

Fibre Cranes

The lightness of power



LIEBHERR

The evolution of rope



**Historic hoisting tools
with hemp rope**



**Time-tested for years carrying out
heavy hoisting work – the steel rope**



**The rope of the future –
high-tech made of synthetic fibres**

Ropes have been used to hoist loads throughout the ages. When the pyramids were built, heavy loads were transported using ropes. Thousands of years later, not only has hoisting equipment changed, but so has the rope. Initially a wide range of natural fibres were woven into ropes, but nowadays the steel rope is standard on building sites.

Liebherr has now gone one step further in the evolution of hoisting technology by developing Fibre Cranes.

“As far as I am concerned, the rope is the heart of the crane.”

The Liebherr research team led by Dr. Mupende has developed a solution together with Austrian rope specialist Teufelberger which delivers a massive increase in crane capacity.







87,000 hours and 85,000 metres of test material for the rope of the future.

A reliable, safe alternative to steel ropes has been developed over many years of intensive research and development work. Made of raw materials which have already proven themselves in many different fields, the result is a high-tensile fibre rope

which satisfies the high demands of modern sites. The fibre rope has proven its worth over many hours of operation using thousands of metres of test rope.

Tested in the field



Construction machinery and accessories are part of building sites as they have to prove their worth over the long term. That is why the Fibre Cranes have been tested extensively in field tests over a number of years. The result is a rope which enables you to meet the challenges on modern sites perfectly.

On a range of sites, the newly developed cranes were able to demonstrate the features which the research and development team had hoped they would deliver.

Using the findings from the constant monitoring of the ropes and feedback from crane operators and service technicians, the Fibre Cranes became the products which they are today:

A major step forward in crane technology.

» **11** tower cranes

» **318** weeks of testing

» **2,035 m** of rope in field tests

» **15** sites

» **5** countries

The benefits of Fibre Cranes

Specialising in large construction sites and high handling capacities, Fibre Cranes deliver outstanding performance values and prove their worth in everyday use.

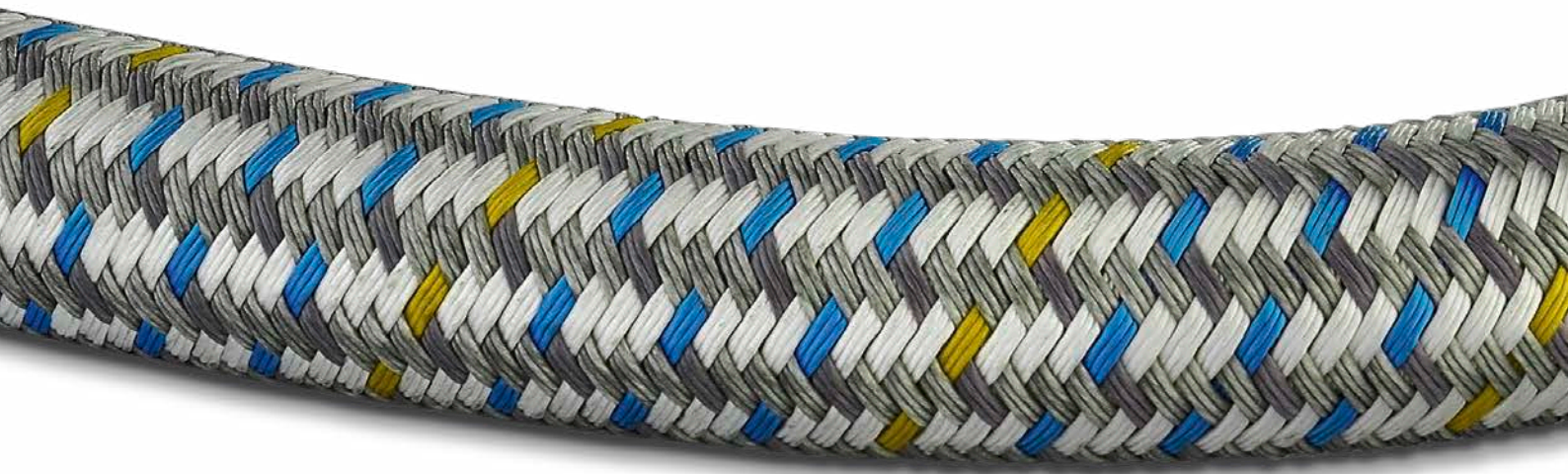
x4

The special materials and special design of the fibre rope make it more durable than existing steel ropes. Fibre ropes are more accommodating to bending cycles which means that they have to be replaced less frequently.



