



IHB File No. S3/7198

CIRCULAR LETTER 22/2008
28 February 2008

STANDARDS FOR HYDROGRAPHIC SURVEYS - S-44 5th Edition

Reference: a) CL 97/2007 dated 5 November

Dear Hydrographer,

1. The IHB would like to thank the following 41 Member States who responded to the Reference: Algeria; Argentina; Australia; Bahrain; Belgium; Brazil; Canada; Chile; Colombia; Croatia; Denmark; Ecuador; Estonia; Finland; France; Germany; Greece; Iceland; Italy; Japan; Korea Rep of; Malaysia; Mexico; Morocco; Netherlands; New Zealand; Norway; Pakistan; Papua New Guinea; Peru; Portugal; Qatar; Russian Federation; Slovenia; South Africa; Spain; Sweden, Tunisia; Turkey; UK; and the USA. All Member States who replied approved the draft 5th Edition of S-44 with some Member States providing comments. All comments together with explanatory responses prepared by the Chairman of the S-44 WG are at Annex A.
2. A pdf copy of the 5th Edition is attached and will shortly be available for free download from the IHB web site. This publication is intended as an electronic publication; however three printed copies will be sent, when available, to each Member State, one copy to all other states listed in the IHO year book and three copies to each IHO accredited training establishment.
3. The IHB thanks Ecuador for its very prompt preparation of a Spanish text of the draft 5th Edition. This is now being finalised taking into account the amendments to the draft text reported in the Annex to this CL. Once complete it will be circulated to all Spanish speaking countries and made available for download from the IHO web site. A French text will be prepared as soon as possible.
4. The IHB thanks all members of the WG for their efforts in preparing this important document. The WG having completed its task is now disbanded and TR K2.33 which gives its ToR will be deleted when IHO Publication M-3 is next updated.

On behalf of the Directing Committee

Yours sincerely,

Vice Admiral Alexandros MARATOS
President

Annex A Comments by Member States
Encl: PDF Version of 5th Edition of S-44

STANDARDS FOR HYDROGRAPHIC SURVEYS (S-44) DRAFT 5TH EDITION

Australia:

The WG seems to have considered all the relevant issues, and we do not have anything further to add to their comments.

Belgium:

With regard to feature detection, Belgium would like to indicate that putting responsibility with national authorities can lead to a diversification instead of a standardisation. However, taking into account the amount of work the WG on Standards for Hydrographic Surveys has put into the draft, Belgium approves the draft of the 5th Edition of S-44.

Comments by the Chairman of the S-44WG: The point raised by Belgium is noted. It was the view of the WG that whilst the Standard could indicate the size of features that should be detected e.g. 1m cube, the wide range of local conditions that hydrographic surveys would encounter and the diverse requirements that they would have to meet, required that the hydrographic office / organization would have to determine the precise requirements and in particular how it would assess whether those requirements had been met.

Canada:

Canada approves the draft 5th Edition of S-44. As this publication continues to be updated a number of issues should be included in the next edition, including the establishment of a survey order higher than Special and a more detailed reference to uncertainty management. In addition, although S-44 standards are designed principally for hydrographic surveys conducted for the compilation of charts for the safety of navigation, these standards are referenced by other users. Therefore it would be helpful if the next edition provides clarity on the use of the standards for other purposes, e.g. for the preparation of claims under UNCLOS.

Comments by the Chairman of the S-44WG: All comments raised in response to the draft 5th Edition of S-44 will be retained and made available to a WG established to prepare a 6th Edition of S-44.

Chile:

This hydrographic service considers that the publication would benefit from a teaching aid to facilitate easy understanding by the users, which would allow them to easily interpret the standards explained in S-44 especially Table 1.

Comments by the Chairman of the S-44WG: The intention of this reply is not fully understood although it is believed not to affect the content of S-44 5th Edition.

Colombia:

If it is appropriate in the 5th Edition of S-44 to exclude information which does not fall under the strict definition of a "Technical Standard", then the inclusion of this information in a hydrographic manual such as M-13 will allow the hydrographer to better understand those aspects referred to as "How to Survey".

