SPECIAL STEEL WIRE ROPES FOR ROAD BARRIERS

Speaker ID

01.01.2019

01

Acquaintance with the company

Our company

SEVERSTAL

- vertically integrated steel and steel-related mining company with major assets in Russia as well as investments in other regions.

SEVERSTAL-METIZ

- group of companies which unites the metlware assets of the Severstal company; production sites are located in Russia (Cherepovets, Oryol, Volgograd).

SEVERSTAL WIRE ROPES

- leading Russian manufacturer of wire ropes; the company’s product line includes more than 100 types of ropes with diameters from 0.65 to 100 mm in various designs.

SEVERSTAL LIFTING TECHNOLOGIES

- a distribution network that sells wire ropes from a warehouse and provides various types of related services: cutting ropes to a measured length, rewinding, pre-drawing, making end fittings.

Our location

Manufacture of wire ropes

Cherepovets

Volgograd

Service and distribution

Cherepovets

Volgograd

Moscow

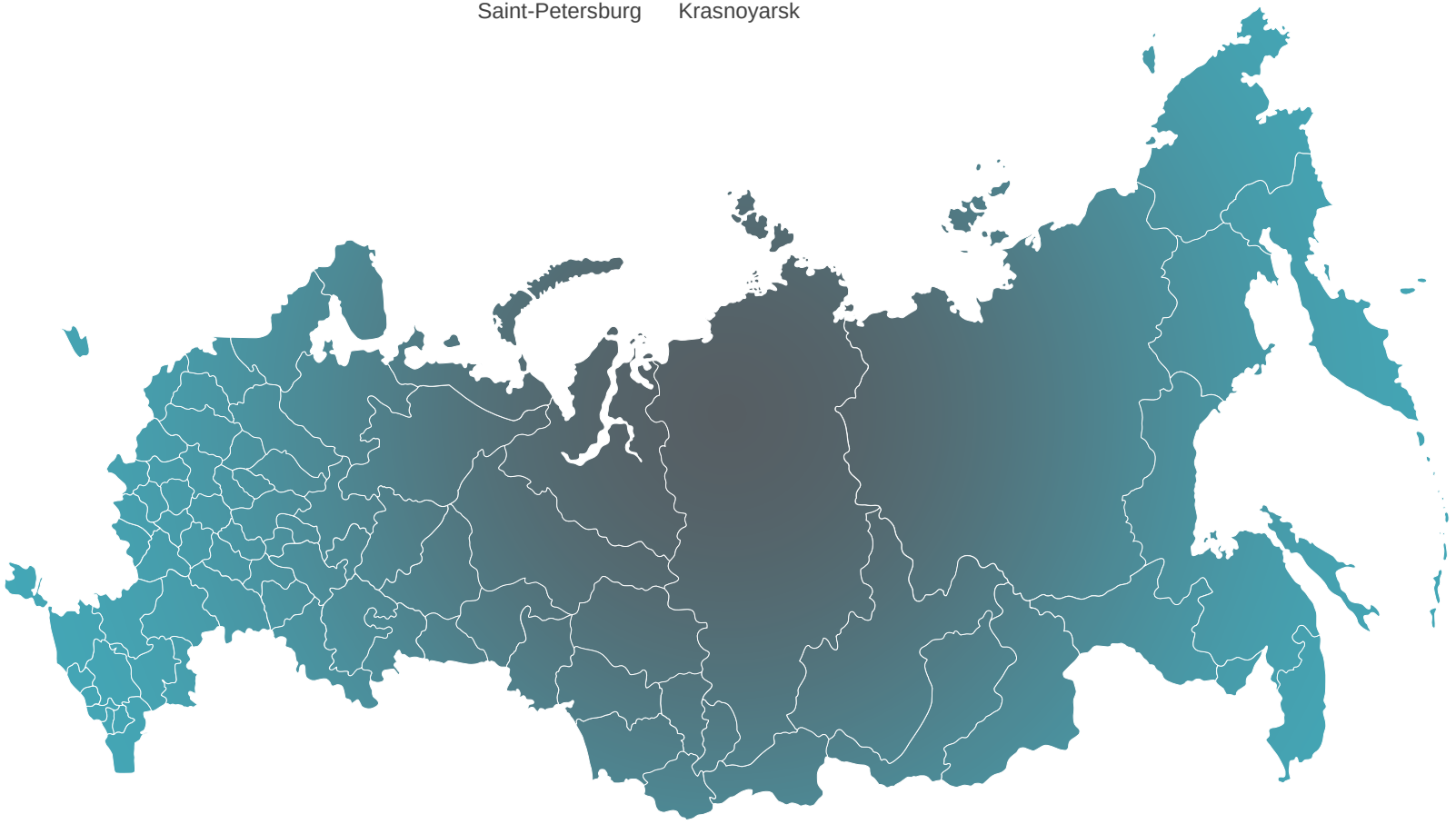
Saint-Petersburg

Nizhny Novgorod

Yekaterinburg

Vladivostok