Safety

The cover on the fibre rope does not have a supporting function but is primarily designed to indicate the level of wear. It features fibres which wear at different speeds. Depending on the level of wear, the red core will eventually be exposed indicating that the rope has reached the end of its service life.





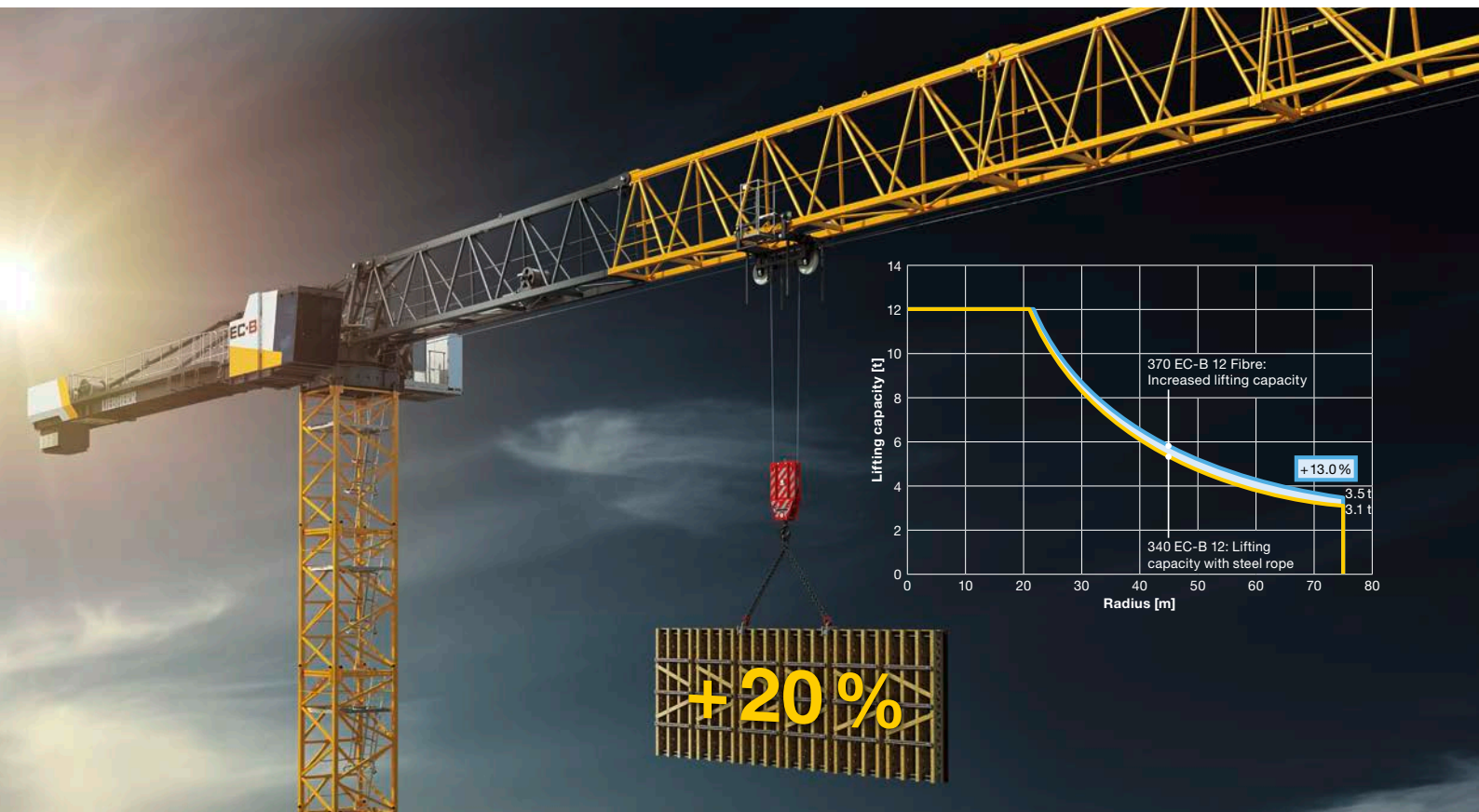
+ 20 %

The cranes deliver significantly higher capacity over the entire load diagram by reducing the weight of the rope and hook block.

Improved erection process

The fibre rope is considerably easier to handle for service technicians. Its flexibility and reduced weight mean that the rope replacement and installation work can be completed more quickly and safely.

Unrivalled performance



Fibre Cranes deliver a particularly good load diagram since the weight of the rope is always included in the load calculation. The reduction to one-fifth of the weight is the main reason behind the increase in the crane's capacity by 8% over the entire moment range and a maximum of up to 20%. The low

load from the rope itself goes straight into the calculation to increase the capacity of the crane. As components such as the hook block are also lighter, this adds to the increase in payload. You benefit from greater capacity without having to accept lower hook heights.

Higher handling capacity ...

The modern control system used on Fibre Cranes achieves faster hoist times with a load by adjusting the speed to the reduced weight. This means that you can complete more load cycles on your site in the same time.



... or lower energy consumption

If the number of hoists does not increase, Fibre Cranes deliver an energy benefit. You can save up to 5% of energy costs during operation.



Simply longer lasting, much longer



13 times as many bending cycles

The number of possible bending cycles is a major key figure in determining the service life of a rope.

