Aids to Navigation (AtoN) Maintenance Guide
(Supplement to IALA Level 2 Technician Training)
AtoN Maintenance Buoy Components and what to check?

- Shape, colour and dimensions
- Range, light characteristic
- Intensity, current, voltage
- Solar panel, battery and sun switch
- Bird spikes and guano
- Corrosion
- Rails and ladder wear
- Anodes
- Verticality and metal thickness
- Dissimilar materials
- Paint thickness and colour
- Guano
- Damages to hull
- Marine fouling
- Buoyancy
- Anodes
- Lifting eye configuration
- Corrosion, marine fouling

Performance measurement by CA or AtoN managers for Availability, Reliability, Continuity, Redundancy and Integrity
AtoN Maintenance, Daymarks

It should not be forgotten that most traffic occurs during the day, which means that the daymarks should be readily identified by mariners at a distance without possibility of confusion.

Detection
The observer is aware of an object. The navigator sees an object, but will usually not be able to deduce its shape or colour and will not know that it is an AtoN.

Recognition
The observer is aware that the object is an AtoN.

Identification
The observer is aware which AtoN the object is. At this distance, the navigator can perfectly discern the type of mark it is.

For AtoN Daymarks the following constructions are in use:
- Flat daymark
- Solid daymark
- Crossed plates
- Lattice construction

For fixed Aids there is more freedom in the design of daymarks. For Example:
- A fixed daymark may be much larger and higher providing a long daymark range;
- A specific colour scheme may be used to identify a particular fixed aid;
- It may be flat;
- It may be designed for a specific background;
- It may have a background panel to show more contrast;
- The design of the daymark should take into consideration environmental conditions such as wave action;
- The supporting structure of a daymark may become part of the daymark or be used to enhance the conspicuity.
AtoN Maintenance Lantern and Lamp Components and what to check?

- Ensure solar modules are not covered and are in clear view of the sun with no shadows
- Visually inspect lantern lens and base for cracks, grazing, holes
- Inspect bird deterrent spike
- Battery check: inspection performed routinely to ensure the charger, battery and ancillary electronics are functioning correctly
- Use voltage meter to check the battery voltage in both on-load and off-load conditions and ensure all terminals are clear of foreign matter
- Inspect battery boxes for damaged flanges, covers, gaskets, vent valves, and securing hardware
- Check for degradation of sector colours, and replace or adjust to the correct charted position if necessary
- Solar panels – tilt angle, framework and mounting hardware, corrosion and tension, broken glass, water intrusion around the edges. Inspect wiring for cuts, abrasion and UV degradation. Where plugs and sockets are used, check for water ingress of corrosion. Test power output including the solar regulator.
- A review of spares holding

Lanterns and Lamps checklist

- Light Intensity, range
- Battery voltage, resistance, current and electrolyte levels
- Cracks or signs of water ingress
- Earthing and power output
- Colour degradation
- Sun switch glazing and lantern glazing
- Bird spikes, Guano and dirt
- Obstruction around lights, solar modues etc
- Level and focus
- Flash character
- Signal output
- Solar Panels

Performance measurement by CA or AtoN managers for Availability, Reliability, Continuity, Redundancy and Integrity
AtoN Maintenance Mooring Components and what to check?

1. Bridle or Tali Chains
2. Riding Chain
3. Thrash Chain
4. Ground Chain

- Wear on links
- Wear on shackle and eye
- Sinker position

Connection to Buoy
- Bridle Chains
- Forelock End Shackle
- Swivel
- Forelock End Shackle
- Pendant/Ground Chain
- Forelock End Shackle
- Sinker
AtoN Maintenance
Paints, Coatings and Retroreflecting materials

Paint provides protection from corrosion and provide the signal colour to be seen by the mariner.

Indirect (Diffuse) Illumination

Direct Illumination

Object Daymark

Haze / Fog

Observer

Starboard Mark
Port Mark
Special Mark
Safe Water Mark
Cardinal Mark
Isolated danger Mark

Colour of the Mark
r: Retroreflecting Material

AtoNs can be equipped with retroreflective material, so the mariner can detect the position and colour at night by use of a searchlight.

In principle, green, red and yellow buoys should carry only one green, red and yellow band respectively.

White bands for safe water, cardinal and isolated danger marks.

- The IALA MBS uses 5 colours: Red, Yellow, White, Blue and Black.
- Coloured surfaces are subject to salt deposits, marine growth, bird fouling, mechanical abrasion, UV degradation, etc.
- A surface colour should always be checked, especially at a distance, for its appearance among the surrounding colours.
- Deterioration of surface colours in use is a common occurrence, and care must be taken that signal colours always remain in compliance with their specifications.
- Effective colour retention will depend on regular maintenance cleaning which will be simplified by utilising paint with a hard and high gloss surface.
- A glossy surface produces a saturated colour, thus it's recommended to use glossy colours for AtoNs.
For more information

www.gem.spc.int