Krasnoyarsk



Our history

1954
start of wire manufacturing in Volgograd

1955
start of rope manufacturing in Volgograd

1973
construction of plant in Cherepovets

1976
Volgograd plant was awarded the order of the «Badge of Honor»

1979
opening of the 1st cable-stayed bridge in Russia

1988
manuf. of wire ropes with Marine Register

1994
familiarization of ropes according to DIN 3051

2004
entry of the Volgograd plant into Severstal-metiz

2009
creation of Severstal Lifting Technologies

2014
foundation of SWR as the single legal unit

2015
1st stage of the “HPF“ project

2017
2nd stage of the “HPF“ project

Investment into equipment

6/630

6/400

6/500

25x630

Stranding machines

6x1000

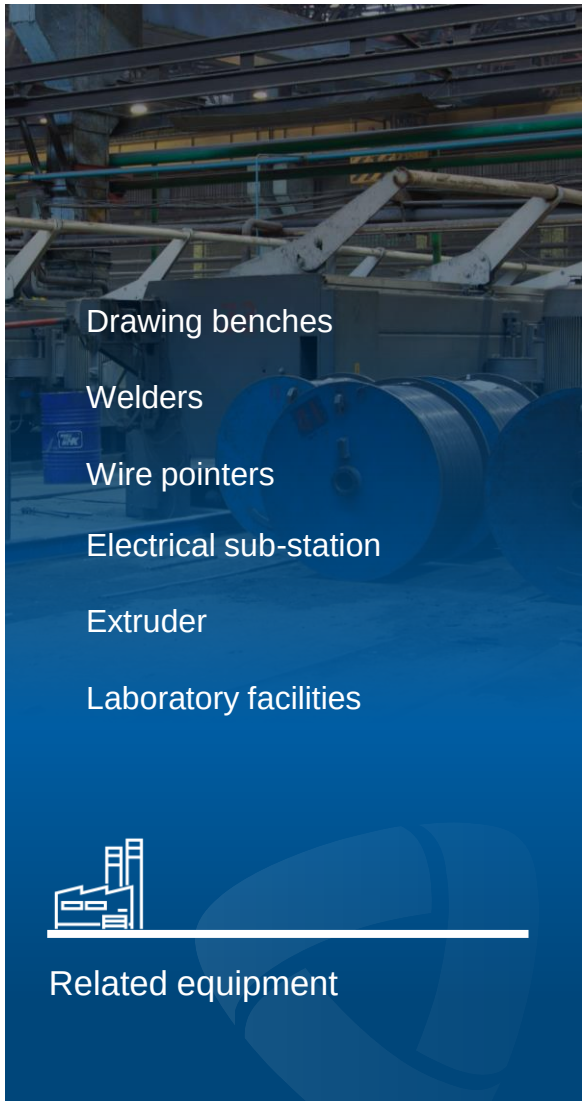
8x800

8x1800

3x1000

48x630

Closing machines



Drawing benches

Welders

Wire pointers

Electrical sub-station

Extruder

Laboratory facilities

Related equipment

QUALITY CONTROL

The modern bench allows to realize breaking tests with the ropes with a diameter from 10 up to 60 mm with a tensile strength to 200 tons.

