



Program for ensuring industrial safety rules during the operation of lifting mechanisms of Engineering staff

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1. General provisions

The program for ensuring industrial safety during the operation of lifting mechanisms was developed in accordance with subparagraph 14, Article 12-2 of the Law of the Republic of Kazakhstan dated April 11, 2014 "On civil protection" and determines the procedure for ensuring industrial safety during the operation of lifting mechanisms by individuals and legal entities carrying out repairs, reconstruction, modernization and operation of lifting mechanisms, movement of goods and people. The program for the safe operation of lifting mechanisms and lifting devices regulates the procedure and methods for the safe operation, purpose and establishes requirements for lifting and transport vehicles and their life cycle processes .

The program applies to the following types of lifting mechanisms:

Cranes:

cranes of all types, including loader cranes;

freight electric trolleys moving along elevated rail tracks together with the control cabin;

excavator cranes designed to work only with a hook suspended on a rope or an electromagnet;

electric hoists;

winches for lifting cargo and (or) people;

interchangeable lifting bodies (hook, grab, lifting electromagnet);

removable lifting devices (slings, grips, traverses);

load-bearing containers, with the exception of special containers used in metallurgical production (ladles, molds, molds), in sea and river ports, the requirements for which are established by industry rules or norms.

Elevators are electric and hydraulic with a carrying capacity of 40 kilograms or more (hereinafter referred to as kg).

Elevators (towers) for moving people with tools and materials to the height of the following types:

self-propelled - automobile; on a special chassis; pneumowheel; caterpillar; railway;

trailed;

mobile.

Lifting mechanisms for special purposes of the military department, installed in the mine, on sea, river vessels and other floating structures, on platforms for exploration and drilling at sea, on aircraft and other aircraft also meet the special requirements of these industries.

The following terms and definitions are used in these Rules:

1) load-lifting mechanism - a lifting device of cyclic action with reciprocating movement of the load-handling body, designed to move cargo in space;

2) hoisting crane - a technical device equipped with permanently installed hoisting mechanisms;

3) shoe - a device that ensures the position of the elevator nodes relative to the guides;

4) deflecting block (diverting, guiding) - a device that deflects the rope in the required direction;

5) block room - a separate room for the installation of blocks;

6) buffer - a device for cushioning and stopping a moving cabin (counterweight) when moving to extreme working positions;

7) commissioning - an event that fixes the readiness of the lifting mechanism for its intended use and is documented in the prescribed manner;

8) input device - an electrical device, the main purpose of which is to supply and remove voltage from the supply lines at the input to the lifting mechanism;

9) type of control - a set of methods for issuing commands, control when using the elevator for its intended purpose;

10) internal control - a type of control in which control commands to start the elevator are given only from the cab;

11) flexible traction element - an element (rope, chain, belt) on which the cabin (counterweight) is suspended and designed to transmit traction;

12) control command - a command to the control system given by a passenger using an elevator, or service personnel, or generated by the control system itself;

13) winch - an electromechanical device with an electric motor, designed to create a traction force that ensures the movement of the elevator car;

14) drum winch - a winch, in which the traction force is created due to the rigid attachment of the traction elements to the drum and their friction with the drum;

15) winch with a friction pulley or drum - a winch, in which the traction force is created due to friction of the traction elements with a pulley or drum;

16) winch with an asterisk - a winch, in which the pulling force is created due to the engagement of the sprocket with the traction chain;

17) elevator - a stationary load-lifting mechanism of periodic action, designed for lifting and lowering people and (or) goods in a cabin moving along rigid rectilinear guides, in which the angle of inclination to the vertical is not more than 15° ;

18) elevator equipment - individual components, mechanisms and devices that are part of the elevator;

19) catchers - a safety device designed to stop and hold the cabin (counterweight) on the rails when the operating speed is exceeded or the traction elements are broken;

20) smooth braking safety devices - safety devices containing an elastic element (spring), the deformation of which determines the magnitude of the force acting on the braking organ (wedge, block);

21) machine room - a separate room for the placement of elevator equipment;

22) laminated glass - a package of two or more layers of glass bonded with a polymer film;

23) installation drawing - a drawing according to which the elevator equipment is installed and mounted;

24) external control - a type of control in which the lift is started only from the floor areas;

25) rated carrying capacity - the largest mass of cargo, for the transportation of which the lifting mechanism is intended;

26) rated speed - the speed of movement of the car, for which the elevator equipment is designed;

27) usable cabin floor area - the cabin floor area limited by the internal surfaces of the walls and the cabin door (doors) (minus the area covered by one of the swing doors and handrails);

28) pit - a part of the elevator shaft located below the level of the lowest floor platform;

29) working speed - the actual speed of movement of the elevator car, which differs from the nominal within 15%;

30) working lighting of the cabin - electric stationary lighting, providing normalized illumination of the cabin;

31) control modes - a set of functionality of the elevator, provided by the control system;

32) control system - a set of control devices that ensure the operation of the elevator;

33) mixed control - a type of control in which the lift is started both from the cab and from the landings;

34) collective control - mixed control, in which, after registering one elevator control command, subsequent ones can be registered, while the control commands are executed in accordance with a given program;

35) certified expert organization - an organization that has a certificate, has the technical means and qualified specialists to carry out the relevant type of activity;

36) maintenance - a set of operations (works) performed to maintain the serviceability and performance of the lifting mechanism;

37) cab stopping accuracy (stopping accuracy) - the vertical distance between the level of the floor of the cab and the level of the landing after the automatic stop of the cab;

38) safety device - a technical device for ensuring the safe use of an elevator;

39) safety circuit - an electrical circuit containing electrical safety devices;

40) circuit of the main current of the electric motor - an electric circuit containing elements intended for the transfer of electrical energy to the electric motor;

41) power circuit - an electrical circuit containing elements whose functional purpose is to produce or transfer a part of electrical energy, its distribution, conversion into electrical energy with other parameter values;

42) control circuit - an electrical circuit containing elements, the functional purpose of which is to actuate electrical equipment and (or) individual electrical devices, or to change their parameters;

43) shaft - the space in which the cabin, counterweight and (or) balancing device of the cabin moves;

44) electrical safety device - an electrical device for ensuring the safe use of an elevator;

45) lift - a load-lifting mechanism of discontinuous action, designed to move people (load) from one level to another;

46) tower - a load-lifting mechanism of discontinuous action, designed to move people (cargo) from one level to another in a vertical direction;

47) dynamic load - a load that occurs when moving a cradle with a load and elements of the lift;

48) wind load - the load created by wind pressure, accepted, but in a horizontal direction;

49) wind load of the operating state of the lift - the maximum wind load, at which the operation of the lift is allowed;

50) stability - the ability of the lift to counteract the overturning moments;

51) stability coefficient - the ratio of the restoring moment to the overturning moment;

52) dynamic tests - dynamic load testing in accordance with current standards;

53) cycle - a set of actions: entering the cradle, lifting to the maximum height and lowering to the “landing” position and exiting the cradle;

54) crane lifting height H - the greatest vertical distance from the base on which the crane stands to the center of the hook opening, which is in the upper (limit) working position;

55) lift height H_1 - the greatest vertical distance from the base on which the lift stands to the floor of the cradle (platform) in the upper position plus 1.5 meters;

56) outreach of the crane boom of a load-lifting crane L - the distance from the axis of rotation of the crane to the vertical axis of the load-handling body when the crane is installed on a horizontal platform;

57) departure L - the greatest horizontal distance from the vertical axis of rotation of the lift to the outer fence of the cradle;

58) lowering depth h - the greatest vertical distance from the base on which the lift stands to the floor of the cradle in the lower position;

59) safety device for additional supports against spontaneous extension during the extension of the lift - a device designed to lock additional supports in the transport position;

60) tilt indicator - a device that indicates the angle of inclination of the lift;

61) anemometer - a device that determines the wind speed;

62) winch for lifting people - a hoisting mechanism with a manual or electric drive, used to lift people in cradles or on platforms;

63) service area limiter - safety devices designed to automatically turn off the lift mechanism and prevent the cradle from leaving the service area;

64) blocking the lifting and turning of the boom when the supports are not set - a device designed to disable the mechanism for lifting and turning the boom when the support is not set;

65) blocking the lifting of supports in the working position of the knees (arrows) - a device designed to disable the lifting mechanism of the supports in the working position of the knees;

66) emergency lowering of the cradle (platform) - a device designed for emergency lowering of the cradle (platform) in case of failure of the hydraulic system or engine;

67) lateral stability stabilizer - a device designed to equalize the deformations of the elastic suspensions of the undercarriage of the lift when cornering;

68) load-handling body - a device for hanging a load;

69) safety device - a device designed to ensure the safety and trouble-free operation of the lift;

70) limiter, limit load - a safety device that automatically turns off the lift control or signals in case of exceeding the load capacity of the cradle (platform);

71) limit switch - a safety device designed to automatically turn off the hoist mechanism when its moving parts pass the established positions;

72) orientation of the cradle in a vertical position - a safety device designed to orient the cradle in a vertical position at any relative position of the knees;

73) cradle - a non-rotating (rotary) platform intended for moving people with cargo;

74) additional supports (outriggers) - retractable supports designed to increase the stability of the lift in working condition;

75) electro-hydraulic hoist - a hoist with hydraulic and electric drive of its mechanisms;

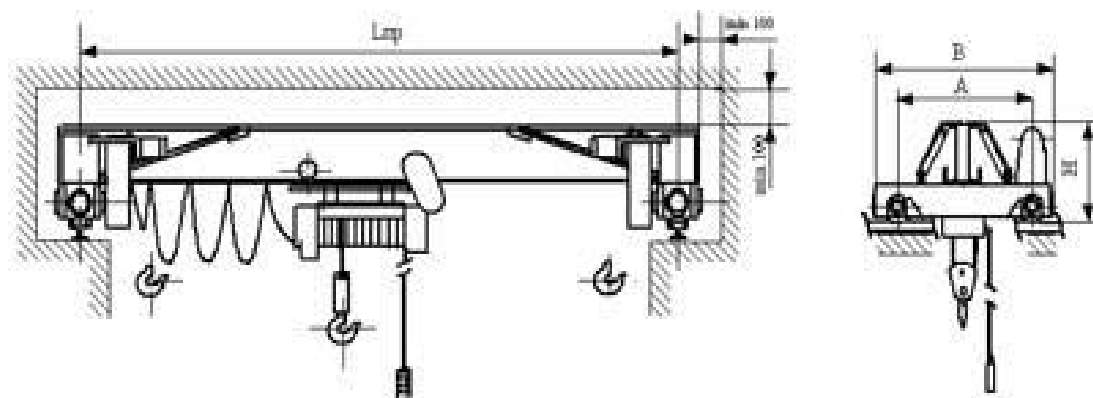
76) rotary lift - a lift that has the ability to rotate (in terms of) the rotary part together with the cradle (platform) relative to the supporting part of the lift;

77) carrying capacity - the largest permissible mass of cargo, for the lifting of which the lifting mechanism is designed;

78) technological repair - an internal regulatory document of an enterprise (organization) that establishes the sequence and methods of conducting work, requirements and measures to ensure the safety of the types of work performed.

