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BIENNIAL STATUS REPORT AND PROVISIONAL AGENDA FOR SSE 12

Proposal to include the output "Revision of the *Revised guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems* (MSC.1/Circ.1318/Rev.1) to clarify the testing and inspection provisions for CO₂ cylinders" in the provisional agenda for SSE 12

Submitted by the United Kingdom and IACS

SUMMARY

Executive summary: This document proposes to include the output "Revision of the *Revised guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems* (MSC.1/Circ.1318/Rev.1) to clarify the testing and inspection provisions for CO₂ cylinders" in the provisional agenda for SSE 12.

Strategic direction, if applicable: None

Output: None

Action to be taken: Paragraph 25

Related documents: MSC 107/17/22 and MSC 107/20

Introduction

1 MSC 107 agreed to include in its post-biennial agenda an output on "Revision of the *Revised guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems* (MSC.1/Circ.1318/Rev.1) to clarify the testing and inspection provisions for CO₂ cylinders", with one session needed to complete the item, assigning the SSE Sub-Committee as the associated organ (MSC 107/20, paragraph 17.60).

2 The main goal of the proposed output was to ensure that all the periodical test requirements, hydrostatic test requirements and test dates for CO₂ cylinders are clarified to avoid inconsistencies in test and inspection implementation.

Background

3 Recalling that, in order to address the need to clarify the hydrostatic testing regime for high-pressure CO₂ cylinders and to align the relevant requirements in the Guidelines (MSC.1/Circ.1318) with those in the *Revised guidelines for the maintenance and inspection of fire protection systems and appliances* (MSC.1/Circ.1432), MSC 103 approved amendments to the above-mentioned Guidelines as prepared by SSE 7, with a view to disseminating as MSC.1/Circ.1318/Rev.1.

4 The co-sponsors believe that the testing requirements for CO₂ cylinders, as set out in MSC.1/Circ.1318/Rev.1, would benefit from additional clarity to allow for its global and consistent application.

5 In particular, it is understood that all CO₂ cylinders are either stamped with an initial test date, or the initial test date is provided to the ship to enable determination of the age of the individual cylinder. At the same time, MSC.1/Circ.1318/Rev.1 refers to the "10-year anniversary" and "20-year anniversary" dates, however, it does not clearly state which date should be used to measure these anniversary/testing periods.

6 In the opinion of the co-sponsors, the date to be used to measure these anniversary periods should be the date of the initial testing stamped on the cylinders. Therefore, to avoid potential inconsistency in intervals for testing old and new cylinders, the clock should be reset for those cylinders that are not tested but replaced with the new ones.

7 Additionally, in light of a recent engine-room fire incident where the CO₂ system failed to release due to faulty couplings on the newly installed pilot hoses, the co-sponsors propose a new paragraph 6.3 under section 6 of the revised circular (Minimum recommended maintenance). Reference is made to the UK MAIB report on the incident (MAIB Safety Bulletin SB1/2022), which states that following the accident, the pilot hoses were found blocked after they had been replaced during previous routine servicing. The report explains that the activating heads (including pilot lines) were not tested after the replacement of pilot hoses and a test of the free airflow in all hoses was not carried out.

8 The co-sponsors note that the current structure of the circular encourages scheduled maintenance intervals but does not address the requirements for testing after modifications or renewals of components between the defined intervals.

9 Paragraph 6.1.2 of the annex of MSC.1/Circ.1318/Rev.1 requires 10% of cylinders to be internally inspected and hydrostatically tested at the 10-year anniversary. The same paragraph also requires that before the 20-year anniversary and every 10 years thereafter, all cylinders should be hydrostatically tested.

10 Clarification of terms such as "anniversary date", and "all cylinders" contained in MSC.1/Circ.1318/Rev.1 regarding 10-year and 20-year anniversary test and inspection dates are being sought by flag States; therefore, clarity is needed for global and consistent application.

Discussion

11 The "anniversary" date referred to in MSC.1/Circ.1318/Rev.1 raises queries as to whether such date is the test date provided by the manufacturer which in turn precedes the installation date.

12 As opined above in paragraph 6, the co-sponsors are of the view that the date to be used to measure these anniversary periods is the date of the initial testing stamped on the cylinders.

13 It is noted that some flag States offer a certain flexibility regarding testing dates in view of harmonizing differences between initial/anniversary test dates of cylinders (month/year) and the ship's delivery date, provided that the initial date stamped on the cylinder does not exceed 12 months before the ship's delivery date, because before delivery of the ship the bottles are stored in a more controlled/less aggressive environment.

