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Large-scale amusement device safety code

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Large-scale amusement device safety code

1 Scope

This Standard specifies the basic safety requirements for the general rules, materials and fasteners, design, manufacturing and installation, use management and maintenance of large-scale amusement devices (hereinafter referred to as amusement devices).

This Standard applies to large-scale amusement devices.

This Standard does not apply to competitive sport devices and fitness devices.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 699 Quality carbon structure steels

GB/T 709-2006 Dimension, shape, weight and tolerances for hot-rolled steel plates and sheets

GB/T 715 Hot-rolled round carbon steel bars for standard parts

GB/T 983 Covered electrodes for manual metal arc welding of stainless and heat-resisting steels

GB/T 985.1 Recommended joint preparation for gas welding, manual metal arc welding, gas-shield arc welding and beam welding

GB/T 985.2 Recommended joint preparation for submerged arc welding

GB/T 1173 Casting aluminium alloys

GB/T 1176 Casting copper and copper alloys

GB/T 1231 Specifications of high strength bolts with large hexagon head, large hexagon nuts, plain washers for steel structures

GB/T 1243 Short-pitch transmission precision roller and bush chains, attachments and associated chain sprockets

GB/T 1527 Drawn tube of copper and copper alloys

GB/T 2040 Sheet of copper and copper alloy

GB/T 2059 Strips of copper and copper alloys

GB 2894 Safety signs and guideline for the use

GB/T 3077 Alloy structure steels

GB 3096 Environmental quality standards for noise

GB/T 3098 (all parts) Mechanical properties of fasteners

GB/T 3190 Wrought aluminium and aluminium alloy - Chemical composition

GB/T 3191 Aluminium and aluminium alloys extruded bars, rods

GB/T 3621 Titanium and titanium alloy plate and sheet

GB/T 3624 Titanium and titanium alloy seamless tubes

GB/T 3766 Hydraulic fluid power - General rules and safety requirements for systems and their components

GB/T 3811-2008 Design rules for cranes

GB/T 3880 (all parts) Wrought aluminium and aluminium alloy plates, sheets and strips for general engineering

GB/T 4423 Copper and copper-alloy cold-drawn rod and bar

GB 4706.1-2005 Household and similar electrical appliances - Safety - Part 1: General requirements

GB/T 4842 Argon

GB/T 5117 Covered electrodes for manual metal arc welding of non-alloy and fine grain steels

GB/T 5118 Covered electrodes for manual metal arc welding of creep-resisting steels

GB 5226.1-2008 Safety of machinery - Electrical equipment of machines - Part 1: General requirements

GB/T 5293 Carbon steel electrodes and flux for submerged arcwelding

GB/T 5313 Steel plates with through-thickness characteristics

GB 5725 Safety nets

GB/T 6829 General requirements for residual current operated protective devices

GB/T 6892 Wrought aluminium and aluminium alloys extruded profiles for general engineering

GB/T 6893 Aluminium and aluminium alloys cold drawn (rolled) seamless tubes

GB/T 7134 Poly (methyl methacrylate) cast sheets

GB/T 8110 Welding electrodes and rods for gas shielding arc welding of carbon and low alloy steel

GB/T 8918 Steel wire ropes for important purposes

GB/T 9438 Aluminum alloy castings

GB/T 10045 Carbon steel flux cored electrodes for arc welding

GB/T 12470 Low-alloy steel electrodes and fluxes for submerged arc welding

GB/T 13384 General specifications for packing of mechanical and electrical product

GB 13495.1-2015 Fire safety signs - Part 1: Signs

GB/T 13808 Wrought copper and copper alloys - Extruded rods and bars

GB/T 13955 Installation and operation of residual current operated protective devices

GB/T 14957 Steel wires for melt welding

GB/T 15115 Die casting aluminum alloys

GB 15763 (all parts) Safety glazing materials in building

GB/T 17493 Low alloy steel flux cored electrodes for arc welding

GB/T 19418 Arc-welded joints in steel - Guidance on quality levels for imperfections

GB/T 20306 Amusement devices terminology

GB/T 34370.1 Nondestructive testing of amusement equipment - Part 1: General requirement

