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Inland Transport Committee

Working Party on Inland Water Transport

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

Sixty-third session

Geneva, 3–5 July 2023

Item 7 of the provisional agenda

Automation in Inland Navigation and Smart Shipping

Harmonization of the Legal Framework and Policy Areas for Fostering Innovations in Inland Navigation

Note by the secretariat

I. Mandate

1. This document is submitted in line with the proposed Programme Budget for 2023, part V, Regional cooperation for development, section 20, Economic Development in Europe, Programme 17, Economic Development in Europe (A/77/6 (Sect. 20), table 20.6).
2. At its sixty-second session, the Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation (SC.3/WP.3) supported the proposal of Belgium to include automated navigation in the agenda of the Expert Group on the European Code for Inland Waterways (CEVNI). It was proposed to (a) harmonize CEVNI with the relevant provisions of the police regulations of the river commissions and (b) continue analysing gaps in the regulatory framework of the Economic Commission for Europe (ECE) that hamper the development of automated navigation on the basis of document ECE/TRANS/SC.3/2019/13. SC.3/WP.3 asked the secretariat to prepare the updated document in cooperation with Belgium for its sixty-third session (ECE/TRANS/SC.3/WP.3/124, paragraphs 69 and 71).
3. The present document contains (a) updates to the international policy framework for automation in inland navigation since October 2019, and (b) policy areas relevant for developing regulations for automated navigation and provisions of CEVNI that may be subject to evaluation. SC.3/WP.3 may wish to consider the proposal as given below and provide further guidance to the secretariat.

II. Updates to the International Policy Framework for Automation in Inland Navigation

4. The concept of smart shipping, including the four essential elements – smart vessels, smart infrastructure, smart communication and smart regulations, and an overview of the



international policy framework for automation in inland navigation are given in ECE/TRANS/SC.3/2019/13. Updates to the international policy framework since October 2019 are given below.

5. Basic documents of the Inland Transport Committee (ITC):
 - ITC Strategy until 2030: the Action Plan for Achieving the Inland Transport Committee Vision provides for enhancing the role of ITC as the United Nations Platform for supporting new technologies and innovations in inland transport
 - ECE Road Map on Intelligent Transport Systems for 2021–2025: Action 11 “Integrating with Inland Water Transport” provides for the preparatory work for the deployment of automated inland navigation in the national capacity building support provided by the ECE secretariat to assist member States and the dissemination of information and awareness raising on automation in inland navigation and related issues
 - Programme plan for 2023, Transport subprogramme: result 3 “Enhanced regulatory framework for sustainable inland transport systems”.
6. Legislative framework and the ongoing activities of the European Union in the field of automated navigation:
 - The Sustainable and Smart Mobility Strategy Action plan, where automated mobility is one of the key elements
 - NAIADES III action plan “Future-proofing European inland waterway transport”, Flagship 6: A roadmap for digitalization and automation of inland water transport, aimed at facilitating the elaboration of a holistic vision for the sector’s digitalization and automation
 - The outcome of the Horizon 2020 PLATINA III project on vision and roadmap on pathway for automation and on-board systems.
7. Documents of the Central Commission for the Navigation of the Rhine (CCNR):
 - International definition of levels of automation in inland navigation, edition 2022¹
 - Vision to support the harmonized development of automated navigation (November 2021)
 - Detailed vision for supporting the harmonized development of automated navigation at the CCNR (March 2022)
 - Authorization procedure for a pilot project for automated navigation on the Rhine (February 2023)
 - List of competent authorities for an authorization request of a pilot project in automated navigation requiring a derogation from the CCNR regulations (May 2022)
 - Inventory of pilot projects in the field of automated navigation
 - Thematic report “An Assessment of New Market Opportunities for Inland Waterway Transport” (February 2022).²
8. The European Committee for drawing up Standards in the field of Inland Navigation (CESNI): the Work Programme for 2022–2024 states that CESNI shall prepare and adopt standards in the field of technical requirements for vessels, actively promoting the digitalization of inland navigation, including automated vessels, digital documents as well as navigation and information equipment. In close cooperation with other working groups, CESNI collects experience gained with pilot projects for automation of inland navigation and evaluation of the regulatory needs.

¹ See ECE/TRANS/SC.3/WP.3/2023/15, annex III.

² https://inland-navigation-market.org/wp-content/uploads/2022/03/Thematic-report_20212022_EN_BD.pdf.

