

Elasticity and Elongation

What gives CASAR Special Wire Ropes the best stress-strain behaviour?

Conventional steel wire ropes often have insufficient modulus of elasticity and too high permanent elongations.

CASAR Special Wire Ropes are optimized with regard to their stress-strain properties by various features:

- The full steel construction provides a high modulus of elasticity.

- The compact rope structure guarantees minimal permanent elongations in the working range.

- The homogeneous load distribution on all rope elements creates high elongations at break.

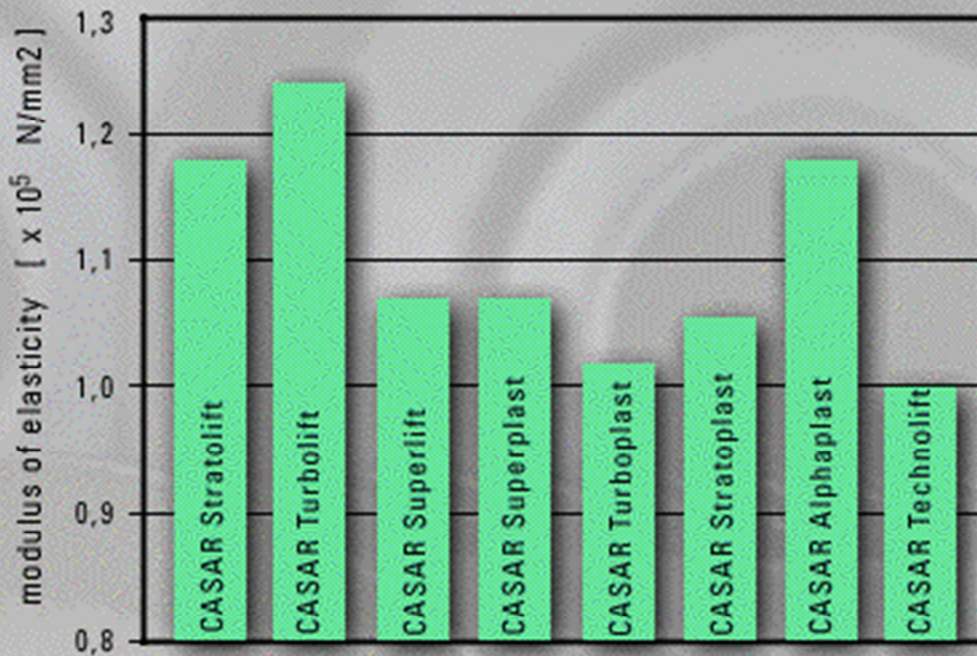
- The plastic layer absorbs dynamic energy.

The balanced stress-strain properties of CASAR Special Wire Ropes offer the user the following advantages:

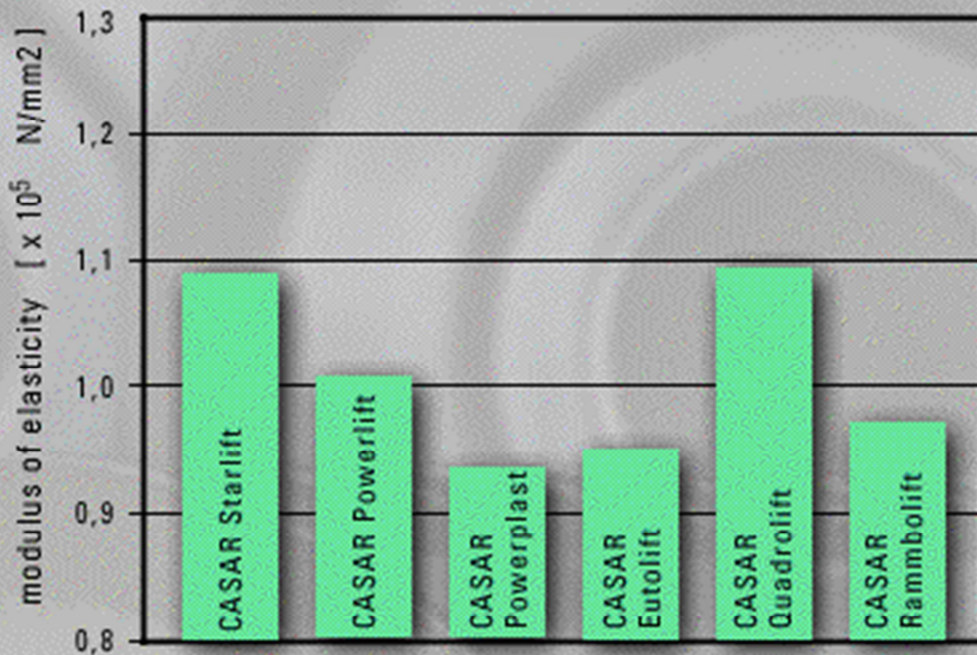
- High rigidity of suspended structures.

