

Ropes 360[®]

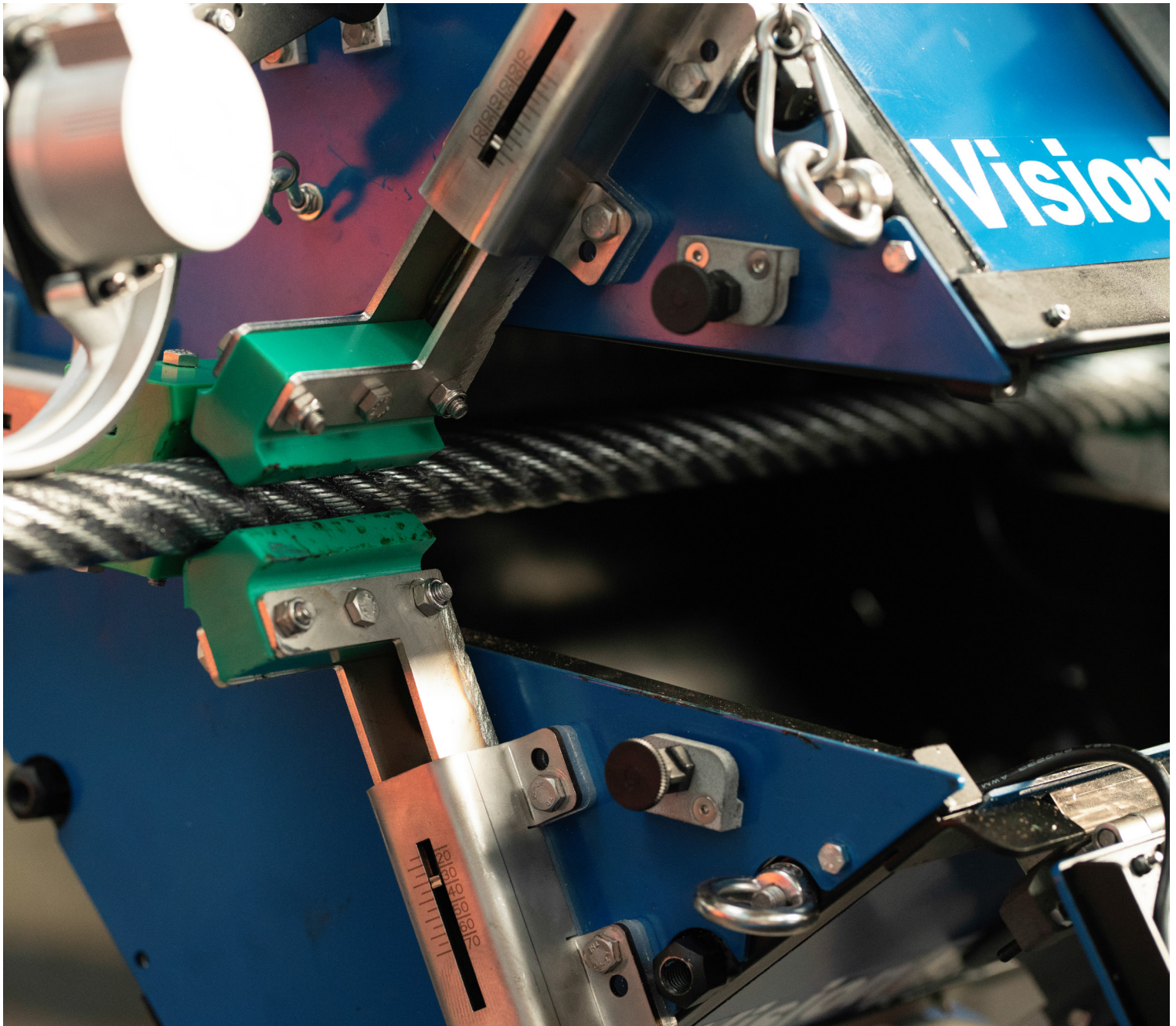
We know the ropes.

