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Working Party on Inland Water Navigation

Working Party on the Standardization of Technical and Safety Requirements in Inland Navigation
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agenda item 6)

MANOEUVRABILITY REQUIREMENTS FOR INLAND NAVIGATION VESSELS

Note by the secretariat

It is recalled that, at its nineteenth session, the Working Party took note of the draft chapter X prepared by the Group of Volunteers and approved by the Ad hoc group (TRANS/SC.3/WP.3/AC.2/2000/2) and felt that the chapter had been drafted in accordance with its own instructions, i.e. as a set of general trunk rules in line with the provisions of the draft revised EC Directive 82/714/EEC and the Regulations for the Inspection of Rhine Vessels (RVBR) and that it was to be completed with appendices reflecting concrete basin-dependant manoeuvrability test procedures/criteria to ensure the compliance of vessels with the framework rules of the chapter. At the twenty-third session of the Working Party, the text of the chapter X was modified as indicated in TRANS/SC.3/WP.3/47, paras. 21 and 22 and the secretariat was requested, with the help of the Chairman, to prepare a revised version of the draft chapter and, using the documentation transmitted by Governments and river commissions on this item as well as the draft provisions agreed earlier by the Working Party in TRANS/SC.3/WP.3/R.60/Rev.1, to try to formulate an appendix to chapter X, referring to particular manoeuvrability test procedures/criteria applied in different river basins (TRANS/SC.3/WP.3/47, para. 23).

Reproduced below is the text of the chapter X, as modified by the Working Party, supplemented by the secretariat with a basin-dependent appendix based on documentation received from Governments and River Commissions.

CHAPTER X

MANOEUVRABILITY [1/]

X-1 GENERAL

Vessels and convoys shall display adequate navigability and manoeuvrability **to the satisfaction of the [competent authorities]** [2/].

Powered vessels and convoys shall meet the requirements set out in paragraphs X-2 - X-10.

X-2 NAVIGATION TESTS

X-2.1 Navigability and manoeuvrability shall be checked by means of navigation tests. The following, in particular, shall be examined in accordance with the requirements as set by the [basin Administrations] in the appendices to this chapter:

Speed **(forward)**	(paragraph X-6);
stopping capacity	(paragraph X-7);
capacity for going astern	(paragraph X-8);
capacity for changing course	(paragraph X-9);
turning capacity [3/]	(paragraph X-10)

X-2.2 The [competent authority of the basin Administration] may dispense with all or part of the tests where compliance with the navigability and manoeuvrability requirements is proven in another manner.

X-3 TEST AREA

X-3.1 The navigation tests referred to in paragraph X-2 shall be carried out on areas of inland waterways that have been designated by the [competent authority of the basin Administration].

X-3.2 Those test areas shall be situated on a stretch of running or still water that is if possible straight, at least 2 km long and sufficiently wide and is equipped with highly-distinctive marks for determining the position of the vessel.

1/ Note by the Group of Volunteers: See the Regulations for the Inspection of Rhine Vessels (RVBR), chapter 5 (document TRANS/SC.3/R.99).

2/ Note by the secretariat: It is recalled that, at the twenty-third session of the Working Party, the Group of Volunteers was requested to consider the possible revision of the definition of the terms “Administration” used in the draft amended chapters, together with the terms “Competent Authorities” or “Administration of the river basin”, “Recognized classification society”, etc. with a view to reducing the number of terms referring to the functions and responsibilities of the State Administration and other bodies to which the State may wish to delegate those functions and responsibilities. In so doing, the group of volunteers was requested to take into account the experience of IMO and other relevant international bodies (TRANS/SC.3/WP.3/47, para. 10(ii)).

3/ Note by the Group of Volunteers: The distinction has been made between the terms “turning capacity” and “turning against the current”.

X-3.3 It shall be possible for the [competent authority of the basin Administration] to plot the hydrological data such as depth of water, width of navigable channel and average speed of the current in the test area as a function of the water level.

X-4 LOADING OF VESSELS AND CONVOYS DURING NAVIGATION TESTS

During navigation tests vessels and convoys intended to carry goods shall be loaded in accordance with the requirements of the [competent authority of the basin Administration].

X-5 USE OF ON-BOARD FACILITIES FOR NAVIGATION TEST

X-5.1 During the navigation test all of the equipment providing the manoeuvrability of the vessel which may be actuated from the wheelhouse may be used, apart from any anchor [4/].

[X-5.2 However, during the test involving turning into the current referred to in paragraph X-10, the anchors may be used.] [5/]

X-6 SPEED **(FORWARD)**

X-6.1 Vessels and convoys shall achieve at least the required speed in relation to the water according to the requirements of the [basin Administration].

[X-6.2 The [inspection body] may grant exemptions to vessels and convoys operating solely in estuaries and ports.] [6/]

X-6.3 The [inspection body] shall check whether the vessel sailing light has the capacity to exceed a speed of 40 km/h relative to the water. If so, the following particular shall be entered in the ship's certificate: "The vessel has the capacity to exceed a speed of 40 km/h relative to the water"

X-7 STOPPING CAPACITY

X-7.1 Vessels and convoys shall be able to stop in good time and within the limits of the minimum required distance while remaining adequately manoeuvrable **to the satisfaction of the [competent authorities]**.