Denmark:

Denmark welcomes the new edition of S-44 and wishes to congratulate the working group on the good result.

Ecuador:

This Institute agrees that the guidelines on "How to Survey" be included in M-13. We also agree that each office has to determine how accurate must be the analysis of the bottom of the sea and that it has to meet the technological developments achieved by the country.

Finland:

On behalf of the Nordic Hydrographic Commission S-44 Sub-group Finland wishes to forward the following encouraging experiences to all Member States. We found it very useful to discuss and harmonize our opinions within the regional hydrographic commission Sub-group before bringing them into discussion among the whole S-44 WG. The Nordic countries have a lot in common with the surveying environment and our coastal waters are widely bordered on each other. Therefore we believe that our experiences, after being harmonized inside our Sub-group, have been a useful contribution to the whole S-44WG. We recommend this kind of regional approach to be used more widely in other Regional Hydrographic Commissions and Working Groups. Our discussions have also helped us to recognise those issues, which have to be solved when preparing our national / Nordic / Baltic implementations of S-44 Edition 5.

The entire variety of subjects and technical details, which affected the work of S-44 WG, was great in number. The task had to be limited to the most critical issues causing that the most challenging issues e.g. surface as a survey result could not be solved at this phase. However, we believe that the surface-orientated examination of the survey uncertainty and need for better tools to describe the exploitation of the survey results for navigation will be focussed again in the near future.

Comments by the Chairman of the S-44WG: All comments raised in response to the draft 5th Edition of S-44 will be retained and made available to a WG established to prepare a 6th Edition of S-44.

France:

France would like to convey its thanks to the members of the Working Group on S-44 who have participated in the preparation of the 5th edition of the IHO Standards for Hydrographic Surveys (S-44).

I am pleased to inform you that France supports in principle the approval of the 5th Edition of S-44 standards, subject to the inclusion of the changes listed in the enclosed annex. The voting paper is also enclosed. I would like to add that France is ready to participate in proof reading the French version of S-44 as soon as a draft is available.

Reservations made by France on the draft 5th Edition of S-44 distributed under CL97/2007:

1. Preface

For the same reason that there is a division of Order 1 into 1a and 1, the removal of order 3 deserves to be mentioned and justified by the improvement of positioning methods which no longer justify decreasing horizontal positioning requirements for depths greater than 200m, which was the main difference between the old Orders 2 and 3.

Comments by the IHB and Chairman of the S-44WG: The following statement has been included: "The removal of Order 3 as it was considered that there was no longer a need to differentiate this from Order 2."

2. Introduction: The last paragraph of the introduction "*it is the responsibility of individual HOs to prepare "Specifications" based on these Standards*" is not really coherent with one of the aims fixed by the IHO Convention in force i.e.: "*(c) The adoption of reliable and efficient methods of carrying out and exploiting hydrographic surveys*" and reinforced by the amended Convention i.e.: "*(d) to establish and enhance the development of international standards for hydrographic data, information, products, services and techniques and to achieve the greatest possible uniformity in the use of these standard*".

In order to ensure that all services in the hydrographic community are able to put into place the specifications of national surveys based on the 5th edition of S-44, it is necessary, in the next edition of the M-13 Manual on Hydrography, in which annexes A and B must be inserted, to take into consideration the inclusion of detailed recommendations to conduct the compiling of these specifications.

Something along these lines should be inserted in this last paragraph.

Comments by the IHB and Chairman of the S-44WG: This matter relates to the last paragraph of the "Preface" rather than the "Introduction". It was the view of the WG that there was a difference between "Standard" and "Specifications". HOs would be expected to prepare detailed specifications for a survey in order to ensure that the results of the survey met the requirements of this Standard. Specifications will tend to be more system specific and as such will be quite dynamic as systems change. Also, given the wide range of systems currently in use throughout the world, it was felt to be impractical to develop a single specification to fit all countries needs. The IHB will arrange for the comments made by France to be considered when a new edition of M-13 is prepared. The following sentence has been added at the end of the Preface. "Specifications will be more system specific and as such will be quite dynamic as systems change."

