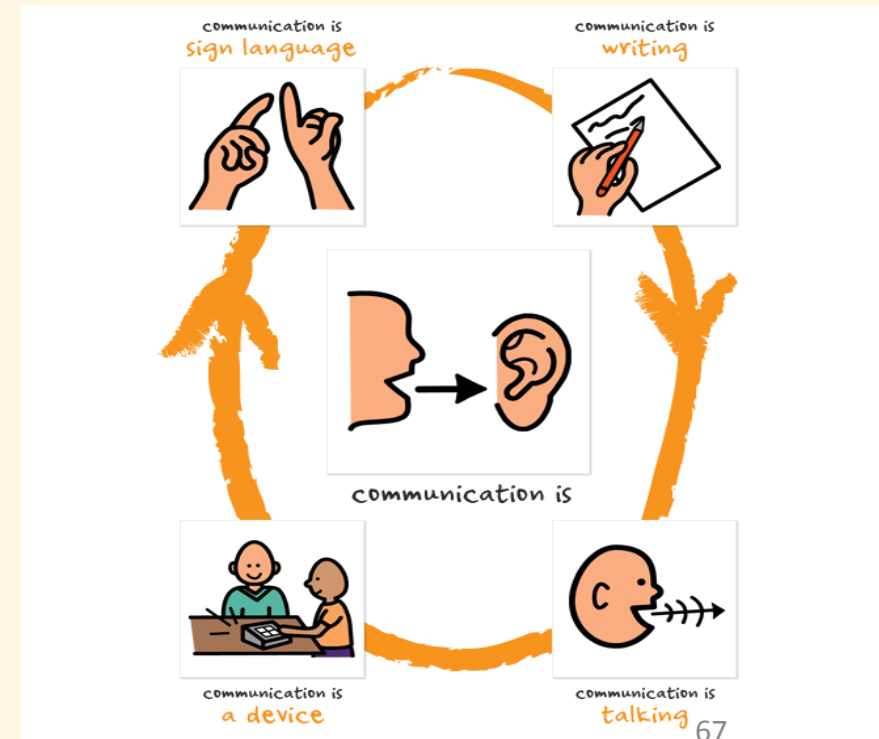
**25.5.3** Prior to towing operations being undertaken, the **master** should establish suitable means of communication, exchange relevant information (eg speed of vessel), and agree a plan for the tow with the tug master.

**PLANNING !** Ship  Tug



All aspects of the towage should be planned in advance, taking into account such factors as tidal streams, current and water depths, as well as the size, windage, displacement and draft of the tow.

The towing arrangements and procedures should be such as to reduce to a minimum any danger to personnel during the towing operations.



# Safe Handling of Tug Lines

When tugs are used to assist manoeuvring the ship, additional care is required by the ship's crew.

The condition of the tug's lines is unknown, and the crew on mooring stations will not normally be aware of when the tug is actually heaving or what load is being applied to the line.

*It is therefore important to stay well clear of the tow line at all times.*

When the tug is being secured or let go, the person in charge of the mooring should monitor the operation closely to ensure that no load comes on to the line before it is properly secured, or whilst it is being let go.

Never let a tug go until instructed to do so from the bridge; do not respond to directions from the tug's crew.

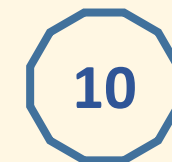
If the tow line has an eye on it, heave this past the bits so that there is sufficient slack line to work with, stopper off the line, then put the eye on the bits.

Do not try to manhandle a line on to the bitt if there is insufficient slack line. If the line has no eye and is to be turned up on the bits then it should *always* be stoppered off before handling it.



## Watch a movie to remember...

### Video



## Working with Tugs

(a) Good communication between the tug and vessel being aided are important to ensure that the status of tow lines is understood by both parties at all times and thus **avoid unexpected loads being applied.**

(b) Ensure the **bitts** upon which the towing eye is to be placed are **clear of rope or wire.**

(c) When conducting towing operations it is important that those involved consider the safety of persons on both vessels.

(d) All equipment used in towing operations including messengers should be **regularly inspected** and **replaced as necessary.** **The tail rope (messenger) should be at least 2m long.**

## Sample of **CORRECT** and **INCORRECT** way of communication:

The person talking on the radio should **thoroughly** understand the importance of **timing, clarity** and being **concise**.

