

Chapter 10 Mobile Facilities

[Ministerial Ordinance] (General Rule)

Article 49

The performance requirements for mobile facilities shall be such that the requirements specified by the Minister of Land, Infrastructure, Transport and Tourism are satisfied in light of the geological, meteorological, hydrographic and other natural conditions, cargo handling conditions, and usage conditions of passengers.

[Public Notice] (Mobile Facilities)

Article 91

The items to be specified by Public Notice under Article 52 of the Ministerial Ordinance concerning the performance requirements for mobile facilities shall be as prescribed in the following Article and Article 93.

1 Mobile Cargo Handling Equipment

[Ministerial Ordinance] (Required Performance of Mobile Cargo Handling Equipment)

Article 50

The performance requirements for mobile cargo handling equipment shall be as prescribed respectively in the following items so as to facilitate safe and smooth cargo handling operations in consideration of the structural type.

- (1) The requirements specified by the Minister of Land, Infrastructure, Transport and Tourism shall be satisfied so as to enable the safe and smooth cargo handling operations.
- (2) Damage due to the actions of self-weight, Level 1 earthquake ground motions, surcharge loads and winds, etc. shall not impair the function of the mobile cargo handling equipment and shall not adversely affect the continuous use of the mobile cargo handling equipment.

[Public Notice] (Performance Criteria of Mobile Cargo Handling Equipment)

Article 92

The performance criteria of mobile cargo handling equipment shall be as prescribed respectively in the following items in consideration of the type of cargo handling equipment:

- (1) The mobile cargo handling equipment shall be arranged appropriately and shall be provided with the necessary dimensions in consideration of the design ships, the types and volumes of cargo, the structural type of the mooring facilities and the conditions of cargo handling operations.
- (2) The mobile cargo handling equipment shall be provided with functions appropriate for the prevention of dust, noise, etc. as necessary so as to contribute to conservation of the environment surrounding the facilities.
- (3) The mobile cargo handling equipment shall be provided with the measure appropriate for collision prevention as necessary so as to enable the safe and smooth cargo handling operations.

[Interpretation]

14 Mobile Facilities

(1) Performance Criteria of Mobile Cargo Handling Equipment (Article 50 of the Ministerial Ordinance and the interpretation related to Article 92 of the Public Notice)

- ① Mobile cargo handling equipment as specified in the Ministerial Ordinance, Public Notice and this transmittal means mobile cargo handling equipment which can handle cargo automatically or by remote control as specified in Article 19 of the Enforcement Order of the Port and Harbour Act.
- ② The appropriate collision prevention measures mean the measures, such as sensors and emergency stop

systems installed on mobile cargo handling equipment, which are to be selected through a comprehensive study of their use conditions including their operation systems.

1.1 General

- (1) Mobile cargo handling equipment in the Port and Harbour Act means cargo handling equipment which has rubber tires or other means of mobility so as to be mobile without being constrained by rails, and which is different from mobile cranes (defined as those cranes which can be moved to any location and are mounted with power engines) as specified in Item 8, Paragraph 1, Article 1 of the Enforcement Order of the Industrial Safety and Health Act. For example, a rubber tired gantry crane (RTG) is classified as a crane based on the Industrial Safety and Health Act.

The provisions in this Chapter are intended for mobile cargo handling equipment which can be operated automatically or by remote control (hereinafter referred to as “automated or remotely controlled mobile cargo handling equipment”).