Rope inspection

Rope maintenance

Training

Installation



Ropes 360 Services



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We offer many services for both steel & synthetic ropes to extend your service life and maximise your safety.

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The correct use of lubrication can help protect ropes, machines, and lives.

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The Bridon-Bekaert Technology Centre (BBtec) is a world leading centre of excellence for rope technology development, testing, analysis, and verification.

10 Inspection

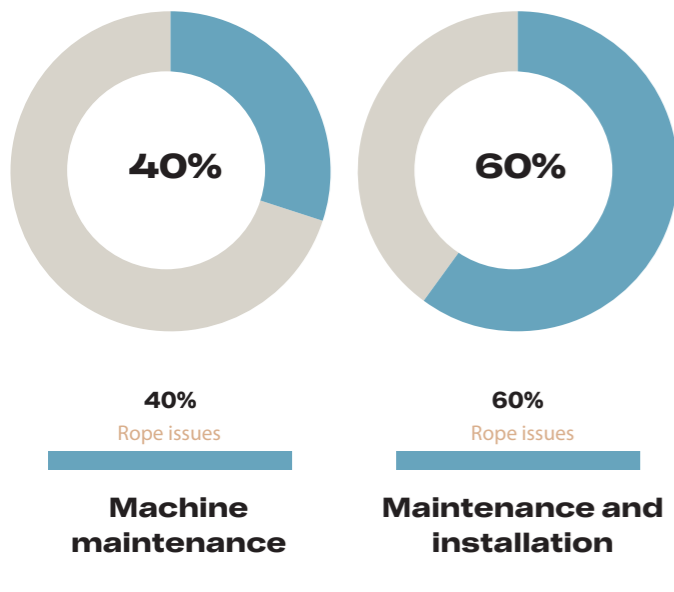
Inspection is the number one preventive measure against issues and the number one attribute to safety. Inspecting devices are written into laws and regulations all over the world for a variety of machines.

12 Advanced inspections

The main methods of advanced rope inspection we offer are Magnetic rope testing, VisionTek, and drones. These devices can be offered as one-time inspections, or as permanent continuous testing devices.



Advanced services



Ropes 360 looks for opportunities to extend your service life. The majority of issues found on ropes globally relate to maintenance issues on the crane, or with the rope installation. Ropes 360 can prevent these issues from happening. With reasonable rates and a global reach, we provide support with all aspects of rope and rope service.

Due to the factors affecting rope life, Bekaert endeavours to be on the forefront of technology, diversifying and investing in people and technology to address all the customers' needs. We believe that a combination of both traditional services and advanced services, including continuous monitoring are the future of rope service.

Our capabilities are split into five fields, including installation, inspection, maintenance, training, and reporting.

In recent years, we have been focused on full packages and developing expertise in other aspects affecting rope life. These now include sheaves, welding, drums, and even addressing application design issues. The full preventative maintenance package starts with a crane pre-inspection, and ends with full satisfaction and stress relief for the customer as their asset is safe and working well.

Maximizing performance is just part of our services offering. Having ropes work safely is top priority, however, also achieving the longest potential service life ensures that the customer maximises their profit and efficiency.

Our offerings

We offer the following services for both **steel and synthetic rope**:

Installation & Training

We offer installation and training courses for rope installation, inspection, and socketing.

Inspection

There are many ways to inspect rope and systems.

Maintenance

Maintenance of ropes are as important as the maintenance of a car engine. Lack of maintenance results in premature failures and compromised safety.



