



The hydrographic surveyor is a specialist in precise positioning and data acquisition in marine environments, expected to work in a wide range of differing situations and applications from inland waters and rivers, to ports and the deep oceans. Moreover, as land resources become scarce, those available from oceans become significant. Cobalt crusts on seamounts and mineral rich manganese nodules will need to be pinpointed and recovered. Effects of wind, waves, changing land and sea levels all necessitate coastal protection. The hydrographic surveyor is a key member of a team comprising planners, ecologists, civil engineers and others dedicated to the acquisition and application of data necessary for monitoring and protection of the environment.

Navigation, oil, gas and mineral resource exploration and recovery, dredging, coastal works, bridge and port construction, submarine telephone cables and pipelines, environmental monitoring, aquaculture and oceanographic research are all crucially dependant on the hydrographic surveyor for accurate, reliable information.

Hydrographic data was first collected on coastal voyages using lead line and shore sights. Captain Cook's 18th century pioneering transformation of the map of the Pacific remains one of man's greatest maritime accomplishments. Naval charts became the hallmark of excellence and certainty; many of the world's navigational charts continue to be produced by naval organisations. Modern charts conform to recognised standards, established by the Monaco-based intergovernmental International Hydrographic Organisation, ensuring high quality and ease of use.

Hydrographic surveyors use state-of-the-art technology ranging from sophisticated sensors to high accuracy positioning systems and were at forefront of developing and refining the use of the GPS, enabling worldwide, 24-hour, all weather, high accuracy positioning. The latest underwater acoustic techniques provide precise relative positioning of both surface and subsea vessels over kilometric distances. Seawater temperature and salinity profiles make allowance for changing signal paths in the water layers. Sound impulses emitted at close intervals as a vessel moves ahead enable electronic stacking of reflected data from points on the rock strata. The resulting high-resolution two and three-dimensional images are essential to the successful search for oil and gas. Developments in swathe sounding technology allow coverage of large areas of the oceans from a single ship in a fraction of the time previously taken. Airborne data gathering has also become more commonplace with the use of colour lasers and remote sensing of the seabed.

For further information see the International Federation of Hydrographic Societies' *Special Publication No. 3 - Hydrography as a Career*

What to expect from a career in hydrography

- The basic graduate starting salary is typically around £16-17,000. On top of this an allowance of up to £75 may be earned for each day spent offshore. Typically 180 days will be spent ashore or at sea per year, equating to an additional £8,000-£14,000.
- Earning potential reaches around £40,000. The basic salary for a party chief is around £27,000, typically with 150 days offshore at £120-140 per day.
- Salaries can vary greatly depending on location, employer, shift premiums and experience.
- Working hours may include regular unsocial hours and can be determined by tides and daylight.
- Some tasks require continuous use of equipment to meet time constraints and make full use of investments.
- Ability to work offshore follows the weather. In the northern hemisphere offshore work tends to be between April and October, accrued leave between September and November and in-house training during the winter months. The self-employment/freelance market may be dependent on commercial activity and contacts.
- Some hydrographic surveyors, mostly self-employed, follow the sun from one hemisphere to another doing contract work in the UK, Europe and North American waters then moving to Australasia and the Pacific Rim.
- Work is largely offshore. Some surveyors are able to live where they wish and fly to the ports to join their vessels. However, staff are generally encouraged to live within commuting distance of their employer's main office.
- Onshore work is generally in office hours. However, if there is a specific problem that needs to be dealt with it may necessitate working late to resolve it.
- Office staff may be on-call over the weekend to handle any offshore problems. This duty might be split between a team.
- Hydrographic surveyors must be prepared to be away from home for extended periods, sometimes at short notice. Long periods away from home are interspersed with long breaks onshore spent at home and/or at shore locations for training and data analysis.
- Although the profession has traditionally been male-dominated this has changed from a 90/10 ratio to a 60/40 ratio in the last ten years.

... a profession whose workplace is at least 70% of the world's surface

Although there are several routes into a career in hydrographic surveying, including via the armed forces, graduate entry now predominates. The profession is open to graduates of many disciplines but a degree in one of the following subjects considerably increases an applicant's chances:

Hydrographic Surveying • Ocean Exploration • Land Surveying
Engineering • Marine Sciences • Civil Engineering
Physical/Mathematical/Applied Science • Geography/Cartography
Computer Science/Software Engineering

A postgraduate qualification is often necessary for those with a less relevant degree. Ability in mathematics and computing is essential.

Recruitment is predominantly based on the interview. Interpersonal skills are ranked particularly highly to ensure that candidates are able to get on with people in pressured situations. Candidates will also need to demonstrate that they are quick learners and have practical skills.

Relevant experience via a sandwich placement or vacation work can be very helpful. Knowledge of navigation/global positioning systems, geographic information systems, seamanship, boat handling and emergency procedures are helpful, although not essential. A driving licence is usually required.

Support and participation in the activities offered by professional bodies, such as the International Federation of Hydrographic Societies and its member hydrographic societies, introduces students and prospective hydrographic surveyors to potential employers, gives them an insight into developments within the profession and demonstrates a professional commitment on a CV.

A typical career path begins with graduate entry at the level of trainee surveyor, engineer or geophysicist depending on the area of specialism and then, following a period of training and experience, progresses to surveyor, engineer or chief physicist. The next probable steps are promotion firstly to senior surveyor and then to the management role of party chief. However there are only a comparatively small number of management roles. Faced with this barrier a number of hydrographic surveyors consider a different role, more focused on client liaison, health and safety, procedural matters, looking after and overseeing the staff, time-management, offshore management, technical backup or training.

Alternatively, having gained four or five years' experience working within a company, it is not uncommon for a hydrographic surveyor to decide to set up on his/her own as a self-employed contract surveyor.

03-09



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Employment Sectors

- **National charting agencies** responsible for the part of hydrography concerned with the production of nautical and navigational charts.
- **Port and harbour authorities** in the main have a self-contained survey department (which may consist of just one person).
- **Contract survey companies** rely on winning contracts by competitive tendering to client companies. Some contract companies maintain a wide range of expertise amongst their employees, others may limit themselves to particular specialisms.
- **Client survey companies** require survey work to be carried out and contract it to a contract survey company. The role of the surveyor within these organisations is to agree the work to be done and ensure that it is carried out to the required standard and specification. Many client companies may not have an in-house survey section, but rely on hiring expertise to look after their interests on a job-to-job basis.
- **Equipment and software companies** and numerous service companies also employ hydrographic surveyors.
- **Freelance surveying and consultancy** makes up the self-employed element of the survey profession. This is an increasingly popular option for those who have gained experience and confidence in the field. Companies frequently deal through agencies when contracting self-employed hydrographic surveyors and it is quite rare to deal directly with the self-employed person.

Activities may include

- using geographical information systems, global positioning systems, sonar and echo sounders to provide data for nautical charts and maps
- dealing with clients internally and externally to provide tenders and results in appropriate forms
- managing projects
- producing reports
- providing accurate and reliable information for other disciplines including navigation; oil, gas and mineral resource exploration; dredging; coastal works; seabed telephone cables; subsea pipelines; environmental monitoring; aquaculture; oceanographic research; bridge construction
- sourcing information on seabed type, water movements and waves
- for those working onshore – production of reports and problem solving for colleagues working offshore
- reviewing company procedures, software projects, providing feedback on courses and in-house training