



On approval of the rules for construction and safe operation of cargo aerial cableways

Unofficial translation

Order № 482 of the Minister of Emergency Situations of the Republic of Kazakhstan dated September 29, 2021. Registered with the Ministry of Justice of the Republic of Kazakhstan on September 30, 2021 under № 24572

Unofficial translation

In accordance with subparagraph 14-5) of Article 12-2 of the Law of the Republic of Kazakhstan "On Civil Protection", I hereby **ORDER** to:

1. Approve the attached Rules for construction and safe operation of cargo aerial cableways.

2. In the manner prescribed by law, the Industrial Safety Committee of the Ministry of Emergency Situations of the Republic of Kazakhstan shall provide:

1) state registration of this order with the Ministry of Justice of the Republic of Kazakhstan;

2) place this order on the Internet resource of the Ministry of Emergency Situations of the Republic of Kazakhstan;

3) within ten working days after the state registration of this order with the Ministry of Justice of the Republic of Kazakhstan, report to the Legal Department of the Ministry of Emergency Situations of the Republic of Kazakhstan on the execution of the actions referred to in subparagraphs 1) and 2) of this paragraph.

3. The supervising vice minister of Emergency Situations of the Republic of Kazakhstan shall be in charge of enforcement of this order.

4. This Order shall take effect sixty calendar days after the date of its first official publication.

*Minister of Emergency Situations
of the Republic of Kazakhstan*

Y. Ilyin

"AGREED"

Ministry of Industry and
Infrastructure Development
of the Republic of Kazakhstan

"AGREED"

Ministry of National Economy
of the Republic of Kazakhstan

Approved by order No. 482
of the Minister of Emergency Situations
of the Republic of Kazakhstan
dated September 29, 2021

Rules for construction and safe operation of cargo aerial cableways

Chapter 1. General Provisions

1. These Rules for construction and safe operation of cargo aerial cableways (hereinafter referred to as the Rules) have been developed in accordance with subparagraph 14-5) of Article 12-2 of the Law of the Republic of Kazakhstan “On Civil Protection” (hereinafter referred to as the Law) and define the procedure for construction and safe operation of cargo aerial cableways.

2. These Rules shall apply to the following cargo aerial cableways and equipment used in conjunction with them:

- single-rope cargo aerial cableways;
- single-rope circular cargo aerial cableways with rolling stock detachable at stations;
- single-rope circular cargo aerial cableways with non-detachable rolling stock at the stations;

- twin-rope circular cargo aerial cableways with rolling stock detachable at stations;
- twin-rope cargo cableways with reversible (pendulum) movement of the rolling stock.

3. The following terms and definitions shall apply in these Rules:

- 1) breaker - a device in which trolleys are disconnected from the traction rope;
- 2) cart- an element of a trolley intended to move it along the carrying rope;
- 3) cableway drive - a device for setting in motion or braking the rolling stock connected to the traction (carrying-traction) rope;
- 4) single-rope cargo aerial cableway - a cargo aerial cableway with reverse (pendulum) movement of the rolling stock attached to the carrier-traction rope;
- 5) trolley- a type of rolling stock for the carriage of cargo;
- 6) twin-rope cargo aerial cableway with reverse (pendulum) movement of rolling stock - a cargo aerial cableway with reverse (pendulum) movement of rolling stock along the rope, along which the rolling stock moves by means of a traction rope;
- 7) switch - a device in which the trolleys are connected (using a clamping device) to the traction rope;
- 8) tension device - a device for creating tension of the carrier, traction (carrier-traction) ropes of the cableway;
- 9) lock - an element of a trolley, fixing the body in the position necessary for loading and transportation;
- 10) safety brake - a cableway drive element to slow down moving masses in the event of a malfunction or danger;
- 11) station - a construction on the cableway route with equipment placed on it, inside which the trolleys attached to the traction rope or disconnected from it move along the rail;

12) single-rope circular cargo aerial cableway with rolling stock that cannot be detached at stations - a cargo aerial cableway with continuous circular movement of rolling stock attached to the carrier-traction rope;

13) twin-rope circular cargo aerial cableway with rolling stock detachable at stations - a cargo aerial cableway with continuous circular movement of the rolling stock detachable at stations along the carrier rope or a rigid rail by means of a rope for movement of the rolling stock along the carrier rope or rail track;

14) single-rope circular cargo aerial cableway with rolling stock detachable at stations - a cargo aerial cableway with continuous circular motion attached to the rope, designed to move the rolling stock attached to it by the rolling stock detached from the rope at stations;

15) traction rope - a rope with the help of which the rolling stock of the cableway is set in motion;

16) carrying rope - a rope along which the rolling stock of the cableway moves.