2. Classification of cranes by design

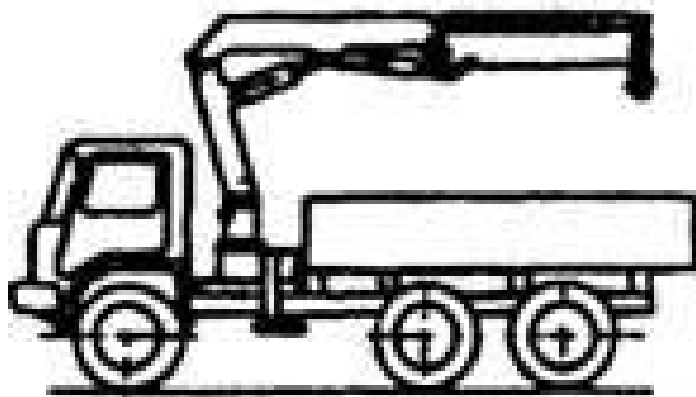
An overhead crane is a crane in which the lifting device is suspended from a cargo trolley, hoist or jib crane moving along the bridge.



A jib type crane is a crane in which a lifting device is suspended from a jib or a trolley moving along the jib. A jib-type crane that can be fitted with jib towers and can be moved with or without a load without the need for special tracks and whose stability is provided by gravity.



An automobile crane is a crane, the CMU of which is mounted on a car chassis



3. Reconstruction, repair, installation of lifting mechanisms

Lifting mechanisms and their elements are manufactured, mounted, modernized and repaired by organizations that have technical means and qualified specialists.

When hoisting mechanisms are assembled from components and parts manufactured by several organizations, the quality of workmanship in general, compliance with these Rules and state standards, execution of technical documentation is carried out by the organization that completes the hoisting mechanism. The passport of the lifting mechanism is compiled by the

manufacturer according to the documents of the manufacturers of individual units. The documents of these organizations are stored in the organization completing the lifting mechanism.

Each lifting mechanism is supplied by the manufacturer with:

passport;

technical description;

instruction manual;

installation manual (if installation is required);

other documentation provided for by the relevant interstate or national manufacturing standard.

In the manufacture of individual metal structures, mechanisms, safety devices for lifting mechanisms, they are supplied with a passport.

The lifting mechanism is equipped with a plate indicating the name of the manufacturer or its trademark, load capacity, date of issue, serial (identification) number, and other information in accordance with the regulatory technical documentation. The plate with inscriptions remains during the entire service life of the crane.

For cranes with a mobile cargo trolley, plates are attached both to the crane and to the trolley, and for self-propelled jib, tower and portal cranes, in addition to the plate, each section of the tower and boom is stamped with the manufacturer's mark.

Passports for lifting mechanisms are drawn up according to the forms specified in the "Crane Passport Form", "Lift Passport Form", "Lift Passport Form" of these Rules, the passport for electric hoists - in Appendix 4 "hoist passport Form" of these Rules.

The passport, instructions and other operational documentation supplied with the lifting mechanism are presented in the state and Russian languages.

The operating manual for the lifting mechanism is developed by the manufacturer.

The guide states:

the frequency of maintenance and repair of units and mechanisms;

possible damage to metal structures and ways to eliminate them;

frequency and methods of checking safety devices;
ways to adjust the brakes;
list of wearing parts and tolerances for their wear;
the procedure for conducting a technical examination;
conditions for the use of a grab and a magnet for grab and magnetic cranes;
device and requirements for the operation of a rail crane track;
instructions for bringing the crane to a safe position in a non-working state;
instructions for the maintenance and operation of the crane, taking into account the specifics of its design.

The organization that owns the load-lifting mechanism, having discovered in the process of installation or operation deficiencies in its design or manufacture, inconsistency of the mechanism with the requirements of these Rules, sends a complaint to the manufacturer, a copy of which is sent to the certification center that issued the certificate and the authorized body in the field of industrial safety.

For load-lifting mechanisms of foreign production, the complaint is sent directly to the manufacturer and the certification center that issued the certificate.

The manufacturer, having received a complaint, eliminates the identified shortcomings made during the manufacture of deviations from these Rules.

Reconstruction and repair of the crane is carried out according to the project developed by an expert organization certified for the right of technical diagnostics, maintenance and technical certification of lifting mechanisms (cranes, hoists (towers), elevators, escalators) (hereinafter referred to as the expert organization).

When developing a project, the results of a survey of the actual condition of the lifting mechanisms (degree of wear, damage) are taken into account.

The shortening of the tower or boom, if the possibility of such changes is not provided for by the crane passport or the manual for its operation, is allowed to be carried out without a project on the conclusion of an expert organization.

Transfer of special-purpose machines (excavator, pipelayer) to cranes is carried out on condition that they are brought into line with the requirements of these Rules.

The possibility of using special-purpose machines as cranes is confirmed by an expert organization.

The organization that performs the installation, repair and (or) reconstruction of lifting mechanisms develops technological regulations containing instructions on the metals and welding materials used, methods for controlling the quality of welding, on the rejection standards for welded joints and the procedure for accepting individual assemblies and finished products, on the procedure for completing documentation .

The organization that carried out the installation, repair and (or) reconstruction of lifting mechanisms reflects in the passport the nature of the work performed, enters into it information about the materials used, indicating the numbers of certificates, about replacing assembly units, safety devices, instrumentation, indicating the identification number of the manufacturer.

In case of changes in the basic electrical, kinematic, hydraulic circuits and in the control system circuits of the hoisting mechanism, the crane passport is supplemented with new circuit diagrams with the indicated changes.

Documents confirming the quality of the material used and welding are kept by the organization that performed the welding.

Repair, installation or other work related to a change in the design or passport data of the crane is carried out in agreement with the manufacturer or with an expert organization.

The quality of the material used in the installation, reconstruction and repair of design elements and parts of lifting mechanisms is confirmed by a certificate.

In the absence of a certificate, the material may be used after it has been tested in accordance with the regulatory technical documentation. The choice of materials is made taking into account the lower limit values of ambient temperatures for the working and non-working states of the lifting mechanism, the degree of loading of the elements and the aggressiveness of the environment. Data on the grade of the material used and the lower temperature limits for the operating and non-operating states of the crane are indicated in its passport.

Cast iron in quality not lower than grade SCH 15 according to [GOST 1412](#) "Cast iron with lamellar graphite for castings. Marks" is allowed to be used for the manufacture of:

gear, worm and running wheels of load-lifting mechanisms with a manual drive;

worm wheels of load-lifting mechanisms with a machine drive, intended for a group of classification (mode) of the mechanism not higher than M5, with a circumferential speed of the wheel not more than 1.5 meters / second (hereinafter - m / s);

worm wheels with a bronze rim, regardless of the type of drive and the group of classification (mode) of the mechanism of the lifting mechanism;

drums, gear housings and blocks, with the exception of blocks of jib and tower cranes;

brake pads, drum brackets and bearing housings.

For brake pulleys of mechanisms of movement and rotation of load-lifting mechanisms, it is allowed to use castings of quality not lower than grade SCH 20 according to GOST 1412 "Cast iron with lamellar graphite for castings. Marks. For the manufacture of counterweights and non-power parts, the brand of castings is not regulated.

Materials that have not previously been used for the installation, reconstruction and repair of lifting mechanisms may be used on the recommendation of a certified organization.

. For welding and tacking of critical elements of metal structures, welding of platforms, railings and ladders of lifting mechanisms, welders are allowed whose welded joints on the control samples of which have passed mechanical tests and have a personal brand.

Welding consumables used for welding steel structures of hoisting mechanisms, provides the mechanical properties of the weld metal and welded joint (tensile strength, yield strength, relative elongation, bend angle, impact strength) not lower than the lower limit of the listed properties of the base metal of the structure, established for this brand became a national standard or technical regulation. This requirement applies to the welding of railings, stairs and platforms.

When using steels of different grades in one joint, the mechanical properties of the deposited metal correspond to the properties of the metal, with a high tensile strength.

Grades of filler materials, fluxes and protective gases are indicated in the technological regulations for the installation, repair or reconstruction, modernization of the lifting mechanism.

For the preparation of structural elements from sheets, shaped rolled products, pipes, it is allowed to use all cutting methods that ensure high-quality obtaining of the shapes and sizes of these elements in accordance with the working drawings.

Cutting materials and semi-finished products from steel is carried out according to a technology that excludes the possibility of cracking or deterioration of the quality of the metal at the edges, in the heat-affected zone.

Welding of metal structures of lifting mechanisms is carried out in rooms that exclude the influence of adverse atmospheric conditions on the quality of welded joints.

Outdoor welding is allowed provided that appropriate devices are used to protect the welding points from precipitation and wind.

