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| IALA Guideline |

Gnnnn

Buoy Tender Activities

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

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# Introduction

# Buoy tender activities are an important aspect of the management of AtoN. The safety risk is higher than other activities. As a result, there are obvious differences between buoy tender activities and other marine vessel operations. This guideline puts forward suggestions on some factors that should be considered for buoy tender activities.

## Responsibilities of the Competent Authority

## As a key participant in front line management and maintenance of AtoN, determining, creating and delivering the necessary guidelines for the crew or workers of the buoy tender is the responsibility of the competent authority. This objective is also in line with the IALA mission.

## Overview

## The operations undertaken by buoy tender crews are unique from those of other vessels. They are complex in nature and often with increased safety risk. Buoy tender crews not only conduct general sailing maneuvers and other activities associated with safe navigation and seamanship, they also carry out high risk buoy tender operations and AtoN maintenance.

## Background

## This guideline focuses on the nature of buoy tenders highlighting safety guidance and operational considerations. At present there are no recommendations or guidance contained within IALA technical documentation, nor existing World Wide Academy (WWA) training courses focused on buoy tending operations.

# BUOY TENDER OPERATIONS

# Buoy tenders frequently carry out activities such as retrieving and deploying AtoN equipment at the edges of waterways, shallow points, or near reefs. These activities are difficult and have high safety risks requiring operators to have special skills and strictly adhere to risk prevention protocols. Making buoy tender activities efficient and safe has always been an important aspect of the work of the competent authorities.

# Aims and Objectives

Provide guidance to the competent authority to manage buoy tender activities, provide safe operation guidelines for buoy tender operations, and assist the personnel responsible for buoy tender activities by identifying safety risks, operational procedures, and responsibilities.

## Scope of the GuidEline

Provide operating parameters for buoy tender activities including the retrieval, deployment, positioning, maintenance and other special operations contained in Table 1.

## Essential Components of the Guideline

# The guideline contains safety and operational guidance for buoy tenders. It contains information on safety procedures, risk management, environmental considerations and buoy tender operations.

Table 1

|  |  |  |
| --- | --- | --- |
| Item | Content | Description |
| 1 | Regulatory Compliance | Competent Authority Regulations, Navigation Laws, Insurance and Liability, Vessel Seaworthiness, and Crew Competence. |
| 2 | Mission Planning | Making work plan, preparation of machinery, collection and analysis of weather/sea/traffic information, pre-departure check. |
| 3 | Safety procedure | Preparation before operation. Crew licensing and certification, fire safety and emergency drills. |
| Personal protection equipment as identified by member state. |
| 4 | Risk Management | Complete risk assessment checklist. |
| Ensure correct vessel and/or equipment for operation. |
| 5 | Environmental Considerations | Ensure that you identify risks and restrictions specific to certain environmental conditions. |
| 6 | Buoy Tender Deck Machinery, Equipment and Maintenance | Introductions to buoy tender deck machinery and equipment, to include, crane, winches, rigging equipment, mooring tools, and rigging inspections. |
| 7 | Task responsibility | Introductions to basic task information and responsibility of bridge, deck, and engine department. |
| 8 | Buoy technical characteristics | Introductions to basic buoy characteristics relating to buoy tender operation. |
| Introductions to buoy mooring system |
| 9 | General buoy operation procedure | Loading and unloading procedure. |
| Buoy retrieval procedure. |
| Maintenance and Inspection of buoy and mooring system. |
| Positioning methods and procedures. |
| Buoy deployment procedure. |
| 10 | Special Operations | Each special operation is unique, and each has its own procedures and safety concerns. |
| These operations are not typically routine and therefore require extra care and consideration. |
| Each evolution should be planned in advance as the case may be and include risk mitigations. |
| Competent Authorities may have standardized methods that must be followed. |

## 3.3 Other consideration of the guideline

# In recent years, with the development of technology, the number of marine economic activities has been increasing. The rise of economic activities such as offshore wind farms and aquaculture have brought new challenges to the activities of buoy tenders. These activities are not limited to traditional buoy maintenance operations. Vessel traffic density and volume have also increased, resulting in more operational and navigational risk, more AtoNs to service, and more private AtoN requiring additional supervision and inspection, with these tasks being assigned to the buoy tender.

# Common requirements

## Regulatory compliance

* Follow international and domestic maritime laws, regulations, and competent authority policies.
* Verify that crew and vessel are properly insured and understand the terms of their liability.
* Buoy tender shall be inspected for seaworthiness.
* Personnel competency and skills must be certified to and follow national standards. These standards may incorporate training as detailed by WWA.

## mission planning

* Develop a work plan.
* Mobilize AtoN Equipment.
* Prepare machinery and load adequate fuel and consumables for the operation.
* Collect and analyze weather/sea/traffic information.
* Coordinate with Port Authorities/VTS.
* Complete pre-departure check.