14 The query regarding "all cylinders" contained in the circular includes when those replaced require testing. The co-sponsors are of the view that these cylinders will require testing at 10-year intervals from the anniversary dates of these bottles (the dates stamped on the bottles).

15 The question is also raised whether the bottles can be tested in batches between 10 years and 20 years or will they all require to be tested at their 20-year anniversary simultaneously.

16 It is noted that paragraph 6.1.2 of the annex to the circular requires 10% of cylinders to be internally inspected and hydrostatically tested at the 10-year anniversary. The same paragraph also requires that before the 20-year anniversary and every 10 years thereafter, all cylinders should be hydrostatically tested. This can be interpreted to mean either:

- .1 that all cylinders require a hydrostatic test once in the first 20 years (and can be done in batches between years 10 and 20) and then every 10 years thereafter (option A);
- .2 that all cylinders, including those tested at the 10-year anniversary, need to be hydrostatically tested at the 20-year anniversary and at 10-year intervals thereafter (option B); or
- .3 that all cylinders require a hydrostatic test once in the first 20 years (10% at 10 years and 90% at 20 years) and then every 10 years thereafter (option C).

17 As an example, assuming that a ship is provided with 100 CO₂ cylinders, all having the same anniversary date, the three options (paragraph 16.1 (option A), 16.2 (option B) and 16.3 (option C)) could produce testing regimes, as follows (the regimes would equally apply to each Group of bottles having different anniversary dates):

Year/Survey number	Cylinders tested		
	Option A	Option B	Option C
10	1 to 10	1 to 10	1 to 10
11	11 to 20	none	none
12	21 to 30	none	none
13	31 to 40	none	none
14	41 to 50	none	none
15	51 to 60	none	none
16	61 to 70	none	none
17	71 to 80	none	none
18	81 to 90	none	none
19	91 to 100	none	none

Year/Survey number	Cylinders tested		
20	1 to 10	1 to 100	11 to 100
21	11 to 20	none	none
22	21 to 30 etc.	none	none

18 The co-sponsors are of the view that option A is the intended outcome, and that batch testing of CO₂ cylinders can be done over the 10-year period (i.e. between the 10-year anniversary and the 20-year anniversary) and the results credited for the 20-year anniversary. This option can be further elaborated based on a ship with 100 cylinders installed, in line with the example above, as follows:

Cylinder Serial numbers	Date on cylinder (initial commissioning testing)	10-year anniversary (01/01/2030)	11-year anniversary (01/01/2031)	12-year anniversary (01/01/2032)	20-year anniversary (01/01/2040)	21-year anniversary (01/01/2041)	22-year anniversary (01/01/2042)
1-10	01/01/2020	Tested (as 10% of the 100 cylinders)	NA	NA	Tested (to ensure these have been tested again in the 10 years since the 10-year anniversary)	NA	NA
11-20	01/01/2020	NA	Tested (with a view to having been tested by 20-year anniversary)	NA	NA (as tested within the 10 years before 20-year anniversary)	Tested (to ensure tested within a 10-year period)	NA
21-30	01/01/2020	NA	NA	Tested (with a view to having been tested by 20-year anniversary)	NA (as tested within the 10 years before 20-year anniversary)	NA	Tested (to ensure tested within a 10-year period)
etc.							

19 The issue raises questions regarding whether the annual inspection date is based on the ship's delivery date. The co-sponsors are of the view that the inspection is relative to the dates of the individual bottles, i.e. at intervals from the date stamped on the bottles, which may mean the anniversary date of the ship and the inspection date of the bottles are not aligned (a ship may be in its ninth year at the point the 10-year inspection of the bottles is required).

20 The co-sponsors are of the view that owners should also be granted some flexibility on when they want to arrange the hydrostatic testing during a 10-year period, i.e. leaving both options A and B acceptable, or something between the two (batch testing every other year or similar) providing all bottles are tested ahead of the 20-year anniversary of the bottles (date stamped on the bottles).

21 As the circular is written, in accordance with paragraph 6.1 of the annex, the verification (by crew) of the hydrostatic test dates is supposed to be carried out approximately every two years on passenger ships and every five years on cargo ships. It is considered that, since the equipment on the two categories of ships is basically the same, then also the maintenance interval for passenger and cargo ships should also be approximately the same, i.e. biennially for passenger ships and at nominal 2.5-year intervals for cargo ships. Hence the co-sponsors consider that paragraph 6.1 of the annex should be amended to clarify that for cargo ships the maintenance should be carried out "at each periodical and renewal survey".