- Less retention for suspended structures and positioning machines.

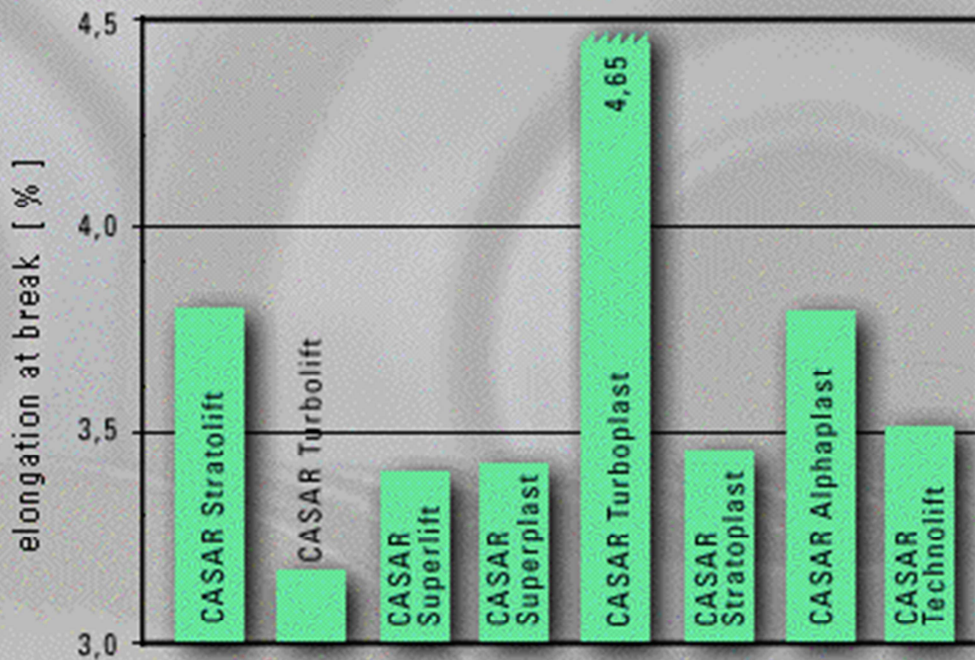
- High safety against dynamic failure.



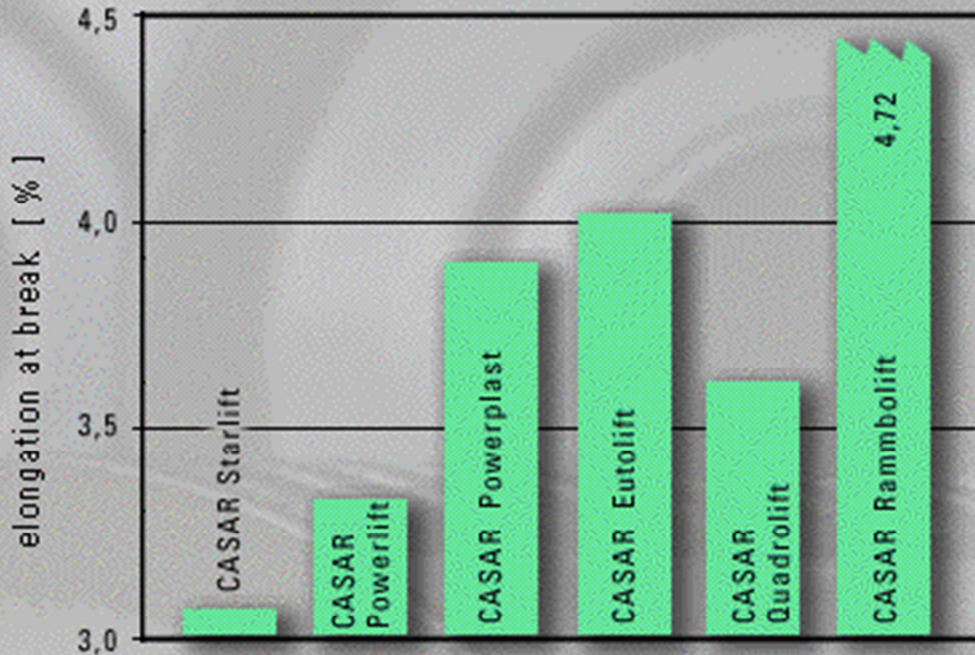
Elasticity 1: Moduli of elasticity for non rotation-resistant CASAR Special Wire Ropes.
 The modulus of elasticity of a steel wire rope is about half the modulus of plain steel.
 (Average values from a great number of tests)



