



EST. 1936

GROUP OF COMPANIES



# USER'S MANUAL

## Synthetic Mooring Ropes

### KATRADIS GROUP OF COMPANIES

MANUFACTURER OF SYNTHETIC, HMPE ROPES & SACRIFICIAL ANODES

PROVIDER OF WIRE ROPES, ANCHORS & CHAINS, VESSEL DECK EQUIPMENT, PORT EQUIPMENT

MAIN OFFICES: 11 Psaron Street, 186 48, Drapetsona, Piraeus, Greece Tel. (+30) 210 40 60 300, Mail: [info@katradis.com](mailto:info@katradis.com)

PLANT : Athinon - Lamias National Rd (69.2 km, Schimatari 320 09 Tel. (+30) 2262 071279, Mail: [info@katradis.com](mailto:info@katradis.com)

[www.katradis.com](http://www.katradis.com)

---

## Contents Pages

---

Brief description of manufacturing process.....	3
Description of Quality Control Arrangement.....	4
<b>On-Board Installation</b>	5 - 8
Hardware/Deck preparation.....	5
Installation on a winch.....	6 - 7
<b>Mooring Operation</b>	8 - 18
Rope Protection.....	9
Minimum Safety Usage Factors.....	10 - 11
Safety Issues.....	12 - 16
<b>Rope Care and Maintenance</b>	17 - 18
<b>Inspection Practices and Retirement Criteria</b>	19 - 25
For unjacketed ropes.....	21 - 22
Jacket Damages.....	23 - 24
Small repairs.....	25
Extensive repairs.....	26
Information regarding packaging and traceability & Storage conditions	27
Annex A.....	28-31

## Synthetic Mooring Ropes



This manual is intended to accompany all **Synthetic Mooring Ropes** manufactured by KATRADIS MARINE ROPES INDUSTRY SA and provide information and guidance regarding their proper usage, installation, safety issues, inspection & discard criteria.

**Synthetic mooring ropes cover a wide range of materials and constructions and can be generally categorized as Polyolefin, Polyester, Mixed Polyolefin/Polyester and Nylon. More specifically:**

### **Polyolefin (Polypropylene PP / Polyethylene PE)**

KATRADIS SA has been producing for many years the special NIKA-Steel® monofilament fibers, a "melt mixture" of first quality virgin raw materials (Polypropylene, Polyethylene and UV stabilizers). Ropes made of NIKA-Steel® are floating, very durable and outlast the common polypropylene ropes.

### **Polyester**

These ropes are made of polyester multifilament fibers and exhibit a lot of advantages such as very high abrasion resistance, flexibility and capability of maintaining breaking strength even at high temperatures. Polyester ropes are non-floating.

### **Mixed Polyolefin/Polyester**

Consisting of NIKA-Steel® and polyester fibers twisted on the outer surface of rope yarns, these ropes combine the high strength and long service life. The proportions of each material can vary and provide floating or non-floating properties.

### **Nylon**

Nylon ropes are used mostly because of their elasticity and shock-load absorbing properties for the shipping industry. This is why they are used mostly for mooring tails, but can be also used as main mooring lines. Nylon ropes (non-floating) tend to lose approx. 15% of their breaking strength in wet conditions, but this effect is recovered when dried.

All the above rope types can be manufactured in 3/8/12/24/32/64-strand construction.

### **Brief description of manufacturing process**

The manufacturing process follows ISO 9001:2015 quality system and includes the following basic production steps:

- The twisting of the yarns in twisting machines
- The stranding level includes the construction of the strands in special one-for-one stranding machines.
- The braiding of the rope is completed in the braiding level in Herzog's braiding machines.
- In case of jacketed construction, the core rope is overbraided with polyester jacket in special 32-str braiding machine.
- The rope coil is weighed, and specimens are prepared for breaking load testing
- After all quality control tests have been satisfactorily finalized, the coil is placed on a rotating base, unlay and measure the required length (for the slack on deck final length). Then the special chafe protection is inserted for each eye splice section and the eye splice is formed (with minimum 5-tucks fabrication per splice). Then follows the marking and packaging to give a complete final product which is taken away for storage and/or transport.



*Manufacturing rope yarns*



*Braiding of Synthetic ropes*

**Description of quality control arrangement**

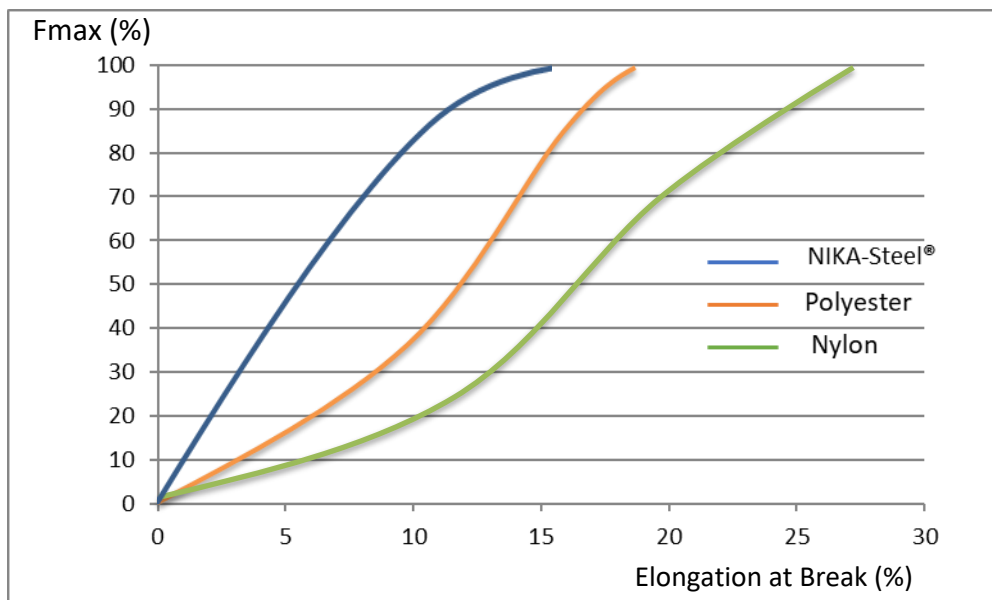
The product quality control involves the following steps/procedures:

- Tenacity testing of the **yarns**.
- Yarn-To-Yarn abrasion test of the **yarns**
- UV resistance tests of the **yarns**
- Breaking strength testing of the rope yarns (**twisted yarns**)
- Breaking testing of rope specimens as per batch order.



