IALA MODEL COURSE

L2.3.4-6

AIDS TO NAVIGATION - TECHNICIAN TRAINING
MODULE 3 ELEMENTS 3.4 – 3.6
LEVEL 2 – LIGHT FLASHERS LAMP CHANGERS AND IPS LANTERNS

Edition 2.0

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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.

Date	Page / Section Revised	Requirement for Revision
December 2016	Pages 7, 8, 9	Module 1 - Section 1.2, Section 1.3.1, Section 1.3.4 – Minor changes Module 2 – Section 2.2, Section 2.3.1, Section 2.3.2 – Minor changes

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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, mindful of their obligations published by the International Maritime Organisation, undertake to consider the international recommendations and guidelines when establishing aids to navigation, including recommendations on training and qualification of AtoN technicians, 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 E-141 Level 2 technician functions. This model course on AtoN Service Craft and Buoy Tenders should be read in conjunction with the Training Overview Document IALA WWA.L2.0 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 an introduction to service craft and buoy tenders. 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 theoretical and practical training necessary to have a satisfactory understanding of how to install, set to work and maintain light flashers; lamp changers and self-contained (Integrated Power System) marine lanterns fitted to minor AtoN stations.

This course should only be conducted after participants have completed successfully Level 2 Module 1 Elements 3.1-3 which includes an introduction to marine lanterns, light characters and ranges. This course is intended to be supported by further practical training modules on classical lenses; rotating beacons (and the flashers and lamp changers fitted to them); mercury rotating optics and range, sector and leading lights. Details of these supporting model courses can be found in the Level 2 Technician training overview document IALA WWA L2.0.

2. OBJECTIVE

Upon successful completion of this course, participants will have acquired sufficient knowledge to install, set to work and maintain light flashers; lamp changers and self-contained marine lanterns at minor AtoN stations within their organizations.

3. COURSE OUTLINE

This principally practical (hands-on) course is intended to cover the knowledge required for a technician to install, set to work and maintain the light flashers, lamp changers and self-contained lanterns used by their organisations at minor AtoN stations. The complete course comprises 2 classroom/workshop teaching modules and a site visit during which a practical competency test will be conducted. Each teaching module deals with a specific subject concerning light flashers; lamp changers and self-contained lanterns and begins by stating its scope and aims. It then provides a teaching syllabus.

4. TEACHING MODULES

Table 1 Table of Teaching Modules

Module Title	Time in hours	Overview
Light flashers and automatic lamp changers	4.0	This module describes the type and function of light flashers and lamp changers used by the organisation and how they should be installed, aligned, set to work and maintained.
Self-Contained lanterns	3.0	This module describes the types of self-contained lanterns used by the organisation and how they should be installed, set to work and maintained.
Evaluation	3.0 + 2.0	Practical competency tests during site visits
Total Hours	**12**	Two-day course

5. SPECIFIC COURSE RELATED TEACHING AIDS

1 This course is either classroom or workshop based. Instruction spaces should be equipped with blackboards, whiteboards, and overhead projectors to enable presentation of the subject matter.

2 Examples of flashers, lamp changers, lamps and self-contained lanterns used in the AtoN service.

6. ACRONYMS

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

AC	Alternating Current
AIS	Automatic Identification System
AtoN	Aid(s) to Navigation
DC	Direct Current
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications (originally Groupe Spécial Mobile)
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities – AISM
IPS	Integrated Power Supply (also known as self-contained lanterns)
L	Level (technician training - WWA)
LED	Light-Emitting Diode
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

In addition to any specific references required by the Competent Authority, the following material is relevant to this course:

1 IALA NAVGUIDE

2 IALA Recommendation E-110 for the Rhythmic Characters of Lights on Aids to Navigation

3 IALA Guideline 1043 on Light Sources used in Visual Aids to Navigation

4 IALA Guideline 1077 on Maintenance of Aids to Navigation

5 IALA Guideline 1064 on Integrated Power System Lanterns

6 IALA Guideline 1038 on Ambient Light Levels at which Aids to Navigation should Switch On and Off

7 Manufacturers' handbooks on marine signal lanterns used by the organisation

PART 2 – TEACHING MODULES

1. MODULE 1 – LIGHT FLASHERS, CHARACTERS AND LAMP CHANGERS

1.1. SCOPE

This module describes the type and function of light flashers and lamp changers used by the organisation and how they should be installed, set to work and maintained.

