The new way of lightness

LIEBHERR

Fibre-Cranes

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From concept to market success

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The future is fibre rope

Innovation and progress have shaped lifting for thousands of years – from ropes made of natural fibres back in the time of the pyramids to present-day construction sites where steel rope is still predominantly used.

But an innovative development has been providing fresh momentum since 2008. Working closely with the renowned rope manufacturer Teufelberger, Liebherr has designed an innovative fibre rope that incorporates the proven features of standard ropes.

With the launch of its Fibre-Cranes in 2019, Liebherr has demonstrated how sound research and development work, and decades of experience can create a safe, high-performance and future-oriented alternative to conventional steel rope.

Historic lifting tools with hemp rope

Steel rope – a time-tested solution for heavy lifting tasks

Rope for the future – high-tech synthetic fibres for even more powerful cranes

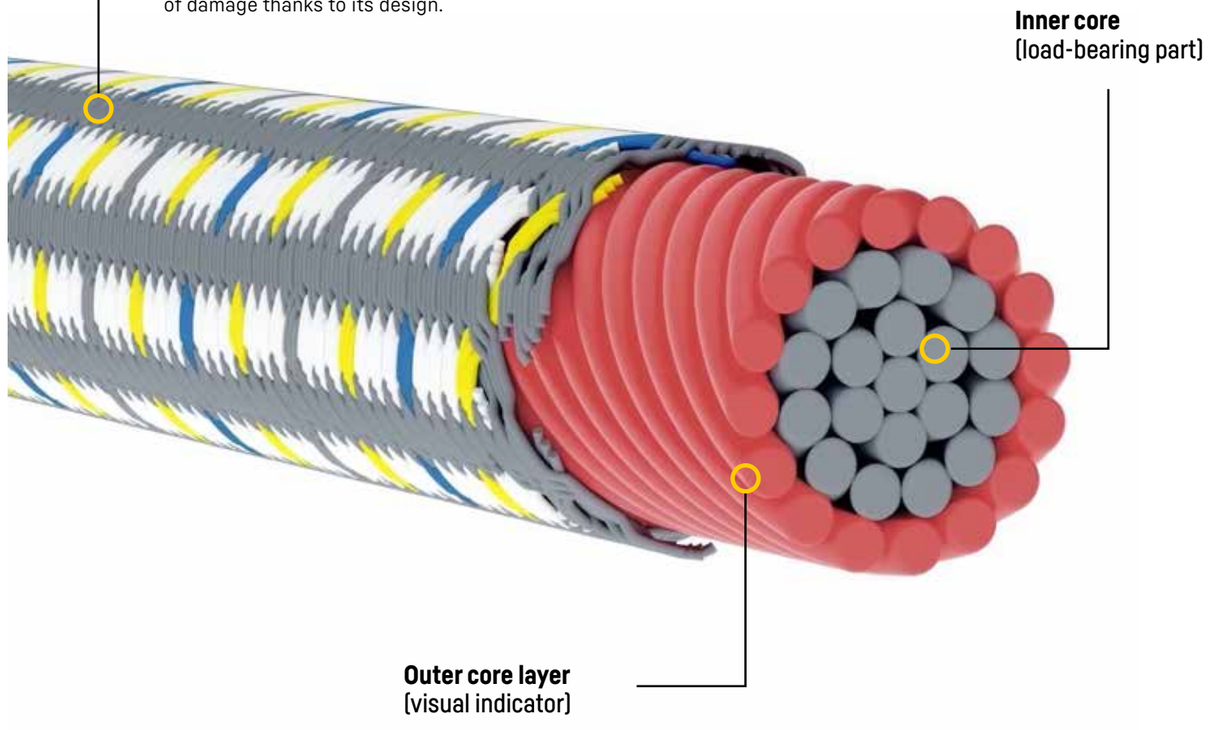
Work without compromise:
> 15 years of development
> 87,000 hours of testing
> 10 years of experience in the field

Construction machines and their accessories are an integral part of construction sites, where they have to prove themselves long-term. With this in mind, Fibre-Technology has been extensively field tested over a number of years.

Constructed with proven materials made from high-tensile synthetic fibres, this innovative hoist rope sets new standards in terms of lifting capacity, stability and weight, therefore paving the way for future-oriented lifting technology.

Outer cover
(rope wear level indicator & protection of core)

The outer cover of the rope doesn't have a load-bearing function but protects the core and serves as an indicator for level of wear through its specific wear pattern. It can easily be repaired in the event of damage thanks to its design.



The fibre rope success story

Research to reality:
From initial concept to a sales share of over 30 %.

~ 300
Fibre-Cranes

>30 %
sales share

Vision put to the test
Field tests confirm the findings from test bench analyses regarding the exceptional robustness of fibre rope when exposed to sources of failure e.g. concrete edges. Fibre rope is less susceptible to damage due to the flexible cover surrounding the load-bearing core and, compared to steel rope, is more forgiving of significant errors in crane operation without rope damage being caused.

Minimised downtimes
Rope damage can't always be avoided, even on today's construction sites. Thanks to our innovative, flexible and competent services, we are able to restore the fibre rope's full performance capability, and in most cases directly on site.