Table 1. Synthetic ropes constituent yarns technical information

Property	Nylon	Polyester	NIKA-Steel®
Density	1,14 kg/dm <sup>3</sup>	1,38 kg/dm <sup>3</sup>	0,92 kg/dm <sup>3</sup>
Tenacity	> 9gr/den	> 9gr/den	8gr/den
Elongation (at break)	25%-30%	18%	15%-18%
Melting point	218 °C	265 °C	165 °C
UV resistance	Excellent	Excellent	Excellent



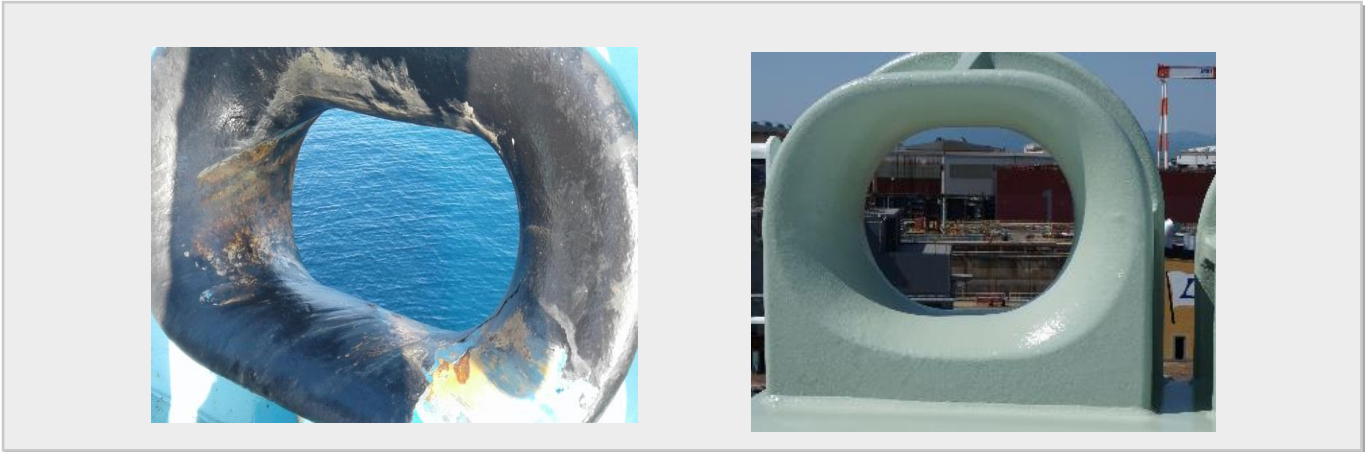
# ON-BOARD INSTALLATION

## Hardware / deck preparation

- Check for sharp edges or rust on flanges, winch drums, bitts and general in every hardware equipment on deck that the rope comes in contact with. Generally, rust will act as “knife” for the mooring line and result in severe rope damage and breaking load reduction, even for a new rope.

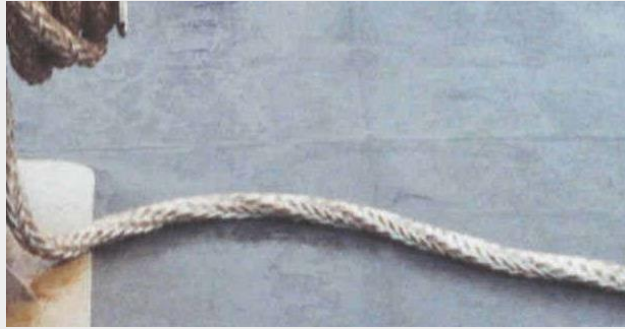


- Take special care in chocks, as these contact points are crucial during the mooring operation.



### Installation on a winch

- Uncoiling the rope from the delivery package must be done carefully and gradually.
- When uncoiling the rope, winding it on a winch must be performed with care to avoid twisting.

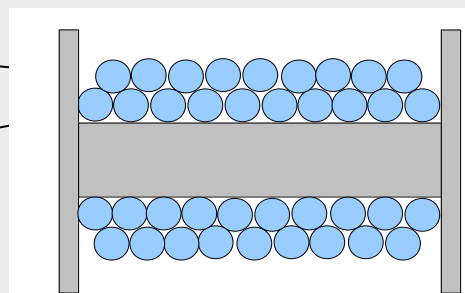


Mooring rope that has suffered several twists, which causes considerable strength reduction. The handling of braided ropes should be with care to avoid twists as much as possible.

- Winding of the ropes must be carried out tightly & evenly, so that no spaces are created between the wraps.

Second Layer

First Layer



- On the tension drum, the rope must have at least 5 wraps during mooring operation (with one layer of mooring line) to avoid slippage.



- When deploying the mooring lines and adjusting the layers on the tension drum, the user can operate temporarily a second layer which can be removed/fix after the deployment. This is recommended in order to make sure that the proper wraps-turns are provided on the tension drum as per above guideline.



- OCIMF recommends that the primary brake should be set to hold 60% of the ship design MBL on the first layer. The brake holding capacity for this type of winch is always quoted for the first layer on the tension drum. If more than one layer is wound onto the drum, then significant loss of brake holding power will result. For undivided drums, it is recommended to ask the winch manufacturer for guidance on maintaining the value for brake rendering.

**(MBLSD) Ship Design Minimum Breaking Load:** The MBL of a new, dry mooring line for which a ship's mooring system is designed. The MBLSD meets standard environmental criteria restraint requirements.

**(LDBF) Line Design Break Force:** The minimum break force at which a new, dry, spliced mooring line will break when tested acc. to CI1500B:2015. This value is declared by the manufacturer on each mooring line certificate.

**LDBF = 100% - 105% of MBLSD**



# MOORING OPERATION



Mooring operation is one of the most critical and hazardous tasks carried out on vessels. Mooring arrangements differ from port to port and careful re-planning of the mooring operation is essential.

Deck crew has to consider various safety precautions and understand working principles of deck machinery and systems. When it comes to mooring operations, additional precautions need to be taken to ensure crew members' safety.

- ✓ **As the ship nears the port the mooring winches are tried out, the breaks are tested, the mooring ropes are checked and positioned.**
- ✓ **Mooring lines must be as symmetrical as possible about the midship line of the vessel.**
- ✓ **Two or more lines leading in the same direction should always be of the same material (also tensile strength, elongation etc.) and construction.**
- ✓ **MIXED MOORING MUST BE AVOIDED.**

## Rope Protection

**Use protective chafe gear.** KATRADIS SA has developed high quality protection sleeves against external abrasion conditions (to be used in areas such as chocks, bitts, etc.). Using chafe protection will substantially extend the service life of your mooring line.

### Protection for the main body of the mooring line



#### **NIKA®-Guard Protector**

Flat Polyester webbing pad used for the protection of ropes against abrasive surfaces (chocks, bitts etc.). The Velcro scratch tape, firmly stitched on the sleeve guard, is used for quick & easy installation and removal.



#### **NIKA®-Guard UltraDouble**

It is manufactured using a combination of High Tenacity polyester and UHMWPE webs in a double-layer sleeve construction. The polyester layer of the webbing sleeve is fixed on the outer side while the UHMWPE layer protects the rope from the inside.

