

Standards of Competence for Hydrographic Surveyors and for Nautical Cartographers

Svante ASTERMO, Sweden and Hugo GORZIGLIA, Chile

Key words: Hydrographic Surveyors, Nautical Cartographers, Courses reviewed, Advisory Board, Recognised courses, Standards, FIG, IHO, ICA.

ABSTRACT

During the International Congress of Surveyors (FIG) at Wiesbaden in 1971, a Working Group was formed by Commission IV (Hydrography) to develop International Standards of Competence within the profession of surveying at sea. In 1972, the International Hydrographic Conference at Monte Carlo, the International Hydrographic Organisation (IHO) set up a working group for the compilation of training programmes in hydrography conducted by Member States. In 1974, at the XIV FIG Congress in Washington, it was resolved that the FIG and IHO working groups combine to study and modify the Report of the FIG working group on Educational Standards.

In 1977, at FIG respectively IHO conferences an International Advisory Board on Standards of Competence for Hydrographic Surveyors (the Board) was formed.

In 2001, at the ICA conference in China, ICA decided to accept a proposal from IHO and FIG to expand the task for the Advisory Board to "Standards of Competence for Nautical Cartographers" and to nominate two more members of the Board.

The Task for the Advisory Board

The FIG/IHO/ICA International Advisory Board shall:

- Review at appropriate intervals (not exceeding two years) the recommended minimum standards of competence for hydrographic surveyors and nautical cartographers, taking into account comments and recommendations received from National Focal Points (NFP) and other authorities.
- Maintain and promulgate all publications and documents resulting from the tasks carried out by the Board.
- Review the syllabi of programmes submitted by Hydrographic Offices, institutions and learned bodies taking into account comments and recommendations received from National Focal Points and other authorities.
- Provide advice and comments on such syllabi by comparison with the recommended minimum standards and award certificates of programme recognition to those institutions whose programmes meet the recommended standards.
- Review the procedures of submission.
- Communicate with IHO through the IHB, with FIG through the Chair of Commission IV, and with ICA through the Commission on Marine Cartography.
- Normally meet once each year.

Members of the Advisory Board

The IHO/FIG/ICA International Advisory Board will be composed of members:

- Of known competence in the civil, governmental or educational sectors of hydrographic surveying and nautical cartography.
- Selected to provide as wide as possible a spectrum of knowledge and experience in educational practices, hydrography and nautical cartography.
- From different geographical areas, as far as reasonable.
- The Board will have up to ten members, four provided by FIG, four provided by IHO and two provided by ICA. Current members see App 1.

Working Conditions

Every year the members of the Board look through the Standards and make updates. Every second year there has been a new edition of the *Standards of Competence for Hydrographic Surveyors* and now the current edition is the ninth. It is published by the INTERNATIONAL HYDROGRAPHIC BUREAU as publication M-5.

This year the first edition of the "Standards of Competence for Nautical Cartographers" will be finished and published by IHB.

A number of courses are reviewed every year. See app 2.

Most of the work is done by correspondence but the Board meets once a year mostly hosted by some of the board members. See app 3.

The most important conditions for the work in the Board is the continuity and therefore each member should be able to stay in the Board for at least 5 years.

It is also important that the members have secured the sponsoring of the expenses, travel and accommodation, to be able to attend every meeting.

So far the Board has functioned very well and done an excellent job, acknowledged by both FIG and IHO.

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Captain Hugo Gorziglia, Chile. Details see appendix 1.

Standards of Competence for Hydrographic Surveyors and for Nautical Cartographers

Svante ASTERMO, Sweden and Hugo GORZIGLIA, Chile

1. BACKGROUND

Both in FIG and IHO there had been many discussions of the need to harmonize the education in hydrographic surveying and the discussions led to independent working groups in the two organisations and then to a joint effort.

During the International Congress of Surveyors (FIG) at Wiesbaden in 1971, a Working Group was formed by Commission IV (Hydrography) to develop International Standards of Competence within the profession of surveying at sea. In 1972, the International Hydrographic Conference at Monte Carlo, the International Hydrographic Organisation (IHO) set up a working group for the compilation of training programmes in Hydrography conducted by Member States. In 1974, at the XIV FIG Congress in Washington, it was resolved that the FIG and IHO working groups combine to study and modify the Report of the FIG working group on Educational Standards.

