

UNIFICATION OF BUOYAGE,

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In order to keep readers of the *Hydrographic Review* informed as to the state of the question and of the progress made towards unification of buoyage, the following extract is given from Pamphlet N° C 817 M 378 issued by the Organisation for Communications and Transit of the League of Nations at the date of 1st December, 1932 :

UNIFORM SYSTEM OF BUOYAGE.

DRAFT REGULATIONS AND EXPLANATORY NOTE

DRAWN UP BY THE FRENCH LIGHTHOUSE SERVICE CONCERNING :

- 1°) *A Uniform System of Lateral Buoyage* (1) ;
- 2°) *A Uniform System of Cardinal Buoyage.*

(Translation.)

DRAFT REGULATIONS.

CHAPTER I. — GENERAL.

ARTICLE 1. — DEFINITION.

The buoyage to which the present rules apply includes, with the exception of lighthouses and important lightships, all fixed or floating marks which serve to indicate either landfalls, or the limits or centres of channels practicable for navigation, or natural dangers, or artificial or accidental obstacles such as wrecks, or certain other points of importance to the navigator.

The principal marks utilisable for this purpose are fixed buoys and beacons, whether lighted or not, boat-buoys or small floating lights and floating buoys.

The present regulations notably do not apply to inland waters not frequented by seagoing ships.

ARTICLE 2. — BUOYAGE SYSTEMS.

There are two principal systems of buoyage :

The *lateral* system, which applies more particularly to well-defined channels, and in which buoyage-marks indicate the location of dangers in relation to the route to be followed by navigators in their vicinity ;

The *cardinal* system, which applies more particularly to coasts flanked by numerous rocks or isolated dangers, and in which the respective locations of the mark and of the danger are indicated according to the nearest true cardinal bearing of the one in relation to the other.

ARTICLE 3. — USE OF SYSTEMS.

In the same country, and according to preference or local requirements, use may be made of one or other or both systems, on condition that the limits of their respective use are clearly indicated in nautical documents and by means of appropriate marks.

ARTICLE 4. — CHARACTERISTICS UTILISED IN BUOYAGE.

Buoyage-marks are characterised in both systems :

- 1° By day, simultaneously or alternatively :

(1) *This part of the document is intended to supplement the British proposals (document C.978. M.543.1931.VIII).*

a) By the shape of the body of the mark or of an openwork superstructure secured to the latter (these two arrangements are regarded as equivalent), or by the shape of a topmark surmounting the mark;

b) By the colouring of the mark.

2° By night:

By lights, which will be differentiated either by colour or by rhythm or by a combination of the two.

ARTICLE 5. — SHAPES OF THE BODY OF THE MARK.

1. *Lateral System.* — Three characteristic shapes may be distinguished: upper part of the mark pointed ("conical"); upper part of the mark flat ("can" (cylindrical)); and upper part of the mark rounded ("spherical").

2. *Cardinal System.* — A distinction may be made between four characteristic shapes: pointed or conical, flat or cylindrical, domed and very elongated ("spindle").

ARTICLE 6. — SHAPES OF TOPMARKS.

1. *Lateral System.* — The characteristic topmarks present the appearance of a cone with point upwards, a cylinder, a sphere, two cones base to base, and a St. George's cross.

2. *Cardinal System.* — The characteristic topmarks present the appearance of a cone with point upwards, a cone with point downwards, two cones base to base, and two cones point to point.

N.B. — This appearance may be produced by intersecting plates or by cages presenting the above-mentioned visible contours.

In both systems, when local circumstances require it (particularly in waters exposed to ice), the topmarks may be replaced by brooms of dark colour, of a shape as nearly as possible approaching that of the topmarks for which they are substituted.

ARTICLE 7. — CHARACTERISTIC COLOURS.

1. *Lateral System.* — The characteristic colours by day for natural dangers are black and red, which for certain special indications may be combined with white.

The characteristic colour by day for wreck-marks is green.

2. *Cardinal System.* — The characteristic colours by day for natural dangers are black combined with white and red combined with white in horizontal divisions.

The characteristic colour by day for wreck-marks is green combined with white.

3. In both systems, and in all cases, the *topmarks* are painted with the darkest characteristic colour used for the corresponding mark. This provision is not obligatory when brooms are employed as topmarks.

