

Redaelli's recommended

Offshore Steel Wire Rope

PRESERVATION

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1. Introduction:

The present document contains some information about the suggested rope storing, periodical control and maintenance procedures.

This would be an aid to the final rope user so to allow a possible better rope performance and longer lifetime.

These indications are additional to the ones required and indicated by the eventual international reference or local standards, if any.

2. Rope Storage indications:

The rope storage is important for the rope safety and its performance while in-use.

Here below are some information regarding necessary actions and precautions to take, for better storing the wire ropes.

- 2.1. The wire rope needs to be stored in a restricted or delimited and well-ventilated area, far from chemical or corrosive elements, work areas, other areas affected by particular environmental conditions or works (for example where welding activities are carried out) that can affect the reel and rope conditions.
- 2.2. Always store the rope on its proper saddle, or if not available it is necessary to avoid completely the rope contact with the floor.
- 2.3. Ensure that reel is properly secured against any sudden movement (this is mainly requested in case the rope is stored on board).
- 2.4. Ensure the original cover is in proper condition, if damages occur due to the transportation, internal movement etc., consider a replacement.
- 2.5. In case the reel is stored in an area with high temperatures consider a periodical reel rotation in order to avoid any eventual lubricant dropping and migration. The "alert" temperature depends both on the lubricant characteristics (for example; dropping point) and on how long the high temperature is present in the area. one partial reel revolution (90°) a year is the minimum requirement, while in case of tropical conditions one needs to consider to perform the reel rotation every 6 months, at least. It is advised to do an inspection (outer layers) on the rope before deciding or performing the reel rotation.
- 2.6. Periodical reel and rope inspection, the number of inspections in a year shall be planned in relation to the storage area conditions, environmental conditions, as well as any particular or sudden happenings that could result in a reel / rope damage. Generally, we suggest a visual inspection every 6 months.
- 2.7. Consider that after any reel rotation and visual inspection the original cover / packing shall be replaced in order to ensure the proper rope storage.
- 2.8. Always handle the rope (reel) with proper lifting devices while using the right anchoring and lifting points.

3. Wire rope inspection (VT and MRT)

The periodical inspection is necessary to evaluate the actual rope condition and in service behaviour. There are different types of inspections related to the time factor:

3.1. Periodical visual inspection:

This is a “planned” inspection carried out to verify periodically, and in relation to the effective use, the rope conditions. Normally it is not related to all the rope length but is focused on the “in use” and “used” max length at that time, and on a specific rope’s section(s). This in order to examine existence of broken wires, wear, corrosion, distortions, any other damage that can influence the rope safety and service life etc., rope diameter and lay length measures. Furthermore, the Periodical visual inspection includes at least the examination of the following specific areas;

- Rope sections close to the End connections, and the end connection itself (if any);
- Rope sections running on (heave) compensating sheaves;
- Free rope parts that are subject to bending through the reeving system;
- Control of the rope on the main winch;
- Other possible critical sections.

This type of inspection can be performed quarterly or in relation to the working time (i.e., nr. of cycles), a timetable for the next inspection could be prepared based on the results/outcome of the last one.

3.2. Extraordinary visual inspection:

Shall be done in case of accidents or operational conditions, which may affect the wire rope’s conditions (damage) and safety. MRT control can be applied too, but always in presence of a proper VT.

3.3. NDT inspection:

This inspection is applicable to all the rope’s length by specific MRT device, in order to determine the actual rope conditions and discover critical rope sections/areas (mainly internally) to be kept under control. This inspection can be performed either on annual basis or based on rope working time (# of cycles), or as extraordinary inspection if required. Actually, in the offshore field, there is no standards and specific time requirements for periodical NDT inspections. This decision is left to the final user / client.

However, Redaelli recommends to:

- carry out the NDT test during the rope final manufacturing closing operation, or during the rope “spooling” on the final winch – this is the “time zero” that can be used for comparisons to the subsequent tests.
- in case of continuous rope usage, a yearly inspection.
- before a new planned lifting operations starts, in case of a long stop in the rope usage.
- in case of accidents or conditions that could damage the rope in any ways, as per extraordinary inspection (see 3.2 also)

Remember that the NDT inspection can provide you with the status of only a part of the rope, and it does not eliminate the need for visual inspections.

