HSPT

PARIS, FRANCE, 20-22 JUNE 2017

VICE-CHAIR CONSIDARATIONS

INTRODUCTION

S-44 is surely the most important IHO publication for HS.

Before starting our work and tasking the group we should weight the potential benefit and the effort to be undertaken on each update and amendments and inclusions we want to bring to New Edition.

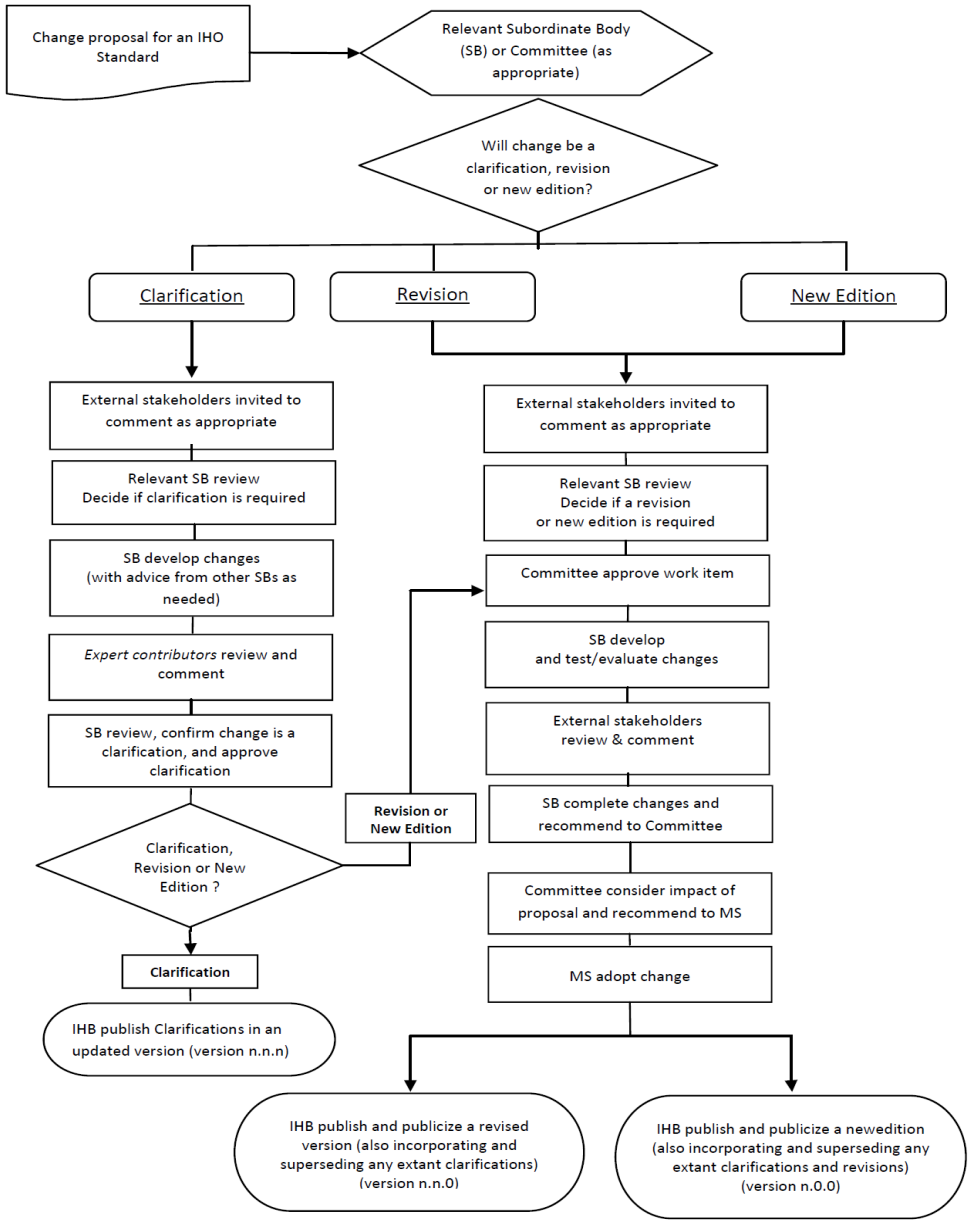
Within the IHO this Surveying Standard is focus on safety of navigation. It is not realistic to cover all aspects of hydrographic surveys (i.e. dredging, offshore constructions, …) in one standard. However there are some aspects beyond Safety os Navigation that are related to the overall scope.

