# Water Awareness and Charge Certificate Manual

## Module 51: Navigation Marks, Lights and Sounds

Current Document Revision Number: 1.2

Revision Date: 14 January 2018

### Module Contents

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| Module Title | Comments | Rev No | Revision Date |
|---|---|---|---|
| Module 51: Navigation Lights, Marks and Sounds | Initial Release | 1.0 | 10 Jan 2013 |
| Module 51: Navigation Lights, Marks and Sounds | Added sailing vessel additional R+G light graphic and text.modified P+S mark graphic | 1.1 | 8 Sept 2013 |
| Module 51: Navigation Lights, Marks and Sounds | Outcomes added | 1.2 | 14 Jan 2018 |

# Outcomes

After completing this module, the certificate holder will:

- Be able to identify the lights required on a particular vessel as described in the Colregs
- Be able to recognize various sound signals
- Be able to interpret IALA buoyage

# 1 Navigation Lights

## 1.1 Lighthouses

A lighthouse is a tower, building, or framework designed to emit light from a system of lamps and lenses as an aid to navigation. Lighthouses are used to mark dangerous coastlines, hazardous shoals and reefs, and safe entries to harbours

Each light has its characteristics printed next to it on the chart. These details will include the colour (if not white), the height above sea level and the nominal viewing range.

In order to differentiate lighthouses in the same area, different patterns of light are used:

- F. = Fixed light. The light is on all the time.
- Fl. = Flashing. The light flashes quickly at regular intervals
- Oc. = Occulting. The light is on for a long periods and off for a short period
- Iso. = ISOPhase. The light is on and off for an equal amount of time,

Some examples

- The Robben Island Light – Oc. WR.7s47m24/12M
  - The light is occulting in White and Red and is on for 7 seconds each cycle. The light is 47m above mean sea level. The white light is visible for 24nm and the red for 12nm.
  - It is not possible to tell from the code, but by looking at the chart you will see that the red light is a sector light, warning of the danger of whale rock.
- Seal Island light – Fl (2)5s8m5M
  - The light is white and flashes twice every 5 seconds. It is 8m above mean sea level and has a range of 5nm

By taking a bearing on two or more lighthouses, it is possible to quite accurately plot your location on a chart. The greater the unknown compass error for which you don't compensate, the less accurate your fix will be.

## 1.2 Running Lights and Shapes

All vessels are required to display lights during the hours of darkness and during periods of reduced visibility. There are 5 types of light:

- Port side light must be red in colour and visible from dead ahead to 2 points abaft the beam on the port side. (112.5 degree viewing angle)
- Starboard side light must be green in colour and visible from dead ahead to 2 points abaft the beam on the starboard side. (112.5 degree viewing angle)
- Masthead light must be white in colour and 2 points abaft the beam on the starboard side across the bow to 2 points abaft the beam on the port side (225 degree viewing angle)
- Stern light must be white in colour and must be visible from 2 points abaft the beam on the starboard side across the stern to 2 points abaft the beam on the port side (135 degree viewing angle)
- All round lights must be as visible as possible from any direction and can be red, green, white or yellow in colour.

The all round lights must have a separate switch from the side lights and all lights should be visible for a minimum of 2nm.

There are many combinations of these lights for vessels of all shapes and sizes. We are only concerned with vessels of less than 12 metres in length.

### 1.2.1 Power-driven Vessels

Must display an all round white light and port and starboard side lights. Masthead and stern lights can be combined into an all round white light.

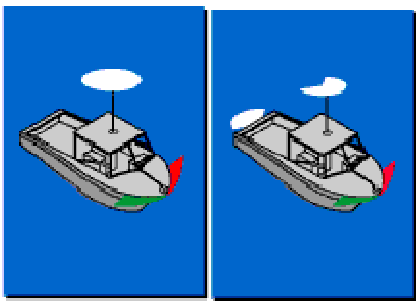


**Figure 1: Power driven vessel lights**

Sailing vessels using an engine for propulsion are considered to be power driven and must display and all round white light and port and starboard side lights

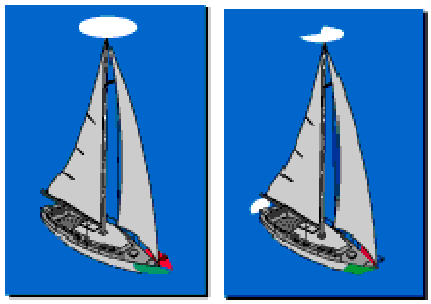


**Figure 2: Power driven sailing vessel lights**

During the day, vessels under sail also being propelled by machinery, must exhibit forward, where best seen, a black conical shape with the apex pointing down. This only applies to harbour areas

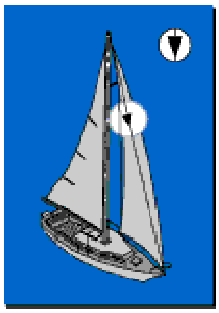


**Figure 3: Motor sailor during the day**

### 1.2.2 Sailing Vessels

Must display a stern light and port and starboard side lights. These lights may take the form of a tricolour light at the masthead.