The possibility and procedure for performing welding operations at air temperatures below 0 ° C are established by regulatory technical documentation.

It is allowed to manufacture welded elements using different welding methods in the same unit, if this is stipulated in the technological regulations.

Tacks made during the assembly process of the structure may not be removed if they are completely melted during welding. Before welding, the tacks are cleaned of slag.

Welded joints have a brand or other symbol that allows you to establish the name of the welder who performed the welding. The marking method used for welded joints does not impair the quality of the marked products. Marking is carried out by methods that ensure its safety during the operation of the lifting mechanism. The method and place of marking is indicated on the drawings.

The type of heat treatment of welded joints of load-bearing structural elements is established by the regulatory technical documentation for the manufacture, repair or reconstruction of cranes.

Quality control of welded joints, carried out during installation, reconstruction, modernization and repair of the hoisting mechanism is carried out by external inspection and measurement, mechanical tests and non-destructive testing methods provided for by regulatory technical documentation.

Quality control of welded joints is carried out after heat treatment (if it is performed for a given welded joint).

The results of the inspection of welded joints are recorded in the relevant documents (journals, maps, forms).

All welded joints are subject to external inspection and measurement in order to identify possible external defects in them:

fracture or non-perpendicularity of the axes of the connected elements;

displacement of the edges of the connected elements;

deviations in the size and shape of the seams from the drawings (along the height, leg and width of the seam, according to the uniformity of reinforcement);

cracks of all types and directions;

sags, undercuts, burns, unwelded craters, lack of penetration, porosity and other technological defects.

Before external inspection, the surface of the weld and the adjacent areas of the surface of the base metal with a width of at least 20 millimeters (hereinafter - mm) on both sides of the weld are cleaned of slag, spatter, metal sagging and other contaminants.

Inspection and measurement of butt welding joints is carried out from both sides along the entire length of the joint. If the inner surface of the welded joint is not accessible for inspection, inspection and measurement are carried out only from the outside.

Inspection of welded joints of design elements of metal structures is carried out after the elimination of defects identified by external inspection. At the same time, the beginning and end of welds of butt joints of chords and walls of box-shaped metal structures of beams, columns, arrows, jibs are subject to mandatory control.

The total length of the controlled sections of welded joints is set at least:

1) 50% of the length of the joint - at each joint of the stretched belt of a box-shaped or lattice metal structure;

2) 25% of the length of the joint or the compressed section of the wall - at each joint of the compressed chord or on the compressed sections of the walls;

3) 75% of the length of the joint - at each joint of the structures of booms, jibs and rack boxes of portal cranes;

4) 25% of the joint length - for all other butt joints not specified in subparagraphs 1), 2) and 3) of these Rules;

5) 25% of the weld length - for other welded joints controlled by the ultrasonic method.

Before carrying out x - ray or gamma control, the corresponding sections of the welded joint are marked in such a way that they can be easily detected on control x- ray or gamma images.

The quality assessment of welded joints based on the results of external inspection and non-destructive testing is carried out in accordance with the technological regulations for the manufacture, installation, repair, reconstruction or modernization of the lifting mechanism, which contain standards for assessing the quality of welded joints, excluding the presence of defects in the product that reduce their strength and operational reliability .

Defects are not allowed in welded joints:

cracks of all types and directions located in the weld metal, along the fusion line and near the weld zone of the base metal, including microcracks detected by microscopic examination;

lack of penetration (non-fusion) located on the surface along the cross section of the welded joint;

penetration at the top (root) of fillet and tee welded joints made without cutting edges;

pores arranged in the form of a continuous grid;

undercuts and influxes (sagging);

not welded craters;

fistulas;

not welded burns in the weld metal;

burn-through and melting of the base metal (during butt-butt welding of pipes);

edge displacement is higher than the norms stipulated by the drawings.

. When unacceptable defects in welded joints are detected by non-destructive testing methods, the entire joint is subjected to control. Defective areas of welds, identified during the control, are removed mechanically and digested.

Mechanical tests are carried out in order to verify compliance with the strength and plastic characteristics of the welded joint on control samples welded under conditions that fully meet the conditions for manufacturing metal structure elements (the same basic and filler materials, the same welding modes, the same welding position).

Organizations specializing in the manufacture, repair, reconstruction and modernization of lifting mechanisms mechanical tests are carried out periodically in accordance with the technological regulations.

When performing these works by other individuals or legal entities, mechanical tests are carried out on control samples welded by each welder who took part in welding the metal structure of the lifting mechanism, in the amount of at least two for each type of test (tensile, bending).

The evaluation of the mechanical properties of a welded joint on control samples is carried out, regardless of the type of welded joint, by tensile and bending tests of butt-welded samples.

The results of mechanical tests are considered satisfactory if:

tensile strength is not lower than the lower limit of the tensile strength of the metal, established for a given steel grade by state standards or specifications;

bending angle for carbon steels - not less than 120° , for low-alloy steels with an element thickness of up to 20 mm - not less than 80° , more than 20 mm - not less than 60° .

40. The quality of welded joints is considered unsatisfactory if, during any type of control, internal or external defects are found in them that go beyond the limits established by these Rules and regulatory technical documentation for the manufacture, installation, repair, reconstruction and modernization of the lifting mechanism.

The choice of material is made taking into account the lower limit values of ambient temperatures for the working and non-working state of the lifting mechanism, the degree of loading of the elements and the aggressiveness of the environment.

Data on the brand of the material used, indicating the certificate, the lower limit temperature for the working and non-working state of the lifting mechanism are indicated by the manufacturer in the passport.

The need for heat treatment of welded joints of critical structural elements is established by the technical specifications for the manufacture and repair of lifts. The type of heat treatment and its mode are established by the technological regulations for welding.

All welded joints are subject to visual inspection and measurements in order to identify the following possible external defects in them:

- cracks of all sizes and directions;

- local sags with a total length of more than 100 mm at a seam section of 1000 mm;

- undercuts with a depth of 0.5 mm on metal up to 20 mm thick, but not more than 3% of the metal thickness;

- pores with a diameter of more than 1 mm with a metal thickness of up to 20 mm and more than 1.5 mm with a metal thickness of more than 20 mm in an amount of more than 4 pieces at a step length of 100 mm with a distance between adjacent defects of less than 50 mm.

The control of welded joints by transillumination must be carried out in accordance with [GOST 7512-82](#) "Non-destructive control. Connections are welded. radiographic method.

At least 25% of the length of the butt weld of the controlled joint is subjected to non-destructive testing. Mandatory control points are established by regulatory documentation, and additional ones - by the technical control department.

If unacceptable defects are detected in welded joints, the entire controlled joint should be subjected to transillumination. Defective areas of welds, identified during the control, are cut down and digested.

The ultrasonic method of testing the seams of welded joints is used to check:

- 100% critical butt welds in order to identify defective areas;

- welds of metal structures with unsatisfactory results of mechanical tests of control samples.

The quality of welded joints is considered unsatisfactory if, during any type of inspection, internal or external defects are found in them that go beyond the limits established by these Rules, the technical specifications for the manufacture and repair of the lift.

Protection of metal structures of lifting mechanisms, assembly units and parts from corrosion is carried out by applying paint and varnish or metal and non-metallic (inorganic) coatings to their surface.

This protection is not required for machined parts operating in an oil bath or grease environment.

Paint coatings comply with the requirements of [GOST 9.032-74](#) “Unified system of protection against corrosion and aging. Paint coatings. Groups, technical requirements and designations”, [GOST 9.104-79](#) “Unified system of protection against corrosion and aging. Paint coatings. Groups of operating conditions.

4. The procedure for creating a system of production control and supervision, maintenance. Cranes

Owners or managers of operating organizations keep cranes, containers, removable load-handling devices, crane tracks in good condition and ensure safe working conditions by organizing proper examination, inspection, repair and maintenance.

For these purposes, organizations are taking measures to create a system of production control and supervision:

appointment of an engineering and technical worker to supervise the safe operation of cranes, removable load gripping devices and containers, an engineering and technical worker responsible for maintaining cranes in good condition, and persons (s) responsible for the safe performance of work by cranes for the movement of goods;

the creation of a repair service and the establishment of a procedure for periodic inspections, maintenance and repairs to ensure the maintenance of cranes, crane tracks, removable load-handling devices and containers in good condition;

establishing the procedure for conducting periodic testing of knowledge of personnel servicing cranes, testing knowledge of these Rules by engineering and technical personnel;

slinging schemes , warehousing of goods and other technological regulations for the safe operation of cranes;

providing engineering and technical workers with rules, regulations for the safe operation of cranes, personnel - with technological regulations;

the implementation of these Rules by engineering and technical workers is ensured, and the maintenance personnel - by the technological regulations.

To carry out production supervision over the safe operation of cranes in the organization, an engineering and technical worker is appointed after checking the knowledge of the requirements of these Rules by the examination committee and issuing an appropriate certificate.

A knowledge check by an engineer and technical worker on supervision of the safe operation of cranes is carried out once every 3 years. The number of supervisory service and its structure is determined by the owner or head of the organization operating cranes, taking into account their number and operating conditions.

Engineering and technical worker for supervision of the safe operation of cranes:

- supervises the technical condition and safe operation of cranes, removable load-handling devices, containers, crane tracks and takes measures to prevent violations of industrial safety rules;

- conducts a survey of cranes and draws up entries in the passport of the crane allowing their operation in the cases provided for by these Rules, keeps records and conducts technical examinations of cranes that are not subject to registration in the territorial division of the authorized body in the field of industrial safety, removable load-handling devices, if specified duties are not assigned to other engineering staff;

- controls the implementation of acts issued by the inspector for state supervision in the field of industrial safety based on the results of the inspection, compliance with the schedules for periodic inspection and repair of cranes, crane tracks and the timing of inspection of removable load-handling devices and containers;

- checks compliance with the requirements for the admission of workers to the management of cranes and their maintenance, participates in commissions for periodic testing of the knowledge of maintenance and repair personnel, for testing the knowledge of engineering and technical workers responsible for maintaining cranes in good condition and persons responsible for the safe performance of work by cranes ;

controls the availability and implementation of technological regulations by maintenance personnel, engineering and technical workers (specialists) responsible for maintaining lifting mechanisms in good condition, and persons responsible for the safe performance of work by cranes;

checks compliance with safety rules, technological regulations when performing work with cranes, paying special attention to the correctness of the methods used for slinging goods, compliance with the dimensions of cargo storage, correct installation of self-propelled jib cranes, compliance with the system of work permits when performing work near power lines and on crane rail tracks bridge and cantilever mobile cranes;

controls compliance with the procedure established by the owner or head of the operating organization for the allocation and direction of self-propelled jib cranes to objects.