4. These Rules shall not apply to movable, special and underground cargo aerial cableways.

Chapter 2. Construction and installation of cargo aerial cableways

5. Cargo aerial cableways shall be installed according to design documentation, with regard to the requirements of these Rules, national and (or) interstate standards and state regulations in architectural, urban planning and construction activities for the installation of metal structures and lifting-transporting gear.

Deviations from the design documentation in the manufacture of cargo aerial cableways shall be agreed upon with the designer.

6. The length of the tension section of the carrier ropes along which the rolling stock moves shall correspond to the conditions under which the increase or decrease in the tension of any of the carrier ropes from friction on the pulleys and on rigidly fixed or swinging devices on the support or station, providing support or deflection of the carrier rope does not exceed 30 percent (hereinafter referred to as %) of the calculated one.

7. The movement speed of trolleys on the line is taken to be:

for single-rope circular cargo aerial cableways with non-detachable rolling stock at stations - no more than 3 meters per second (hereinafter - m / s);

for single-rope circular cargo aerial cableways with rolling stock uncoupled at stations - no more than 6 m/s;

for twin-rope circular cargo aerial cableways with rolling stock detachable at stations - no more than 6 m/s.

If there is rolling stock at the facilities intended for loading and unloading of the rolling stock or its transition to another drive section, on which the trolley, disconnected from the traction (carrying-traction) rope, is forcibly moved along the rigid rail of the cargo aerial cableways specified in part one of this paragraph, horizontal bypass pulleys, the movement

speed of trolleys is 1.6 m / s - for loaded and 2 m / s - for empty ones, and if there are linear couplings or safety bandages on the carrying ropes, the movement speed of trolleys is 3.5 m / s;

single-rope cargo cableways with reverse (pendulum) movement of the rolling stock - 8 m /s;

twin-rope cargo cableways with reversible (pendulum) movement of the rolling stock - 12 m/s.

8. At stations and structures of cargo aerial cableways, the clearance between the trolley and engineering structures, taking into account the transverse and longitudinal swing and the full circle of rotation of its body, are taken at least:

to the floor of the station or to the top of the load lying on the grate above the bunker - 0.1 meters (hereinafter - m);

to the protruding parts of the columns - 0.2 m;

to the flooring of the safety bridge - 0.3 m;

to the safety net - 0.5 m;

to the walls in the places with possible presence of people - 0.6 m.

9. On the site on which the supports of cargo aerial cableways are located between the end linear stations with the equipment on it, the vertical distance from the lowest point of the trolley, taking into account the longitudinal swing, as well as the rope or safety device, is taken to be:

above buildings and structures - at least 2 m;

over undeveloped territories - at least 2.5 m;

above the territories of settlements, industrial enterprises, construction sites, the surface of cultivated fields - at least 5 m.

Smaller distances to the ground level are admissible, provided that these areas are fenced, but not less than 0.3 m.

10. When determining the lower clearance dimensions of cargo aerial cableways, the conditions for the passage of a trolley with a tipped body are taken into account, with regard to the longitudinal swing, the maximum sag of the carrier or traction ropes, and for safety nets - from their maximum sag when the trolley or load falls.

11. The free lateral clearance between the trolley, taking into account the lateral swing of the rope and trolleys, and structures or natural obstacles is taken to be at least 1 m, and in places where people can pass - at least 2 m.

In this case, the tangent of the deviation angle from the vertical axis of the trolley is no more than 20%.

12. In the placement of parts of the cargo aerial cableways equipment, designed to hold the ropes along the route at the design height along the cargo aerial cableways route, as well as tension and anchor stations, the following requirements shall be met:

observance of distances and clearance in accordance with paragraphs 8 and 9 of these Rules;

equal load on the supports from the carrying ropes;

compliance with the bending angles of the supporting ropes on the supports, ensuring a reliable fit of the rope to the shoes of the supports;

load uniformity, ensured by simultaneous approach to the supports, not more than 25% of the total number of trolleys on the line.

13. The distance between two branches of the cableway is taken with regard to the condition under which the clearance between oncoming trolleys is at least 0.5 m when the ropes with the trolleys are swaying transversely into the track from the effects of wind, which is acceptable for the operation of cargo cableways.

14. Along the axis of the cableway in places without safety devices, a strip free of buildings, structures, vegetation and other obstacles shall be provided. The minimum width of such a strip in each direction from the cableway axis is taken according to the parameters determined by the formula:

A: $2 + 2$ meters,

where A is the gauge width of the cableway (the distance between the carrying (carrying-traction) ropes), measured in meters.

