Bulletin N° BU220002

Date	01.02.2022	**Classification**	
Enterprise	**Rixen Cableway GmbH**	☐ OS ☒ O	☐ IS ☐ I
Document No.	BU220002		
Substituted	----------		
Editor WoLu / NaAu	**Kind** Plant in general	**Assembly** Ropes	**Number of pages** **4**

Running Cable

The heart of every mountain cable car is the hoisting wire ropes, just like the running cable is to our water skiing/wakeboarding facility. The demands on the running cable are very high as it can travel at a speed of up to 58 km/h (= 18 m/s). A normal mountain cable car on the other hand runs at a range of 10 to 20 km/h. Rixen uses running cables with a diameter of 8 – 10 mm depending on the type of system. The cable design is also different depending on the type of system but mostly they are cross-impact with fiber or steel core. For decades Rixen has been working with various manufacturers to ensure consistent quality with a long service life. However, various influencing factors such as the number of bending changes around the deflection wheels, direction of impact, clamping weight, maintenance and adjustment of the deflection wheels are critical factors for the service life of a cable.

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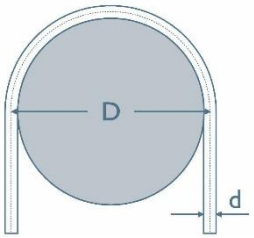
Bending change of the running cable

The most important factor for the lifetime of the running cable is the number of bending changes that the cable is undergoing.



It is not decisive whether the cable is bent by a 90° or only a 10° angle. It's rather the ratio of the diameter between the deflection wheel and the diameter of the cable that is the more decisive factor. With a Rixen FSC system the ratio of the diameter of the deflection wheel D to the diameter of wire d (1300 mm / 10 mm) is 130. With this ratio we are in the optimal range and can assume a rough value of 2 million bending changes for the lifetime of the cable.

Here are two examples:

Assumptions: Speed v = 30 km/h

Operating hours / year Bs = 1500 h

Bending change BW = 2,000,000

1. 5-mast system, 800m running cable length
   Bending change/hour = 5 (masts) x 30,000 m/h / 800 m = 187.5 BW/h Expected service life 2,000,000 BW / 187.5 BW/h /1500 h/year = 7.1 years

2. 6-mast system, 500m running cable length
   Bending change/hour = 6 (masts) x 30,000 m/h / 500 m = 360 BW/h
   Expected service life 2,000,000 BW / 360 BW/h /1500 h/year = 3.7 years

For the water ski cable this means: The more corners and therefore deflection wheels and the shorter the system, the more bending changes per operating hour => the lower the average lifetime of the running cable.

Direction of impact of the running cable

Another essential factor for the lifetime of a cable is the opening and closing of the wire during circulation around a deflection wheel. This happens when the running cable does not enter in the center of the wheel linings but on the upper or lower edge. Here the adjustment of the deflection wheel in the transverse and longitudinal direction plays an essential role. Through the correct adjustment of the deflection pulley (determined by a flag test) and with the running cable in an unloaded state (no rider) the opening and closing of the running cable is reduced to a minimum.

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However, when loaded by a rider the running cable is always pulled downwards and it is pressed to the lower edge of the deflection wheel. Depending on the direction of travel of the system and the direction of the wire strand twist of the running cable the cable will either be twisted inwards or outwards. However, when the wire rope is twisted out basket formation can occur (the wire strands will be twisted open) which affects the wire much worse compared to twisting inwards. This means that systems running to the right should be equipped with both running cables having a left cable strand twist as this will prevent the basket formation of the cable. By observing several cable ski systems with different configurations over several years this effect has now been confirmed.

In the future, please order only two running cables with the same direction of twist (for right-hand systems = counterclockwise 2x running cables with left twist, for left-hand systems 2x running cables with right twist).

The counter weight

Another factor for the service life is the preload through the counter weight which gets transferred to the running cable. This preload is adjusted by the amount of weight of the counter weight and was calculated when designing your system for the optimal payload of the running cable. Increasing the counterweight weight does not increase the wear of the circulating rope linearly but exponentially. If you increase the unning cable tension by 10% wear increases by 20%!

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Lubrication

According to unanimous expert opinion regular lubrication is an essential factor in increasing the service life of your running cable. For lubrication we recommend greasing the entire running cable at least annually and weekly on the carrier and wedge clamps. Please use only a high-quality cable grease!

Running Cable => Nyrosten (Rixen Webshop Art. Rix 10572)

Shock load

Another important factor for the service life of a running cable are the shock loads produced by the riders. Of course, we cannot prevent these loads but the right adjustment of the frequency converter can reduce these loads. This not only saves the running cable from additional loads, it also helps to reduce energy consumption so the drive will run much more economically. A "sharp" inverter can consume up to 30% more power. For an optimal setting of your system please contact our service team.

Replacement of circulating ropes

When replacing the running cable use only a manufacturer approved cable with the right certificate (material certificate 2.2). Cable type, breaking strength and design must correspond to the original part! Wire or wedge clamps must be approved by the manufacturer for the corresponding application!

If you have any question, please do not hesitate to contact our service team.

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Please include this bulletin in the operating instructions of the cable system!

Thank you in advance for your understanding and for your cooperation. The Rixen service team is looking forward to an ongoing and good cooperation.