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

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Item 6 (b) of the provisional agenda
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)

Amendment proposals to the annex to Resolution No. 61, revision 2, based on the European Standard laying down technical requirements for inland navigation vessels, Edition 2019

Note by the secretariat*

Mandate

1. This document is submitted in line with the Proposed Programme Budget for 2020. part 5, Regional cooperation for development section 20, Economic Development in Europe. Programme 17, Economic Development in Europe (A/74/6 (Sect. 20) and Supplementary).

2. It is recalled that the Working Party on Inland Water Transport (SC.3) at its sixtieth session had decided to align the Annex to Resolution No. 61 with the European Standard laying down Technical Requirements for Inland Navigation vessels (ES-TRIN) (ECE/TRANS/SC.3/203, para. 67) adopted by the European Committee for drawing up common standards in the field of inland navigation (CESNI).

3. On 8 November 2018, the European Committee for Drawing up Standards in the field of Inland Navigation (CESNI) had adopted ES-TRIN edition 2019, which replaced edition 2017 (available at https://cesni.eu/en/documents/es-trin-2019/). The annex to this document contains (a) amendment proposals to the annex to resolution No. 61 emanating from ES-TRIN edition 2019, and (b) newly introduced provisions of ES-TRIN that may be relevant for the annex to resolution No. 61 and can be used for further work.

* This document was scheduled for publication after the standard publication date owing to circumstances beyond the submitter's control.

Annex

Amendment proposals to the Recommendations on Harmonized Europe-Wide Technical Requirements for Inland Navigation Vessels (annex to resolution No. 61, revision 2)

A. Draft amendment proposals to the annex to resolution No. 61, revision 2

I. Amendment proposals to chapter 15, "Special provisions for passenger vessels"

1. Section 15-8

In the end, *add*

15-8.10 Passenger vessels must be equipped with at least one automated external defibrillator. Its location is indicated by a symbol for 'automated external defibrillator' in accordance with sketch 11 of appendix 3, having a side length of at least 10 cm. The automated external defibrillator must be maintained in accordance with the manufacturer's instructions.

2. Section 15-10

Paragraph 15-10.3, in the end, *add*

(x) locations where an automated external defibrillator is to be found.

3. Section 15-13

Paragraph 15-13.2, in the end, add

(xx) the automated external defibrillator.

II. Draft proposal for a new chapter XX, "Special provisions applicable to electric vessel propulsion"[1]

XX-0 Definitions

For the purposes of this chapter, the following definitions shall apply:

1. "Propulsion installation": a unit comprising an electrical power source including power electronics, electric propulsion motor, gearbox, shaft, propeller, etc. employed to generate movement of a craft;

2. "Electric vessel propulsion": either a purely electric or diesel-electric or gas-electric propulsion installation of a craft, which is operated either by its own power supply or by the on-board network and comprising at least one electric propulsion motor. In the case of a diesel-electric or gas-electric propulsion installation, this term refers solely to the electrical components of the propulsion installation in question;

3. "Electric main propulsion": an electric vessel propulsion which is applied to achieve the manoeuvrability laid down in chapter 5;

4. "Electric auxiliary propulsion": an additional electric vessel propulsion of a craft that is not an electric main propulsion;

5. "Electric propulsion motor": an electric motor to propel the propeller shaft or the shaft of comparable propulsion installations such as water jet propulsion devices.

[1] *Note by the secretariat:* based on Chapter 11 "Special provisions applicable to electric vessel propulsion" of ES-TRIN.

XX-1 General provisions for electric vessel propulsion

XX-1.1 Craft's electric main propulsion must consist of at least:

(a) two electrical power sources, irrespective of the number of main propulsion,

(b) a switchgear,

(c) an electric propulsion motor,

(d) steering positions and

(e) depending on the design of the electric main propulsion, the corresponding power electronics.

XX-1.2 If an electric main propulsion is equipped with only one propulsion motor and if the craft has no additional vessel propulsion that ensures sufficient propulsion power, the electric main propulsion must be designed in such a way that the craft is still capable of making steerageway under its own power while retaining the required manoeuvrability in the following cases:

(a) failure in the power electronics or

(b) failure in the regulation and control

of the propulsion installation.