GB/T 34370.2 Nondestructive testing of amusement equipment - Part 2: Visual examination

GB/T 34370.3 Nondestructive testing of amusement equipment - Part 3: Magnetic particle testing

GB/T 34370.4 Nondestructive testing of amusement equipment - Part 4: Penetrant testing

GB/T 34370.5 Nondestructive testing of amusement equipment - Part 5: Ultrasonic testing

GB/T 34370.6 Nondestructive testing of amusement equipment - Part 6: Radiographic testing

GB 50005 Standard for design of timber structures

GB 50007 Code for design of building foundation

GB 50009 Load code for the design of building structures

GB 50010 Code for design of concrete structures

GB 50011 Code for seismic design of buildings

GB 50017 Code for design of steel structures

GB 50057 Code for design protection of structures against lightning

GB/T 50065 Code for design of ac electrical installations earthing

GB 50135 Code for design of high-rising structures

GB 50169 Code for construction and acceptance of grounding connection electric equipment installation engineering

GB 50202 Code for acceptance of construction quality of building foundation

GB 50204 Code for quality acceptance of concrete structure construction

GB 50206 Code for acceptance of construction quality of timber structures

GB 50231-2009 General code for construction and acceptance of mechanical equipment installation engineering

GB 50545 Code for design of 110 KV ~ 750 KV overhead transmission line

GB 50661-2011 Code for welding of steel structures

JB/T 3223 Quality management specification for welding materials

JB/T 5000.12 Heavy mechanical general techniques and standards - Part 12: Paint

NB/T 47014 Welding procedure qualification for pressure equipment

NB/T 47015-2011 Welding specification for pressure vessels

TSG Z6002 Examination rules for welding operators of special equipment

3 Terms and definitions

For the purpose of this document, the terms and definitions defined in GB/T 20306 apply.

4 General

4.1 Basic requirements

4.1.1 The design, manufacturing, installation and use of amusement devices shall ensure personal safety.

4.1.2 Other requirements not mentioned in this Standard shall be implemented in accordance with the specifications of relevant national laws and regulations, safety technical specifications and standards.

4.1.3 Amusement devices shall be set up with product nameplates at prominent locations. The nameplate of products shall include at least the name of the manufacturing organization and the manufacturing address, the manufacturing license number, the device type, the product number, the manufacturing date and major technical parameters.

4.1.4 The manufacturing, installation, renovation and repair organizations of amusement devices shall obtain the permission according to laws before engaging in the corresponding activities, and shall be responsible for the quality of the manufacturing, installation, renovation and repair. The operation and use organization of amusement devices is responsible for the use safety of the amusement devices.

4.1.5 When adopting new techniques, new methods, new materials and new amusement devices that are not listed or exceed the scope of this Standard,

5.2.2.1 The chemical compositions of aluminum and aluminum alloys shall comply with the specifications of GB/T 3190. The mechanical properties of the processed products shall comply with the specifications of GB/T 3191, GB/T 3880 (all parts), GB/T 6892 and GB/T 6893.

5.2.2.2 The chemical composition and mechanical properties of casting aluminum alloys shall comply with the specifications of GB/T 1173. The chemical composition and mechanical properties of die casting aluminum alloys shall comply with the specifications of GB/T 15115. Aluminum alloy castings shall comply with the specifications of GB/T 9438.

5.2.3 Titanium and titanium alloy plates and sheets

The mechanical properties of titanium and titanium alloy plates and sheets shall comply with the specifications of GB/T 3621. The mechanical properties of titanium and titanium alloy tubes shall comply with the specifications of GB/T 3624.

5.2.4 Copper and copper alloys

5.2.4.1 The chemical composition and mechanical properties of copper and copper alloy plates and sheets shall comply with the specifications of GB/T 2040 and GB/T 2059. The chemical composition and mechanical properties of tubes shall comply with the specifications of GB/T 1527. The mechanical properties of bars shall comply with the specifications of GB/T 4423 and GB/T1 3808.

5.2.4.2 The chemical composition and mechanical properties of casting copper alloys shall comply with the specifications of GB/T 1176.

