

NOMENCLATURE OF MARITIME LIGHTS (*)

Classification and Definition of the Lights.

The Fourth International Hydrographic Conference held at Monaco in April 1937, invited the International Hydrographic Bureau to study at some appropriate moment the question of harmonising the nomenclature of lights with the modern lighting technique and to submit the results for the comments of the States Members.

In fact, since the introduction by the Lighthouse Services of new characteristics in new lighting methods, such as short flashing lights and the quick flashing lights, it becomes essential to reconcile on the one hand the different categories of lights which are generally recognised, and, on the other hand, to examine for certain categories of lights the best partition of the periods of light and darkness.

This question of a more accurate differentiation between the various categories of lights, distinction of definition which leads little by little to a clear delimitation between the various categories, has been discussed by the International Technical Conference on Maritime Signals, convened in Paris in 1933, and which brought together a large number of the Heads of the Lighthouse Services. An International Committee was charged with the preparation of a detailed table in which the first part defines the lights from the point of view of the appearance presented to the navigator who observes them on various bearings: a second part gives the lights according to their character and their appearance when observed on the same bearing.

The examination and study of this table was undertaken during the course of the International Technical Conference on Maritime Signals convened in Berlin in 1937, shortly after the last International Hydrographic Conference held at Monaco. Since that time numerous exchanges of opinion between the representatives of the various Lighthouse Services have brought about a concordance in the view-points. The Table prepared in May 1939, by the Special Committee, summarizes the work done in common and in the successive editions in which each contributed his part. Of course it does not represent an officially adopted table or one which is explicit, but it may be taken to represent rather well just what the various Heads of the Lighthouse Services are prepared to accept as definitions in their own countries, each being at liberty further to adapt these definitions to the special needs or customs of his own country, while no one is obliged to utilise all the types which are listed as a matter of precaution in the Table.

(*) From information communicated to the International Hydrographic Bureau through the courtesy of the International Technical Commission on Lighthouses.

The sole difficulty which remains arises from the differences in the national regulations now extant. It is necessary, therefore, to revise and harmonise these regulations in order to establish a common nomenclature, by paying closer attention in the translations to the spirit rather than to the letter.

In the proposed nomenclature the definitions have been based on technical necessity and also on maritime requirements. From this there arises a multiplicity of categories of lights which is only apparent, because, if for the mariners it is not necessary to specify the difference, say, between revolving flashing lights and short flashing lights, this classification is necessary to the technicians.

Likewise, in order to take into consideration the desiderata of the German nomenclature on the subject of "Blitzfeuer" (short flashing) and "Blinkfeuer" (long flashing lights) these categories have been retained owing to the difficulty for the German Hydrographer of grouping the foreign lights in which the duration of the flash varies, for instance, from 0.8 to 1.9 seconds, since it is only in Germany that the distinction is made between the "Blitz" (short flash of between 0.1 to 0.7 sec) and the "Blink" (long flash of at least 2 sec).

In order to generalize the Table still more, certain technical characteristics of a numerical order have been deleted, such as the number of flashes per minute for the quick flashing lights or the ratio of the duration of light and darkness to be attributed to certain lights, such as the occulting lights, the short flashing lights or the intermittent lights. For the rest, these details might be made the object of a supplementary nomenclature recommended for examination.

In this manner this Table represents in itself and as far as possible that which can be submitted by the Lighthouse Services to the Hydrographic Service and thereupon made available by this intermediary to the navigators. In any case, it is always optional to the Services in touch with the users to take from this Table only that which is essential for their needs, each taking that which is serviceable. When the nomenclature shall have been completed and the mariners and technicians have become accustomed to it, it might be submitted to one of the next International Hydrographic Conferences.

Nomenclature of Lights for Coastal Lighting.

I. *CLASSIFICATION FROM THE POINT OF VIEW OF THE APPEARANCE PRESENTED BY THE LIGHT ON ALL ITS BEARINGS.*

DESIGNATION OF THE LIGHT AND DEFINITION.