15. In the station sections where the trolleys are disconnected from the traction rope, the load from the trolleys' weight is taken issuing from the conditions of the trolleys' close, side-by-side arrangement.

16. Structural elements that directly receive the load from the traction rope, trolleys and other equipment are calculated with the dynamic coefficients given in Appendix 1 to these Rules.

17. The strength and stability of stations and structures of cargo aerial cableways is calculated taking into account the following increasing load factors:

for loads from the tension of the carrying ropes - 1.2.

At the same time, for structures with a cantilever load from carrying ropes for an empty rope, the safety factor for loads can be taken as equal to 1 with a minimum rope tension;

for loads from the tension of the traction rope - 1.4;

for tension loads of net and bracing ropes - 1.2;

for dynamic horizontal resistance load when the trolley passes through the support - 1;

for loads from the weight of trolleys, including the weight of cargo in the trolley body - 1.2;

for loads from the weight of the equipment - 1.1;

for loads from rope friction on the shoe - 1.3.

Floors in people's passage places with a slope of more than 10% shall be ribbed or stepped

18. Drives for cargo aerial cableways must be located indoors. This ensures the possibility of carrying out installation and repair work and compliance of the temperature in the rooms, where the control cabinets are installed, with the parameters specified in the manufacturer's documentation.

19. At the stations mechanization of loading and unloading of trolleys, of the trolleys movement along the station tracks, the return of the body to its original position after unloading shall be provided, as well as devices for automatically releasing trolleys onto the line.

20. At stations, in places where trolleys are unhooked from the traction rope, dead-end rail tracks must be provided for the removal of faulty trolleys. At the stations of cargo aerial cableways sidings are made, the total length of which enables placement of the trolleys on the entire drive section.

21. In the structures of stations and supports, devices (mounting poles, brackets) shall be provided for their use when lifting ropes and equipment during installation and repair work.

Stations where counterweights are installed are equipped with devices for lifting these counterweights.

22. All stations, with the exception of linear ones, shall be equipped with electric winches for periodic replacement of ropes and entry into the station of trolleys that did not join into the traction rope or got stuck in the tripping device.

The rail tracks of galleries and stations with an inclination to the horizon of more than 10%, are equipped with devices (safety gear) preventing reverse movement of the trolleys when they move up.

23. For servicing stations and linear structures of cargo aerial cableways, the possibility of vehicles access shall be provided.

24. Supports shall be equipped with safety arcs that ensure the traction rope fitting into the supporting rollers. The longitudinal gradient of the load-bearing ropes in the span adjacent to the station excludes the possibility of the traction rope touching the deflecting shoes installed on the entrance trusses of the station, at any position of the trolleys in the span.

25. Supports and stations of cargo aerial cableways for climbing them shall be provided with stairs.

26. Vertical stairs of supports up to 30 m high and line stations with a height of more than 5 m are equipped, starting from a height of 3 m, with arc-shaped fences. The arcs must be distanced no more than 800 millimeters (hereinafter referred to as mm) apart and interconnected by at least three longitudinal strips. Stairs with the height of more than 30 m shall be made in the form of flights with platforms every 6-12 m.

27. Other solutions for the access of workers to the supports are developed by the operating organization on the condition of ensuring safety when lifting the workers and approved by the relevant order.

28. For access to the cargo aerial cableway mechanisms during their maintenance, safe approaches shall be provided.

29. The width of the aisles for people servicing the equipment must be at least 0.8 m.

30. Open stations shall be fenced along the perimeter, and at the entry and exit points of the trolleys, when the station floor level exceeds the ground level by more than 0.5 m, meshes at least 1 m wide are installed.

31. Moving parts of equipment (with the exception of trolleys), as well as ropes at stations and in the engine room, located at the height of less than 2.5 m from the floor, must be protected.

32. On platforms (stationary or mobile) for maintenance of equipment located at the height of more than 2 m a fence shall be installed at least 1 m high and solid lining at the bottom to at least 0.15 m height.

The surface of the platforms, bridges, as well as the steps of the stairs must exclude slipping on them.

33. Accumulation of water in the support elements is not allowed.

34. All supports shall be numbered.

35. Cargo aerial cableways must have warning labels and hazard signs.

36. Stations and supports of cargo cableways shall be equipped with lightning protection.

37. All ropes and metal structures of cargo aerial cableways shall be grounded.

38. For the cargo aerial cableways' operation in the dark, stations and sections of entry and exit of trolleys must be equipped with lighting.