1.2. LEARNING OBJECTIVE

To gain a **satisfactory** understanding of how to install; program the correct flash character; align; set to work and maintain light flashers used by the organisation at minor (short to medium range) AtoN stations.

1.3. SYLLABUS

1.3.1. LESSON 1 – LIGHT FLASHERS AND THEIR FUNCTIONS

1 Types of programmable light flashers:

- a LED flashers.
- b Incandescent flashers.
- c Synchronised flashers.

2 Lamps fitted to each type of flasher.

3 Function of their component parts including sun switches / astronomical clocks.

4 Types of marine lantern housings into which flashers are fitted.

1.3.2. LESSON 2 – LAMP CHANGERS

1 Single filament lamp changers.

2 Motor-driven lamp changers.

3 DC and AC variants.

1.3.3. LESSON 3 - USER-SELECTABLE FLASH CODES

1 Revision of light characteristics

2 Setting/programming flash code

1.3.4. LESSON 4 – INSTALLATION AND SETUP PROCEDURES

1 Selection of Marine Lantern housing

2 Installation of flasher/lamp changer unit

3 Checks on lamp alignment

4 Setting flash characters

5 Adjusting intensity for LED flashers

6 Installation of sun switch / astronomical clocks

7 Adjustment of sun switch / astronomical clock thresholds

8 Selection of synchronisation

9 Connection of power supply

10 Sealing the unit

11 Test procedures

1.3.5. LESSON 5 - MAINTENANCE PROCEDURES

1 Site visit reports.

2 Cleaning and inspecting lenses, housings, topmarks, bird spikes and securing bolts.

3 Checks of batteries; power supply cables and seals.

4 Hot lamp and power isolation safety procedures.

5 Correct opening procedures.

6 Internal inspections including cable terminations.

7 Diagnostic checks and component replacement including lamps.

8 Re-sealing procedures.

9 Final test procedures.

10 Maintenance records.

2. MODULE 2 – SELF-CONTAINED MARINE LANTERNS

2.1. SCOPE

This module describes the types of self-contained lanterns (also known as integrated power supply lanterns) used by the organisation and how they should be installed, set to work and maintained.

2.2. LEARNING OBJECTIVE

To gain a **satisfactory** understanding of how to install; set to work and maintain self-contained marine lanterns used by the organisation at minor (short to medium range) AtoN stations, including the process of programming the correct flash character in self-contained lanterns.

2.3. SYLLABUS

2.3.1. LESSON 1 – TYPES AND COMPONENTS OF SELF-CONTAINED LANTERNS

1 Types of self-contained lanterns.

2 Function of their component parts:

- a Housing and base units.
- b Lenses and vertical divergence options.
- c LED array.
- d Circuit boards.
- e GSM/GPRS/AIS monitors if fitted.
- f Sun switch / astronomical clocks.
- g Internal battery.
- h Remote program controller.

2.3.2. LESSON 2 - INSTALLATION AND SETUP PROCEDURES

1 Correct disassembly procedure.

2 Battery installation.

3 Setting/programming flash characters.

4 GSM/GPRS/AIS monitoring (if available).

5 Adjustment of sun switch / astronomical clock thresholds (where possible).

6 Programming intensity.

7 Selecting synchronisation.

8 Sealing the unit.

9 Test procedures.

2.3.3. LESSON 3 - MAINTENANCE PROCEDURES

1 Site visit reports.

2 Cleaning and inspecting lenses, housings, topmarks, bird spikes and securing bolts.

3 External check of battery power using the remote control.

4 Correct opening procedures.

5 Internal inspections.

6 Diagnostic checks and component replacement including LED unit and battery.

7 Re-sealing procedures.

8 Final test procedures.

9 Maintenance records.

2.4. SITE VISIT

The purpose of the site visit is to permit participants to consolidate the practical knowledge gained in the classroom/workshop through a visit to a number of operational minor AtoN stations fitted with marine lanterns.

During the site visit, each participant should be tasked to conduct the maintenance procedure competencies acquired during PART 2 section 1.3.5 and section 2.3.3.