In 1977, at FIG respectively IHO conferences an International Advisory Board on Standards of Competence for Hydrographic Surveyors (the Board) was formed.

The Advisory Board has been working since 1978. The first chairman was Rear Admiral D.C. Kapoor, director in the Directing Committee of IHB, Monaco. Since that the chairmanship has altered between FIG and IHO.

In many years there has been a similar, as concerning hydrographic surveying, discussion about nautical cartography. Many ideas has been examined and the Advisory Board has been approached several times. The Board has offered alternative solutions and after some iterations FIG and IHO, with the acceptance from the Board, made an offer to ICA.

In 2001, at the ICA conference in China, ICA decided to accept a proposal from IHO and FIG to expand the task for the Advisory Board to "Standards of Competence for Nautical Cartographers" and to nominate two ICA members to the Board.

2. THE TASK FOR THE ADVISORY BOARD

The Board has two main tasks: 1. To review the minimum standards for competence and 2. Review the syllabi of programmes submitted to the Board and award certificates of recognition to those who meet the minimum standards.

To fulfill these tasks the Board has a Vision and a Mission:

VISION OF THE BOARD

To improve the level of international Hydrographic competence

MISSION

To provide guidance to the international Hydrographic community about Hydrographic education

2.1 Review of Standards

2.1.1 Year 1997

At its XIXth meeting, the Board decided to carry out a review in depth of the Standards, restructuring the Syllabus to provide a new organisation as follows :

1. Basic or background subjects, which may be fully or partially carried from other courses and exempted.
2. Essential subjects, concentrating the minimum standards necessary for a professional career.
3. The specialisms previously required under Edition 5, 6 and 7 of the Standards were replaced by Optional Units, for which the Board provided guidelines. These Optional Units provide guidance on complementary matters which may be offered by the different courses. They are described more generally, allowing organisations more flexibility in offering different training options.
4. Courses already recognised under the system of Specialisms will maintain the Certificates as they stand until they are due for re-submission.

The Eighth edition of the Standards (IHO publication M-5) was published in November 1997.

2.1.2 Year 1998

The Board decided that no changes were necessary to the 8th edition and that adequate time was necessary for institutions running courses to adapt to the new syllabus of the 8th edition.

2.1.3 Year 1999

The classification and definition of the 3 existing levels of knowledge were reviewed in accordance with Bloom's taxonomy. The new definitions were included in the 9th edition.

The topic "Nautical Science" (subject Essential 7 of the Syllabus) was reviewed to stress its importance for a hydrographer. The topic was re-drafted and became Basic 4 with four main

headings, as follows : Vessels, characteristics and handling, Safety at Sea, Navigation and pilotage, Hydrographic Operations.

An Appendix providing guidance on tasks to be carried out as nautical background was also drafted.

2.1.4 Year 2000

The re-structuring of the Standards continued and the definitions of the syllabus matters were re-drafted, adapting it to clearly define the task that a student must be able to achieve in each matter at the end of the programme.

The task continued by correspondence during the inter-sessional period.

2.1.5 Year 2001

At the XXIVth meeting, the draft Ninth Edition of the Standards of Competence for Hydrographic Surveyors (M-5) was completed.

The Ninth Edition has a completely rewritten Syllabus, casting what were previously lists of words, phrases and topics into Bloom's "learning outcomes" – sentences starting with active verbs which define the actions that (in the Board's view) hydrographic surveyors should be capable of performing, upon completion of the training process. For the first time, separate sets of learning outcomes (programme content) have been established for Category B and Category A programmes. The three learning levels used in previous M-5 Editions have been redefined. The only other major change was that Nautical Science was moved from Essential Subject to Basic Subject, and was modified to reflect the minimum knowledge required by a hydrographic surveyor.

The 9th Edition of the Standards of Competence for Hydrographic Surveyors (M-5) is available from the IHB web page.