5.3 Non-metallic materials

5.3.1 Basic requirements

The non-metallic materials used shall comply with the specifications of the relevant national standards, and their mechanical properties, anti-aging properties, environmental performance and flammability shall meet the requirements of working conditions.

5.3.2 Wood

The wood for main force-bearing members shall be not-easy-to-crack and dry wood with less natural defects, high strength. Wood used in important locations shall be subjected to flame retardant and preservative treatment if necessary. The design of wooden structures shall comply with the specifications of GB 50005, and the construction quality shall comply with the specifications of GB 50206.

d - the nominal diameter of the thread, in millimeters (mm).

6 Design

6.1 Basic design requirements

6.1.1 Basic requirements

6.1.1.1 The design of amusement devices shall have design instructions, calculation instructions, use and maintenance instructions and a full set of drawings, risk assessment reports and design verification outlines complying with the relevant national standards. The above information shall be kept until at least the amusement devices are scrapped.

6.1.1.2 The design of amusement devices and auxiliary devices shall be calculated correctly and reasonably structured to ensure passenger safety. When accurate calculation cannot be performed, it can be confirmed and verified by tests.

6.1.1.3 Operation and use organizations or design commissioners shall provide the local meteorological, power supply, seismic and geological data in written form to the design and manufacturing organizations.

6.1.1.4 The selection of materials shall be based on the consideration of structural importance, load characteristics, structural forms, stress conditions, manufacturing processes, connection methods and work environment.

6.1.1.5 The mechanical properties, heat treatment performance and welding performance of metal materials used for important mechanical parts shall meet the requirements of working conditions.

6.1.1.6 Amusement devices shall specify the design service life of the complete machine and its main components. The calculated design life of the complete machine shall be not less than 35000 hours, including the getting on/off time.

6.1.1.7 The use and maintenance instructions shall be in simplified Chinese. For multilingual versions, the simplified Chinese version shall prevail. At least the following contents shall be included:

a) Device overview and structure introduction;

b) Technical performance and parameters, operating conditions;

c) Operational procedures and precautions;

d) Notice to passengers;

a) When carrying 1 ~ 2 adults, it is calculated as not less than 750 N/person; when carrying more than 2 adults, it is calculated as not less than 700 N/person.

b) Children (not more than 1.2 m in height or under 10 years of age) shall be calculated as not less than 400 N/person.

NOTE: When calculating the number of passengers based on members, it shall calculate according to the number of passengers designed to be carried. For example, for flying chair's single seat system, it is calculated as no less than 750 N/person. for overall pylons, it is calculated as not less than 700N/person.

6.1.2.3 Supporting and constraint reaction of passengers

When designing cabins, the force exerted by the passenger on the armrest, support, ankle and lining, etc. shall be taken into consideration when the vehicle is in normal operation and during start-up, braking and emergency situations. These forces shall not be less than 500 N/adult, and shall not be less than 300 N/person for amusement devices for children, expressed in Q_2.

6.1.2.4 Value, Q_3, of uniformly distributed live loads in human activity area

The value of live loads uniformly distributed in human activity areas such as platforms, stairs, entrances and exits of amusement devices is as follows:

- Ordinary areas where human stand, such as stations, stairs, entrances and exits: 3.5 kN/m^2;

- Densely populated areas where human stand, such as densely populated stands, stairs: 5 kN/m^2;

- Unopened areas where human stand, such as floors, stairs, entrances and exits that are not open to the public: 1.5 kN/m^2;

- If the amusement device specifies the number of passengers in a certain area, the uniformly distributed live loads in this area shall be calculated based on the concentrated live loads of the number of passengers.

6.1.2.5 Value, Q_4, of horizontal thrust in human activity area

The value of the horizontal thrust applied on fences, handrails, wallboards and other similar places of amusement devices is as follows:

- In non-densely-populated areas, the point of action is at the high point of the fence, etc.: 0.5 kN/m;

more than 80 mm, the calculation method of its load shall be in accordance with according to the specifications in GB 50009. The snow load is expressed in Q_{10}. When operating in snow-free areas or there are measures to prevent snow accumulation, the impact of snow loads may not be taken into consideration.