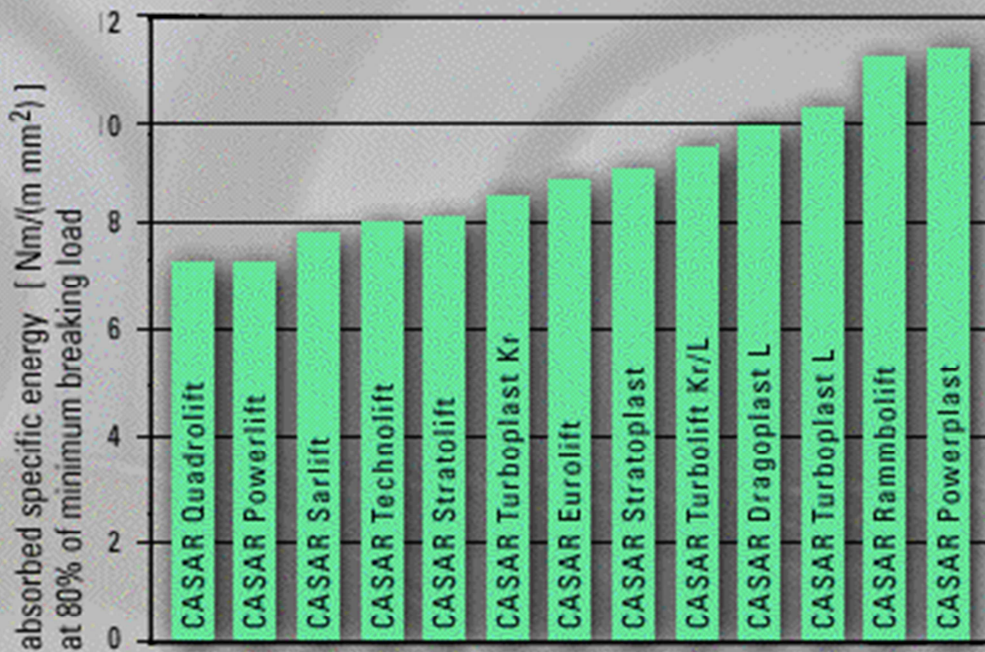
Elasticity 2: Moduli of elasticity for rotation-resistant CASAR Special Wire Ropes.
 The modulus of elasticity of a steel wire rope is about half the modulus of plain steel.
 (Average values from a great number of tests)