Installation / Training

- Installation
- Winch hire
- Socketing training
- Inspection training



Inspection

- Visual inspection
- VisionTek inspection
- MRT inspection
- Drone inspection
- Ultrasonic inspection



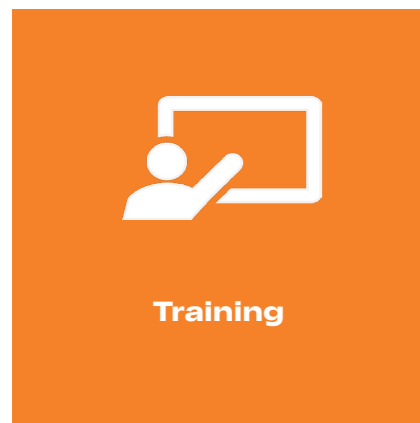
Maintenance

- Relubrication
- Repairing
- Socketing
- Retensioning
- Splicing

Working safely with ropes

Ropes 360 offer training, supervision and support on rope installation, maintenance and inspection. With sufficient training and knowledge, our customers can make the correct decisions leading to longer rope life.

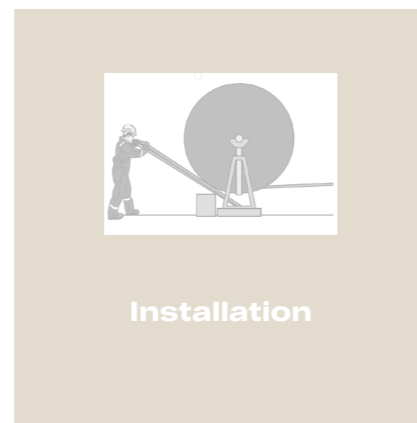
For some applications there are some jobs that don't come up very often, therefore combining our knowledge with the application and system knowledge from the customer, we are able to work together to give the best possible performance from rope. Together we can achieve the desired safety and performance every time. That is the Ropes 360 model.



Training

Knowledge of ropes, applications, and how to managing and maintenance are basic requirements. Bekaert offers a variety of courses across many applications.

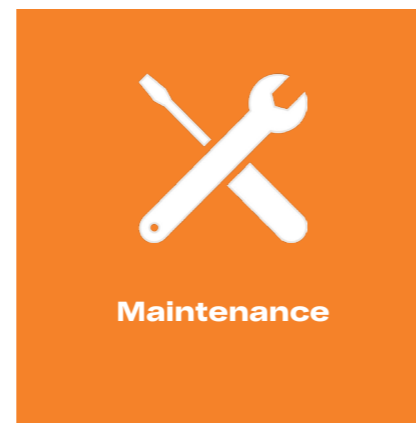
- Introduction to wire rope course - learn all the basics of how ropes are made, inspection, laws, and more.
- Wire rope handling and inspection course - inspection training tailored to the application in question.
- Socketing inspection - both theoretical and practical courses.
- Lifting equipment inspection.
- Deep shaft mining inspection and maintenance.



Installation

We offer proven procedures and expert consultancy to ensure the installation of your rope is right first time, every time. Correct installation is vital for ropes to work to their full potential.

- Supervision Services - use our knowledge with your people, creating a great knowledge and training platform.
- Spooling Capabilities (up to 450T back tension spooling).
- On site rope connections including splicing, welding socketing.
- Spooler rentals.



Maintenance

Maintenance covers all manner of tasks taken to increase the life of the product. It is vital to keep efficiency and safety as a priority.

- Rope Maintenance - Relubrication, Reterminating, Repairing sheathing.
- System maintenance - re tensioning ropes, repairing connection parts.
- Rope Splicing - create a new rope of any length, repair a damaged rope, or alter an existing rope to suit a changing application.
- Ropes 360 also has a range of product to help you maintain the system, including sheave gauges, vernier, lubrication and relubrication devices.

Lubrication

Protecting ropes, machines, and lives

A wire rope or strand is manufactured by twisting wires around a core in a helical pattern. Each individual wire needs to be free to move during rope useage, similar to an engine in a car. Compacted strands, although designed to act as one, also need to be well lubricated to get the best out of the rope.

A rope without lubricant will fail internally due to increased friction and internal abrasion which occurs with steel to steel contact. Externally, rope life can be heavily affected by many factors, including the environment. Both internally and externally, lubrication is of paramount importance to achieve a good rope life.