XX-1.3 The general plans concerning the entire electrical installation pursuant to [paragraph 9-1.3, subparagraph (i)] shall also include the locations of the main components and the electrical service rooms of the electric vessel propulsion.

XX-1.4 If the electric propulsion motors are fed by batteries or accumulators, their capacity must be monitored and displayed.

It must be ensured that the capacity of batteries or accumulators shall enable the safe reaching of a berth under the craft's own power at all times and under all conditions.

In the event of a drop of the capacity of batteries or accumulators to the minimum residual capacity required pursuant second sentence, an optical and acoustic alarm is to be triggered and displayed in the wheelhouse.

XX-1.5 If the electric vessel propulsion is gas-electric or diesel-electric, the electrical components must not negatively affect the gas or diesel engines.

XX-1.6 A malfunction of the electric vessel propulsion shall not obstruct the operation of the craft such

that the emergency systems provided for in accordance with this annex, in particular, the steerageway under its own power or the emergency electrical power supply, are affected.

XX-1.7 Two electric vessel propulsions can only be deemed independent if the power supply circuits of the electric propulsion motor are completely separate from one another or if an FMEA-S[2] safety study demonstrates that no failure of one electric propulsion impairs the operation of the other.

XX-1.8 It must be possible to shut down or deactivate an electric vessel propulsion manually in an emergency.

XX-2 Generators, transformers and switchgear for electric vessel propulsion

XX-2.1 The generators, transformers and switchgear must be designed for

(a) temporary overloads and

(b) the effects of manoeuvres

according to their application and operating conditions.

[2] Failure modes and effects analysis.

XX-2.2 The diesel or gas regulators of diesel or gas engines for electric propulsion systems must ensure safe operation over the entire speed range and for all sailing and manoeuvring conditions in single and parallel operation.

If an electrical power source set fails according to paragraph XX-1.1, subparagraph (a), there must be an automatic reduction in power so that the electric main propulsion continues with reduced power such that the craft is still capable of making steerageway under its own power.

XX-2.3 The electrical power sources according to paragraph XX-1.1, subparagraph (a), of the generators must be designed so that they can record the reverse power occurring during reversing manoeuvres when considering the propulsion concept.

XX-2.4 Generators must be capable of being switched on and off without interrupting electric main propulsion.

XX-3 Electric propulsion motors for electric vessel propulsion

XX-3.1 According to their application and operating conditions, electric propulsion motors for electric vessel propulsion must be designed for

(a) temporary overloads and

(b) the effects of manoeuvres.

XX-3.2 Electric propulsion motors must be designed in such a way that harmonics of currents and voltages do not impair their safe operation.

XX-3.3 The insulation of the windings must be designed for overvoltages, which can occur due to manoeuvres and switching operations.

XX-3.4 The main propulsion systems' propulsion engines, both electric and with external cooling, must be dimensioned such that, should the external cooling fail, they are still capable of operating on reduced power so that the craft is at least capable of making steerageway under its own power.

XX-3.5 Electric propulsion motors must withstand a short-circuit at their terminals and in the propulsion installation without damage under rated operating conditions until the protective device is triggered.

XX-4 Power electronics for electric vessel propulsion

XX-4.1 The power electronics requirements according to [Article 10.18][3] and paragraph 9-2.18 shall apply with the following provisions.

XX-4.2 Power electronics must be designed for the anticipated loads, including overload and short circuit, during all operating and manoeuvring conditions.

XX-4.3 If power electronics are force-cooled, they must, if their cooling system fails, be able to continue operating with reduced power while ensuring, at a minimum, in the case of electric main propulsion, that the craft is capable of making steerageway under its own power. In the event of a failure of the cooling system, an alarm is to be triggered and displayed in the wheelhouse.

XX-4.4 Excitation circuits, the failure of which can endanger safe operation, may only be protected against short circuits.

XX-5 Monitoring equipment

XX-5.1 The operating state of the electric vessel propulsion and its principal components is to be displayed in the wheelhouse and in the propulsion installation.