### **•Incorrect & not helpful:**

*"Well, uh, you're coming in more or less even, I guess, uh, and it looks like, uh, I don't know, uh, maybe about, uh, 10 feet or so. Oh, and you're, uh, closing kind of quick too, uh, so, like, you know, uh, you might want to think about...."*

**•Correct & very helpful:** *"10 feet up and down, closing fast."*

For dramatic effect some may substitute the term ***"coming in hot"*** instead....



**25.5.2** Equipment used for towing should be adequately maintained and **inspected before use, as during towing operations excessive loads may be applied to ropes, wires, fairleads, bitts and connections.**

**25.5.3** Prior to towing operations being undertaken, the **master should establish suitable means of communication, exchange relevant information (eg speed of vessel), and agree a plan for the tow with the tug master.**

**concise** [kən'saɪs] 1) краткий; сжатый; лаконичный, немногословный (о речи, стиле письма)

# The anchoring/mooring party

**MUST wear:**



(1) Safety goggles; the windlass operator should remember that the wearing of safety goggles may reduce his field of vision, but nevertheless, they must be worn.



(2) Safety helmet.



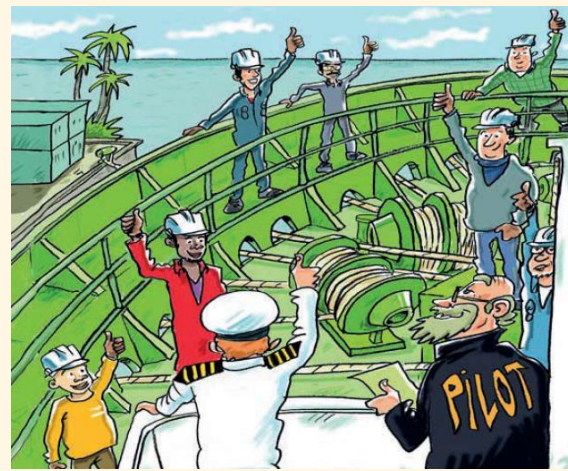
(3) Safety shoes.



(4) Overall with long sleeves.



(5) Safety gloves



25.5.4 All workers involved should be adequately briefed in their duties and safety precautions to be taken. They should be equipped with **personal protective equipment** including safety helmets and safety shoes.

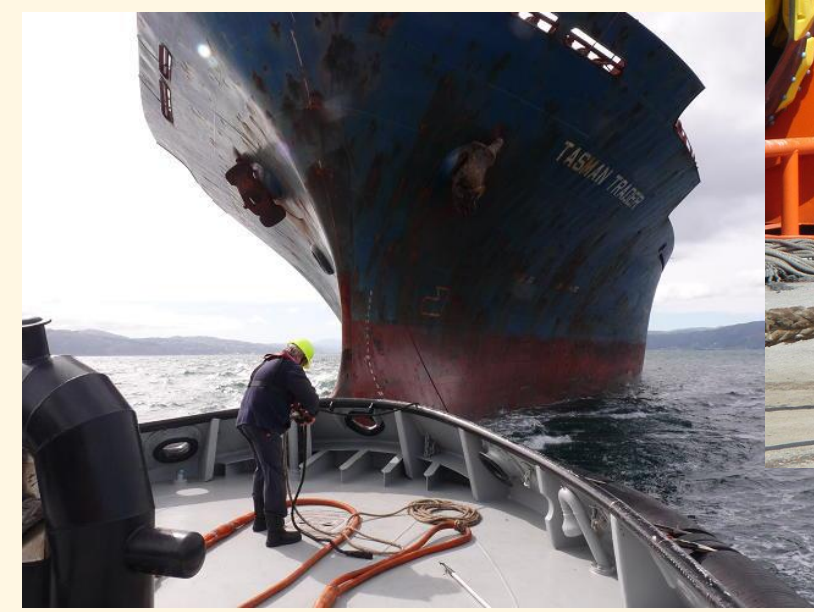
## - NORBULK PERSONAL PROTECTIVE EQUIPMENT MATRIX -

Note: Because it is not possible to accurately reflect the true hazards of all onboard activities in a single matrix, the Vessel Management Team should approve exceptions to this matrix through Risk Assessment Process. Please refer to Code of Safe Working Practices for Merchant Seaman.

