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Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation

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Standardization of technical and safety requirements in inland navigation: Recommendations on Harmonized Europe-Wide Technical Requirements for Inland Navigation Vessels (Resolution No. 61, revision 2)

Proposals for amendments to Recommendations on Harmonized Europe-Wide Technical Requirements for Inland Navigation Vessels (Resolution No. 61): technical requirements for ramps for inland navigation vessels

Transmitted by the Government of the Russian Federation

I. Mandate

1. This document is submitted in line with cluster 5: Inland Waterway Transport, paragraph 5.1 of the programme of work 2018–2019 (ECE/TRANS/2018/21/Add.1) adopted by the Inland Transport Committee at its eightieth session (20–23 February 2018) (ECE/TRANS/274, para. 123).

2. At its fifty-fourth session, the Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation (SC.3/WP.3) requested the secretariat to publish the proposal to amend the annex to resolution No. 61, revision 2, submitted by the Russian Federation concerning technical requirements for ramps for inland vessels, in the form of a working paper, for its fifty-fifth session (ECE/TRANS/SC.3/WP.3/108, para. 65). The annex contains the text of the proposal.

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Annex

Requirements for ramps for inland navigation vessels

I. Amendments to section 1-2, “Definitions”

Amend section 1-2 “Definitions” with the addition of paragraphs 144 and 145, as follows:

“144. ‘Ramp’ is a composite or single platform designed for entry and exit of vehicles of different types or passage of people (passengers) to and from one of the decks of the vessel.

145. ‘Ramp and associated equipment’ is equipment that includes a ramp, ramp control mechanisms, an automation system, a position display device and monitoring and measuring instruments.”

II. Proposed amendments to chapter 9, “Electrical installation”

Add section 9-3 to chapter 9, “Electrical installations”, as follows:

“9-3 Electric drive and alarms for ramps

9-3.1 The electric drive of the ramps must be equipped with at least two safety cut-off devices, one in the wheelhouse and the other in the ramp control station.

9-3.2 The wheelhouse must be equipped with a light signal for each ramp indicating the position of the ramp and visual and acoustic alarm system while a ramp is in motion. Ramps below the bulkhead deck that ensure a watertight seal must be equipped with a light signal indicating whether they are in an open or closed position or, separately, whether or not they are in a secure watertight position.

9-3.3 Alarm systems must satisfy the following requirements:

(i) Provide an indication that the light signals for ramps are in working order and that they cannot be accidentally switched off;

(ii) Emit an alert signal when there is a power failure of the automation system for the ramp;

(iii) The circuits of the limit switches (sensors) for the ramp position are to be closed when a ramp is raised and stowed (if several sensors are installed on the same ramp they may be connected in a series);

(iv) The circuits of the limit switches (sensors) for the position of the cleats (securing devices) of a ramp that ensures a watertight seal are to be closed when the closing appliance is in the secure watertight position (if several sensors are installed on the same closing appliance they may be connected in a series);

(v) The circuits for the indicators ‘ramp closed/not closed’ and ‘secured/not secured’ must be independent but may be run in a single multicore cable;

(vi) In the event of a change in the position of any of the limit switches (ramp position sensors), an alarm should be activated: ‘ramp is not closed/not secured’ and ‘locking device is not locked’.

9-3.4 The alarm system installed in the wheelhouse must be fitted with a means for selecting one of two operating modes, ‘alongside’ and ‘under way’, and must sound an audible alarm at the ramp control station if a ramp is in the open position while the vessel is under way and if a ramp below the bulkhead deck that ensures a watertight seal is not closed or secured or both.

9-3.5 The power supply for the alarm must be independent of the power supply for the drive, and an emergency source of power must be provided for.

9-3.6 Passenger and cargo vessels of combined (river-sea) navigation that have a watertight closing appliance must be provided with video surveillance equipment and acoustic alarms for water leakage. The video surveillance system is to provide for monitoring of the current position of the ramp and leakage through the closing appliance."