XX-5.2 If the control system in the wheelhouse fails, the monitoring and operation of the electric main propulsion must be possible on-site. The crew must be able to switch within

[3] *Note by the secretariat:* the annex to resolution No. 61 does not contain provisions for electronic equipment. In this connection, the Working Party may wish to come back to the text of Article 10.18 of ES-TRIN, contained in ECE/TRANS/SC.3/WP.3/2018/6.

a reasonably short time without having to make changes to the propulsion installation and propeller speed and direction. A voice communication system must be provided to the wheelhouse.

XX-5.3 The operating conditions and operation of the electric vessel propulsion, including the response of the protective device, are to be documented in a non-volatile computer memory such that the fault can be readily analysed in a verifiable manner.

XX-6 Control, regulation and automatic power limitation

XX-6.1 (left void)

XX-6.2 To protect the on-board network from being overloaded, provision shall also be made for

(a) an automatic shutdown of the electrical equipment not relating to personal safety or safe navigation and

(b) where required, additional automatic power limitation of the electric propulsion motors.

XX-6.3 The provisions of [Article 8.03(4)][4] apply mutatis mutandis.

XX-6.4 In the event of individual propulsion units being shut down as a result of an automatic power limitation, the propulsion asymmetry is to be kept to a minimum.

XX-7 Protection of the electric vessel propulsion

XX-7.1 The automatic switching off of the electric vessel propulsion, which would affect the manoeuvrability of the craft, must be restricted to malfunctions that would result in significant damage within the propulsion installation.

XX-7.2 Protective devices must be set so that it is not triggered in the event of situations referred to in paragraphs XX-2.1 and XX-3.1.

XX-7.3 If a measured or reference value is lost or in the event of a power supply failure of the control or regulation system in accordance with section XX-6:

(a) the propeller speed must not increase to inadmissible levels;

(b) the propulsion system must not reverse of its own accord;

(c) no other dangerous operating condition must arise.

XX-7.4 If an electric vessel propulsion can be mechanically locked uncontrollably, it must be equipped with a monitoring device which shall protect the electric vessel propulsion against damage.

XX-7.5 Each electric propulsion motor is to be fitted with

(a) earth fault monitoring;

(b) differential protection or equivalent protective device and

(c) winding temperature monitoring system with an alarm trigger at high winding temperatures.

XX-7.6 The following additional protective devices must be provided:

(a) overspeed protection;

(b) protection against overcurrent and short circuit;

(c) protection against harmful bearing currents on the electric propulsion motor by means of steep voltage edges.

XX-7.7 It must be ensured when protective devices are triggered that:

[4] *Note by the secretariat:* the annex to resolution No. 61 does not contain similar provisions.

(a) the power is reduced or malfunctioning subsystems are selectively switched off;

(b) electric vessel propulsion are shut down in a controlled manner;

(c) the power stored in components and in the load circuit cannot have a detrimental impact when they are switched off.

XX-7.8 The triggering of protective, reducing and alarm devices must be displayed optically and acoustically in the wheelhouse and at a suitable position of the craft. The display must be reset only after acknowledgement. An alarm condition must remain visible even after the shutdown.

XX-8 Testing of the electric vessel propulsion

XX-8.1 The test concept envisaged by the manufacturer of the electric vessel propulsion must be submitted to the inspection body before being put into service for the first time. The latter may demand additional testing and proof confirming the safe operation of the electric vessel propulsion and its functions. This applies in particular to those instances where the craft is required to be capable of making steerageway under its own power in the event of malfunctions. The test concept accepted by the inspection body is deemed to be a manufacturer’s instructions according to paragraph XX-8.2.

XX-8.2 The testing of the electric vessel propulsion must be carried out by an expert according to the manufacturer's instructions:

(a) before being put into service for the first time,

(b) before being put back into service after any major modification or repair,

(c) on every periodical inspection.

An inspection attestation shall be issued, signed by the expert and showing the date of the inspection. The inspection attestation must be permanently kept on board.