NORBULK		PERSONAL PROTECTIVE EQUIPMENT																					
		Boiler Suit	Hard Hat/ Safety Helmet	Safety Boots	Safety Goggles	Welding Goggles	Face Shield	Safety Glasses	Face/ Dust Mask	Respirator	Welding Gloves	Working Gloves	Working Apron	Chemical Gloves	Chemical Suits	Safety Harness	LSA Protection	Atmosphere Testing Equipment	High Visibility Vest	Ear Defenders	Thermal Clothing	Ventilation	Permit to Work
ACTIVITY	Mooring	✓	✓	✓	✓																		
	Anchoring	✓	✓	✓	✓				✓			✓								✓			
	Rigging Gangway	✓	✓	✓								✓											
	Rigging Pilot Ladder	✓	✓	✓								✓					✓	✓					
	Working with Batteries	✓	✓	✓	✓		✓					✓	✓										
	Cargo Gear Rigging and Operation	✓	✓	✓	✓		✓							✓									✓
	Handling Chemicals (certified with MSDS)	✓	✓	✓	✓		✓						✓	✓									✓
	Cleaning equipment with chemicals	✓	✓	✓	✓		✓				✓												✓
	Crane Operations	✓	✓	✓	✓							✓				✓				✓			
	Pumproom Entry	✓	✓	✓	✓							✓				✓		✓					NS212
	Enclosed Spaces	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			NS213
	Hot work	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓							✓		✓	NS214
	Working Aloft	✓	✓	✓	✓		✓					✓				✓						✓	NS215
	Working Outboard	✓	✓	✓	✓		✓					✓				✓	✓						NS215
	Quayside Activities	✓	✓	✓	✓							✓						✓					
	Painting	✓	✓	✓	✓		✓			✓		✓										✓	
	Stores Handling	✓	✓	✓	✓							✓											
	Chipping	✓	✓	✓	✓					✓		✓									✓		
	Chiseling	✓	✓	✓	✓					✓		✓									✓		
	Drilling	✓	✓	✓	✓					✓		✓									✓		
Lathe Machine	✓	✓	✓	✓		✓			✓		✓		✓							✓			
Wire Handling	✓	✓	✓	✓			✓				✓									✓			
Welding	✓	✓	✓	✓		✓				✓													
Working in Machinery spaces	✓	✓	✓	✓							✓									✓			
Galley Cleaning	✓	✓	✓	✓			✓				✓												
Galley Hot Surface Operations	✓	✓	✓	✓							✓												
Working with Asbestos	✓	✓	✓	✓					✓		✓												
Use of Pesticides	✓	✓	✓	✓					✓		✓		✓	✓									

MANDATORY AS CIRCUMSTANCES DICTATE





**Messenger:** A light line used for hauling over a heavier rope or cable.

**25.5.5** Workers should, wherever possible, agree with the tug crew the area where the heaving line is to be thrown to, in order that they move clear.

A messenger should be used to heave the tug's tow line on board by a winch, and then a stopper used while the eye is placed around the bollard.



*Tug boats pulling us off ESSO Terminal in Fawley*

*They are ready with the fire wire*



Only enough turns of the messenger should be used on the warping drum end to heave in the tow line. On tankers, do not place the tow line's eye over the bollard which has the fire wire made fast to it. **Take the fire wire off, if there is no bollard available.**