III. Proposed amendments to chapter 10, "Equipment"

Add section 10-6 to chapter 10, "Equipment", as follows:

"10-6 Ramps

10-6.1 General requirements

10-6.1.1 Ramps for the entry and exit of various types of vehicles must have longitudinal framing oriented towards the movement of vehicles during loading operations. The longitudinal external ramps must be rigid enough to withstand loading/unloading at trim of up to 3° or more. The strength and rigidity requirements must be determined by direct calculations.

10-6.1.2 The external ramp should have framing, plaiting, outer plating in the lower part, fender beams, support axes, pads for lifting and lowering the ramp and other elements.

At the end of the ramp on the quay side, a hinged flap or finger flaps that facilitate the smooth entry of vehicles onto the ramp may be installed.

10-6.1.3 The ramp deck should be made of structured steel sheeting or sheeting with round or square bars welded onto it to prevent skidding when loading. The ramp framing is to be designed in a way that is similar to the framing of the cargo deck.

10-6.1.4 Fender beams with a height of not less than 0.35 m must be installed on the ramp for the entry and exit of vehicles. If the ramp is designed for the passage of passengers, it should be equipped with a removable guard rails with a height of at least 900 mm.

10-6.1.5 External ramps must meet the following requirements:

(i) Allow vehicles to roll on and off the vessel and passengers to embark and disembark on foot;

(ii) Operate correctly at heel angles of up to 6° and trim angles of up to 3° or more;

(iii) Be power driven;

(iv) Have a mechanical securing system;

(v) Be protected against falling in the case of the failure of the hoisting gear;

(vi) Provide for compact and secure stowage of the ramp in the stowed position;

(vii) Have a signalling device that indicates that the ramp has reached its final position;

(viii) Include ramp position indicators;

(ix) Are arranged in such a way so that they may be operated by one person.

The requirements of paragraph 10-6.5 (iii)–(x) do not apply to the ramps positioned with onshore crane equipment.

The requirements of paragraph 10-6.5 (iii) and (vi)-(viii) do not apply to ramps that are positioned manually.

10-6.1.6 Internal ramps must meet the following requirements:

(i) Allow vehicles to roll and passengers to pass on foot from one deck to another;

(ii) Operate correctly at heel angles of up to 5° and trim angles of up to 2° or more;

(iii) Be power driven;

(iv) Have a mechanical securing system while under way;

(v) Be protected against falling in the case of the failure of the hoisting gear;

(vi) Provide for compact and secure stowage of the ramp in the stowed position;

(vii) Have a signalling device that indicates that the ramp has reached its final position;

(viii) Include ramp position indicators;

(ix) Ensure that the ramps are placed in the required positions;

(x) Are arranged in such a way that they may be operated by one person.

The requirements of paragraph 10-6.6 (iii) and (vi)–(viii) do not apply to manually driven ramps.

10-6.1.7 When the external ramp is in working position, one end must be attached to the hull at deck level by means of a hinged support, while the other (free) end must be supported by the jetty support or, when embarking vehicles or passengers from an unprepared shore bank, the outer end of the ramp is to be positioned directly on the ground.

10-6.1.8 The design loads on the ramp should be determined on the basis of the specifications of the vehicles to be transported on board the vessel and the means used for loading and unloading.

In the absence of data on wheels and their footprints, the design pressure on the ramp, kPa, is determined by the formula:

$$p = p_0/w, \qquad (10.6.1.8\text{-}1)$$

Where p_0 is the maximum air pressure in tires, kPa

w is a factor and is taken to equal:

A single wheel	1.00
Twin wheels	1.20;
Triple wheels	1.27

Wheel footprint area, m^2:

$$p = 0.5\, Q_0/p, \qquad (10.6.1.8\text{-}2)$$

Where Q_0 is the static maximum axle load of the vehicle, kN

The design position of the wheel footprint for the purpose of calculating the strength of the plate is shown in figure 10.6.1.8-1 and the strength of the stiffener in 10.6.1.8-2.