- (2) Related Laws, Regulations and Guidelines

- ① The laws, regulations and guidelines related to mobile cargo handling equipment are as follows:
 - (a) **The Safety Ordinance for Cranes** (Ordinance of the Ministry of Labour No. 34 of 1972)
 - (b) **The Structural Standards for Cranes** (Public Notice of Ministry of Labour No. 134 of 1995)
 - (c) **The Structural Standards for Mobile Cranes** (Public Notice of Ministry of Labour No. 135 of 1995)
 - (d) **The Structural Standards for Derricks** (Public Notice of Ministry of Labour No. 55 of 1962)
 - (e) **The Structural Standards for Forklifts** (Public Notice of Ministry of Labour No. 89 of 1972)
 - (f) **The Structural Standards for Shovel Loaders and Other Equipment** (Public Notice of Ministry of Labour No. 136 of 1978)
 - (g) **The Structural Standards for Straddle Carriers** (Public Notice of Ministry of Labour No. 137 of 1978)
 - (h) **Cranes – Design Principles for Loads and Load Combinations** (JIS B 8831, 2004)
 - (i) **Calculation Standards for Steel Structures of Cranes** (JIS B 8821, 2013)
 - (j) **The Technical Standards for Electric Facilities** (Ordinance of Ministry of International Trade and Industry No. 61 of 1965)
- ② **The Safety Ordinance for Cranes**, established based on **the Industrial Safety and Health Act** (Act No. 57 of 1972) to ensure the safety of cranes, consistently specifies the requirements during the life cycle of cranes including their production, installation, use and disposal.
- ③ **The Structural Standards for Cranes, Mobile Cranes, Derricks, Forklifts, Shovel Loaders and Straddle Carriers**, established based on **the Industrial Safety and Health Act**, specify the safety standards for the structural and mechanical sections of cranes and wire ropes.
- ④ **Cranes – Design Principles for Loads and Load Combinations** and **Calculation Standards for Steel Structures of Cranes** specify the requirements for the performance verification, production, transportation, installation and testing of cranes.
- ⑤ **The Technical Standards for Electric Facilities**, established based on **the Electricity Business Act** (Act No. 170 of 1964), specify the technical standards for electric facilities.

- (3) For items concerning cargo handling equipment as port facilities, refer to **Part III, Chapter 7, 2.1 (1) to (8)**.

1.2 Mobile Cargo Handling Equipment for the Use of Cargo Handling in Container Yards

1.2.1 General

- (1) Mobile cargo handling equipment for the use of cargo handling in container yards means mobile cargo handling equipment for transferring, loading and unloading cargo such as containers in container terminals and on wharves.
- (2) The structures of mobile cargo handling equipment for the use of cargo handling in container yards shall conform to the items considered in accordance with the characteristics of the cargo sorting areas and safety standards for the respective cargo handling equipment based on **the Industrial Safety and Health Act**.

1.2.2 Fundamentals of Performance Verification

- (1) The performance verification of mobile cargo handling equipment for the use of cargo handling in container yards can be carried out by referring to **the Structural Standards for Cranes**.
- (2) In addition to the provision of the preceding paragraph, the performance verification shall be carried out for the functions of mobile cargo handling equipment in accordance with the characteristics of the port, which is specified in **1.2.3 Appropriate Collision Prevention Functions for Automated or Remotely Controlled Mobile Cargo Handling Equipment** below.

1.2.3 Appropriate Collision Prevention Functions for Automated or Remotely Controlled Mobile Cargo Handling Equipment

- (1) Automated or remotely controlled mobile cargo handling equipment shall be provided with the appropriate functions to prevent collisions and to prevent automatic or remote controlled operation in emergency situations.

(2) Collision Prevention Devices

Collision prevention devices mean devices such as barriers, fences and sensors, which have the function of preventing cargo handling equipment from colliding with persons, vehicles or other cargo handling equipment.

(3) Appropriate Functions to Prevent Cargo Handling Equipment from Being Operated Automatically or by Remote Control in emergency situations.

Automated or remotely controlled mobile cargo handling equipment shall be provided with the appropriate functions capable of immediately stopping the equipment, even in emergency situations such as a breakdown in command through wireless communication.

(4) Operation of Cargo Handling

Automated or remotely controlled mobile cargo handling equipment shall be operated with clear distinction between the areas for automated or remotely controlled cargo handling and the areas for manual cargo handling.

1.2.4 Points of Caution When Introducing Automated or Remotely Controlled Mobile Cargo Handling Equipment

- (1) When introducing automated or remotely controlled mobile cargo handling equipment for the purposes of ensuring safety and improving the efficiency of cargo handling operation, it is necessary to construct and maintain the pavement in areas for automated or remotely controlled cargo handling operation by paying closer attention to gradients and other factors than to the pavement in normal cargo sorting areas because unevenness in the paved surfaces will affect the accuracy of automated or remotely controlled mobile cargo handling.

1.2.5 Maintenance of Automated or Remotely Controlled Mobile Cargo Handling Equipment

- (1) For the specific inspection and diagnosis methods and contents of maintenance and repair methods for the maintenance of mobile cargo handling equipment, refer to **the Guidelines for the Establishment of a Maintenance Plan for Port Cargo Handling Equipment**¹⁾ and **the Guidelines for the Inspection and Diagnosis of Port Cargo Handling Equipment**.²⁾ For automated or remotely controlled mobile cargo handling equipment, it is necessary to give due consideration to the maintenance of collision prevention devices.
- (2) For hazard prevention measures for automated or remotely controlled mobile cargo handling equipment, it is preferable to establish operation rules which stipulate the requirements for safety ensuring devices, their maintenance, ancillary facilities and the formulation of structures assuming responsibility while giving due consideration to achieving both efficient and safe port operation.

