

# Competency Certification for Hydrographic Surveyors – The Australasian Experience

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## SUMMARY

Hydrographic surveying is an enabling activity supporting virtually all marine pursuits, but critically it provides the information used in the production of nautical charts which are essential to safe navigation. In recent years the trend towards larger ships navigating with limited under keel clearances in ever more congested waterways, particularly in ports and coastal waters places higher demands on hydrographic surveyors. Hydrographic surveying enables port infrastructure development and also underpins the offshore oil, gas and resource industries which transcend State and National borders. These are high value industries but they also pose high potential for environmental impact. For these reasons it is essential that hydrographic surveys are carried out by competent professionals to consistent and appropriate standards.

The Australasian Hydrographic Surveyors Certification Panel (AHSCP) provides a pathway for certification of hydrographic surveyors to international standards. The AHSCP, which has been operating for 15 years, has assessed over 180 applications from around the world and in Australia and New Zealand AHSCP certification has been widely adopted as the competency standard for hydrographic surveyors undertaking safety of navigation surveys. The certification is designed to ensure that those employed as hydrographic surveyors have the appropriate skills, education and experience to undertake their tasks. It is especially useful for potential employers or contractors to know that prospective employees have been assessed to a common international standard.

# **Competency Certification for Hydrographic Surveyors – The Australasian Experience**

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## **1. INTRODUCTION**

Hydrographic Surveying provides the fundamental information for production of navigational charts essential for safe navigation and is the core skill underpinning other aspects of marine exploration and coastal zone development. In recent years the demands of international shipping have continued to increase as larger ships navigate with limited under keel clearances in ever more congested waterways, particularly in ports and coastal waters. Hydrographic surveying also underpins the offshore oil and gas resource industries. These are high economic value industries but also pose high risks with the potential for adverse environmental impact. Thus it is essential that supporting hydrographic surveys are carried out by competent professionals to the highest standards.

The global nature of the shipping industry is such that common standards need to be applied across state and national borders. Hydrographic surveying standards are set by the International Hydrographic Organisation (IHO) and documented in the IHO publication S-44. International standards of competence for hydrographic surveyors are set by the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors & Nautical Cartographers (IBSC) and documented in IHO publication M-5 (Standards of Competence for Hydrographic Surveyors). However the M-5 standards can only be seen as academic guidance as it no longer (since the 7<sup>th</sup> Edition, 1994) mandates specific requirement for practical experience for hydrographic surveyors to achieve the highest Hydrographic Surveying qualification (IHO Category A). The Australasian Hydrographic Surveyors Certification Panel (AHSCP) Certification Process fulfils this international void for competency certification. It applies the FIG/IHO/ICA endorsed competency requirements for hydrographic surveyors by confirming evidence of academic study and combines this with a detailed assessment of their verified employment history and relevant hydrographic experience to assess the competency of individuals and award certification.

## **2. HISTORY**

In the late 1980s the hydrographic community in Australia realised there was a need to establish a method by which hydrographic surveyors in Australia could be certified (accredited), in an endeavour to lift standards in hydrographic surveying, ensure the delivery of quality survey services to Government and private clients and to provide a career path for aspiring hydrographic surveyors.

At the Hydrographic Society Symposium held in Sydney in 1991 some 100 hydrographic surveyors voted unanimously to find a means of industry regulation and certification

(accreditation) of hydrographic surveyors. In 1992 the Institution of Surveyors, Australia (ISA) expressed a wish to widen its membership to include all aspects of surveying and agreed to the establishment of commissions for different specialities, modelled on the FIG commissions. The 1993 meeting of the Reciprocating Surveyors Board of Australia and New Zealand (comprising all Surveyors General of States and Federal Governments) was briefed on the accreditation proposal and it supported the idea. The ISA Hydrographic Commission was subsequently formed and charged with the task of establishing a means of accreditation. This resulted in the creation of the Australian Hydrographic Surveyors Accreditation Panel (AHSAP), which held its inaugural meeting on 4 August 1994. At this time there was no Category 'A' Hydrographic Survey course operating in Australia or New Zealand.