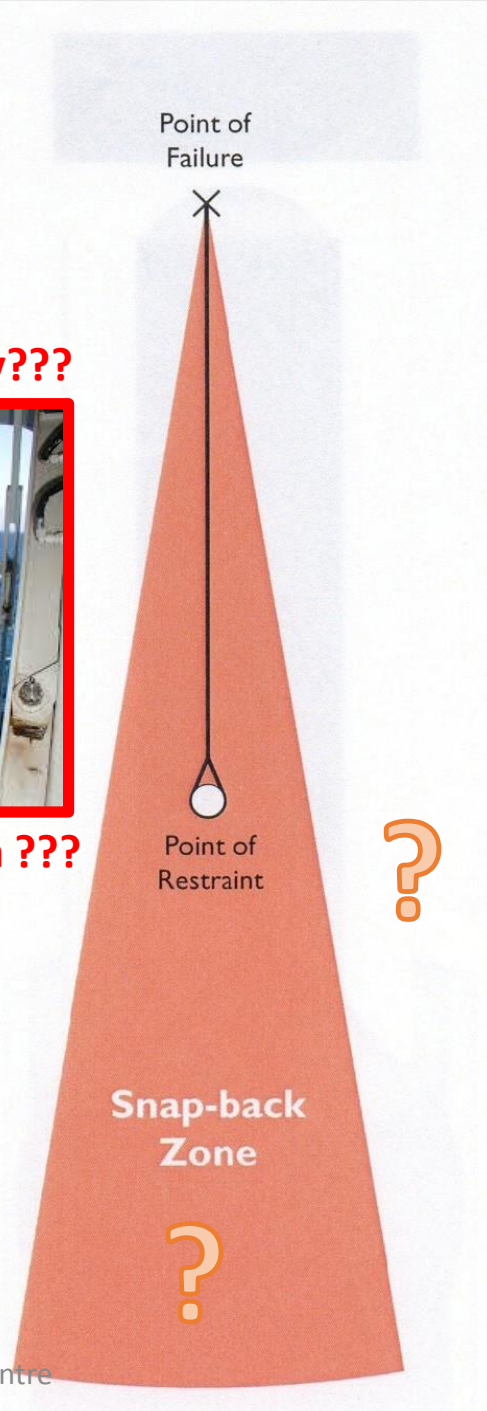
13.03.14

Where to stay???



Safe position ???

Hanza Training Centre

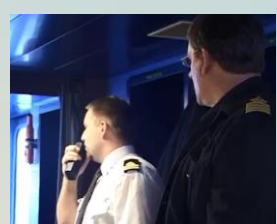


25.5.6 Once the tow is connected, non-essential personnel should keep clear of the operational area. If anyone is required to remain in this area or to attend to towing gear during the towing operation, they should take extreme care to keep clear of bights of wire or rope and the “Snap-Back” Zone should a line break. Exposure time should be kept to a minimum.