In the event of malfunctions, violations of these Rules during the operation of cranes and their maintenance, an engineering and technical worker for supervision of the safe operation of cranes takes measures to eliminate them, and, if necessary, stops the crane.

An engineering and technical worker for supervision of the safe operation of cranes does not allow the operation of a crane when :

detection of malfunctions of brakes, ropes and their fastenings, chains, hooks, winches, running wheels, blocking devices and safety devices, electrical circuit of the crane;

presence of cracks and deformations in load-bearing metal structures;

detection of malfunctions of the elements and deviations of the rail track specified in the "Limited rejection rates of the main elements of the crane rail tracks" "Limit values of deviations of the crane rail tracks (in plan and profile) from the design position" to these Rules;

expiration of the period of technical examination or the standard service life of the crane;

maintenance of the crane by crane operators, slingers who have not passed the next test of knowledge and in the absence of the appointment of engineering and technical workers responsible for maintaining lifting mechanisms in good condition, persons responsible for the safe performance of work by cranes;

absence of a passport or information about the registration of a load-lifting crane in the territorial department for state supervision in the field of industrial safety;

absence of removable load-handling devices, containers corresponding to the mass and nature of the transported goods, or their malfunction;

failure to comply with the instructions or acts issued by him based on the results of an inspection by the state inspector for state supervision in the field of industrial safety;

malfunction of grounding devices or electrical equipment of the crane.

Responsibility for the maintenance of cranes in good condition is assigned by the owner or head of the operating organization to an engineering and technical worker of the appropriate qualification, who is subordinate to the personnel (except for slingers) servicing the crane, after the examination committee has checked their knowledge of these Rules and issued him an appropriate certificate and technological regulations.

The next test of knowledge of the engineering and technical worker responsible for the maintenance of lifting mechanisms in good condition is carried out once every 3 years. The number and date of the order to appoint a responsible person, position, surname, name, patronymic (if any), certificate number and signature are recorded in the passport of the crane.

The specified information is entered in the passport each time after the appointment of a new responsible person.

For the period of vacation, business trip, illness or in other cases of absence of a responsible person, the fulfillment of his duties is assigned by order (instruction) to the employee who replaced him in his position, who has the appropriate qualifications and passed the test of knowledge of these Rules.

The owner or head of the operating organization creates conditions for the responsible person to fulfill the duties assigned to him.

The engineering and technical worker responsible for maintaining cranes in good condition ensures:

maintenance in good condition of cranes, removable load-handling devices, containers and crane rail tracks (if the maintenance of the latter in good condition is not assigned to other services) by carrying out periodic inspections, maintenance and repairs within the time schedule established by the schedule, systematic

monitoring of the correct maintenance of a journal of periodic inspections and timely elimination of identified faults, personal inspection of lifting mechanisms, crane tracks, removable load-handling devices and containers in a timely manner;

maintenance and repair of lifting mechanisms by trained and certified personnel with the necessary knowledge and sufficient skills to perform the duties assigned to him, periodic testing of the knowledge of the maintenance personnel;

execution by crane operators and maintenance personnel of the technological regulations for the maintenance of cranes;

timely preparation of a crane for technical examination, preparation for a special examination of a crane that has completed its standard service life;

putting the crane into repair according to the schedule;

compliance with the brand system during the operation of overhead cranes;

implementation of the established procedure for the admission of maintenance personnel and other workers to the crane tracks of overhead and mobile jib cranes for repair and other work;

storage of passports and technical documentation for cranes and removable load-handling devices, containers and crane tracks, keeping logs of periodic personnel knowledge checks;

implementation of acts issued by the inspector for state supervision in the field of industrial safety based on the results of the inspection and instructions of the engineering and technical worker for supervision of the safe operation of cranes. The maintenance of removable load-handling devices and containers, crane tracks in good condition is assigned by the order (order) of the owner or head of the operating organization to another specialist of the appropriate qualification.

In each workshop, at a construction site or other area of work of cranes, in each shift, by order (instruction) of the organization, a person (s) is (are) responsible for the safe performance of work by cranes, from among engineering and technical workers, foremen, foremen, heads of sections, foremen.

In warehouses of materials, warehouse managers are appointed as persons responsible for the safe performance of work by cranes.

The appointment of employees as persons responsible for the safe performance of work by cranes is made after checking their knowledge of the relevant sections

of these Rules, technological regulations. Persons who pass the knowledge test are issued a certificate.

The next test of knowledge of persons responsible for the safe performance of work with cranes is carried out at least once every 12 months.

The person responsible for the safe operation of cranes must:

organize the conduct of work by cranes in accordance with the requirements of these Rules, with the technological regulations developed and approved by the first head;

instruct crane operators and slingers on the safe performance of the work ahead, paying attention to hazards, special conditions at the work site, preventing crane overload, control the correct slinging and hooking of goods, the correct installation of self-propelled jib cranes, the safety of work when loading and unloading gondola cars, platforms and motor vehicles or other vehicles, observance of personal safety by slingers;

do not allow untrained and untrained personnel to service cranes, determine the required number of slingers, the appointment of signalmen during crane operation;

exclude the use of unlabeled, defective or non-corresponding in terms of carrying capacity and nature of the cargo, removable load-handling devices and containers;

indicate to crane operators and slingers the place, procedure and dimensions of warehousing of goods;

slinging schemes have not been developed , in others cases provided for by technological regulations;

indicate to crane operators the installation site of self-propelled jib cranes for work near power lines and issue a work permit with an entry in the logbook;

control compliance with the brand system during the operation of overhead cranes;

not to allow the performance of work without a work permit in the cases provided for by these Rules;

provide workers with the necessary equipment and means for the safe performance of work with cranes;

monitor the implementation of technological regulations by crane operators and slingers.

For organizations with a small number of hoisting cranes (up to three registered cranes), in which all engineering staff provided for by these Rules cannot be appointed, the performance of the duties of an engineering and technical worker responsible for maintaining hoisting mechanisms in good condition, and a person responsible for safe the performance of works by cranes is assigned to one engineering and technical worker.

In cases where the owner of the crane or the operating organization is not able to appoint engineering staff provided for by these Rules, it is allowed to assign their duties to employees of a specialized expert organization under an agreement concluded with it.

Crane operators and locksmiths are appointed to operate and maintain cranes in organizations, and electric locksmiths are appointed to service lifting mechanisms with an electric drive.

The assistant crane operator is appointed in cases provided for by the technological regulations for the operation of the crane, or if necessary according to local working conditions.

The control of a truck crane is entrusted to the driver of the vehicle after training him by profession - a crane operator and successfully passing a knowledge test based on the results of training.

and tie (slinging) the load onto the hook of the crane. As slingers, workers of the main professions, trained in the profession of slinger or hooker , are allowed .

For hanging cargo on the hook of a lifting mechanism without prior strapping (cargo having loops, eyes, trunnions, located in buckets, tubs, containers or other containers) or in cases where the cargo is captured by semi-automatic gripping devices, workers of basic professions, trained professions are allowed - hooker . These workers are subject to the same requirements of these Rules as to slingers.

In cases where the area served by the crane is not completely visible from the crane operator's cabin, and in the absence of radio or telephone communication between the crane operator and the slinger, a signalman from among the slingers is assigned to the crane operator to transmit the slinger's signals.

To perform the duties of a crane operator, an assistant crane operator, a locksmith, an electrician, a slinger, employees who have passed a medical examination are appointed.

Crane operators, their assistants and maintenance personnel undergo a medical examination before being assigned to work to determine whether their physical condition meets the requirements for workers in these professions.

Training and retraining of crane operators, their assistants, slingers, locksmiths, electricians and adjusters of safety devices is carried out in organizations certified for the right to conduct these types of work in the field of industrial safety. The training of workers in these specialties is carried out in accordance with the requirements of the [Law of the Republic of Kazakhstan](#) dated April 11, 2014 "On Civil Protection".

Crane operators and their assistants, transferred from a crane of one type to another type of crane (from a tower to an overhead or to a crawler crane), before starting independent work, are trained and tested. In this case, training is carried out according to an abbreviated program.

When transferring a crane operator and their assistants from one crane to another of the same type, but of a different model, index or with a different drive, they study the features of the device and maintenance of such a crane and undergo an internship. After checking theoretical knowledge and practical skills, these workers are allowed to work independently.

The procedure for training, internships and testing of practical skills is established by the owner of the crane or the head of the operating organization.

Crane operators and their assistants, after a break in work in their specialty for more than one year, are tested for knowledge of the requirements of these Rules, and if the results of the test are positive, they are allowed to undergo an internship to restore the necessary skills.

Re-testing the knowledge of service personnel (crane operators, assistants, locksmiths, electricians, adjusters of safety devices and slingers) is carried out at least once every 12 months.

The results of the periodic examination of the knowledge of the service personnel are recorded in the protocol and the corresponding mark is made in the certificate.

Persons who have passed the exams are issued certificates of the established form signed by the chairman of the commission.

The crane driver's license indicates the type (s) and lifting capacity of the crane (s) he/she is authorized to operate.

Employees carry their ID during work.

Admission to work for crane operators, their assistants, locksmiths, electricians, adjusters of safety devices and slingers is issued by order (order).