Our facilities

Cherepovets

Ø 0,65-65,0 mm
1180-2160 N/mm²
≈ 2000-2500 tons per month

Volgograd

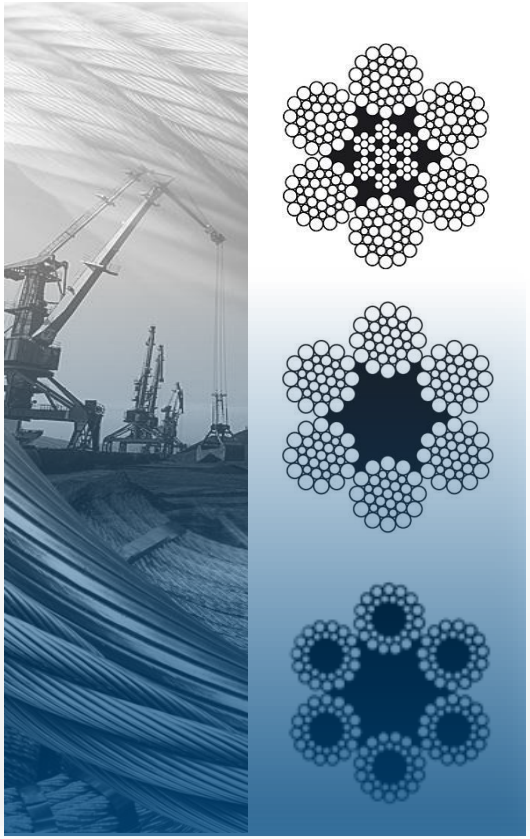
Ø 0,65-100,0 mm
1180-2160 N/mm²
≈ 2500-3000 tons per month

Evolution of client solution

Severstal-metiz GOST ropes provider

1

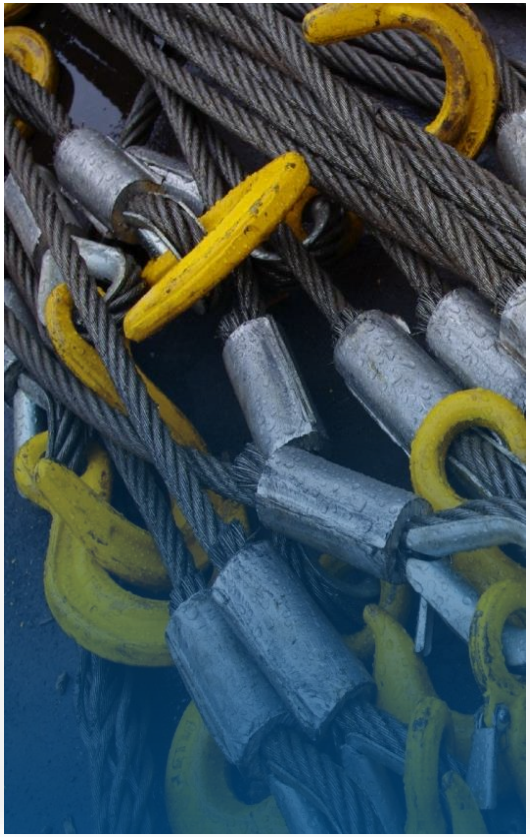
- Standard wire ropes



Severstal-metiz Services provider

2

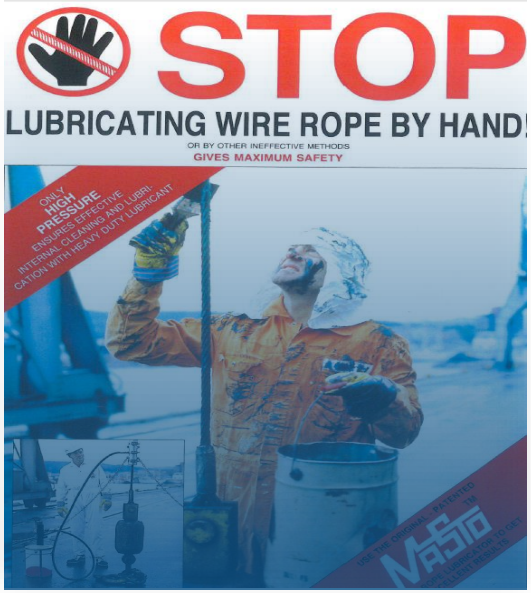
- Special wire ropes, slings and handling accessories



Severstal-metiz Solutions provider

3

- Customized customers' problem solving



CREATE NEW OPPORTUNITIES

invent new products & services, explore new markets, change the conditions by the actions which are non-standard, first of all, for ourselves, our competitors, partners and Customers

02

Steel wire ropes

STEEL WIRE ROPE

is product made of metal wire and used as an element of lifting or drag mechanisms and suspended structures