### Protection for the rope's eye



#### **Polyester Eye splice Protector**

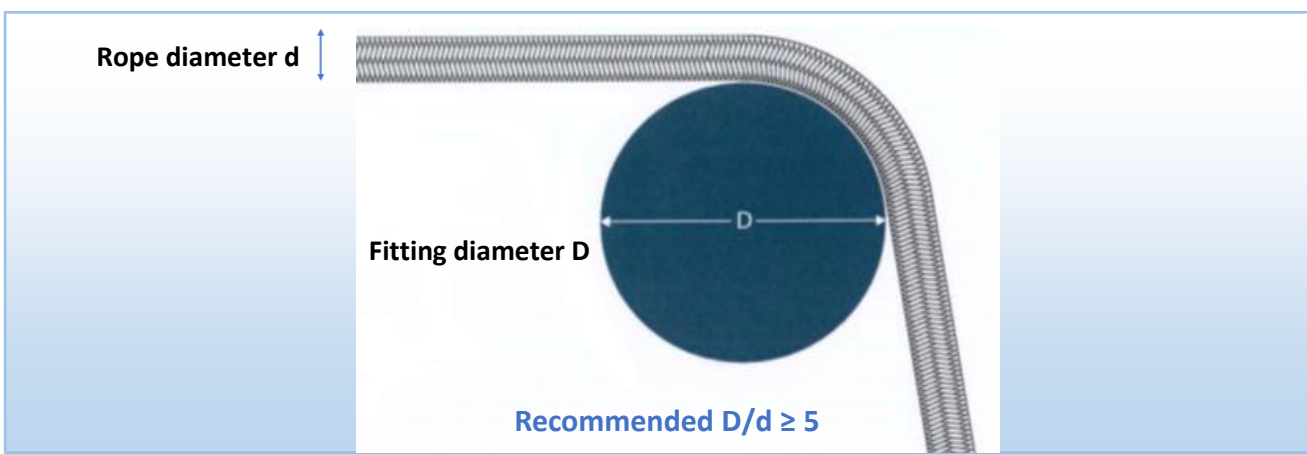
Special braided cover designed for extra protection of the eye splices, made from specially twisted polyester fibers.

### Minimum safety usage factors

The maximum Working Load Limit (WLL) of synthetic mooring lines must not exceed 50% of the ship design MBL (MBLsd).

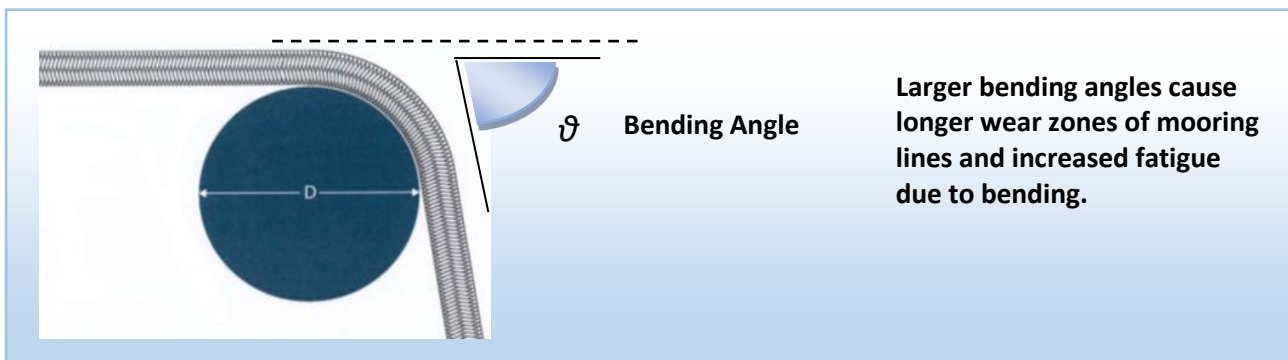
The SWL of the bitts and other deck hardware should be equal or greater than the MBLsd of the employed mooring line.

Any bending of mooring lines will instantaneously reduce its breaking strength. Repeated bending will reduce the service life of the line. The D/d ratio (D: diameter of bend, d: diameter of mooring line) should be as large as possible to maximize mooring line strength and working life.



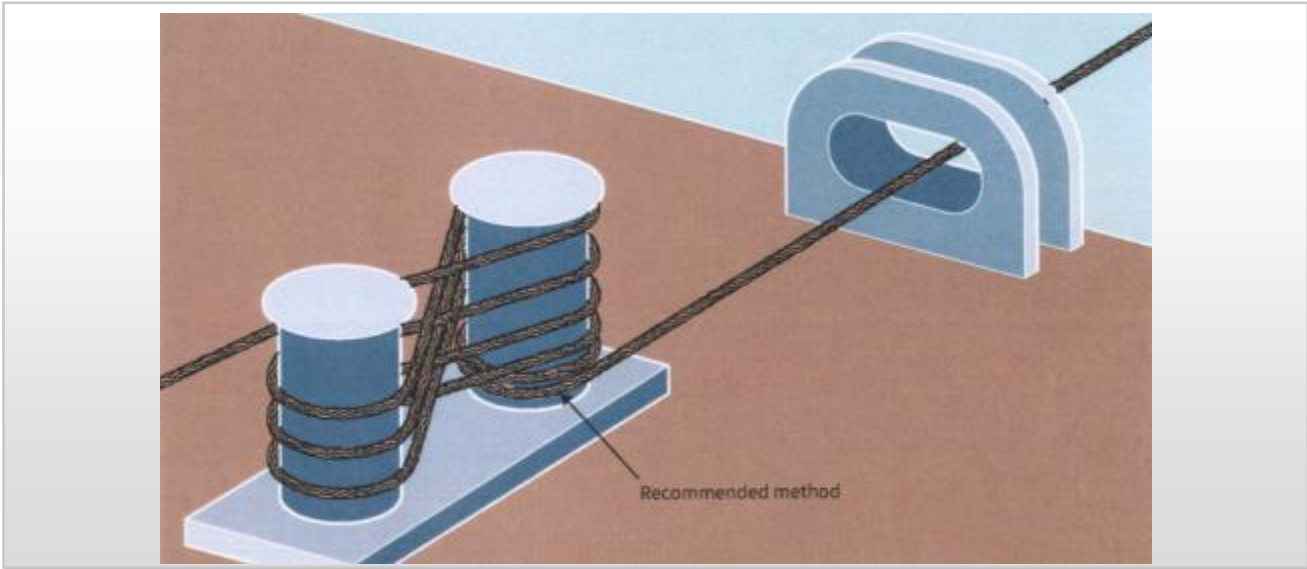
The diameter  $D$  of bitts, pedestal fairleads, etc. that meet mooring lines should be at least 5 times larger than the diameter of the line.

