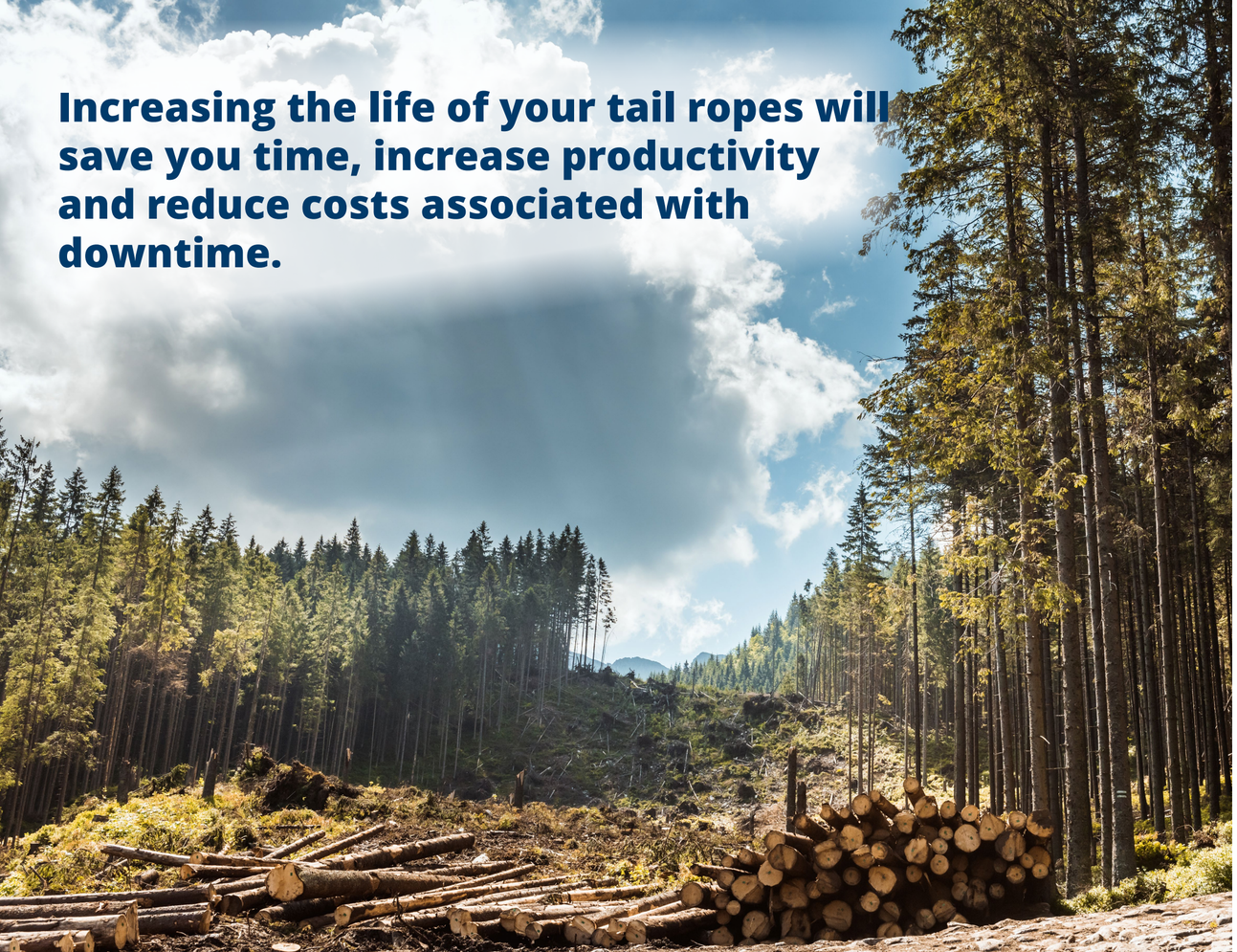

THREE WAYS
TO EXTEND
THE LIFE OF
YOUR ROPES.



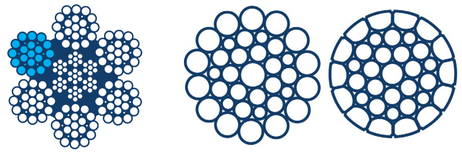
Maximise the life of your tail ropes

Choosing The Right Rope

WHICH ROPE SHOULD I CHOOSE?