Lubrication can be split into two categories, build lubricant and service dressing. The build lubricant in the majority of the market is wax based, however different components are combined to give improved characteristics. The mixing of the incompatible ingredients can effect factors such as the viscosity of the lubricant. which is why choosing the correct service dressing effects the rope life.

There are three specific characteristics of rope lubrication which have to be considered, including the following:

- No melt lubrication - for hot works crane
- Good wash off resistance - for offshore or marine purpose
- Friction lubricant - for friction driven systems such as mine hoists and elevators.

The type of service lubricant and frequency of application varies by the rope construction, the operating conditions, and its functional application. Using the incorrect service lubricant can cause the rope to prematurely fail, specifically friction lubricant where a loss of friction can cause deadly accidents. Bekaert's unequalled experience in the world of wire rope manufacture and many years spent in the development of service lubricants have been used in the formulation of the Brillube product range.





Bridon-Bekaert Technology Centre (BBtec)

The Bridon-Bekaert Technology Centre (BBtec) is a world leading centre of excellence for rope technology development, testing, analysis, and verification. BBtec is equipped with unique equipment capable of testing steel/synthetic ropes and wires. With extensive forensic analysis laboratory facilities and specialists capable of conducting detailed forensic evaluation of new, retired or samples of in-service ropes, BBtec can support the services offered by the Ropes 360 team to provide solutions to rope end users.

Forensic Services

BBtec can perform detailed forensic examinations on wire ropes returned from the field to support customers with “slip and cut” activities or to provide a post service assessment. Controlled rope disassembly provides qualitative and quantitative information on rope performance including evaluation of lubrication, corrosion, wear, and other degradation mechanisms. Results from the evaluation can be assessed against international (such as ISO4309) or customer standards to provide valuable information on the service life and performance of the rope.

Mechanical Testing

BBtec is equipped with mechanical testing equipment to determine test data in accordance with international standards. Destruction tests can be conducted to determine the actual breaking load of the rope; modulus tests and load diameter data can also be recorded. Mechanical testing of individual wires (post spin testing) determines the residual properties of the individual elements of the wire rope.

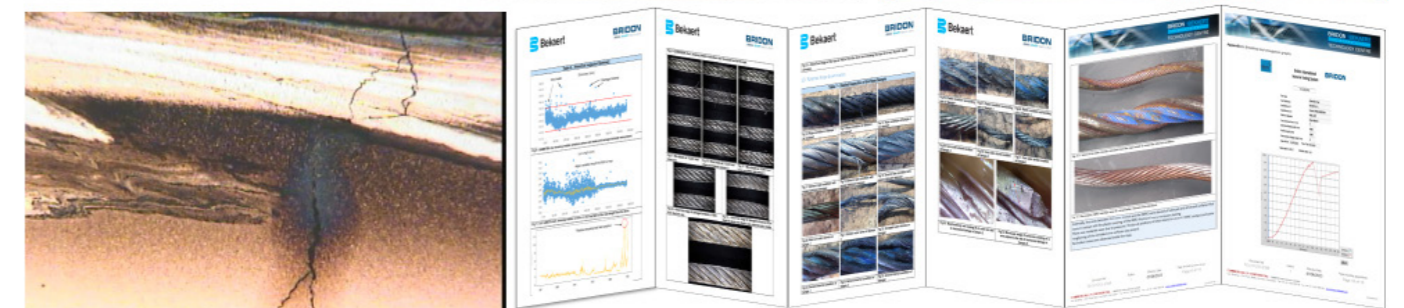
Application and Technology Specialists

The Applications team specialise in understanding how wire ropes integrate onto the end user's equipment by using information obtained from investigations.