43 cranes with rope damage

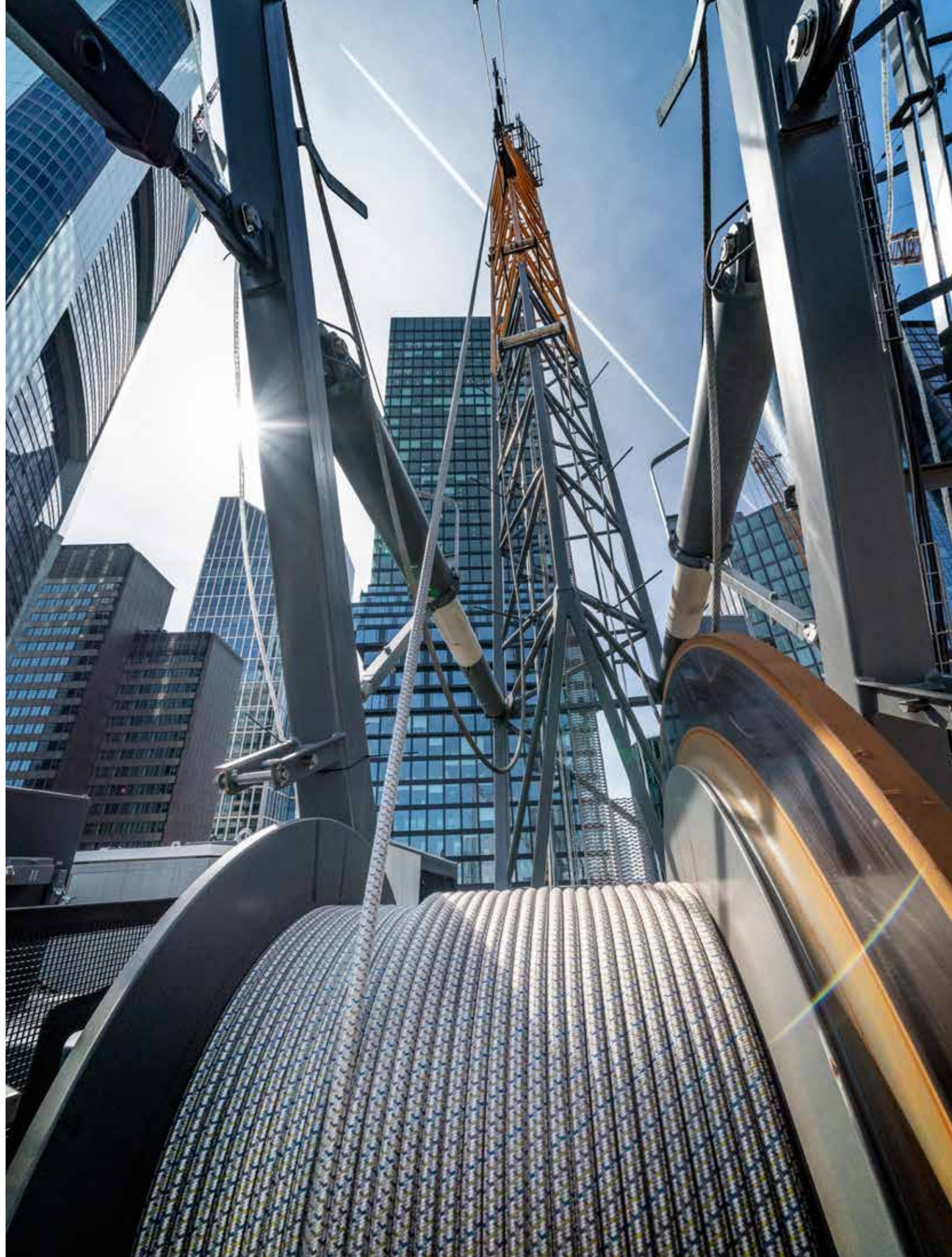
21 cranes repaired with fibre repair kit

16 cranes repaired with rope shortening*

37 cranes repaired with fibre repair kit & rope shortening*

85 % repair rate

2 % downtime rate**



* Rope shortening possible in future, evaluation based on existing crane configuration and its functionality after rope shortening
** Measured on the basis of past service feedback

In harmony with our customers

Innovation paired with a passion for delivering the highest quality are values that drive our company every day. A combination of experience gained in recent years, feedback from construction sites and the needs of our customers have influenced three key developments.

Maximum uptime through rope shortening

The introduction of rope shortening for fibre rope, similar to what is standard practice for steel rope cranes, further increases options for fibre rope repairs. If a fibre rope is irreparably damaged at one point, it can be shortened and re-bonded again so that the rope can continue to be used at a reduced length. The new end connection can be fitted both on site and at our factory – a flexible solution that fits in with site conditions and can be specified by our customers.

The introduction of a storage duration means that ropes can be shortened at our factory without losing value. The combination of rope shortening and fibre repair kit achieves a repair rate not possible with steel rope.