I. *Ordinary Light.*

Light displaying the same characteristics, in particular the same colour,

showing all around the horizon or around the greater part which is of interest to the navigator.

2. *Sector Light.*

Light showing in the various arcs of its maritime horizon with different characteristics and in particular in different colours.

SPECIAL CASES :

a) *Directional Light.*

Light constituted by an optical system which concentrates the light in one single relatively narrow sector and frequently having its maximum intensity along the bissector of the sector.

b) *Directional Light with Sectors.*

Light constituted by an optical system which divides the light equally between the *illuminated part* of the horizon, but in which one or more relatively narrow sectors, enclosed between sectors of a different characteristic are lighted, and mark the navigable zones or channels.

c) *Ordinary Light with auxiliary sector light.*

If a sector light is associated in the same edifice with an ordinary light, it shall be designated "ordinary light with auxiliary sector light".

d) *Range Light.*

The directional lights, the ordinary lights and those lights properly called sector lights, may be combined among themselves to light a range.

II. CLASSIFICATION FROM THE POINT OF VIEW OF APPEARANCE ALONG ONE SINGLE BEARING.

Notes : A light may present the appearance of a steady and uniform character or may have a periodic rhythm. It may either be white or coloured or show successively white or coloured lights; this last category is denominated an alternating light.

The rhythm may be produced by various methods, such as :

— the rotation of the optical apparatus, concentrating the luminous flux in one or more beams.

— the periodical extinction of the luminous source placed in a fixed apparatus.

— the periodical occultation, by means of a revolving screen, of the light source issuing from a fixed optical device.

Except in the case of the fixed and flashing lights, the light appears rather suddenly at great distances; nevertheless, at short distances and in

clear weather, one can note a permanent faint luminescence between the flashes.

When the rhythm is produced by the rotation of the optical apparatus, one receives the impression of a rotation of the beams in certain cases, even if the light is still below the horizon of the navigator, especially if the light is very powerful. The beams are then much less intense than when viewed directly at the moment of the passing of the flash.

In the alternating lights, the alterations of the colours may either succeed each other without interruption or may be separated by an eclipse of short duration.

DESIGNATION OF THE LIGHT AND DEFINITION.

I. Fixed Light.

Light in which the luminous source appears steady and uniform (produced by apparatus with fixed optic).

II. Rhythmic Lights of constant colour.

A. — Light with flashes distinctly shorter than the longest period of darkness.

CATEGORY I.

a) *Revolving Light with regular flashes or light with regular flashes.*

Light with revolving beams or one in which the flashes succeed each other at regular intervals and are distinctly shorter than the periods of darkness.

b) *Revolving Light with group flashes or group flashing light.*

Light with revolving beams or where the flashes are grouped into one or more groups which succeed or alternate regularly and where the period of the flashes, like the eclipses between the flashes of the same group, are relatively short with respect to the intervals of darkness separating the groups.

CATEGORY 2.

a) *Regular short flashing light.*

Light (constituted by a fixed optical apparatus in which the luminous source is eclipsed at equal intervals and in which the duration of the flashes is distinctly shorter than the periods of darkness.

b) *Group short flashing light.*

Light (constituted with fixed optical apparatus) where the flashes are grouped into one or more groups which succeed each other or alternate regularly and remain relatively short (as well as the eclipses which separate them) with respect to the intervals of darkness separating the groups.

CATEGORY 3.

- a) *Regular flashing light with relatively short flashes (for instance, the German "Blitzfeuer").*

Light (constituted by a revolving optic or fixed optic) where the flashes succeed each other at equal intervals and whose duration is intrinsically short, less than 0.7 sec. and always decidedly shorter than the periods of darkness.

- b) *Group quick flashing light.*

Light (constituted by a revolving or fixed optical apparatus) where the flashes are grouped into one or more groups which succeed each other or alternate regularly and remain intrinsically short (duration less than 0.7 sec.) as well as the eclipses which separate them with respect to the intervals of darkness separating the groups.

CATEGORY 3 a.