XX-9 Electric auxiliary propulsion with power electronics

XX-9.1 An electric auxiliary propulsion with power electronics for speed control must consist of at least a switchgear, an electric propulsion motor and the corresponding power electronics.

XX-9.2 In addition to the provisions pursuant to [Article 10.18],[3] the power electronics of electric auxiliary propulsion shall comply with the following requirements:

(a) The power electronics components must be protected against exceeding their current and voltage limits;

(b) Semiconductor fuses must be monitored. In the event of a failure of the power electronics, the electric auxiliary propulsion is to be switched off if necessary in order to avoid consequential damage having regard to the safe operation of the craft;

(c) When the protective devices of power electronics are triggered, the provisions of paragraph XX-7.7 shall apply mutatis mutandis;

(d) The triggering of protective devices must be indicated by an alarm signal in the wheelhouse and on the protective devices.

III. Amendment proposal to appendix 3, "Safety signs and signals to be used on board inland navigation vessels"

In the end, *add*

Sketch 9 First aid kit		Colours: green/white
Sketch 10 LNG warning		Colours: black/yellow
Figure 11 Automated external defibrillator		Colours: white/green

B. Provisions of ES-TRIN edition 2019 that may be relevant for the annex to resolution No. 61, revision 2

IV. Article 13.05, provisions for K_2CO_3-fire-fighting systems

Article 13.05[5]

Permanently installed fire-fighting systems for protecting engine rooms, boiler rooms and pump rooms

1. Extinguishing agents

For protecting engine rooms, boiler rooms and pump rooms, the following extinguishing agents may be used in permanently installed fire-fighting systems:

…

f) K_2CO_3 (potassium carbonate).

…

15. K_2CO_3-fire-fighting systems

In addition to the requirements laid down in (1) to (7) and (9), fire-fighting systems using K2CO3 as the extinguishing agent shall comply with the following provisions:

a) The fire-fighting system shall have a type-approval pursuant to MSC/Circ. 1270[6] or another Standard recognised by one of the Member States. Type-approval shall be carried out by a recognised classification society or an accredited testing institution. The accredited testing institution shall comply with the European Standard EN ISO/IEC 17025:2005.

[5] *Note by the secretariat:* Article 13.05 can be found in ECE/TRANS/SC.3/WP.3/2017/14.

[6] Circular MSC/Circ. 1270 – Revised Guidelines for the approval of fixed aerosol fire-extinguishing systems equivalent to fixed gas extinguishing systems, as referred to in SOLAS 1974, for machinery spaces – adopted on 4 June 2008. Circular MSC/Circ. 1270/Corr. 1 – Corrigendum – adopted on 29 August 2008.

b) Each room shall be provided with its own firefighting system.

c) The extinguishing agent must be stored in specially provided unpressurised tanks in the room to be protected. These tanks must be fitted in such a way that the extinguishing agent is dispensed evenly in the room. In particular the extinguishing agent must also work underneath the deck plates.

d) Each tank is separately connected with the triggering device.

e) The quantity of extinguishing agent relative to the room to be protected is at least 120 g per m^3 of the net volume of this room. This net volume is calculated according to MSC/Circ. 1270, items 11.2 to 11.4. It shall be possible to supply the extinguishing agent within 120 seconds.

V. Article 14.04

Article 14.04

Side decks

1. The clear width of a side deck shall be at least 0,60 m. This requirement applies up to a height of 2,00 m above the side deck.

By way of derogation from the first sentence, the clear width of the side deck may be reduced to

a) 0,50 m at certain points that are necessary for the operation of the vessel such as deckwashing valves,

b) 0,40 m at bollards and cleats.

2. By way of derogation from (1), the clear width of the side deck may be reduced to 0,54 m, up to a height of 0,90 m above the side deck, provided that the clear width above, between the outer edge of the hull and the inner edge of the hold, is not less than 0,65 m.

3. By way of derogation from (1), the clear width of the side deck may be reduced to 0,50 m, provided that the outer edge of the side deck is fitted with a guard rail in accordance with European standard EN 711:2016 to prevent falling.