Significant increase in overall service life

As a result of additional insights into the fibre rope's weather resistance, we have increased the overall service life from 10 to 14 years. Overall service life comprises duration of use and storage time, regardless whether this occurs at the start or during the rope's lifespan. The overall service life is measured from the time the rope is assembled.

Rope wear is indicated by the rope cover; if the underlying red signal layer appears and can't be repaired, the rope must be replaced. The increase in overall service life is independent of the rope's purchase date and also applies to all ropes in the field.

Full flexibility both ways

When you buy a Fibre-Crane, your options are open. The ability to convert to a steel rope crane gives you the security you need when investing in a technology that is new to you. Liebherr cranes are known for their high resale value, and this conversion option gives our customers worldwide the opportunity to resell their cranes as steel rope cranes through existing networks.

And as believers in Fibre-Technology, we also offer the option of converting a steel rope crane into a fibre version. This opportunity makes it easier to get started with the technology and enables keen fibre users to convert their entire fleet to Fibre-Technology. You wouldn't be the first to do so.

Strong arguments: 4 advantages through innovation

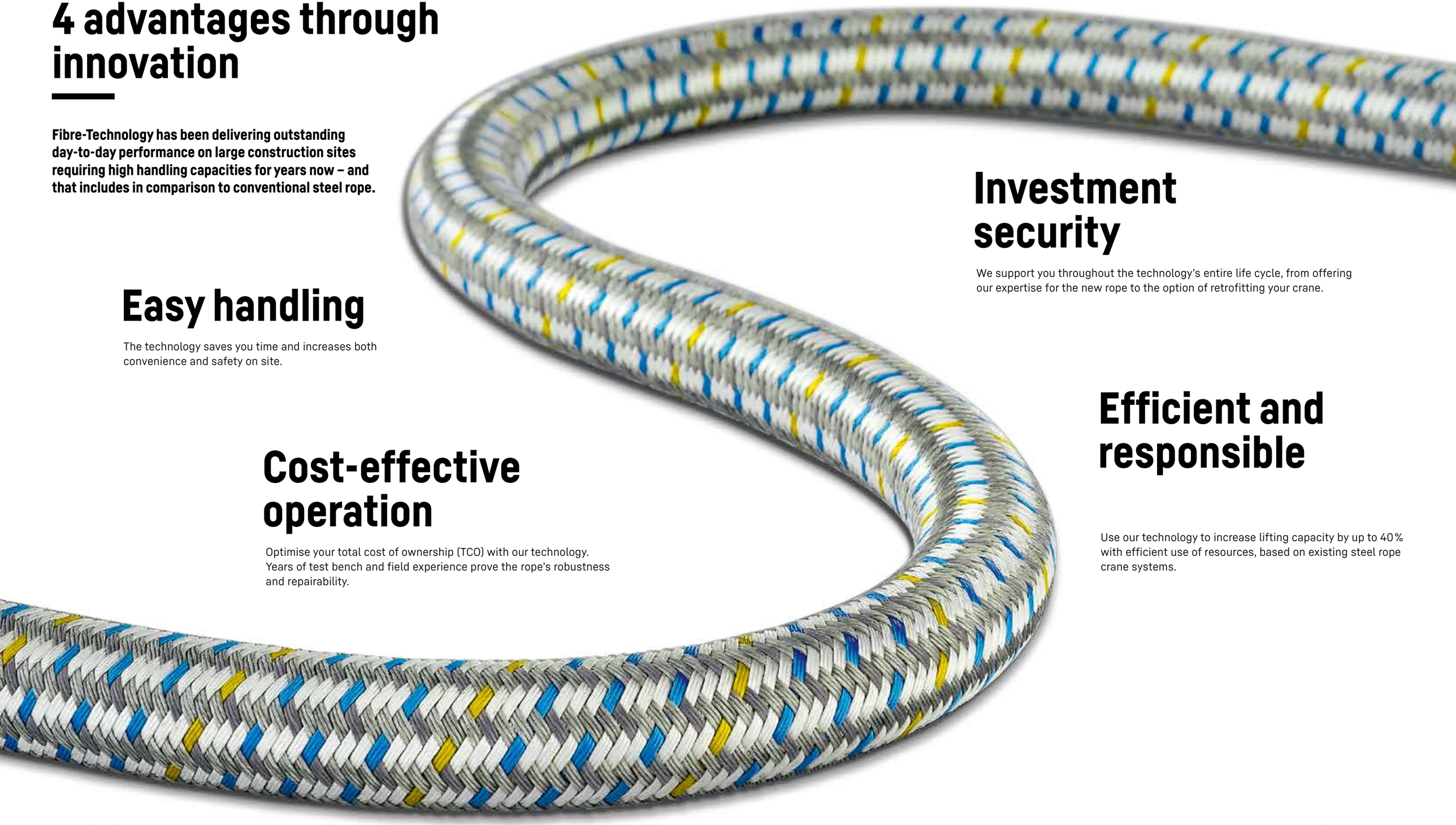
Fibre-Technology has been delivering outstanding day-to-day performance on large construction sites requiring high handling capacities for years now – and that includes in comparison to conventional steel rope.

Easy handling

The technology saves you time and increases both convenience and safety on site.