The result of each inspection (VT and MRT) shall be recorded in order to have an overview of the past inspections and the rope’s behaviour along its lifetime ISO 4309:2010 can be taken as a main reference for the inspection and discard criteria.

4. Keeping wire rope clean and lubricated:

The ropes for offshore application are delivered with a special heavy lubrication done during the manufacturing, if not differently agreed at the contract stage. This will allow to evade the need for any rope re-lubrication during its initial spooling on the system as far as the storage indications are followed and there are no other critical conditions that may require this operation.

4.1. General

After each long deployment and permanence in water, it is suggested to rinse the rope during its recovering with fresh water (not salty one) so to water down / clean the present salt on the rope's exterior and also its interior, if any.

In case the utilization is on hold for periods longer than one week, consider re-lubricating the rope (dry one) with specific high pressure systems.

In case the operations are continuous, only rinse the rope with clean and fresh water during its recovering.

When the entire job is completed rinse the rope during the last recovering, allow the rope to dry up as much as possible and then re-lubricate the rope, spooling down the entire rope length or at least the used length during the previous working operations.

4.2. Re-lubrication

The main goal of this operation is to get back the characteristics of the original lubricant that might have been lost due to the usage and environmental conditions and furthermore to restore the right protection layer between the strands. Obviously, on a very tight and full metallic section rope, like the non-rotating compacted ropes, the lubricant penetration inside the rope is not easy, and a high pressure system is required in order to achieve an acceptable re-lubrication process internally. The "on spot" re-lubrication, will not have a significant effect on the rope's behaviour, life or safety, so it is preferable to perform a periodical re-lubrication process. The indicative period is at least twice a year, but the right time between one re-lubrication and the next needs to be evaluated case by case considering the use of the rope, induced stress (for example, reeving lay out), environmental conditions, rope age and rope lifetime history.

If it is not possible to ensure what above, it might be better not to re-lubricate the rope.

4.2.1. Re-lubrication procedure:

Periodical re-lubrication is recommended, and needs to be carried out in relation to the effective ropes work, environmental condition etc.; at least every 6 months if the rope is not continuously used, reduced times to be considered in case of continuous rope service.

In order to do a proper rope re-lubrication, it is always advisable to:

- clean the rope from the old lubricant and the superficial oxidation (if present) so to allow the new lubricant to adhere properly to the "steel" and avoid any contamination with the dust that can be present on the external rope surface.
- The new lubricant shall apply on "dry" rope, this is in order to avoid any water / humidity trap inside the rope that can result in an internal corrosion. Accordingly, it is recommended to re-lubricate the rope while it is being deployed as opposed to when it is being recovered.
- Apply the new lubricant with high-pressure system that can help the lubricant penetration inside the rope. If possible, apply the lubricant close to bending points (like sheaves) so to help the lubricant inside penetration.
- It is advised to re-lubricate the wire rope with the original one so to ensure the compatibility between the two lubricants. Due to the abundance of alternative lubricants in the market, our advice is to consult the grease manufacturer regarding the compatibility issues.

- It is recommendable to not apply a thick layer of lubricant so to allow periodical visual inspections.
- If the re-lubricant contains solvents, a proper mixture of the lubricant should be assured so to avoid spraying only the solvent on the rope.

Redaelli ropes are lubricated with Nyrosten T55 that has great compatibility with many different re-lubricant greases, but it is always better to consult the grease manufacturer regarding the grease compatibility so to avoid any unforeseen problems.

5. Redaelli's on-request Services:

On request, Redaelli can carry out the following services:

<i>WR VT inspection</i>	Redaelli can provide on-site VT inspections and rope's expertise worldwide.
<i>MRT inspection</i>	Redaelli can perform MRT inspection on ropes up to 110 mm. (under process to be upgraded to 170 mm). Both during the rope manufacturing as directly on filed.
<i>WR assessment</i>	Redaelli can perform rope assessment on cut samples so to analyze the rope condition (externally and internally), and perform some laboratory tests on the wires providing a report with the tests' results and eventual action to consider for the rope usage, repair and so on.
<i>WR re-lubrication</i>	for dia. up to 120 mm. (under process to be upgraded to 170 mm).
<i>WR re-socketing, repair</i>	on-site and worldwide.
<i>WR spooling & installation</i>	in collaboration with specialized partners.

You can consult the Redaelli Offshore catalogue for further information regarding the wire ropes.

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