COMPREHENSIVE STABILITY TRAINING ACCREDITATION PROGRAMME

AND

BALLAST CONTROL OPERATOR CERTIFICATION PROGRAMME

Operated by the
International Association of Drilling Contractors
In conjunction with

The Nautical Institute

OVERVIEW

IADC, in conjunction with the Nautical Institute, has developed a standard for a comprehensive stability training course based on IMO Assembly Resolution A.891(21).

This course is intended to fulfill the international flag state training requirements for Ballast Control Operator (BCO), Barge Supervisor (BS), and Offshore Installation Manager (OIM) licenses serving aboard an MOU. The system has been officially approved for individuals seeking those licenses on vessels registered in the Marshall Islands and Vanuatu.

The course has also been designed as the starting point for an IADC Ballast Control Operator (BCO) Certification, which qualified individuals can obtain upon documentation of sea time and verified completion of key ballast control tasks.

This document is provided as a reference to the specifications and characteristics of these two programmes. It is divided into the following sections:

Part 1 – Provider Accreditation. This section describes the basic specifications of the training provider accreditation system, including instructor qualifications and course guidelines.

Part 2 – BCO Certification. This section describes the process under which a qualified individual can obtain IADC certification as a Ballast Control Operator, including requirements for documentation and recertification.

Appendix A – Comprehensive Stability Course Curriculum

Appendix B – IADC Accreditation Procedures

Appendix C -- Ballast Control Operator Logbook

PART 1 -- PROVIDER ACCREDITATION

Training providers seeking to deliver the course must demonstrate compliance with standards of accreditation established by IADC/NI regarding course structure, instructional materials, testing and administrative procedures, and instructor qualifications. Once awarded, accreditation is valid for a period of five years, contingent on annual renewal and reporting requirements. Training providers must issue an IADC Certificate of Completion to students successfully completing an approved course. Certificates may be one of two classes:

Class A – Comprehensive stability instruction utilizing full-motion simulators to replicate extreme wind and sea conditions and emergency situations; this certificate would comply with regulations in the United Kingdom, flag state requirements, US Coast Guard (USCG) and the International Maritime Organization (IMO).

Class B -- Comprehensive stability instruction without full-motion simulators, compliant with flag state requirements, USCG and IMO. (Not compliant with regulations in the United Kingdom.)

Training providers are encouraged to develop a student pre-evaluation process to determine proficiency in basic math skills prior to entering the course, and to give consideration to providing a preparatory course in theory and/or mathematics to students with a demonstrated need to develop stronger skills. Such a preparatory course may be delivered using computer based training (CBT) or distance learning methodology.

A complete outline of the required Comprehensive Stability Course Curriculum is contained in Appendix A.

RETRAINING

It is recommended that any individual who has had a lapse of service of two years or more as an active BCO be retrained in accordance with the IADC Ballast Control Operator Training & Certification programme.

Individuals who have previously obtained BCO Certification may choose to be retrained as a method of renewing their certification (See Part 2 – BCO Certification).

INSTRUCTOR QUALIFICATIONS

Instructors conducting comprehensive stability course must have the knowledge and competence to deliver the training. All instructors teaching the comprehensive course must be approved in advance by IADC/NI. When a new training centre submits an accreditation application to IADC, it is necessary to provide a list of instructors to be involved in the training, together with their biographical data or C.V. If a new instructor is brought into a training centre that has already been awarded accreditation, similar C.V.

data must be provided to IADC. Similarly, the training centre must inform IADC of any instructor no longer involved in its comprehensive stability training.

Instructors must be able to demonstrate possession of at least two of the following:

- **Current Marine License (Master, Mate, BCO, BS, or OIM)**
- **Relevant maritime experience and/or MODU experience**
- **Relevant teaching/presentation experience**

Specific requirements and expectations of these elements are detailed below:

Marine License

To satisfy this requirement, instructors must have offshore experience and hold the appropriate mariner's credential. Instructors should ideally hold a qualification as, Master, Mate, OIM, Barge Supervisor, or Ballast Control Operator. Preferably, comprehensive stability instructors should hold a comprehensive stability certificate.

Relevant maritime experience and/or MODU experience

To satisfy this requirement, instructors must have offshore experience and should have experience in the conduct of ballast/stability operations or have other specialized operational experience.