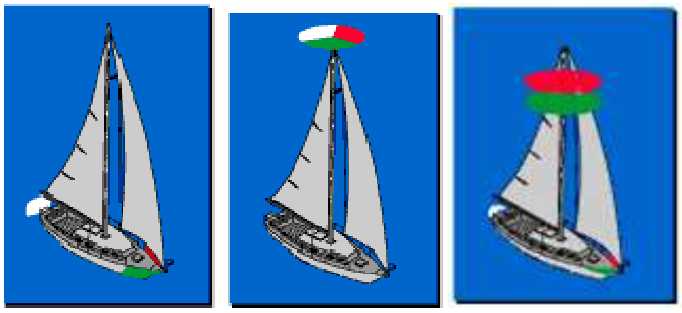


**Figure 4: Sailing vessel lights**

Sailing vessels may exhibit additional all round lights where they can best be seen, red over green. They may not be exhibited in conjunction with the combined tricolour light.

### 1.2.3 Vessels at Anchor or Aground

Must display an all round white light.

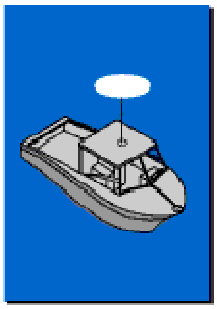


**Figure 5: Anchored vessel lights**

During the day, all vessels at anchor must display a black ball shape, forward where it can be best seen.

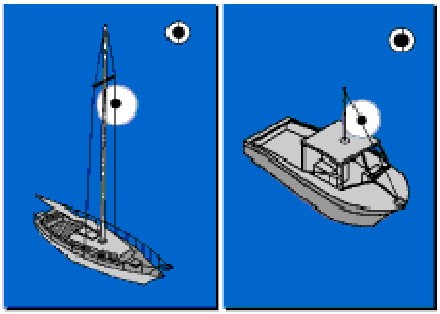


**Figure 6: Vessel at anchor during the day**

### 1.2.4 Vessels with Restricted Manoeuvrability

Must display appropriate day shapes or lights. The only case we are likely to encounter is a vessel is engaged in diving activities. During the day, it must exhibit a rigid replica of the international code flag "Alpha" not less than 3.3 feet/ 1 meter in height. If the diving activities are at night, the vessel must display the navigation lights all round white with all round red above and below

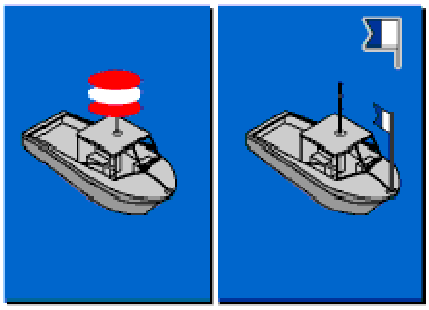


**Figure 7: Vessels with restricted manoeuvrability**

### 1.2.5 Vessels under 7m

Vessels with an overall length of less than 7m are considered as a special case.

Vessels less than 7m in length are not required to display an anchor light or shape unless it is anchored in or near a narrow channel, fairway or anchorage, or where other vessels normally navigate

Vessels less than 7m in length and with a maximum speed of less than 7 knots are only required to display an all round white light. This light may be portable.

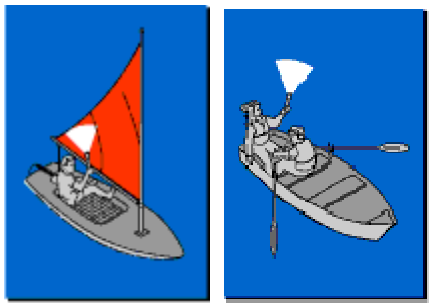


**Figure 8: Vessels less than 7m**

## 2 Sound Signals

Sound signals are used in two possible situations.