39. Emergency lighting must be installed in the engine room.

40. Cargo aerial cableways shall be provided with warning alarms that notify workers of the upcoming launching of the road into operation and an alarm that is triggered when an accident occurs and that shows the place where the operating mode malfunctioned.

41. "Emergency stop" buttons shall be installed at all stations, in the drive rooms, near the switches and breakers of the trolleys, also at their loading and unloading places.

Emergency signal is transmitted to the control panel from all the "Emergency Stop" buttons, from limiting switches and wind speed indicator.

42. Between the stations, as well as between the control panel and the stations, a telephone communication shall be provided, connected to the telephone network of the operating organization. Permanently serviced stations are equipped with loudspeakers.

43. On cargo aerial cableways, steel ropes must be used that have the manufacturer's certificate verifying their quality.

44. Spiral ropes of a closed design are used as load-bearing ropes.

45. Double lay strand ropes with an organic core are used as traction and carrying ropes.

46. Strand ropes with an organic core are used as tension ropes for carrying ropes.

47. As tension ropes for traction ropes, double or triple twisted ropes with an organic core are used.

48. Spiral, spiral closed or double twisted ropes with a metal core are used as net and bracing ropes.

49. Ropes are used with a safety factor (the ratio of the breaking force of the rope as a whole to the maximum tension) not less than:

carrying rope - 2.8;

traction rope - 4;

carrier-traction rope - 4.5;

tension rope for carrying ropes - 3.5;

tension rope for traction ropes - 4;

net rope under static load - 2.5;

signal rope - 2.5.

50. The number of connections of new ropes is to be minimal and determined by the maximum length of ropes produced by manufacturers.

The ends of the carrying rope are fixed with couplings, anchor drums and clamps, by installation of multi-bolt clamps.

The ends of the traction (carrying-traction) rope are fixed by splicing method.

The ends of tension, net and brace ropes are fixed with couplings or multi-bolt clamps, or thimbles with clamps.

51. In case of partial replacement of the carrier or traction ropes during operation, no more than 5 connections per 1 kilometer of the rope length are allowed.

The length of the splicing of a traction (carrying- traction) rope must be at least 1300 rope diameters, and the distance between the ends of the splices - at least 3000 rope diameters.

52. The tension rope is connected to the carrying rope by an adapter sleeve, and it is fixed to the counterweight by an end sleeve or multi-bolt clamps.

53. The tension of the carrying rope is created by a counterweight or anchoring of both ends of the rope. When anchoring both ends of the rope, at least once every six months, control and adjustment of its tension shall be made. The ratio between the minimum tension of the carrying rope and the weight of the loaded trolley is to be at least 8.

54. When fixing the carrier rope with the help of an anchor drum, there must be at least three rope coils in one layer on the drum, and at least two clamps on the end of the rope descending from the drum.

55. Traction (carrying-traction) ropes of circular cargo aerial cableways are equipped with a tensioning device. The minimum tension of the traction rope less than $600q$ is not allowed, where q is the linear weight of the traction rope in newtons per meter. The ratio of the total weight of the load to the minimum axial tension of the carrier-traction rope on single-rope cargo aerial cableways is to be more than 1:10.

56. Fastening in the couplings of the carrying ropes shall be performed in accordance with the recommendations of the rope manufacturers.

57. The number of wheels of trolley carts shall meet the condition that the ratio of the minimum tension of the carrying rope to the pressure component perpendicular to this rope caused by each wheel (subject to assumptions for the component of forces from the traction rope on the cart of the trolley) is at least 50.

58. Steel ropes of cargo cableways are rejected issuing from the number of breaks and the presence of defects in accordance with national and (or) interstate standards for each specific design of the selected rope.

59. The diameter of a pulley, roller or drum, wrapped around by a steel rope, corresponds to the parameters determined by the formula:

$$D / d \geq e,$$

where D is the diameter of the wrapped around pulley, roller or drum;

d- is the rope diameter;

e - coefficient depending on the purpose of the rope and pulley, the value of which is given in Appendix 2 to these Rules.

60. The shoes of the carrying rope are fixed on the support using the system that enables adjusting their position relative to the axis of the cable car.

The radius of the groove in the carrying rope shoe is assumed to be 10% more than the rope radius.

The minimum radius of the shoes is assumed to be 150 rope diameters and does not lead to a centripetal acceleration of the cart of the trolley of more than 2.5 meters per second squared (hereinafter - m / s²).

61. Roller balancers on the supports of single-rope cargo aerial cableways consist of at least two rollers. Single rollers are only used to guide the ropes entering the drive or return pulley.