Types of strands

Severstal

standard

low flexibility,

medium wear-resistance,

low breaking strength

seale

medium flexibility,

high wear-resistance,

medium breaking strength

warrington

high flexibility,

low wear-resistance,

medium breaking strength

filler

high flexibility,

medium wear-resistance,

medium breaking strength

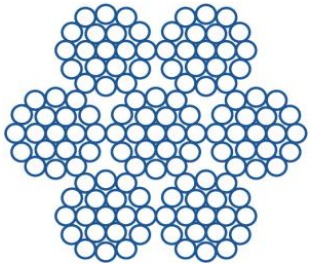
warrington-seale

high flexibility,

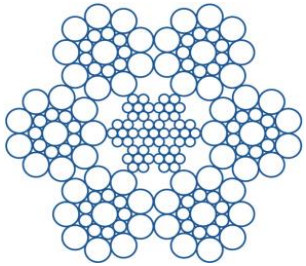
medium wear-resistance,

high breaking strength

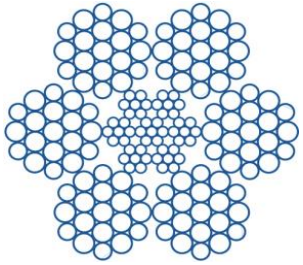
6x19M-WSC



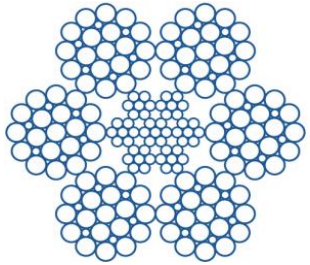
6x19S-IWRC



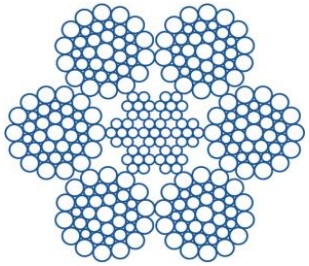
6x19W-IWRC



6x25Fi-IWRC



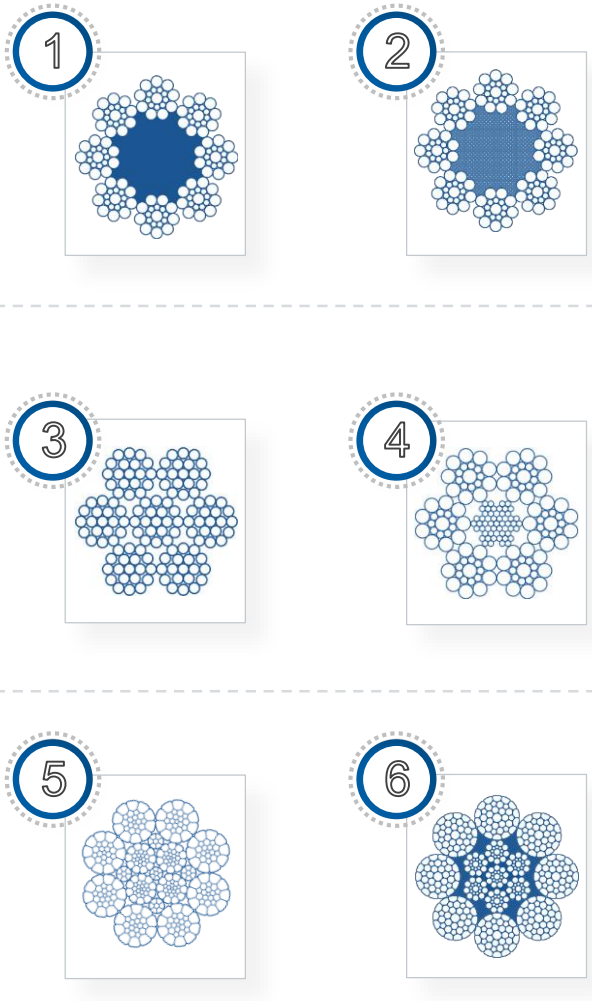
6x36WS-IWRC



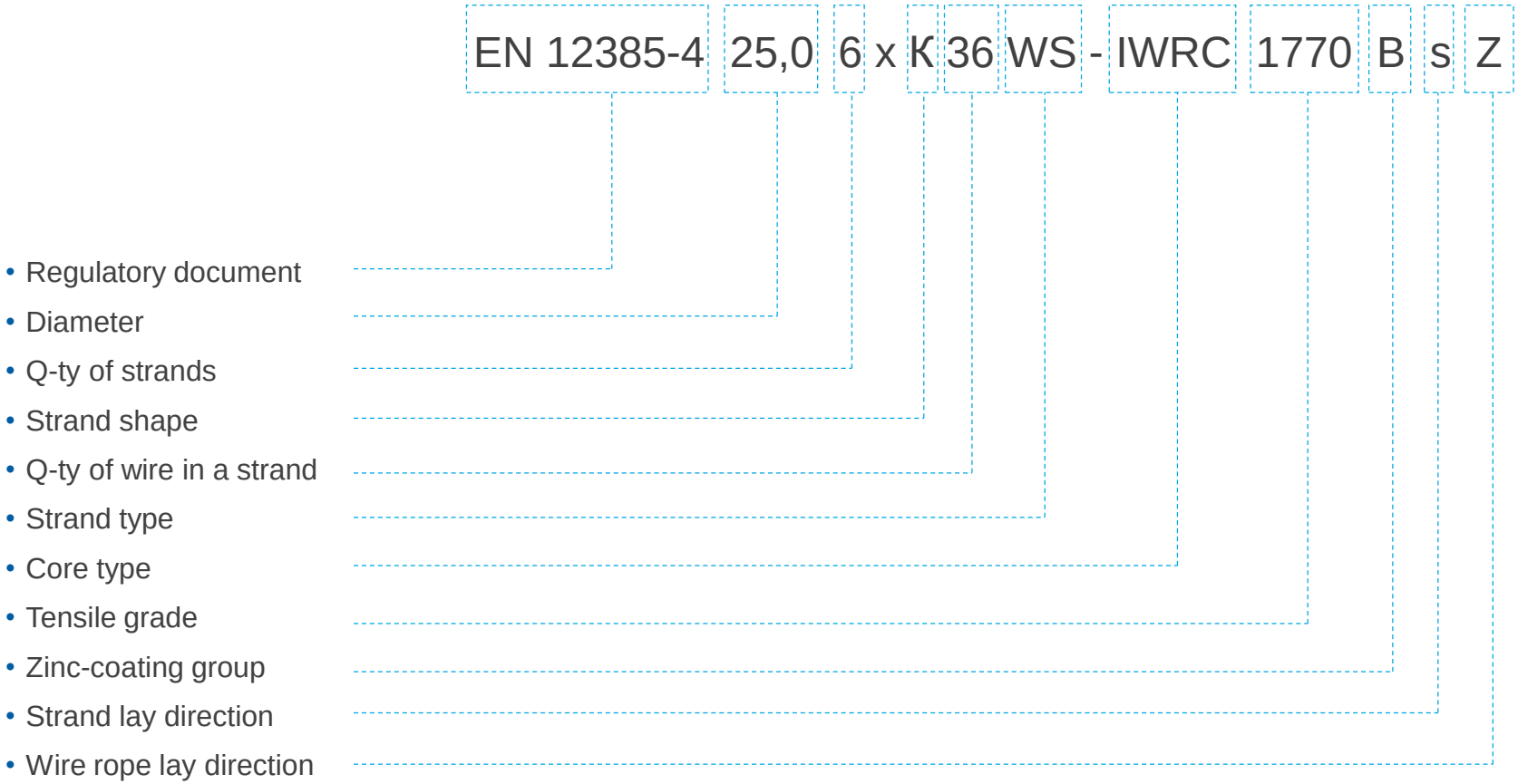
Types of cores

EN 12385

01	SFC (synthetic fiber core)
02	NFC (natural fiber core)
03	WSC (wire strand core)
04	IWRC (independent wire rope core)
05	PWRC (parallel wire rope come)
06	EPIWRC (extruded plastic IWRC)



Legend



Compacted strand wire rope

BREAKING STRENGTH
+10-15%

CONTACT WITH
SUPPORT SURFACE
+8-10%

STRAND ENGAGEMENT
IS EXCLUDED

03

Wire ropes for road barriers

Current situation

Problem

There were 155 thousand accidents registered in Russia in 2018. At the same time about 16 thousand people died. One of the main causes of accidents with serious consequences was the departure of drivers in the oncoming traffic

Solution

The most effective method of dealing with such accidents is the using of a central separation barrier between oncoming traffic in dangerous areas.

Regular types of road barriers

Concrete barriers

Because of their one-sided configuration and large width, they require a wide dividing strip, what is not always possible being provided. It should be noted that when hitting a car on these fences, due to their rigidity, both the car itself and passengers suffer significant damage.