2.1.6 Year 2002

To the meeting 2002 in June in New Hampshire, USA, the Board has circulated, amongs its members, the first draft of the "Standards of Competence for Nautical Cartographers" drafted by the past chairman Hugo Gorziglia who also will make the second draft after comments from all Board members. During the 2002 meeting the Board hopefully will approve the "Standards for Nautical Cartographers" for publication by IHB.

2.2 Review of Submitted Programmes

The work is done mostly by correspondence when the Board members do the reviewing individually and circulate the comments to all members. During the meetings, once a year, the whole Board discuss the syllabi of programmes submitted, write to the institution for complementation if needed or give the institutions possibility to complement during the meeting if representants are aviable for presentation and information. The intitutions

fulfilling the Standards are awarded a recognition as an category A or category B programme. The Board has awarded recognition to a number of courses throw out the years. Granted recognitions during the latest years see appendix 2.

3. MEMBERS OF THE INTERNATIONAL ADVISORY BOARD

The current list of members to the Advisory Board on Competence for Hydrographic Surveyors and Nautical Cartographers see Appendix 1.

3.1 Competence of the Members

The International Advisory Board will be composed of member that are:

- a) of known competence in the civil, governmental or educational sectors of hydrographic surveying and nautical cartography.
- b) selected to provide as wide as possible a spectrum of knowledge and experience in educational practices hydrography and nautical cartography.
- c) from different geographical areas, as far as reasonable.

3.2 Number of Members

The Board will have up to ten members, four provided by FIG, four provided by IHO and two provided by ICA

3.3 Secretariat of the Board

The Board will have its permanent Secretariat at the International Hydrographic Bureau, Monaco. The Secretariat will publish the documents and publications produced by the Board as required.

3.4 Financing of the Board

The IHO will finance the cost involved of the IHB and Secretariat. Members of the Board are expected to be supported by their own organisations for travel expenses and work.

Most of the work is done by correspondence but the Board meets once a year mostly hosted by some of the board members. See app 3.

4. COMMENTS

To work in the Board is very exciting and gives the members experience from different countries and cultures and the close work make the Board as a very good team and the members remain friends long time after finished in the Board. The work is special and it is necessary that the members stay in the board at least for a five year period in order to have acquired enough experience to be able to give his or her best contribution

BIOGRAPHICAL NOTES

Mr Svante Astermo, The Hydrographer of Sweden (ret), Managing director of Satllite Image Corporation, Kirun, several managing posts in the National Land Survey of Sweden.

Captain Hugo Gorziglia, The Hydrographer and director for the "Servicio Hidrográfico y Oceanográfico de la Armada de Chile" (ret) and now International expert for the Chilean Hydrographic Office and consultant in the field of Hydrography and Oceanography.

APPENDIX 1

LIST OF CURRENT MEMBERS OF THE ADVISORY BOARD (Jan 2002)

NAME	COUNTRY	ADDRESS	PHONE	FAX/ e-mail
Mr. Svante ASTERMO (FIG) Chairman starting 01 July 2001	Sweden	Tunnlandsvägen 85 S-168 36 BROMMA Sweden	46 8 56436452 mobile = 46 708 191120	46 8 56 436453 svanteao@algonet.se
Captain Hugo Gorziglia (IHO) Chairman until 01 July 2001	Chile	Servicio Hidrográfico y Oceanográfico de la Armada Casilla 324, Valparaiso	(56)-32-266506	(56)-32-283537 hgorziglia@shoa.cl
Mr. Gordon Johnston (FIG)	U.K.	Thales Geosolutions Group Unit 4. White Lodge Business Park, Hall Road, Norwich NR4 6DG UK	+44(0)1603281808 Mobile: +44(0)467 382616 Fax: +44(0)1603 281801	johnstong @thales-geosolutions.com
Mr. Mohd Razali Mahmud (FIG)	Malaysia	Centre for Hydrographic Studies Faculty of Geoinformation Science & Engineering Universiti Teknologi Malaysia 81310 UTM Skudai Johor Malaysia	607 5502943	607 5566163 razali@fksg.utm.my
Cdr. Steve Shipman (IHO) Vice-chairman starting 01 July 2001	UK	16 Newtake Road Whitchurch Tavistock Devon PL19 9BX	44 1752 286046	44 1752 555 980 home : steve.shipman@ntlworld.com office : s. Error! Bookmark not defined.
Rear Admiral K.R. Srinivasan, AVSM, I.N (IHO)	India	Chief Hydrographer to the Government of India Directorate of hydrography Naval Headquarters	office : 91- 11- 6181332 (at Delhi) office: 91-135 744873 (at Dehradun)	91 11 6181834 (FAX - DELHI) 91 135 748 373 (FAX - DEHRADUN)