[References]

- 1) Ministry of Land, Infrastructure, Transport and Tourism: "Guidelines for Establishment of Maintenance and Management Plan for Cargo Handling Equipments in Port", July., 2016(in Japanese).

- 2) Ministry of Land, Infrastructure, Transport and Tourism: "Guidelines for Inspection and Diagnosis of Cargo Handling Equipments in Port", July., 2014(in Japanese).

2 Movable Passenger Boarding Facilities

[Ministerial Ordinance] (Performance Requirements of Movable Passenger Boarding Facilities)

Article 51

The performance requirements of movable passenger boarding facilities shall be as prescribed respectively in the following items for the purpose of the safe and smooth embarkation and disembarkation of passengers in consideration of the structural types of the facilities.

- (1) The requirements specified by the Minister of Land, Infrastructure, Transport and Tourism shall be satisfied so as to enable passengers to safely and smoothly embark and disembark.
- (2) Damage to movable passenger boarding facilities, etc. due to the actions of self-weight, Level 1 earthquake ground motion, surcharge loads and winds, etc. shall not adversely affect the continuous use of movable passenger boarding facilities without impairing the functions of the movable passenger boarding facilities.

[Public Notice] (Performance Criteria of Movable Passenger Boarding Facilities)

Article 93

The performance criteria of movable passenger boarding facilities shall be as prescribed in the following items:

- (1) Passages shall satisfy the following requirements to ensure safe and smooth embarkation and disembarkation of passengers:
 - a) Passages shall have appropriate widths and gradients;
 - b) Passages shall be provided with anti-slip measures or made of non-skid materials;
 - c) Passages shall have side walls and handrails on both sides.
- (2) Passages shall not be provided with staircases. However, when staircases need to be installed, the heights of rises shall be installed appropriately for ensuring the safety of users and stair landings shall be installed appropriately as necessary.
- (3) Passenger boarding facilities shall not double as vehicle boarding facilities. Provided, however, that this shall not apply in cases where pedestrian zones are separated from roadways.
- (4) Mobile ranges in a vertical direction at the tips of movable bridges on passenger boarding facilities shall be appropriately set in accordance with tide levels, fluctuations in the drafts of ships, and the rolling and pitching of ships.
- (5) The risk of losing the soundness of members in a permanent state in which the dominating action is self-weight shall be equal to or less than the threshold level.
- (6) The risk of losing the stability of the facilities due to uplifting of the leg sections of the facilities shall be equal to or less than the threshold level in a variable situation, in which the dominating actions are Level 1 earthquake ground motion, surcharge loads and winds.

[Interpretation]

14 Mobile Facilities

- (2) **The Performance Criteria of Movable Passenger Boarding Facilities** (Article 51 of the Ministerial Ordinance and the interpretation related to Article 93 of the Public Notice)

The performance requirements of movable passenger boarding facilities in a permanent situation in which the dominating action is self-weight of facilities, or in a variable situation in which the dominating actions are Level 1 earthquake ground motions, surcharges and winds, shall be serviceability. The performance verification items and standard indexes to determine limit values with respect to the action shall be as shown in **Attached Table 14-1**. In **Attached Table 14-1**, the standard index to determine limit values for the soundness of members shall be appropriately set when carrying out the performance verification of members. Furthermore, in **Attached Table 14-1**, the standard index to determine limit values for the stability shall be appropriately set when carrying out the performance verification of the stability of foundation sections and the uplift of leg sections.

Attached Table 14-1 Performance Verification Items and Standard Indexes to Determine the Limit Values of Movable Passenger Boarding Facilities under the Respective Design Situations (Except in Accidental Situations)

Ministerial Ordinance			Public Notice			Performance requirements	Design situation			Verification item	Standard index to determine limit value
Article	Paragraph	Item	Article	Paragraph	Item		Situation	Dominating action	Non-dominating action		
51	-	2	93	-	5	Serviceability	Permanent	Self-weight	Surcharge, earth pressure, water pressure	Soundness of member	-
					6		Variable	Level 1 earthquake ground motion (Surcharge) (Wind)	Self-weight, surcharge, earth pressure, water pressure (Self-weight, earth pressure, water pressure) (Self-weight, surcharge, earth pressure, water pressure)	Uplift of leg section	-

*[] means alternative dominating actions to be studied as design situations.

* () means alternative non-dominating actions to be studied in accordance with the dominating actions.

