



**ICA Contribution to the Development
of
International Standards of Competence
for
Nautical Cartographers**

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The aim of the paper and this presentation is to bring to the wider notice of ICA members the existence and aims of the Standards of Competence

- Background to the ICA involvement in developing the Standards
 - ✓ICA WG on Marine Cartography and earlier Commission
 - ✓Need for ongoing ICA involvement
- Introduction to the Standards of competence
 - ✓What are they?
 - ✓Where can I get a copy?
 - ✓Why are they needed?
 - ✓Why are they significant?
 - ✓The two Categories – A and B.
 - ✓The format and structure of the Standards
 - ✓The underpinning philosophy of the Standards
 - ✓Procedure for program recognition

Background

Development of Standards of Competence for Hydrographic Surveyors

1971 – FIG Commission IV (Hydrography)

1972 – International Hydrographic Organization

... and Nautical Cartographers

From 2000 - ICA

The FIG/IHO/ICA International Board for Standards of Competence of Hydrographic Surveyors and Nautical Cartographers (IBSC)

Why is ICA involved with international standard of competence?

ICA continued involvement in the work of the IBSC is in accord with ICA's specific objective of offering its expertise and knowledge of technical developments (in cartography) to other organisations.

ICA's vision is to ensure that cartography and GIScience are employed to maximum effect and full potential for the benefit of society and science through promotion and representation of the disciplines and professions of cartography and GIScience internationally.

ICA is the acknowledged authority for cartography and its contribution is essential to ensure the Standards of Competence for Nautical Cartographers remain extant and contemporary.

It is inconceivable that ICA would NOT have continuing involvement in work of such importance for cartography.

INTERNATIONAL
FEDERATION OF
SURVEYORS



INTERNATIONAL
HYDROGRAPHIC
ORGANIZATION



INTERNATIONAL
CARTOGRAPHIC
ASSOCIATION



**STANDARDS OF COMPETENCE
FOR CATEGORY "A" NAUTICAL
CARTOGRAPHERS**

**Publication S-8A
First Edition
Version 1.0.0 - Month YEAR**

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The International Hydrographic Organization
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Comments arising from the experience gained in the application of the guidance are welcome. They should be addressed to the Chairman of the International Board for Standards of Competence of Hydrographic Surveyors and Nautical Cartographers at the above address. This document is published periodically. Please check with IHB for the latest edition, including current amendments.

What are they?

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**STANDARDS OF COMPETENCE
FOR CATEGORY "B" NAUTICAL CARTOGRAPHERS**

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Where do I go to get a copy?

They can be downloaded from the website of the International Hydrographic Organization

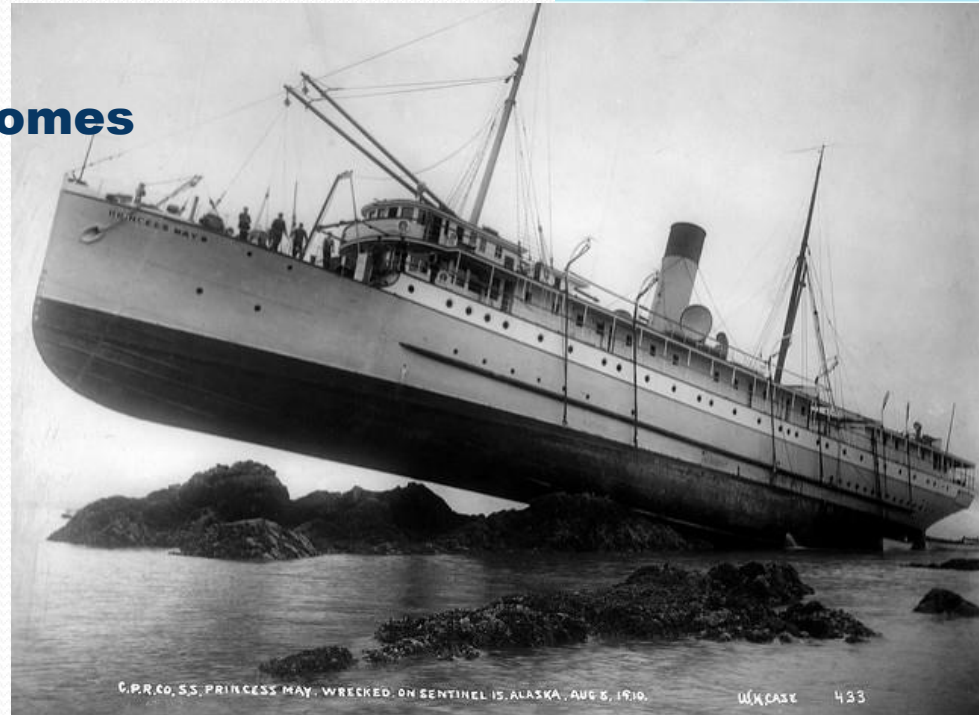
www.iho.int > Standards and Publications > Download > Draft Publications for discussion

Note: The finally approved Standards are expected to be published in September 2017.

Why are Standards required?



Need to avoid these sorts of outcomes



Why are the Standards significant?

The world's trade depends on shipping

Navigating the ocean environment is hazardous enough in itself

The safety of shipping and lives at sea is an essential objective of nautical charting whether it be by traditional paper charts or by electronic navigation charts integrated into the vessel's bridge systems, such as ECDIS (Electronic Chart Display and Information Systems)

Nautical cartographers have always needed to produce and present graphically complex ocean information that tests their professional competence

With the development of ENCs, nautical cartographers have had to be even more competent as they compile multifarious data sets into a multiplicity of chart presentations

In an international context, adherence to approved international standards is critical.

