

International Association of Lighthouse Authorities

MARITIME BUOYAGE SYSTEM

HISTORICAL BACKGROUND

As recently as 1976 there were more than thirty different buoyage systems in use world wide, many of these systems having rules in complete conflict with one another. This resulted in a situation particularly confusing at night when a mariner could be unexpectedly confronted by a light, the meaning of which was not clear. Such confusion was especially dangerous when the unidentified light was marking a new and as yet uncharted danger, such as a recent wreck. This left the mariner in doubt as to his proper course of action leading him to make a wrong and perhaps disastrous decision.

There has always been disagreement over the way in which buoy lights should be used since they first appeared towards the end of the 19th century. In particular, some countries favoured using red lights to mark the port hand side of channels and others favoured them for marking the starboard hand.

Another major difference of opinion revolved around the principles to be applied when laying out marks to assist the mariner. Most countries adopted the principle of the Lateral system whereby marks indicate the port and starboard sides of the route to be followed according to some agreed direction. However, several countries also favoured using the principle of Cardinal marks whereby dangers are marked by one or more buoys or beacons laid out in the quadrants of the compass to indicate where the danger lies in relation to the mark, this system being particularly useful in the open sea where the Lateral buoyage direction may not be readily apparent.

Over the years, many attempts were made to solve these differences of opinion but without success. The nearest approach to international agreement on a unified system of buoyage was reached at Geneva in 1936. Unfortunately, this Agreement, drawn up under the auspices of the League of Nations, was never ratified due to the outbreak of World War II. The Agreement proposed the use of either Cardinal marks or Lateral marks but separated them into two different systems. It also provided for the use of the colour red on port hand marks and largely reserved the colour green for wreck marking.

At the end of World War II many countries found their aids to navigation destroyed and the process of rehabilitation had to be undertaken urgently. In the absence of anything better, the Geneva rules were adopted with or without variation to suit local conditions and the equipment available. This led to wide and sometimes conflicting differences particularly in the crowded waters of North Western Europe.

Much of the North and South American continents and some countries of the Pacific continued to favour "red to starboard" and used only a Lateral system of buoyage.

The whole unsatisfactory situation was well known to IALA, and as long ago as 1965, the Association set up an international Technical Committee to examine the problem and to suggest a solution.

There were three basic problems facing the Committee:

- i) the need to retain existing equipment as far as possible to avoid undue expense.
- ii) how were the colours green and red to be used when marking channels?
- iii) the need to combine the Lateral and Cardinal rules.

Attempts to bring complete unity had little success. Fresh impetus was given to the task of the Committee by a series of disastrous wrecks in the Dover Strait area in 1971. These wrecks, situated in one lane of a traffic separation scheme, defied all attempts to mark them in a way all could readily understand.

To meet the conflicting requirements, it was thought necessary as a first step to formulate two systems, one using the colour red to mark the port hand side of channels and the other using the colour red to mark the starboard hand side of channels. These were called System A and System B respectively.

The rules for System A which included both cardinal and lateral marks were completed in 1976 and agreed by the Inter-Governmental Maritime Consultative Organization (IMCO). The introduction of the System began in 1977 and its use has gradually spread throughout Europe, Australia, New Zealand, Africa, the Gulf and some Asian countries.

The rules for System B were completed in early 1980 and these were felt to be suitable for application in the countries of North, Central and South America, Japan, Korea and the Philippines.

The rules for the two Systems were so similar that the IALA Executive Committee felt able to combine the 2 sets of rules into one, known as "The IALA Maritime Buoyage System". This single set of rules allows Lighthouse Authorities the choice of using red to port, or red to starboard, on a regional basis, the two regions being known as Region A and Region B.

To achieve this single set of rules and to meet the needs of Region B countries, it was proposed to make certain small additions to the agreed System A rules. These additions were of minor nature and did not make any significant change to the System A buoyage already in course of introduction.

At a Conference convened by IALA in November 1980 with the assistance of IMCO and the International Hydrographic Organization (IHO), the Lighthouse Authorities from 50 countries and the representatives of 9 International Organizations concerned with aids to navigation met, and agreed to adopt the rules of the new combined System. The boundaries of the buoyage regions were also decided and illustrated on the map annexed to the rules. The Conference also underlined the need for cooperation between neighbouring countries and with Hydrographic Services in the introduction of the new System.

Thus the IALA Maritime Buoyage System will, for the first time, help the Mariner of any nationality to fix his position and avoid dangers without fear of ambiguity. This is indeed an important and positive contribution to safety of life and property at sea.

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GENERAL PRINCIPLES OF THE SYSTEM

Within the IALA Buoyage System there are 5 types of marks which may be used in combination. The mariner can easily distinguish between these marks by readily identifiable characteristics.

Lateral marks differ between Buoyage Regions A and B as described below, whereas the other 4 types of mark are common to both regions.

LATERAL MARKS

Following the sense of a 'conventional direction of buoyage', Lateral marks in Region A utilize red and green colours by day and night to denote the port and starboard sides of channels respectively. However, in Region B these colours are reversed with red to starboard and green to port.