62. The minimum force from the side of the rope on each supporting roller of single-rope cargo aerial cableways is taken to be at least 500 newtons (hereinafter - N). Increasing the rope tension by 40% does not lead to rope breakage and loss of its contact with the roller on the support, the highest point of which is below the chord connecting two adjacent supports.

63. The supporting rollers do not cause deflection of the carrier-traction and traction ropes by more than 10%.

64. The diameter of the linear rollers must meet the conditions, which are checked by the following formula, relating it to the deflection angle, rope diameter and rope tension:

$$(S \times \operatorname{tg} f) / (d \times D) \approx 50 \div 80 \text{ N/cm}^2,$$

where:

D – is diameter of linear rollers in centimeters, not less than 10d;

f – deflection angle, degree;

d – rope diameter, centimeter;

S - rope tension, Newton.

65. The drive provides the nominal and reduced (revision) speed of the traction (carrying-traction) rope.
66. The launch of cargo cableways' drive is carried out from the control panel.
67. The stop of cargo cableways' drive is enabled from the control panel, from the "STOP" buttons installed at each station, and from the "Emergency Stop" emergency switches. If several drive sections are provided for a cargo cableway, their drives are synchronized in remote control mode.
68. The coefficient of the traction rope adhesion with the drive pulley is assumed to be at least 1.1.
69. Drives enable operation of the cableway with a revision speed of not more than 1 m/s.
70. Drives must be equipped with service brakes.
71. Drives with a traction sheave of cargo cableways, on which spontaneous movement of a traction or carrier-traction rope is possible, are equipped with additional safety brakes on the shaft or on the pulley rim.
72. The braking torque of each brake is at least 1.25 times the static torque under the most severe cableway loading conditions.
73. In the event of a power outage on cargo cableways, the service and safety brakes are automatically activated.
74. Drives designed to operate in braking mode are equipped with devices for controlling speed and ensuring automatic stop of cargo cableways when the design speed is exceeded by 20%.
75. On cargo cableways with pendulum movement of rolling stock, automatic control of the end positions of the trolley is provided.
76. The drive of cargo cableways with pendulum motion of rolling stock provides for a system for regulating and controlling the speed of trolleys, taking into account its reduction when approaching the station.
77. Cargo cableways with pendulum motion of rolling stock provide for an automatic stop in the event of a malfunction in the speed control system.
78. The clamps have a safety margin of at least 1.5, taking into account the possible reduction in the rope diameter.
79. For cargo aerial cableways with uncoupling rolling stock, measures shall be provided to prevent leaving the station and entering the line of trolleys fixed on the rope with a deviation from the design characteristics.
80. Zones of cargo aerial cableways passage over railways and roads, buildings and structures, pedestrian zones shall be equipped with safety devices in the form of nets or bridges, as well as boards with warning inscriptions.
- Safety devices must keep back a falling loaded trolley and prevent spillage of the transported cargo larger than 20 mm.

81. The width of the safety nets ensures overlap of the protected space by 2 m in each direction from the axis of the carrier rope (for spans over 250 m - from the size of the swinging trolley at the calculated wind load). The height of the sides of the nets must be at least 1.2 m.

82. The length of the safety nets is taken based on the need to cover the entire protected space, taking into account the trajectory of the fall of the trolley or cargo.

83. The width of the safety bridges provides an overlap of 1.25 m in each direction from the axis of the carrying rope. The height of the sides of the bridges must be at least 1.8 m.

84. Sags of the safety nets ropes, taking into account the static load and the load from the fallen trolley must be within the limits allowed by the clearance gauge for the structures spanned by the nets.

85. Electrical equipment of cargo aerial cableways shall be provided with the main switch and the differential circuit breaker capable of completely cutting off the power supply.

86. The rope system must have a built-in emergency shutdown circuit. Easy identification of the emergency stop circuit control button shall be provided. The emergency shutdown circuit ensures an emergency stop of cargo cableways and prevents restart without operator intervention. Restart of cargo cableways after elimination of the emergency shutdown causes is carried out manually by the operator. It also provides automatic activation of the emergency shutdown circuit in the event of a power failure.

87. A signal of the cargo cableways stoppage cause is displayed on the operator's console. The signal remains until the full working capacity of the cargo cableways is restored.

88. Cargo cableways are equipped with protection of all electric lines going from the station from exceeding of the design parameters.

89. Cargo cableways are equipped with a fault-tolerant programmable control that has the function of displaying, storing records and documenting all incidents and malfunctions that have occurred.

90. Cargo cableways, on which spontaneous movement of traction (carrying- traction rope) is possible, shall be equipped with a built-in speeding tracking system that activates the safety brake of the drive and opens the emergency shutdown circuit when the maximum allowable speed of cargo cableways is exceeded.