Figure 10.6.1.8-1

Footprint area for the wheel load for the plate

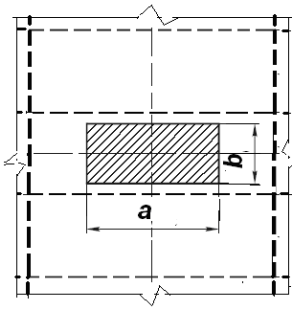
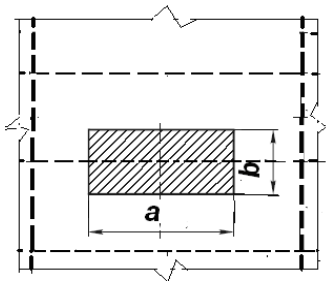


Figure 10.6.1.8-2

Footprint area for the wheel load for the stiffener



Dimensions of the loading platform, m, when vehicles move along the beam framing (see fig. 10.6.1.8-1 and fig. 10.6.1.8-2) are determined by formulas:

$$a = \sqrt{kA}, \qquad (10.6.1.8\text{-}3)$$

$$b = \sqrt{A/k}, \qquad (10.6.1.8\text{-}4)$$

Where: a is the length of wheel footprint (along the vehicle), m;

b is the width of the wheel footprint (across the vehicle), m;

k is a factor and is taken to equal:

A single wheel 2.0 m;

Twin wheels 0.8;

Triple wheels 0.5,

10-6.1.9 The external and internal ramps must be designed to withstand the loads specified in 10-6.1.8.

The external ramp strength should be checked by the following calculations:

(i) Overall strength of the ramp as a span with one end freely supported on the vessel and the other on the shore or jetty, with vehicles under embarkation in the most unfavourable positions;

(ii) Strength of the longitudinal stiffeners supporting the ramp plating by treating them as beams supported on the transverse frame members;

(iii) Strength of the ramp plating.

Calculation of the strength of the ramp structure as a whole can be performed using software that implements the finite element method or other numerical methods.

Analogous calculations of the design strength shall be performed for internal ramps.

The panels and framing of internal ramps used as covers for deck openings must meet the same strength requirements as permanent decks for rolling vehicles.

10-6.1.10 Permissible stress levels are taken as shown in table 10-6.1.10.

Table 10-6.1.10

Name and description of the structural member of the ramp	*Type of design load stress*	*Permissible stress expressed as a fraction of critical stress*
1. Web girders	Normal bending stresses	
	In a span	0.70
	On a support	0.80
	Equivalent stress from combined bending and torsion	
	In a span	0.80
	On a support	0.90
2. Webs of a web frame	Shearing stress	0.80
3. Beam framing	Normal bending stresses	
	In a span	0.85
	On a support	0.90

The relative deflection of the ramps during loading/embarkation operations must not exceed 0.004 *L*, where *L* is the length of the ramp between the supports.

10-6.2 Technical requirements for the design for the ramp hoisting gear

10-6.2.1 The drive mechanism of the ramp must be designed to withstand a lifting load equal to at least 1.5 times the weight of the ramp.

10-6.2.2 The drive of the ramp hoisting gear must be so designed as to ensure that the ramp can be stopped and held in any given position.

10-6.2.3 The power-driven ramp hoisting gear must be capable of slowing down the raising and lowering of the ramp when approaching the final positions, or buffer devices must be provided.

10-6.2.4 The ramp hoisting gear must be power driven or manually driven.

The ramp may be lowered by means of a drive from a power source or under its own weight.

10-6.2.5 The ramp must be equipped with an emergency lowering device that operates independently of the main hoisting gear drive. The emergency lowering device must be so designed as to ensure smooth and controlled lowering of the ramp under its own weight.

10-6.2.6 Electrically driven ramps must have automatic brakes installed on the drive shaft that are activated in the event that the drive loses power or otherwise fails.

The automatic brake is not required if there is a self-locking gearbox.

10-6.2.7 For hydraulic drives with pistons or blades that can be locked by oil pipe valves, a special braking device may not be used.

10-6.2.8 Power-driven ramps at their final positions must be equipped with automatic drive disconnection devices.

10-6.2.9 The strength of the drive parts must be checked under the application of forces from the maximum drive torque or the torque corresponding to the protection limit setting. The equivalent stress in the parts must not exceed 0.95 times the yield strength of the part material.

Under a nominal traction load, the stresses must not exceed 0.4 times the yield strength of the part material.