NAME	COUNTRY	ADDRESS	PHONE	FAX/ e-mail
		Newdelhi , 110011, India National Hydrographic Office Post Box N 75 107-A Rajpur Road Dehra Dun - 248001 India	home - 91-11-4693028 (Delhi) res: 91-135-744873 (Dehradun)	home : jillu@de12.vsnl.net.in office: nho@sancharnet.in (at Dehradun) Please, send e-mail to both office at Dehradun and home
Capt. Andy ARMSTRONG (IHO)	USA	University of New Hampshire Joint Hydrographic Center Océan Engineering Lab 24 Colovos Road Durham, NH 03824 USA	603 – 862 - 4559	603- 862- 0839 andy.armstrong@unh.edu
Dr. David Wells (FIG)	Canada	Dept. of Geodesy & Geomatics Engineering University of New Brunswick P.O. Box 4400 or 538 Squires Street Fredericton New Brunswick E3B 5A3	office: (1)-506-4535147 home : (1)-506-4542650	(1)-506-4540352 dew@unb.ca
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Captain Federico Bermejo Secretary (IHB)	Monaco	International Hydrographic Bureau 4 Quai Antoine 1er BP 445 MC 98011 Monaco Cedex	(377)-93-108107	(377)-93-108140 e-mail = patp@ihb.mc Home : bermejof@excite.com

COURSES REVIEWED

Appendix 2

During the period 1997/2002, the IAB reviewed and granted recognition to the following programmes:

Year 1997 (7) :

- 4-YEAR COURSE PROGRAMME IN HYDROGRAPHY OF "HOGERE ZEEVAARTSCHOOL", AMSTERDAM, NETHERLANDS. Category A level and Specialisms 1, 2 and 3.
- SPECIALIZATION COURSE OF THE ITALIAN HYDROGRAPHIC INSTITUTE. Category A level and Specialism 1.
- COURSE IN HYDROGRAPHY FOR PETTY OFFICERS OF THE HYDROGRAPHIC INSTITUTE OF THE SPANISH NAVY. Category B level and Specialism 1.
- COURSE IN HYDROGRAPHY OF THE ADMIRAL MAKAROV MARITIME STATE ACADEMY, RUSSIAN FEDERATION. Category A level and Specialisms 1 and 2.
- HYDROGRAPHIC COURSE OF THE JAPANESE MARITIME SAFETY SCHOOL. Category B level and Specialism 1.
- BASIC/LONG HYDROGRAPHIC SPECIALIST COURSE OF THE INDIAN NAVAL HYDROGRAPHIC SCHOOL, GOA. Category A and Specialisms 1, 2 and 3.
- COURSE POSTGRADUATE DIPLOMA IN HYDROGRAPHY AND BSC (HONS) HYDROGRAPHY OF THE PLYMOUTH UNIVERSITY, U.K. Recognition was not granted at this time.

Year 1998 (5) :

- COURSE FROM THE FRUNZE HIGH NAVAL COLLEGE, RUSSIAN FEDERATION. Recognition was not granted at this time.
- COURSE FROM THE UNIVERSITY OF TECHNOLOGY OF MALAYSIA (UTM). Category A level and Options 2, 5 and 7.
- COURSE "POSTGRADUATE DIPLOMA IN HYDROGRAPHY" OF THE UNIVERSITY OF PLYMOUTH, U.K. Recognition was not granted at this time.
- GROUP TRAINING COURSE IN HYDROGRAPHIC SURVEY (M.S.A. AND J.I.C.A), JAPAN. Category B level and Specialism 1 and 2.
- LONG HYDROGRAPHIC COURSE OF THE NATIONAL HYDROGRAPHIC SCHOOL, GOA, INDIA. Category A level and Options 1, 2, 3 and 4.