9. The World Association for Waterborne Transport Infrastructure (PIANC) released its first report on automated and autonomous shipping “Smart Shipping on Inland Waterways” in March 2022.

III. Policy Areas to Be Addressed to Create Regulations for Automated Navigation and Smart Shipping

10. At the sixty-third session of the Working Party on Inland Water Transport, Belgium presented document ECE/TRANS/SC.3/2019/13 on the harmonization of the legal framework and policy areas for fostering innovations in inland navigation. This document contains, in particular, policy areas and proposals for evaluation of international conventions and ECE resolutions to identify gaps, challenges and bottlenecks that hamper the development of automated navigation.

11. Evaluation shall be based on the following major assumptions:

- Automated vessels shall maximize safety of the inland waterway network
- Automated vessels shall support the market by bringing new cargo flows to inland shipping
- Automated vessels shall contribute to increasing the modal share of inland water transport.

12. The proposed policy areas are as follows:

- Area 1 Definitions
- Area 2 Competences and crew qualifications
- Area 3 Technical requirements for inland navigation vessels
- Area 4 Presence of the boatmaster and crew members on board
- Area 5 Responsibility and liability
- Area 6 Technical solutions
- Area 7 Communication between a vessel and the competent authority
- Area 8 Ship-to-ship communication
- Area 9 Digital documents/documents to be available on-board
- Area 10 Recreational navigation
- Area 11 Emergency situations
- Area 12 Cybersecurity
- Area 13 Inland waterway infrastructure.

13. It was proposed in ECE/TRANS/SC.3/2019/13 to work on temporary derogations from the existing regulations in order to enable testing of automated vessels and share the knowledge and best practices for creating a harmonized forward-looking approach.

14. At its autumn session of 2022, CCNR adopted Resolution 2022-II-12 on a new article 1.26 to the Police Regulations for the Navigation of the Rhine concerning temporary derogations for vessels for a vessel with automated crew tasks or for a remotely operated vessel. The article will come into force on 1 December 2023.³

15. In line with the proposed approach, SC.3/WP.3 may wish to consider a possibility of introducing temporary derogations in chapter 9 “Regional and National Special Requirements” of CEVNI for a vessel with automated crew tasks or for a remotely operated vessel for automated vessels.

³ See ECE/TRANS/SC.3/WP.3/2023/15, annex II.

16. The table below contains the provisions of CEVNI 6 subject to evaluation.

Policy Area	CEVNI 6
1	Article 1.01, section 1 “Types of vessels”
2	Article 1.02:
	1. Every vessel or assembly of floating material, except vessels in a pushed convoy other than the pusher, shall be placed under the authority of a person having the necessary qualifications . This person is hereinafter referred to as the boatmaster. Boatmasters are considered to possess the necessary qualifications if they hold a valid boatmaster’s certificate.
4	3. When a vessel is under way the boatmaster shall be on board ; in addition, the boatmaster of floating equipment shall always be on board when the equipment is in operation.
5	5. Every floating establishment shall be placed under the authority of a person . This person shall be responsible for the observance of the provisions of these regulations on the floating establishment.
	7. In the case of a moored vessel or assembly of floating material having no boatmaster, the person responsible for ensuring compliance with the provisions of these regulations shall be:
	(a) The person responsible for keeping watch and surveillance under article 7.08 ;
	(b) The operator and owner of such vessel or assembly if the person referred to in subparagraph (a) is absent .
	Article 1.03:
5	1. Crew members shall carry out the orders given to them by the boatmaster in the performance of his duties . They shall assist in complying with the requirements of these regulations and of any other provisions applicable.
5	2. All other persons on board are required to comply with the orders given to them by the boatmaster in the interest of safe navigation or of good order on board.
5	3. Members of the crew and other persons on board who temporarily determine the vessel’s course and speed themselves shall also be responsible in that respect for ensuring compliance with the requirements of these regulations.
	Article 1.07:
6	2. The load or the list of the vessel shall not restrict the direct view at a distance of more than 350 m in front of the vessel . If direct visibility astern and aside is restricted during the voyage, this lack of visibility may be compensated for by the use of radar .
	If direct visibility astern is restricted during the voyage, it may be compensated also by an optical means that provides a clear image without deformation within sufficient field of vision . If there is not sufficient visibility in front of the vessel due to load, when the vessel passes through bridges or locks, this lack of visibility may be compensated during the passage by using flat-reflector periscopes, radar or a lookout in permanent contact with the wheelhouse .
6	3. In derogation from the first sentence of paragraph 2, direct visibility may be restricted up to 500 m in front of the bow of the vessel in the event that radar and video equipment are used , if:
	(a) Such aids ensure that 350 to 500 m are visible in front of the bow of the vessel;
	(b) The requirements of article 6.32, paragraph 1, are met;
	(c) Radar antennas and cameras are installed at the bow of the vessel;
	(d) These aids are recognized by the competent authorities as appropriate.