Cost-effective operation

Optimise your total cost of ownership (TCO) with our technology. Years of test bench and field experience prove the rope's robustness and repairability.



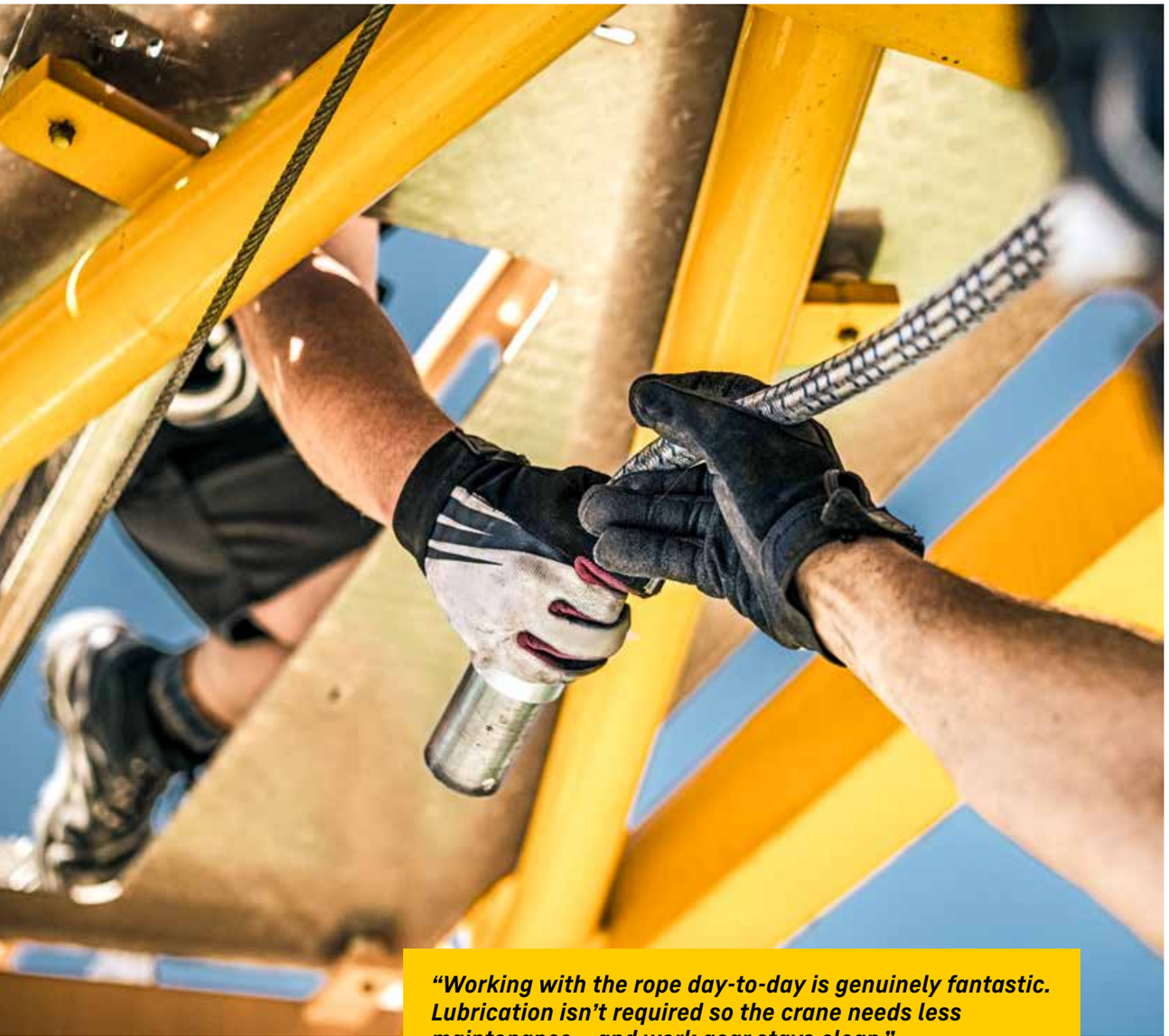
Investment security

We support you throughout the technology's entire life cycle, from offering our expertise for the new rope to the option of retrofitting your crane.

Efficient and responsible

Use our technology to increase lifting capacity by up to 40 % with efficient use of resources, based on existing steel rope crane systems.

Easy handling



“Working with the rope day-to-day is genuinely fantastic. Lubrication isn’t required so the crane needs less maintenance – and work gear stays clean.”

Jochen Braunger, Service Technician

Short assembly times
Service work on cranes costs time and money. The new fibre rope is 80 % lighter than comparable steel rope, so replacement takes less time and needs fewer people. This simplifies handling and no additional lifting tools are needed either. As a result, you get to save on assembly costs and reduce downtimes.

Low maintenance and clean
Fibre-Cranes are low maintenance and as the fibre rope generates little friction, they don’t require lubricant, unlike steel rope cranes. The lack of lubricant means the crane stays cleaner, and so do the assembly engineers and catwalks. Despite regular lubrication, steel rope cuts into the rope pulleys over time and then needs to be replaced. This task is a thing of the past with Fibre-Cranes.