2.1 General

The related laws and regulations for passenger facilities include **the Act concerning the Promotion of Smooth Transport of Elderly and Physically Disabled Persons Using Public Transportation** (Act No. 68 of 2000).

2.2 Fundamentals of Performance Verification

- (1) Movable passenger boarding facilities shall have functions enabling passengers to safely and smoothly embark and disembark ships and shall be separated from vehicle boarding facilities in principle.
- (2) Movable passenger boarding facilities shall not cause passengers to feel like they are in danger and shall have stable structures with respect to winds and the rolling and pitching of ships.
- (3) Structural Types
 - ① The structural requirements for movable passenger boarding facilities are as follows.
 - (a) The widths of passages shall be appropriately set so as to be equal to or more than 75 cm, taking into consideration the usage conditions of fixed passenger boarding facilities. Furthermore, it is preferable that the passages have a width of 1.2 m or more in consideration of the convenience of elderly and physically disabled persons.
 - (b) Passages shall have side walls and handrails on both sides. In addition, passages shall be provided with anti-slip measures on their surfaces or the surfaces shall be finished with non-skid materials.
 - (c) The heights of the rises of staircases shall be set in consideration of the safety of users and staircases shall be provided with landings as appropriate. Generally, the heights of the rises and the widths of the treads on the staircases can be about 16 cm and 30 cm or more, respectively. It is preferable that staircases with overall heights exceeding 3 m have landings with a width of 1.2 m or more at vertical intervals of 3 m or less.
 - (d) Movable passenger boarding facilities shall not double as vehicle boarding facilities, provided, however, that this shall not apply in cases where pedestrian zones are separated from roadways.

- (e) The gradients of boarding passages shall be appropriately set in consideration of the safety of users. In the case of slip ways, their gradients are generally set at 12% or less; however, the gradients are preferably 5 to 8% or less in consideration of the convenience of elderly and physically disabled persons.
- ② The mobile ranges in a vertical direction at the tips of movable bridges on movable passenger boarding facilities shall be appropriately set in accordance with tide levels, fluctuations in the drafts of ships, and the rolling and pitching of ships. Such mobile ranges may be set at the values obtained by adding 1 m to the difference between mean monthly-highest water levels and mean monthly-lowest water levels.
- ③ Those movable passenger boarding facilities for use in public transportation shall give due consideration to the safe use of persons in wheelchairs, taking into consideration the convenience of elderly and physically disabled persons. In this situation, refer to **the Guidelines of Facilities for Elderly and Handicapped People in Public Transport Terminals.**¹⁾

2.3 Performance Verification

- (1) For the performance verification of movable passenger boarding facilities, refer to the Specifications and Commentary for Highway Bridges²⁾ and the Technical Standards and Commentary of Grade Separation Facilities for Pedestrians.³⁾
- (2) Because movable passenger boarding facilities are used in corrosive environments, they shall be provided with corrosion control so as not to damage their durability.

2.4 Ancillary Facilities

- (1) Movable passenger boarding facilities shall be provided with the necessary ancillary facilities in consideration of passenger safety.
- (2) Handrails have functions not only for preventing falls but also for providing smoother passenger traffic by alleviating passenger concerns about safety. Although the height of handrails can be set at 1.1 m or higher to prevent adults of average size from climbing over them, such a height might not enable handrails to effectively prevent users such as infants, children and persons in wheelchairs from falling. Thus, handrails shall have structures comprising columns, crosspieces and metal meshes as fall prevention measures to ensure users a sense of safety.
- (3) Movable passenger boarding facilities shall be provided with fences, ropes or chains at entrances to safely guide passengers to the facilities. The height of fences and others necessary measures to ensure passenger safety may be set at 70 cm. When using ropes or chains, they shall be tightened firmly without sagging beyond what is necessary.
- (4) When covers are installed over movable passenger boarding facilities, the height of the covers can be set at 2.1 m or higher.
- (5) Movable passenger boarding facilities shall be provided with emergency exits when their lengths exceed 60 m. The intervals between entrances and emergency exits or between emergency exits shall be 60 m or less. In addition, guide and indication signs for emergency exits shall be installed along passages.

[References]

- 1) Transport Ecology and mobility Foundation: Guideline of the Facilities for Elderly and Handicapped People in Public Transport Terminals, 2001
- 2) Japan Road Association: Specifications and Commentary for Highway Bridges, Maruzen Publications, 2002
- 3) Japan Road Association: Technical Standards and Commentary of Grade Separation Facilities for Pedestrians, 1979