Relevant teaching/presentation experience

This will involve case-by-case evaluation of the instructor's resume. Many people have backgrounds with education, training and work experience that would substantiate the level of knowledge and skill needed for approval as an instructor. To allow proper evaluation of instructors, expertise and job experience must be clearly laid out in the submitted resume.

It is recommended and advisable that training establishment instructors possess full knowledge of the education process (instructional technology) and teaching experience, *i.e.*, the instructional skills and ability needed to accomplish the objectives of the training and impart the required information to the students. Such experience and skill covers a wide range of abilities, including those necessary to:

1. Understand learning objectives and curriculum;
2. Develop an effective training program;
3. Be familiar with various training media and presentation techniques;
4. Communicate the knowledge to the students;
5. Develop, understand and apply assessment criteria; and,
6. Measure performance.

To show knowledge, experience, and ability in instructional technology, IADC requires experience in course/curriculum development, as well as instructor ability. This can be substantiated by demonstrating the following:

- Work experience as an educator, documented by performance evaluations showing successful performance in curriculum development, assessment criteria development, and presentation of material and lecturing. The National Maritime Center (NMC) does not consider student course critiques or letters prepared specifically as documentation to obtain instructor or course approval to be performance evaluations;
- Successful completion of relevant education and training; and/or,
- Successful completion of a 40-hour "train-the-trainer" course.

Assistant Instructors

IADC may also approve assistant instructors in subject or skill areas where operational or seagoing experience is not crucial. Assistant instructors may conduct instruction and assessment under the supervision of a lead instructor. Subdivision of training courses or programs into specific areas of subject matter (course modules or topic areas) will allow for easier evaluation of assistant instructor qualifications. (If the assistant instructor is being groomed to become a full instructor, he/she should meet the same operational and offshore experience requirements)

COURSE TIME REQUIREMENTS

The comprehensive stability course must consist of a minimum of 40 hours of instructor/student contact time. The training provider may add additional contact time at its discretion. There is no requirement the course be conducted on consecutive days (e.g., a class spread over two weeks with no class on weekends.) Contact time should be limited to no more than nine hours per day.

TESTING REQUIREMENTS

The test(s) should include stability theory, large angle stability, negative stability, environmental effects of the mooring system, damage control, and a mathematics test involving a short form calculation. The minimum short form calculation should involve adding and removing weights from a summary sheet and result in trim and list in degrees as well as new KG margin.

Test construction is at the training provider’s discretion, and may include multiple choice, essay, short answer or fill-in-the-blank questions but as a minimum should include relevant calculations. Providers must describe test scoring/passing criteria.

COURSE SIZE LIMITATIONS

The Comprehensive Course will be limited to no more than 15 students. Facilities used must include adequate spacing, ventilation and lighting.

REVIEW & APPROVAL PROCESS

The process under which the accreditation process will operate is contained in Appendix B. Also included in this appendix are additional considerations and guidance for training providers.

PART 2 -- BCO CERTIFICATION

The course has also been designed as the starting point for an IADC Ballast Control Operator (BCO) Certification, which qualified individuals can obtain upon documentation of sea time and verified completion of key ballast control tasks.

Students who have completed the comprehensive course may have subsequent work experience documented in the IADC Ballast Control Operator Logbook, with written certification provided by an immediate licensed supervisor.

Upon completion of all sections of the Logbook and a minimum of six months' recorded sea service as a ballast control operator or BCO trainee**,** the students may return the Logbook to IADC with a request for BCO Certification. Upon verification of the Logbook, IADC will issue the individual a BCO Certification.

LOGBOOK

The IADC Ballast Control Operator Logbook containing the BCO Familiarization Log and Assessment is contained in Appendix C. Actual logbooks will pocket-sized, approximately 11 by 15.5 cm (4.25 by 6 in).

The logbooks are to be issued by accredited training providers to those persons interested in pursuing individual IADC BCO Certification. For individuals who wish to be grandfathered into the programme, logbooks will also be available from IADC upon submission of qualifying documentation.

The logbook is the property of the individual and contains the record that will provide evidence of qualifying for the BCO Certificate. It is important that it be kept safe and that all the sections are properly completed.

Following an accredited course, the training provider should ensure that the details are entered in the logbook and it is stamped and signed by the instructor upon satisfactory completion of the course.