In the even of a possible collision, the following signals will be give manoeuvring and warning alerts between vessels in sight of each other. A short "blast" means a duration of about one second, and a long (or "prolonged") blast lasts four to six seconds.

| | |
|---|---|
| 1 short | In a head to head situation, I am altering my course to starboard (no response required) |
| 2 short | In a head to head situation, I am altering my course to port (no response required) |
| 3 short | I am engaging my engines astern (no response required) |
| 5 short (or more) | Make your intentions known (wake up) |
| | |
| 1 long | Rounding a bend or obstruction (respond in kind) |
| 2 long, 1 short | I am overtaking to starboard (respond with long/short/long/short) |
| 2 long, 2 short | I am overtaking to port (respond with long/short/long/short) |
| Continuous foghorn | I require assistance |

In the event of reduced visibility, sound signals may be the only method available to alert others to your presence. For this purpose, a separate set of signals exist

| | |
|---|---|
| 1 long every 2 min | I am under power, under way and making way |
| 2 long every 2 min | I am under power, under way and hove to |
| 1 long, 2 short every 2 min | I am not under command, restricted manoeuvrability, sailing, fishing towing or pushing, at anchor fishing, at anchor in restricted visibility (vessels < 12m) |

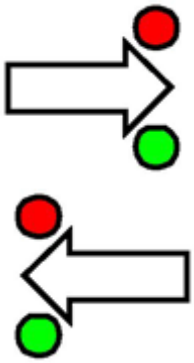
# 3 Marks

The International Association of Lighthouse Authorities (IALA) system of buoys or marks is used in South African waters. Buoys are used to mark isolated dangers, navigable channels and safe waters. The IALA system has 5 different types of buoy and each buoy will consist of a bottom and optional top mark.

| | | | | |
|---|---|---|---|---|
| Bottom Marks | Conical | Can | Pillar | Spar |
| Top Marks | Cone | Can | Sphere | |

Not all buoys are fitted with top marks, or with lights.

## 3.1 Lateral Marks



Lateral marks are usually positioned to define well established channels, and indicate port and starboard sides of the navigation route into a port. When entering a port, the starboard mark is left to starboard and the port mark to port.

When exiting the port, the port mark is left to starboard and the starboard mark is left to port.

A **port** mark is coloured red and the basic shape is a can

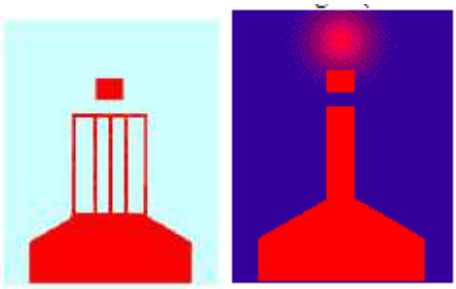


**Figure 9: Port hand lateral mark**

By night a port mark shows a flashing red light (when lit)

A **starboard** mark is coloured green and the basic shape is a cone

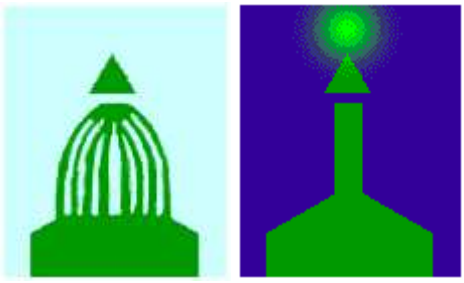


**Figure 10: Starboard hand lateral marks**

By night a starboard mark shows a flashing green light (when lit)

## 3.2 Cardinal

A cardinal mark indicates where the best and safest water may be found and is used in conjunction with a compass. It shows where the mariner has safe passage.

The safe passage is always to the named side of the cardinal mark (i.e. keep north of the north cardinal mark, west of the west cardinal mark etc). The buoy will be between the vessel and the danger.

Cardinal Mark features:

- Top marks - Black double cones clearly separated.
- Colours - Black and yellow horizontal bands with the position of the black band or bands relative to the respective cardinal points.
- Lights - A cardinal mark exhibits a white light and its quadrant is distinguished by a specific group of quick or very quick flashes.

