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**Large-scale Amusement Devices - Inspection, Maintenance
and Repair - Part 2: Sort of Track Rides**

大型游乐设施 检查、维护保养与修理

第 2 部分：轨道类

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Large-scale Amusement Devices - Inspection, Maintenance and Repair - Part 2: Sort of Track Rides

1 Scope

This document specifies the basic requirements for the inspection, maintenance and repair of in-use track rides-type large-scale amusement devices.

This document is applicable to in-use track rides-type large-scale amusement devices (hereinafter referred to as track rides-type amusement devices), such as: scooters, overhead sightseeing trolleys and slide rails, etc. The inspection, maintenance and repair of track rides-type small-scale amusement devices may take this as a reference in the implementation.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 20306 Amusement Devices Terminology

GB/T 41106.1 Large-scale Amusement Devices - Inspection, Maintenance and Repair - Part 1: General

3 Terms and Definitions

The terms and definitions defined in GB/T 20306 and GB/T 41106.1 are applicable to this document.

4 General Requirements

In addition to this document, the inspection and maintenance of the track rides-type amusement devices shall also comply with the relevant requirements of GB/T 41106.1.

5 Inspection Items and Requirements

5.1 The inspection items, cycles and requirements for the track rides-type amusement devices shall be determined in accordance with the principles specified in GB/T 41106.1.

bolts;

- d) Supporting structure: inspect the deformation, corrosion and welds of the steel structure, and interference with the environment, etc.;
- e) Lifting system: inspect the condition of friction wheels, wire ropes, chains, gears and counterweights, etc.;
- f) Drive (transmission) system: inspect the motors, reducers, open gears, belts, chains, pin gear drives, drive wheels and connecting bolts for temperature rise, abnormal noise, wear, fastening and working conditions;
- g) Hydraulic pneumatic system: inspect the functional conditions of the hydraulic system, hydraulic pump stations, hydraulic pipelines, valve groups, motor leakage, abnormal noise and working conditions, as well as air compressors, pressure reducing valves, air path and joint leakage, and temperature rise, etc.;
- h) Electrical and control system: inspect the condition of power supply, power transmission and distribution equipment, wires and cables; the system's compliance with the requirements in grounding and insulation; the condition and working conditions of machine rooms, control cabinets, electrical components, control panels, sensors, leakage protection devices, UPS power supplies, batteries and lightning protection devices, etc.;
- i) Safety protection devices: inspect the condition and working conditions of braking devices, anti-reversing devices, anti-collision devices, buffer devices, position limits, speed limits and door locking devices, etc.;
- j) Protection system: inspect the protection measures, such as: platform safety isolation measures, guiding beacons, safety distance and anti-skid measures; the condition of safety fences and protective nets;
- k) Backup power: inspect the condition and working conditions of emergency power supply and backup power units;
- l) Auxiliary equipment and facilities: inspect the condition and working conditions of emergency evacuation passages, high-altitude platforms, maintenance platforms and lighting, etc., as well as aviation warning lights, anemometers, alarm bells, fire protection equipment, audio systems, video surveillance systems, and emergency rescue equipment;
- m) Associated equipment and facilities: inspect the condition and working conditions of other associated equipment and facilities, such as: special effects, packaging and performances, etc.;
- n) Other related special equipment: inspect the compliance of other special equipment, such as: pressure containers, gas cylinders, elevators and hoisting machinery, with the

national regulatory requirements;

- o) Foundation: inspect the fastening of anchor bolts, foundation settlement, corrosion and deformation, etc.;
- p) Guidelines and safety warning signs: inspect the condition of guidelines and safety warning signs.

5.4 The inspection items, contents, requirements and inspection modes of typical track rides-type amusement devices are shown in Appendix A.

6 Maintenance

6.1 The main maintenance items of the track rides-type amusement devices include, but are not limited to, the following aspects:

- a) In accordance with the specified cycles and methods, lubricate passenger restraint devices, car body systems, hoisting systems, drive systems, bearings, important pins, gears and reduction gearboxes; add or replace lubricants;
- b) In accordance with the equipment application and maintenance instructions and the actual application conditions, replace the hydraulic oil and filter element in the hydraulic and pneumatic systems;
- c) Fasten or replace fasteners, such as: loose bolts and anchor bolts, in accordance with the specified requirements;
- d) Perform de-rusting and re-painting treatment on the rusted parts of steel structures, such as: rails and columns, or where the paint has fallen off;
- e) Perform necessary dust removal and cleaning on power distribution cabinets, control cabinets and motors, etc.