The framework of the Accreditation Panel and the 'Guidelines for Accreditation' were formulated to meet, as a minimum, the International Hydrographic Organisation (IHO) standards and specialties as outlined in the FIG/IHO/ICA document M-5 (Standards of Competence for Hydrographic Surveyors). Levels for certification were aligned closely with the IHO Category A (which we termed Level 1 to avoid confusion) and IHO Category B (termed Level 2). Under the process the Panel assessed the individual competency specified in M-5 attained by applicants through a combination of education and on the job practical experience, to award the appropriate level of certification.

### **3. DEVELOPMENT AND EVOLUTION**

In 2001 the ratification of the Trans Tasman agreement between the ISA and the New Zealand Institute of Surveyors (NZIS) resulted in the AHSAP becoming the Australasian Hydrographic Surveyors Accreditation Panel. By then it had accredited a number of applicants from New Zealand and other countries and its work was becoming recognized internationally.

In 2003 a Category 'A' Hydrographic Surveying Course was established at the University of Otago, New Zealand, and to date is the only course in Australasia for civilian students to have IBSC recognition.

In 2004 the ISA amalgamated with other interrelated bodies to become the Spatial Sciences Institute (SSI). The AHSAP became the Australasian Hydrographic Surveyors Certification Panel (AHSCP) in line with SSI conventions that recognize accreditation of courses of study and certification of individuals.

With a Category 'A' Hydrographic Surveying course available in the region, and the increasing demand for academic qualifications, the greater availability of relevant tertiary courses and use of ever-more complex survey systems, the Panel decided to discontinue certification under 'Long Term Practice' alone from January 2009.

In 2009 members of the SSI and the ISA voted to merge the two institutes to create the Surveying and Spatial Sciences Institute (SSSI).

#### **4. WHAT IS COMPETENCE IN HYDROGRAPHIC SURVEYING?**

The underpinning philosophy of the work of the IBSC in publishing M-5 (Standards of Competence for Hydrographic Surveyors) is that Competence = Knowledge + Experience. Until 1994 the M-5 Standards required the IBSC recognized courses to satisfy the 'Experience' component. This was specified as "an aggregate period at least 2 years of varied field experience in hydrographic surveying" in order to reach the minimum level of competence. The IBSC awarded 'Full Recognition' to Courses that satisfied both the Education and Experience requirements, and 'Academic Recognition' to Courses that did not meet the 'Experience' requirement. Subsequently the 7<sup>th</sup> Edition of M-5 (Oct 1994) eliminated the distinction between Full and Academic recognition.

Although the IBSC never recognized or certified individual hydrographic surveyors, there exists a misleading but common practice of referring to individuals who have completed the recognized courses as a "Category A" or "Category B" hydrographic surveyors. It is important to note that completion of the academic course alone, without gaining the ensuing appropriate field experience, does not equate to having attained competence.

To overcome the lack of individual competency certification by the IBSC, the 7<sup>th</sup> Edition of M-5 introduced a recommendation that a single institution in each country provide individual recognition to those who have completed a recognized Hydrographic Survey Course and attained the required practical experience. The AHSCP meets this recommendation by providing an avenue for individual recognition of Hydrographic Surveying Competence.

#### **5. THE AUSTRALASIAN HYDROGRAPHIC SURVEYORS CERTIFICATION PANEL (AHSCP) CERTIFICATION PROGRAMME**

The 'AHSCP Guidelines For Specialist Certification in Hydrographic Surveying' provide details of the certification programme, including the procedure for submission of applications. (<http://www.sssi.org.au/>).

