



# MODEL COURSE

L2.11.6

MARINE AIDS TO NAVIGATION - TECHNICIAN  
TRAINING

LEVEL 2 - PRESERVATION OF STRUCTURES

**Edition 2.0**

**December 2017**



# DOCUMENT HISTORY

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

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December 2013	1 <sup>st</sup> issue	Council 56
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## FOREWORD

The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) recognises that training in all aspects of Marine 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 R0141 - 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 Level 2 technician functions. This model course on Preservation of structures 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 Preservation of structures. 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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Internet: [www.iala-aism.org](http://www.iala-aism.org)



## PART 1- COURSE OVERVIEW

### 1. SCOPE

This course is intended to provide technicians with the practical training necessary to preserve fixed (as opposed to floating) AtoN structures. This course should be undertaken after the theoretical course on Marine Aids to Navigation Structures: Materials, Corrosion and Protection (L2.11.1-5) has been completed successfully.

This course is intended to be supported by further training modules on the application of coatings and maintenance records. 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 and skill to preserve AtoN structures.

### 3. COURSE OUTLINE

This practical course is intended to cover the skills required for a technician to preserve fixed AtoN structures. It does **not** cover specialist skills concerned with the repair of masonry and welding metals. The complete course comprises 4 teaching modules each of which includes a practical test of competence. The modules deal with a specific subject covering the preservation of fixed AtoN structures. Not all modules will apply to all AtoN service providers or organisations. Additional travel time may need to be added if the training location is remote from the training facility.

### 4. TEACHING MODULES

*Table 1 Table of Teaching Modules*

Module Title	Time in hours	Overview
The preservation of timber structures	2.0	This module describes how to preserve timber structures and their component fasteners
The preservation of metal structures	6.0	This module describes how to preserve both ferrous and non-ferrous structures
The preservation of concrete and masonry structures	3.0	This module describes how to preserve concrete and masonry structures
The preservation of GRP and plastic structures	3.0	This module describes how to preserve GRP and plastic structures and rubber fendering
Evaluation	2.0	A 30-minute practical protection test at the end of each module
<b>Total Hours</b>	<b>16.0</b>	Two-day or three-day course

### 5. SPECIFIC COURSE RELATED TEACHING AIDS

This practical course will be workshop and/or site based. There are no specific teaching aids required.



## 6. ACRONYMS

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

<b>AtoN</b>	Marine Aid(s) to Navigation
<b>IALA</b>	International Association of Marine Aids to Navigation and Lighthouse Authorities
<b>L</b>	Level
<b>SOLAS</b>	International Convention for the Safety of Life at Sea, 1974 (as amended)
<b>WWA</b>	World Wide Academy

## 7. DEFINITIONS

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

## 8. REFERENCES

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

- 1 IALA Guideline G1007 on Lighthouse Maintenance.
- 2 IALA Guideline G1076 on Building Conditioning of Lighthouses.
- 3 IALA Guideline G1077 on Maintenance of Aids to Navigation.
- 4 IALA Guideline G1036 on Environmental Considerations in Aids to Navigation Engineering.
- 5 IALA NAVGUIDE.



## PART 2 – TEACHING MODULES

### 1. MODULE 1 – THE PRESERVATION OF TIMBER STRUCTURES

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#### 1.1. SCOPE

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This module describes how to preserve timber structures and their component fasteners.

#### 1.2. LEARNING OBJECTIVE

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To gain a **satisfactory** understanding of how to preserve timber structures and their component fasteners.

#### 1.3. SYLLABUS

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##### 1.3.1. LESSON 1 – TIMBER STRUCTURES

- 1 Health, safety and environmental considerations.
- 2 Checks for physical damage and loose components.
- 3 Checks and treatment for dry rot and termite/pest infestation.
- 4 Checks in the tidal zone.
- 5 Alignment checks.
- 6 Maintenance records.

##### 1.3.2. LESSON 2 – FASTENERS

- 1 Checks for corrosion of steel components.
- 2 Replacement of steel components.
- 3 Checks on internal corrosion.
- 4 Checks and replacement of wire ropes.
- 5 Lubrication and coatings.
- 6 Inspection records and photographic evidence.

### 2. MODULE 2 – THE PRESERVATION OF METAL STRUCTURES

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#### 2.1. SCOPE

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This module describes how to preserve both ferrous and non-ferrous structures.