[X-7.2 For smaller vessels and convoys the [basin Administration] may replace stopping capacity tests by turning against the current.] [7/]

4/ Note by the Group of Volunteers: To come back to later on.

5/ Note by the Group of Volunteers: To come back to later on.

6/ Note by the Group of Volunteers: Should be dealt with in the general paragraph.

7/ Note by the Group of Volunteers: To come back to later on.

X-8 CAPACITY FOR GOING ASTERN

X-8.1 Vessels and convoys are to have sufficient capacity for going astern **to the satisfaction of the [competent authorities],** which has to be checked during the tests.

X-8.2 Where the stopping manoeuvre required by paragraph X-7 is carried out in still water it shall be followed by a test while going astern.

X-9 CAPACITY FOR CHANGING COURSE

Vessels and convoys shall be able to change course in good time **to the satisfaction of the [competent authorities]**. That capacity shall be proven by means of manoeuvres carried out within a test area as referred to in paragraph X-3.

X-10 TURNING CAPACITY

The turning capacity shall be tested in accordance with the requirements of the [basin Administration].

Appendix

Manoeuvrability test procedures/criteria applied in different river basins

1. General provisions

1.1 For the purpose of this appendix all European inland waterways are divided into three river basins:

(i) River basin I: the Rhine [and other inland waterways of the European Union belonging to navigational zone 3 as defined in 1-1.3 [8/] with the exception of the Danube];

(ii) River basin II: the Danube (with regard to technical and navigational characteristics of pushed convoys only); and

(iii) River basin III: The Danube (with regard to technical and navigational criteria of vessels other than pushed convoys) and all other inland waterways not mentioned in (i) and (ii) above.

2. **River basin I**

2.1 Requirements concerning: (i) speed (forward) in accordance with article X-6; (ii) stopping capacity in accordance with article X-7; and capacity for going astern in accordance with article X-8 shall be checked by means of navigation tests carried out in accordance with Directive No. 2 of the Central Commission for the Navigation of the Rhine (CCNR) [9/].

2.2 Requirements concerning: (iv) capacity for changing course in accordance with article X-9; and (v) turning capacity in accordance with article X-10 shall be checked by means of navigation tests carried out in accordance with Directive No. 1 of the CCNR [10/].

3. **River basin II**

3.1 Technical and navigational characteristics of pushed convoys shall be in compliance with the Recommendations of the Danube Commission concerning the Technical and Navigational Characteristics of Pushed Convoys and shall be checked with the use of the Methods for Testing Pushed Convoys indicated in the above Recommendations [11/].

8/ As set out in resolution No.34, document TRANS/SC.3/104/Add.2.

9/ See document TRANS/SC.3/WP.3/R.64 and Corrs.1-2.

10/ See document TRANS/SC.3/WP.3/R.99/Add.1.

11/ See document TRANS/SC.3/WP.3/2002/5.

4. River basin III [12/]

4.1 General provisions

4.1.1 Purpose and scope

4.1.1.1 The purpose of these **provisions** is to define the manoeuvrability characteristics of vessels/convoys to which requirements shall apply, as well as methods for their numerical assessment, and the minimum requirements for characteristics that are common to all waterways with regard to other characteristics, the minimum requirements for the manoeuvrability of vessels/convoys shall be established by the [local authorities].

4.1.1.2 The results of the description of the manoeuvrability performance of the vessel should be presented in the form of a Table of the Vessel's Manoeuvrability Characteristics, the presence of which on board the vessel should be a condition for allowing the vessel to navigate.

4.2 Minimum manoeuvrability requirements

This chapter describes in a number of tests the minimum manoeuvrability requirements for vessels and convoys.

In the case of convoys composed of e.g. several vessels or a pusher with one or more barges the manoeuvrability requirements apply to the convoy as a whole.

The test area should meet the minimum requirements set out in chapter 4, and the test results should be corrected for test conditions.

4.2.1 Straight course

4.2.1.1 The vessel/convoy must be able to keep a chosen straight course. The frequency with which the helm is put over in order to keep the vessel/convoy on course must not be more than five times a minute.

4.2.1.2 For empty cargo vessels/convoys, passenger vessels and all ships with a high-piled-up cargo, e.g. containers, calculations must be made of navigation under wind conditions in order to determine the vessel's/convoy's ability to maintain course. For navigation on a straight course with a side wind, the calculated angle of drift of vessels/convoys should not exceed a value set by the [local authorities] on

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12/ Note by the secretariat: These provisions are based on the proposal of the Russian Federation in TRANS/SC.3/WP.3/2000/1. Since the proposal of the Russian Federation meant to lay down draft Pan-European manoeuvrability requirements it tended to leave the most controversial manoeuvrability criteria to the discretion of Administration. The Working Party may wish, therefore, to restore some or all of the criteria appearing in sections 3.1, 3.2, 3.3, 3.4, 3.5 and 3.6 of the draft Recommendations on Minimum Navigability and Manoeuvrability Requirements for Inland Navigation Vessels (TRANS/SC.3/WP.3/R.60/Rev.1) in the case of this particular River basin.

the basis of the dimensions of waterways in the basin concerned and of those authorities' regulation wind speed.