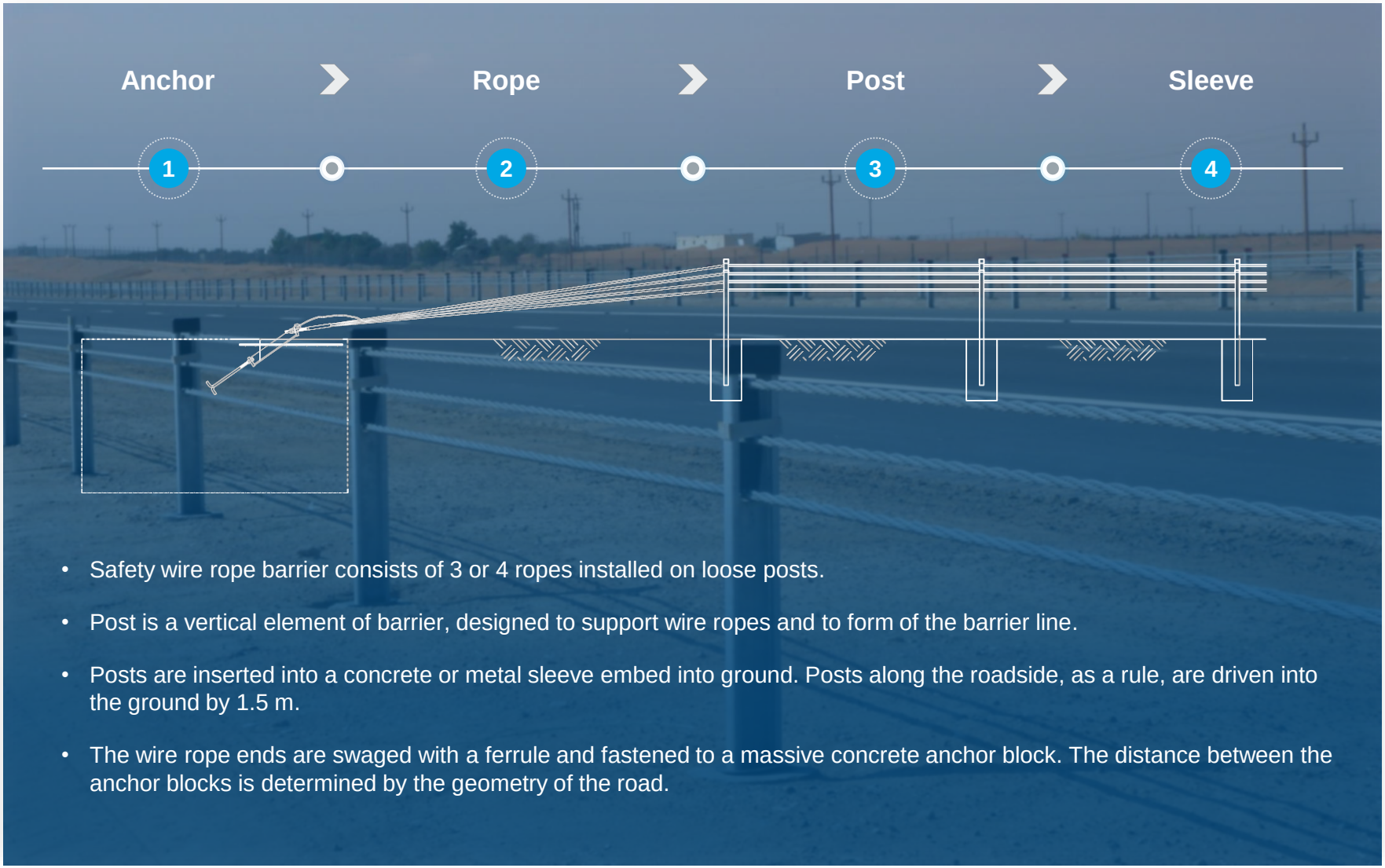
Steel barriers

The key disadvantage of a steel barrier is that it consists of short segments that break when hitted and cause damages to a car, often piercing or cutting through it.