Increased safety
The fibre rope’s cover makes it very easy to identify when the rope needs to be replaced. The red signal layer, which appears as a result of wear during operation, can be seen from a distance and clearly shows that the rope needs to be repaired or replaced. As both the core and the cover are made of high-tensile synthetic fibres, there is no risk of injury from protruding wires when working with the rope.

Water and rust don’t stand a chance
The core of the high-tensile fibre rope is designed to make it very difficult for water to penetrate. As the rope core is made of high-tensile synthetic fibres corrosion damage can’t occur, which means there is no risk of undetected corrosion attacking from the inside. This feature is a major advantage and increases safety substantially compared to steel rope, especially when used in a maritime environment.

Cost-effective operation

“Fibre rope is extremely robust and tolerates operating errors. If minor damage does happen, a quick and simple rope repair directly on site is often enough.”

Knud Feurig, Managing Director and Partner at Feurig Baumaschinen GmbH

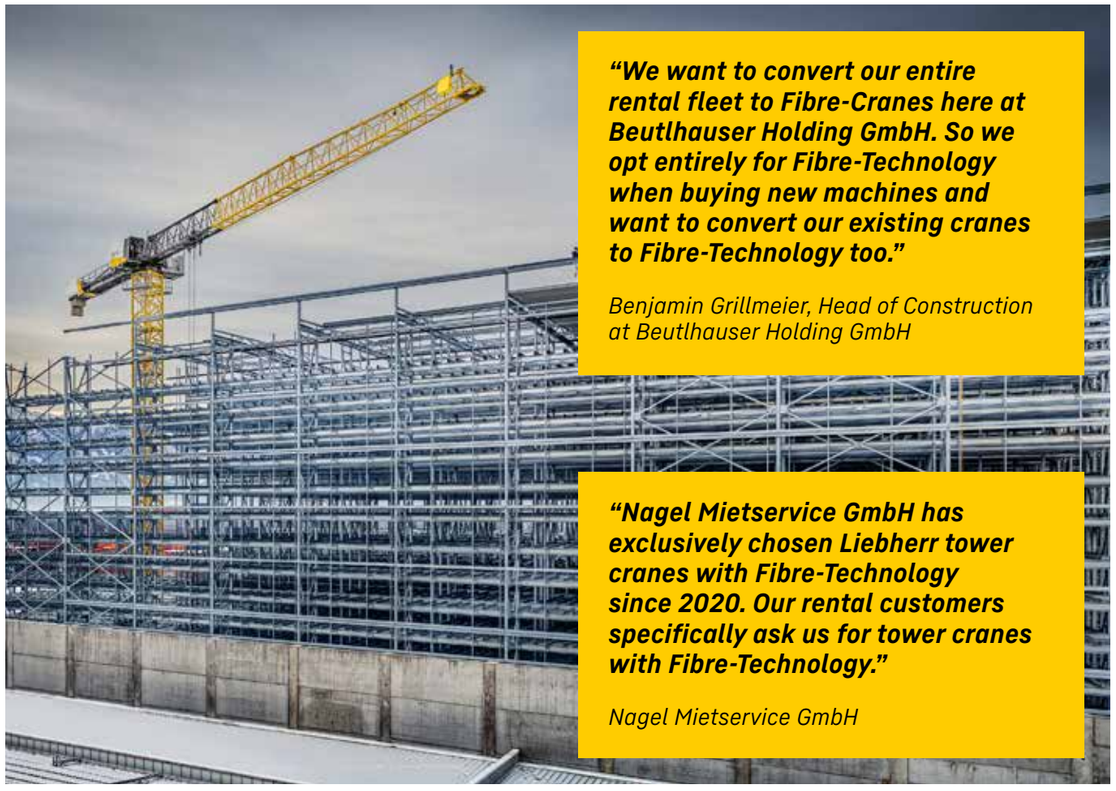
Low TCO due to long service life
The test bench work carried out prior to market launch, which used a realistic load profile, revealed a service life of up to 14 years. The service life of a rope is primarily determined by the number of possible bending cycles. Test bench analyses showed that the fibre rope core’s special structure achieves up to 13 times as many bending cycles compared to steel rope.

Robust in the face of projecting edges
Field tests confirm the findings from test bench analyses regarding the exceptional robustness of fibre rope when exposed to sources of failure e.g. concrete edges. Fibre rope is less susceptible to damage due to the flexible cover surrounding the load-bearing core and, compared to steel rope, is more forgiving of significant errors in crane operation without rope damage being caused.

Excellent repairability
Past service feedback confirms that fibre rope has an extremely high repair rate in those instances where projecting edges do have significant impact on the rope. In most cases, your rope can be repaired quickly and easily on site using our fibre repair kit. We are continually gathering experience with this technology and aim to keep optimising repair options so that even more cases of damage can be simply and easily resolved in future.

The fibre repair kit offers a considerable advantage over steel rope, for which there is no such option. If damage to the rope is irreparable with the fibre repair kit, there is the option of shortening the rope, similar to what is already standard practice with steel rope. Given the fibre rope’s higher value, shortening the rope is a more attractive option cost-wise. *Find out more on pages 9 and 23.*

Investment security



“We want to convert our entire rental fleet to Fibre-Cranes here at Beutlhauser Holding GmbH. So we opt entirely for Fibre-Technology when buying new machines and want to convert our existing cranes to Fibre-Technology too.”