Workers of the main professions are allowed to operate a crane controlled from the floor or from a stationary console after training in the profession - a crane operator controlled from the floor.

To slinging (hooking) the cargo, workers of the main professions trained by profession are allowed - slinger or hooker .

Signalmen are appointed from among the slingers who have extensive experience in practical work as a person responsible for the safe performance of work by cranes.

To control the crane-manipulator are allowed employees, drivers of the vehicle, trained by profession - a crane operator controlled from the floor.

Workers of the main professions who service cranes controlled from the floor or from a stationary console, and who carry out cargo hooking, are re-instructed every 3 months.

For the maintenance of cranes, the owner or head of the operating organization develops technological regulations for crane operators, their assistants, repairmen, electricians, slingers (hooks).

The technological regulations are issued to the indicated persons (against signature) before they are allowed to work independently.

The owner of cranes, removable load-handling devices and containers or the head of the organization operating them develop technological regulations according to which the persons who are entrusted with the duties of servicing the equipment (crane operators, their assistants, electricians, locksmiths) monitor the equipment assigned to it by inspecting and check their operation and keep it in good condition.

Crane operators inspect cranes before starting work, for which the technological regulations determine the appropriate time for its implementation.

The results of the inspection and verification by the crane operator are recorded in the logbook, the form of which is given in [Appendix 14](#) "Form of the logbook" to these Rules.

Slingers inspect removable load-handling devices and containers before their use in work.

5. Permission of personnel to service cranes and mechanisms

Persons at least 18 years of age who have passed a medical examination in the manner approved by the Decree of the Government of the Republic of Kazakhstan, trained in labor safety in accordance with the Law of the Republic of Kazakhstan "On Industrial Safety at Hazardous Production Facilities" are allowed to operate lifting and transport equipment and having the right to control the specified equipment.

To perform loading and unloading operations, persons are allowed who have completed a training course and a knowledge test on labor safety in accordance with the Law of the Republic of Kazakhstan "On industrial safety at hazardous production facilities", as well as first aid.

Employees admitted to loading (unloading) dangerous and especially dangerous goods must undergo special labor safety training with subsequent certification.

In the production of loading and unloading operations with dangerous goods, the current briefing should be carried out before starting work.

The briefing program should include information about the properties of dangerous goods, the rules for working with them, and first aid measures.

In accordance with the requirements of industrial safety, control over the technical condition, examination and operation of cranes should be assigned by order of the head of the enterprise (owner) to the appropriately qualified engineer after checking his knowledge of the current requirements, norms, instructions, regulations and other regulatory documents on industrial safety in constantly the current examination commission of the enterprise and the issuance of a certificate signed by the chairman of the commission and a representative of the territorial subdivision of the authorized body for industrial safety.

6.Main characteristics of cranes;

According to their design, cranes can be divided into the following main types:

Jib cranes which the load-gripping body is suspended from the boom or trolley moving along the boom. These include tower, portal, semi-portal, jib cranes, etc.

Bridge-type cranes are typical equipment for workshops, pumping stations , closed and open warehouses .

The supporting structure has the form of a bridge with a trolley or electric hoist moving along it . These include overhead, gantry, semi-gantry, jib cranes, overhead loaders, etc.

Loader Crane : A jib-type crane mounted on a vehicle chassis for loading and unloading that chassis. Usually installed on a truck, it allows loading and transporting goods with one piece of equipment.

7. Conditions and procedure for carrying out technological processes;

The choice of methods for the production of work should provide for the prevention or reduction to the level of permissible standards of exposure to hazardous and harmful production factors by:

- mechanization and automation of loading and unloading operations;
- the use of devices and devices that meet safety requirements;
- operation of production equipment in accordance with the current regulatory and technical documentation and operational documents;
- the use of sign and other types of signaling when moving goods with handling equipment;
- correct placement and stowage of goods in the places of work and in vehicles;
- compliance with the requirements for power transmission security zones, engineering communications and power supply units.

Slinging of goods must be carried out in accordance with the slinging schemes using removable load-handling devices, containers and other means specified in the documentation for the transportation of these goods. The applied load-handling devices and means must comply with the requirements of the "Rules for ensuring industrial safety during the operation of load-lifting mechanisms".

The movement of goods of unknown mass should be carried out after determining their actual mass. It is forbidden to lift a load whose mass exceeds the capacity of the lifting machine or lifting device.

To ensure the safe movement, tilting, loading and unloading of goods in the organization, schemes for slinging goods should be developed depending on their type, weight, shape.

Slinging schemes (methods of tying, fastening and hanging the load to the hook of the lifting machine using slings made of ropes, chains and other materials) should be studied by slingers, crane operators and hung out at work sites.

slinging schemes have not been developed should be carried out under the guidance of a person responsible for the safe performance of work by cranes.

In the absence of data on the mass and center of gravity of the load, it should be lifted only after receiving the data from the person responsible for the safe performance of work with cranes. The definition of these data can be made in accordance.

When slinging loads, it is necessary to be guided by the fact that:

the mass and center of gravity of factory-made products must be indicated in the technical documentation for these products;

the mass of machines, machines, mechanisms and other equipment must be indicated on the nameplate attached to the bed or frame of the machine or machine;

the mass, center of gravity and slinging points of the packaged cargo must be indicated on the cargo plating.

Loading and unloading operations with lifting mechanisms should be carried out in the absence of people at the places of cargo reloading on platforms and in vehicles, with the exception of the slinger when hooking and uncoupling load handling devices and checking the correct slinging of the load when it is lifted to a height of no more than 200-300 mm from the floor level (sites).

slinger or cargo hook must retire to a safe place after checking the reliability of the slinging of the cargo and lifting it to a height of not more than 1 m from the floor (platform) level.

When placing a vehicle for loading or unloading, measures must be taken to prevent its spontaneous movement.

When loading and unloading goods with sharp and cutting edges and corners, linings and gaskets should be used to prevent damage to the load gripping devices.

Loading and unloading areas must have marked boundaries.

The movement of cargo by several cranes must be carried out in accordance with the requirements of the "Rules for Ensuring Industrial Safety in the Operation of Hoisting Mechanisms".

Roofs of containers and devices for moving cargo must be cleaned of foreign objects, dirt, etc. Slings of containers must be carried out in accordance with the slinging scheme .

For manual slinging (unslinging) of containers, regular ladders, ladders and other devices should be used, the use of which should ensure the safety of the slinger.

Workers should not be on or inside a container while it is being lifted, lowered or moved, or on adjacent containers.

Timber - and lumber must be loaded into vehicles in packages, taking into account the possible increase in the weight of the lifted load due to changes in the moisture content of the wood.

In places of loading and unloading timber and lumber, devices should be provided to prevent the collapse of packages.

The load must be placed and, if necessary, secured on the vehicle so that it does not endanger the driver and others, does not restrict the driver's visibility, does not violate the stability of the vehicle, does not cover light and signal devices, license plates and registration numbers of the vehicle, did not interfere with the perception of hand signals, did not create noise, did not produce dust, did not pollute the road and the environment.

If the condition and placement of the cargo do not meet the specified requirements, it is necessary to take measures to eliminate the listed violations;

Loading of the car body (trailer) must be carried out from the cab to the tailgate, unloading - in the reverse order.

Before lifting and moving the load, the stability of the load and the correctness of its slinging must be checked .

Slingers are required to inspect containers before using them.

Unmarked, faulty or damaged containers are not allowed in the places of work.

When using the container, the following requirements must be met:

The container should not be loaded more than the nominal gross weight;

The method of loading should exclude the appearance of residual deformations of the container, including local ones;

The cargo placed in the container must be below the level of its sides;

Overturning of containers should be carried out by lifting devices equipped with special devices;

Moving containers by dragging and tilting is not allowed;

Testing of containers after manufacture by proof load is not necessary.

When loading long loads (pipes, rails, structures, logs, etc.) onto drop trailers, it is necessary to leave a gap between the rear wall of the vehicle cab and the load so that the trailer can freely rotate 90° in relation to the vehicle in each side. In order to prevent the load from moving onto the cab during braking or downhill driving, it must be placed on the vehicle higher than on the trailer-dissolution by an amount equal to the deformation (settlement) of the vehicle springs from the load.

When loading cargo of irregular shape and complex configuration (except for cargo that is not allowed to be tilted), the cargo should be placed on the vehicle in such a way that the center of gravity is as low as possible.

Slings of large-sized cargoes must be carried out using special devices, slinging units or places marked on the cargo, depending on the position of its center of gravity.

The slinging points, the position of the center of gravity and the weight of the load must be marked on the load.

During operation, the slings must be subjected to periodic inspection within the established time limits, at least every 10 days - with regular use and before being put into work - for rarely used ones.

The rejection of ropes and chains of slings must be carried out in accordance with the standards for rejecting removable load-handling devices with the registration of the results in the register and inspection of the load-handling devices.

When loading or unloading gondola cars, motor vehicles by crane, it is not allowed to lower or lift the load while people are in the gondola car, body or cab of the car.

The location of the slinger should be determined by the technological documentation and be equipped in the places of permanent work in an appropriate way (with the installation of overpasses, hanging platforms, etc.).

In the regulatory documentation for the production of loading and unloading operations, it should be laid down on the operational performance of work, indicating safe places for the slinger during each operation of lifting or lowering the load.

Loading and unloading sites should be located on a specially designated area with a flat hard surface or hard ground capable of absorbing loads from goods and lifting and transport machines. Platforms for loading and unloading operations should have a slope of no more than 5 °.

Places of production of loading and unloading operations must be equipped

Access roads to loading and unloading sites must have a hard surface and be kept in good condition.

Loading and unloading areas must be of a size that provides a normal scope of work.

Places of production of loading and unloading operations must have illumination of at least 10 lx . (Lux).

In case of need to illuminate large areas, floodlights can be used.

Meteorological conditions for the production of loading and unloading operations must be appropriate for the work.