- a) *Light with regular flashes relatively long (for instance the German "Blinkfeuer").*

Light (constituted by a revolving or by a fixed optical apparatus) where the flashes succeed each other at equal intervals and whose duration is relatively long (exceeding 2 secs.) although distinctly shorter than the periods of darkness.

- b) *Group flashing light with relatively long flashes.*

Light (constituted by a revolving or fixed optical apparatus) where the flashes are grouped into one or more groups which succeed or alternate at regular intervals and remain relatively long and greater than 2 secs., as well as the eclipses which separate them, although decidedly shorter than the periods of darkness separating the groups.

B. — Intermittent or isophase lights.

Light (constituted by an apparatus with fixed optic) showing equal periods of light and darkness.

C. — Occulting Lights.

- a) *Light with regular occultations.*

Light (constituted by apparatus with fixed optic) eclipsed periodically at equal intervals, of which the periods of light are distinctly longer than the periods of darkness.

- b) *Group occulting Light.*

Light (with fixed optic) eclipsed periodically in which the eclipses are grouped into one or several groups which succeed or alternate regularly and remain, *like the periods of light in the groups*, relatively short with respect to the intervals of light separating the groups of occultations.

D. —1) *Continuous quick flashing light.*

Light with rapid alternations of flashes and darkness, very rapid and regular.

2) *Discontinuous quick flashing lights.*a) — *Quick flashing light with short flashes.*

Light where the periods of flashing are interrupted by eclipses and are distinctly shorter than the periods of darkness.

b) *Intermittent quick flashing light.*

Light in which the periods of flashing are interrupted by eclipses and are equal to the periods of darkness.

c) — *Quick flashing occulting light.*

Light in which the periods of flashing are interrupted by eclipses and are distinctly longer than the periods of darkness.

E. — Lights with Mixed Characteristics.1) *Fixed and regularly flashing.*

Fixed light reinforced by flashes of greater power at regular intervals (the passage of the flashes is sometimes preceded or followed by a short eclipse).

2) *Fixed and group flashing.*

Fixed light reinforced by flashes of greater power grouped into one or several groups (the passage of the flashes is sometimes preceded or followed by a short eclipse).

3) *Morse Code Light.*

Lights not comprised in the above categories (and constituted by a fixed optic) where the various periods of light and darkness generally do not have equal duration and are grouped in such a manner as to reproduce one of the characters of the Morse alphabet, or characteristics of the same nature.

III. Lights with variable colours. (Alternating lights).**A. —**1) *Lights with regularly varying colours, continuous light.*

Lights which shine steadily and whose colours vary regularly and alternately.

2) *Lights with colours varied in groups, continuous light.*

Lights which shine continuously but with colours alternating in groups.

B. — Lights with rhythmic colour variations.

Same designations as for the lights in § 11, except for the addition of

the word "alternating" to the word light (for instance, alternating light with quick flashes etc.)...

Same definition as for the lights in § 11 except for the addition of the words "and in which the periods of light appear with colours alternating regularly or in groups".

SUPPLEMENTARY NOTE.

1° — The definitions given in the above Table facilitate the classification, the identification and the comparison of the various characteristics of the lights. They serve to prevent confusion, discrepancies and the anomalies heretofore extant and which might also arise in the future.

The Table has been compiled as thoroughly as possible in order that no characteristic at present employed in the lights of any country, or which might be employed in future, should be omitted.

No Lighthouse Service is obliged to have recourse to all the characteristics enumerated for the lights, of which some are no longer, or not yet, utilised for the coastal lighting of certain countries.

Without excluding the use of the other characteristics not defined in the above table of nomenclature, it is recommended however that no others be devised or utilised which might create confusion with those contained in the table.

If new characteristics are introduced which are, as yet, not included in the above mentioned tabulation, the attention of the authorities presiding over Maritime Signals is drawn to the fact that the designation, definition and abbreviation corresponding to the new characteristic, must be made the subject of agreement in accordance with the rules which have governed the elaboration of the whole table.