ARTICLE 8. — LIGHTED BUOYS AND SPECIAL BUOYS.

It is of advantage to give the body of lighted buoys and special buoys (such as bell-buoys, whistle-buoys, etc.), when their mode of construction and conditions of use permit, the characteristic shape corresponding to their position in the buoyage system, or, failing that, to supply them with a corresponding topmark.

The same applies to boat-buoys or other floating marks which serve the same purpose as lighted buoys.

ARTICLE 9. — DIFFERENTIATION OF THE CHARACTERISTICS OF LIGHTS.

The main categories of lights are the following:

Flashing or intermittent lights, in which the appearances of light are definitely shorter than the periods of darkness;

Occulting lights in which the eclipses are definitely shorter than the periods of light;

Occulting lights in which the periods of light are equal to the periods of darkness;

Quick-flashing lights, in which the alternations of light and darkness are very rapid and attain a rate of at least forty per minute;

Interrupted quick-flashing lights, in which successions of quick flashes are separated by intervals of darkness.

In the case of lights with groups of flashes, occultations, or quick flashes, the interval between two groups should be equal to at least three times the interval of the variations in each group.

CHAPTER II. — LATERAL SYSTEM.

ARTICLE 10. — DEFINITION OF THE DIRECTION OF ARRIVAL.

In principle, the position of the marks in the lateral system is determined according to the general direction taken by a navigator coming from seaward; it may also be determined, particularly when approaching a port or river-mouth, according to the direction of the main stream. The application of these principles shall be defined as far as may be necessary by nautical documents.

ARTICLE 11. — CHARACTERISTICS OF MARKS ON THE SIDES OF CHANNELS.

1. Marks on the two sides of a channel are differentiated as follows:

Starboard-hand marks:

Conical shape (compulsory for ordinary buoys);

Conical topmark: Colour black, or, particularly in the case of multiple channels, black and white chequers;

Lights: Either white with an odd number of variations, or green with a rhythm other than those reserved for the marking of wrecks.

Port-hand marks:

Cylindrical shape (compulsory for ordinary buoys);

Cylindrical topmark: Colour red, or, particularly in the case of multiple channels, red and white chequers;

Lights: Either red, or white with an even number of variations.

2. If marks at the side of a channel are *numbered* or lettered, this numbering or lettering shall commence from seaward; odd numbers shall be on the starboard and even numbers on the port hand.

ARTICLE 12. — BIFURCATION- OR JUNCTION-MARKS OR MIDDLEGROUND-MARKS.

1. *Spherical shape* or *spherical topmark* placed under the other characteristic topmarks defined below.

2. *Colour:*

Alternate red and white horizontal bands where the main channel is to the right or the channels are of equal importance;

Alternate black and white horizontal bands where the main channel is to the left.

3. *Topmarks:*

a) Main channel to the right:

At the bifurcation, a cylinder;

At the junction, a St. George's cross.

b) Main channel to the left;

At the bifurcation, a cone, point upwards;

At the junction, a cone, point downwards.

c) Channels of equal importance:

At the bifurcation, two cones base to base.

At the junction, a sphere.

4. *Lights:*

The choice and character of lights will be based both on the rules given above for lights marking the sides of channels (Article 11) and on the advisability of making a differentiation with neighbouring lights marking sides of channels.

CHAPTER III. — CARDINAL SYSTEM.

ARTICLE 13. — ASSIGNMENT OF CHARACTERISTICS AMONG THE QUADRANTS.

There are four quadrants, north, south, east and west, bounded respectively by the directions N.E., S.E., S.W. and N.W.

1. Danger-marks are characterised as follows in the different quadrants:

Northern quadrant (N.W. to N.E.):

Conical shape;

Conical topmark, point upwards;

Colour: Black with a wide white median band, or, for spars only, white with a wide black median band;

White light with even number of variations or quick-flashing.

Southern quadrant (S.E. to S.W.):

Cylindrical shape;

Conical topmark, point downwards;
 Colour: Red with wide white median band;
 Light with odd number of variations or interrupted quick flashes, red preferably, or white.

Western quadrant (S.W. to N.W.):

Spindle shape;

Topmark: Two cones, point to point;

Colour: Black above and white below;

White light with an odd number of variations or interrupted quick flashes.