Benjamin Grillmeier, Head of Construction at Beutlhauser Holding GmbH

“Nagel Mietservice GmbH has exclusively chosen Liebherr tower cranes with Fibre-Technology since 2020. Our rental customers specifically ask us for tower cranes with Fibre-Technology.”

Nagel Mietservice GmbH

Getting started made easy
Liebherr Fibre-Cranes are designed to be the equivalent of steel rope cranes. You can therefore use all steel rope crane components in the same way for your Fibre-Crane, with exception of the hoist drum, rope pulleys and hook block. This allows you to maximise the use of identical parts, especially when it comes to cost-intensive tower sections and substructures. Plus, the structural design of the Fibre-Crane is the same as that of its steel rope counterpart, so the only additional expertise required is for the fibre rope itself.

Added flexibility
The flexibility of being able to convert a Fibre-Crane into a steel rope crane offers additional security when investing in Fibre-Technology. Discover the benefits of Fibre-Technology for yourself – and if you do decide to convert, we are happy to help. *Find out more on page 9.*

Performance-orientated spare parts price
Consistent demand and a wealth of development and sales experience together with internal optimisations, e.g. in fibre rope storage, make improvements possible. The combination of improvement potential and technical progress has resulted in an optimised service life to price ratio.

Our extended warranty, a secure promise
Our extended warranty is designed to give you additional security when using fibre rope. Low downtime rates coupled with our performance-orientated spare parts price make cost improvements to the existing extended warranty possible. *Find out more on pages 22 and 23.*

Efficient and responsible

“The huge increase in load capacity when using existing towers and substructures is amazing. That’s why we at Utleiecompagniet AS also use Fiber-Cranes since 2020.”

Kjetil Tettum, Head of Construction at Utleiecompagniet AS

Maximum utilisation of existing systems
Fibre-Cranes use the same tower sections and substructures as corresponding steel rope counterparts, so no additional investment is required. The same structural heights also apply, so that extra complexity can be minimised both internally and externally. Benefit from a lifting capacity increase of up to 40 %.

Each lifting capacity increase in relation to the corresponding steel rope crane can be found on pages 20/21.

The higher the better
The likelihood of the bottom hook block twisting increases with high lifting heights. This can be prevented by adding extra modular weights to the bottom hook block. Structures with high lifting heights require a lot of rope. The reduced weight of the fibre rope therefore has a much greater effect and compensates for the additional weights. The lifting capacity of the 370 EC-B 12 Fibre, for example, increases from + 400 kg at a lifting height of 50 m to + 780 kg at 200 m.

The choice is yours

Increase in handling capacity
The Fibre-Cranes’ modern control system achieves shorter lifting times under load through adapting speed to the reduced weight. This means that more load cycles are possible on site in the same amount of time.

Reduced energy consumption during operation
Where increasing the number of lifts isn’t an issue, Fibre-Cranes offer an energy advantage. Up to 5 % of energy costs can be saved during operation.

Reduced carbon footprint
Carbonfootprints are often assessed in the form of a cradle-to-grave analysis, which includes all the environmental impacts of a product from the extraction of raw materials through to its disposal. The results of such an analysis show that Fibre-Cranes are 12 % more carbon efficient and therefore 12 % more sustainable than their steel rope counterparts. As the main component of Fibre-Technology, fibre rope is 100 % energetically recyclable.

Liebherr core values taken further
Liebherr cranes are known for their quality and consequently their long service life, which forms the basis for high resale prices throughout the product life cycle. Fibre-Technology takes this a step further by significantly increasing the service life of the main wearing part. We are innovative, responsible and deliver the highest quality across everything we do.

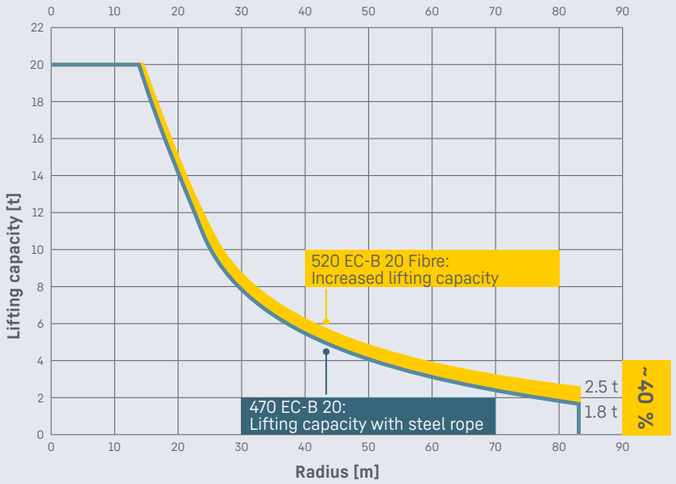
Unrivalled performance with maximum safety

Fibre-Cranes particularly excel in terms of their high performance, significantly improving the lifting capacities of existing systems, especially towers and substructures. As well as the rope itself being 80 % lighter, components such as the hook block are also lighter as a result.