##### **5.1 Panel Members**

The AHSCP is jointly sponsored by the SSSI and NZIS. The composition of the Panel and the 'Guidelines for Specialist Certification in Hydrographic Surveying' under which it operates is formulated to meet IHO standards. The Panel is comprised of six Level 1 Hydrographic Surveyors from various hydrographic disciplines who have extensive practical expertise in:

- Nautical Charting Hydrography
- Surveys for Coastal Zone Management
- Industrial Offshore Surveying
- Education
- Private Practice

Panel members are elected and the incumbent Hydrographer of Australia chairs the Panel as an ex-officio member. The term of office is two years and, in order to maintain continuity, election of 2 or 3 Panel members are held annually. The AHSCP members hold 3 to 4 meetings a year, mainly through telephone conferences, during which the main business is assessment of applications for certification. The Panel works closely with the Hydrography Commission of the SSSI.

## **5.2 Levels of Certification**

The AHSCP applies the FIG/IHO/ICA endorsed competency requirements for hydrographic surveyors by confirming evidence of academic study and combines this with a detailed assessment of their verified employment history and relevant hydrographic experience to assess the competency of individuals and award certification. The certification scheme is designed to ensure that those employed as hydrographic surveyors have the appropriate skills, education and experience to undertake their tasks. It is especially useful for potential employers or contractors to know that prospective employees have been assessed to a common international standard. There are two levels of specialist certification in hydrographic surveying. Certification at Level 1 is the highest attainable of professional hydrographic certification. At this level the Hydrographic Surveyor is assessed as competent to undertake and manage hydrographic surveying projects. Level 2 Certification recognises a practical comprehension of hydrographic surveying.

### 5.2.1 Level 1 Certification

There are three alternative application clauses of requirements for certification at Level 1:

- (i) Successful completion of an IBSC recognised Category ‘A’ Course AND A minimum aggregate period of 2 years appropriate experience in practical hydrographic surveying, and a substantial amount of the sea-time component should be ‘in-charge’ time.
- (ii) Successful completion of an approved Bachelor Degree, or equivalent, in Surveying or an allied discipline AND successful completion of a Category ‘B’ Course AND A minimum aggregate period of 2 years appropriate experience in practical hydrographic surveying, and a substantial amount of the sea-time component should be ‘in-charge’ time.
- (iii) Successful completion of an approved Bachelor Degree, or equivalent, in Surveying or an allied discipline AND A minimum aggregate period of 5 years appropriate surveying experience; 2.5 years of which should be practical hydrographic surveying and a substantial amount of the sea-time component should be ‘in-charge’ time. This experience shall demonstrate a competence that is not less than stipulated in (i) and (ii) above.

### 5.2.2 Level 2 Certification

There are two alternative application clauses of requirements for certification at Level 2:

- (i) Successful completion of an IBSC recognised Category ‘B’ Course AND A minimum aggregate period of 2 years appropriate experience in practical hydrographic surveying.
- (ii) Successful completion of an approved Diploma or Certificate in Surveying, or an allied discipline, AND A minimum of 5 years appropriate surveying experience; 2.5 years of which should be practical hydrographic surveying and which demonstrates an expertise that is not less than that stipulated in (i) above.

### **5.3 Important Definitions - ‘Sea-Time’ and ‘Days In Charge’**

The AHSCP Guidelines for certification are formulated to meet, as a minimum, the standards of competence outlined in M-5 ([http://www.iho-ohi.net/iho\\_pubs/standard/M510thed08.pdf](http://www.iho-ohi.net/iho_pubs/standard/M510thed08.pdf)). Section 4.3 (Certificate of field proficiency) of its current edition states:

*“Appropriate national organizations, or alternatively institutions providing a programme which has been recognized, are encouraged to provide a certificate of field proficiency for successful academic students. It is suggested that such certificates be awarded only to students who present log book records demonstrating completion of at least 24 months of supervised field experience in hydrographic surveying, at least 50 % of which was afloat.”*