When placing cargo, there should be no interference with natural lighting, ventilation, safe operation of equipment, the passage of vehicles, the passage of workers, the safe performance of work, the use of fire-fighting equipment, evacuation routes for workers in emergency situations, etc.

Placement of materials in the area of pits, trenches should be carried out outside the collapse prism, but not less than 1 m from the edge of the natural slope or the attachment of the excavation (pit, trench).

The dimensions of the loading and unloading areas should provide a distance between the dimensions of vehicles with a load of at least 1 m. When loading and unloading near a building, the distance between the building and a vehicle with a load should be at least 0.8 m, while pavement and sidewalk.

If it is necessary to work with a load that is a source of harmful and dangerous production factors, appropriate means of protection (both collective and individual), including organizational measures, must be applied.

Production equipment used in loading and unloading and transport operations must be safe during installation, operation, repair, when used separately or as part of complexes and technological systems.

Overhead (suspended) electric cranes are used for loading and unloading operations with various cargoes (single, in packages, containers, etc.) when they are moved, stacked in open areas, in closed warehouses, industrial premises, repairs of mechanical and technological equipment, etc.

Overhead cranes (suspended), equipped with a manual hoist hung on a span I-beam and moving along it, are intended mainly for repairs of mechanical and technological equipment, loading and unloading operations of small in weight and quantity of goods.

Self-propelled jib cranes on a car course are designed to perform loading and unloading operations in open areas and dispersed objects.

Cranes-manipulators mounted on vehicles are designed for loading and unloading these vehicles.

Requirements for the installation, repair, reconstruction and operation of hoisting machines and mechanisms, hoisting devices and containers used in the production of hoisting and transport operations are determined by the "Industrial safety rules for the operation of hoisting mechanisms".

Lifting machines are allowed to move only those loads, the mass of which does not exceed the carrying capacity of the machine (for jib cranes, taking into account the reach of the boom, outriggers, counterweights).

It is not allowed to find unmarked or faulty containers, faulty or without tags, brands of removable load-handling devices in the places of work.

When operating hoisting machines controlled from the floor, free passage must be ensured for the person operating the hoisting machine.

The safety of work using containers must be ensured:

Using only serviceable containers;

Operation of containers in combination with hoisting machines in compliance with the requirements of the "Industrial safety rules for the operation of hoisting mechanisms".

Organizing and conducting regular technical inspections of containers, keeping containers in good condition;

A container that does not meet the requirements and has defects found during the inspection is considered not to have passed the technical examination and should not be allowed for operation.

Packaging for small-piece and bulk cargoes must be inspected after manufacture. Testing such containers by cargo is not mandatory.

On the container, its purpose, number, dead weight, the largest weight of the cargo for which it is intended to be transported must be indicated.

The capacity of the container should exclude the possibility of overloading the lifting machine.

The locking and fixing devices of the container should not allow its spontaneous opening during loading and unloading, transport operations and during storage.

At periodic inspection the container should be checked.

This should check:

the appearance of cracks, wear and distortion in gripping devices for slinging
;

serviceability of fixing devices;

serviceability of locking devices;

presence of marking.

The results of the technical examination of containers must be entered in the register of inspections of accounting and inspection of removable load-handling devices and containers.

Requirements for the design and safe operation of slings made of steel ropes and chain slings are determined by the Rules for Ensuring Industrial Safety in the Operation of Lifting Mechanisms and Removable Load Gripping Devices.

In accordance with the " Industrial safety rules for the operation of hoisting mechanisms " approved. By order of the Minister for Emergency Situations of the Republic of Kazakhstan dated December 30, 2014 No. - before using lifting slings, slingers or other engineering staff are required to carefully inspect them.

With continuous operation, the culling of the slings should be carried out regularly, and the results of the inspection should be recorded in a log. Engineering and technical personnel responsible for the maintenance of lifting mechanisms in working condition, including workers responsible for the proper operation of cranes, must inspect the lifting slings every 10 days. When slings are rarely used, inspection is carried out immediately before its operation (that is, issuance to slingers for work).

When inspecting textile slings, the main attention should be paid to the condition and integrity of the tape, hooks, grabs, hangers and their attachment points.

slings, the main attention should be paid to the condition of the cables, the places where the cable is braided or the places where the cables are crimped with a bushing, hooks and hangers.

Chain slings slings must be checked for serviceability of all elements: chains, hooks, connecting links, etc.

Removable lifting devices must be branded or firmly attached with a metal tag indicating the number, load capacity and date of manufacture.

The rope sling is subject to rejection if the number of visible breaks in the outer wires of the double lay rope exceeds:

4 things. on a section of a rope sling with a length of $3d$;

6 pcs. on a section of a rope sling $6d$ long;

16 pcs. on a section of a rope sling $30d$ long.

Note: d - rope diameter, mm .

Rejection of rings, loops, hooks, slings is carried out:

in the presence of cracks;

when the surface of the elements is worn or local dents, leading to a decrease in the cross-sectional area by 10%;

in the presence of residual deformations, leading to a change in the initial size of the element by more than 3%.

Slings that have:

missing or damaged marking tags;

the thimbles are deformed or their wear has led to a decrease in the initial dimensions of the section by more than 15%;

there are cracks on the crimping sleeves or the dimensions of the latter have changed by more than 10% from the original ones;

there are displacements of the rope in the braid or bushings;

braids or other protective elements are damaged or missing if there are protruding ends of the wire at the braiding point ;

hooks do not have safety locks.

Rope slings, the branches of which are made of ropes with an organic core, are allowed to be used for transporting goods with a temperature not exceeding 100 ° C.

Rope slings, the branches of which are made of ropes with a metal core, and the ends of the rope are terminated by crimping with aluminum bushings, are allowed to be used for transporting goods with a temperature not exceeding 150 ° C.

Deviations in the length of branches used to complete a multi- branch sling should not exceed 1% of the length of the branch.

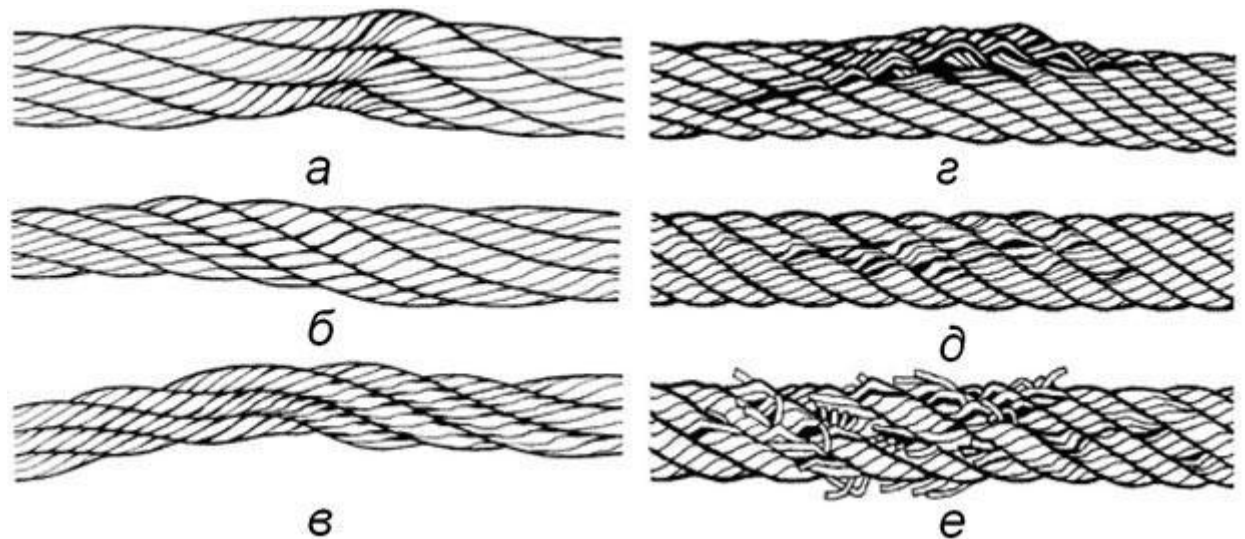


Fig.1. Mechanical damage to the rope: a) Rope breakage; б) Rope crushing; в) Reducing the diameter of the rope at the site of destruction of the organic core; а) Extrusion of wire strands; д) Wear of the outer wires of the rope; е) Breakage of the outer wires of the rope.

Rejection of tape slings is mandatory in the following cases:

In the absence of a tag on the sling or unreadable information about it.

If there are knots on the carrier tapes of the textile sling

In case of transverse cuts or tears on the tape of the textile sling

In the event that there are longitudinal breaks or cuts on the tape of the textile sling with a total length of more than 10% of its entire length, as well as in the presence of single cuts or breaks with a length of more than 50 mm.

In the presence of local bundles of the tape of the textile sling (except for the places where the edges of the tape are sealed) over a length of more than 0.5 m in total on one of the extreme or on two or more internal seams . (in case of rupture of three or more seam lines).

If there are local bundles of tapes of a textile sling at the place of sealing the edges of the tape over a length of more than 0.2 m. on one of the extreme seams or on two or more internal seams (in case of rupture of three or more lines of the seam).

In case of detachment of the edge of the tape or stitching of the tapes at the loop for a length of more than 10% of the length of the sealing of the ends of the tape.

In the presence of surface breaks in the tape threads, formed by rubbing the sling against the sharp edges of the load, the length of which exceeds 10% of the total tape length.

If the tape is damaged by exposure to chemicals (acids, alkalis, oil products) with a total value of such damages of more than 10% of the length or width of the textile sling or in case of single damages of more than 10% of the width of the sling and more than 50mm. length.

When threads bulge out of the textile sling tape at a distance of more than 10% of the tape width and in the presence of through holes from sharp objects, the diameter of which exceeds 10% of the tape width.

In the presence of burnt holes from splashes of hot metal, the diameter of which is more than 10% of the width of the tape, as well as in the presence of more than three through holes with a distance between them of less than 10% of the width of the tape (regardless of their diameter).