A modified Lateral mark may be used at the point where a channel divides to distinguish the preferred channel, that is to say the primary route or channel which is so designated by an Authority.

CARDINAL MARKS

Cardinal marks indicate that the deepest water in the area lies to the named side of the mark. This convention is necessary even though for example, a North mark may have navigable water not only to the North but also East and West of it. The mariner will know he is safe to the North, but must consult his chart for further guidance.

Cardinal marks do not have a distinctive shape but are normally pillar or spar. They are always painted in yellow and black horizontal bands and their distinctive double cone top-marks are always black.

An aide-memoire to their colouring is provided by regarding the topmarks as pointers to the positions of the black band(s):

Topmarks pointing upward: black band above yellow band

Topmarks pointing downward: black band below yellow band

Topmarks pointing away from each other: black bands above and below a yellow band

Topmarks pointing towards each other: black band with yellow bands above and below.

Cardinal marks also have a special system of flashing white lights. The rhythms are basically all "very quick" (VQ) or "quick" (Q) flashing but broken into varying lengths of the flashing phase. "Very quick flashing" is defined as a light flashing at a rate of either 120 or 100 flashes per minute, "quick flashing" is a light flashing at either 60 or 50 flashes per minute.

The characters used for Cardinal marks will be seen to be as follows:

North: Continuous very quick flashing or quick flashing

East: Three "very quick" or "quick" flashes followed by darkness

South: Six "very quick" or "quick" flashes followed immediately by a long flash, then darkness

West: Nine "very quick" or "quick" flashes followed by darkness.

The concept of three, six, nine is easily remembered when one associates it with a clock face. The long flash, defined as a light appearance of not less than 2 seconds, is merely a device to ensure that three or nine "very quick" or "quick" flashes cannot be mistaken for six.

It will be observed that two other marks use white lights. Each has a distinctive light rhythm which cannot be confused with the very quick or quick flashing light of the Cardinal marks.

ISOLATED DANGER MARK

The isolated Danger mark is placed on a danger of small area which has navigable water all around it. Distinctive double black spherical topmarks and Group flashing (2) white lights, serve to associate Isolated Danger marks with Cardinal marks.

SAFE WATER MARKS

The Safe Water mark has navigable water all around it but does not mark a danger. Safe Water marks can be used, for example, as mid-channel or landfall marks.

Safe Water marks have an appearance quite different from danger marking buoys. They are spherical, or alternatively pillar or spar with a single red spherical topmark. They are the only type of mark to have vertical stripes (red and white). Their lights, if any, are white using isophase, occulting, one long flash or Morse "A" rhythms.

SPECIAL MARKS

Special marks are not primarily intended to assist navigation but are used to indicate a special area or feature whose nature may be apparent from reference to a chart or other nautical document.

Special marks are yellow. They may carry a yellow "X" topmark, and any light used is also yellow. To avoid the possibility of confusion between yellow and white in poor visibility, the yellow lights of Special marks do not have any of the rhythms used for white lights.

Their shape will not conflict with that of navigational marks, this means, for example, that a special buoy located on the port hand side of a channel may be cylindrical, but will not be conical. Special marks may also be lettered or numbered to indicate their purpose.

NEW DANGERS

It should be specially noted that a "new danger" which is one not yet shown in nautical documents, may be indicated by exactly duplicating the normal mark until the information is sufficiently promulgated. A "new danger" mark may carry a Racon coded Morse "D".

MARITIME BUOYAGE SYSTEM

RULES

1. GENERAL

1.1. Scope

This system provides rules which apply to all fixed and floating marks (other than lighthouses, sector lights, leading lights and marks, lightships and large navigational buoys) serving to indicate:

- 1.1.1. The lateral limits of navigable channels.
- 1.1.2. Natural dangers and other obstructions such as wrecks.
- 1.1.3. Other areas or features of importance to the mariner.
- 1.1.4. New dangers.

1.2. Types of marks

The system of buoyage provides five types of marks which may be used in combination:

- 1.2.1. Lateral marks, used in conjunction with a "conventional direction of buoyage", generally used for well defined channels. These marks indicate the port and starboard sides of the route to be followed. Where a channel divides, a modified lateral mark may be used to indicate the preferred route. Lateral marks differ between Buoyage Regions A and B as described in Sections 2 and 8.
- 1.2.2. Cardinal marks, used in conjunction with the mariner's compass, to indicate where the mariner may find navigable water.
- 1.2.3. Isolated Danger marks to indicate isolated dangers of limited size that have navigable water all around them.
- 1.2.4. Safe Water marks to indicate that there is navigable water all around their position, e.g. mid-channel marks.
- 1.2.5. Special marks not primarily intended to assist navigation but to indicate an area or feature referred to in nautical documents.

1.3. Method of characterising marks

The significance of the mark depends upon one or more of the following features:

- 1.3.1. By night, colour and rhythm of light.
- 1.3.2. By day, colour, shape, topmark.