Sea-time is a critical component of the certification process and, for the purposes of assessment, is defined as time spent surveying whilst embarked in a hydrographic survey platform (sea-going vessels; a fixed wing aircraft or helicopter undertaking remote sensing hydrographic surveys, etc). Based on realistic achievement in full-time employment one year of sea-time has been defined as 180 days, and for shore-based hydrographic surveyors one day is defined as 7.5 hours. The Panel recognises that in some disciplines of the hydrographic profession sea-time may only constitute part of a day’s work with the remainder of the day taken up with field preparation, calculations or the processing of data from a survey. All these are valid hydrographic tasks that are undertaken onshore.

In attaining certification at Level 1 the Hydrographic Surveyor has been assessed as competent to undertake and manage hydrographic survey projects. Hence it is essential that for certification at this level the applicant has to clearly articulate (in Logbook of Practical Hydrographic Surveying Experience) his/her experience in charge of the planning, management and conduct of a variety of practical hydrographic survey activities.

### **5.4 Submission of Applications and Assessment**

A person wishing to achieve certification will have to satisfy the requirements stipulated by the relevant Level 1 or Level 2 criteria outlined above. The applicant is required to submit the following:

- (i) Completed AHSCP application form and assessment fees
- (ii) Details of educational qualifications
- (iii) Logbook of Practical Hydrographic Surveying Experience
- (iv) A minimum of two references from applicant's most recent supervisors.  
(The referees are to submit their reports direct to the AHSCP secretariat)
- (v) Two recent hydrographic survey reports or plans (for Level 1 applicants).

Applications are assessed in terms of their overall hydrographic surveying competence taking into consideration the applicant's relevant academic qualifications AND practical experience, noting that competence is a combination of knowledge and the ability to practically apply that knowledge gained through relevant experience.

The AHSCP will determine whether the applicant meets minimum standards to achieve certification. The applicant may be required to submit additional evidence in support of the application. Such evidence would typically include, but is not restricted to, personal statements, copies of survey documentation, letters of reference, affidavits, academic transcripts and copies of professional licensing/registration. A personal interview by Panel member/s is also an option.

Formal certificates indicating the level of certification attained (1 or 2) are awarded to successful applicants. The certificate issued will remain current providing Continuing Professional Development (CPD) requirements are met.

### 5.5 Current Status of Certification

The AHSCP has assessed a total of 182 applicants to date (December 2009), of which 117 have been certified at Level 1 and 45 at Level 2. Fourteen (14) applicants are still in the process of assessment, i.e required to submit additional information, mainly in respect of their Logbook (inadequate details, requiring more hydrographic surveying experience, etc.). The remaining 6 applicants have been assessed as not meeting the criteria for certification.

About 17 % of the applications received are from countries outside the Australasian region, as evident from the following breakdown:

#### Summary of AHSCP Applications (as at 31 Dec 2009)

Applications:	Sub Total			Breakdown of Foreign Applications									
	Australia	New Zealand	Foreign	Bangladesh	Canada	Finland	Hong Kong	Italy	Peru	Singapore	South Africa	UK	USA
Certified at Level 1	94	7	16	1		4	1	1		2	4	3	

Certified at <b>Level 2</b>	<b>45</b>	31	7	7		1	2					2	1	1
Under Review (pending submission of additional information)	<b>14</b>	6	1	7								1	6	
Not eligible	<b>6</b>	3	2	1						1				
<b>Total</b>	<b>182</b>	134	17	31	1	1	6	1	1	1	2	7	10	1

## 5.6 Eligibility for Membership of Professional Organisations

Certification by AHSCP will confer eligibility for membership of the SSSI or NZIS - with notation as a Certified Professional in Hydrographic Surveying – Level 1 or 2, and their names included on the SSSI List of Certified Professionals in Hydrographic Surveying (<http://www.sssi.org.au/>). An individual certified at Level 1 is eligible to become a Member of SSSI or NZIS, whereas certification at Level 2 confers eligibility as an Associate Member of these institutes.