6.1.2.12 Temperature load

The value and calculation of the temperature load shall be in accordance with the specifications in GB 50009. The temperature load is expressed in Q_{11}.

6.1.2.13 Earthquake load

Large-scale, high-rise structures and amusement devices on buildings shall be designed with consideration of earthquake-induced loads, expressed in T. The calculation method shall be in accordance with the specifications of GB 50011.

6.1.2.14 Ice-coating load

For amusement devices with a height of more than 40 m and installed outdoors, there is a possibility of ice coating on the structural members, the ice load shall be calculated, expressed in Q_{12}. The calculation method is in accordance with the specifications of GB 50135.

6.1.2.15 Impact load

6.1.2.15.1 There may be impacts during the movement of amusement devices, so as to generate impact loads (e.g. in purchase tackles, the impact load may come from a track joint or a pit formed by a worn track). The load (permanent load and live load and inertial forces borne) on the moving parts shall be multiplied by an impact coefficient of not less than k_1 = 1.2. For amusement devices with a speed of less than 2 m/s, the impact load may not be calculated.

6.1.2.15.2 If the moving part has greater impact force during the actual operation and the impact force cannot be reduced to range of the design requirements, it is necessary to increase the impact coefficient accordingly to carry out the modification calculation.

6.1.2.15.3 For amusement devices operating on tracks, when the operating speed is greater than 20 km/h, the load on the track structure during operation shall be multiplied by the vibration coefficient (not less than k_2 = 1.2). In the following cases, vibration may be exempted:

a) Support members or suspensions of track structures (e.g. main support tubes, columns, etc. of tracks);

b) Ground pressure;

detailed welding records and pictures.

6.5 Structural design

6.5.1 The appropriate structural form shall be selected according to the performance and force of amusement devices, and structural stress concentration shall be minimized as possible.

6.5.2 The testability of amusement devices shall be considered. Measures shall be taken to ensure the safety of structures that cannot be tested. Parts that require regular inspections and non-destructive testing during use shall be easy to inspect and tested; parts need to be disassembled shall be easy to disassemble.

6.5.3 The structural units shall be divided according to conditions such as force, transportation, storage and lifting.

6.5.4 The geometric dimensions of the inspection holes and manholes shall meet the inspection requirements, and measures shall be taken to prevent water accumulation.

6.5.5 Drainage measures for structural members shall be effective, and there shall be no leakage or residual water accumulation on the exterior surfaces and interior of structural members.

6.5.6 The suspension point of structural members shall be set so that it does not cause plastic deformation during the lifting process.

6.5.7 Force frames such as supports, cabins, vehicles for the passengers shall be made of metal or other high-strength non-metallic materials. The overall structure shall be a sturdy structure.

6.5.8 Important bolt connections shall be able to meet the load requirements and measures shall be taken to prevent loosening of the bolts. After the bolt is installed, there shall be a clear anti-loose sign.

6.5.9 Pin connections between important parts shall have anti-dropping measures.

6.5.10 For important shafts and pins, the surface roughness of the mating surface shall meet the requirements of working conditions.

6.5.11 Important shafts and pins shall avoid stress concentration, e.g. as small cross-sectional changes as possible and as large rounded corners at the shaft shoulder as possible.

6.5.12 If necessary, measures shall be taken to avoid resonance.

6.6.2.13 For parts where bearings and contact surfaces have relative motion, lubricating measures shall be provided. Those need to be added with lubricants shall be easy to operate.

6.6.3 Hydraulic and pneumatic systems

6.6.3.1 To ensure the safety of use, all members in the system shall be selected to ensure that these members can operate reliably when the system is put into use. Particular attention shall be given to the reliability of members that may cause danger due to failure or malfunction.

6.6.3.2 It shall be designed to prevent the pressure of the system from exceeding the maximum pressure allowed by the system and the rated pressure of any member. When the pressure is lost or the critical pressure is reached, the personnel shall not be put at risk.

6.6.3.3 Hydraulic or pneumatic systems shall be designed to minimize impact. The impact pressure and pressure loss shall not cause danger.