Case study

Location Brescia, Italy	Application Hot works ladle crane	Temperatures Average 80° c Highest >350° c
Previous rope 6x36 IWRC using wax based lubricant drop point 110°C	Comments Rope becomes dry after one month and wires begin to loop	Life time 2.2 months
New rope Same construction, relubricated with Brilube HR	Comments Ropes relubricated once a month and no issues found	Life time 3.5 months

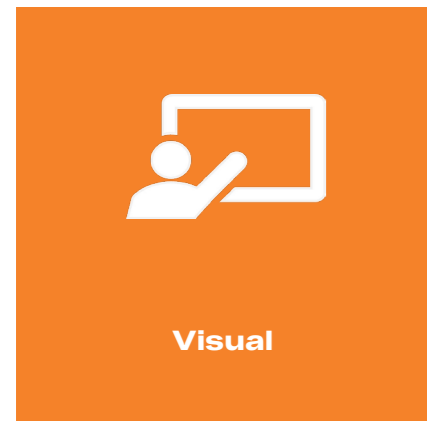
Lubrication Type	NLGI Grade	Corrosion Resistance	Operating Temperature	Description
Brilube 30	Solvent liquid	-	-30°C to +60°C	Semi-dry thin film lubricant for surface cranes
Brilube 40	Solvent liquid	-	-55°C to +40°C	Synthetic lubricant for friction driven installations
Brilube 70	0	Pass	-40°C to +70°C	Medium offshore lubricant w/ high corrosion properties
Brilube Ultra 2	2	Pass	-40°C to 120°C	Hybrid EAL compliant with US EPA VFP permit
Brilube HR	1	Pass	0°C to >400°C	Specific for resistance to high temperatures



Inspection

Inspection is the number one preventive measure against issues and the number one attribute to safety. Inspecting devices are written into laws and regulations all over the world for a variety of machines. In some cases a simple inspection made visually is enough to judge the condition of the system; and in some cases more advanced methods and technology have been adapted to inspect more accurately. The same can be said for ropes.

Our visual inspections can be complimented with additional aids to help get the correct images in order to make a judgement on condition of the rope.

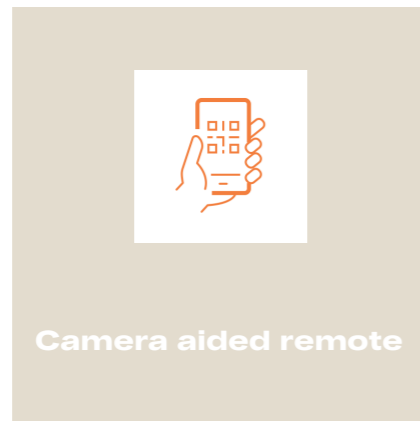


Visual

Visual inspection

Although advanced systems exist in the market to inspect individual components. There is no better way to inspect a full system than by having an expert look over it.

- Inspect rope using traditional tools.
- Inspect sheaves and drums using traditional tools.
- Ability to measure system issues such as fleet angles or sockets.
- Ability to reach areas that advanced measurements cannot.

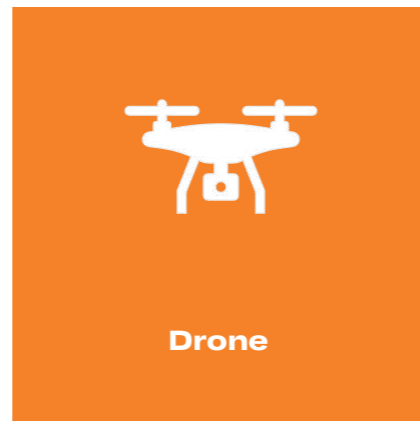


Camera aided remote

Remote inspection

Remote inspection is a way to bring visual inspection to the customer without bringing the personnel.

- Quick response on rope issues.
- Can be leased out for applications where inductions and certification can often be time consuming.
- Expert opinion without the cost of transporting the expert.



Drone

Drone Inspection

Maintenance covers all manner or tasks taken to increase the life of the product. It is vital to keep efficiency and safety at its peak.

- Ability to check hard to reach places without climbing, or creating access platforms.
- Ideal for boom hoists and structural ropes to make a quick check for rope surface issues or rope slippage.
- Different point of view of the rope.

UT Inspection



Ultrasonic inspection allows us to inspect the inside of sockets for potential wire breaks.

