



IALA MODEL COURSE

C2001-8

AIDS TO NAVIGATION– TECHNICIAN TRAINING MAINTENANCE OF STEEL BUOYS

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DOCUMENT REVISION

Revisions to this IALA Document are to be noted in the table prior to the issue of a revised document.

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June 2016	Entire document	Minor textual changes
December 2021	Entire document	Review of content



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FOREWORD

The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) recognises that training in all aspects of Aids to Navigation (AtoN) service delivery, from inception through installation and maintenance to replacement or removal at the end of a planned life-cycle, is critical to the consistent provision of that AtoN service.

Taking into account that under the SOLAS Convention, Chapter 5, Regulation 13, paragraph 2; Contracting Governments, undertake to take into account the international recommendations and guidelines when establishing aids to navigation, including referring to the appropriate recommendations and guidelines of IALA. This includes recommendations on training and qualification of AtoN technicians, and consequently IALA has adopted Recommendation E-141 on Standards for Training and Certification of AtoN personnel.

IALA committees working closely with the IALA World-Wide Academy have developed a series of model courses for AtoN personnel having R0141 Level 2 technician responsibilities. This model course on the maintenance of steel buoys should be read in conjunction with the Training Overview Document IALA WWA C2000 which contains standard guidance for the conduct of all Level 2 model courses

This model course is intended to provide national members and other appropriate authorities charged with the provision of AtoN services with specific guidance on the training of AtoN technicians in maintenance of steel buoys. Assistance in implementing this and other model courses may be obtained from the IALA World-Wide Academy at the following address:

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PART 1 - COURSE OVERVIEW

1. SCOPE

This course is intended to provide technicians with the practical and theoretical training necessary to have a satisfactory understanding of the maintenance of steel buoys.

This introductory course is intended to be supported by further training modules on theoretical and practical aspects of floating aids to navigation (AtoN). Details of these supporting model courses can be found in the Level 2 Technician training overview document IALA WWA C2000.

2. OBJECTIVE

Upon successful completion of this course, participants will have acquired sufficient knowledge and skill to maintain steel buoys whilst on the job within their organisations.

3. COURSE OUTLINE

This practical course is intended to cover the knowledge required for a technician to maintain steel buoys under supervision. The complete course comprises five classroom modules, each of which deals with a specific subject covering aspects of steel buoy maintenance. Module six comprises a site visit designed to consolidate theoretical and practical knowledge. Each module begins by stating its scope and aims, and then provides a teaching syllabus.

The required standard of competence is considered to be the level of proficiency that should be achieved for the proper performance of the duties carried out by the technician in their organization.

This Model Course is focussed at the satisfactory level of competence.

Table 1 Levels of Competence

Competence Level	Learning Outcome	Instructional Objectives	Required skills
2	The conduct of routine tasks unsupervised and some more complex tasks under guidance	A satisfactory understanding of theoretical concepts and principles so that they can be applied in practice	Correctly acquired responses have become habitual. Actions can be performed confidently and efficiently

4. TEACHING MODULES

Table 2 Table of Teaching Modules

Module Title	Time in hours	Overview
Health and Safety	1	This module identifies the health and safety issues associated with steel buoy maintenance
Types of steel Buoys	0.5	This module describes the types of steel buoys in common use

Afloat Maintenance	1	This module describes maintenance that can be carried out whilst buoy is on station
Ashore Maintenance – Dismantling/Rebuild	4	This module describes the dismantling and rebuild of the buoy in the shore facility
Standards	0.5	This module describes the international and local standards pertinent to steel buoys
Site visit	4	To visit a buoy refurbishment facility to consolidate knowledge learned
Total Hours:	11	2 day course

5. SPECIFIC COURSE RELATED TEACHING AIDS

This course involves both classroom instruction and a visit to a buoy refurbishment facility. Classrooms should be equipped with appropriate teaching aids to enable presentation of the subject matter.

6. ACRONYMS

To assist in the use of this model course, the following acronyms have been used:

AtoN	Aid(s) to Navigation
BS	British Standards
EN	English
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
ISO	International Organization for Standards
MBS	IALA Maritime Buoyage System
SOLAS	International Convention for the Safety of Life at Sea, 1974 (as amended)
WWA	World Wide Academy

7. DEFINITIONS

The definition of terms used in this Model Course can be found in the International Dictionary of Marine Aids to Navigation (IALA Dictionary) at <http://www.iala-aism.org/wiki/dictionary>

8. REFERENCES

The following material is relevant to this course:

- 1 IALA NAVGUIDE.
- 2 IALA Recommendation R1001 on the IALA Maritime Buoyage System (MBS).
- 3 IALA Recommendation R0108 on Surface Colours used as Visual Signals on Aids to Navigation.
- 4
- 5 IALA Guideline G1015 on Painting Aids to Navigation Buoys.
- 6 Technical documentation from coating suppliers.