There are several key factors to consider when selecting a tail rope. These include:

- ✓Construction
- ✓Level of rope compaction
- ✓Breaking Load (strength)



Non-Compacted Strand Compacted Strand

ROPE CONSTRUCTION

Wires are considered the basic building blocks of a wire rope. They lay around a centre (king wire) in a specified pattern in one or more layers to form a strand. The strands are then closed over a core to form a rope.

Steel wire ropes are supplied with either fibre or steel cores, the choice being largely dependent on the use for which the rope is intended.

For Forestry applications a steel core (Independent wire rope core) is recommended. The IWRC provides greater stability, crush resistance and strength all factors that are needed in an industry that works on a low safety factor (3 to 1).

A common tail rope design is 6x26WS this represents the number of strands in the rope (6) the number of wires in the strand (26) and the design of the strand Warrington Seale (WS).

The different properties of a strand, IE how the wires are arranged in the strand (design), are what gives the rope more flexibility or resistance to crushing or abrasion. Smaller wires are better suited for applications where the rope is bent sharply over a small sheave. Larger outer wires offer better abrasion & crushing resistance, making them better suited to applications where they are frequently rubbed or dragged through abrasive environments. The Warrington Seale design is the best mix of flexibility and abrasion resistance, having three layers of wires over a king wire. The outer layer of larger wires protects the more flexible Warrington layer, which is a mix of medium and small wires. Common Warrington Seale strand designs have 26 (1-5-5+5-10) 31 (1-6-6+6-12) 36 (1-7-7+7-14)or 41 (1-8-8+8-16) wires.

ROPE COMPACTION

Compacted wire ropes refer to a wire rope which has undergone a process of reducing the diameter of either the strands, the complete rope or both of these to get to the required finished diameter. There are two primary methods of rope compaction - Dyforming (strands) and swaging (Rope).

Dyform

The Dyforming process is where the six strands having been produced oversize are drawn through a die or rollers to reduce them to the correct diameter before being closed around the IWRC to form the rope. This process increases the steel fill factor in the strand and shapes the wires to produce a smooth surface on the exterior of the strand. See fig 1 Dyform rope. Dyform ropes offer greater flexibility than a swaged rope but will have a lower breaking load and are not as robust.

Swage

The swaging method sees an oversize rope pass through a rotary hammer swager that flattens the rope and increases the fill factor (density). This method increases the strength and the crush resistance of the rope, while the smooth profile of the rope increases the contact area on sheaves and drums allowing for better wear resistance. See fig 2 swaged rope.

Fig 1. Dyform rope

Fig 2. Swaged rope

Dyswage

Dyswage is a combination of the previous two compaction methods IE the six strands are made oversize before being drawn down through rollers or dies and then the rope itself is hammer swaged to the correct finished diameter. This type of rope offers the highest strength but the increase in compaction means reduced flexibility.

Strength

There are two ways of increasing the strength of a forestry rope:

Compaction: Increasing the compaction of your rope increases the strength but counter to this it can reduce the fexibility of your rope

Increased Wire Tensile: Increasing the tensile strength of the wires used in your rope will increase the breaking load. IE standard forestry ropes are manufactured from wires that are 1770 N/mm2. A move to 1960 N/mm2 wires will see an increase in breaking load of approximately 15-20%.

SUMMARY

In choosing the best rope design for your forestry crew, consideration must be given to the type of gear that you are running. Modern extraction methods including bunching see grapples being used on swing yarders and pole haulers picking up multiple stems. This adds extra stress to your rope with the increased loadings on a lower than normal safety factor (3 to 1). This method of extraction is also quicker than using traditional chokers and results in crews being able to carry out more drags in a day, resulting in increased production. The negative effect of this increased production is that your wire rope carries out more bend cycles in a day under increased load, resulting in a reduced working life (in terms of days/months).

So what can you do:

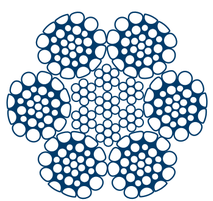
- ✓ Modern testing has proved that increasing the safety factor will increase the bend performance of your rope IE a rope with a higher breaking load will carry out more bend cycles before failure than a rope of the same construction with a lower breaking load. The reasoning – the rope is not having to work as hard due to the increased safety factor.

- ✓ Increasing the flexibility of your rope without compromising the robust construction of your rope will mean improved bend cycle performance. Improved bend cycle performance will then reflect in more tonnage being pulled over the life of your rope. IE a lower overall cost.