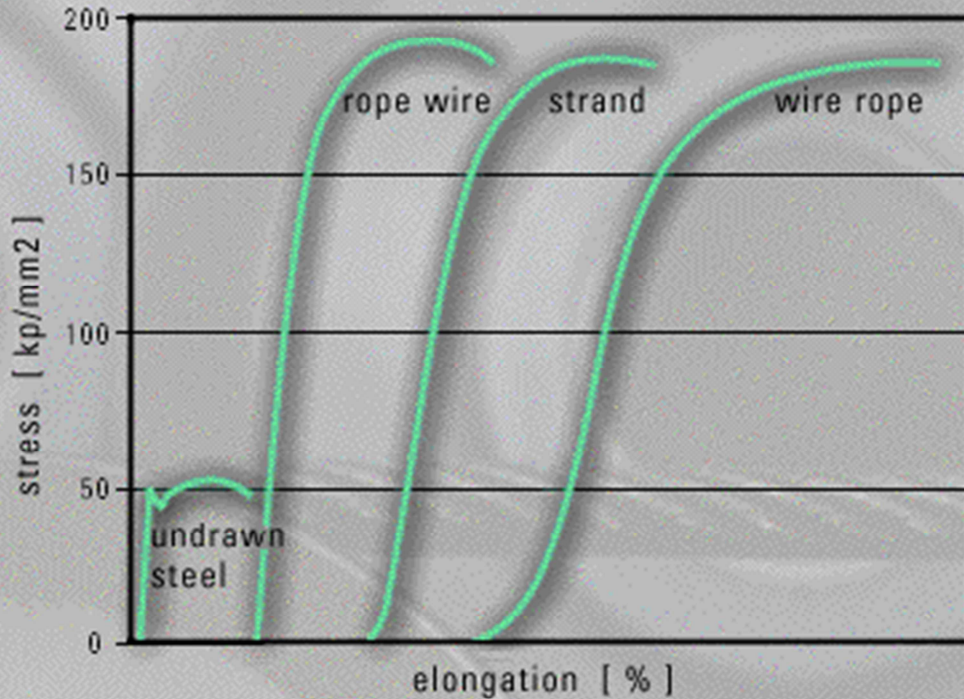
Elasticity 3: Elongation at break for non rotation-resistant CASAR Special Wire Ropes.
 The elongations at break range from 3.2 to 4.7 percent.
 (Average values from a great number of tests)



Elasticity 4: Elongation at break for rotation-resistant CASAR Special Wire Ropes.
 The elongations at break range from 3.1 to 4.7 percent.
 (Average values from a great number of tests)



Elasticity 5: Absorbed energy at 80% of the minimum breaking load for CASAR Special Wire Ropes. Langs lay ropes have a higher energy absorption than regular lay ropes, ropes with an internal plastic layer have a higher energy absorption than full steel ropes.



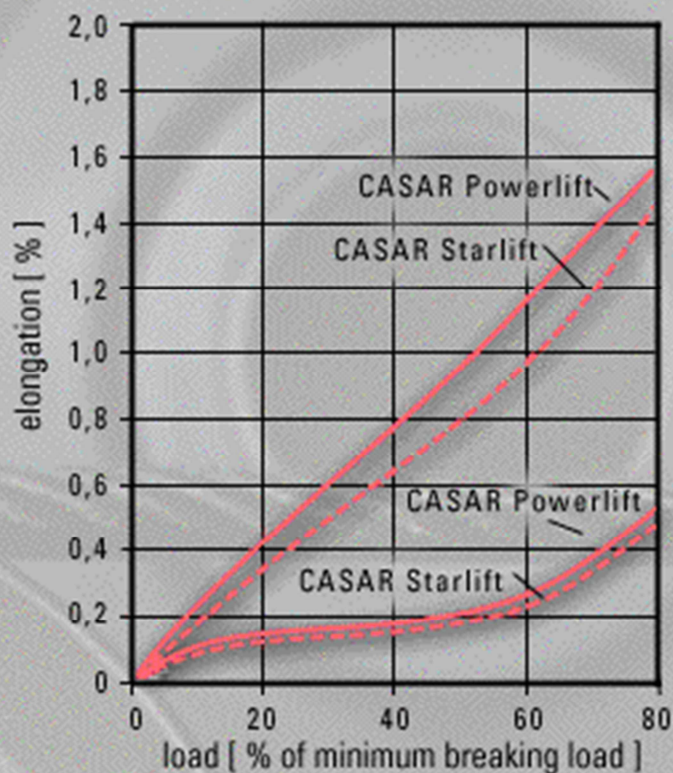
Elasticity 6: Comparison of the stress-elongation- curves of steel, rope wire, strand and wire rope.

Elongation diagrams:

The knowledge of the elongation properties of a steel wire rope can be of great importance to the equipment manufacturer or user.

Therefore we present the load-elongation diagrams of the most important CASAR Special Wire Ropes, here.

The upper curves show the total elongations depending on the load. The lower curves show the permanent elongations remaining in the rope after unloading depending on the previous load.



The diagrams show the average values of a great number of cyclical loading and unloading tests performed with ropes of different diameters and tensile strength. The diagrams are independent of the rope diameter. The influence of the tensile strength is negligible.

Please note: setting in the end fitting can cause additional elongation.

R = Regular Lay

L = Langs Lay