## Safety Procedure

* Decide what Personal Protective Equipment (PPE) the buoy tender personnel are required to use according to national regulations and environmental conditions.
* Determine the safest operational procedures according to national regulations and good marine practices.
* Provide task-oriented training (on the job) in accordance with standard operating procedures.
* Conduct regular emergency drills and operational simulations.
* Conduct safety and risk mitigation briefings as required by competent authority.

## Risk Assessment

* Create health and safety risk assessment and mitigation strategies.
* Identify common risks related to the task.
* Identify risks associated with particular objectives or operations.

## ENVIRONMENTAL CONSIDERATIONS

* Marine Protected Areas.
* Endangered Species.
* Seasonal Restriction.s
* Pollution Contamination.
* Noise.
* Guano.
* Poisonous Plants.
* Dangerous Animals.
* Waste Management.
* Oil Spill Prevention.

## BUOY DECK MACHINERY AND EQUIPMENT

* Make sure that all buoy tender deck machinery and equipment are maintained and inspected according to national regulations and those of the competent authority.
* Ensure that buoy tender deck machinery and equipment is rated to perform the buoy and mooring operation.
* Buoy tender deck cargo, machinery, and equipment, should be properly secured during operations and transit.
* When conducting night operations ensure buoy tender deck is equipped with sufficient lighting.

## TASK RESPONSIBILITY

Captain responsibilities:

* Captain shall maintain command, control, and organization of the operation through the Bridge, Deck and Engine crews.

Bridge crew responsibilities:

* Route planning.
* Safe navigation and maneuvering of the ship.
* Log Keeping.
  + Internal and external communications.
  + Give order to execute, pause and secure the specific AtoN operation.
  + Positioning the buoy.
  + After launching and fixing position of the buoy, prepare and complete required administrative tasks.

Deck crew responsibilities:

* Prepare buoys, moorings, lanterns.
* Load and secure deck cargo.
* Ensure crew is wearing proper PPE.
* Test tools and deck machinery, to include cranes, winches, and loose cargo gear, prior to operations and verify they are in good condition.
* Responsible for following procedure for specific deck machinery
* Test internal communications.
* Prepare crew and equipment before conducting moorings maintenance, and buoy deployment and recovery.
* Follow deck safety procedures and work as a group to achieve the operating goal.
* Ensure proper identification of the buoy with assigned number.
* Conduct inspection of buoy including moorings and lighting system. Repair and replace components as required.
* Take picture of buoy.
* Deploy buoy and mooring.

Engine crew responsibilities:

* Readiness of all machinery propulsion and buoy tender deck equipment to include:
  + Hydraulics.
  + Winches.
  + Auxiliary such as electrical power, etc.

## BUOY TECHNICAL CHARACTERISTICS

Typical Physical characteristics of a buoy are as follows:

* Height.
* Diameter.
* Total Weight of Buoy and Mooring Assembly.
* Material.
* Lifting Eye.
* Buoy Mooring Type.
* Battery Type
* Lantern Type
* Topmark Type

## GENERAL BUOY OPERATING PROCEDURE

Loading and Unloading Procedure

* Follow competent authority instructions on cargo handling.

Retrieval Procedure

* Identify correct buoy.
* Approach buoy based on environmental conditions (wind, tide, etc..)
* Capture and connect to the buoy.
* Lift the buoy on deck.
* Secure buoy to the deck.
* Retrieve the mooring assembly to the deck.

Inspection

* General inspection of buoy hull, lighting equipment.
* Conduct general overview of mooring during lifting procedure.
* Secure mooring chain before lifting sinker.
* Remove marine growth.
* Inspect mooring assembly (chain, shackles, swivels, sinker for wear and thickness).
* Verify thickness and replace mooring components that measures below organization standard.
* Replace worn components.
* Inspect buoy prior to deployment.

Deployment

* Ensure buoy is secured during transit to deployment position.
* Use proper positioning system to deploy the buoy and mooring assembly on charted position.
* Deploy the buoy and mooring assembly by following safety considerations.
* Verify and record deployed position.

## SPECIAL OPERATIONS

Each special operation is unique, and each has its own procedures and safety concerns. These operations are not typically routine and therefore require extra care and consideration. Each evolution should be planned in advance as the case may be and include risk mitigations. Competent Authorities may have standardized methods that must be followed.