SAFETY WIRE ROPE BARRIER

is a type of separation barrier, designed to prevent intentional and unintentional moving of a vehicles across a road and beyond its edges, as well as to separate traffic flows of opposite directions

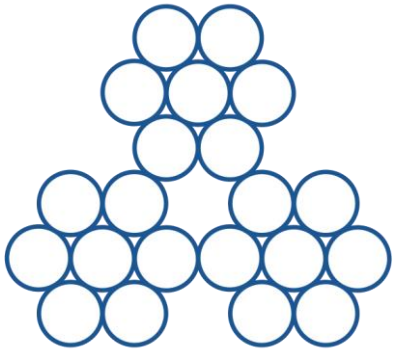
Components of wire rope barrier

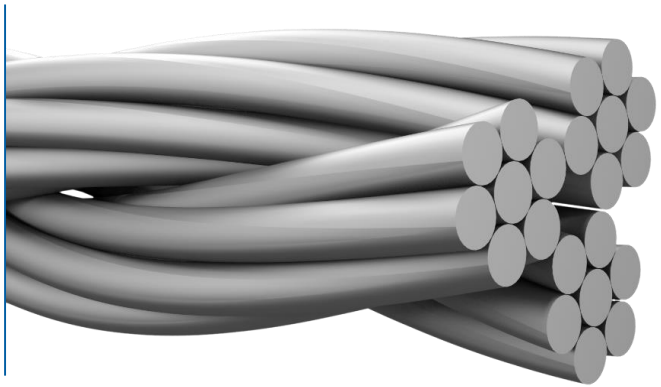


- Safety wire rope barrier consists of 3 or 4 ropes installed on loose posts.
- Post is a vertical element of barrier, designed to support wire ropes and to form of the barrier line.
- Posts are inserted into a concrete or metal sleeve embed into ground. Posts along the roadside, as a rule, are driven into the ground by 1.5 m.
- The wire rope ends are swaged with a ferrule and fastened to a massive concrete anchor block. The distance between the anchor blocks is determined by the geometry of the road.

Characteristics of wire rope

Especially for safety wire rope barriers, AO “Severstal Wire Ropes” has developed 3-strand ropes that fully accord with all the necessary requirements of the Methodical Recommendations for the installation of wire rope road barriers "ODM 218.6.004-2011"





STO 71915393-TU 110-2011	Characteristics
Scheme	3x7 (1+6)
Diameter, mm	19,0
Weight, kg/m	1,20
Elasticity modulus, kN/mm²	155
Zinc coating density, g/m²	245
Min. breaking load, kN	173

The product standard includes the following obligatory technologies in the manufacture:

- Zn — zinc coating to prevent corrosion of the rope during the entire period of operation
- pre-stretching of the rope to provide the required elasticity at the time of hitting the car with the barrier

Advantages of safety wire rope barrier

- High vehicle safety due to reduced stiffness of barrier
- The ability to extinguish and transform the kinetic energy of motion and contact vibration
- Lower metal consumption
- Lower cost of 1 km of barrier
- Shorter installation time
- Simple and fast replacement of elements, the possibility of quick structure restore after an accident
- Increased service life
- Lack of snow-bank formation
- Improved road visibility
- No need for painting and related maintenance work
- Lower operating costs

Tests

Condition

Wire rope barriers 14-ДД-4Е / 09-3.0 (300) were tested under conditions as close as possible to real ones and received confirmation of the holding capacity and the corresponding dynamic deflection, as well as the safety of people in the vehicle

Method

The tests were conducted by the Central Scientific Research Automobile and Automotive Engines Institute. A wire rope barrier with a total length of 183 m was installed on the asphalt road. The vehicle (bus "IKARUS-256") drove into the wire rope barrier at a speed of 63.9 km/h at an angle of 200°

Results

According to the results of the tests, the living space of the bus is not damaged. Barrier with wire ropes TU 110 is recognized as capable to safely holding a bus weighing 16 tons under certain characteristics of movement and the environment with minimal damage to the vehicle during a collision

Our projects

Route A104 (Moscow-Dubna)

Highway M4 "Don" (Rostov region)

M8 "Kholmogory" (Yaroslavl region)

M7 Volga (km 671 - km 672 and km 674)