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Article 1.08:

- 3 1. Vessels and assemblies of floating material shall be **so constructed and rigged as to ensure the safety of those on board** and safe navigation and to be **able to satisfy the requirements of these regulations**.
- 2 2. All vessels, except vessels in a pushed convoy other than the pusher, **shall have a crew sufficient in number and sufficiently skilled to ensure the safety of those on board** and safe navigation. However, non-motorized vessels in a side-by-side formation and some of the towed vessels in a rigid assembly are not required to have a crew if the vessel propelling the side-by-side formation or rigid assembly, or keeping it safely stopped, **has a crew sufficiently large and skilled to ensure the safety of those on board** and safe navigation.
- 3 3. The requirements set out in paragraphs 1 and 2 above are considered to be complied with when the vessel has a ship's certificate and when **the construction and the equipment of the vessel correspond to the content of the ship's certificate**.

Article 1.09:

- 2 1. When under way, a vessel shall be steered by **at least one qualified person of not less than 16 years of age**.
- 6 3. In order to ensure proper control of the vessel, the helmsman shall be able to receive and give all information and all orders **reaching or proceeding from the wheelhouse**. In particular, he shall be able to **hear sound signals and have a sufficiently clear view in all directions**.

Article 1.10:

- 9 1. The following documents shall be available **on board** if required by other regulations: (...)

Article 1.16:

- 11 1. In the event of an accident endangering **persons on board**, the boatmaster shall use every means at his disposal to save them.
- 11 2. Every **boatmaster who is close to a vessel or assembly of floating material** which has suffered an accident endangering persons or threatening to obstruct the fairway is required to give immediate assistance insofar as is consistent with the safety of his own vessel.

Article 1.17:

- 4 1. The boatmaster of a grounded or sunken vessel or of a grounded or broken assembly of floating material shall arrange for the nearest competent authority to be informed as soon as possible. In the case of a grounded or sunken vessel, **the boatmaster or another member of the crew shall remain on board or near the site of the accident** until the competent authority has authorized him to leave.
- 8 2. When a vessel is grounded or sunk, or an assembly of floating material is grounded, in or near the fairway, **its boatmaster shall**, unless it is obviously unnecessary, as soon as possible and without prejudice to the obligation to display the marking prescribed in article 3.25, **give warning to approaching vessels and assemblies of floating material** at suitable points far enough from the site of the accident to enable them to take the necessary action in good time.

6, 8 Chapter 3

11 Article 3.30:

1. When a vessel in distress needs assistance, it may display: (...)

Article 4.01:

6 1. When sound signals other than bells are prescribed in these regulations or any other provisions applicable, they shall be given:

(a) On motorized vessels, except small craft unless these are vessels with radar, by means of **mechanically operated sound signalling devices**, placed sufficiently high that the sound signals can spread freely to the front and if possible also to the back;

(b) On non-motorized vessels and motorized small craft whose equipment does not include a sound signalling device, by means of a suitable trumpet or horn.

The sound intensity of signals shall conform to the requirements of chapter I, annex 6 to these regulations.

6 2. **The sound signals given by motorized vessels shall be accompanied by light signals synchronized with them**, such light signals shall be yellow, bright and visible from all directions. This provision shall not apply to small craft or to vessels proceeding downstream, navigating by radar and giving the signal prescribed in article 6.32, paragraph 4 (a), to be given by vessels, or to vessels ringing a bell.

7, 8 Article 4.05:

3. Motorized vessels, excluding small craft, **may navigate only if they are equipped with a radiotelephone installation** in proper working order for ship-to-ship, nautical information and ship-to-port-authority networks. (...)

6 Chapter 5

Article 6.03:

6 1. Meeting or overtaking is permitted only when the fairway is unquestionably wide enough for simultaneous passage, taking all the local circumstances and movements of other vessels into account.