Mooring line arrangements often require redirection from winches and bending of lines around pedestal rollers. Users should keep in mind that high bending angles can cause compression of the inside strands and yarns and also extensive wear when the line is under loading and unloading conditions.



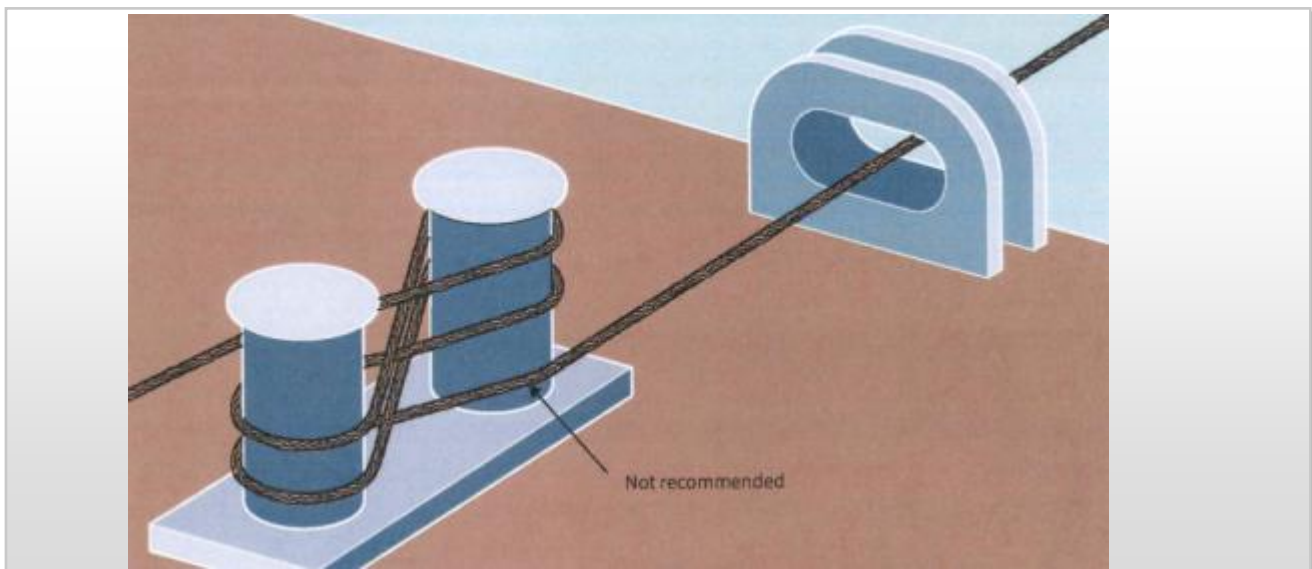
### Securing Mooring Lines in figure 8 arrangement

It is recommended by MEG4 that when securing mooring lines to double post mooring bitts, two turns should be placed around the first post before beginning to belay figure of eights.



Recommended method of turning up a mooring line on bitts (two full turns around leading post)

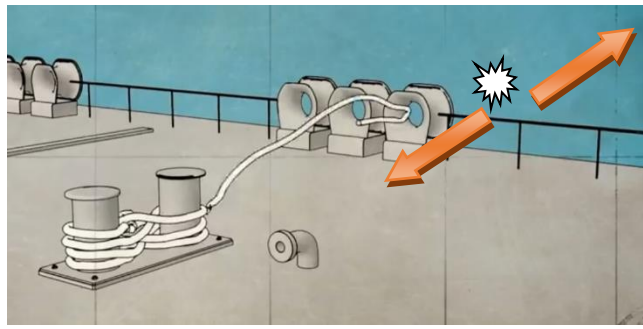
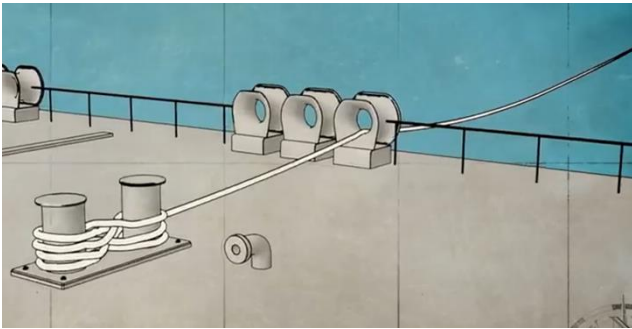
If the two full turns of the mooring line around the first post are missing, a higher stress is induced in each post creating a tendency for the bitts to be pulled together. This method is not recommended and is illustrated below:



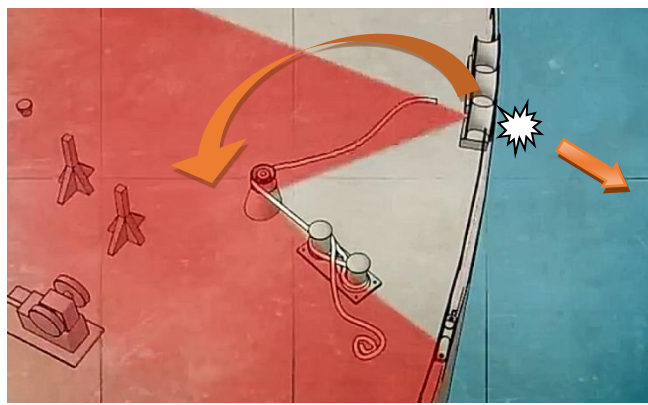
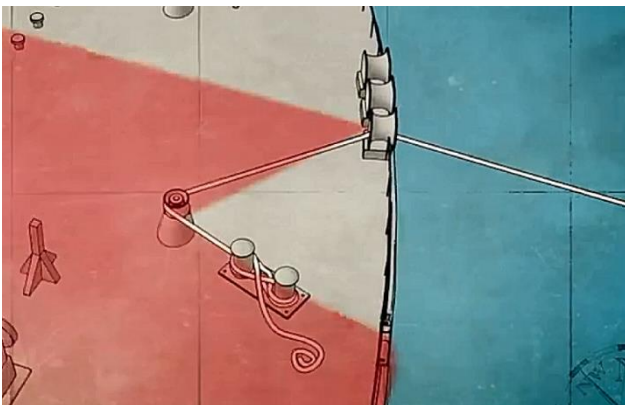
Incorrect figure of eight method for attaching a mooring line on mooring bitts

## Safety issues

**ALWAYS CONSIDER** the high-risk areas regarding snap-back effect of mooring ropes, as it can be proven lethal.



**Snap-back** is the extreme recoiling during a rope partition and it is a result of released energy. The direction of recoiling is unpredictable due to the variation of bending angles and rope direction.



In the above example, the rope parts on the outside of the vessel. In case the partition takes place on the inside of the vessel, the resulting snap-back reaction can be very different.