Eastern quadrant (N.E. to S.E.):

Dome shape;

Topmark: Two cones, base to base.

Colour: Red above, white below, or, for spars only, red below and white above;

Light with even number of variations or quick flashes, red preferably, or white.

2. As a simplification, only two characteristic forms may be used for the body of the mark, the same conical or dome shape being employed in the northern and eastern quadrants and the same cylindrical or spindle shape in the southern and western quadrants.

3. The use of topmarks is compulsory in cases in which the body of the mark is not one of the characteristic shapes.

The topmarks may be repeated above one another in order to facilitate differentiation between similar marks. It will then be sufficient to repeat the lower cone for the east or west.

Exceptionally, topmarks on spars may be omitted for climatic reasons, or owing to the special nature of the traffic.

CHAPTER IV. — WRECKS.

ARTICLE 14. — GENERAL PROVISIONS.

Wrecks may be marked according to the lateral system or the cardinal system.

Nautical documents should indicate the system or systems in use in each country.

Wreck-marks shall be provided with special characteristics, at any rate as long as may be necessary to render their presence familiar to navigators. When this result has been achieved, wrecks may be marked in the same manner as natural dangers.

Wreck-marks shall be painted with the characteristic colour, green; or, at any rate, green must predominate.

Wreck-marks shall, if possible, carry the letter "W" painted in white, or, in the case of vessels, an inscription at least containing this letter.

If lighted, they must always include at least one green light; in the case of a lightship marking a wreck, the latter shall not carry the ordinary riding-light for vessels at anchor.

ARTICLE 15. — CHARACTERISTICS WHEN THE LATERAL SYSTEM IS USED.

1. *For buoys or beacons marking a wreck to be passed on the starboard hand:*

A conical shape or mark surmounted by a conical topmark;

Colour: Green, the lower part having compulsorily to be painted black if the characteristic shape has not been used;

Green light, with groups of three flashes.

2. *For buoys or beacons marking a wreck to be passed on the port hand:*

Cylindrical shape or mark surmounted by a cylindrical topmark;

Colour: Green, the lower part having compulsorily to be painted red if the characteristic shape has not been used;

Intermittent green light, with groups of two flashes (or appearances of light).

3. *For buoys or beacons marking a wreck to be passed on either hand:*

Spherical shape or mark surmounted by a spherical topmark where possible;

Colour: Green;

Occulting green light, in which the periods of light are equal to the periods of darkness.

4. *Vessel marking a wreck to be passed on the starboard hand.* — It shall carry:

One spherical shape between two conical shapes in a vertical line and painted green;

Three green lights in a vertical line.

5. *Vessel marking a wreck to be passed on the port hand.* — It shall carry:

A cylindrical shape above a spherical shape in a vertical line and painted green;

Two green lights in a vertical line.

6. *Vessel marking a wreck to be passed on either hand.* — It shall carry :
Spherical shapes painted green in pairs in a vertical line, with at least four showing ;
Green lights arranged in the same way.

ARTICLE 16. — CHARACTERISTICS IN THE CASE OF THE CARDINAL SYSTEM.

1. *For buoys or beacons in the northern quadrant :*
Conical shape ;
Conical topmark with point upwards ;
Colour : White with wide green median band ;
Intermittent green light, with groups of four flashes (or appearances of light), or quick-flashing.
 2. *For buoys or beacons in the southern quadrant :*
Cylindrical shape ;
Conical topmark with point downwards ;
Colour : Green with wide white median band ;
Intermittent green light, with groups of five flashes (or appearances of light), or quick-flashing with interruptions.
 3. *For buoys or beacons in the western quadrant :*
Spindle shape ;
Topmark consisting of two cones point to point ;
Colour : Upper half green, and lower half white ;
Intermittent green light, with groups of five flashes (or appearances of light), or quick-flashing with interruptions.
 4. *For buoys or beacons in the eastern quadrant :*
Dome shape ;
Topmark consisting of two cones base to base ;
Colour : Upper half white, lower half green ;
Intermittent green light, with groups of four flashes (or appearances of light), or quick-flashing.
 5. *Vessel in the northern and eastern quadrants.* — It shall carry :
A conical shape above a spherical shape in a vertical line and painted green ;
Three green lights over a white light.
 6. *Vessel in the southern and western quadrants.* — It shall carry
Two cylindrical shapes over a spherical shape in a vertical line and painted green ;
Two green lights over a white light.
- N. B.* — For the sake of simplification, only two characteristic shapes may be utilised for the bodies of buoys ; the same conical or dome shape must be used in the northern and eastern quadrants and the same cylindrical or spindle shape in the southern and western quadrants.