Article 6.20:

6 1. Vessels **shall regulate their speed** to avoid creating excessive wash or suction likely to cause damage to stationary or moving vessels or structures. (...)

Article 6.26:

7 1. Without prejudice to the other provisions of these regulations and to any other provisions applicable, **boatmasters shall**, on approaching and passing through movable bridges, **obey any instructions given to them by the bridge staff** to ensure safe and orderly navigation or quick passage. **The boatmaster of a vessel shall announce the intention** to navigate through the bridge to the bridge operators **by means of a long blast or radiotelephone**.

7 3. Overtaking when approaching movable bridges is prohibited unless special instructions are given by the bridge staff.

7 6. The bridge operator is obliged to have on or near the bridge a radiotelephone device corresponding to the provisions of article 4.05. For the entire duration of the navigation through the bridge, the radiotelephone device must remain switched on.

Article 6.28:

7 2. In lock basins and locks, vessels equipped with a radiotelephone permitting communication on the nautical information network **shall listen on the channel allotted to the lock**.

6 6. On entering locks, vessels **shall reduce speed** so as to avoid bumping against the gates or protective devices or against other vessels, assemblies of floating material or floating establishments.

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- 6 7. In locks:
- (...)
- (b) While the lock is being filled or emptied and until they are allowed to leave, vessels shall be made fast and the mooring ropes shall be so handled as to prevent bumping against the walls, gates or protective devices or against other vessels or assemblies of floating material;
- (...)
- 6 8. In locks and lock basins it is obligatory to keep a minimum lateral distance of 10 m **from the vessels or convoys carrying the marking prescribed in article 3.14, paragraph 1.** (...)
- 7 13. In order to ensure safe and orderly navigation, quick passage through locks or their full use, the lock staff may **give instructions supplementing or departing from the provisions of this article.** Vessels in locks and lock basins shall comply with such instructions.
- Article 6.30:
- 8 1. In reduced visibility, all vessels **shall navigate by radar.**
- Article 6.32:
- 2 1. When a vessel is navigating by radar, there shall be **at all times in the wheelhouse a person holding a certificate required by the competent authorities** for that section of the waterway and for the type of vessel he navigates and the certificate referred to in article 4.06, paragraph 1 (b), **and a second person sufficiently conversant with this method of navigation.** However, if the wheelhouse is designed for radar navigation by one person, it is sufficient that the second person can, if necessary, be summoned to the wheelhouse immediately.
- Article 6.33:
- 4, 6 1. In reduced visibility, vessels and convoys not navigating by radar shall immediately proceed to the nearest safe berthing or anchoring areas. The following provisions shall apply during the voyage to this berth:
- (...)
- (b) Any vessel proceeding alone and any vessel carrying the boatmaster of a convoy shall sound one long blast; this signal shall be repeated at intervals of not more than one minute. **Such vessels shall have a lookout forward;** in the case of convoys, however, a lookout is required on the leading vessel only. The lookout shall be **within sight or hearing or in communication through a voice link with the boatmaster** of the vessel or convoy;
- (...)
- Article 7.08:
- 4 1. An efficient watch **shall be kept continuously on board** of vessels lying in the fairway.
- Article 8.01:
- 6, 11 4. On board the vessels referred to in paragraph 3 above it shall be imperative immediately to:
- (a) Close all windows and openings to the outside;
 - (b) Extinguish all unprotected fire and naked light;
 - (c) Stop smoking;
 - (d) Stop all unessential auxiliary machinery;
 - (e) Avoid creating sparks.

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7 8. Boatmasters receiving a “Do not approach” signal shall do their utmost **to report it without delay to the closest competent authority.**

Article 8.02:

7 1. **Boatmasters of the following vessels and convoys shall**, prior to entering the sectors, traffic control posts, traffic centres and locks indicated by the competent authority, eventually by the sign B.11 (annex 7), which may be complemented with an additional sign marked “Reporting requirement”, **report their presence** on the indicated radiotelephone channel: (...)

7 3. The data given in paragraph 2 above, except those in (c) and (g), may be communicated by **other services or persons** to the competent authority **either in writing, or by telephone or if possible electronically.** In all cases, the boatmaster **shall report** when his vessel or convoy enters the sector subject to the reporting requirement and when it leaves the sector again.

7 6. When a vessel’s journey is interrupted in the sector subject to the reporting requirement mentioned in paragraph 1 above for more than two hours, **the boatmaster shall report** the beginning and end of the interruption.