22 It has also been identified that under row 19 of the appendix to MSC.1/Circ.1318/Rev.1 under section – Description of Inspection/Test as stated below:

"10% of cylinders and pilot cylinder/s pressure tested every 10 years. All cylinders and pilot cylinder/s pressure tested before the 20-year anniversary and every 10-year anniversary thereafter"

The word "every" in the first sentence of the annex to the revised circular was from the previous version's wording of the circular, which conflicts with the newly added second sentence of this row.

Proposal

23 Based on the discussion in paragraphs 11 to 22, the co-sponsors propose to include the output on " Revision of the *Revised guidelines for the maintenance and inspections of fixed carbon dioxide fire-extinguishing systems* (MSC.1/Circ.1318/Rev.1) to clarify the testing and inspection provisions for CO₂ cylinders" in the provisional agenda for SSE 12.

24 In order to progress this output, the co-sponsors have prepared draft amendments to MSC.1/Circ.1318/Rev.1, as set out in the annex. The draft amendments include optional text in square brackets referring to option A, and options B and C together.

Action requested of the Sub-Committee

25 The Sub-Committee is invited to consider the foregoing, the proposal in paragraph 23 and in the annex, and to take action, as appropriate.

ANNEX

**DRAFT AMENDMENTS TO REVISED GUIDELINES FOR THE MAINTENANCE AND
INSPECTIONS OF FIXED CARBON DIOXIDE FIRE-EXTINGUISHING SYSTEMS
(MSC.1/CIRC.1318/REV.1)**

The following changes are proposed:*

"6 Minimum recommended maintenance

6.1 At least biennially (intervals of 2 years \pm 3 months) in passenger ships or at each periodical ~~or~~ and renewal survey¹ in cargo ships, the following maintenance should be carried out (to assist in carrying out the recommended maintenance, examples of service charts are set out in the appendix):

...

- .2 the hydrostatic test date of all ~~high-pressure cylinders-storage containers~~ should be checked and the ~~High-pressure~~ cylinders should be subjected to periodical hydrostatic tests ~~at intervals not exceeding 10 years~~. At the 10-year anniversary* inspection, at least 10% of the total number provided should be subjected to an internal inspection and hydrostatic test.² If one or more cylinders fail, a total of 50% of the onboard cylinders should be tested. If further cylinders fail, all cylinders should be tested. Before the 20-year anniversary* ~~all cylinders should be subjected to a hydrostatic test at least once after installation.~~ ~~and~~

[Option A: Thereafter, each cylinder should be subjected to periodical hydrostatic tests at intervals not exceeding 10 years from the date of previous test.]

[Option B&C: At every 10-year anniversary* thereafter, all cylinders should be subjected to a hydrostatic test.]

Flexible hoses should be replaced at the intervals recommended by the manufacturer and not exceeding every 10 years. When cylinders are removed for testing, the cylinders should be replaced such that the quantity of the fire-extinguishing medium continues to satisfy the requirements of 2.2.1 of chapter 5 of the FSS Code, subject to SOLAS regulation II-2/14.2; and

* *Anniversary* means the date corresponding to the [manufacturing date] [installation date] of the cylinder(s).

...

6.2 At least biennially (intervals of 2 years \pm 3 months) in passenger ships or at each ~~periodical~~ and renewal safety equipment survey¹ in cargo ships, the following maintenance should be carried out by service technicians/specialists trained to standards accepted by the Administration:

* Tracked changes are indicated using "grey shading" to highlight new insertions and "strikethrough" to highlight deletion of the text.

...

6.3 After repairs, replacements or modifications, the inspection and tests listed in the service chart in the appendix of this circular should be carried out and recorded, as applicable. At least the following should be included:

- .1 the free flow of air should be tested on all repaired, replaced or modified pipes and their valves, hoses (including pilot hoses) and nozzles to verify that they are not blocked, as per paragraph 6.1.3; and
- .2 a function test of all replaced or repaired activating heads, as per paragraph 6.2.1.

¹ Refer to the *Survey Guidelines under the Harmonized System of Survey and Certification (HSSC), 2023* (resolution A.1186(33)), as amended or superseded."

"APPENDIX

EXAMPLE SERVICE CHARTS

...

Description of inspection/Tests

No.	Description	Carried out	Not carried out	Not applicable	Comment
...
19	10% of cylinders and pilot cylinder/s pressure tested every at the 10-years anniversary. All cylinders and pilot cylinder/s pressure tested before the 20-year anniversary and every 10-year anniversary thereafter.				

"