04

Additional services

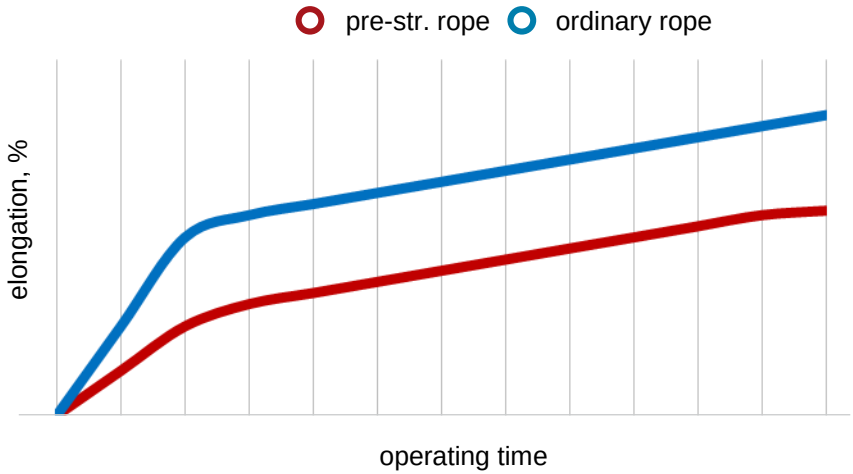
Pre-stretching

Dynamic pre-stretching for thin ropes Ø 8-15 mm

Dynamic pre-stretching for medium ropes Ø 15-35 mm

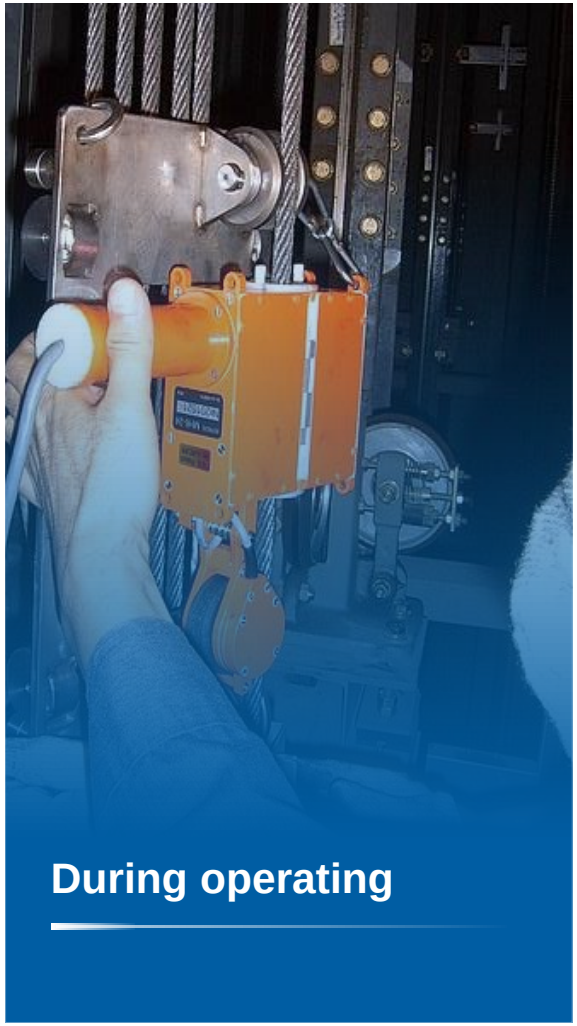
Static pre-stretching for large ropes Ø 19-90 mm

- reduced elongation
- high modulus of elasticity
- much lower torque
- more economical in commissioning



Non-destructive defectoscopy

During manufacturing



During operating

Only instrumental internal control can give a complete assessment of the damage degree and the remaining life of wire rope

Non-destructive defectoscopy detects the loss of the cross section of the rope, external and internal local damage and their location

Non-destructive defectoscopy is used in industries such as metallurgy, mines, cableways, elevators, cable-stayed bridges

End fittings

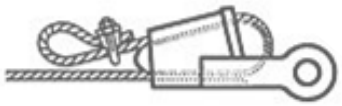
0,80 U-shaped with clips

0,90 U-shaped with ferrule

0,80 Hand splicing

0,90 Swaged fittings

0,85 Wedge socket



1,00 Spelter socket

Aftersales services

Technical support department

Applications

- Elevators
- Shovels & draglines
- Mines
- Cranes
- Drilling rigs

Functions

- Selection
- Installation
- Inspection
- Maintenance
- Recommendations

THREE SIMPLE ANSWERS

What do we create?

Complex solutions for the efficient and safe operation of machinery, equipment, buildings and structures.

What do we perform?

Proper and trusted bring into use engineering and computer calculations.

What do we sale?

Safe and efficient hoist, descent, drag and tensioning system.

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