In laboratory tests, the special structure of the fibre rope core achieved up to 13 times as many bending cycles as a steel rope. This means a significantly longer service life.

The extensive test phase with the fibre rope showed that in practice it achieves 4 times the service life of a comparable steel rope – as long as it is used correctly. This means that

a service life of up to ten years is definitely possible. In addition to purchasing the rope itself, this also reduces the labour costs for replacement.

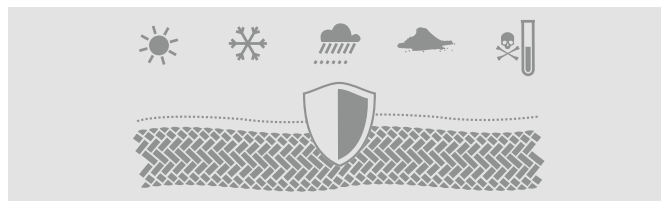
Good winding properties

A clean winding pattern, similar to a steel rope.



Environmental influences

Cranes and their ropes are permanently exposed to a very wide range of environmental influences such as weather, dirt and various chemicals. The protection afforded by the special cover and coating helps to preserve the long service life of the fibre rope.



Easy, clean handling

“The handling of the rope is really perfect. It is so light that we can install it without any equipment. What’s more, the catwalks are no longer slippery because the rope does not have to be lubricated – and our clothes also stay clean.”

Jochen Braunger, Service Technician

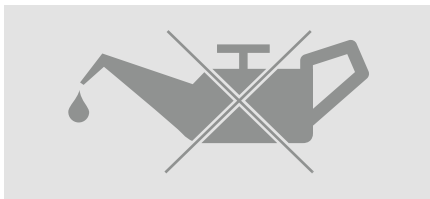


Rope replacement

Service work on cranes cost time and money. Rope replacement work with the new fibre rope can be completed very quickly and with few personnel. The significantly lower rope weight simplifies its handling and means that no additional hoisting tools are required. This saves installation costs and reduces downtime.

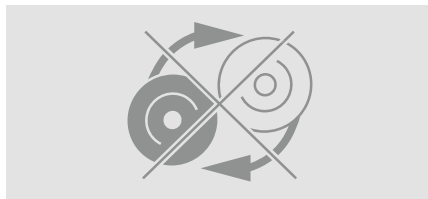
No lubrication

The low friction of the fibre rope means that it requires no lubrication. In turn, this means that not only does the crane stay cleaner, but so do the erection engineers and catwalks.