6.6.3.4 The passenger cabin is lifted by support of oil cylinder or air cylinder. When the pressure piping, hose and pump fail, the descending speed of the passenger cabin shall not be greater than 0.5 m/s. Otherwise, an effective buffer device or protective device shall be provided.

6.6.3.5 The oil temperature shall comply with the specifications of GB/T 3766: when the ambient temperature is the highest, the temperature of the oil imported by the oil pump shall not exceed 60 °C. The device shall operate normally when the ambient temperature is at a minimum.

6.6.3.6 In a hydraulic or pneumatic system, an overpressure protection device not exceeding 1.2 times the rated working pressure shall be provided.

6.6.3.7 The design of the hydraulic cylinder shall meet the requirements of GB/T 3766. It shall be designed and adjusted when installed to allow the reaction force of the load to pass through the centerline of the hydraulic cylinder.

6.6.3.8 For single-acting piston-type hydraulic cylinders, the exhaust port shall be designed and placed in an appropriate position so as to avoid danger to the personnel caused by the injected liquid.

6.6.3.9 For hydraulic systems with an inflatable accumulator, the specifications are as follows:

a) The oil pressure of the accumulator shall be automatically removed at shutdown, or the accumulator shall be reliably isolated. Except in special circumstances where pressure is still required after shutdown;

6.7.2.1 The control circuit power supply shall comply with the specifications of GB 5226.1-2008. When the power supply is interrupted, the operating data may be lost. When the entire system is difficult to recover quickly, set the UPS power supply unit.

6.7.2.2 The control system shall meet the operating conditions of the amusement devices and shall ensure the passenger safety. The control logic shall be reliable and reasonable.

6.7.2.3 When using automatic control or interlocking control, there shall be repair (maintenance) mode. Each movement should be able to be controlled separately.

6.7.2.4 When using automatic control or interlocking control, if mis-operated, the device does not allow movements that endanger passenger safety.

6.7.2.5 When wireless and non-mechanical sensors are used to participate in control, full consideration shall be given to the ability of the transmitting and receiving sensing components to resist external interference and the sensitivity to the working environment, and a fault monitoring and alarm system should be provided. When there is an error in the signal transmission, no personal injury shall occur.

6.7.2.6 On the occasions where exceeding working limit (speed, pressure, torque, position) may result in a hazardous situation, the corresponding protection control shall be triggered when the operating limit exceeds the limit.

6.7.2.7 If there may be dangers when the amusement device exceeds a predetermined position during operation, the limit position control and limit position control device shall be provided, and the control device shall be safe and reliable.

6.7.2.8 When the amusement device is driven by reels and traction machines, it shall be provided with controls and extreme position control devices to prevent over-winding and loosening of the steel wire ropes. The multiple steel wire rope drive systems that are not visible to the operator under normal operation shall have broken ropes detection control device.

6.7.2.9 The emergency stop button shall be set on the operator's station (if required, it shall also be set on the platform), and the push button type shall adopt the convex manual reset type. Dangers due to pressing the emergency stop button are not allowed.

6.7.2.10 During installation, maintenance and inspection, when it needs to enter a dangerous area or stretch a certain part of the human body (such as an arm)

shall not exceed 120 mm. Safety fences shall be set up so that children cannot climb. Except for fences for staff-only channels or platforms.

6.9.9.3 The safety fence shall be set with entrance and exit, and the guide fence shall be set at the entrance. Platforms shall have anti-slip measures.

6.9.9.4 The security gate opening direction shall be consistent with the passenger's direction of travel (except for special circumstances). To prevent injury to the personnel's hands when opening or closing the door, the gap between the door frame and the upright shall be appropriate, or other protective measures are taken.

6.9.9.5 The width of steps for the entrance and exit of amusement devices shall not be less than 240 mm and the height range shall be 140 mm to 200 mm. The slope of the ladder shall be the same. When the entrance and exit are ramps, the slope shall not be greater than 1:6. For slopes with non-slip patterns, the slope shall not be greater than 1:4.

6.9.9.6 The operating room of amusement devices shall be set up separately, with a wide field of vision, sufficient space for activities and lighting. For blind spots where the operator cannot observe the operation, safety measures such as monitoring systems shall be available when there is a danger. When all passengers getting on/off situations cannot be observed in the operating room and the passenger safety tie-down device is not interlocked with the start-up, the safety confirmation button shall be added at the corresponding position and interlocked with the start-up.