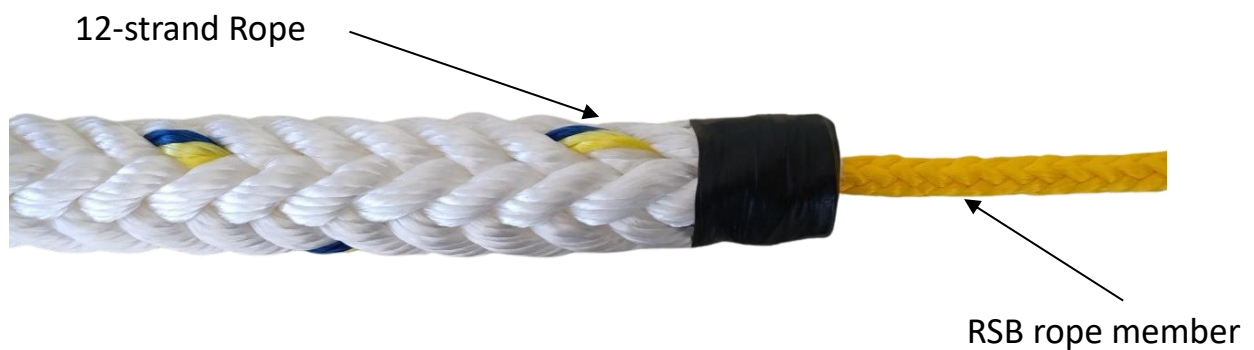
**MEG4 Guidelines** suggest that a snap-back area should not be marked on deck because such an approach gives a false sense of safety for the crew outside the marked areas. It is suggested that during mooring operations, all crew and personnel should become aware of the snap-back dangers and not be in close proximity of the tensioned mooring lines.

Any work that must be performed near to a mooring line under tension must be performed as quick as possible, but **NOT HASTY**, and with extreme caution.

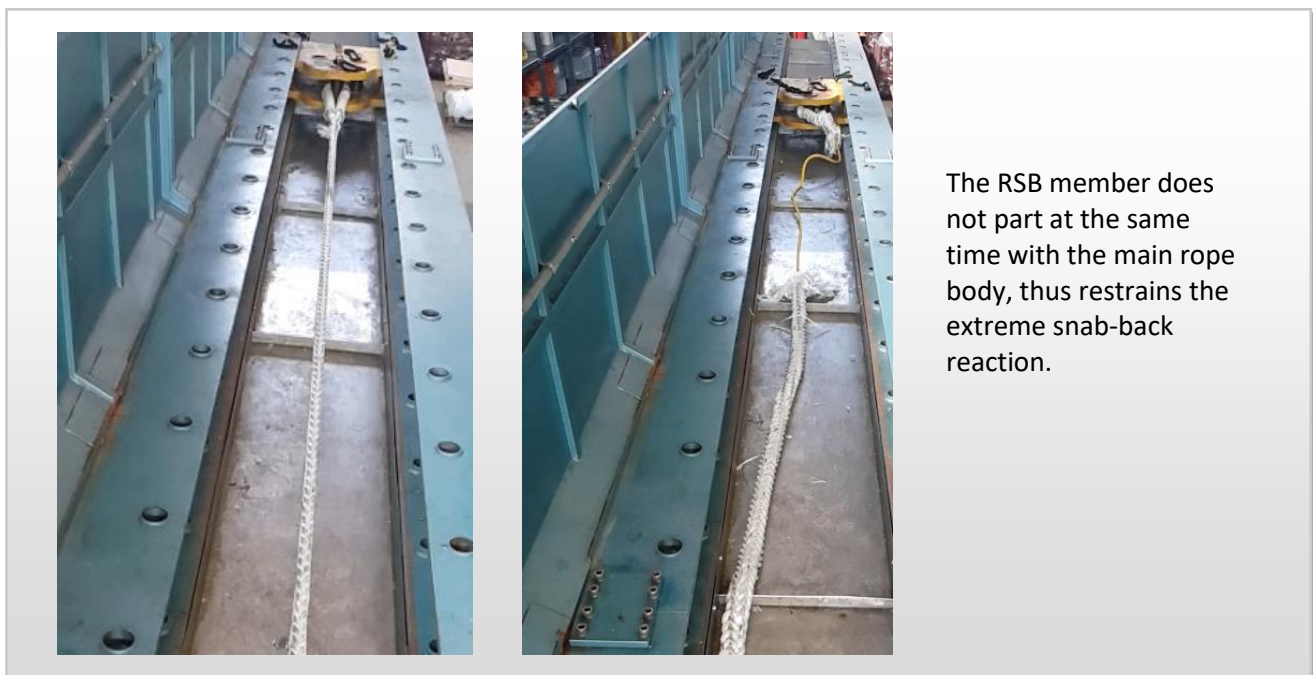
## **RSB – Reduced Snap-back Ropes**

IMPROVED 12 RSB is the rope developed for maximum safety on-board due to the specified construction engineered for reduced snap-back reaction.

The reduced recoil effect is accomplished with the use of an inner-braid rope structure that will enable the restraining of snap-back release in case of partition. Due to the different elongation properties of the primary 12-strand rope and the RSB member, the recoiling of the rope is reduced, which increases the safety on-board.



Testing has shown the different behavior of RSB ropes compared to conventional rope constructions.



**Never let two ropes rub one another when they are under tension. There can be excessive heat build-up that will damage the fibers locally and impose a weak point in the line.**

**Directing more than one mooring line through fairleads, chocks etc. is a bad mooring practice because of local compression and abrasion, which can severely affect the performance of the lines.**

Mooring lines that come in contact with each other create high-risk working conditions.