No rope pulley replacement

Whilst steel ropes cut into the rope pulleys as they are used, the pulleys on Fibre Cranes are protected as a result of the low rope friction.



Simple rope cleaning

The protective cover on the fibre rope significantly reduces the amount of cleaning work required. No polluting cleaning products are required.



Safety

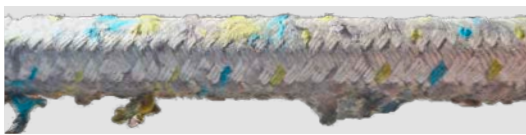
The new fibre rope not only increases the lifting capacities of tower cranes, it also enhances their safety levels. The unique rope construction coupled with the material protects everybody on the site.

Rope replacement indicator

During the development of the fibre rope, special attention was given to ensuring that it was possible to identify when the rope needs replacement as easily as possible.

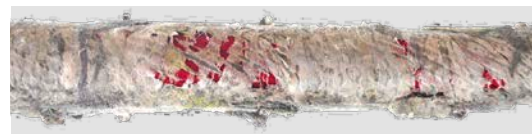
The external cover of the rope does not have a support function. As the cover wears over time, the red signal layer beneath

it appears. This can be seen from distance and shows clearly that it is time for the rope to be replaced.



Wear level around 40 %

Indicator fibres of the cover are clearly worn.



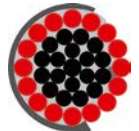
Wear level around 95 %

All cover fibres show strong signs of wear. In some sections, a maximum of three adjoining strands of the rope core are visible. The rope has to be replaced.



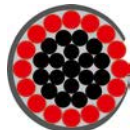
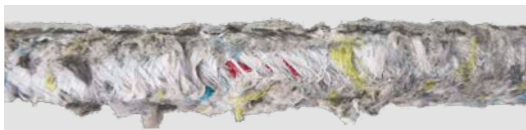
Wear level around 60 %

In addition to the coloured indicator fibres, the grey and white protective fibres begin to wear.



Wear level around 100 %

Large sections of the rope core are clearly visible and no longer protected. Crane operation cannot be continued.

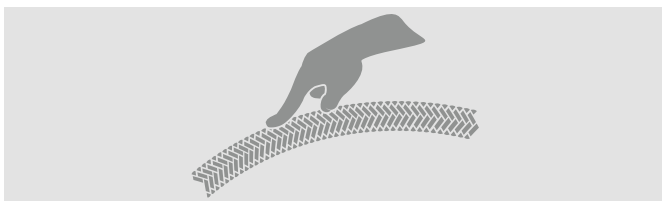


Wear level around 90 %

All cover fibres show signs of wear. In some sections, a maximum of two adjoining strands of the rope core are visible. The rope replacement has to be initiated.

No wire fractures

Since both the core and also the cover are made of high-tensile plastic fibres, which are not as brittle as steel wires, nobody will be injured by broken wires.