91. Actuation of differential braking systems, as well as braking systems activated in the event of a power failure and during an emergency stop, does not cause excessive negative acceleration of cargo aerial cableways.

92. The speed of the rolling stock at the entrance of the station of reversible cableways is monitored by a device that activates the power-off cycle if the speed at the entrance exceeds the maximum allowable. It is also allowed to use a buffer system for stopping the rolling stock.

93. Cargo cableways with pendulum motion of rolling stock are equipped with a built-in emergency stop system, which is activated in the event of a malfunction of the service brake and activates the safety brake.

94. For cargo aerial cableways, the following measures shall be taken to prevent derailment and increased wear of the carrier (carrier-traction) rope:

equipping the pulleys of the drive and bypass stations with adjustable devices for clearing ice (these devices are installed outside the operation zone of the rope);

presence in the design of cargo aerial cableways of elements that prevent the rope from coming off the pulleys;

roller balancers are equipped with protective elements that prevent the rope from going into the cableway track, as well as rope catchers (on the outside), ensuring unhindered passage of the rope and clamp on them.

Chapter 3. Operation of cableways

95. Commissioning of cargo aerial cableways is carried out in accordance with the requirements of subparagraph 22) of paragraph 3 of Article 16 of the Law and these Rules.

96. Prior to the commissioning of cargo aerial cableways, the operating organization shall:

1) ensure fulfillment of the requirements established by paragraph 106 of these Rules;

2) check availability and completeness of:

passports for cargo aerial cableways . The passport form is exemplified in Appendix 3 to these Rules;

manufacturer's certificates of conformity for ropes;

acts of embedding ropes in couplings;

acts on the rope splice;

acts of measuring the sag of the carrier rope;

counterweight weighing certificates;

rolling stock test certificates;

acts on fixing the metal structures of stations and supports on the foundations;

acts of acceptance of foundations and supporting structures;

acts for hidden work;

acts of testing hydraulic systems;

acts of testing station equipment;

manuals for the operation of cargo aerial cableways;

3) organize the work of the commission in order to make a decision on the possibility of putting the cargo aerial cableways into operation, consisting of:

chairman of the commission - representative of the owner;

commission members:

representative of the operating organization;

representative of the territorial unit of the authorized body in the industrial safety or the local executive body exercising state supervision in the industrial safety, if a cargo aerial cableway is installed at a social infrastructure facility.

By agreement, the commission includes representatives of:

organizations that performed designing, construction, installation of cargo aerial cableways;

organization-manufacturer and (or) organization-supplier of equipment.

97. Based on the commission's work results, a report shall be drawn up on the feasibility of the cargo aerial cableway commissioning.

98. The person in charge of serviceability and safe operation of cargo aerial cableways shall make a record in the passport of the cargo aerial cableway on the cargo aerial cableway commissioning, indicating the date of its commissioning.

99. After the cargo aerial cableway is put into operation, the operating organization shall register the cargo aerial cableway in accordance with the Rules for the registration and deregistration of hazardous production facilities and hazardous technical devices approved in accordance with subparagraph 14-3) of Article 12-2 Law.

100. The cargo aerial cableways shall be operated in accordance with these Rules, the operating manual drawn up by the manufacturer or the organization that developed the design of the aerial cargo cableway.

101. Production control shall be organized and carried out in accordance with the Instructions for the organization and implementation of production control at a hazardous production facility, approved by Order No. 315 of the Minister of Emergency Situations of the Republic of Kazakhstan dated June 24, 2021 (registered in the Register of State Registration of Regulatory Legal Acts under No. 23276).

102. The organization operating the cargo aerial cableway shall provide its serviceability and safe working conditions by organizing maintenance, technical inspection and repairs.

The technical inspection of the cargo aerial cableway shall be performed by the organization operating it or, on the basis of a contract, by organizations certified for the right to conduct industrial safety inspections in accordance with Article 72 of the Law, in the presence of the person in charge of serviceability and safe operation of cargo aerial cableways

The control and diagnostics methods used during the cableway operation, or its technical inspection, are indicated in the operation manual of the cargo aerial cableway.

In the absence of information in the operation manual of the cargo aerial cableway about the frequency of the technical inspection, the cargo aerial cableway operator shall conduct it at least once every 5 years from the commissioning date of the cargo cableway.

103. During the technical inspection, the following shall be carried out:

verification of operational documentation;

checking of the technical condition of the equipment by inspection and measurements;

static and dynamic tests.

