

STANDARDS OF COMPETENCE FOR HYDROGRAPHIC SURVEYORS

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INTRODUCTION

In presenting the Report of the International Advisory Board on Training, I propose to outline some of the principles and concepts that contributed towards the development of the syllabi and the accompanying guidelines issued as the IHO-FIG "Standards of Competence for Hydrographic Surveyors". I shall also endeavour to present some thoughts on how the Advisory Board envisages the future implementation of these international standards.

THE BACKGROUND TO THE STANDARDS

Traditionally and historically the profession of hydrographic surveying has developed within government agencies responsible for national charting. Consequently, the training of hydrographic surveyors has mainly been conducted within special institutions established by the various hydrographic departments, primarily for their own departmental personnel. However, with the rapid expansion of hydrography in the commercial field brought about mainly by off-shore exploration and exploitation of hydrocarbons there has been a corresponding requirement for trained surveyors to meet the demands of industry. Added to this requirement is the fact that a number of third world countries who do not yet have any national hydrographic capability are employing contracting firms to carry out surveys necessary for their development plans, particularly in port expansion schemes and similar projects.

As long as hydrographic activity was confined mainly within the national hydrographic departments there was little problem in training surveyors according to national standards which, I might add, vary considerably from country to country. But when it came to employment of

personnel by commercial companies, as well as the need to verify the technical capability of firms in the awarding of contracts, there immediately arose the question as to what standards are to be followed in adjudging the qualifications of surveyors. Merely to illustrate this point I would like to cite one case where a contract for a fairly extensive survey was awarded to a firm, and it subsequently transpired that not one of the personnel employed had a proper hydrographic background with the result that the field data was of such doubtful accuracy that it was rejected, and this led to prolonged litigation. Needless to say, the firm in question contended that its personnel were all fully qualified hydrographic surveyors.

Against this background and other events, the need for internationally accepted standards of competence in hydrographic surveying was first raised at the 1971 Congress of FIG and in the 1972 International Hydrographic Conference.

A joint FIG-IHO Working Group was constituted with the object of developing international standards and syllabi. The Working Group having completed its task reported to the two parent bodies at their respective Conferences in 1977. In accepting this report, the parent bodies constituted the International Advisory Board with the object of implementing the recommendations of the Working Group. It was acknowledged at the outset that the results of the work would have to satisfy both the needs of the governmental and commercial sectors for hydrographic education and competence. It was further realized that there were great differences already existing in hydrographic education among various countries, and it became increasingly clear as the work progressed that the only standards which would find international acceptance would be those that aimed at a minimum standard, permitting individual countries and institutions to adopt standards far above this level. However, it is stressed that several years of experience will be necessary to reach even the minimum level of competence.

In establishing the categories to be defined a number of alternates were considered e.g. the terms "graduate" and "non-graduate", "professional" and "non-professional" etc., but it was soon realized that there were numerous pitfalls in the use of these terms. Hence the simple terminology, categories "A" and "B", has been adopted.

The hydrographic surveyor category "A" is considered in general to be a manager, capable of performing and supervising hydrographic operations and to take responsibility for their accurate and thorough execution; the category "B" has been considered, in general, to be an assistant, albeit with a practical ability to perform many hydrographic tasks without direct supervision.

The minimum acceptable standards were seen to be the requirements for small organizations with limited resources, in which the personnel would need competence in surveys at short and medium ranges from shore control and a grasp of the principles underlying all surveying operations. It has been the prime consideration that, if at this level a workable scheme of implementation can be established, higher standards might be defined and agreed in the course of time.

Whilst developing the standards there was a prolonged and exhaustive discussion on the requirements for entry to any education or training course. This focused mainly on two aspects, i.e. academic background and sea experience.

As regards academic qualifications it became clear after a detailed study of vastly differing standards, existing in various countries, that it would be impossible to stipulate any such entry qualification which must be left entirely to the discretion of the local institutions. However, it has been stated in the guidelines that the educational background should be commensurate with the definitions ascribed to the two categories of surveyors, and the category "A" should have a deeper theoretical ability in mathematics and applied physics.

