

## RECOGNITION OF CATEGORY "A" COURSE ON HYDROGRAPHY AND OCEANOGRAPHY FOR OFFICERS "THE CHILEAN EXPERIENCE"

Training Center of the Hydrographic and Oceanographic Service of the Chilean Navy

### THE START

The first program of the Hydrographic and Oceanographic course presented by the Hydrographic and Oceanographic Service of the Chilean Navy (SHOA) to the International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographer (IBSC), constituted by the International Federation of Surveyors (FIG), the International Hydrographic Organization (IHO) and the International Cartographic Association (ICA), was recognized at the level of Category "B" in 1989. Almost immediately improvements and adaptations were incorporated to this program and, consequently, in 1990, the program was again submitted to the then IAB, at its meeting held in Bandung, Indonesia. The IAB, after examining the documentation submitted, decided to award Category "A" to the program which included two options: hydrography for nautical charting and port and nearshore surveys. SHOA considers this as being the starting point of the Officer Course.

In order to comply with the international requirements currently in force, SHOA kept updating its curriculum according to the relevant provisions of the various editions of the publication "Standards of Competence for Hydrographic Surveyors and Nautical Cartographers" (originally S-5 Category A, presently S-5A). This publication indicates the minimum necessary knowledge and skills that a hydrographic surveyor must possess in order to comply with the international hydrographic requirements aimed at satisfying the various expectations and competency levels demanded by relevant institutions and the industry. In 2000, SHOA requested the then IAB to re-recognize its updated program of the course. The IAB, at its 23<sup>rd</sup> session held in Valparaíso, Chile, from 12 to 18 April 2000, agreed to grant SHOA re-recognition at the level of Category "A" with options 1 and 2 (nautical charting hydrography and hydrography for coastal zone management), to its program.

In order to maintain the programme's recognition, in 2010, SHOA again decided to undergo a refreshed recognition procedure for its program. In this occasion, at the 33<sup>rd</sup> session held in Port of Spain, Trinidad and Tobago, in March 2010, SHOA's representatives submitted the program to the IBSC and gave a presentation about the objective, entry requirements, content of the syllabus of course, as well as clarifying details to the IBSC members at the session. In this opportunity the IBSC decided to award recognition to the specialization course on Hydrography and Oceanography for a six-year period.

### NEW STANDARD – REDUCTION OF THE PERIOD OF VALIDITY OF THE RECOGNITION

Indeed, it was from the year 2010, that the IBSC changed the recertification period for the recognition of programmes, due to the rapidly increasing rate of the advancement of technology and improvements of knowledge in hydrographic surveying. The change led to a reduction from 10 to 6 years for a period of recognition, each institution being required to resubmit its documentation for review by the members of the IBSC within the reduced period.

Following this new scenario, in 2015, SHOA initiated the compilation of the documentation needed to be submitted to the IBSC at the end of that year, for its consideration in April 2016, at the 39<sup>th</sup> meeting of the IBSC held in Brest, France.

However, on that occasion, the extension of one year to the current recognition was granted for the introduction of improvements recommended by the IBSC to be included. Such improvements included, among others:

- the final training project should be undertaken near the end of the programme to reflect the knowledge gained through the essential subjects;
- the course content for core hydrographic subjects, as evidenced by the assessment, was not presented at an appropriate level for a Category "A" programme;
- the provision of a full set of examination papers in the S-5A essential subjects or S-5A hydrographic sciences subjects;
- the provision of descriptions of the content of the course modules with more details than the S-5/S-5A item descriptions and with proper reference to the S-5/S-5A syllabus.

This set of recommendations that should be complied throughout the year and be presented to IBSC in an upcoming presentation before March 2017 was a huge challenge for SHOA, since the work involved an overall restructuring of the course and the documentation submitted in 2016. In addition to this need for restructuring, the IBSC recommended SHOA to consider revising its new presentation to be based on the new edition of the Standard (S-5A), the publication of which was then still in draft format and only became issued officially in August of that same year.

The new Publication S-5A, "Standards of Competence for Category "A" Hydrographic Surveyors" not only offered new contents, but also established the need for meeting advice received from the IBSC of the need for a series of new entry requirements criteria for applicants and the requirement for a complex final multidisciplinary practical work project. Additionally, the new program should be developed using a competency-based model.

## PREPARATION OF A NEW PROGRAM – A TEAM-WORK CHALLENGE

Being aware of this challenging work, SHOA decided to allocate one month to think on a strategic approach, aiming at finalizing the new program within a period of less than eight months at the end of which time a draft publication should be made available, assuming the risks that such draft program would require an iterative improvement before it could be published. The result of the brainstorming process undertaken resulted in the need to establish a multidisciplinary team of experts in curricular design and evaluation. The team was formed with representatives belonging to the Universidad de Playa Ancha de Ciencias de la Educación (UPLACED) and to the Naval Polytechnic Academy (APN), who worked with staff of SHOA's training center and hydrographic surveyors who had previously completed a Category "A" program.

Later, this team was complemented with a graphic designer, who was tasked to produce the submission dossier. Additionally, a translator was added, who translated all documentation into English and worked as coordinator of the entire work team.