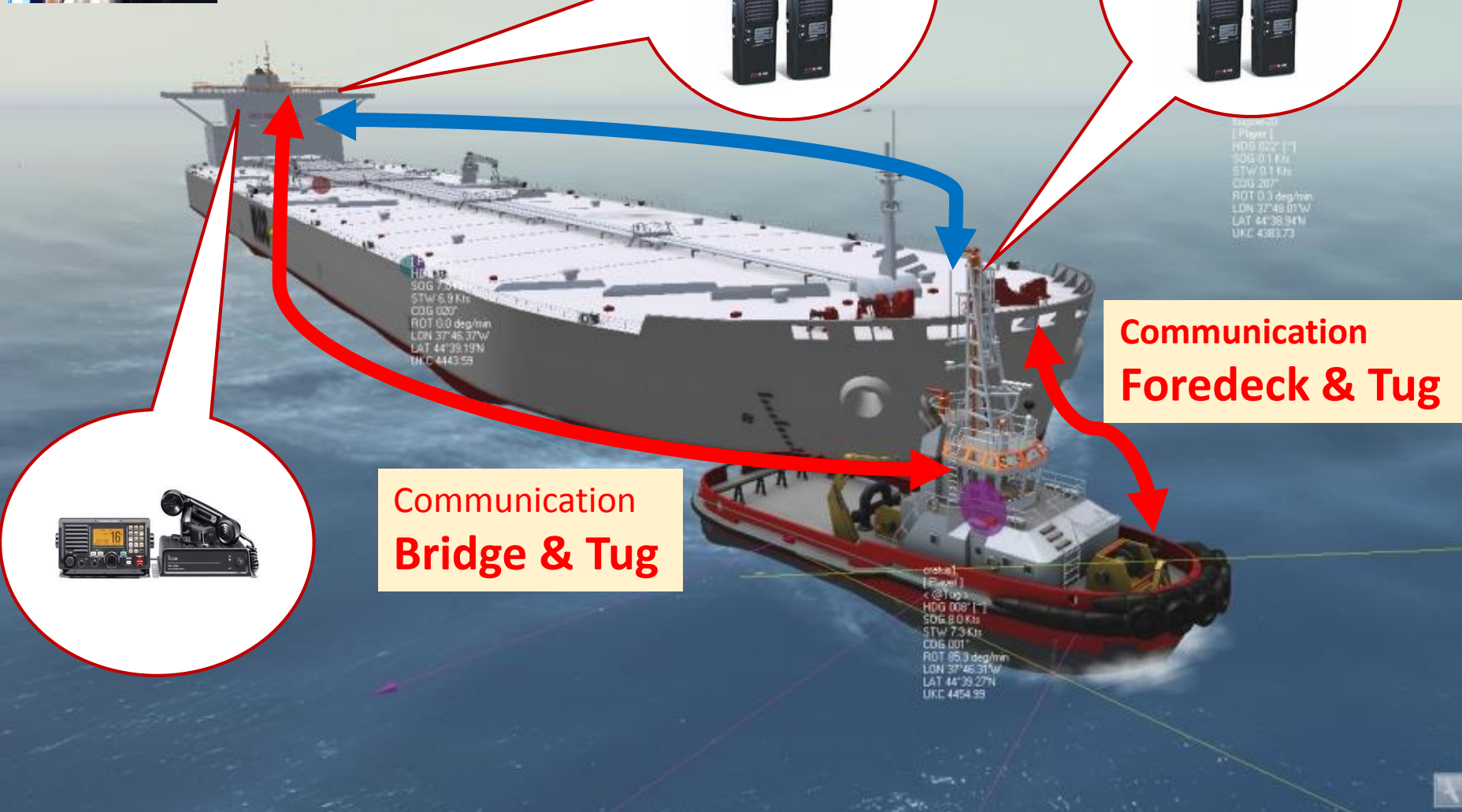


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## Communication Foredeck & Bridge



Communication  
**Bridge & Tug**

Communication  
**Foredeck & Tug**

**25.5.7** During operations, **communications** should be maintained **between:-**

(a) the **towing vessel** and both the **bridge team** and the **foredeck** of the vessel under tow; and

(b) the **tow party** and the **bridge team**.

In all communications **clear identification** of the parties communicating should be used to prevent **misunderstandings**. The Tug Master should be kept informed of engine movements, proposed use of thrusts etc. Persons in charge of the mooring party should monitor the tow line to give warning to the crew if the tow line should become taut, for whatever reason.



## Letting go tow line:

1. Tug ready ?
2. Heave up messenger to make slack tow line
3. Take of eye from bollard
4. Let go tow line & control speed



**DO NOT ALLOW TO RUN OUT UNCONTROLLED!**



**25.5.8** When letting go the tow, **no attempt** should be made to heave in the tow line slack before making positive communications with the tug's crew and they have indicated that they are ready to receive their line.

Use the tug's attached messenger to heave in the slack and then stopper it off before taking the eye off the bollard.

Use turns of the messenger around the bollard to control the speed at which the tow line goes out and is retrieved on board the tug.

If the tow line is allowed to run out uncontrolled, it could whiplash, and strike a crewmember, causing severe injuries.

messenger small diameter rope attached to a heavier rope such as **towing** line to facilitate heaving

13.03.14

# Safe Handling of Tug Lines

When tugs are used to assist manoeuvring the ship, additional care is required by the ship's crew:

- The condition of the tug's lines is unknown, and the crew on mooring stations will not normally be aware of when the tug is actually heaving or what load is being applied to the line.
- ***It is therefore important to stay well clear of the tow line at all times.***
- When the tug is being secured or let go, ***the person in charge of the mooring should monitor the operation closely to ensure that no load comes on to the line before it is properly secured, or whilst it is being let go.***
- ***Never let a tug go until instructed to do so from the bridge;*** do not respond to directions from the tug's crew.
- If the tow line has an eye on it, heave this past the bitts so that there is sufficient slack line to work with, stopper off the line, then put the eye on the bitts.
- ***Do not try to manhandle a line on to the bitt if there is insufficient slack line.*** If the line has no eye and is to be turned up on the bitts then it should ***always*** be stoppered off before handling it.

**25.5.8** When letting go the tow, **no attempt** should be made **to heave in the tow line slack before making positive communications** with the tug's crew and they have indicated **that they are ready to receive their line.**

Use the tug's attached messenger to heave in the slack and then stopper it off before taking the eye off the bollard.

Use turns of the messenger around the bollard to control the speed at which the tow line goes out and is retrieved on board the tug.

**If the tow line is allowed to run out uncontrolled, it could whiplash, and strike a crewmember, causing severe injuries.**

- **Do not try to hold a line in position by standing on it just because it is slack - if the tug moves away so will you!**
- When letting go **do not simply throw the line off** the bits and let it run out. Always slack it back to the fairlead in a controlled manner, using a messenger line if necessary to avoid whiplash.

**whiplash** ['(h)wɪplæʃ] 1) ремень кнута; бечева плети 2) травма спины, шеи, позвоночника (от внезапного резкого движения)

*Correct and safe procedures should be followed by all parties when making a towline connection forward with a ship making way*



Safe procedures for ship crews when securing tugs require attention. Safe procedures should also include **ship's officers keeping an eye on the tugs when securing in case something goes wrong.**

Most captains and more than half of the pilots prefer that tugs approach the bow only when the ship's crew is ready to send a heaving line.