More concise forms may be deduced from the table when this nomenclature is presented to the users by the Hydrographic Services. (*)

2° — The Sector Lights have been defined with their particular cases on the supposition that they consist essentially of zones lighted either by different coloured beams or by having different rhythms.

(*) See, for instance, the Livre des Phares N° 208, Series D, Mer Méditerranée, Mer Adriatique and Mer Noire, published by the Service Hydrographique de la Marine, Paris, 1940, pages IV to VIII in the Preface

See also Swedish Light List "Svensk Fyrlista" 1940, published by the Pilotage Commission, Stockholm, pages 24 to 33. This volume gives a very carefully worked out adaptation of the nomenclature to the various kinds of lights, the characteristics of which are given in four languages (Swedish, German, English and French) with diagrammatic illustrations and a synoptic table of the abbreviated designations in the various Light Lists.

3° — The various categories established amongst the lights with periods of light shorter than the longest periods of darkness will probably never be employed simultaneously in the same country.

But certain authorities, without pretending to introduce characteristics which are really different, may desire to call the attention of the navigator to the rather different aspects presented notably by the flashing lights produced by means of a revolving optic and the very short flashes of light produced by a fixed optic in which the luminous source is periodically extinguished or masked by means of revolving screens.

These two categories might be, in certain nautical documents, grouped under the special term "flashing lights" (*feux à éclats*), and in other separate documents be designated as "revolving flashing lights" (properly speaking) and "short flashing lights" (*Feux clignotants*).

In other countries a distinction might be made between the lights with relatively short flashes (example, Germany: "Blitzfeuer") and the lights with relatively long flashes (Germany: "Blinkfeuer"). The ratio between the duration of the flashes in the two kinds of lights is at least 1 to 5.

It is advisable that those countries which do not adopt this distinction between the various categories of lights with flashes much shorter than the longest periods of darkness and which do not publish these characteristics in their lists of definitions, should at least make mention of them in the column of remarks or other notes contained in their Light Lists and in particular to report on the fact of the rotation of the optic.

4° — In all the regular lights with periods of light distinctly shorter than the longest periods of darkness, the duration of the flash will be suitably fixed if it is at the most equal to $\frac{3}{7}$ of the period of darkness. It is even preferable to take the ratio at $\frac{1}{3}$ at the most.

The newly established lights and those which are transformed without excessive cost should follow these rules.

5° — In order that it may be possible to distinguish clearly, by the duration of its common period of light and darkness, between the quick flashing light and all those lights in which the periods of light and darkness are unequal, the intermittent or isophase light should have its common period (light or darkness) comprised preferably between 1.25 sec. at least and 5 sec. at the most; that is, at the least 1.25 sec. light and 1.25 sec. darkness and, as a maximum, 5 sec. light and 5 sec. darkness.

It is prudent not to employ the intermittent or isophase lights concurrently with the regular quick flashing lights or regular occulting lights except in those countries where the ratios between the periods of light and darkness of the above are sufficiently different from unity to avoid all risk of confusion between them and the intermittent lights.

6° — For the regular occulting lights, the duration of the period of light may be suitably fixed at at least $7/3$ of the duration of the period of darkness. It is even better if this ratio is increased to 3 at least.

The newly established lights and those which may be transformed without excessive cost should follow these ratios.

7° — The number of flashes in the regular short flashing lights, in the regular quick flashing lights and in the intermittent or isophase lights and in the regular occulting lights, should never exceed 24 per minute.

8° — In the continuous quick flashing lights, the minimum number indicated for the alternations should never be less than 40 per minute; it would even be preferable if this number could be increased to 60 per minute. In any case it should be the double of the number used in the same country for alternations of the intermittent lights or isophase lights and the regular flashing lights having a relatively short duration of flash (for instance, the "Blitzfeuer" in Germany).

9° — In the case of the discontinuous quick flashing lights, there should be at least 8 flashes between two periods of consecutive obscurity.

10° — Alternating lights, that is, those having a variable colour on the same bearing, and whose use is further undesirable, should never be employed in categories D & E above (short flashing and Morse signal lights).