## 5.7 Maintaining Certification Currency - Continuing Professional Development (CPD)

The AHSCP is committed to ensuring that certified hydrographic surveyors maintain a level of knowledge that is current and relevant within and across the hydrographic surveying profession. This is achieved through Continuing Professional Development (CPD) administered by the AHSCP with the support of the SSSI and NZIS.

In order to retain certification all certified hydrographic surveyors who are SSSI or NZIS members are required to demonstrate and report CPD on an annual basis in line with their respective Institute's CPD policy. The current SSSI policy requires 15 CPD points per year (20 points for NZIS). Certified hydrographic surveyors who are not members of SSSI or NZIS are required to apply for certification every year providing normal submission documentation but limited to the period since last certification.

Failure of members to commit to CPD, and non-members to certify every year, may result in the removal of the individual's name from the SSSI List of Certified Professionals in Hydrographic Surveying. To regain certification subsequent to being removed from the List it will be necessary to again apply for certification providing normal submission documentation but limited to the period since last certification.

## 6. RECOGNITION OF AHSCP CERTIFICATION

The AHSCP certification process is now widely recognized throughout government and industry, both nationally and overseas.



## 6.1 National Recognition

The AHSCP ‘Specialist Certification in Hydrography’ is now the primary Competency Standard for Hydrographic Surveyors in Australia and New Zealand. Whilst the Panel’s aim is for its certification process to be adopted as the standard by all authorities and sectors of industry, initial concentration is focused on port and harbour surveyors. To date most of the Maritime Authorities and Surveyors Generals of the Australian States have adopted the AHSCP certification as the competency standard for hydrographic surveyors undertaking safety of navigation surveys.

The Australian Hydrographic Service has included a mandatory requirement that any contracted survey for safety of navigation purposes must be conducted by an AHSCP certified Level 1 Hydrographic Surveyor. Additionally, the Royal Australian Navy has introduced a requirement that Navy personnel gain Level 1 certification as a pre-requisite to being appointed “In Charge”

Four significant publications have been developed to supplement IHO Special Publication S-44 (Standards for Hydrographic Surveys) for the Guidance of Hydrographic Surveys in Australia and New Zealand. All of these have the employment of AHSCP Certified Hydrographic Surveyors embedded in their guidelines:

1. ‘Principles for Gathering & Processing Hydrographic Information in Australian Ports’ - A set of generic standards (developed by Ports Australia) for hydrographic surveys within Australian Ports based on the S-44 standards with a tightening of error specifications to meet the requirements of individual port’s Under Keel Clearance formulae.  
([http://www.portsaustralia.com.au/whats\\_new/article.php?id=4](http://www.portsaustralia.com.au/whats_new/article.php?id=4))
2. ‘Standards for Hydrographic Surveys within Queensland Waters’ - A very thorough and specific document developed by Maritime Safety Queensland.  
(<http://www.msq.qld.gov.au/Waterways/Hydrographic-survey-standards.aspx>)
3. ‘Guidelines of Good Practice for Hydrographic Surveys in New Zealand Ports and Harbours’ – published by Maritime Safety New Zealand  
(<http://www.maritimenz.govt.nz/>)
4. ‘Draft Guidelines for Hydrographic & Geotechnical Data’ - published by Maritime New South Wales  
([http://www.maritime.nsw.gov.au/docs/policy/Hydrographic\\_%20geotechnical\\_data\\_guidelines.pdf](http://www.maritime.nsw.gov.au/docs/policy/Hydrographic_%20geotechnical_data_guidelines.pdf))

It is becoming more and more evident that the AHSCP certification of hydrographic surveyors is being recognized within the Industry in Australia and New Zealand, as the requirement for Level 1 hydrographic surveyors is now being regularly specified in government and port authority contracts and for position applications. Under the Australian

skilled migration programme, applicants with professional qualifications and experience in hydrographic surveying are referred to the AHSCP for assessment.