6.9.9.7 Safe passages shall be set along the slope elevation section or the overhead part of the aerial tracks. The safety passages shall be solid and reliable to facilitate passenger evacuation or device maintenance.

6.9.9.8 For the main body of amusement devices, the operating channels and the culverts passing through, the enclosures shall be made of materials that are not easy to fall off, and the decorative parts shall be firmly fixed.

6.9.9.9 Safety nets shall be provided in places where there is a risk of injury caused by falling bodies or objects. The connection of safety nets shall be reliable. The performance of the safety nets shall meet the requirements of GB 5725.

6.9.9.10 Ladders, passageways and platforms used for inspection and maintenance shall be firm and reliable, and their space shall be able to meet the working requirements. Ladders higher than 3 m shall be guarded or equipped with seat belt attachment devices.

6.9.10 Safety signs

7.4.2 Assembly of pins and fasteners

7.4.2.1 Bolted connections with preloading requirements shall comply with the specifications of 5.2.4 of GB 50231-2009.

7.4.2.2 The assembly of high-strength bolts shall comply with the relevant specifications of 5.2 of GB 50231-2009.

7.4.2.3 All kinds of tab washers of which the tab shall be turned after the nut is tightened. The lockout fuses on the bolt head shall be tangled tightly around the thread.

7.4.2.4 Taper pins shall be subjected to the coloring inspection with holes at the time of assembly. The contact rate shall be greater than 60 % of the length of fit and shall be evenly distributed.

7.4.2.5 The assembly of connectors such as bolts, keys, pins, positioning pins shall meet the relevant requirements of 5.2 of GB 50231-2009.

7.4.3 Other requirements

7.4.3.1 The assembly of sliding bearings, rolling bearings, clutches, brakes, couplings, gears, chains, interference fit parts shall comply with the relevant specifications of Clause 5 of GB 50231-2009.

7.4.3.2 Before installing the pneumatic system, use dry and clean compressed air to thoroughly purge all internal channels of fittings, pipes and valves.

7.4.3.3 Before assembling the hydraulic system, the inner surface of fittings, piping and fuel tanks shall be clean and free of any dirt. The hydraulic oil used shall be clean and free of impurities. The fuel tank shall be sealed well. Care shall be taken to minimize the following conditions during installation:

a) excessive deformation of the hydraulic cylinder structure due to push or pull loads;

b) cause lateral bending loads;

c) the upper and lower pins of the hydraulic cylinder shall be fully lubricated.

7.5 In-factory test

7.5.1 Each transmission component, safety device that can be tested first, and components that can be commissioned independently shall be tested and commissioned first.

7.5.2 The requirements for commissioning conditions during on-site commissioning may refer to 7.10.

Visual inspection should be performed before other non-destructive testing. For other non-destructive testing, the testing area and proportion shall be corrected based on the results of the visual inspection.

7.11.6 Ultrasound and radiographic testing

7.11.6.1 Ultrasonic testing shall be carried out in accordance with the specifications of GB/T 34370.5. The quality requirements and qualification levels are as follows:

a) For butt joints that require all non-destructive testing, the pulse reflectance ultrasonic testing technology grade is not lower than Grade B, and the qualification level is Grade I;

b) For butt joints that require local non-destructive testing, the pulse reflection ultrasonic testing technology grade is not lower than Grade B, and the qualification level is Grade II;

c) For butt welds of fillet joints and butt welds of T-joints, the pulse reflection ultrasonic testing technology grade is not lower than Grade B, and qualification level is Grade II;

d) For welded joints using diffractive time difference method and phased array ultrasonic testing, the qualification level is not lower than Grade II;

e) For parts, the pulse reflection ultrasonic testing technology grade is not lower than Grade B, and the qualification level is Grade II.