Year 1999 (6) :

- COURSE IN HYDROGRAPHY OF THE UNIVERSITY OF PLYMOUTH, UK. Category B level and Option 1
- LONG COURSE IN HYDROGRAPHY OF THE U.K. ROYAL NAVY HYDROGRAPHIC SCHOOL. Category A level and Option 6.
- COURSE IN HYDROGRAPHY OF THE NATIONAL HYDROGRAPHIC SCHOOL, GOA, INDIA. Category B level and Options 1, 2, 3 and 5.
- ADVANCED COURSE IN HYDROGRAPHY OF THE JAPANESE MARITIME SAFETY AGENCY. Category A level and Option 1.
- INTERNATIONAL HYDROGRAPHIC MANAGEMENT AND ENGINEERING PROGRAM OF THE NAVAL OCEANOGRAPHIC OFFICE, USA. Category B level and Option 1.
- COURSE IN HYDROGRAPHY OF THE ST. PETERSBURG NAVAL ACADEMY (FORMER FRUNZE NAVAL ACADEMY) RUSSIAN FEDERATION. Category A level and Specialism 1 and 2.

Year 2000 (5) :

- JOINT INTERNATIONAL HYDROGRAPHIC APPLIED SCIENCE PROGRAM OF THE UNIVERSITY OF SOUTHERN MISSISSIPPI-NAVOCEANO, USA. Category A level and Options 1 and 5.
- HARBOUR AND COASTAL MANAGEMENT ADDRESSED TO HARBOUR AND COASTAL SURVEYORS OF IMA, TRIESTE, ITALY. Category B level and Option 2.
- HYDROGRAPHIC AND OCEANOGRAPHIC COURSE FOR NAVAL OFFICERS OF THE CHILEAN HYDROGRAPHIC OFFICE. Category A level and Options 1 and 2.
- HYDROGRAPHIC SURVEYORS PROGRAM OF THE NAVAL ACADEMY OF COLOMBIA. No recognition was granted at this time.

- MSC/DIPLOMA IN HYDROGRAPHIC SURVEYING OF THE UNIVERSITY COLLEGE LONDON AND PORT OF LONDON AUTHORITY, UK. No recognition was granted at this time.

Year 2001 (7) :

- PORT HYDROGRAPHY COURSE OF THE BORDEAUX UNIVERSITY, FRANCE. Category B level with Option 2.
- ENGINEERING COURSE WITH HYDROGRAPHIC OPTION OF SHOM – ENSIETA, FRANCE. Category A level with Options 1 and 5.
- MSC IN HYDROGRAPHIC SURVEYING OF THE UNIVERSITY COLLEGE OF LONDON/PORT OF LONDON AUTHORITY, U.K. Category A level with Options 1 and 2.
- HYDROGRAPHIC SURVEYORS PROGRAM OF THE NAVAL ACADEMY OF COLOMBIA. Category A level with Option 1 and 2.
- GRADUATE PROGRAMME IN OCEAN MAPPING OF THE JOINT HYDROGRAPHIC CENTER/UNIVERSITY OF NEW HALPSHIRE (UNH) and NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) USA. Category A level.
- COURSE IN GEOMATICS AND HYDROGRAPHY OF THE HAMBURG UNIVERSITY OF APPLIED SCIENCES, GERMANY. Category A level with Option 1
- LSGI HYDROGRAPHIC POSTGRADUATE DIPLOMA OF THE POLYTECHNIC UNIVERSITY HONG KONG, CHINA. Category A level.

MEETINGS OF THE ADVISORY BOARD

Appendix 3

XXth	31Jul-06 Aug 1997 Stockholm, Sweden	Hosted by the Swedish Hydrographer.
XXIth	07-14 July 1998 Tokyo, Japan	Hosted by the Japanese Hydrographer
XXIIInd	07-13 April 1999 New Delhi, India	Hosted by the Indian Hydrographer
XXIIIrd	12-18 April 2000 Valparaiso, Chile	Hosted by the Chilean Hydrographer
XXIVth	03-09 May 2001 Trieste, Italy	Hosted by the International Maritime Academy