ARTICLE 17. — FOG-SIGNALS ON WRECK-MARKING VESSELS.

In thick weather, a manned wreck-marking vessel shall ring a bell as follows :
Three strokes if the vessel is to be passed on the starboard hand ;
Two strokes if the vessel is to be passed on the port hand ;
Four strokes if the vessel may be passed on either hand ;
Six strokes if the vessel is to the north or east of the wreck ;
Five strokes if the vessel is to the south or west of the wreck.

CHAPTER V. — SPECIAL MARKS AND MISCELLANEOUS INDICATIONS.

ARTICLE 18. — LANDFALL BUOYS.

Landfall buoys shall be painted with black and white or red and white vertical bands.

ARTICLE 19. — MID-CHANNEL BUOYS.

Mid-channel buoys moored in safe waters shall, if possible, have a special shape distinct from the other principal characteristic shapes. Their topmark, if any, shall also have a shape different from the other characteristic shapes.

The marks in question shall be painted with black and white or red and white vertical bands.

ARTICLE 20. — ISOLATED DANGER-MARKS.

Isolated danger-marks shall have the following characteristics :

Spherical shape or spherical topmark ;

Colour : Wide black and red horizontal bands, separated by a narrow white band ;

Light : White or red.

ARTICLE 21. — INTERMEDIATE BUOYS.

Buoys indicating the transition between the cardinal and lateral systems shall be painted with red and white or black and white spiral bands.

ARTICLE 22. — MISCELLANEOUS BUOYS.

Buoys whose use is not defined in the present regulations shall be painted with a colour not liable to be confused with the characteristic colours of the buoyage systems.

Quarantine buoys shall be painted yellow.

ARTICLE 23. — SECTOR LIGHTS IN HARBOURS.

As regards lights placed on works at the entrance of harbours and chiefly intended to indicate the boundary of a channel, the colours and rhythms shall, as far as possible, be allocated according to the rules of the lateral system.

When coloured sectors are placed on lights belonging to the lateral system, it is desirable, if circumstances permit, that their colouring should be allocated in accordance with the rules of that system. In cases in which such an allocation is not considered practicable, it is recommended that the colours should be assigned in accordance with a definite rule for the region in question, in order that the sectors should be arranged in the same way when circumstances are the same.

ARTICLE 24. — COLOURS OF SUPPORTS.

The fixed supports of lights belonging to the lateral or cardinal buoyage systems should, as far as possible, be painted with the colour belonging to their position in the system in question. If it is impossible to use the regulation colour, the use of the opposite colour should in any case be avoided.

ARTICLE 25. — GENERAL REMARKS.

1. Derogations from the above rules should remain the exception, and should only be allowed in cases of technical impossibility or of genuine danger to be apprehended for shipping, or of expenditure out of proportion with the traffic affected.

The attention of navigators should be particularly drawn to the existence of these derogations.

Every opportunity should be taken to put an end to them as soon as possible.

These derogations must not create confusion with the characteristics fixed in the present regulations.

2. If, in order that it may stand out better against the background, the upper part of a mark is coloured with a light or dark colour differing from its characteristic colours, this shall not be regarded as a derogation, provided that it only applies to a small part of the mark and allows its characteristic colours to predominate.

EXPLANATORY NOTE.
PRELIMINARY REMARKS.

1. It has been assumed for the sake of convenience that the colour red will be assigned to the port side in the lateral system, but this must not be taken as a hard-and-fast rule as far as French arrangements are concerned, for they could quite well be made to fit in with an opposite assignment in order to facilitate a more general unification of buoyage systems.

2. It appears useful, in order to obviate the reservations and objections that have already been put forward on many occasions, to insert here, and perhaps reproduce in the final agreement, or in the explanatory memorandum annexed thereto, a declaration on the following lines :

"The provisions defined herewith both for the various systems of buoyage and for the lighting of marks or fog-signals should not be interpreted as involving any obligation to adopt these various methods of signalling, but simply as constituting an invitation to conform to the characteristics indicated if the said methods should come to be adopted".