The logbook must be signed while offshore by a licensed supervisor. For purposes of this logbook, a licensed supervisor is defined as a flag state licensed Offshore Installation Manager (OIM), Barge Supervisor (BS), Ballast Control Operator (BCO), Master or Mate who is supervising the BCO Candidate during the time the Ballast Control Familiarization Log is completed.

At the end of the on-board training period, the OIM or Master must sign the endorsement contained in section D.

When the logbook is complete, it should be sent to IADC at the address listed in the book. IADC will then verify the following information:

- Stamped evidence of successful completion of an approved comprehensive stability course
- Completed BCO Familiarization Log (Section B) signed by a licensed supervisor
- Signed evidence of sea time by an OIM or Master in Section C.
- Endorsement of the OIM or Master in Section D.
- Vessel stamp and official number.

Upon verification of the above, IADC will record the award of the BCO Certificate in the logbook and return it with a numbered and dated BCO Certificate.

Grandfathering for existing BCOs. Persons currently employed as BCOs may obtain IADC BCO Certification by presenting the following to IADC:

- Proof of having previously attended a flag-state recognized stability course;
- Verifiable documentation of six months recorded sea service as a ballast control operator; and
- A completed IADC logbook including the BCO Familiarization Log and Assessment signed off by a licensed supervisor.

RECERTIFICATION

IADC BCO certification will be valid for five years, at which time retraining or requalification will be required to renew certification. This may be accomplished through the following means:

- Retaking a complete comprehensive course;
- Completing an approved refresher course;
- Recompleting the logbook;
- Or by other means that may be defined in the future.

As noted in Part One, it is recommended that any individual who has had a lapse of service of two years or more as an active BCO be retrained in accordance with this programme prior to being re-employed as a BCO.

SUPERVISOR/ASSESSOR GUIDANCE

The BCO Certification process begins with a comprehensive stability course at an accredited training provider, but it is essential that Licensed Supervisors perform on-the-job training of BCO Candidates and provide a realistic assessment of their performance. Should an assessment reveal the employee cannot correctly complete a task, immediate training or re-training should be provided by the supervisor.

The Licensed Supervisor should have prior experience in and be proficient in each of the tasks being assessed in the familiarization log. It is the Licensed Supervisor's role to

assess the BCO Candidate's performance with the tasks in the familiarization log, and to sign off on those he has observed to be performed satisfactorily.T

The assessment should focus on the core knowledge, skills and abilities that the BCO Candidate must possess to perform the listed tasks safely and effectively. The main purpose of the assessment is as follows:

- To verify, through observation and questioning, that the core job skills necessary to do the job have been mastered by the BCO Candidate.
- To ensure the BCO Candidate understands what is required to address each skill.
- To develop the ability to identify when extra training or coaching may be needed.

Additional guidance for supervisors and assessors is contained in a section of the logbook.

Appendix A

COMPREHENSIVE STABILITY COURSE CURRICULUM

Training providers are encouraged to develop a student pre-evaluation process to determine proficiency in basic math skills prior to entering the course, and to give consideration to providing a preparatory course in theory and/or mathematics to students with a demonstrated need to develop stronger skills. Such a preparatory course may be delivered using computer based training (CBT) or distance learning methodology.

Emergency procedures should be assessed through on-board simulation. This may be supplemented by simulation exercises conducted in dedicated training facilities.

The following outlines required topics of instruction for the comprehensive course of instruction.

I. Knowledge of and ability to apply relevant international and national standards.

1. Basic Units and Definitions
   - Systems of Measurement (Metric, Imperial and US Customary units)
   - Quantities and Measurements for Stability Calculations
   - Definitions

II. Use of loading/stability information from trim and stability diagrams and marine operations manual. Additionally, computerized loading/stability programmes may also be included.