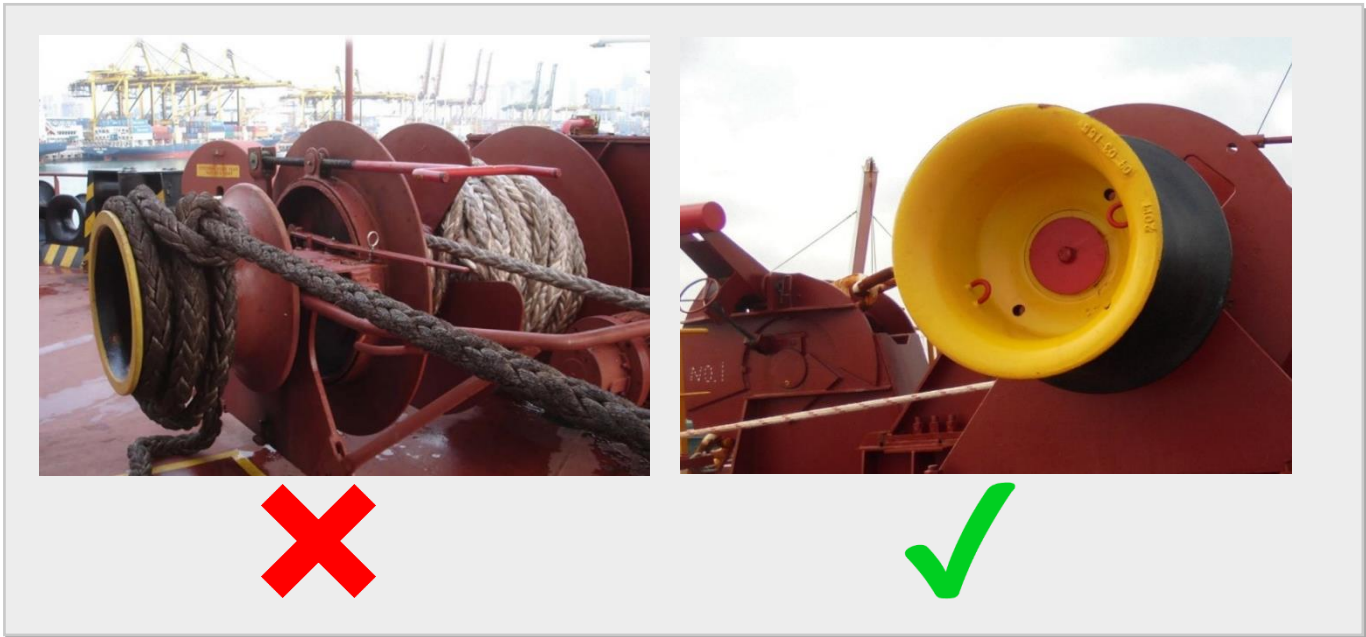


**All mooring lines must be equally tensioned, otherwise the most tensioned line will be exposed to overloading.**

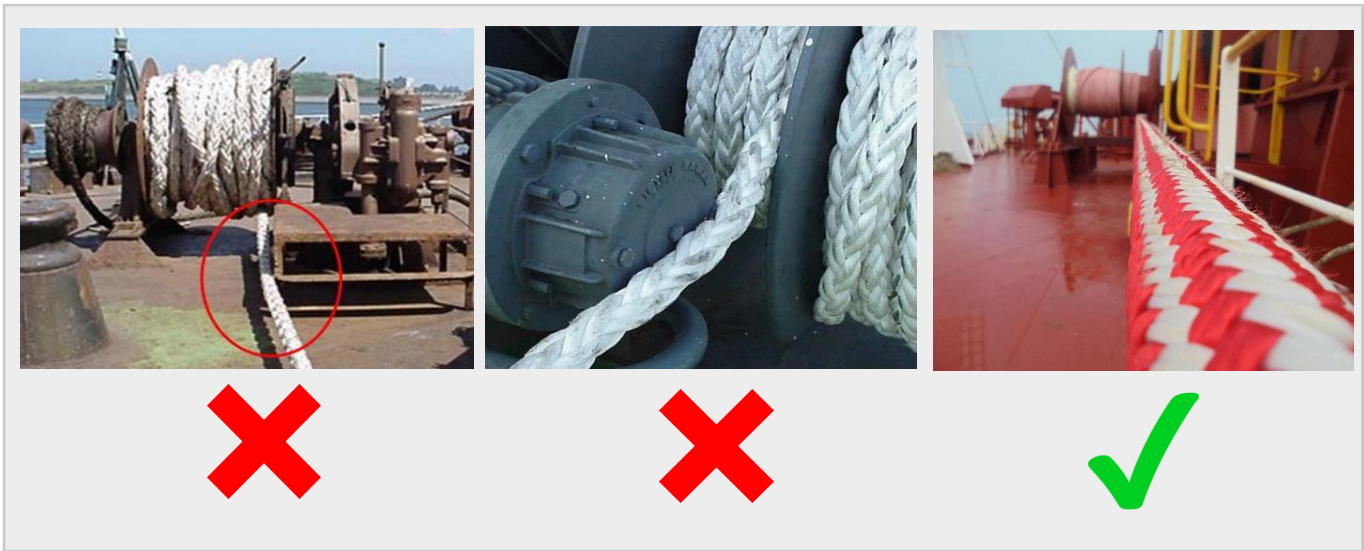
This line is highly tensioned compared to the rest mooring lines which can cause greater fatigue compared to the looser tensioned ropes.



**AVOID** keeping mooring lines on drum ends. Lines must be kept in storage drums with appropriate wraps.



**MAKE SURE** that there are no obstacles on the mooring line's directions. Parts of the vessel's construction that come in contact with mooring lines must be removed as they can cause rope damages that could lead to unexpected premature failure of the mooring line.



**⚠ Under no circumstances** the rope should contain oil/grease material, as it may cause chemical contamination and foreign particle adhesion (which will create abrasive conditions).



### Induced Twisting:

As already mentioned, the handling of braided ropes should be with care to avoid twists as much as possible - twisting of ropes causes a strength reduction up to 7% per twist per meter. Below there is an example of rope that has suffered several twists.

Mooring rope suffering a large number of twists.

Under no circumstances the mooring ropes should work with induced twists, because it highly affects their performance.



**BEST ACTION:** Spread the twisted length of the rope along the deck and align in order to straighten the rope.

After removing the twists that may have been induced, wind it carefully back to the winch.



# ROPE CARE AND MAINTENANCE

**Reverse your mooring line end-for-end:** bring the rear part of the rope in front and vice versa so that the wear is distributed and get a longer service life.

**Avoid making knots at all costs** because this can reduce the line's strength by up to 50%. Also, **end-to-end splices will cause significant strength loss up to 20%**. Best practice is to make **eye splices** instead.

**Keep the ropes clean:** wash them with tap water on a regular basis (the time frame is to be decided upon operators' experience) to remove any dirt or sea salt. Such particles will act as “razors” and damage the fibers when dry.

Spread the mooring line on the deck and after the tap water scouring let it dry normally.

Nylon ropes must be carefully dried as their strength starts to decrease in wet conditions.



**Conduct regular inspections on the rope and the hardware** (see more on the inspection practices).

**For better abrasion performance we recommend the use of the special NIKA-Lube lubricant.** It is polyurethane based and appropriate for application on mooring ropes (for more information please contact KATRADIS SA).

### Determination of NORMAL / EXTREME Operating Conditions

Generally, mooring lines operate in various weather conditions, types of ports (sheltered or exposed – open sea), mooring arrangements and loading conditions. Such factors highly affect the service life of mooring lines and should be taken into consideration when evaluating their condition and performance.

Below, there is a table for determining the normal or extreme operating conditions of mooring ropes.