**25.5.8** When letting go the tow, **no attempt** should be made **to heave in the tow line slack before making positive communications** with the tug's crew and they have indicated **that they are ready to receive their line.**

Use the tug's attached messenger to heave in the slack and then stopper it off before taking the eye off the bollard.

Use turns of the messenger around the bollard to control the speed at which the tow line goes out and is retrieved on board the tug.

**If the tow line is allowed to run out uncontrolled, it could whiplash, and strike a crewmember, causing severe injuries.**

# COMMUNICATIONS

Safe mooring operations require the ship's crew and the shore or boat mooring teams to understand one another.

In many cases **this may be made difficult by language differences.**

Background noise and environmental conditions may create further difficulties.

Radios will be useful and many ports require mooring teams to have radios.

However hand signals can also be a reliable means of communication.

There are a set of hand signals which are recognised and understood by crews of ships of all nationalities.

**Use of these signals and not carrying out any task until requested will improve the safety of mooring operations and reduce accidents.**



Figure 1 - Vertical up and down movement of an outstretched hand means "slack away" or "slack off".



Figure 2 - Arms crossed in front of the body or above the head means "make fast" or "is fast"



Figure 3 - Rotation of a hand held up means "heave away"



Figure 4 - Cupped movement of the hand upwards means "let go" or "cast off"



Figure 5 - Hands held up together means "stop" or "Hold on"

**Note: Figures 1 to 5 from The Code of Safe Working Practice for Merchant Seamen (chapter 25)**

## MOORING, TOWING OR HAULING EQUIPMENT ON ALL VESSELS - SAFE INSTALLATION AND SAFE OPERATION

Notice to all Builders, Repairers, Owners, Operators, Masters, Skippers, Officers and Crew of Merchant Ships, Yachts (Motor and Sail) and Fishing Vessels.

*This notice supersedes Merchant Shipping Notice M.718*

### Summary

This Guidance Note provides updated advice on the safe installation, maintenance and use of mooring, towing and hauling equipment. It emphasises the importance of seeking expert advice on the repair and maintenance of equipment. It also advises that risk assessments which cover the use of mooring equipment should in particular take full account of the potential dangers of bights in mooring warps and of "Snap-Back" Zones.

### 1. Introduction

- 1.1. Operations such as mooring, towing and hauling (including trawling operations) impose great loads on ropes, warps, gear and equipment. **The circumstances of recent accidents show that greater emphasis should be given to considering the safety aspects of mooring and towing systems as a whole, rather than the individual safety aspects of component parts.** Hence the system should include the safety of windlasses, winches, bollards and fairleads, their construction and their attachment to a vessel's structure.

### 2. Design and Installation of Mooring Equipment

- 2.1 **Winches or windlasses** should be constructed to give warning of undue strains by stalling at well below half the designed maximum safe working load of the weakest element in the system (e.g. bollard, fairlead, shackle, holding down bolt, etc.) and to afford further protection by walking-back at about half the design load (e.g. breaking strength of the mooring rope, tow line or hawser which ever is applicable). *For Example: A winch or windlass capable of a 10 tonne pull should be fitted with a rope having a "breaking strain" of 20 tonnes or more.*

25.5.9 Further recommendations on towing are contained in Merchant Shipping Notices **MGN 308 (M+F)**





# Remember !

- To reduce the risk of accidents, vessels and equipment must be **maintained to a high standard.**
- All personnel should be adequately trained with the correct personal **protective equipment.**
- **Correct procedures** should be in place and the required work permits issued with all mooring operations supervised by a competent person.
- **Training in mooring operations** should be incorporated into vessels' regular schedules and include all personnel.

ONCE AGAIN -

**BAD PRACTICE:**



Ropes badly stored on wet deck



# Remember !

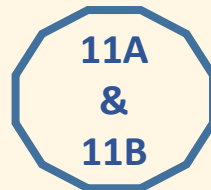
## Organization and safety

- ✓ Communication equipment has been tested and the crew has been briefed on the mooring plan.
- ✓ All supervising officers are familiar with the nature of the equipment used. Experience and vigilance are vital in the prevention of accidents **Supervising officers shall have a working knowledge of:**
  - The characteristics of the ropes, springs and warps used
  - The ropes' breaking strength
  - The criteria for condemning ropes, springs and warps
  - Operating winches
  - Communication
  - Holding power brake band
  - Winches' self tensioning properties
  - Winches' heaving power
  - The mooring plan
  - The location of capstans and hawssoles and the correct handling of mooring ropes along them
  - The work to be carried out
  - The snap-back zones (see schedule of danger zones)
- ✓ Supervision over and operation of winches and capstans should be in the hands of **experienced crew**.
- ✓ **Officers in charge** should have an overall picture of the situation at all times
- ✓ Preparation of the work space is vital to safety at work. Work should only be carried out by **authorised persons**.





