

Lifespan of Ropes



Introduction

A common subject in many meetings when discussing ropes is the life span of a rope. How long do they last? This simple question doesn't have an easy answer as there are many factors that influence the time you can use the rope onboard the vessel.

It can be measured in the time from the installation on the winch (months/years). A more precise measurement is to measure the mooring hours, or the exact time in hours the rope has been in use.

Regular visual inspections of the ropes can also highlight damage that can cause premature retirement of the rope. This article will address the factors that influence a rope's service life and what you can do to prolong the rope's lifespan.

Factors affecting a rope's service life

These are usually not within one's control and cannot be influenced by the crew.



Vessel Type

Will define how often the vessel uses the ropes, the general design of the mooring arrangement, cargo and much more.



Mooring arrangement and its design

Sometimes mooring arrangements are not ideal and can even cause unnecessary abrasion of the ropes. This should be carefully considered in the design phase of the vessel.



Position of the rope

A shorter life time for spring lines or breast lines is typical, because of the mooring arrangement and usage.



Trading pattern

If the vessel's regular route has a long sailing period, obviously the ropes will be used less than for a vessel that has short sailing route.



Ports

Different ports have different environments and equipment. Badly maintained equipment in port can damage ropes. In addition, there are ports where ropes are attached to a truck and dragged on the pier, causing sever abrasion damage to the ropes.



Cargo

Dirty, dusty cargo can damage the ropes.



Environment

Natural elements like weather, wind, swell and tide can affect your rope's lifespan.



Picture 1 shows a particularly bad mooring procedure. Each rope should have its own route and not be in contact with other mooring ropes.



Picture 2 – A sharp edge, cutting fiber in the mooring rope

Factors that can prolong the rope's lifespan

These can be influenced and are within you and your crew's control.



Rope installation

Installation should be done by experienced crew, according to the manufacturer's instructions. Incorrect winding on the drums or adding twists is an example of errors made during the installation. Twists will decrease the strength of the rope and can cause the rope to break. Using a rotating platform will avoid twist on the rope. Using 2 colors for an easy detection of the twist can help to observe the twist.



Maintenance of the mooring equipment

Uneven surfaces and sharp edges will destroy fibers. It is incredibly important to have well-maintained mooring equipment. Well maintained panama chocks seem to work best, whereas roller fairleads tend to stop rolling and need more maintenance. The D/d ratio should be as large as possible. A small D/d ratio will reduce strength and the working life of the rope. According to OCIMF MEG4 the recommended D/d ratio for mooring fittings should be at least 15.



Rope handling on board

Crew should handle the ropes with care and follow the manufacturer's recommendations.



Storage

Keep the ropes covered, out from the sunlight and do not store with chemicals.



Usage

It is recommended to use the same ropes on all positions where ropes are working in parallel. Two ropes working in tandem made of different materials, with different elongation, will not cooperate and the rope with lower elongation will then take the greater share of the load. This situation will decrease the life-span for the overloaded rope. Other factors other than material that will influence this situation are length, diameter, mooring hours, construction, design.



Rope protection

Rope protection can help limit damage. There are several solutions, such as a braided protective jacket on the entire length or parts of the length, or a chafe protection that can be purchased separately.



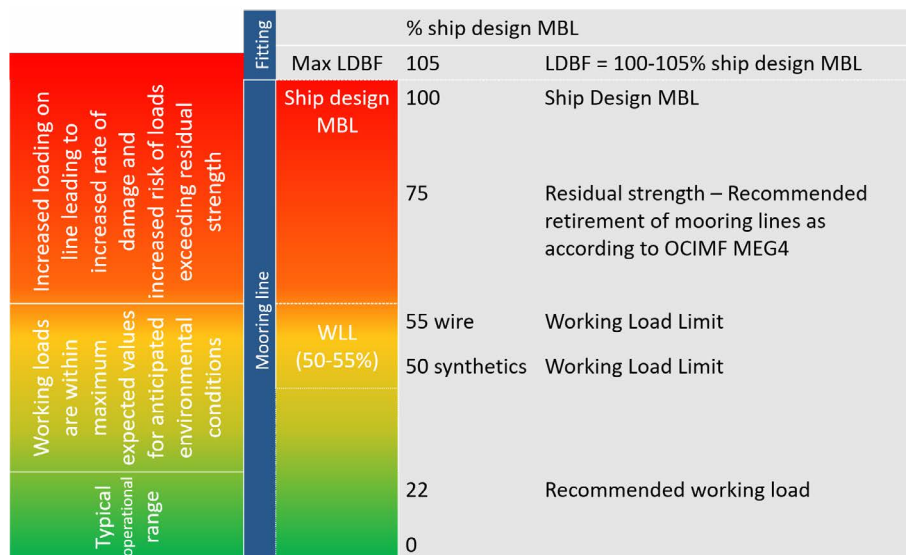
Picture 3 – Perfectly installed rope



Picture 4 – A chafe guard in use

Ropes Working Load Limit

Overloading the rope will decrease the service life of the rope. According to OCIMF MEG4, the typical operating range of the rope is up to 22% of the Ship design MBL* The working load limit is 50% for synthetic ropes and 55% for wire ropes. Loads higher than this limit will cause damage on the rope and can exceed the residual strength and cause breakages.



OCIMF (2018). Mooring equipment Guidelines (MEG4).

OCIMF MEG4 recommends retiring mooring lines when the residual strength has reached 75% of the Ship Design MBL*. Today this can only be tested by a destructive test.

* Ship design MBL is the minimum breaking load of new, dry mooring lines for which a ship's mooring system is designed, to meet OCIMF standard environmental criteria restraint requirements. (OCIMF MEG4)

Picture 5 – Strength values for mooring ropes

Best practices to prolong ropes' lifespan

The service life of ropes can be prolonged by correct rope handling, good installation and maintenance. Crew should be well trained to understand the manuals and recommendations of the manufacturer and pay attention to the mooring ropes. Ropes should be regularly inspected and there should be close cooperation with the manufacturer, including testing of residual strength of the ropes on board.

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