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Joint Meeting of Experts on the Regulations annexed to the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) (ADN Safety Committee)

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Item 5 (b) of the provisional agenda

**Proposals for amendments to the Regulations annexed to ADN:
Other proposals**

Operation of Inland AIS stations during loading, unloading and gas-freeing of ADN tank vessels

Transmitted by the Central Commission for the Navigation of the Rhine (CCNR)^{1,2}

1. Inland AIS (Automatic Identification System) is a system coming from maritime shipping which automatically transmits to other vessels the position and further safety-relevant information of a vessel. Inland ECDIS (Electronic Chart Display and Information System) is a system which displays navigation-relevant information on an electronically displayed navigational inland chart. If all vessels navigating on an inland waterway are equipped with Inland AIS and Inland ECDIS, every master will see a graphical representation of all vessels on his electronic navigational inland chart, plus their most important safety-relevant information. Investigations have shown that over 90% of the inland vessels on the Rhine are equipped with Inland AIS.

2. The information transmitted by Inland AIS stations must be complete and reliable in order that masters can use them to navigate their vessels. Incomplete or wrong information can lead to misinterpretations of the situation on the water and, consequently, to wrong

¹ In accordance with the programme of work of the Inland Transport Committee for 2012-2016 (ECE/TRANS/224, para 94, ECE/TRANS/2012/12, programme activity 02.7, (A1b)).

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decisions taken by the master. Therefore it ought to be ensured that, with the exception of very few small vessels, on principle every vessel and convoy is equipped with Inland AIS stations. In addition, it ought to be ensured that the Inland AIS is used, that the station is constantly in operation and that the transmitted information is correct. Currently CCNR is discussing the mandatory introduction of Inland AIS, which could enter into force in the near future.

3. Inland AIS stations are permanently installed in the wheelhouse. They consist of a positioning module (GPS receiver) and a data radio transmitter and receiver. Inland AIS data radio modules operate with two power levels: either 12.5 Watt (W) or less (1 or 2 W, depending on the station). These levels determine the station's radio range. Switching the station from the 12.5 W level down to the lower power level is a complex procedure, so that it is recommendable either to switch off the AIS station or to operate it at 12.5 W.

4. A shielded cable connects the Inland AIS station to its antenna. The antenna is typically mounted to the wheelhouse or to the bow. The requirements for the antenna position are laid down as follows in article 4 (Antenna installation) of the Guidelines on the Installation of the Inland Automatic Identification System:

"4. Antenna installation

The use of certified antennas, type approved with the Inland AIS station, are mandatory.

Antennas not included in the type approval need a declaration of conformity to the type approval certificate, delivered by the manufacturer of the type approved Inland AIS station.

4.1 AIS VHF Antenna

The AIS VHF antenna should be installed in such a way that the potential interference with other high-power energy sources, such as radar and other VHF antennas, is as low as technically and physically possible. The VHF antenna should be placed in a vertical position, but it must be possible to lower the antenna temporarily for passing bridges and other objects with a reduced height.

Interferences to the ship's VHF radiotelephone shall be avoided; attention should be paid to the location and installation of the various antennas, in order to support the antenna characteristics in the best possible way.

The AIS VHF antenna must have an omni-directional characteristic and a vertical polarisation. Special attention should be paid to the installation on a movable antenna mast.

The AIS VHF antenna should be placed in an elevated position, as free standing as possible, with maximum horizontal distance from objects made of conductive materials.

The antenna should not be installed close to any large vertical obstruction. The AIS VHF antenna should have a visible horizon of 360°.

The AIS VHF antenna should be installed with maximum horizontal distance from interfering high-power energy sources, such as radar, and if possible out of the way of their transmitting beam.

The distance between the Inland AIS VHF antenna and other VHF antennas, e.g. for VHF voice communication, shall be as large as possible to avoid interference between the antennas."

5. According to the provisions of the ADN Regulations, electrical installations installed in the wheelhouse of tank vessels have to be (at least) of the type "limited explosion risk" during loading, unloading and gas-freeing (see paragraphs 9.3.x.52.3 of AND). This means that only those electrical installations may be operated which during

normal operation do not emit any sparks and do not have surface temperatures above the required temperature class (200 °C). Exceptions cover radiotelephone installations, mobile and fixed telephone installations, and spaces under overpressure. The ADN does not explicitly mention AIS stations. There are no corresponding limitations for other types of vessels regarding the operation of electrical installations which are operated within the wheelhouse.