Why are the Standards significant?

**IT FOLLOWS THAT THOSE CARTOGRAPHERS WORKING TO DELIVER
MODERN INTERNATIONAL CHART SERVICES MUST BE COMPETENT**

COMPETENCY = EDUCATION & TRAINING PLUS EXPERIENCE

**The Standards have recently been completely reviewed to reflect
modern educational practices**

**They focus on *Learning Outcomes*
based on essential *Content*
following the *constructive alignment* approach**

CONSTRUCTIVE ALIGNMENT

(defined by Biggs (2003))

“... coherence between assessment, teaching strategies and intended learning outcomes in an educational programme.” (McMahon & Thakore 2006)

- **Formulate intended learning outcomes and list content to be covered**
- **From the intended outcomes, develop the teaching strategy and assessment criteria**
- **Within designed assessment regime, organise activities to teach student how to meet the assessment criteria, and therefore, the learning outcomes**

The two Categories – A and B

The motivation behind the separation of the Category A and Category B requirements and the intended outcome of Category A and Category B education/training is as follows:

Category A programmes will introduce subjects from the beginning at the underlying principles level; and

Category B programmes will introduce subjects from a practical level.

The two Categories – A and B

According to this framework, the Category B Standard will be aimed at the *basic educational and training* requirements for nautical cartographers (S-8).

The Category A Standard will be aimed at the *theoretical educational and foundational background* necessary for nautical cartographers in-charge and cartographic managers who will develop specifications for nautical charts, establish quality control and quality assurance systems, and respond to the specific requirements of a full range of cartographic projects.

Format and Structure of the Standards

PROGRAMME

**SUBJECTS (Basic, Essential, Foundation or
Cartography Science)**

e.g. Nautical Cartography

TOPICS

e.g. The Nautical Chart

ELEMENTS

e.g. Evolution of Nautical Charts

TOPICS and/or ELEMENTS are associated with:

One or more intended LEARNING OUTCOMES which should be tested

A Content list associated with one or more specific learning Outcomes

Format and Structure of the Standards (cont.)

Bloom's taxonomy (Bloom, B.S. (Ed.) 1956, Anderson, L.W. et al. 2001) has been applied to describe each intended learning outcome of the Standards and the associated verbs are an indication of the expected level of knowledge.

One of the three following levels of knowledge is associated with each element of the Standards.

***Basic* - Basic knowledge of the subject provides familiarity with the concepts.**

***Intermediate* - Knowledge of the subject as far as theory and principles are concerned, sufficient to enable their application in practice.....**

***Advanced* - Thorough knowledge of the subject in all its aspects to enable its application in all hydrographic and nautical cartography activities**

Format and Structure of the Standards (cont.)

***Category "B"* programmes are intended to deliver Basic and Intermediate levels of knowledge and Category "A" programmes are intended to deliver Basic, Intermediate and Advanced levels of knowledge. At the Category B level, a programme will be around 24 weeks including a major project.**

***Duration of programmes:* At the Category A level, the length of a programme will be around 40 weeks including a major and comprehensive cartographic project.**

A Category A programme must be completed within six years and a Category B programme within five years.

Format and Structure of the Standards (cont.)

Nautical cartography is an applied discipline.

**A programme must deliver a “hands-on”
component comprising:**

Practical exercises

PLUS

a Final Project of a minimum period of four weeks.

From Category B

E7: Nautical Cartography		
E7.1 The Nautical Chart		
Element	Content	Learning outcomes
E7.1c Nautical chart design (I)	<ul style="list-style-type: none"> (i) Characteristics (ii) Content (iii) Terminology (iv) Symbolization 	<p><u>Describe</u> present day characteristics and design principles of nautical charts.</p> <p><u>Describe</u> the impact of technology on nautical chart design and production.</p>

From Category A

E7: Nautical Cartography		
E7.1 The Nautical Chart		
Element	Content	Learning outcomes
E7.1c Nautical chart design (A)	<ul style="list-style-type: none"> (i) Design principles for nautical charts (i) Characteristics (ii) Content (iii) Terminology (iv) Symbolization. 	<p><u>Specify</u> present day characteristics and design principles of nautical charts.</p> <p><u>Analyze</u> the impact of technology on nautical chart design and production.</p>

Philosophy underpinning the Standards

Nautical charting is highly specified due primarily to the international use of nautical charting products.

The design and cartography inherent in nautical charting specifications have evolved over centuries, especially in recent decades as technology and delivery options have transformed charts from paper products to electronic formats based on complex databases.

The cartography of nautical charting is complex and also has evolved in parallel with media technology which in turn has increased complexity.

Education and training of nautical cartographers must be based on internationally accepted Standards of Competence and these, in turn, are strengthened through a foundation of solid cartographic grounding.

Procedure for recognition of a programme

Institutions design their programmes to comply with the Standards and submit them for consideration of recognition by the IBSC at its next plenary meeting.

A recognition is valid for SIX years.

Detailed Guidelines for S-8 for submitting institutions are published and are downloadable from:

www.iho.int > Standards and Publications > Download

COMPETENT NAUTICAL CARTOGRAPHERS SAVE LIVES

How much of this vessel lies UNDER the water?



Thank you
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