In as far as previous sea experience is concerned, there is indeed a very valid argument in that knowledge of seamanship and navigation is an important requirement for attaining proficiency in various hydrographic operations at sea. This requirement is easily met in the case of hydrographic departments that draw their personnel from amongst serving naval officers. However, it would be extremely difficult for universities and similar civilian establishments to fulfill such a requirement.

Consequently, in the application of the syllabi three aspects have been stressed:

- a) that candidates should previously ensure their adaptability and suitability for working afloat;
- b) that courses should contain generous periods of supervised sea training in surveying;
- c) that a minimum aggregate period of two years' field experience is necessary for competence in either category.

Additionally, a course entitled Nautical Science is included in the syllabus to cover navigation, pilotage and seamanship.

Whilst developing the guideline syllabi, we took note of the fact that many hydrographic services follow a system of gradings (classification into survey grades) often based on a series of progressively higher standard courses interspersed with periods of practical field experience.

It is the opinion of the Board that in these circumstances the syllabi could be broken down into convenient blocks to form successive courses, the aim being, nevertheless, to cover the entire syllabus within these courses.

In regard to the special needs of developing countries it was considered inadvisable to lay down any modified or perhaps lower standards as this would, in the long term, lead to differentiation in qualifications within the profession. In this context, it has been suggested at one time or another that sophisticated electronic systems would not normally be available to personnel in developing countries, hence this part of the syllabus is of only marginal interest. However, the Board does not necessarily share this opinion as we find that, in a number of developing countries where hydrographic services presently exist, plans are already proceeding to acquire automated systems and we, therefore, feel that the inclusion of

this part is all the more important not only for the use of the systems but also at the planning and acquisition stages.

IMPLEMENTATION

The first edition of the Standards of Competence for Hydrographic Surveyors was issued in August 1978, initially in the English and French texts, and now a German text is also available. The document has been published by the IHB in Monaco and copies are supplied gratis to all interested institutions and individuals. The demand has been such that a second printing of 1,000 copies of the English version has been necessary, to supplement the first printing of 500 English and 300 French versions.

In response to the recommendations of the International Advisory Board the International Hydrographic Bureau has invited Hydrographers of IHO Member States to act as "National Focal Points" and to liaise with their counterparts, nominated by FIG, for implementing the resolutions adopted by the two parent bodies in regard to the work of the International Advisory Board.

It is envisaged that the National Focal Points will disseminate the syllabi to the appropriate educational and training establishments and institutions, both governmental and commercial, within their respective countries. It is hoped that institutions would be encouraged to submit their education programmes in hydrographic surveying, based on the syllabi, for review by the Advisory Board with the object of obtaining international recognition. Whilst there can be no compulsion to do so, it is believed that the institutions themselves will be interested in having their individual programmes reviewed against an international standard.

The National Focal Points, after first examining the programmes submitted, will forward them together with their recommendations to the Advisory Board for review. The Board recommends that all correspondence concerning programmes be routed through the National Focal Points. I am glad to report that some programmes, based on FIG/IHO standards, are already beginning to come in for review.

Certificates of Recognition will be awarded to programmes adjudged by the Board to conform to the international standards.

I am also glad to report that in response to the IHB's invitation a fairly large number of Hydrographers have indicated their willingness to act as National Focal Points and have taken steps to promulgate the "Standards" to the concerned institutions. To date, these include Australia, Canada, France, Germany, India, Japan, The Netherlands, New Zealand, Norway, Portugal, UK, USA and (for the commonwealth states) The Commonwealth Association of Surveying and Land Economy (CASLE).

In addition to the certification of training programmes there have been suggestions, and in one case a specific application, for the certification of individual surveyors by the Board. The Board has given this matter a great deal of thought and come to the conclusion that certification of

individuals should remain at the national level i.e. the professional institutions and the National Focal Points. This conclusion stems from various factors including the practical difficulties to be encountered in verification of individual cases and the fact that there might be national rules and regulations governing recognition of professional qualifications.