## **6.2 International Recognition of National Certification Schemes**

In 2006 the Panel requested the FIG-IHO-ICA International Board on Standards of Competence for Hydrographic Surveyors & Nautical Cartographers (IBSC) to expand its scope to include the recognition of individual competency schemes such as the AHSCP certification programme. The IBSC meeting held in Sydney in 2008 provided members of the Board with an opportunity to attend the AHSCP meeting and observe the manner in which the AHSCP conducts its business, particularly the assessment of applications for certification.

Following mandate from its parent organizations, the IBSC is developing guidelines for recognition of national, regional and industrial schemes which themselves recognize and accredit hydrographic surveyors and nautical cartographers. These 'Guidelines for Individual Recognition Schemes' will be included as a section of the IHO M-5 and S-8 Standards. The AHSCP is in the process of seeking IBSC recognition for the AHSCP Certification Programme.

Such an endorsement will further promote the status of AHSCP certification to relevant government authorities and industry in Australasia and enhance international recognition of the profession of Hydrography. Furthermore international recognition of national certification programmes will assist regional and national bodies to apply consistent standards to the certification of hydrographic surveyors, but will not prevent those bodies from imposing additional requirements, such as knowledge of local law, as pre-requisites for licensing or registration before permitting persons to practice Hydrographic Surveying within their jurisdictions.

## **7. CONCLUSION**

The AHSCP has evolved from an Australian domestic requirement to regulate an industry where no formal training was available through to an internationally accepted competency certification scheme that currently fills a void in formal recognition of hydrographic competency.

Operating under the combined stewardship of the Australian and New Zealand National Professional Survey Associations (SSSI and NZIS) it is a body of experts from the various hydrographic disciplines that rigorously applies the FIG/IHO/ICA endorsed competency requirements for hydrographic surveyors by confirming evidence of academic study, combined with a assessment of their verified employment history, relevant hydrographic experience and evidence of recent projects to assess the competency of individuals and award certification. Conversely, the IBSC removed the mandatory requirement for practical surveying experience as part of a recognised course with the publication of Edition 7 of M-5 in 1994, thus a Category 'A' Hydrographic Surveying qualification alone can no longer be

considered a de-facto competency standard.

This robust system of competency assessment and certification of individuals supports and protects maritime authorities (by ensuring that work is done by a competent professional), employers and contractors (by reducing their overheads in assessing the experience and qualifications of their prospective job applicants) and hydrographic surveyors themselves (by providing a credible system that certifies their competency). The AHSCP certification programme has already made a significant contribution towards ensuring that the hydrographic surveys critical to safety of navigation and marine exploration are conducted by competent professionals, thus reducing risk of incident and promoting marine safety and environmental protection.

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## BIOGRAPHICAL NOTES

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Commodore Nairn is currently Chairman of the Australasian Hydrographic Surveyors Certification Panel, the Permanent Committee on Tides and Mean Sea Level and the Ports

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Mr Jasbir Randhawa [MSSSI (Cert. Prof. Hydrographic Surveyor Level 1), MSISV, MISM] is currently Deputy Director External Relations, Australian Hydrographic Service. Passed the RICS Final Exams in Land Surveying (1973) UK, Category 'A' Hydrographic Surveying Course at RN Hydrographic School, HMS DRAKE, UK (1983). Employment - Hunting Surveys, UK (1973-1974); Port of Singapore Authority (1974-1989); Australian Hydrographic Service (1989 to present). His surveying experience includes land surveys in UK and Iran, offshore hydrographic surveys in the North Sea, harbour surveys in Singapore, the Joint Hydrographic Surveys and Joint Tidal & Current Studies in the Straits of Malacca and Singapore, Hydrographic Surveys of Muara Port and Brunei River in Brunei Darussalam.

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