104. Based on the technical inspection results, the operating organization shall make a decision on the possibility of further operation of the cargo aerial cableway or on repair or restoration work and approve it by its order.

105. A record on the technical inspection results shall be made in the passport of the cargo aerial cableway by the person in charge of serviceability and safe operation of cargo aerial cableways.

106. Organizations operating cargo aerial cableways shall:

- appoint a person responsible for serviceability and safe operation of cargo aerial cableways;

- provide the staff sufficient for the cargo aerial cableway management and for its maintenance, in accordance with the design documentation;

- establish the procedure for periodic inspections, technical maintenance and repairs, technical inspections of cargo aerial cableways in accordance with the operating manual, with their implementation ensured;

- organize training, retraining of employees servicing cargo aerial cableways in accordance with the Rules for training, retraining and testing of knowledge of specialists, professionals in the industrial safety, approved by order No. 332 of the Minister for Emergency Situations of the Republic of Kazakhstan dated July 9, 2021(registered in the Register of State Registration of Regulatory legal acts under No. 23461) (hereinafter referred to as the Training Rules);

- develop logbooks of cargo cableways operation and shift transfers, a log for recording the results of planned inspections of equipment, a log for recording the scheduled maintenance results, a schedule for inspection of equipment, maintenance schedule;

- engineering and technical staff of cargo aerial cableways shall be provided with job descriptions and guides for the safe operation of the cargo aerial cableway, the staff servicing cargo aerial cableways- with technological regulations approved by the order of the operating organization.

107. Operation of cargo aerial cableways is not allowed in the following events:

- expired technical inspection term;

- non-fulfillment of routine maintenance provided for by the operation manual and (or) design documentation of the cargo aerial cableway;

- malfunctions of safety instruments and devices, alarms and telephone communications, as well as protective structures;

- presence of cracks in the design elements of metal structures and nodes;

- rope wear in accordance with rope rejection standards with regard to the national and (or) interstate standards;

- brake failures;

- absence of employees who have passed the knowledge test in the industrial safety in accordance with the Training Rules;

adverse weather conditions specified in the passport and operation manual of the cargo aerial cableway.

108. Transportation of people in trolleys shall be forbidden, with the exception of carrying :

- workers performing rope inspections or routine maintenance;

- workers using the cargo aerial cableway to get to their work station in accordance with the design documentation.

In this case, they shall be transported in special rolling stock. The procedure for carrying workers in rolling stock and the requirements for rolling stock carrying workers shall be developed by the operating organization and approved by its order.

109. Daily monitoring of the condition of cargo aerial cableways before starting work shall be conducted in accordance with the operation manual for cargo aerial cableways.

110. When cargo aerial cableways are stopped in case of emergency (storm, thunderstorm , ice formation, avalanche, lightning discharge), before resuming work, the readiness of cargo aerial cableways for work and a control start-up shall be carried out in accordance with the operation manual of the cargo aerial cableway.

111. Routine work during the operation of cargo aerial cableways and their elements shall be performed in accordance with the operating manual of the cargo aerial cableways, subject to the requirements of these Rules.

112. Scheduled inspection of equipment, metal structures, structures of cargo aerial cableways shall be carried out by employees servicing the cableway, within the period not exceeding:

- carrier rope - 30 days;

- traction rope (carrying-traction) - 7 days;

- trolley - 7 days;

- security devices and appliances, alarms, communications - 7 days;

- deflecting pulleys, supporting rollers, roller batteries - 14 days;

- line equipment (supports, line stations, anchor devices, a device for tensioning carrying ropes, shoes, balancers, roller batteries), foundations - 60 days;

- station equipment (drives, tensioners, deflecting pulleys, rollers, roller batteries) and station structures - 60 days;

- other equipment (loading, unloading devices, equipment for moving trolleys at stations) - 90 days.

113. Scheduled maintenance shall be carried out by employees of the operating organization's repair departments.

Maintenance must include inspection, lubrication, wear measurement, cleaning, adjustment of components and parts.

Maintenance shall be carried out within the time frames specified in the operation manual for cargo aerial cableways.

114. The terms and scope of the current, medium and major repairs of equipment, metal structures, structures are established depending on the technical condition of the equipment, assessed during the scheduled technical examination and (or) technical inspection .

115. Cargo aerial cableways with expired standard service life are subject to a technical condition survey in order to determine the possibility of their further operation by organizations certified for the right to conduct industrial safety examinations in accordance with Article 72 of the Law.