3. Technical reserves

Pages 2 and 3: Reference made to "Deick (2007) – Measurement Uncertainty: Methods and Applications, 4th Edition, ISA (Instrumentation, Systems and Automation Society) ISBN-13:978-1-55617-915-0". It would be preferable to make reference here to the ISO /IEC 99:2007 guide.

Comments by the IHB and Chairman of the S-44WG: Following further discussions with France reference has been made to two ISO/IEC publications.

Page 8: 2nd paragraph: in accordance with the terminology used by IUGG, IAU and IERS, it would be more precise to write: "based on the International Terrestrial Reference System (ITRS)" and to replace everywhere in the document "ITRF" (which is the generic term to describe the practical realisations of ITRS, such as WGS84) by "ITRS".

Comments by the IHB and Chairman of the S-44WG: It is agreed that the use of the generic term ITRS is more appropriate and the text has been amended to read "...a geocentric reference frame based on the International Terrestrial System (ITRS) e.g. WGS84." Similar amendments have been made elsewhere in the text. See also the comments raised by Japan.

Page 8, paragraph 2.2: this paragraph should be moved to annex A paragraph A.2 where it appears more logically.

Comments by the Chairman of the S-44WG: It is agreed that this more correctly fits into Annex A paragraph A.2 and has been moved there.

Page 10, paragraph 3.4: the second paragraph is ambiguous. In the case of finding a least depth of less than 40m in depths greater than 100m, the standard uncertainty measure to apply to the least depth is not explicit. The specification should be completed to avoid such an ambiguity: "For wrecks and obstructions which may have less than 40metres clearance above them and may be dangerous to normal surface navigation, their position and the least depth over them should be determined by the best available method while meeting the depth uncertainty standard **of the appropriate order** in Table 1. Thus, the service responsible for the survey must take the decision of the position to reach considering the local constraints on safety to navigation.

Comments by the Chairman of the S-44WG: It is considered that the amended text indicates the intention of this paragraph more clearly and the text has been amended accordingly.

Page 12, paragraph 4.3: in accordance with resolution 2 adopted by the IUGG in July 2007, the 5th edition of S-44 should not recommend the preferred use of WGS84. All ITRF based on the ITRS are acceptable. The wording should be replaced by "based on ITRS (e.g.: WGS84).

Comments by the Chairman of the S-44WG: The intention of the WG was to reflect the requirements of S-57 that ENC's should be referenced to the WGS84 datum. The use of "preferably" does not preclude the use of other reference frames based on the ITRS it merely acknowledges the likely future use of the survey data. See also the comments raised by Japan.

Page 12, paragraph 4.5: the definition of the period of observation of current data is more within the scope of a specialised technical guide or the Manual on Hydrography rather than the S-44. This period isn't however, identified in the paragraph on tidal data. In order to have consistency between these two paragraphs, this period of observation should be deleted for the currents.

Comments by the Chairman of the S-44WG: The point raised here is accepted and the words "at intervals not greater than 1 hour" have been removed from the end of the second paragraph of section 4.5 and the text altered to read "the period of observation should preferably be not less than 30 days." This then is the same as in the section on tidal data.

Page 14, paragraph 5.3: the reason for the difference between the "individual" uncertainties of each sounding and a possible "collective" uncertainty attributed to a batch of soundings "by

default” to be negligible, is excessive. It would be more appropriate, within this framework, to make sure that the “collective” uncertainty be better than the “individual” uncertainties.

Comments by the Chairman of the S-44WG: The reason that we can use a collective uncertainty for a number of depths is that all the individual uncertainties are the same hence we do not need to record the uncertainty against each one as a single value fits all. In order to improve the clarity the text has been amended to read: “however a single uncertainty estimate may be recorded for a number of soundings or even for an area provided the difference between the individual uncertainty estimates and the collectively assigned uncertainty estimate is negligible.”