It is obvious that surveys of HOs are often used from a wide range of users (i.e. coastal protection, science, …). These uses are important for the recognition of Hydrographic Offices beyond safety of navigation.

On that point of view the product of HO surveys as basic geodata, aiming a final product like nautical charts; depending on how they are processed allows the broader use. The data set will not fit all uses, thus MS must be aware not to compromise the acquired data in order to use for a generic product losing the focus on safety of navigation. The quality management is necessary and this includes minimum standards, qualification of personnel and survey techniques, as such QM should also take into account the limited resources, the special regional circumstances, new techniques and new approaches.

For further task on the HSPT or rather HSWG we will be able to bring up Standards aiming other uses, as well as updating/revising other publications like C-13.

Diagram – Changes to IHO Standards – General Case

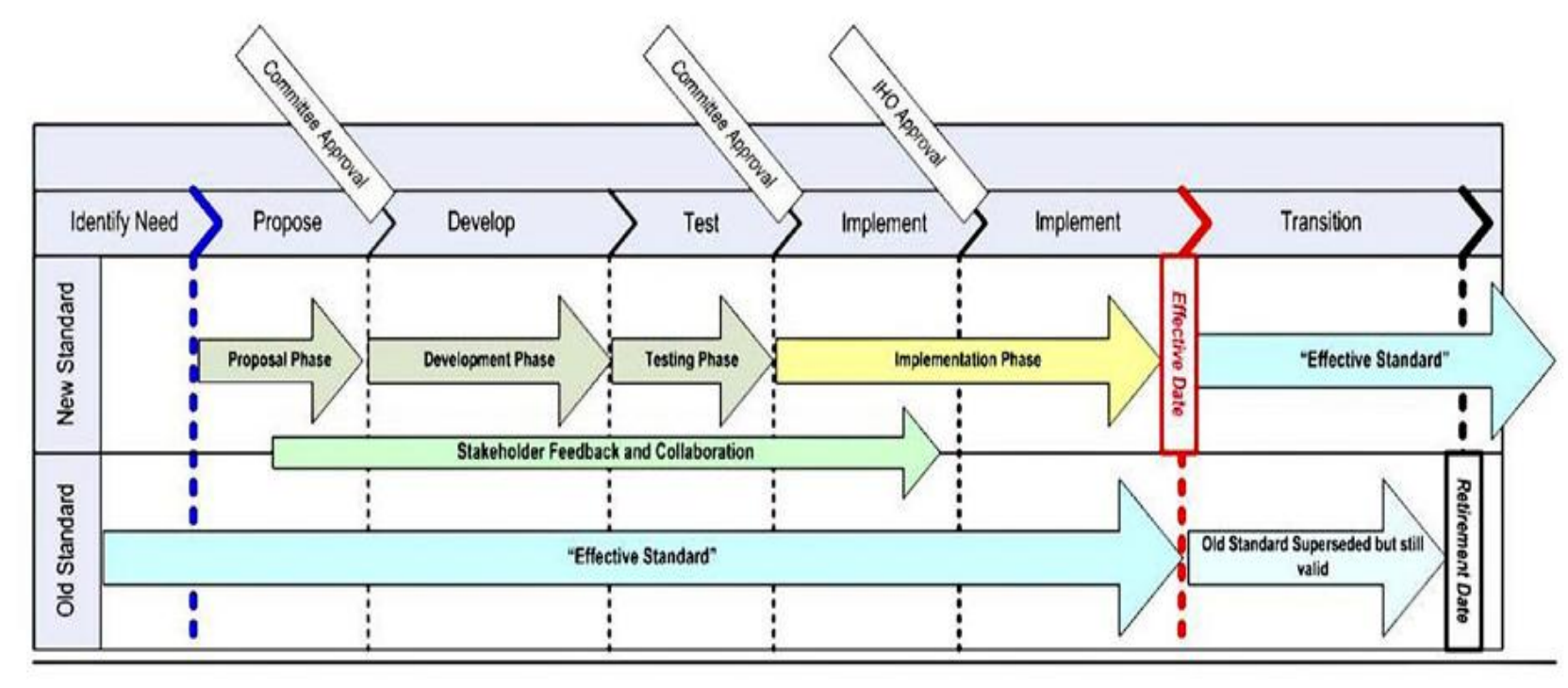


PRINCIPLES AND PROCEDURES FOR MAKING CHANGES TO IHO TECHNICAL STANDARDS AND SPECIFICATIONS

Resolution Number : 2/2007 , 1st Edition Refer: A1.21 , Latest Amendment : 69/2014