Ad Article 1. — It has been thought useful, in defining the different elements of buoyage, to deal separately with the case of important lightships, which are generally manned, and the case of small floating lights, or boats occasionally carrying a light, or the boat-buoys in use in certain estuaries; certain countries are opposed to the characteristic colours used chiefly for buoyage being applicable to large lightships, which are sufficiently recognisable by their shape, but there is no reason to abolish all characteristics in the way of colours or topmarks for boat-buoys, for example.

It has also been thought advisable to refer to the artificial obstacles which necessitate temporary or permanent buoyage, such as the works of ports under construction or submarine cables which have to be brought to the mariner's attention from the point of view of moorage zones.

Lastly, water surfaces inaccessible to seagoing vessels proper, or not frequented by them in practice, should be excluded from the sphere of application of the regulations.

Ad Article 7. — It will be noticed that white is used very differently by day (in association with the other characteristic colours) in the lateral system and in the cardinal system. The use of several white and dark bands (at least four bands) or of chequers is reserved for the lateral system; while the use of a broad white median band or the painting in white of a considerable part of the height of the work (at least one-third) is characteristic of the cardinal system.

Ad Article 10. — In defining the direction of arrival in the lateral system, no attempt has been made to go further than the general indication of arrival from seaward, or, in certain cases, the direction of the main stream; but, in doubtful cases, the technical services concerned may usefully avail themselves of the suggestions contained in § II, 3, of the annex, page 19 of the "General Report and Proposals of the Technical Committee" (document C.59.M.34.1929.VIII).

Ad Article 11. — Secondary channels may conveniently be distinguished from the principal channel by assigning thereto chequer patterns, for example; in other cases, these patterns, if assigned to one of the sides of a single important channel, can, with advantage, be used to facilitate the distinction between the marks on the one hand, which will be of uniform colour, and those on the other hand, which will be of the other characteristic colour with a chequer pattern.

It will be noted that shape is rendered obligatory only for ordinary buoys marking the sides of a channel — *i.e.*, for buoys which have to present cylindrical or conical characteristics; but an openwork superstructure of the same shape would be regarded as equivalent to that of the body of the buoy itself.

Ad Article 12. — As an illustration, the lights of bifurcation — and junction — marks may be distinguished from neighbouring lights marking the sides of channels by utilising, for example, apparatus showing alternate white and red lights or a number of white or coloured flashes greater than those of the marks on banks.

Ad Article 13. — In the cardinal system, the possibility had hitherto been allowed of employing for the bodies of the marks either four shapes only or two shapes, in which case the cylindrical and conical shapes only had been proposed. The latter, however, are the characteristic shapes of the lateral system; as it is important to distinguish as much as possible between the two systems of buoyage, it would seem advisable not to condemn the services using this simplification to employ precisely the shapes most used elsewhere, but to leave them free to use the other two shapes also, dome (ogival) and spar, which are least utilised and which there is no reason to reserve solely for the eastern and western quadrants when the four shapes are used.

An alternative has been provided as regards the arrangement of day colours in the northern and eastern quadrants in order to avoid confusion in the case of spars not provided with a topmark when, in certain lights, it would not be easy to identify the dark colour employed. By reversing respective positions of white and of the dark colour, an additional chance is given to navigators to ascertain whether they are in the northern or southern quadrant on the one hand, or in the eastern or western quadrant on the other hand.

Ad *Articles 15 and 16.* — Rules have been proposed both for buoys or beacons capable of being used for marking wrecks and for the boats which are sometimes used for this purpose.

As regards the latter, it has been endeavoured to avoid confusion with the depth signals or entrance and departure signals regulated at Lisbon in 1930, and to find different arrangements for day signals and lights, both in the lateral system and in the cardinal system.

In any case, the lights one above the other provided for on boats marking wrecks will be placed at such a height and at such a distance from one another as to ensure their visibility; in this respect, the rules already laid down in this connection should be followed.

Among the lights which might also be used for the buoyage of wrecks in the cardinal system, mention may be made of alternate white and green lights.