1. Hydrostatic properties
   - Hydrostatic Property Information
   - Draft
   - Displacement
   - Height of the Centre of Buoyancy (KB) or Vertical Centre of Buoyancy (VCB)
   - Longitudinal Centre of Buoyancy (LCB) and Transverse Centre of Buoyancy (TCB)
   - The Waterplane Area (WPA)
   - Tons Per Inch (TPI)—Tonne per cm (TPC)
   - Longitudinal Centre of Flotation (LCF) and Transverse Centre of Flotation (TCF)
   - The Height of the Longitudinal Metacentre (KMl) and Transverse Metacentre. (KMt)
   - Moment to Heel or Trim 1° (MH1°–MT1°). Moment to Trim or Heel 1 cm (MCT–MCH)

2. Free surface effect
   - The Free Surface Effect on Stability
   - Calculation of the Loss of GM caused by the Free Surface Effect
   - The effect of added bulkheads in tanks on the Free Surface Effect
   - The Tank Tables with Free Surface Moment
   - Wet and Dry GM

3. Stability calculations on board
   - Loading Conditions
   - The Mooring System Correction
   - The Maximum Allowable Area Loading
   - The Stability Calculations on Daily Report Forms
   - Tank Capacity Tables and Curves

III. Understanding of fundamental principles-theories-factors affecting trim and stability to preserve trim and stability and measures to preserve trim and stability.

1. The centre of gravity, the centre of buoyancy, and the metacentre
   - The Centre of Gravity (G)
   - The Centre of Buoyancy (B)
   - The Metacentre (M)
   - The Height of the Metacentre (KM)
   - The Stability Couple
   - The Metacentric Height (GM)
   - The Righting Arm (GZ)
   - The Righting Moment
   - Heeling and Lolling
   - Hog and Sag
   - Stable Equilibrium
   - Neutral Equilibrium
   - Unstable Equilibrium
   - Stiff and Tender
   - Rolling Period
   - Transverse Versus Longitudinal Stability
   - Categories of Stability

2. Change of draft, heel, and trim
   - Mean Draft (MD)
   - True Mean Draft (TMD)
   - Change of Draft (COD)
   - Change of Trim (COT)—Change of Heel (COH)

IV. Static and dynamic stability criteria for MOUs, environmental limits, and criteria for survival conditions.

1. The calculations for Centre of Gravity (G), Centre of Buoyancy (B) and Metacentre (M)
   - The Effect of Weight Shifts on the Centre of Gravity (G)
   - Recapitulation of Shift of Centre of Gravity
   - The Position of the Centre of Buoyancy (B) and the Metacentre (M) in Relation to K
   - The Effect of Draft on the Centre of Buoyancy (KB)
   - Inertia
   - Calculation for BM
   - Calculation for GM
   - Calculation for List and Trim in Degrees
   - Summary of Static Stability for Small Angles

2. Stability at large angles—stability curves
   - Intact Statical Stability Large Angles
   - The Curve of Statical Stability
   - The Cross Curves of Stability
   - Use of Cross Curve of Stability
   - The Curve of Righting Moments
   - Dynamic Stability
   - Damage Stability
   - Basic Damage Stability Procedures
   - The Down-Flooding Angle
   - The Maximum Allowable Vertical Centre of Gravity (VCG)

V. Understanding of inclining experiment, deadweight, and their use

1. The Inclining Experiment
   - The Preparation of the Inclining Experiment
   - The Principle of the Inclining Experiment
   - The Inclining Experiment Calculation
   - Lightship and variable loading
   - Tracking cumulative changes to lightship condition.

VI. Use of daily loading calculations.

VII. Knowledge of the Effect of:

1. Trim and stability of MOUs in event of damage and consequent flooding and countermeasures.
   - Intact Statical Stability Large Angles
   - Basic Damage Stability Procedures
   - The Down-Flooding Angle
   - Effects of tanks or spaces open to the sea and free communication between tanks or spaces within the unit

2. Movement or off loading supplies or equipment and ballasting of MOUs in order to keep the unit's stress within the acceptable limits. Should include basic discussion/explanation of the following:
   - The Maximum Allowable Area Loading
   - Forces Working on the Floating Unit
   - Stress, Strain, and Yield
   - Fatigue
   - Shear Stress
   - Sagging and Hogging
   - Design Loading Conditions
   - Steel Quality and High Strength Steel
   - Member Loading and Stress
   - Fatigue in Members and Connections
   - Load Curves on Drilling Vessels
   - Preloading and leg stresses on Jackups

3. Mooring system.
   - Mooring System Components & Purpose
   - The Anchor System Correction
   - Use of Catenary Curve Tables
   - Vertical Component of Line Tension
   - Lightweight Correction for Deployed Chain
   - Environmental Forces & Offset
   - Effects of Line Failures

4. Loss of buoyancy
   - Definition of Damage Stability
   - Causes of Damage Stability
   - Consequences of Damage Stability
   - Permeability
   - Reserve Buoyancy and Damage Stability
   - Watertight Integrity
   - Calculation of Damage Stability
   - The Added Weight Method
   - The Lost Buoyancy Method
   - Comparison Between Added Weight and Lost Buoyancy Methods
   - The Stability Curve for Damage Stability
   - Damage Control Procedure
   - Damage Stability Calculation on Board

VIII. Knowledge of:

1. The emergency response for flooding due to damage, fire fighting, loss of buoyancy, and the effect on trim and stability.
   - Basic Damage Stability Procedures
   - Hazards Associated with Counter Flooding
   - The Down-Flooding Angle.