Appendix 1
to the Rules for construction and
safe operation of cargo cableways

Dynamic factors for structural elements of cargo aerial cableways

| Load | Dynamic factor for structural elements | | |
|----------------------------|--|-----------|-----------|
| | Steel | concrete | wooden |
| Traction rope tension | 1,2 (1,5) | 1,3 (1,6) | 1,1 (1,4) |
| Weight of the drive | 1,3 | 1,4 | 1,2 |
| Weight of a moving trolley | 1,1 | 1,1 | 1,0 |

Note:

Dynamic factors, indicated in the table in brackets, are taken when the load from the traction rope is the main load.

Appendix 2
to the Rules for construction and
safe operation of cargo cableways

Coefficient depending on the purpose of the rope and pulley

| Rope | Purpose of the drum or pulley | Coefficient e |
|-------------------------------|---|---------------|
| Carrying | Anchoring drum | 50 |
| Tension rope to traction rope | Deflection pulley | 30 |
| Tension rope to carrying rope | Deflection pulley | 20 |
| | Drive and deflection pulleys with wrap angle: | |
| | under 5 degrees | Non-regulated |
| | from 5 to 10 degrees | 30 |
| | from 10 to 20 degrees | 40 |
| | from 21 to 30 degrees | 50 |
| | over 30 degrees | 60 |
| | Drums of traction winches | 40 |

Appendix 3
to the Rules for construction and
safe operation of cargo cableways

Form

(name, type of the cableway)

Passport of cargo cableway

(passport designation)

| | |
|---|---|
| The cableway is registered under No. | _____ |
| under management of | _____ |
| | (name of the federal executive body in industrial safety) |
| " __ " _____ 20__. | |
| The passport has _____ numbered and laced sheets. | |
| _____ | |
| (position, full name of the person who performed registration, signature) | |
| 20__ . | |

1. Basic technical specifications of the cargo aerial cableway

Type of the cableway

Capacity in forward (loaded side) direction, t/hr

Capacity in opposite direction (empty side), t/hr

Movement speed of trolleys on the line, m/s

Movement speed of trolleys at the station, m/s

Time interval between trolleys, s

Rope diameter:

carrying of straight branch, mm

carrying of return branch, mm

traction, mm

tension for the carrier (carrier-traction) rope, mm

tension for traction rope, mm

Rolling stock:

type

payload capacity, t

load on trolley, t

trolley weight, including:

trolley ,t

suspension, t

body, t

number, pcs.

Number of drive sections, pcs.

For each drive section:

horizontal line length, m

line length along the slope, m

elevation of the upper station over the lower one, m

number of supports, pcs.

track width, m

maximum rope slope in the span, %

drive power, kW

maximum circumferential force on the drive pulley, kN

maximum wind speed at which cableway operation is allowed, m/s.

2. Main cargo cableway construction participants

| | | |
|--|--|--|
| Organization(s) that carried out engineering surveys | | |
| General project documentation developer | | |
| Manufacturer(s) of main mechanical equipment | | |
| Manufacturer(s) of metal structures | | |
| Manufacturer(s) of control, signaling, communication systems | | |
| General contractor(s) | | |
| Other organizations | | |

3. Commissioning Information

| | | |
|---|-------------------------------|--|
| Cargo aerial cableway | | |
| | (name, type, code) | |
| based on the examined report on commissioning feasibility of " " 20__ No. ____ was found serviceable. | | |
| Person in charge of serviceability and safe operation | (signature) (print full name) | |
| Service life of the cableway is ____ years. | | |
| Passports of components and equipment are attached to the passport. | | |

4. Information on appointing a person in charge of serviceability and safe operation of the cableway

| | | | | |
|--------------------------------------|-------------------|----------|------------------------------------|-----------|
| Number and date of appointment order | Surname, initials | Position | Number and validity term of the ID | Signature |
|--------------------------------------|-------------------|----------|------------------------------------|-----------|

(at least 3 sheets)

5. Information on cableway maintenance and reconstruction (replacement of ropes, rope couplings, repair of rolling stock and splicing of ropes, replacement of electrical appliances and equipment)

| | | |
|--|--|--|
| | | |
|--|--|--|

| | | |
|------|---|----------------------|
| Date | Information on maintenance and reconstruction | Authorized signature |
|------|---|----------------------|

(at least 10 sheets)

6. Record of technical inspection results

| | | |
|------|--------------------|-------------------------|
| Date | Inspection results | Date of next inspection |
|------|--------------------|-------------------------|

(at least 30 sheets)

7. Registration

The cableway is registered under No. _____

(registration body)

The passport has _____ pages numbered and _____ sheets laced,
including drawings on _____ sheets.

(position of the registering person)

(signature) (print full name)

" _____ " _____ 20 ____ .

Seal (if any)