If the belt is contaminated by more than 50% with oil products, resins, paints, cement or soil, the sling must be rejected immediately.

When stratifying threads on tapes of a textile sling.

If any of these signs appear, textile slings are culled, because. their subsequent operation is unsafe.

The rejection of chain slings produced in accordance with PB-10-382-00 and TU 3150-001-52466920-2005 is mandatory if:

In the absence and damage of the label of the sling, as well as in the absence of a passport for the sling

If the markings on the elements of the sling are unreadable

If the difference in the lengths of the branches of the sling during the free sag is more than 15 mm - the culling of the sling is mandatory

In the event that the chain link, connecting links and hangers are extended by more than 5% of their original size

If, due to wear, the cross-sectional diameter of chain links or connecting links has decreased by more than 8%

In the absence of safety locks on the hooks or load-gripping elements of the chain sling

If any of the listed defects is detected, chain slings are rejected, further use is unsafe.

Self-repair of chain slings is prohibited.

On the structural elements of the chain sling (such as brackets, hooks, connecting links, etc.) are unacceptable:

1. cracks of any size, delaminations, tears and hairlines
2. surface wear and dents that lead to a decrease in the cross-sectional area of the elements of the sling by 10% or more
3. deformations leading to a change in the dimensions of the sling element by more than 5%
4. Damage to the fasteners of elements and threaded connections is a clear sign of the need to reject slings.

At loading and unloading sites, the distances between vehicles for loading or unloading goods must be at least: 10 m - in the depth of the column of vehicles and 1.5 m - along the unloading front; from the wall of the warehouse - at least 0.5 m, from the stack of cargo - at least 1 m.

Distances from hoisting machines to parts of buildings and protruding elements of equipment must not be less than those specified in Appendix 8.

Lifting machines must be installed so that when lifting the load, the inclined position of the load ropes is excluded and a clearance of at least 0.5 m is provided above the equipment, stacks of cargo, etc. encountered on the way of moving the load.

When operating the crane from the floor, free passage must be provided for the employee operating the crane along the entire route of the crane.

The installation of self-propelled jib cranes should be carried out on a prepared site with compacted and leveled soil with a slope not exceeding that specified in the crane passport.

Before work, self-propelled jib cranes must be installed on outriggers with strong and stable linings under them.

Installation of cranes in the security zone of overhead power lines must be agreed with the owner of the line.

Installation and operation of mobile self-propelled cranes for automobiles, at a distance of less than 30 m from the outermost wire of a power transmission line or an overhead electrical network with a voltage of 42 V , must be carried out according to a permit.

During loading and unloading operations, it is necessary to ensure the use of means that exclude the occurrence of dangerous and harmful production factors.

The container should be used in accordance with the requirements.

Cargoes stored in bulk should be stowed, formed into piles with a slope corresponding to the angle of repose for a given material.

If necessary, such stacks should be fenced with protective bars.

Cargoes in containers and bales must be stacked in stable stacks, the maximum height of which must not exceed the requirements.

Oversized and heavy loads should be stacked in one row on linings.

The goods to be placed must be stacked in such a way that the danger of their falling, tipping over, falling apart is excluded, and at the same time the accessibility and safety of their removal during release into production or loading for shipment is ensured.

Stacking of goods, including at loading and unloading sites and in places of temporary storage, close to the walls of the building, columns and equipment, stack to stack is not allowed.

The gaps between the load and the wall, the column must be at least 1 m, between the load and the ceiling of the building - at least 1 m, between the load and the lamp - at least 0.5 m.

Cargoes in boxes or bales must be stacked in stable piles.

Ways of stowage of goods should provide:

Stability of stacks, packages and cargoes in stacks;

Mechanized dismantling of the stack and lifting of cargo with hinged grippers of handling equipment;

Safety of workers on or near the stack;

Possibility of application and normal functioning of protective equipment for workers and fire fighting equipment;

Circulation of air flows during natural and artificial ventilation in closed warehouses;

Compliance with the requirements for the security zones of power lines, engineering communications and power supply units.

It is not allowed to find people and move vehicles in the zone of possible fall of goods during loading and unloading from the rolling stock, as well as when moving goods with lifting and transport equipment.

When laying loads (except for bulk goods), measures must be taken to prevent them from pinching or freezing to the surface of the site.

The distances between the rows of stacks should be determined taking into account the possibility of stacking, removing the load from the stack by the load gripping devices of the used lifting equipment and providing fire breaks.

Between stacks in warehouses, sites for temporary storage of goods, passages with a width of at least 1 m and driveways, the width of which is determined by the dimensions of vehicles, transported goods and handling mechanisms, must be provided.

Loaded on an open rolling stock, taking into account packaging and fastening, should not exceed the established dimensions (Fig. 1) or zonal clearance on the roads allowed for its use.

To place and secure cargo on open rolling stock, stretch marks, strapping, thrust and spacer bars, racks, linings, shields, turnstiles and other devices, and standard reusable fasteners are used.

Stretching (strapping) for fastening loads can be made of wire, metal rods, strips, chains, steel cables, etc.

Each brace must be fastened at one end to the parts of the cargo, and at the other end to the parts of the wagons used for securing cargo.

When unloading rods of round or square section of metal in packs from a gondola car, slings with hooks must be used. In this case, the pack or rods must be fastened "on a noose". When lifting a pack of metal or rods to a height of not more than 1 m, the slinger must make sure that the slinging is correct and must move to a safe place determined by the technology (work plan or technological map) approved by the crane owner, and from this place he must give a signal to lift the load. This order must be followed before the end of the work.

When unloading sheet metal from a gondola car, you must:

Bring the auxiliary sling (slinger) under the required amount of cargo - a sheet not exceeding the nominal capacity of the crane, put the loops of the sling on the crane hook and pull them lightly by lifting the hook. Slingers must move to a safe place determined by the work plan or technological map;

At the signal of the senior slinger, the crane operator must lift the captured load to a height of not more than 0.5 m, and the slingers must bring the main slings into the resulting gap; after which the load must be lowered into place, and the auxiliary sling is removed from the hook and the main slings must be hung on it. The slingers must move to a safe place, after which, at the signal of the senior slinger , the crane operator can move the load to the place of laying. Laying should be done on linings or gaskets. This order must be followed until the end of the work.

Placement of rolled metal, depending on the properties of the metal, the size of the rolled product, the type of packaging, the intensity of the cargo flow, the method of transportation, should be carried out in piles, on racks, in bundles or single loads, in open areas, closed or semi-closed warehouses, taking into account the type of rolled metal.

When placing rolled metal, passages between rows of stacks or racks must be at least 1 m, between stacks or racks in a row - at least 0.8 m.

The height of a stack or rack during manual stacking of rolled metal should not exceed 1.5 m.

The height of a stack or rack during mechanized laying of rolled metal depends on the allowable load on the floor and the stacking scheme and is determined by a capacity of 20 tons from the condition of ensuring the stability of the stack or rack and the safety of work performed by mechanisms. In this case,

special platforms, devices or ladders should be provided that allow the slinger to safely climb to the upper zone of the stack, rack and sling the load without being on the metal.

When laying rolled metal in a stack or on a rack, it is necessary to lay metal square strips with a thickness of at least 40 mm between bundles and bundles to allow the slings to be released from under them, as well as for greater stability of the stored cargo. The ends of the gaskets should not protrude beyond the stack or rack by more than 100 mm.

Rolled metal stacked on racks should not exceed their carrying capacity. The load capacity must be marked on each rack.

In order to avoid rolling of rolled metal, it is forbidden to fill the cell above the rack racks.

Placement of rolled metal in a stack must be carried out on linings previously laid on the floor. Railway sleepers, beams, etc. can be used as linings.

Laying of rolled metal on the floor of the warehouse or on the ground of the site without lining is not allowed.

The boundaries of stacks, aisles and passages between them should be marked on the stowage areas. It is not allowed to place loads in the aisles and driveways.

The width of the driveways should ensure the safety of the movement of vehicles and handling equipment.

Loading and unloading areas, including walkways and driveways, must have sufficient natural and artificial lighting in accordance with building codes and regulations.

Illumination should be uniform, without blinding effect of lamps on workers. The types of lighting fixtures should be selected depending on the environmental conditions, properties and nature of the goods being processed.

The temperature of the outside air and the strength of the wind in a given climatic region, at which it is necessary to stop working in the open air or arrange breaks for warming workers, is established by the administration of the enterprise in accordance with applicable law.

Passages and workplaces must be leveled and not have holes, potholes. In winter, the passages should be cleared of snow, and in case of icing, sprinkled with sand, slag or other anti-slip materials.

For the passage (lift) to the workplace, sidewalks, stairs, bridges, ladders that meet safety requirements must be provided.

8. Terms of carrying out and the main volumes of work in the maintenance of cranes and mechanisms.

Lifting machines in operation are subject to periodic technical inspection:

1) partial - at least once every 12 months;

2) complete - at least once every 3 years, with the exception of rarely used machines (cranes for maintenance of machine rooms of electrical and pumping stations, compressor units, other lifting machines used only for equipment repair).

Rarely used load-lifting machines are subject to a full technical examination at least once every 5 years. The assignment of cranes to the category of rarely used is made by the owner.

The technical examination is intended to establish that:

a) the crane and its installation comply with the requirements of the "Industrial safety rules for the operation of hoisting mechanisms", passport data and documentation submitted for registration;

b) the crane is in a condition that ensures its safe operation.

During a full technical examination, the crane must be subjected to:

a) inspection;

b) static tests;

c) dynamic tests.

During a partial technical examination, static and dynamic tests of the crane are not carried out.

Static tests of the crane are carried out with a load that is 25% higher than its nameplate load capacity.

During static tests of boom-type cranes, the boom is installed relative to the running support part in a position corresponding to the lowest design stability of the crane, and the load is lifted to a height of 100-200 mm.

The crane is considered to have passed the static tests if the lifted load does not fall to the ground within 10 minutes, and no cracks, residual deformations and other damage to metal structures and mechanisms are detected.