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| * Large buoy (light ship) operation. |
| * Sunken Buoy Recovery |
| * Drifting Buoy Recovery |
| * Beached Buoy Recovery. |
| * Obstructions and Hazards to Navigation. |
| * Diving Operations. |
| * Drones and Remotely Operated Vehicles (ROVs). |
| * Hydrographic and AtoN Surveys. |
| * Construction of fixed AtoN Structures. |
| * Operating in Strong Currents and Heavy Seas. |
| * Towing Operations. |
| * Ice Breaking. |
| * Alongside operation (fixed mark/off-shore structure). |

# References

1. R0118 (O-118) THE RECORDING OF AIDS TO NAVIGATION POSITIONS
2. G1035 AVAILABILITY AND RELIABILITY OF AIDS TO NAVIGATION ‐ THEORY AND EXAMPLES
3. G1099 HYDROSTATIC DESIGN OF BUOYS
4. G1077 MAINTENANCE OF AtoN
5. G1066 DESIGN OF FLOATING ATON MOORINGS
6. G1092 SAFETY MANAGEMENT FOR AtoN ACTIVITIES
7. G1127 SYSTEMS AND SERVICES FOR ACCURACY POSITIONING AND RANGING
8. G1173 ATON TRAINING AND AWARENESS FOR MARINERS

# DEFINITIONS

The definitions 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> and were checked as correct at the time of going to print. Where conflict arises, the IALA Dictionary should be considered as the authoritative source of definitions used in IALA documents.

# abbreviations

This section should be typed with the **Abbreviations** style. The acronym or initialism is typed and then tab is pressed so that the style inserts the appropriate tabs and paragraph spacings e.g.:

AtoN Marine Aids to Navigation

ROV Remotely Operated Vehicle

WWA World Wide Academy

VTS Vessel Traffic Services

The list should be typed in alphabetical order. The text automatically aligns as an indented paragraph until carriage return is hit and then the next term can be entered.

# references

References are sources directly referred to in the running text and should be given a sequential number, starting at 1. The reference number should be included as close to the referenced text as possible and included as a number within square brackets.

The reference should be listed in the References section in the following syntax using the **Reference** **list** style:

[Author surname,] <space> [initial.] <space> [year] <space> [title.]

For example:

“Hawking also suggests ways that quantum mechanics can be combined with the theory of special relativity [1]. This text builds on his discussion of the instability of black holes described in *A Brief History of Time* [2].”

should be included in the reference list as follows:

1. Hawking, S. (2001) The Universe in a Nutshell.
2. Hawking, S. (1988) A Brief History of Time.

The **Reference list** style will add a number for the reference as soon as you start typing the text and the paragraph will automatically align with the first line of text. Press return to enter a new reference in the list.

# Further reading

Any texts that are recommended to the reader without direct reference in the text should be listed within this section using the same syntax as the reference list. Sources should be listed using the **Further reading** style.

1. Einstein, A. (1905) Relativity: The Special and General Theory of Relativity
2. Idle, E. (1984) The Galaxy Song

# Index

**No index entries found.**

1. Example of appendix Title (Head 1) style

Appendices should be started on a separate page and contain information that is directly relevant to the main body of the text at a certain point, but that would be too large or distracting to include at that particular point. There are four levels of appendix heading styles available in the **Style Gallery.** Care should be taken to select the appropriate heading for the section.

* 1. Example of Appendix Head 2 style

At the end of the **Appendix head 2** style text press carriage return, the following paragraph is **the Heading 1 separation line** style, press carriage return again, and the following line will be in **Body text** style.

* + 1. Example of Appendix head 3 style

The same following formatting applies to the **Appendix Head 3** style i.e., press carriage return, the following paragraph is the **Heading 2 separation line** style, press carriage return again, and you will be back to body text.

* + - 1. Example of Appendix Head 4 style

The Appendix Head 4 style is followed by body text and does not have a separation line. Only the level 1 **Appendix Title** will appear in the TOC.

* + - * 1. Example of Appendix Head 5 style

The **Appendix Head 5 style** is followed by body text and does not have a separation line. Figure and tables should be labelled as a continuation from the main Guideline content.

1. Example of Annex title (Head 1) style

Annexes should include information that can exist in isolation e.g.

* a technical specification for a new piece of equipment;
* the content and structure of a new training module; or
* the detail associated with a new recommendation for an AIS.

Annexes can include appendices if required. There are also four levels of annex heading styles available in the **Style Gallery.** In addition to the **Annex title** (**Head 1)** style there is **Annexe Head 2**, **Annexe Head 3** and **Annexe Head 4**. These follow a similar format to the appendix heading styles. As many annexes can be included as needed and it is advisable to separate them with a page break. Only the level 1 **Annex title** style text will appear in the TOC.

* 1. Example of Annex Head 2 style
     1. Example of Annex Head 3 style
        1. Example of Annex Head 4 style

Annex figures and tables should be labelled with the **Annex Figure Caption** and **Annex Table Caption** styles respectively, rather than the main figure and table caption styles. This ensures the annex can be read logically in isolation and that annex figures and tables are not included in the List of Figures and Tables respectively on the main Guideline contents page.

1. Example of annex table caption
2. Example of annex figure caption
   * + - 1. Example of Annex Head 5 style