DEVELOPING COUNTRIES

Due to the need generated by the UN Law of the Sea Conference for surveys of the continental shelf, there has been an increasing interest on the part of developing countries to establish national capabilities in hydrography, the first step in this direction being the training of personnel. There has, therefore, been a fairly large number of enquiries recently regarding the availability of suitable training courses and internationally recognized programmes.

In the past the needs of training of a limited number of personnel from various countries have been met admirably by the schools established within the larger hydrographic departments, by a system of bilateral agreements, and in recent years a certain number of universities have also started to conduct courses in hydrography. However, with a substantial increase anticipated in the number of students, it does not appear likely that the existing institutions would be in a position to cope, particularly as most of them were established for the purpose of training departmental personnel.

In these circumstances, I venture to suggest that the answer might lie in either expanding a certain number of existing institutions to cater for students on a regional basis or by establishing new regional training centres. Inevitably, such measures will call for either international funding or financial support from regional economic commissions. Training within the framework of regional centres has been highly successful in land survey and mapping. Furthermore, it is being increasingly recognized that training given in the developing country itself or in the environment of the geographic region is comparatively more effective since common language, prevailing economic and environmental conditions, customs and traditions all have an influence. Whatever the nature of institutional structures for future training, it is hoped that international standards will be adopted to the maximum extent possible.

INTERNATIONAL ADVISORY BOARD MEETING

10-12 May 1979

The second Annual Meeting of the Board was kindly hosted by the Canadian Hydrographic Service in Ottawa prior to this Conference. A full agenda was covered and several changes were agreed, chiefly concerning the implementation of the Standards in the light of comment received since their publication in August 1978.

It was acknowledged that a new edition at this time would be inappropriate, since the appointment of National Focal Points is still in progress and education and training institutions are still familiarizing themselves with the first edition. As a matter of policy, it was agreed that non-urgent amendments would be accumulated until a new edition of the Standards is warranted. Urgent amendments will be promulgated by IHO Information Memoranda through the National Focal Points.

Since the first publication of the Standards the need to clarify certain of the Board's intentions has been identified. For example, the grades of knowledge required of the syllabi—familiarization, practical and full knowledge—have suffered in translation and there has been some misinterpretation. It has been decided to use instead the terms "Basic"—implying an acquaintance with, and general understanding of the subject; "Practical"—implying a knowledge of the principles and their application, and "Detailed"—implying a thorough command of the subject.

A further point concerns sea-training. The approvals procedure allows for the qualified recognition of courses which satisfy a "specified part only of the total requirement". However, it has been agreed that a minimum aggregate stipulation of two months supervised hydrographic surveying, including ship and launch operations, during the period of a qualifying course should *not* be relaxed. Institutions which are unable to satisfy this requirement in-house should be encouraged to make arrangements to comply, for example through a joint submission in collaboration with industry or other organizations.

Several problem areas were considered by the Board and although these will be subject to constant review, no action is contemplated or considered practical at this time. These include:

- a) the Law of the Sea syllabus which contains some elements that are yet to be clarified within UNCLOS, before they can be made applicable to the hydrographic surveyor's sphere of expertise.
- b) the control and monitoring of the quality of practical experience gained both during and following courses of education is not easily achieved.
- c) the many practising surveyors of experience, for whom courses of instruction are not appropriate, are effectively excluded from international recognition.
- d) although the present guidelines do not provide any indication of the duration of courses, it has been broadly assessed by the Board that the Category "A" syllabus implies approximately 3 years of instruction and Category "B" 2 years. But these periods could be effectively reduced where previous sea experience, academic qualifications or hydrographic experience are held by candidates.

In conclusion, I would like to bring to your notice that the Advisory Board keeps the standards of competence under constant review and welcomes comments and suggestions aimed at their improvement—particularly suggestions arising out of practical application of the syllabi in educational institutions.