Page 18, note 3: the last sentence of the note (“the increasing size...reflects the maximum expected draught of vessels”) is incomprehensible. It is impossible to read in its present state, whether it describes the discontinuity at 40m within the definition of features to detect or it justifies the fact that the size of the features is in proportion to the depth beyond 40m. The sentence could be replaced by: “For order 1a, the relaxing of feature detection criteria at 40m reflects the maximum expected draught of vessels.”

Comments by the Chairman of the S-44WG: This clearer text proposed by France has been included.

Page 22, paragraph A.1 4th paragraph: the initials MBES should be defined when it is first used in the text, in this paragraph.

Comments by the Chairman of the S-44WG: Agreed.

Page 22, paragraph A.1, last paragraph: the terms “raw data” and “processed” seem to be contradictory.

In the perspective of a definition of a data conservation policy given by each office, a distinction should be made between raw data from gauges, and sets of processed data. The proposal could therefore be replaced by the following: “Each office is responsible for the definition of its long-term conservation policy for raw data and processed full data sets.”

Comments by the Chairman of the S-44WG: It is agreed that this sentence could be improved and the following amended text has been included “Each office is responsible for the definition of its long-term conservation policy for both raw and processed data sets.”

4. Editorial remarks

Page 2, 5th paragraph, penultimate line: read: “the reference ... provide a basis” (there is an “s” missing at provide”). *IHB: done.*

Page 6, 2nd paragraph: replace “The table on pages 17-18” by “Table 1” to be consistent with other cross references to the Table elsewhere in the text. *IHB: done.*

Page 8, 3rd paragraph: in anticipation of the deletion of the annexes, it would be preferable to delete the cross references in the main text (see also page 9, paragraph 3.2)

Comment by the Chairman of the S-44 WG: It is agreed that these references should be removed. The existence of, and the reason for, the annexes are explained in the Preface and at the end of the second paragraph of the Introduction. This is considered sufficient justification although it is noted that the Netherlands would have preferred more references. This sentence in the Introduction will be removed when the annexes have been removed following inclusion in M-13.

The glossary terms are not systematically indicated in italics in the text contrary to what is indicated in the introduction. The following gaps (non exhaustive list) are listed as examples:

Blunder: page 23 3rd line (amongst others)

Confidence level: page 17, table 1, line Para 3.2 and note 1, column Order

Error: p19, definitions of Confidence level, THU, TPU....
Feature: p17, table 1, line Chapter 1, column 1a
Full bottom search: p10 § 3.5, 1st paragraph.

Comment by the IHB: A full check for all such omissions has been made following the finalisation of the text. Where the term appears in a Chapter or Section heading it has not been italicised.

Japan:

Some various expressions regarding geodetic systems are found in the text: we should have consistency in description. For example we find the expression "ITRF preferably WGS84" in 4.3, Chart and Land Survey Vertical Datums Connection, but we also find the different expression "(ITRF) e.g. WGS84" in 2.1 Horizontal Uncertainty. Because the S-57 requires that ENC's should be based on WGS84, the expression "ITRF preferably WGS84" is preferable in coordination with it.

Comments by the Chairman of the S-44WG: The appropriate consistent usage has been made. See also the comment made by France.

Netherlands:

The NLHO congratulates the WG with its good work on this leading IHO document. The final draft 5th edition reflects the suggestions of the NLHO, as published in CL13/2005, well. The NLHO has a number of remaining remarks regarding the clarity of the document that may require further consideration:

- 1: The wording "most of the features" in the definition of "Full bottom search" should be better defined. It is easily misinterpreted as a 95% probability of detection, which is inadequate for hydrographic surveying.
- 2: the relation of Annexes A and B with the main text is unclear, as they are insufficiently referred to;
- 3: the Annexes need further revision;
- 4: it is unclear whether bottom characteristics are still a factor in the determination of the Order, as they were in the 4th edition.