2. Countermeasures for damage stability
   - Basic Damage Stability Procedures
   - The Down-Flooding Angle

3. Effectively communicate stability-related information.
   - Loading Conditions
   - The Anchor System Correction
   - The Maximum Allowable Area Loading
   - The Stability Calculations on Daily Report Forms

4. Environmental Considerations – Pollution Prevention

Appendix B

IADC ACCREDITATION PROCEDURES

1. Assessment of training needs

IADC, through its Training Committee, will periodically assess the stability training needs of the industry and make appropriate revisions to course curriculum, specifications or other elements of this programme.

2. Training capabilities

The reviewers of training courses will require access to or evidence of the following to conduct a thorough evaluation of the programme:

(i) Programme overview and training objectives
(ii) Skills and knowledge content for each section
(iii) Training equipment, including simulation equipment where available
(iv) Course material and records
(v) Qualification and experience of instructors
(vi) Facilities for delivering training
(vii) The method of testing the effectiveness of the training.

3. Training programme

The reviewers will require details of the methods to be used in meeting the above objectives, the resources needed in terms of staff and material, and the time allocation for all sections of the training programme.

4. Course evaluation

The reviewers will require a simplified statement of course objectives which will be provided to each trainee at the outset of their training. Student evaluation forms shall be a compulsory part of the course material and will be made available during periodic visits from the reviewers.

5. Accreditation

A training provider seeking IADC accreditation of Comprehensive Stability courses must submit a completed Application for Accreditation (Form BCS-02) to IADC with copies of all supporting documentation related to the training proposals. This documentation will include C.V. information and biographical data on all staff who will be involved in the training programme, along with a description and diagram of the training facility. If this documentation appears to be in order, a date will be mutually agreed for a site visit at the training provider's location.

IADC will send a minimum of two reviewers to visit the training facility. They will observe a course and will expect to talk to instructors and students undertaking training if available.

IADC will, subject to a satisfactory standard being achieved, accredit the training provider. The training provider will be required to keep records of all the trainees participating on approved courses for at least two years. The provider will issue numbered course certificates obtained from IADC and maintain a central register of student activity. Reports of student activity and other relevant data must be periodically reported to IADC.

Accreditation is valid for a period of five years, after which the training provider must apply for reaccreditation. Training providers are also subject to an annual renewal fee during the period of accreditation.

Additional Considerations for Training Providers

Every effort must be made to ensure instructors and other personnel involved in the conduct of shore-based stability training establishments are enabled to keep up-to-date with the latest developments within the stability world. Instructors should develop active links with commercial organisations involved with the conduct of stability operations, and avail themselves of every opportunity of gaining hands-on experience of stability operations. It is also important that instructors are enabled to attend the various conferences and seminars organised from time to time on stability and related subjects.

Training establishments should make adequate arrangements to allow for continuous review and development of the course material. As has been mentioned, stability is a rapidly developing technology, and the training must keep fully up-to-date with those developments. It is not adequate to develop a training scheme, and then to leave it in situ for long periods of time without further work.

It is also important that those responsible for the running of training establishments ensure that the latest literature relating to stability operations is available to instructors and students alike. The training centre should maintain a library of reference material containing such items as the following:

i. Regulations and guidelines from maritime and other authorities
ii. Equipment and system operational handbooks
iii. Vessel operations manuals, where available, together with related material such as checklists
iv. Relevant marine and industry publications
v. Reprints of magazine articles of relevance
vi. Collected papers from conferences and seminars on the subject of stability training and operations

APPENDIX C

BALLAST CONTROL OPERATOR LOGBOOK

To order a Ballast Control Operator Logbook, please contact the Accreditation and Certification Department at stability@iadc.org.