- Excellent test results up to 100mm into socket neck
- Mostly used for structures and fixed ropes, but can be used on any termination

Tension Measuring



Tension Measuring ensures that the ropes are using even tensions. This is of paramount importance in applications where multiple ropes are being used for hoisting.

- Vital inspection for some applications
- Often forgotten after initial installation
- Different sizes available for different ropes

Weld Inspection



Weld inspection, including MPI (Magnetic Particle Inspection), is available across all equipment from lifting gear to supporting structures.

- Increased safety of structures and fittings
- Increase the usage and life of lifting appliances

Advanced Inspections

We invest heavily in finding the best inspection methods to suit our customers' needs. The advanced service portfolio is always growing with bespoke solutions. The main methods of advanced rope inspection we offer are Magnetic rope testing, VisionTek, and drone inspections. These devices can be offered as one-time inspections, or as permanent continuous testing devices.

Magnetic rope testing

Magnetic rope testing (MRT) is a method of checking for defects and deterioration in steel wire ropes. Many ropes deteriorate from the inside, which means a traditional visual examination is not sufficient. MRT is recognised across many safety critical industries as an appropriate method for aiding the condition assessment of ropes. MRT uses Magnetic Flux Leakage techniques to identify loss of metallic area or wire breaks as local faults (LF) and loss of metallic area (LMA) in ropes in service.

VisionTek

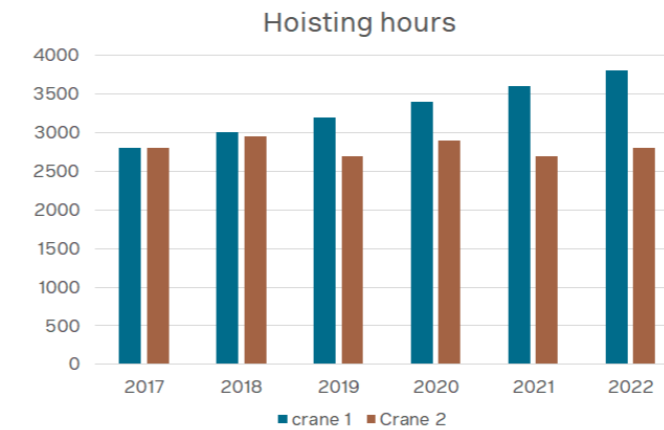
VisionTek inspects rope parameters and the external surface of the wire rope. The rope runs through a camera system where diameter and lay length are measured. Algorithms are used to detect defects such as lubrication amount, wire breaks, and heavy abrasion. Whereas MRT tests are often done on top of visual inspections, Vision Tek has the capability to remove the need for visual inspections; creating a safer environment for the rope to run.

Feature	MRT	Vision Tek	
		Measure	Surface Analysis
Diameter		✓	
Lay Length		✓	
Roundness		✓	
Waviness		✓	
Axis Alignment		✓	
Surface Condition			✓
Image Recording			✓
Loss of Metallic Area	✓		
Internal Broken Wires	✓		
External Broken Wires	✓	✓	✓
Abrasion	✓		✓
Lubrication			✓
Internal Corrosion	✓		
External Corrosion	✓		✓

Mid/post life analysis

Although advanced inspections can test the majority of the rope, the best way to fully maintain and recertify a rope is to run it through our mid life recertification. A rope is run onto a winch and can be immediately reinstalled or optionally a second rope can be installed. A report is produced and the rope is good to go, similar to a car service.

Post-life analysis is part of our MORE program, in which a rope is taken off an application slightly early and analysed down to extreme details to find where the deterioration is starting. The next rope can then be modified to increase life. This process can be taken in steps, giving the safest and most reliable way to better rope life.



Conclusion

The crane with PLA and inspections made by ropes 360 resulted in increased hoisting hours and a much more stable life.



Bespoke model

There are many things that can affect the rope life and therefore many things we can inspect. We make suggestions on what can go wrong with the rope. These issues can be application and sometimes rope-type specific.

Straightforward process

Step 1

Clean the rope - vital step in visually seeing issues either with own eyes or for the equipment.