New Editions of standards introduce significant changes. *New Editions* enable new concepts, such as the ability to support new functions or applications, or the introduction of new constructs or data types, to be introduced. *New Editions* are likely to have a significant impact on either existing users or future users of the revised standard. It follows that a full consultative process that provides an opportunity for input from as many stakeholders as possible is required. Proposed changes to a standard should be evaluated and tested wherever practicable. The approval of Member States is required before any *New Edition* of a standard can enter into force. All cumulative *clarifications* and *revisions* must be included with the release of an approved *New Edition* of a standard.

The following diagram illustrates the typical life cycle of an IHO standard:



History and Background

- S-44 is the minimum standard for hydrographic surveys to provide data for navigational products.
- S-44 is the International Hydrographic Organisation's standard for hydrographic surveys.
- The IHO definition for Hydrographic Surveys "surveys conducted for the purpose of compiling nautical charts generally used by ships."

1st Edition SP-44 - 1968

- The first Work Group took 6 years to bring up the first edition of the SP-44 in 1968. 4 members (2 USA, 1 Finland, 1 Brazil)
- “Recommended Accuracy Standards”
- “density and precision of measurements”
- Represent the sea bottom and other features sufficiently accurately for NAVIGATIONAL PURPOSE.”

2nd Edition – SP-44 - 1982

- Edition 2 – Published 1982 A WG representing 11 Member States
- “IHO Standards for Hydrographic Surveys and Classification Criteria for Deep Sea Soundings”.
- “Improvement of the accuracy of depths”

3rd Edition –SP-44 - 1988

- Edition 3 – SP-44 “IHO Standards for Hydrographic Surveys, Classification Criteria for Deep Sea Soundings and Procedures for Elimination of Doubtful Data”
- “full seafloor coverage for recommended tracks” MB,SSS, HSSS

1989 - IMO Resolution “The minimum standards to which hydrographic surveys are to be conducted, to verify the charted depths in the traffic lanes are those defined in Special Publication No 44 of the IHO”

4th Edition – S-44 - 1998

Edition 4 – Published 1998 (13 membere – 4 Years)

- "Standards for Hydrographic Surveys"
- "To specify minimum standards for hydrographic surveys in order that hydrographic data collected according to these standards is sufficiently accurate and that the spatial uncertainty of data is adequately quantified to be safely used by mariners (commercial, military or recreational) as primary users of this information."

4th Edition – S-44 – 1998 (cont)

- Idea of full seafloor coverage
- Sistem detection capability
- 4 orders of survey:

Special – critical areas with minimum under keel clearance;

1 – harbours, harbour approaches,recommended tracks etc;

2 – coastal areas with depths to 200m not covered by Special and Order 1;

3 – all areas not covered by Special, Order 1 or 2 and water greater than 200m in depth.

5th Edition – S-44 – 2008

Edition 5 – Published 2008 - 22 member- 15 MS

- The title and principal aim remain unaltered from edition 4.
- “the purpose of S-44 is to provide surveys that are suitable for use in navigational products”

5th Edition – S-44 – 2008 (cont)

- Removal of section on Classification Criteria for Deep Sea Soundings, introduced in Edition 2 - 1982
- independent of technique (remained some samples)
- Order 1 into Order 1a and 1b.
- Accuracies Error turned to uncertainty
- minimum UKC turned to Critical UKC

- If conducting a survey for use in navigational charting S-44 should be used. Requirement of the SOLAS convention as modified in 1989.
- S-44 is a way to inform the mariner about the quality of the survey that the chart is based upon.
- The Mariner relies on the Chart Producers, they belive that the surveys are assessed under the S-44 Standard.

Orders and ZOCs

- The Source Data diagram on paper charts or the CATZOCs of ENCs, are not harmonized, there is a need to liaise whit the Data Quality Working Group
- (DQWG), in order to bring, the data diagram, surveys orders and Catzoc together in one “unique reference” of the quality of the information delivered by the different charting products.