7.11.6.2 Radiographic testing shall be carried out in accordance with the specifications of GB/T 34370.6. The quality requirements and qualification levels are as follows:

a) For butt joints that require all non-destructive testing, the radiographic testing technology grade is not lower than Grade B, and the qualification level is Grade II;

b) For butt joints that require local non-destructive testing, the radiographic testing technology grade is not lower than Grade B, the qualification level is Grade III, and surface defects are not allowed.

7.11.7 Surface testing

The surface testing shall be carried out in accordance with the specifications of GB/T 34370.3 and GB/T 34370.4. The quality requirements and qualification levels are as follows:

after checking without problems and trial operation. Operational records shall be taken.

8.3.3.3 Notices to passengers shall be set at the obvious places of amusement devices. The operating service personnel shall publicize the precautions to the passengers at any time and prevent the dangerous behavior of the passengers.

8.3.3.4 For amusement devices not for children, the use organization shall specify the age and height of children according to the characteristics of the amusement devices.

8.3.3.5 Before each operation of amusement device, the operator shall confirm that the passenger tie-down device is locked, the operator and service personnel have been evacuated to the safe area, and there are no other personnel and obstacles in the device operating area.

8.3.3.6 Operators, platform service personnel, etc. are forbidden to enter the device operating area during the operation of the device and when the device is not stopped, except for special conditions (maintenance, emergency rescue, etc.).

8.3.4 Inspection

8.3.4.1 The use organization shall establish a self-inspection operation guidance document in accordance with the device use and maintenance instructions and relevant regulations and standards.

8.3.4.2 The inspection methods for amusement devices include: spot inspection and routing inspection. In spot inspecting, the inspector shall use instruments to measure the inspection site according to the specified method and frequency, record the inspection data, and obtain the inspection result according to the determination standard. In routing inspection, the inspector shall use sensory, visual inspection, etc. to judge the operating state of the amusement device and record the inspection result.

8.3.4.3 The type of inspection for amusement device includes: regular safety inspections (daily inspections, weekly inspections, monthly inspections, annual inspections), safety inspections before major holidays and major events. Before regular safety inspections, the inspectors shall prepare the testing instruments, tooling equipment and safety protection equipment. During the inspection process, the inspectors shall strictly follow the work instructions to perform safety operations. After the inspection, the inspectors shall record the inspection results and report the identified safety hazards to the safety management personnel promptly. For safety inspections before major holidays and major events, the use organization shall appropriately increase inspection items according to the results of regular safety inspections.

For amusement devices that beyond the complete machine design service life but still worth repairing and renovating, the use organization shall entrust related organizations according to law to perform safety assessment in accordance with the requirements of this Standard, confirm the work (including maintenance, repair and renovation) required for the life extension of the devices, put them into practice, and confirm the duration and conditions of continued use of amusement devices. The use organization shall re-establish regular inspection requirements and maintenance requirements in accordance with laws and regulations, national standards, device use and maintenance instructions and assessment organization opinions, increase the frequency of comprehensive self-inspection, and strengthen the safety management of life extended devices.

8.4 Emergency rescue

The operation and use organization of amusement devices shall make an emergency plan in accordance with laws and regulations, national standards and use and maintenance instructions, and organize emergency rescue drills at least once a year. The operation and use organization shall establish an emergency rescue command apartment equipped with rescue personnel, rescue equipment and emergency items. Rescue personnel shall be trained to grasp emergency handling, rescue knowledge and practical methods. Rescue equipment shall be in good condition.

8.5 Maintenance, repair and renovation

8.5.1 Maintenance

8.5.1.1 For the maintenance of amusement devices, it shall make a plan according to the use and maintenance instructions, the operating personnel shall carry out maintenance in strict accordance with the plan, combined with the device safety inspection, and truthfully record the results.

8.5.1.2 The management of spare parts of amusement devices shall comply with the system requirements. The purchased spare parts shall have product quality certification. The replaced spare parts shall be marked by the operating personnel and monitored as regular safety inspection items.

8.5.2 Repair and renovation

The repair and renovation of amusement devices shall be implemented by the entity that has obtained the corresponding qualification licenses. Before the repair and renovation, the use organization shall cooperate with the repair and renovation organization to inform the local amusement device safety supervision and administration department. During the repair and renovation process, the use organization shall provide conditions such as tooling

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