

Pre-stretched and low-stretch elevator ropes

TECH TIP 16

Many users of elevator ropes are confronted with the choice between pre-stretched and non-prestretched elevator ropes. Some rope manufacturers recommend prestretched elevator ropes and some do not. Others offer low-stretch elevator ropes.

Questions

What exactly does 'prestretching' mean and what is the effect of it? Are there alternatives?

Definition

Pre-stretching is defined as pre-loading ropes in a way that the main rope elements, such as core fibers, core, wires and strands, can settle under load prior to installation.

Purpose

Pre-stretching should reduce (but not eliminate) the amount of elongation of newly installed elevator ropes. Ropes with little elongation do not need to be shortened as soon after installation.

IWRC (Independent Wire Rope Core) ropes or mixed core ropes do have a better elongation behavior than fiber core ropes. Pre-stretching these rope types is not required since they are naturally settled due to their construction.

Answers

Pre-stretching is done during or after the rope production process.

Prestretching during production

If ropes are pre-stretched during rope production the result can be negligible. It is not possible to prestretch natural fiber core elevator ropes during production. Time is too short to get any benefit.

Improving elongation behavior by prestretching natural fiber core ropes needs a very high time factor. Therefore some producers offer post production pre-stretched elevator ropes.

Prestretching after production

If ropes are prestretched after the rope production process the effect is little to none. Even if the rope speed is slower than during rope production, the time to achieve meaningful lower rope stretch is not sufficient.

Natural fiber core ropes for elevators with effective long time pre-stretching would be too costly.

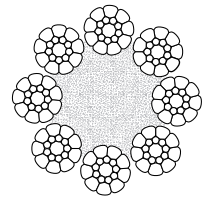
Ropes change reels a few times before they are installed on elevators. First they move from production to master reels and usually from master reels to smaller warehouse reels for distribution. At the end they are cut to length and wound from warehouse reels to small reels or coils, ready to be installed on elevators.

During such handling, strands and wires change position and tend to lose any benefit of a prestretching process. This is another reason why the resulting effect of pre-stretching ropes is extremely small or absent.

Alternatives

Natural fiber core ropes

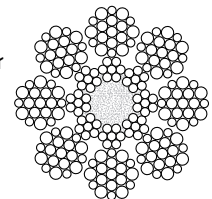
The core of a natural fiber core rope is the most important part. It supports the strands when the rope is under load. A good natural fiber core stays firm and will not get compressed by the strand pressure and thus prevents excessive rope stretch.



A good natural fiber core has a significant influence on reducing rope elongation behavior. Therefore, rope manufacturers with in-house core production can integrate and control the core production in their own quality systems. Such ropes have a good elongation behavior.

Mixed or steel-reinforced core ropes

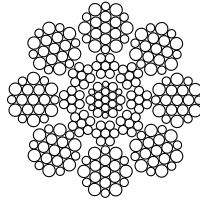
In mixed core ropes, part of the natural fiber core is replaced by steel wire strands or smaller steel ropes. A steel-reinforced core supports the outer strands better than a pure natural fiber core. This gives the mixed core rope a better elongation behavior than a natural fiber core rope.



In addition, the steel part of the mixed core relieves the outer strands of some load which also results in lower stretch. Mixed core ropes have a good elongation behavior.

Steel core ropes

Steel wire strands or steel wire rope (IWRC) can also be used as cores. Both have an enormous effect on positive rope elongation behavior. Steel core ropes support the outer strands best. This results in very little diameter reduction and therefore keeps rope stretch very low. Steel core ropes have the best elongation behavior.



Remark

Different manufacturers offer elevator ropes with mixed and steel cores.

Parallel laid elevator ropes with mixed or steel cores are very delicate and tend to untwist easily during installation if not handled correctly. With this exception, parallel laid ropes have a good elongation behavior.

Prestretched vs. natural fiber, mixed and steel cores

As mentioned, elevator rope constructions differ in elongation behavior. In Table 1, some possible elongation values are indicated:

Table 1 - Elongation comparison of different cores

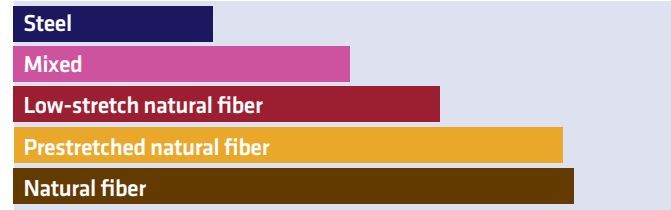


Table 1 indicates that the difference between prestretched and non-prestretched natural fiber core ropes is very small. Alternative ropes show a much better elongation behavior.

Conclusion

Any natural fiber core rope can be used if stretch is not an issue.

If stretch using natural fiber core ropes is an issue, then we recommend Gustav Wolf low-stretch natural fiber core ropes.

All Gustav Wolf natural fiber cores are produced in-house with special care and are of very high quality. Therefore Gustav Wolf low-stretch natural fiber core ropes are superior to, and have less stretch than prestretched elevator natural fiber core ropes.

If stretch is a very important consideration, Gustav Wolf provides elevator ropes with steel-reinforced fiber cores (PAWO F3 and PAWO F7) and full steel cores (PAWO F7S and PAWO F10) with elongation approximately half that of low-stretch natural fiber core ropes.