No chance for water

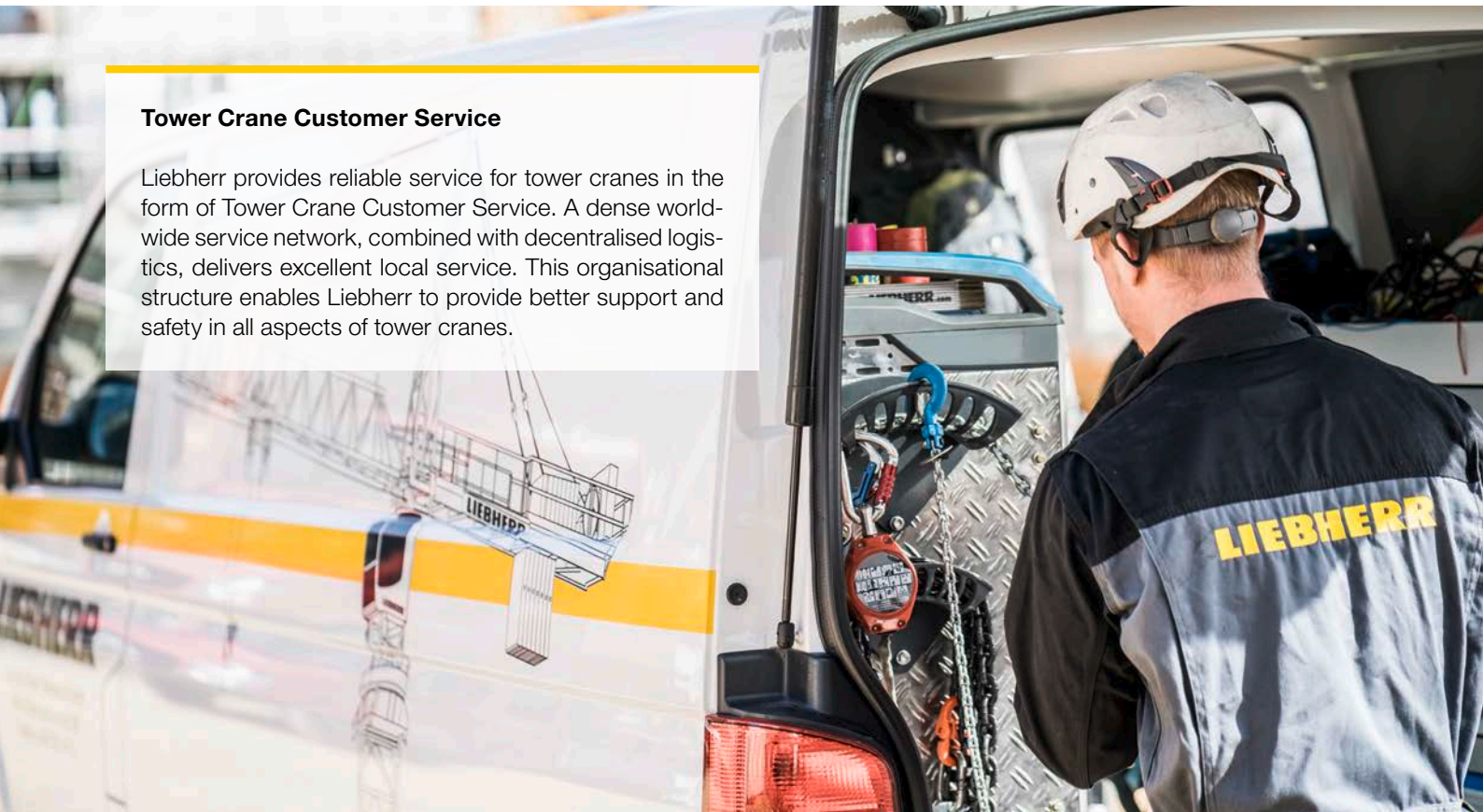
The core of the high-tensile fibre rope is designed to make water ingress very difficult. Since the core of the rope is made of synthetic fibres which do not corrode, there is also no chance of corrosion from the inside remaining unnoticed.



Fibre rope service

Tower Crane Customer Service

Liebherr provides reliable service for tower cranes in the form of Tower Crane Customer Service. A dense worldwide service network, combined with decentralised logistics, delivers excellent local service. This organisational structure enables Liebherr to provide better support and safety in all aspects of tower cranes.

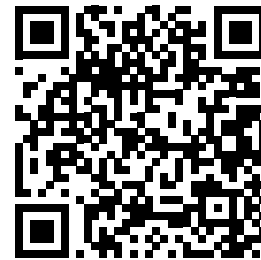


We can supplement your high-tech rope with a great feeling of safety – with Fibre-Care.

Tower Crane Customer Service can provide a hedge to keep you safely in profit and protect you from unforeseen rope damage.

This rounds off the overall package for Fibre Cranes.

You can find more information and details and the direct line to our service team on our website.



www.liebherr.com/tc-customer-service