S-44 5ED 2008

CIRCULAR LETTER 22/2008 (28 February2008)

Comments that remains from the 5th Edition

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- **Belgium: -** Feature Detection, responsibility of national authorities can lead to a diversification instead of a standardisation. *hydrographic office / organization - to determine the precise requirements and in particular how to assess whether those requirements had been met.*
- **Canada: -** including the establishment of a survey order higher than Special and a more detailed reference to uncertainty management.

  Although S-44 designed principally the safety of navigation, these standards are referenced by other users, - the next edition to provide clarity on the use of the standards for other purposes, e.g. for the preparation of claims under UNCLOS.

Comments that remains from the 5th Edition

- **Chile: -** that the publication would benefit from a teaching aid to facilitate easy understanding by the users.
- **Colombia, Ecuador: -** M-13 will allow the hydographer to better understand S-44 on those aspects referred to "How to Survey".
- **Finland:** 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 that remains from the 5th Edition

- **Netherlands: -** "Full bottom search" misinterpreted as a 95% probability of detection (200% coverage?)

  4th edition "underkeel clearance and where bottom characteristics are potentially hazardous to vessels"/ 5th "under-keel clearance". (Clarify)

- **Portugal:** - uncertainty and bottom search can be clarified.
- **Russian Federation:** - To consider " Special Order, Order 1, Order 2 and Order 3".
- - to enhance the requirements for the accuracy of positioning of fix
- - the specifications for bottom sampling for local anchoring should be retained as set out in the 4th Edition of S-44.

- **Full sea floor search**: A systematic method of exploring the sea floor undertaken to detect most of the *features* specified in Table 1; utilising adequate detection systems, procedures and trained personnel.

- 200% coverage would be more appropriate in order to verify the uncertainty?

- Hydrographic standards and classifications
- Methodologies
- Vertical depth measurements
- Horizontal position fixing
- Surveying Platform: Roll Pitch Heave and Yaw efects
- Full covarage / Line Spacing
- Tides / Elipsoid Heigth
- Tide datum / Tide Stations / HEIGTH
- The WGS84 datum

TABLE 1
Standards for Hydrographic Surveys

ORDER		Special	1a	1b	2 a	2 b
Examples of Typical Areas		Harbours, berthing areas, and associated critical channels with minimum under keel clearances	Areas shallower than 40 meters where under-keel clearance is less critical but features of concern to surface shipping may exist.	Areas shallower than 100 metres where under-keel clearance is not considered to be an issue for the type of surface shipping expected to transit the area.	Areas generally deeper than 100 metres where a general description of the sea floor is considered adequate.	All areas where the accuracies doesn´t need to meet the requirements of the previous orders
H	Horizontal Accuracy (95% Confidence Level (2 SIGMA))	2m or less	5m + 5% of depth	5m + 5% of depth	20m + 10% of depth	> 20m + 10% of depth
V	Depth Accuracy for Reduced Depths (95% Confidence Level (2 SIGMA))	a = 0.25m or less b = 0.0075 or less	a = 0.5m b = 0.013	a = 0.5m b = 0.013	a = 1.0m b = 0.023	Same as order 2
D	System Detection Capability	Features > 1m (or less) cubed	Features > 2m cubed in depths up to 40 m; 10% of depth beyond 40m [3]	N/A	N/A	N/A
C			Type of coverage (M270)			
	1. complete coverage		(multibeam, multi-transducer, acoustically swept);			
	2. systematic survey		(single-beam echo sounder lines run parallel at pre-planned line spacing, LiDAR);			
	3. sparse coverage		(lead-line surveys, reconnaissance, track soundings, spot soundings);			
	4. Alternative technics		(i.e Crowd sorce, Satelite bathimetry etc...)			
	5. unsurveyed					
SBES	Maximum Line Spacing	The lesser of: 3x average depth or 25m in depths to 10m; or 50m in depth of 10-40m; or 100m in depths deeper than 40m. Closer line spacing may be required in doubtful areas.	The lesser of: 3x average depth or 200m. For Bathymetric LiDAR a spot spacing of 5x5 metres or less.	The lesser of: 3x average depth or 1000m.	N/A	