PART 2 – TEACHING MODULES

1. MODULE 1 – HEALTH AND SAFETY

1.1. SCOPE

This module describes the health and safety issues associated with steel buoy maintenance.

1.2. LEARNING OBJECTIVE

To gain a satisfactory understanding of the health and safety issues associated with the maintenance of steel buoys.

1.3. SYLLABUS

1.3.1. LESSON 1 - HEALTH AND SAFETY

- 1 Personal Protective Equipment.
- 2 Use of mobile crane.
- 3 Control of heavy items being moved – buoy tipping and rolling.
- 4 Fork lift trucks.
- 5 High pressure water jet.
- 6 Grit blasting.
- 7 Spray painting.
- 8 Working at heights.
- 9 General hand tools.
- 10 Workplace risk assessment.

2. MODULE 2 – TYPES OF STEEL BUOYS

2.1. SCOPE

This module describes the types of steel buoys in common use.

2.2. LEARNING OBJECTIVE

To gain a satisfactory understanding of steel buoys in common use.

2.3. SYLLABUS

2.3.1. LESSON 1 - TYPES OF STEEL BUOYS

- 1 Tail tube buoys.
- 2 Skirted buoys.
- 3 Other types.
- 4 Ballast weights.

3. MODULE 3 – AFLOAT MAINTENANCE (See IALA WWA C2001-5 L2.1.8)

3.1. SCOPE

This module describes how steel buoys can be maintained afloat.

3.2. LEARNING OBJECTIVE

To gain a satisfactory understanding of how steel buoys can be maintained afloat.

3.3. SYLLABUS

3.3.1. LESSON 1 - INSPECTION

- 1 Review of cleaning – high pressure water/mechanical (scrapers).
- 2 Coating condition.
- 3 Mooring eye wear.
- 4 Damage inspection.

3.3.2. LESSON 2 – MAINTENANCE

- 1 Localised painting.
- 2 Marine growth and guano removal.
- 3 Mooring eye wear build up or mooring eye replacement.
- 4 Paint fade.

4. MODULE 4 – ASHORE MAINTENANCE – DISMANTLING AND REBUILD

4.1. SCOPE

This module describes the maintenance of steel buoys at a maintenance facility ashore.

4.2. LEARNING OBJECTIVE

To gain a satisfactory understanding of the maintenance of steel buoys at a shore facility.

4.3. SYLLABUS

4.3.1. LESSON 1 - DISMANTLING

- 1 Marine growth and guano removal.
- 2 Tail tube/ballast dismantling.
- 3 Superstructure removal and dismantling.
- 4 Mooring eye – inspection and repair.
- 5 Lifting eye testing.
- 6 Pressure testing.
- 7 Surface preparation:
 - a Water jet.
 - b Grit blast

4.3.2. LESSON 2 - COATINGS

- 1 Coating application:
 - a Wet film thickness.
 - b Dry film thickness.

- 2 Paint composition – pigments, binders, solvents, additives.
- 3 Paint types – alkyds, epoxies, polyurethanes, polysiloxanes, acrylated rubber, antifouling etc.
- 4 Galvanising/zinc spray
- 5 Cathodic protection

4.3.3. LESSON 3 - REASSEMBLY

- 1 Superstructure assembly.
- 2 Superstructure attachment.
- 3 Dissimilar metals and their isolation.
- 4 Solar unit attachment.
- 5 Bridle attachment.

4.3.4. LESSON 4 – INSPECTION AND TESTING

- 1 Final inspection prior to deployment:
 - a Pressure testing
 - b Mooring and/or lifting eye testing.

4.3.5. LESSON 5 - END OF LIFE DISPOSAL

- 1 Disposal plan for end of life.

5. MODULE 5 – STANDARDS

5.1. SCOPE

This module describes the standards pertinent to steel buoys.

5.2. LEARNING OBJECTIVE

To gain a satisfactory understanding of the standards pertinent to the maintenance of steel buoys.

5.3. SYLLABUS

5.3.1. LESSON 1 - STANDARDS

- 1 IALA Recommendation R0108 on Surface Colours used as Visual Signals on Aids to Navigation.
- 2 Welding standards – e.g. BS EN 1011, BS EN ISO 5817.
- 3 Materials standard – e.g. BS EN 10025.
- 4 Spacing between different colours (colour breaks on Cardinal/Safe Water Marks etc.).
- 5 Surface preparation – e.g. BS EN ISO 8501.
- 6 Local standards.
- 7 Local standard operating procedures and record keeping

6. MODULE 6 – SITE VISIT

6.1. SCOPE

To visit a shore buoy maintenance facility.

6.2. LEARNING OBJECTIVE

To consolidate knowledge learned from this course.

6.3. SYLLABUS

Visit to a buoy maintenance facility or buoy tender to view the maintenance of steel buoys in operation.