Before saying Goodbye  
two more video...



Towards the end  
some words in  
Russian...

next pages



# ТЕХНИКА БЕЗОПАСНОСТИ ПРИ ВЫПОЛНЕНИИ ШВАРТОВЫХ ОПЕРАЦИЙ

1. При подготовке к швартовке капитан должен находиться на ходовом мостике и сам руководить маневрами судна.
2. Перед швартовкой к причалу иллюминаторы со стороны борта швартовки должны быть закрыты.
3. Перед началом швартовных операций убедитесь, что швартовные механизмы и вьюшки находятся в исправном состоянии и работают нормально.
4. Пуск в действие швартовных механизмов производите только по команде лица, руководящего операциями.
5. Для швартовных операций применяйте только исправные тросы. Не работайте со стальными тросами, у которых торчат концы оборванных проволок, перебиты пряди или трос деформирован.
6. Не допускайте нахождения посторонних людей в местах производства швартовных операций.
7. При подготовке к швартовным операциям разнесите по палубе тросы необходимой длины. Не травите тросы непосредственно из бухт или с вьюшек.

8. Не стойте внутри шлагов разнесенного по палубе швартовного троса. Подавая для швартовки трос, очищайте его от колышек.
9. Подавая бросательный конец, предупредите окриком "Берегись!".
10. Не давайте большой слабины швартовному тросу при выборке его поданным бросательным концом. Тяжелые тросы потравливайте через кнехт, наложив на него один—два шлага.
11. Не задерживайте руками или ногами вытравливающийся трос.
12. Накладывая трос на кнехт, следите, чтобы на нем не образовались колышки, в противном случае швартовный конец возьмите на стопор, расправьте все образовавшиеся колышки и только после этого вновь наложите его на кнехт.
13. Взяв швартовный трос на стопор, не находитесь впереди по направлению его натяжения и ближе 1 м от места наложения стопора (для синтетических канатов — не ближе 2 м).
14. При отдаче стопора находитесь только со стороны, противоположной натяжению швартовного троса, и в стороне от линии натяжения.
15. Стравливая трос из бухты, встаньте за бухту лицом по направлению движения стравливаемого троса и сбрасывайте шлагги вперед от себя.

16. Выбирайте и травите швартовные тросы только по команде лица, руководящего швартовкой.
17. Выбирая или потравливая швартовные тросы, держите ходовой конец, не подходя к кнехтам или барабану швартовного механизма ближе 1 м.
18. По окончании швартовки на верхние шлагги стального троса, заведенного на кнехт, накладывайте схватку из тонкого растительного троса.
19. При отдаче с кнехта туго натянутого троса, сняв схватку, потравите трос до образования достаточной слабины. Только после этого снимайте шлагги с кнехта.
20. Не находитесь на линии натяжения выбираемого или стравливаемого троса, а также вблизи кнехтов и роульсов.
21. Не выбирайте и не травите тросы, если с ними производятся работы у роульсов или киповых планок (освобождение зажатых тросов, перекладывание матов и пр.).
22. Не протаскивайте швартовные концы через клюзы без специальных крючьев.
23. Во время производства швартовных работ не держите руки на планшире фальшборта, не перегибайтесь через него.
24. Не переходите с судна на причал, с причала на судно или с судна на судно до окончания швартовки.

25. При завозке швартовного троса шлюпкой или моторным катером набирайте достаточное количество шлагов троса для свободного его потравливания.
26. Не подбирайте завезенный шлюпкой швартовный трос до тех пор, пока шлюпка не освободится от троса и не отойдет от него на безопасное расстояние.
27. Если человек находится на швартовной бочке, не травите, и не выбирайте швартовный трос.
28. Дополнительные шлаги троса накладывайте на барабан швартовной лебедки, шпиля или брашпиля только при остановленном механизме. Не стравливайте трос с вращающегося барабана швартовного механизма, когда барабан вращается в сторону выборки.
29. После окончания швартовных операций уберите свободные тросы на вьюшки или в бухты, а механизмы отключите.
30. Наблюдая за полетом линеметательных ракет, находитесь за надежным укрытием.
31. При запуске линеметательной ракеты следите за тем, чтобы литье находилось под ветром в стороне от Вас на расстоянии, исключающем соприкосновение с ним.
32. Запускайте линеметательную ракету с таким расчетом, чтобы она упала за целью и своим литьем накрыла ее.