**North** - Top mark points up, black band above yellow band.

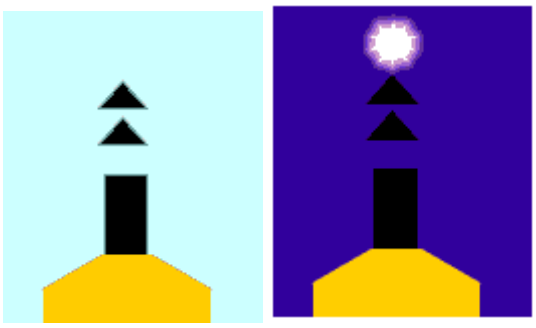


**Figure 11: North cardinal mark**

At night, a white light flashes continuously

**East** - Top mark points outward, black bands above and below yellow band.

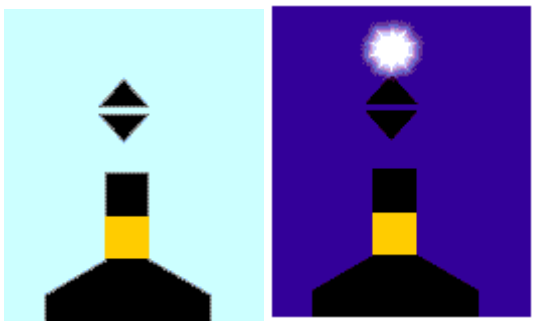


**Figure 12: East cardinal mark**

At night, a white light flashes in groups of 3

**South** - Top mark points down, black band below yellow band.

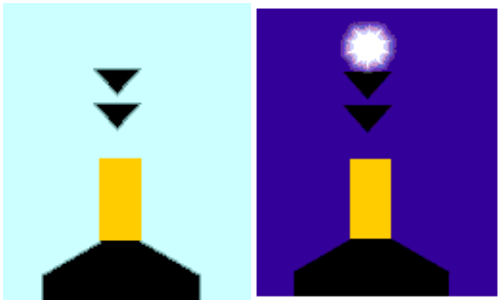


**Figure 13: South cardinal mark**

At night, a white light flashes 6 times followed by a long flash.

**West** - Top mark points inward, black band between yellow bands.

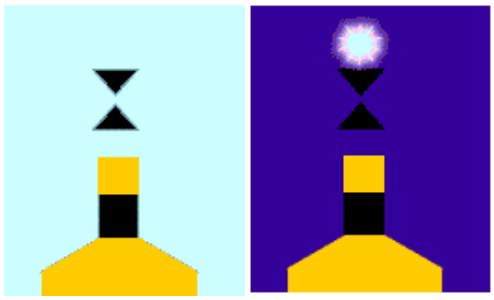


**Figure 14: West cardinal nest**

At night, a white light flashes in groups of 9

To assist in remembering cardinal marks, associate the number of flashes of each group with that of a clock face. That means that north is at twelve o'clock, east is at three o'clock, south is at six o'clock and west is at nine o'clock.

To ensure that no confusion occurs between east, south and west marks, a long flash immediately follows the six flashes of the south mark.

## 3.3 Isolated Danger

Isolated danger marks designate an isolated danger of limited extent which has navigable water all round it, for example an isolated shoal, rock or wreck.

Isolated danger mark features:

- colour - black with one or more red horizontal bands
- top mark - two black spheres positioned vertically and clearly separated
- Light - a white flashing light showing groups of two flashes.

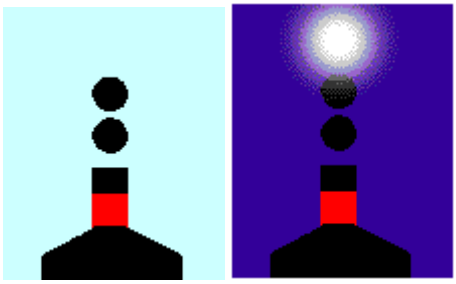


**Figure 15: Isolated danger mark**

## 3.4 Safe Water

Safe water marks indicate that there is navigable water all around the mark, for example mid-channel or landfall buoy.

Safe water mark features:

- colour: red and white vertical stripes
- top mark: a single red sphere
- Light: exhibits a white light, isophase, occulting, or single long flash every 10 seconds.

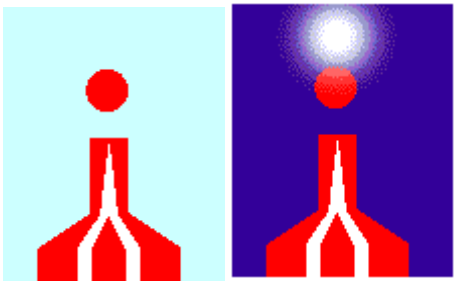


**Figure 16: Safe water mark**

## 3.5 Special

Special marks indicate a special area or feature such as traffic separation marks, spoil, ground marks, cable or pipe lines marks including outfall pipes.

They can also define a channel within a channel, for example a channel for deep draught ships in a wide estuary where the limits of the channel for normal navigation are marked by red and green lateral buoys.

Special mark features:

- colour — yellow
- top mark — when a top mark is carried, it takes the form of a single yellow X
- Light — it is yellow and the rhythm may be any other than those used for the white lights of cardinal, isolated danger and safe water marks.

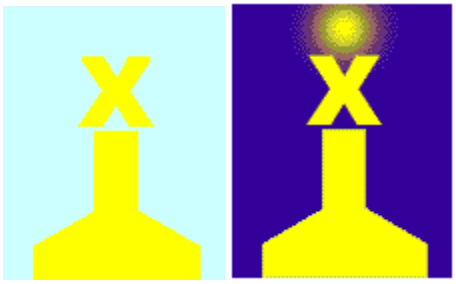



**Figure 17: Special mark**