

THE NEXT SIZE UP

Inshore Survey Vessels

The May 2002 edition of Hydro international included two articles on small 7-10m outboard motor-driven inflatable and GRP road-towable planning boats adapted for near shore, sheltered water or estuarial hydrographic surveys. This article outlines the specifications and requirements of the larger 10m-14m LOA purpose-built inshore survey vessels which have evolved as the standard for most major or long duration open-sea inshore hydrographic and geophysical surveys.

Inshore hydrographic and geophysical surveying is probably the most difficult and demanding of all survey work. Offshore deep-water operations from large and comfortable survey ships have become a day-to-day routine and make few demands on vessels or surveyors other than the repair and maintenance of equipment for which all onboard facilities will be available.

The inshore surveyor works in small day-work survey vessels, often in uncomfortable conditions on the limits of the vessel's sea-keeping abilities. Other difficulties involve possible restricted harbour and survey site tidal access, shipping traffic, yachts and pleasure craft, static fishing gear, angler's lines from piers, beach access, groynes and swimmers, availability of berths in crowded marinas, hotel accommodation and early or late tidal working and meals for surveyors and crews.

An unsuitable or undersized inshore survey vessel will not help the above.

Criteria

The survey vessel is the backbone and one of the major costs of a survey and should be carefully chosen. The successful open-sea inshore survey vessel evolved from the following requirements: 10m-14m length giving the best compromise for open-sea inshore surveying regarding cost, draught, sea keeping, manoeuvrability and ability to support the required number of survey staff, crew and survey equipment for cost-effective collection of reliable survey data in an acceptable range of sea conditions. Other important criteria include:

Traditional heavy displacement or semi displacement hull form which has better sea-keeping abilities than light, shallow draught, planing, mono or catamaran hull forms. These include better line keeping at slow speeds in gusting and cross winds and surging tidal streams over irregular seabeds, and less rolling and pitching and sudden sensor movements which degrades survey data, particularly in short seas.

Accommodation

Adequate wheelhouse, accommodation space and seating, cooking, domestic and toilet facilities, heating or air conditioning and ventilation in accordance with regulatory requirements for surveyors and crew to enable them to efficiently work the normal 10 or 12 hour inshore survey day in all seasons. For echo sounding, staff can comprise surveyor, skipper and crew. For additional side-scan, seismic and magnetometer surveys they can comprise surveyor, assistant surveyor, engineer, geophysicist, client's representative, skipper and crew. Most maritime safety regulations do not permit single manning. Survey staff working long hours in undersized, unsuitable boats and difficult and uncomfortable sea conditions are unlikely to function efficiently or produce good work.

Sufficient wheelhouse space for all types of survey equipment, non-slip deck and working space for stowing and handling towed transducers, grabs and generators and below-deck stowage space for seismic power sources and replacement survey equipment to avoid having to return to port in the event of an equipment breakdown.

The ability to carry all staff, equipment and spares within the passenger licence, regulatory loading and stability limits. A maximum draught of 1.0m to 1.5m to allow adequate surveying time over shallows and between low and high water marks. Propellers protected by keel skegs. An inshore survey vessel may often make contact with the seabed and the propeller is close to the deepest part of the vessel and vulnerable to damage, particularly on twin-screw vessels. Ability to ground and dry out without damage or falling over, if necessary using support legs.

Engines

Reliable inboard diesel engines and low-revving, non-turbocharged engines are the more dependable. Engines should be well soundproofed as excessive noise over long working periods is a major contributor to fatigue. Petrol engines, with their high fuel consumption and the large quantities of petrol which must often be carried to give the range to and from survey sites and for surveying, with the attendant fire hazard and regulatory restrictions, are generally unsuitable for commercial marine use. The ability to run at a sustained slow survey speed of between 3.0 to 3.5 knots for side-scan and seismic work without having to constantly engage and disengage the engine drive. Tight turning ability for minimum line hop when running close echo-sounding lines and for backing out from a beach or wall between groynes or other obstructions. Large diameter cable entrance and exit ducts in the wheelhouse and any stowage spaces for cable runs to and from equipment. Cables should not be run through open doors, windows or hatches which will compromise vessel safety, security and general convenience.

Hull mounted echo-sounding transducers which are standard on any purpose-built survey vessel and avoid over-the-side mounting complications. Transducer offsets should be recorded in the vessel's hull drawings or papers. Bow and side-mounted swathe sounding transducer poles should be available. The vessel should have a chain or wire bar check, preferably operated by small hand winches.

Adequate 12V, 24V DC, 110V and 220V AC power supplies with high capacity (100 amp) alternator and battery bank. AC power can be supplied by generators, rotary or static inverters. Supplies to computers should be through a UPS as loss of power can cause loss of recorded survey data for which a chartered vessel could be held responsible. The vessel should be wired for shore mains for data

processing in harbour, charging batteries and general domestic use.

Noise Requirements

Low electrical and acoustic noise, particularly for seismic work and for the former a steel vessel is the better. Power supplies and vessel electrical equipment must be suppressed to avoid interference with survey equipment. Acoustic noise from hull and propeller wash can be minimised by towing transducers or hydrophones on outriggers to one side of the vessel. A single earthing point to the hull of a steel vessel, or to an earthing plate on a GRP vessel, should be provided.

Cellular phone and fax with masthead antenna for best range. Five-day hard-copy weather forecasts are essential and can be received by cellular fax or the NAVTEX system and records kept to substantiate bad weather standing.

Stern gantry or derrick and a winch for handling over-the-side towed transducers, grabs, oceanographic equipment and for loading and discharging these and seismic supply generators. Lifting gear must have load test certification, be marked with the safe working load and operated within lifting limits specified in the vessel stability book.

A fast survey vessel will give more surveying time where there is a long distance between the working port and survey site. High speed surveying is generally prevented by speed limits in port approaches, harbours, rivers, estuaries and beach areas and shipping traffic, yachts, windsurfers, buoys, rocks, shallows, static fishing gear, angler's lines, groynes, swimmers, sea conditions, spray, pounding, vibration and sheer speed of events prevent it from being a practical or safe option elsewhere.

Transportable by road for surveys a long distance from the home or last working ports, or the infrequent need for "rapid response". This will involve width limits and a removable or folding mast for access under bridges. Travelling by road avoids wear and tear and bad weather delays on long sea transits and ensures arrival on time.

Safety certification issued by a competent authority. In the UK this is the Maritime & Coastguard Agency and Category II certification for up to 60nm from a safe haven, carrying up to 10 persons, is a practical standard for 10m-14m inshore survey vessels. Skipper and crew must hold certificates of competency and medical, first aid, survival and fire-fighting endorsements. Insurance endorsed for commercial survey operations, including public liability cover to £2.0 million for injury or death for all persons on board, the public, damage to other vessels, fishing gear or structures, etc.

Open sea inshore survey vessels conforming to the above will be efficient, obtain reliable survey data and complete their surveys in an acceptable range of sea conditions without excessive down-time costs on fixed price and bad weather standing or lump sum price contracts, to the advantage of clients, contractors and the reputation of the inshore survey industry generally.