The reduced load on the crane through the use of Fibre-Technology is directly reflected in the crane's performance – dead load becomes working load.

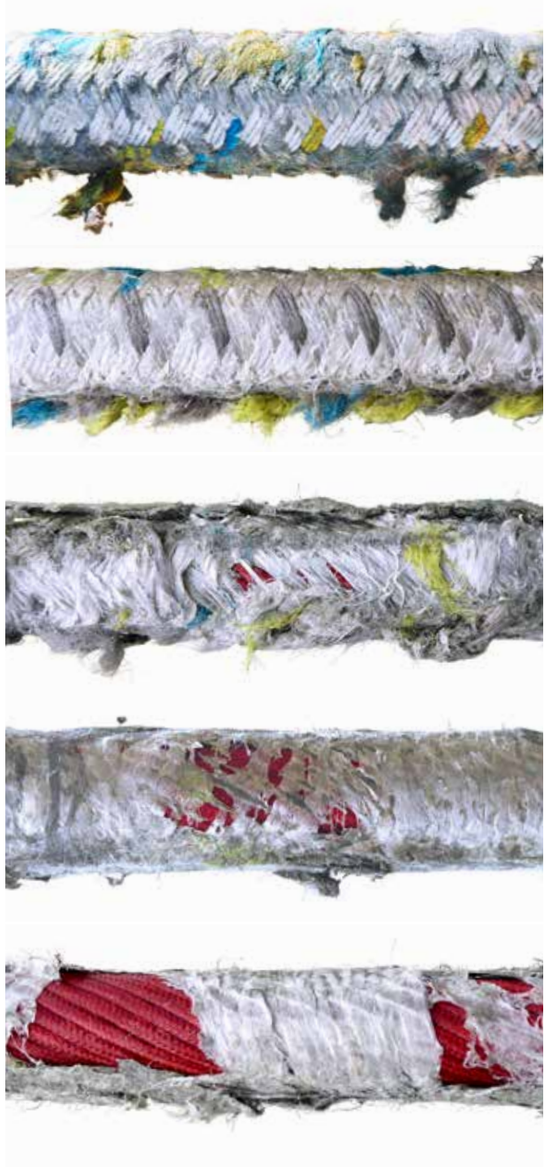
Both the 520 EC-B 20 Fibre and the 258 HC-L 10/18 Fibre achieve the maximum lifting capacity increase of ~40 %.

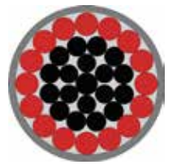
An overview of the lifting capacity increase for each crane model can be found on pages 20/21.



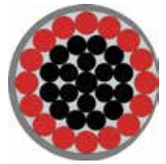
Responsibility also means making sure that safety risks don't arise during crane operation. Fibre-Technology makes it possible to combine this awareness with economic efficiency by being able to determine the latest possible time for rope replacement as precisely as possible.

The rope's outer cover, which reliably indicates the level of wear on the load-bearing rope core, makes it all possible. As the cover wears over time, the red signal layer underneath appears. This is clearly visible, even from far away.

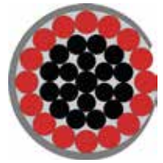




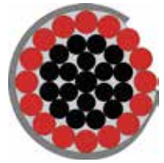
Wear level approx. 40 %
The cover's indicator fibres are clearly worn.



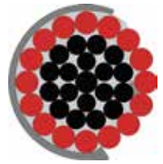
Wear level approx. 60 %
In addition to the coloured indicator fibres, the grey and white protective fibres are beginning to wear.



Wear level approx. 90 %
All cover fibres show wear. A maximum of two adjacent strands of the rope core are recognisable at certain points. The replacement process has to be initiated.



Wear level approx. 95 %
All cover fibres show heavy wear. A maximum of three adjacent rope core strands are visible. The rope must be replaced.



Wear level approx. 100 %
Larger areas of the rope core are clearly visible and no longer protected. Continued crane operation is not possible.

Fibre-Cranes overview

EC-B cranes:

Our flat-top cranes with fibre rope have proven themselves. By bringing together all the advantages of Fibre-Technology and the cranes' features, high performance is guaranteed.

240 EC-B 10 Fibre

Max. lifting capacity	10.0 t
Intersection point	19.3 m
Max. radius	68.0 m
Jib head lifting capacity	2.5 t
Lifting capacity increase*	**250 kg (13 %)**

240 EC-B 12 Fibre

Max. lifting capacity	12.0 t
Intersection point	15.9 m
Max. radius	68.0 m
Jib head lifting capacity	2.4 t
Lifting capacity increase*	**350 kg (21 %)**

300 EC-B 12 Fibre

Max. lifting capacity	12.0 t
Intersection point	18.8 m
Max. radius	73.0 m
Jib head lifting capacity	2.55 t
Lifting capacity increase*	**400 kg (22 %)**