#### 2.2. LEARNING OBJECTIVE

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To gain a **satisfactory** understanding of how to preserve metal structures.

#### 2.3. SYLLABUS

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##### 2.3.1. LESSON 1 – CHECKS ON STEEL AND ALUMINIUM STRUCTURES

- 1 Health, safety and environmental considerations.
- 2 Checks for corrosion, pitting, fatigue, cracking or breakage.
- 3 Checks on bolts and welds.
- 4 Checks on foundations and/or guys and their anchors.
- 5 Checks on anti-corrosion (dissimilar metal) spacers.





- 6 Use of ultrasonic equipment.
- 7 Checks for alignment, deformation, distortion and deflection.
- 8 Checks on structure components – ladders, platforms and towers.
- 9 Checks on drain holes.
- 10 Inspection of coatings.

### 2.3.2. LESSON 2 - PRESERVATION TECHNIQUES

- 1 Health, safety and environmental considerations and use of protective clothing.
- 2 Chipping, needle scaling and abrasive blasting.
- 3 Flame descaling techniques.
- 4 Removal of salt, dirt and bird droppings.
- 5 Pressure washing.
- 6 Dissimilar metal plastic spacer installation.
- 7 Rust prevention, sealants and greasing.
- 8 Application of appropriate coatings [in accordance with Model Course L2.5].
- 9 Replacement of cathodic protection anodes.

### 2.3.3. LESSON 3 – MAINTENANCE AND INSPECTION RECORDS

- 1 Maintenance forms used by the organisation.
- 2 Taking photographic evidence.
- 3 Completion of inspection reports.

## 3. MODULE 3 – THE PRESERVATION OF CONCRETE AND MASONRY STRUCTURES

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### 3.1. SCOPE

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This module describes how to preserve concrete and masonry structures.

### 3.2. LEARNING OBJECTIVE

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To gain a **satisfactory** understanding of how to preserve concrete and masonry structures.

### 3.3. SYLLABUS

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#### 3.3.1. LESSON 1 – REINFORCED CONCRETE

- 1 Health, safety and environmental considerations.
- 2 Checks on steel reinforcing – spalling, cracking and staining.
- 3 Checks on abrasion and chemical deterioration.
- 4 Checks on concrete foundations and anchor bolts.

#### 3.3.2. LESSON 2 - MASONRY

- 1 Checks on missing or displaced blocks.
- 2 Checks on metal fasteners and fittings.
- 3 Checks on pointed joints.
- 4 Alignment checks and monitoring of cracks.



- 5 Reapplication of coatings.
- 6 Maintenance records.

### 3.3.3. LESSON 3 – PRESERVATION OF INTERIORS

- 1 Checks for rust, mould, stains and insect infestation.
- 2 Checks for condensation and water ingress.
- 3 Checks on plaster and wall coverings.
- 4 Inspection of heaters, airflows and vents.
- 5 Humidity measurement.
- 6 Inspection and repair of door and window seals.
- 7 Inspection of drains.
- 8 Maintenance records and photographic evidence.

## 4. MODULE 4 – THE PRESERVATION OF GRP AND PLASTIC STRUCTURES

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### 4.1. SCOPE

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This module describes how to preserve GRP and plastic structures and rubber fendering.

### 4.2. LEARNING OBJECTIVE

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To gain a **satisfactory** understanding of how to preserve glass reinforced plastic (fibreglass) and polyethylene structures and rubber fendering.

### 4.3. SYLLABUS

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#### 4.3.1. LESSON 1 – GRP

- 1 Health and Safety considerations.
- 2 Checks on broken or damaged components and gelcoat.
- 3 Checks on stainless steel connectors.
- 4 Repair of damaged fibreglass using polyester, vinyl ester or epoxy resin systems.
- 5 Reapplication of coatings to GRP.
- 6 Maintenance records.

#### 4.3.2. LESSON 2 - POLYETHYLENE PLASTICS

- 1 Checks on cracked, broken or damaged components.
- 2 Checks on bolted connections.
- 3 Maintenance records.

#### 4.3.3. LESSON 3 – RUBBER FENDERING

- 1 Checks on rubber deterioration.
- 2 Replacement of damaged components.
- 3 Maintenance records.



## 5. ASSESSMENT

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Participants will be assessed on their practical competency at the end of each Module.