Step 2

VisionTek- let the device do the surface inspecting, diameter measurements and lay length measurements.

Step 3

MRT - find the internal condition of the rope in terms of level of corrosion and potential wire breaks.

Step 4

Termination - check condition of the sockets, or rope terminations, both visually and with Ultrasonic testing.

Step 5 - MLA only

Relubricate the rope - pressure lubrication is the only way to get lubricant beyond the outer layer.

Step 6

Take a sample - 2-5m sample needed to be able to do a break test and check the tensile condition of the rope.

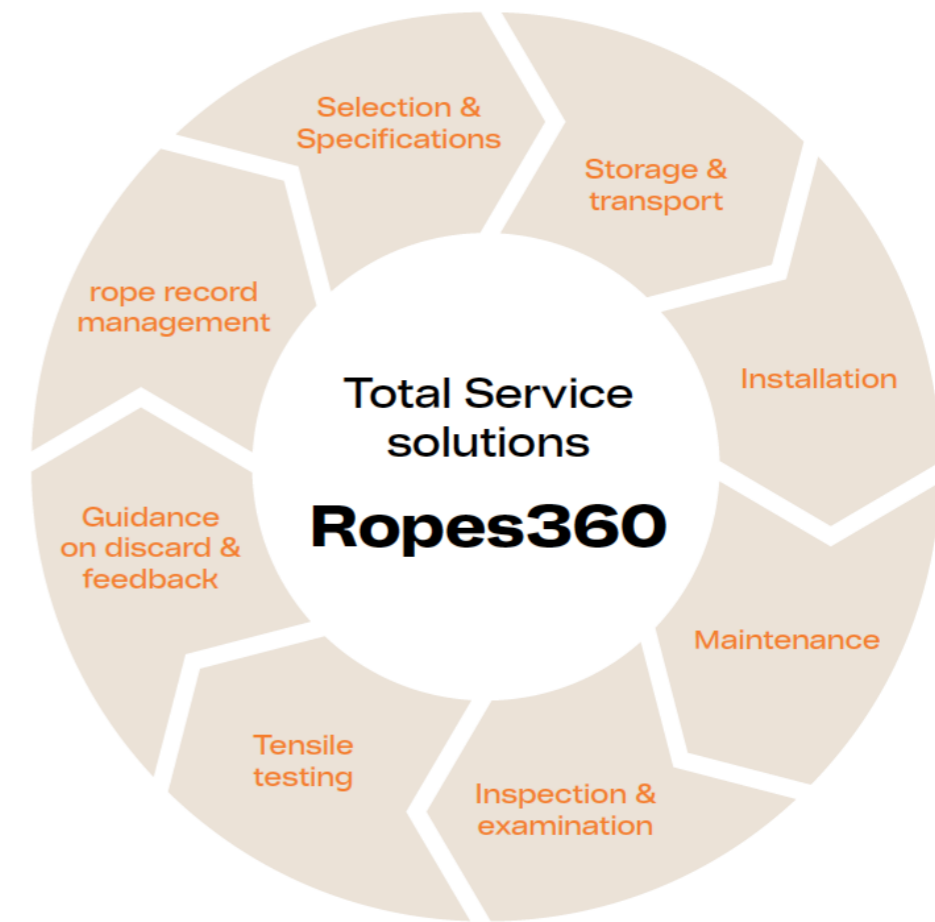
Step 7 - PLA only

Take samples of the rope in worst affected condition and perform strip down assessment and forensic test for areas of deterioration.

Ropes 360 services offers complete solutions and support, with the goal of maximizing our customers' safety and their ropes' operational life. Dedicated rope technicians and engineers offer flexible services, from rope inspection and non-destruction examination (NDE) services to post-retirement examination and feedback systems.



Notes



Contact us
ropes360@bekaert.com

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Contact us

NV Bekaert SA
Bekaertstraat 2
8550 Zwevegem - Belgium
T 0800 022 75 20

www.bekaert.com