4.2.2 **Speed while going ahead**

4.2.2.1 A vessel/convoy must be able to develop and maintain maximum and minimum speeds relative to the water the values of which are set by the [local authorities] on the basis of conditions in the basin concerned.

4.2.3 **Change of course**

4.2.3.1 Vessels with the initial speed mentioned in paragraph 3.2 and the maximum rudder angle must be able to make a change of course of at least 10^{o} within a time of 30 s. During this change of course the vessel/convoy shall reach an angular speed of turn of at least 30^{o}/min. Then, in the next 60 s, the vessel/convoy should be able to return to its original course.

4.2.3.2 For convoys exceeding 110 m in length, the change of course during the first 30 s shall be at least 5^{o}, and the return to the original course must be achieved within the next 90 s.

4.2.3.3 The angle of overshoot of the vessel/convoy after the helm has been put over for easing shall not exceed 20^{o} during these tests.

4.2.4 **Stopping**

4.2.4.1 Vessels/convoys must be sufficiently powerful to stop from maximum speed within a minimum distance set by the [local authorities] for the basin concerned.

4.2.4.2 Stopping means stopping relative to the water. Stopping tests should be carried out in deep still water. If they are carried out in running water, the stopping distance measured relative to the bank shall be corrected to allow for the speed of the current.

4.2.4.3 During the stopping manoeuvre, the vessel/convoy shall remain sufficiently manoeuvrable and its course sufficiently steady.

4.2.5 **Turning** [13/]

4.2.5.1 The turning capacity of a vessel/convoy shall be assessed by determining the diameter of the circle measured from the centre of gravity of the vessel/convoy that the vessel/convoy describes with the maximum rudder angle.

13/ Note by the secretariat: The delegation of Ukraine proposed in TRANS/SC.3/WP.3/2002/5/Add.1 to use under this section a simpler formulation appearing in section 3.6 of the Danube Commission's Recommendations "Turning time and turning space" (document TRANS/SC.3/WP.3/2002/5).

4.2.5.2 The diameter of the circle measured from the centre of gravity of the vessel/convoy shall not exceed:

For single vessels - 2 vessel lengths

For convoys - 3 vessel lengths.

The diameter of the circle may be determined:

4.2.5.3 By making the circle with the maximum rudder angle and at the maximum speed referred to in paragraph 4.2.2. If this manoeuvre is carried out in running water, the diameter of the circle shall be taken as the distance between the extreme points of the trajectory of the vessel's/convoy's centre of gravity measured perpendicularly to the current;

4.2.5.4 By causing the vessel/convoy to enter a turn under the same conditions with the maximum rudder angle and by easing the turn by reversing the rudder as soon as the vessel/convoy deviates from its original course by an angle equal to the rudder angle.

4.2.5.5 In this case, the diameter of the circle shall be approximately defined as:

$$D = 50 \frac{V_o}{r} (1)$$

Where V_o is the speed of the vessel/convoy on its original course, in m/s;

r is the **rate of turn** of the vessel/convoy at the moment of easing of the turn in degrees/s.

4.2.6 **Going astern**

4.2.6.1 A vessel/convoy must have adequate manoeuvrability while going astern, i.e. it must be capable of moving in the desired direction both when manoeuvring to stop and when prolonged movement astern is required for reasons of navigation.

4.3.6.2 When the stopping test is carried out in accordance with paragraph 3.4 above on still water, an additional going-astern manoeuvre is required in order to determine the vessel's/convoy's ability to maintain course while going astern.

4.3 Test area

4.3.1 The test area shall be situated on a straight section of adequate length and breadth. The speed of the current shall be as low as possible, not exceeding 1.5 m/s on the average. The water shall be as deep as possible. The desirable depth of the water for testing is three or more times the draught of the vessel.

4.4 Requirements for the vessel or convoy during the tests

4.4.1 Degree of loading

4.4.1.1 During manoeuvrability tests, cargo-carrying vessels and convoys shall be loaded to at least 70% of their deadweight and the cargo shall be distributed in such a way as to ensure a horizontal trim as far as possible.

4.4.1.2 If a vessel/convoy can only comply with the minimum requirements of these **provisions** when loaded less than the prescribed 70%, it must be explicitly noted in the test report at what maximum loading the minimum requirements are met.

4.4.1.3 Whenever it can be expected that specific loading conditions less than 70% will be decisive for the navigability and the manoeuvrability of the vessel/convoy, the tests, or the affected part of the tests, shall be carried out under those specific loading conditions.

4.5 Test report

4.5.1 The results of each test and the circumstances during the test shall be reported for certification purposes as well as for research purposes in order to come to an evaluation of the minimum requirements given in these Recommendations. They shall also be available for use by the crew and recorded in the Table of the vessel's manoeuvrability characteristics.
