CONCEPT

Hydrographic Surveying Training Course: Multibeam Bathymetry, Tides and Data QC

14 – 18 November 2027
Riyadh - KAFD district five-star



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Ref: 1338_31176 **Date:** 14 – 18 November 2027 **Location:** Riyadh - KAFD district five-star **Fees:** 20000 SAR

Introduction:

Hydrographic surveying, covering multibeam bathymetry, tides and data QC, is a 1-week course for port, marine, dredging and coastal survey teams that ends with a Hydrographic Survey Plan and QC Report for a case port approach channel. Ports and marine projects lose time and money when depth data reaches charts, designs or dredging decisions with uncorrected sound velocity, wrong tide reduction or unknown uncertainty, so channel limits and berth depths cannot be trusted. Nominees already acquire, process or check survey data and work through a modelling build of line plans, uncertainty budgets and QC checks. CoreConcept Training Center delivers this hydrographic surveying course.

Course Objectives:

- Specify the purpose, survey order, coverage and deliverables of a hydrographic survey for a port channel, berth or marine works site
- Select and configure single-beam, multibeam and side-scan sonar systems for the depth, seabed type and feature detection required
- Integrate GNSS, inertial motion data, vessel offsets and patch test calibration values into a survey system set-up
- Apply sound velocity profiles and tide or ellipsoid-referenced reduction to bring soundings to chart datum
- Clean multibeam data, estimate total propagated uncertainty and run crossline and junction checks against the required survey order
- Produce bathymetric surfaces, chart extracts and volume grids within a Hydrographic Survey Plan and QC Report for a case port approach channel

Target Audience:

- Hydrographic survey teams that plan, acquire and process bathymetric data for ports and marine works
- Port and harbour engineering teams responsible for channel, basin and berth depth records
- Dredging survey teams that supply depth surfaces for progress monitoring and handover
- Coastal and marine construction survey teams that check seabed levels around structures and outfalls
- Survey data processing teams that clean soundings and prepare charts, grids and reports

Course Outline:

Day 1: Hydrographic Survey Purpose, Products and Port Survey Baseline

- Hydrographic Survey Purposes for Navigation, Construction and Dredging
- Nautical Chart, Bathymetric Surface and Seabed Feature Products
- Survey Platforms from Crewed Launches to Uncrewed Surface Vessels
- Survey Specification Review for Approach Channels and Berth Pockets
- Current-State Review of a Port Bathymetric Data Archive

Day 2: Survey Standards, Accuracy Orders and Acoustic Sensor Principles

- International Hydrographic Survey Standards Orders and Coverage Requirements
- Total Horizontal and Vertical Uncertainty Limits by Order
- Single-Beam Echosounder Frequency, Beam Width and Draft Settings
- Multibeam Echosounder Swath Geometry, Beam Forming and Backscatter
- Side-Scan Sonar Range, Towfish Altitude and Target Detection

Day 3: Positioning, Motion, Sound Velocity and Tide Reduction in Practice

- GNSS RTK and Post-Processed Kinematic Positioning on Survey Vessels
- Heave, Pitch and Roll from Inertial Motion Reference Units
- Vessel Offset Measurement and Multibeam Patch Test Calibration
- Sound Velocity Profile Casts and Refraction Correction Checks
- Tide Gauge Records, Chart Datum and Ellipsoid-Referenced Reduction

Day 4: Data Processing, Uncertainty, QC Failures and Survey Safety

- Multibeam Sounding Cleaning with Swath and Surface Editors
- Total Propagated Uncertainty Budget for Each Depth Sounding
- Crossline Comparison, Junction Checks and Data Density Tests
- Diagnosing Artefacts from Timing, Refraction and Heave Errors
- Survey Launch Risk Assessment and Safe Working at Sea

Day 5: Modelling Build of the Port Approach Channel Survey Plan and QC Report

- Case Approach Channel Survey Brief and Order Selection
- Case Line Plan, Sensor Configuration and Calibration Schedule
- Case Uncertainty Budget and Tide Reduction Workflow Build
- Case Bathymetric Surface, Chart Extract and Volume Grid Outputs
- Hydrographic Survey Plan and QC Report Completion and Review

Skills You Will Gain:

- Survey Order Selection
- Echosounder Configuration
- Patch Test Calibration
- Sound Velocity Correction
- Tide Reduction to Chart Datum
- Uncertainty Budgeting
- Multibeam Data Cleaning
- Bathymetric Deliverable Preparation

Why Attend This Course:

- Deliver a Hydrographic Survey Plan and QC Report for a case port approach channel to the marine engineering head and the harbour master's office
- Decide which survey order, sensor set and line spacing a channel, berth or construction site needs before a vessel is mobilised
- Avoid resurveys, disputed depths and unsafe charted depths caused by unchecked sound velocity, tide or calibration errors
- Share line planning, calibration, uncertainty and QC checklists with surveyors and data processors across the unit

Conclusion:

Back at work, the participant gives the marine engineering head and the harbour master's office a Hydrographic Survey Plan and QC Report that sets survey order, line plan, sensor calibration, tide reduction, uncertainty budget and deliverable formats. The port uses it to approve survey contracts, accept contractor data and decide whether charted depths and declared channel limits can be maintained. After the first survey, the unit should review crossline results, uncertainty against the chosen order, resurvey requests and any delay in data delivery.

Frequently Asked Questions FAQ:

What should participants know before a hydrographic surveying course on multibeam bathymetry?

Participants should already acquire, process or check depth survey data and understand basic coordinates and heights. Bringing a recent survey specification, line plan or QC report from their own port or project helps them apply the modelling build to real work.

How does hydrographic surveying differ from a dredging or land surveying course?

It concentrates on acquiring and qualifying depth data: echosounders, positioning, motion, sound velocity, tides, uncertainty and QC. Dredging courses use those surfaces to measure pay volumes and select dredgers, and land surveying courses set out works on shore with total stations.

Why does hydrographic surveying need sound velocity and tide corrections?

Without them soundings are wrong. Sound speed changes with temperature and salinity, bending the outer multibeam beams, and the water level moves with the tide, so each depth must be corrected for refraction and reduced to chart datum before it is charted or compared.

What do participants take back from the hydrographic surveying course?

Participants take back a Hydrographic Survey Plan and QC Report for a case port approach channel, with line planning, calibration, uncertainty and QC checklists, plus templates for bathymetric surfaces, chart extracts and volume grids they can adapt to their own surveys.