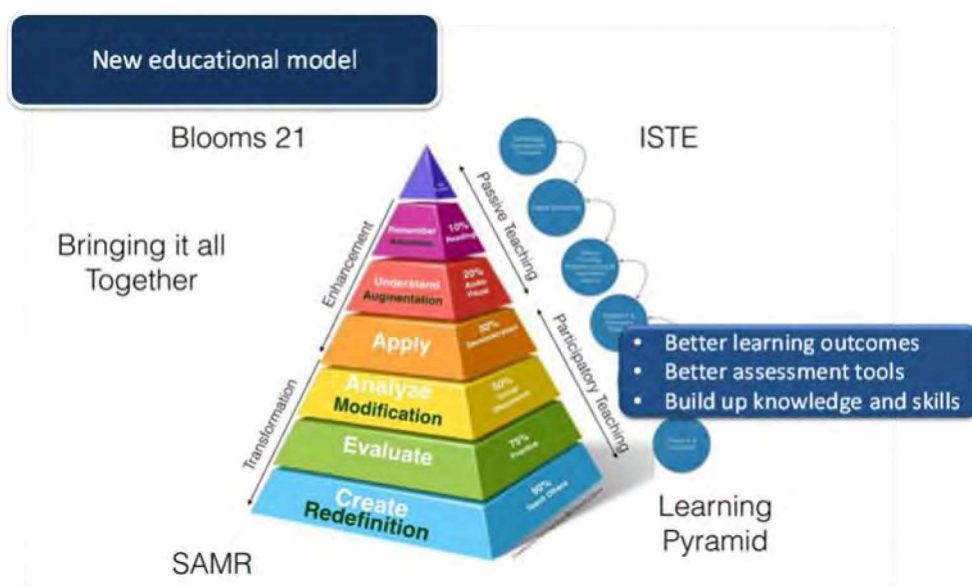
The responsibility to lead the team was assigned to the Head of the SHOA's Training Department, with the specific task to meet the objective within the time allocated. The approach is reflected in *Figure 1*.



**Figure 1:** Internal Review Process.

As a result of this work, a new competency-based curriculum was designed. It has several advantages for the training of our specialists, since this approach allows for a better understanding of the abilities achieved by graduated students upon their completion of the studies included in the program. This facilitates the process of transition that occurs between the end of their studies and the time they join the real exercise of their functions as hydrographer and oceanographer. On the other hand, the competency-based training helps to train graduates that are more efficient since the practical work developed in the study stage together with the activities of the hydrographer allow them to reach the international standards of competencies required by a Hydrographic Surveyor and widely recognized across the industry.

The educational model adopted (Bloom's model revised for the 21<sup>st</sup> Century) is shown in **Figure 2** (Nota del Editor para el autor: si la figura fue copiada, por favor indicar el libro o artículo).



**Figure 2:** The education model adopted as a result of the Internal Review Process.



Likewise, in accordance with S-5A Publication, it established the need to create a mechanism that will evaluate the competences in basic sciences of both Chilean and foreign applicants, for which a written Admission Test in five areas was created. On the other hand, a b-learning platform (combination of classroom work and online work, internet and digital media) was designed to support tutorial classes, and the Admission Test, which in the first experimental phase showed excellent results to evaluate the basic knowledge of the applicants.

As the final component of the program, a complex and multidisciplinary work project was included and is divided into two parts: a hydrographic project and fieldwork on board a hydrographic vessel. The final hydrographic project takes place during the entire last semester. This requirement is quite different to the former curriculum requirement, which considered the development of a thesis in parallel to the classroom attendance. The main objective of this hydrographic project is to have students facing the real conditions of a hydrographic survey and at the same time be able to compare the theory and the practice and exercise their learned skills as a capstone to their educational experience. As a result, students should be competently able to design, prepare, conduct and carry out a hydrographic survey of a particular area to generate different marine geospatial products.



**Figure 3.-** Practical Activities on board Hydrographic Surveying Vessel.



**Figure 4.-** Configuration of GPS.

The documentation was translated into English, designed and diagrammed with all components required by the Publication S-5A "*Guidelines for the Implementation of the Standards of Competence for Hydrographic Surveyors and Nautical Cartographers*" and submitted in December 2016, to the 11 members of the IBSC, for review.

The new program was considered at the 40<sup>th</sup> session the IBSC, held in March 2017 in Wellington, New Zealand. The Chilean Delegation, headed by the Director of SHOA and the head of the Training Department, provided a presentation to the IBSC members on the curriculum, contents, lecture hours and the type of evaluations in the course. The IBSC recognized the Course on Hydrography and Oceanography at Category "A", for a period of six years.

It is worth mentioning, that during this meeting, probably reflecting the complexities of transitioning to the revised S-5A Standard, only three programs were awarded re-recognition without the need for subsequent revision. These courses, in addition to the Chilean course, were presented by Germany and Portugal. The decision allows SHOA to continue delivering the course to national and foreign officers in accordance with the highest levels of competency required and recognized internationally.

## CONCLUSIONS AND EXPERIENCES

While the certification process was a long and arduous process that involved two years of work, this is just the beginning, since competency-based training involves great challenges to train SHOA's new specialists. The incorporation of the early practice and "know-how" as a central element of the curriculum and training produces a paradigm shift not only in the curriculum, but also to the teacher who must modify the procedure used in the previous teaching methodologies. In addition, the teacher should be responsible for the students to achieve the competencies of the profile according to pre-established standards and criteria, for which partial compliance status is not acceptable.

As a first phase for the implementation of this new IBSC re-recognized program it has been necessary to train teachers on competency-based assessment and upgrade them in the application of the technology used for the b-learning platform associated with the tutorial and self-guided classes. Subsequently, it is considered necessary to adopt a continuous follow-up with the implementation of major field work activities.

The joint teamwork, which included different specialists adding their relevant skills, contributed strongly to the re-recognition of the Hydrography and Oceanography Category "A" Course Program for Officers which is delivered by SHOA, in Spanish.