370 EC-B 12 Fibre

Max. lifting capacity	12.0 t
Intersection point	21.0 m
Max. radius	78.0 m
Jib head lifting capacity	2.8 t
Lifting capacity increase*	**400 kg (20 %)**

370 EC-B 16 Fibre

Max. lifting capacity	16.0 t
Intersection point	15.6 m
Max. radius	78.0 m
Jib head lifting capacity	2.5 t
Lifting capacity increase*	**400 kg (24 %)**

520 EC-B 20 Fibre

Max. lifting capacity	20.0 t
Intersection point	15.4 m
Max. radius	83.0 m
Jib head lifting capacity	2.9 t
Lifting capacity increase*	**700 kg (39 %)**

* Increase in the Fibre-Crane's absolute lifting capacity (LM1 and Load-Plus) compared to the corresponding steel rope crane. The percentage refers to the increase in lifting capacity in LM1.

EC-H cranes:

EC-H cranes come into play when extra performance is needed. Performance capacity is increased by up to a further 2.1 t with the Fibre-Crane. This significantly extends Liebherr's tower crane series portfolio upwards.

1188 EC-H 40 Fibre

Max. lifting capacity	40.0 t
Intersection point	38.0 m
Max. radius	90.0 m
Jib head lifting capacity	9.1 t
Lifting capacity increase*	**2.100 kg (18 %)**

HC-L series:

HC-L cranes are our specialists for high hook heights. These particularly benefit from the lighter components of the Fibre-Crane models. The higher the hookheight, the greater the lifting capacity advantage is over the steel rope version.

258 HC-L 10/18 Fibre

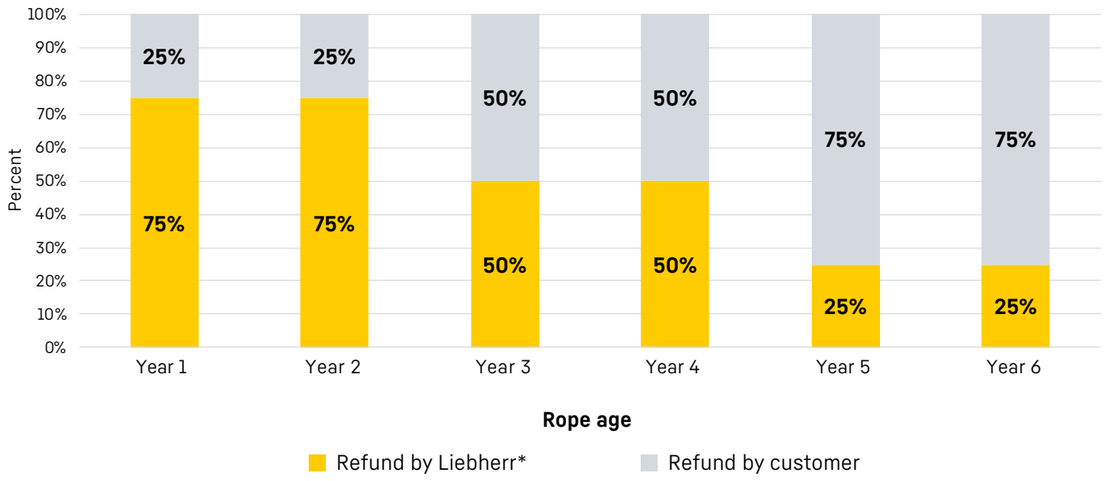
Max. lifting capacity	18.0 t
Intersection point	29.0 m
Max. radius	60.0 m
Jib head lifting capacity	2.5 t
Lifting capacity increase*	**1.100 kg (43 %)**

Guaranteed safety with Fibre-Care

A crane with fibre rope delivers reliable performance and outstanding handling over many years. To give you peace of mind throughout this time, we offer you our Fibre-Care extended warranty. In the event of unforeseen damage, we will contribute towards the purchase of a new fibre rope. Depending on the age of your rope, this contribution can be up to 75 % of the new purchase price.

This allows you to combine the advantages of innovation in crane construction with financial security. Fibre-Care is based on 15 % of the gross sales price of the new fibre rope. Fibre-Care can be conveniently added when purchasing a new crane and as part of the spare parts service via the relevant portals.

Fibre-Care refund model



* Based on the current price of a fibre rope in the length of the covered rope. Wilful intent, action by third parties and force majeure are not covered.

Purchase
Fibre-Crane + Fibre-Care or **Rope only + Fibre-Care**

Damage claim by the customer

Repairable fibre rope

Fibre repair kit

- Repair by own assembly engineers
- Repair by Liebherr assembly engineers

Rope shortening

- Repair on site by Liebherr assembly engineers
- Repair at the Liebherr factory

Defective fibre rope

We find the right solution together

Repair of the fibre rope at the customer's construction site

Work on site continues with repaired fibre rope

Repair of the fibre rope at the Liebherr factory

Replacement rope for future construction sites stored at the customer's warehouse

Order of a new fibre rope

Work on site continues after installation of the new fibre rope

Fibre-Care process

Return of the defective fibre rope to Liebherr or submission of the shortened rope ID to the Liebherr factory site

Credit note as per the refund model to the buyer after receipt of the old part or provision of the ID





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