6.2 The maintenance items, contents and methods of typical track rides-type amusement devices are shown in Appendix B.

7 Repair

7.1 Before repair, grasp the operation and maintenance instructions of the product, and understand the structure of the equipment. In accordance with the failures, formulate repair schemes.

7.2 For equipment disassembly, corresponding disassembly schemes shall be formulated in accordance with the product operation and maintenance instructions, and the installation process guidance documents. After disassembly, the various parts shall be placed and stored in categories, and safety protection management shall be properly performed.

Appendix C

(Informative)

Commonly Seen Repair Methods and Requirements for Track Rides-type Amusement Devices

C.1 Welding Repair of Steel Structure

C.1.1 The tracks and columns of the track rides-type large-scale amusement devices are repaired by welding, and mainly through the mode of repair welding, with the purpose of repairing cracks and compensating for wear. The selection of welding materials, process, inspection and repair shall comply with the design documents and the stipulations of GB 8408, so as to control the welding quality.

C.1.2 For on-site welding, in accordance with the qualified welding processes and evaluation reports, the welding process shall be formulated. In addition, the welding shall be performed strictly in accordance with the welding process. If necessary, welding process specimens shall be produced on the site and pass the evaluation. On-site welding operation shall not be performed on the parts where on-site repair welding is not allowed in the design documents.

C.1.3 When one of the following circumstances occurs on the site of welding, corresponding protection measures shall be taken to satisfy the welding requirements, otherwise, welding shall not be performed:

- a) wind speed: for gas shielded welding, greater than 2 m/s; for other welding methods, greater than 10 m/s;
- b) relative humidity: greater than 90%;
- c) rain and snow environment;
- d) Weldment temperature is lower than $-10\text{ }^{\circ}\text{C}$.

C.1.4 For long-distance welding (above 20 m) on the construction site, the length of cable extension shall be compatible with the cable diameter (cross-sectional area); the cables cannot be used in coils during operation. Before welding, the welding machine shall be debugged to ensure that the output voltage of the welding cable is consistent with the value displayed on the voltmeter of the welding machine.

C.1.5 The welding process shall have welding records. After welding, in accordance with the requirements of the design documents and relevant standards, conduct non-destructive testing or tests to ensure that the welding quality complies with the requirements.

C.2 Wheel Axle Repair

C.2.1 Before repairing the wheel axle, in accordance with the design drawings, formulate a repair scheme; clarify the procedures and steps of disassembly and installation, necessary tools and equipment for construction, requirements for post-repair inspection, and instruments and measuring tools, etc.

C.2.2 In accordance with the installation process documents, hoist the vehicles. The track rides-type vehicles are generally installed in the sequence of carriages from the end of the track in the maintenance section.

C.2.3 After disassembly, if the axle is found to be corroded, several worn, deformed or broken, it shall be replaced.

C.2.4 After reassembly, the axle steering mechanism of the vehicle shall be flexible and reliable; there shall be no jamming. The vehicle coupler shall be safe and reliable, and the rotation shall be flexible. The wheel device shall be flexible; the tire pressure shall be moderate.

C.3 Track Repair

C.3.1 For severely worn, deformed or broken tracks, they shall be replaced and re-installed. The track installation shall comply with the design documents and the stipulations of relevant standards.

C.3.2 The hoisting process shall ensure that the tracks are stable and docked in place. The track joints shall be smoothly transitioned. The height difference at the joint of the contact surface between the track and the wheel shall not be greater than 1 mm, and shall be gradually polished and smoothed at least 150 times the length of the deviation.

C.3.3 The allowable error of the track gauge shall comply with the design requirements. Before track hoisting, 10% spot check shall be performed to re-measure the track gauge, and the pass rate is required to be 100%. Once disqualified parts are found, complete re-inspection shall be conducted, and the inspection results shall be fed back to the manufacturing organization. If necessary, on-site correction shall be performed.

C.3.4 The transition of tracks with different curvature radiuses shall be smooth, so as to ensure the smooth operation of the vehicle.

C.4 Others

For other mechanical parts and electrical equipment that need to be repaired for health recovery due to wear, tear, deformation, fatigue and corrosion, a specific repair scheme shall be formulated. Repair shall be carried out in accordance with the specified process through disassembly of equipment parts, replacement of damaged parts (including electrical control and safety devices), assembly and system debugging.

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