<b>NORMAL OPERATING CONDITIONS</b>	Operating temperatures up to 50°C
	Mooring at sheltered port
	Low wind forces (1-4 beaufort)
	Typical mooring layout
	Absence of swell
<b>EXTREME OPERATING CONDITIONS</b>	Operating temperatures exceeding 50°C
	Mooring at exposed terminal
	Ship-to-Ship operations
	High wind forces (over 5 beaufort)
	Presence of swell
	SPM, CBM or Multi Buoy Mooring layout



*Typical mooring at sheltered berth*

## INSPECTION PRACTICES AND RETIREMENT CRITERIA

---



**Ropes should be inspected after each operation. An experienced person from the crew, assigned by the master or by the company, must be charged with the visual inspections. A diary log must be kept where as much information as possible must be recorded (mooring line history, hours of mooring operations, visual findings as per KATRADIS inspection guidelines).**

## INSPECTION TYPES & GUIDELINES

Below there is given guidance for determining the routine or detailed inspection as well as inspection and evaluation criteria regarding the visual condition of the ropes.

Type of Inspection		
	Routine Inspection	Detailed Inspection
<b>Description of line inspection</b>	The in-service section of the line length (typically on the tension side of the mooring winch) is inspected. This is visual inspection according to below evaluation methods.	The full length of the line, which includes both the storage and tension side of the rope. This is visual inspection according to below evaluation methods.
<b>Frequency</b>	Every mooring operation (before or after usage)	Annually

The visual inspection does not give the output of the exact residual strength of the rope, but it can determine if a rope can be fit for further use or not.

The indication of residual strength can be addressed by break testing of a cropped mooring line length. MEG4 includes this recommendation for end users, so they can build strength analysis data based on their specific application requirements.

Not all lines on-board need to be tested. Taking an indication from 1 or 2 lines of a vessel (best practice is to test the ropes of the most worn condition) can help evaluate the conditional state for others of similar manufacturing type.

It is recommended that mooring lines which their strength has reached the 75% of the ship design MBL (respectively) must be replaced.

Recommended planned retirement for mooring lines: 5 years or 5000work. hours (whichever comes first).

The visual inspection must check the following

**For unjacketed ropes:**

- **One strand of the rope is pulled out.** If it is possible, try and work it back to the rope (if the strand is in good condition and there no significant wear), and look out for the cause (possibly some snagging on deck equipment). RETIRE THE ROPE? NO



- **Rope strand that has parted (probably due to working under extreme loading conditions):** this damage can cause dramatic strength reduction and the rope must be repaired. CUT AND RESPLICE\* if remaining length is sufficient for mooring operations OR RETIRE



(\*RESPLICE: forming a new rope eye after cutting the undesired length of the rope. The term does not refer to an end for end splicing of two rope lengths.)

- **The rope's diameter is inconsistent.** Possibly due to shock loading there can be broken internal strands or rope yarns (in that case the rope becomes much softer in this area).  
REPAIR THE ROPE (CUT AND RESPLICE if remaining length is sufficient for mooring operations) OR  
RETIRE



- **The rope has extensive wear/damages due to abrasion.**  
CUT AND RESPLICE if damage is local and if remaining length is sufficient for mooring operations) OR  
RETIRE



- **The rope is contaminated** (oil/grease residues from deck or other chemicals). Clean thoroughly with plenty of water and soap. RETIRE THE ROPE? NO



## Jacket Damages:

In case of a worn jacket or a pulled strand, **local repair** in the jacket could be performed (as long as it is verified that the load bearing core is in good condition and hasn't suffered any damage - for details refer to Unjacketed rope inspection instructions). Examples of jacket damages are given below:

**Abraded jacket**



**Cut jacket strands**



**Glazed (fused) strands on the jacket**



**Discoloration**



When the jacket is damaged, we recommend inspection of the inner strength member if possible. If the inner strength member is damaged, then it may be necessary to downgrade the rope. The cause of the damage should be determined and if possible, removed.

Depending on the extent of the damage either a small repair or an extensive repair is recommended (See below sections: Small repairs & Extensive repairs).



**In case of a total jacket partition, the repairing should take place by KATRADIS SA (this includes removal of the parted jacket and overbraiding a new one as long as the core rope is in good condition). On-board, only a temporary repair can take place in this case.**

A temporary repair can take place: bring the two jacket parted sides as close as possible and use the Repair Kit (see below instructions: Extensive repairs).

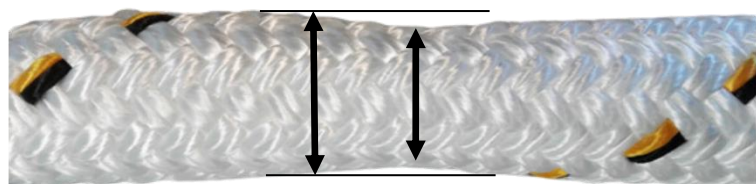


### Broken internal strands:

A broken internal strand can be recognized from the diameter's reduction. Specifically, a 14% - 15% loss of the rope's diameter is expected when an internal strand has parted. Most likely the inside of the rope will become softer in the particular area.

**BEST ACTION:**

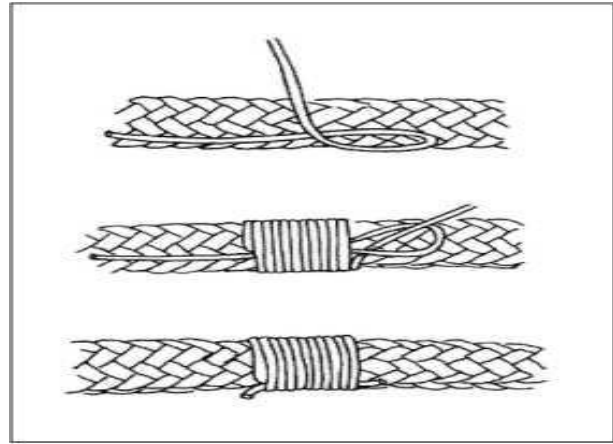
**CUT AND RESPLICE** and if remaining length is sufficient for mooring operations  
**OR RETIRE**



## Small repairs

The most durable method to make small repairs on the jacket braid requires the use of whipping twine and polyurethane glue.

Remove all the damaged yarns and coat the free yarn ends with the glue, in order to prevent further unraveling of the cover. Start whipping at least three centimeters away from the damage, as shown in the drawing. Lay a loop of twine across the rope, leaving a free tail after the damage zone of about ten centimeters. This tail has to be grasped later, so avoid covering it completely with whipping. With the working end of the twine, make multiple wraps around the rope from the tail end toward the apex of the loop, covering the loop until the whipping is at least three centimeters beyond the damage.



To finish the whipping, insert the working end of the small twine through the loop. Pull on the very end or tail of the small twine until the loop slides completely out of sight. Clip the ends close to the whipping.

If necessary, a temporary cover repair can be made using high quality adhesive tapes such as vinyl electrical tape, etc. A more permanent repair, as described above, should replace the tape as soon as possible.