6. On dry cargo vessels, however, according to 7.1.3.70.1, no part of an aerial for electronic apparatus, no lightning conductor and no wire cable shall be situated above the holds and according to 7.1.3.70.2, no part of aerials for radiotelephones shall be located within 2 m from substances or articles of Class 1.

7. In this connection, the transitional provisions according to 1.6.7.2.2.2 are relevant in respect of 9.3.1.52.1 (e) and 9.3.3.52.1 (e), as well as 9.3.1, 9.3.2 and 9.3.3. Moreover, the rules for construction of tank vessels of type G, C and N apply, in particular 9.3.1.52.3, 9.3.2.52.3 and 9.3.3.52.3. According to the Regional Arrangement concerning the Radiotelephone Service on Inland Waterways, radiotelephone installations, which according to 9.3.x.52.3 may be operated in the wheelhouse during loading, unloading and gas-freeing, have an output of up to 25W.

8. From the nautical point of view a difference has to be made between:

(a) Loading and unloading

(i) in harbours: switching off the AIS station is not critical;

(ii) at quay walls/on waters adjacent to the fairway: switching off the AIS station may possibly be critical;

(b) Gas-freeing when the vessel is under way: switching off the AIS station is very critical.

9. According to the provisions of CEVNI (Code européen des voies de navigation intérieure) and the Police Regulations for the Navigation of the Rhine it is mandatory for vessels under way to communicate via radiotelephone information which is relevant for the safety of navigation. This obligation applies also during gas-freeing while the vessel is under way.

10. Paragraphs 4.8.1, 4.8.2.2 and 4.8.4 of ISGOTT (International Safety Guide for Oil Tankers and Terminals), which is being used in maritime navigation, determine that all electrical installations have to be switched off, with the exception of small radiotelephones with an output below 1 W.

11. Consequently, the mandatory introduction of Inland AIS and the obligation to have the station always switched on, i.e. even during loading, unloading and gas-freeing, might conflict with the ADN.

12. The CCNR River Information Services (RIS) working group RIS discussed this issue during its session on 5 and 6 March 2013. The working group proposes to change the ADN so that Inland AIS stations may constantly be switched on, even if they are not explosion-protected, because they are quite similar to radiotelephone installations which are permitted:

- The Inland AIS station is a radiotelephone intended for the automatic exchange of nautical data. Therefore, it is not a radiotelephone installation although it is based on the same technological principle.
- It uses the same frequency range.
- As stipulated in 9.3.3.52.3 (b) (ii), it is installed in the wheelhouse.

- It can be operated at two power levels, 12.5 W and 1 or 2 W, according to the type. According to 7.1.4.51 of the ADN the prohibition to operate radio transmitters does not apply to VHF transmitters provided the output of the VHF transmitter does not exceed 25 W and no part of its antenna is located at a distance less than 2 m from the substances or articles mentioned above (i.e. explosives of class 1).
- According to 7.1.3.70.2 of the ADN no part of aerials for radiotelephones shall be located within 2 m from substances or articles of Class 1. The antenna of the Inland AIS station is generally installed near the wheelhouse and thus outside the distance of 2 m from the dangerous goods.

13. In view of the technical expertise of the German Physikalisch-Technische Bundesanstalt (PTB), CCNR asked PTB to give a statement on this issue. The statement was submitted in the form of an attachment to Informal document INF.8 (twenty-third session). In a supplementary assessment dated 21 October 2013 and referring to VDE 0848-5 standard "Safety In Electric, Magnetic And Electromagnetic Fields – Part 5: Protection Against Explosion" of January 2001 as well as after consideration of ADN paragraphs 7.1.3.70.1, 7.1.3.70.2 and 7.1.4.51, PTB has reached the following conclusion: "On the basis of the facts here known we consider a distance between the aerial and the cargo area (zone presenting an explosion risk) of at least 2 metres as sufficiently safe even for inland navigation vessels transporting dangerous goods, for which explosion protection is required, so that during loading, unloading and gas-freeing the AIS stations may remain switched on. This shall apply on condition that 7.1.3.70.1 is observed."

14. Accordingly, CCNR proposes the amendment of paragraphs 9.3.1.52.3 (b), 9.3.2.52.3 (b) and 9.3.3.52.3 (b) to the ADN Safety Committee. These paragraphs could be amended by adding a new (v) as follows:

“(v) Inland AIS stations in the accommodation and in the wheelhouse if no part of an aerial for electronic apparatus, no lightning conductor and no wire cable is situated above the cargo area and if no part of a VHF antenna for AIS stations is situated within 2 m from the cargo area.”