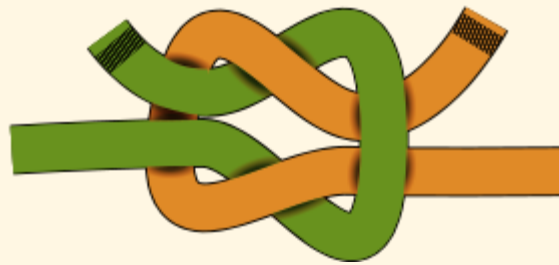
# Швартовка (Commands for mooring)

Give on shore the heaving line	Подать бросательный	Haul taut = Haul fast	Выбрать втугую
Send on shore the head-rope	Подать носовой	Ship the fenders	Подложить кранцы
Send on shore the stern-rope	Подать кормовой	Unship the fenders	Убрать кранцы
Send on shore the bow spring	Подать носовой шпринг	Is the propeller clear?	За кормой чисто?
Send on shore the stern spring	Подать кормовой шпринг	Yes, the propeller is clear	За кормой чисто. Винт чист.
Send on shore the breast line	Подать прижимной	No, the propeller is not clear	За кормой не чисто
Pay away the bow spring	Потравить носовой шпринг	Are the fenders on berth?	Кранцы на причале?
Pay away the stern rope	Потравить кормовой	Yes, fenders are on berth	Да кранцы на причале
Check the head-rope	Задержать носовой	Have fenders ready fore and aft	Кранцы на баке и корме приготовить
Check the stern spring	Задержать кормовой шпринг	We will be berth portside alongside	Будем швартоваться левым бортом
Check the breast line	Задержать прижимной	Send a heaving line ashore	Подать бросательный на берег
Make fast the bow spring	Крепить носовой шпринг	Use the center lead	Заводить через центральный клюд
Make fast the stern rope	Крепить кормовой	Use the Panama lead	Заводить через Панамский клюз
Make all fast	Так крепить	Use the port quarter lead	Заводить через левый кормовой клюд
Cast off the head-rope	Отдать носовой	Keep the lines tight	Держать концы в тугую
Let go the head-rope	Отдать носовой	Report the forward distance to shore	Доложить расстояние от носа до берега
Heave in the bow spring	Вира носовой	Stand by for letting go	Приготовиться к отшвартовке
Hold on	Стоп выбирать		
Avast heaving in	Стоп выбирать		
Heave in aft	Выбрать комовые швартовы		
Haul in the slack	Выбрать слабинку		

## Команды. Commands for anchoring - Постановка на якорь.

1. **Get the starboard anchor ready** - Правый якорь к отдаче приготовить
2. **Get the port anchor ready** - Левый якорь к отдаче приготовить
3. **Get both anchors ready** - Оба якоря к отдаче приготовить
4. **Stand by the starboard anchor** - Стоять у правого якоря
5. **Stand by the port anchor** - Стоять у левого якоря
6. **Let go the starboard anchor** - Отдать правый якорь
7. **Let go the port anchor** - Отдать левый якорь
8. **Pay away the cable** - Травить якорь цепь
9. **Keep the cable slackened** - Держать слабо якорь цепь
10. **Hold on the cable** - Задержать якорь цепь
11. **Put the windlass in gear** - Сообщить брашпиль
12. **Be ready to heave in** - Приготовится выбирать
13. **Heave in the starboard anchor chain** - Выбирать правую якорь цепь
14. **Heave in the port anchor chain** - Выбирать левую якорь цепь
15. **Heave in upon the cable** - Выбирать якорь цепь
16. **Stop heaving in the cable** - Стоп выбирать
17. **Disengage the windlass** - Разобщить брашпиль
18. **Secure the anchor for sea** - Якорь по-походному
19. **The anchor is up and down** - Якорь панер
20. **The anchor is apeak** - Якорь панер
21. **How is anchor?** - Как якорь?
22. **Clear anchor** - Якорь чист
23. **Foul anchor** - Якорь не чист
24. **Stand clear of the anchor chain** – Не стоять у якорь цепи
25. **Pay away three shackles of the chain** - Потравить три смычки





The end

Thank you! Good luck!