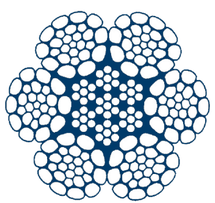
COMMON TYPES OF TAIL (HAULBACK) ROPES

While Dyform ropes are a suitable alternative to a non-compacted tail rope they are not robust enough to handle the loadings applied by grapple yarders. Standard swaged 6x26 is an effective tail rope in most situations however if you want to the best return for your hard earned dollars a swaged 6x31 rope will give you more life (bend cycles).

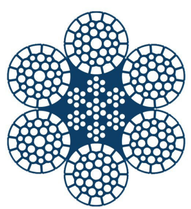
S631 Generation 2 is the next step. An improvement in breaking strain (19mm -35 tonnes 23mm 50 tonnes) means you are working with heightened safety, your ropes are under less stress and the 6x31 Warrington Seale design gives you the best combination of flexibility and abrasion resistance.



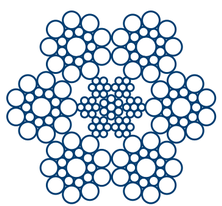
Swage 6x31



Swage 6x26 \ Dyswage



Dyform 6



6x26

Larger Sheave Blocks

LARGER SHEAVE BLOCKS

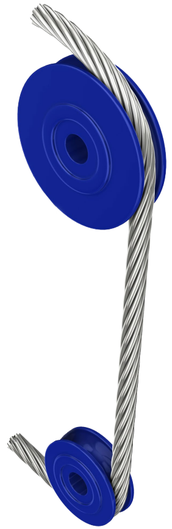
A common tail rope set up now sees sees two blocks on a mobile tail hold. When your wire rope runs around a sheave block it goes from a straight state to a bent state and then back to straight again, this is referred to as a bend cycle. The change from the traditional one tail rope block to the more common two that we see today introduces another bend cycle into your rope. With each drag we see four bend cycles on a two block system versus two bend cycles on a single block.

A larger sheave block reduces the radius of which a rope has to bend during a bending cycle, leading to reduced internal stress on the rope, ensuring you get more bend cycles from your ropes.

Is running one larger sheave block the answer to increased rope life?

While in theory yes, in practice we know that line wrap is a rope killer and running one block increases the risk of line wrap, so in some cases two larger blocks will be a more effective solution.

Increasing the bending cycles of a wire rope means an increase in production time and less downtime replacing or repairing ropes.



Wire Rope Lubricant

LUBRICANTS

We have already mentioned that forestry ropes work under extreme loads and run around sheaves. This metal on metal contact under load creates wear. Wear on your rope eventually leads to bend fatigue breaks on the outer wires usually occurring at the point of contact with the sheave.

Wire rope lubricants can help this, as they have two primary purposes;

- ✓Reduce friction as wires move over each other
- ✓Provide resistance to corrosion

There are two different types of lubricant, penetrating and coating.

Penetrating lubricants rely on a petroleum solvent to carry the lube into the core of the rope, which then evaporates, leaving behind a heavy lubricating film to protect and lubricate each strand.

Coating lubricants only slightly penetrate the rope and are designed to seal the outside of the rope from moisture and reduce wear and corrosion from contact with external properties.

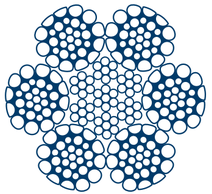
The primary type of lubricant used in tail rope applications is penetrating lubricants. This is due to the lubricants ability to get within the wires of the strand and reduce friction between wires as the ropes move through the sheaves.

BRILUBE®

COOKES

Lubricating Your Ropes

Our Recomendation



S6x31 GEN2

- ✓Improved flexibility
- ✓Highest breaking strentgh
- ✓Improved crush resistance

YOUNGS BLOCKS

- ✓Larger sheave
- ✓High Strength
- ✓Lightest weight

BRILUBE® FIT

- ✓Wear protection
- ✓Corrosion protection
- ✓Easy application

COOKES
a BRIDON · BEKAERT Ropes Group Brand

contact@cookes.co.nz

www.cookes.co.nz

facebook.com/Cookesbbrg

linkedin.com/company/cookes

twitter.com/bridonbekaert

Head Office
Bridon New Zealand Limited
trading as Cookes
6-10 Greenmount Drive, East Tamaki
PO Box 14 422, Panmure
Auckland
0508 274 366
+64 9 274 4299

Edition 01/2020 - 3 Ways to Increase the Life of Your Tail Ropes

customerservices@cookes.co.nz

0508 274 366
+64 9 274 4299
www.cookes.co.nz

BRIDON · BEKAERT
THE ROPES GROUP