Dynamic tests of the crane are carried out with a load, the mass of which is 10% higher than its passport load capacity, and are aimed at checking the operation of its mechanisms and brakes.

During dynamic tests of cranes (except for cable-type cranes), multiple (at least three times) lifting and lowering of the load are performed, as well as checking the operation of all other mechanisms when combining the working movements provided for by the crane operation manual.

The results of the technical examination of the crane are recorded in its passport by the engineer and technical worker for monitoring the safe operation of hoisting machines, removable load-handling devices and containers, who conducted the examination, indicating the date of the next examination. When inspecting a newly mounted crane, an entry in the passport must confirm that the crane has been mounted and installed in accordance with the “Industrial Safety Rules for the Operation of Hoisting Mechanisms”, the operating manual and has passed the tests.

Maintenance and repair of cranes, including those that have worked out their standard service life, as well as repair and straightening of crane tracks must be carried out in accordance with the crane operation manuals and other regulatory documents within the time limits established by the preventive maintenance schedule.

The results of maintenance, information about crane repairs should be recorded in the repair log. Information about repairs that necessitate an extraordinary full technical examination of the crane is entered in its passport. The results of the inspection of removable load-handling devices and containers are recorded in the journal of periodic inspections.

During the operation of removable load-handling devices and containers, the owner must periodically inspect them within the following periods:

traverse, pincers and other grips and containers - every month;

slings (with the exception of rarely used ones) - every 10 days;

rarely used removable lifting devices - before issuing them for work.

Damaged removable load-handling devices identified during the inspection should be removed from work.

9. Order and timing of diagnostics, examination of cranes;

Cranes that have worked out their standard service life must be subjected to expert examination (diagnosis), including a full technical examination, carried out by specialized organizations in accordance with regulatory documents. The results of the survey should be entered in the crane passport by an engineering and technical worker responsible for monitoring the maintenance of cranes in good condition.

The main work during the survey.

Inspection of lifting machines should include the following types of work:

Checking the work performed by the owner of the lifting machine.

Acquaintance with the documentation of the lifting machine.

Checking the condition of metal structures.

Checking the condition of mechanisms, rope-block system and other nodes.

Checking the condition of electrical , hydraulic equipment .

Checking the status of devices and safety devices.

Checking the condition of the rail tracks (for cranes and trolleys moving on rails).

Checking the chemical composition and mechanical properties of the metal of the supporting elements of metal structures.

Drawing up a list of defects.

Static and dynamic tests of the crane.

Estimation of the residual resource.

Formulation of survey results.

lifting machines that are in working order are subjected to inspection . It is allowed to conduct an inspection of a load-lifting machine that is in an inoperable

state, with the subsequent completion of the inspection and testing after bringing it into working condition.

The period for which the service life is extended is established based on the results of the inspection of the hoisting machine, carried out in accordance with the Guidelines for this type, and depends on the technical condition of the machine, but cannot exceed three years.

10. Safety measures during technological processes

For the safe performance of work on the movement of goods by cranes, their owner and the organization performing the work ensure that the following requirements are met:

1) at the place of production of work on the movement of goods, the presence of persons not directly related to the work performed is not allowed on the crane;

2) access to bridge-type cranes and mobile jib cranes and descent from them is made through the landing area or, in some cases, through the walk-through gallery;

3) if it is necessary to inspect, repair, adjust mechanisms, electrical equipment of the crane, inspect and repair metal structures, the switch of the input device is turned off. This requirement is met if it is necessary to reach the deck of the bridge crane of the bridge type;

4) on bridge-type cranes, in which the rails of the cargo trolley are located at the level of the deck of the gallery, before the exit of the service personnel to the gallery, the trolley is installed in the immediate vicinity of the exit from the cab to the deck.

Construction and installation work is carried out according to the project for the organization of work by cranes, which provides for:

1) compliance of the installed cranes with the conditions of construction and installation works in terms of load capacity, lifting height and reach (load characteristic of the crane);

2) ensuring safe distances from networks and overhead power lines, places of urban traffic and pedestrians, safe distances for cranes to approach buildings and places for storing building parts and materials;

3) conditions for installation and operation of cranes near slopes, pits;

4) conditions for the safe operation of several cranes on the same track and on parallel tracks;

5) a list of used load-handling devices and a graphic representation (scheme) of cargo slinging ;

6) places and dimensions of cargo storage, access roads and other places;

7) measures for the safe performance of work, taking into account the specific conditions at the site where the crane is installed (fencing of the construction site, installation area and other measures).

Control persons, crane operators and slingers get acquainted with the project (under signature) before the start of work:

1) loading and unloading operations and warehousing of goods by crane at bases, warehouses, sites are carried out according to technological regulations;

2) it is not allowed to lower the load onto the motor vehicle, lift the load when people are in the body or in the cab of the motor vehicle. In places of constant loading and unloading of motor vehicles and gondola cars, stationary overpasses or hinged platforms for slingers are arranged. Unloading and loading of gondola cars with hook cranes is carried out according to technological regulations, which determine the location of slingers when moving goods, the possibility of their access to overpasses and hinged platforms. The presence of people in gondola cars when loading and unloading them with cranes is not allowed;

3) the movement of the load is not carried out when people are under it. The slinger is allowed to be near the load during its lifting or lowering, if the load is raised to a height of not more than 1000 mm above the platform level;

4) slinging of goods is carried out in accordance with slinging schemes . For slinging the load intended for lifting, slings are used that correspond to the mass and nature of the load being lifted, taking into account the number of branches and their angle of inclination; general purpose slings are selected so that the angle between their branches does not exceed 90 °;

5) movement of small-piece cargoes is carried out in the intended container, while the possibility of falling out of individual cargoes is excluded. It is allowed to lift bricks on pallets without fencing during loading and unloading (on the ground) of vehicles;

6) the movement of cargo of unknown mass is carried out only after determining its actual mass;

7) the load or load-handling device, when moving horizontally, is previously raised 500 mm above the objects encountered on the way;

8) when moving a self-propelled jib crane with a load, the position of the boom and the load on the crane are set in accordance with the methodological recommendations for the operation of the crane;

9) it is allowed to lower the transported load only to the place intended for this, where the possibility of falling, overturning or sliding of the load being installed is excluded. At the place of installation of the load, pads of appropriate strength are preliminarily laid so that the slings can be easily and without damage removed from under the load. It is not allowed to install the load in places not intended for this. Stowage and disassembly of cargo should be carried out evenly, without violating the dimensions established for cargo storage and without blocking the aisles. Stowing of cargo in gondola cars, on platforms is carried out in accordance with the loading certificate. Loading of cargo into motor vehicles and other vehicles is carried out in such a way that it is possible to conveniently and safely sling it during unloading. Loading and unloading of gondola cars, platforms, motor vehicles and other vehicles is carried out without disturbing their balance;

10) it is not allowed to find people and carry out any work within the movement of goods by cranes equipped with a grab or magnet.

Ancillary workers serving such cranes may only be allowed to perform their duties during breaks in the operation of the cranes and after the grab or magnet has been lowered to the ground. The places of work with such cranes are fenced and marked with warning signs;

11) it is not allowed to use the grab for lifting people or performing work for which the grab is not intended;

12) at the end of work or during a break, the load is not allowed to be left suspended, the knife switch in the crane operator's cab or on the crane portal is turned off and locked. At the end of the work of the tower, portal, gantry crane and bridge loader, the control cabin is locked, the crane is reinforced with all anti-theft devices available on it;

13) tilting of goods by cranes is allowed to be carried out on tilting platforms or in specially designated places. The performance of such work is allowed only according to the technological regulations, which reflect the sequence of the operation, the method of slinging the load and instructions for the safe performance of work;

14) when operating overhead cranes installed in several tiers, the condition for the passage of cranes of the upper tier above the cranes located below is fulfilled, only without load, with the hook raised to the upper working position;

15) when lifting the load, it is preliminarily raised to a height of no more than 200-300 mm to check the correctness of the slinging and the reliability of the brake;

16) when lifting a load installed near a wall, column, stack, railway car, machine or other equipment, it is not allowed to find people (including the person who hooked the load) between the load being lifted and the specified parts of the building or equipment; this requirement is also fulfilled when lowering the load.

During the operation of the lifting machine is not allowed:

1) entrance to the cabin of the lifting machine during its movement;

2) finding people near a working self-propelled jib or tower crane in order to avoid pinching them between the rotary and non-rotary parts of the crane;

3) movement of a load that is in an unstable position or suspended by one horn of a two-horned hook;

4) movement of people or cargo with people on it. It is allowed to lift people with cranes in exceptional cases and only in a specially made cabin after the development of measures to ensure the safety of people. Such work is carried out according to technological regulations;

5) lifting of cargo covered with earth or frozen to the ground, embedded with other cargo, reinforced with bolts or poured with concrete, as well as metal and slag, frozen in a furnace or welded after draining;

6) pulling a load along the ground, floor or rails with a crane hook with an inclined position of the cargo ropes without the use of guide blocks that ensure the vertical position of the cargo ropes;

7) release with the help of a hoisting machine of slings, ropes or chains pinched by the load;

8) pulling the load during its lifting, moving and lowering. To turn long and bulky goods during their movement, hooks or guy lines of the appropriate length are used;

9) alignment of the transported cargo by hand, adjustment of the slings in the air;

10) supply of cargo to window openings and balconies without special receiving platforms or special devices;

11) the use of limit switches as working bodies for automatically stopping mechanisms, except for the case when the overhead crane approaches the landing site arranged at the end of the building;

12) work with disabled or faulty safety devices and brakes;

13) turning on the crane mechanisms when people are on the crane outside its cabin (on the gallery, in the engine room, on the boom, tower, counterweight and other places). An exception is allowed for persons inspecting and adjusting mechanisms and electrical equipment. In this case, the mechanisms are switched on at the signal of the person performing the inspection;

14) lifting the load directly from the place of its installation (from the ground, platform, stack and other places) with a jib winch.