Notwithstanding these remarks, NLHO supports this new edition, which will provide a useful basis to maintain the national hydrographic survey policy. Furthermore NLHO recommends that the WG promotes this 5th edition of S-44 as the starting point for other CHRIS Working Groups to reconsider some of their specifications. For example reconsideration of the CATZOC specification by the Chart Specification and Paper Chart Working Group.

Comments by the Chairman of the S-44WG:

1. *The point raised here is understood, many members of the WG were in favour of the inclusion of a value (e.g. 95%) however it was agreed that this was impossible to assess - (How can someone know how many features they have not detected?) - Consequently the definition was agreed as written*
2. *The reason for and nature of the annexes is explained in the Preface. There is also a reference to them in the Introduction which will be removed when the annexes have been incorporated into M-13. See also the comments by France.*
3. *It is agreed that further work on the annexes should be undertaken when this information is transferred to M-13.*

4. The Netherlands is correct in pointing out that in the 4th Edition reference was made to “underkeel clearance and where bottom characteristics are potentially hazardous to vessels” whereas in the 5th edition it only refers to “under-keel clearance”. This matter was debated in the WG and it was considered that it was the “Under-keel clearance”, “depth of water” and “type of surface shipping” that were most relevant to determining the Order of survey to be conducted. Clearly the bottom characteristics will affect the manner in which the survey is conducted; feature detection in an area of irregular rocky seabed will be distinctly more difficult and time consuming than in an area of smooth sand; however it should not affect the Order of Survey that is required.

Norway:

Norway has been a member of the S-44 WG, and has raised our comments through the Nordic sub group during the different meetings. Norway fully supports the Final Draft 5th Edition of 2 November 2007.

Portugal:

The Portuguese Hydrographic Office (IHPT) is very satisfied with the improvements made in this edition of S-44. IHPT strongly believes that this publication addresses the issues of uncertainty and bottom search in a clear way. IHPT acknowledges the efforts and work developed by the NHO and their representatives at the S-44 WG.

Russian Federation:

1. It would be expedient to retain the existing numbering of orders in the classification of surveys. i.e. Special Order, Order 1, Order 2 and Order 3.
2. In our opinion, it is necessary to enhance the requirements for the accuracy of positioning of fixed aids to navigation, topography and the coastline for Special Order surveys.
3. We suggest that the specifications for bottom sampling for local anchoring should be retained as set out in the 4th Edition of S-44.

Comments by the Chairman of the S-44WG: The naming of the orders was considered in detail by the WG. The use of 1a and 1b and the removal of 3 were done quite deliberately to avoid any confusion with surveys conducted in accordance with the 4th Edition of S-44. Orders 1a and 1b are divisions of the 4th Edition Order 1. Order 4 has been removed as the distinction between the requirements for this order and Order 3 are no longer considered to exist. The positioning requirements were considered in detail by the WG, however as with all other comments made in response to CL 97/07 this information will be maintained and made available in any future revision of S-44. The requirements for ‘Bottom Sampling’ in anchorage areas were considered by the WG and the preferred text of the WG is as set out in section 4.2.

Sweden:

We fully support the Finnish comments.

UK:

UK approves the draft 5th Edition of S-44 prepared by the WG. UK does, however, note that the text would benefit from a further minor editorial review to rationalize the interchangeable use of terms such as “bottom”, “seabed” and “seafloor”, and to ensure consistency in their use with publications M-4 and S-32. The chair of the S-44 Working Group (Chris Howlett, UK) is in agreement with this suggestion and will take appropriate action.

Annex A to CL 22/2008
IHB File No. S3/7198

Comments by the Chairman of the S-44WG: The text has been reviewed and "sea floor" has been made consistently two words, previously there were occurrences of "seafloor" and "sea-floor". "Bottom" has been replaced by "sea floor" when it relates to the water / seabed interface and by "seabed" when it implies the composition of the bottom of the sea. This terminology is consistent with IHO Publication (M-4) and has been proposed for inclusion in the Hydrographic Dictionary (S-32).