Temporary repair with adhesive tape



Effective repair by whipping

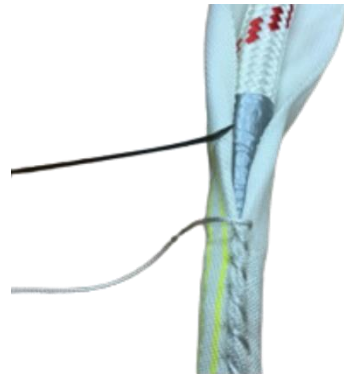
## Extensive repairs

For extensive repairs the following tools are needed: replacement cover, some sewing twine and a large sewing needle. Optionally additional protection can be obtained by a two-component polyurethane.

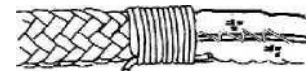
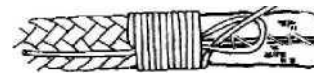
**A full set of such repairing tools can be obtained from the Repair Kit by KATRADIS SA.**

Remove all the damaged yarns and inspect the rope. After inspection coat the free yarn ends with the glue, in order to prevent further unraveling of the cover. Wrap the damaged part in the replacement cover.

Stitch the web together, with a special knot that will prevent the stitching yarn from loosening when it is torn.



Protect the beginning and the end of the replacement cover with whipping. Start whipping at least three centimeters away from the edge, as shown in the drawing. Lay a loop of twine across the rope, leaving a free tail after the damage zone of about 10cm. This tail has to be grasped later, so avoid covering it completely.



With the working end of the twine, make multiple wraps around the rope from the tail end toward the apex of the loop, covering the loop until the whipping is at least three centimeters beyond the damage.

To finish the whipping, insert the working end of the twine through the loop. Pull on the very end or tail of the twine until the loop slides completely out of sight.

Clip the ends close to the whipping.



### Information regarding packaging and traceability

The ropes are packaged in Polyethylene heat shrinking film. On this, there is a glossy label where it is marked /stated:

a) Product name / type b) Weight of the coil c) Length of the coil d) Construction of the rope (e.g. 12Strands) e) production code number and f) Date of Production

The marking on the product, also involves **metal labels (2 metal labels per coil)** where the unique code number of the rope coil is marked permanently for traceability purposes. This marking is being carried out in a way that it is visible, legible and indelible. This unique product code number is the reference to the manufacturer's certificate.



### Storage conditions

Store the ropes in a clean environment under mild and dry environmental conditions (avoid storage in high temperatures) and away from direct sunlight.

Store the ropes away from heat generating sources and acid (especially sulfuric acid) and alkaline environment. Good ventilation of the storage place is also preferable.

Under these specified conditions, the ropes can be stored without loss of properties for 5 years (shelf-life), but the user should keep in mind that once the rope is unpacked and subjected to operation the shelf-life management stops and the service life begins.






## ANNEX A: RETIREMENT CRITERIA FOR MOORING ROPES


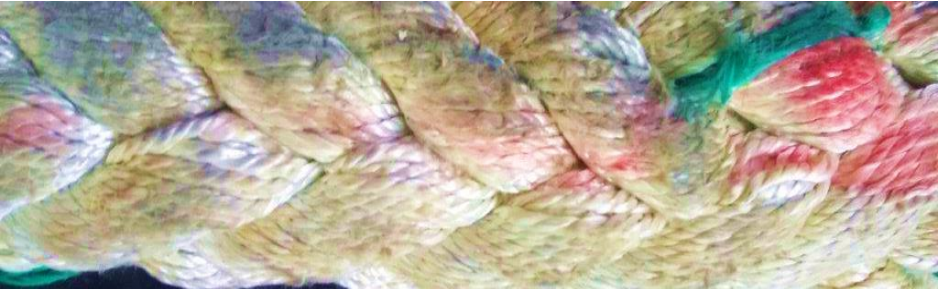



**After each operation, mooring ropes should be inspected by a qualified crew member assigned by the master or company. Findings, including operational hours and condition, should be recorded in a logbook following KATRADIS inspection guidelines.**





**Retirement criteria include signs of excessive wear, structural damage, fraying, or any deterioration compromising rope integrity. When these conditions are met, the mooring rope must be retired and replaced to maintain operational safety.**

**For unjacketed Ropes**

CONDITION	Resplice (if localized)	Retire
<p>-Bulk of surface yarns or strands reduced by 50% or more for a linear distance equal to the rope diameter</p> 	X	X
<p>-Exposure to excess temperature (Temperatures above 70°C will cause severe degradation on fiber ropes)</p>	X	X
<p>-Burns or melting visible for a length of over four rope diameters</p>  	X	X

<p>- Abrasion on inside of eye, with bulk of surface yarns or strands reduced by 50% or more</p> 	X	X
<p>-Chemical contamination</p> <p>Ropes exposed to chemicals and kept stored will show severe and irreversible strength reduction.</p> 	Consult manufacturer for further guidance	
<p>-Heavy surface fuzz-progressive</p> 	X	X
Remove source of abrasion		

**For jacketed Ropes**

CONDITION	Repair (if localized)	Retire
<p>-Core visible through cover, because of cover damage</p> 	X	
<p>-Core severely damaged and visible</p> 		X
<p>-Core strand cut to 5% of diameter within one lay length</p> 	X	X
<p>-Hockle or backturn</p> 	X	X



## DISCLAIMER

Katradis Marine Ropes Industry S.A., to the best of its knowledge, makes reasonable efforts to include accurate and up-to-date information in this manual. However, it makes no warranties or representations, either express or implied, regarding the accuracy or completeness of the information provided. All material and information in this manual are presented "as is," without any warranties of any kind, including but not limited to warranties of merchantability, fitness for a particular purpose, commercial viability, title, or non-infringement.

Katradis Marine Ropes Industry S.A. and its affiliates accept no liability or responsibility for any errors or omissions within this manual's content. The user is responsible for the correct use, handling, maintenance, and regular inspection of synthetic mooring ropes. Under no circumstances, and under no legal theory, shall Katradis Marine Ropes Industry S.A., its affiliates, suppliers, or any party involved in creating, producing, or delivering this manual's content be liable to users for any indirect, direct, special, incidental, or consequential damages arising from any cause whatsoever.

### Visual Illustrations

The images of damages and deformations included in this manual are intended solely for illustrative purposes, serving as general guidelines to help users recognize common forms of wear, tear, and damage. Actual damages or deterioration in equipment may differ substantially in appearance, extent, and causation.

These images are not intended to be the sole basis for assessing the safety or condition of any equipment. For a thorough evaluation and recommendations regarding repair or replacement, users are advised to consult a qualified professional or contact Katradis Marine Ropes Industry S.A.



11, Psaron Street, Piraeus 186 48, Greece

Tel.: +30 210 4060300 Fax: +30 210 4626268

Email: [info@katradis.com](mailto:info@katradis.com)  
[www.katradis.com](http://www.katradis.com)