NCWG2-08.2A

2nd NCWG MEETING
IHB, Monaco 26-28 April 2016

Paper for Consideration by NCWG

High intensity LED lights in linear array

Submitted by:	UK
Executive Summary:	Guidance is required for charting high intensity LED lights in linear array (e.g. 'Lite Pipes')
Related Documents:	CSPCWG11-INF1
Related Projects:	None

Introduction / Background:

1. CSPCWG11/NCWG1 briefly discussed the development of 'Lite Pipes', high intensity LED lights used as navigation lights (or possibly as highlighting for navigation lights). The original manufacturer details are at Annex.

Analysis / Discussion:

2. The record of NCWG1 states:

   Nick Webb (UK) presented the INF paper on the Lite Pipe. It was recognized that this may be a method of highlighting existing aids to navigation, or may become an aid to navigation in its own right. The use of the symbol for a strip light (P64) (used for comparatively low brightness fluorescent tubes) is likely to be inappropriate for such a bright light source (visible 20 NM or more). Jens Schröder-Füstenberg (NIPWG Chair) requested that NIPWG should be notified of any decision to allocate a term or international abbreviation to this light, to ensure common usage if data-modelling.

   ACTION NCWG1-58: UK to contact IALA to ask for more information about the 'Lite Pipe' with a view to conceiving a suitable term for nautical charts and publications.

3. UK contacted IALA and received the following response from the Chairman of the IALA AtoN Requirements and Management Committee (Captain Phil Day):

   "The term Lite Pipe is a trade mark term used to describe an extended light source, designed to substantially improve the conspicuity over point sources in harbours and along rivers in populated areas with moderate to high background lighting. They would most usually be mounted to provide a vertical strip of light but could be conceivably mounted horizontally.

   There is no specific IALA Guidelines or recommendations on these light types but they are built to comply with the General recommendations on colour, range etc…and we believe this is the "IALA Specifications" being referred to.

   In relation to charting the symbol for a strip light IHO ref 478.5 would be the most appropriate symbol."

4. S-4 states:

B-478.5 **A Strip light** has a linear form, usually horizontal, which can reach a length of several metres. This type of light may be used, for example: on heads of piers; along quay walls; at the corners of quays; on dolphins; replacing or in addition to a painted strip. Occasionally they are disposed vertically to enable bearings to be taken from them; in such cases, the legend '(vert)' should be included in the light description. A strip light may have a rhythmic character and may be coloured. The light-description should be in conventional form.

The symbol for a strip light must be a small black position circle with a serrated (zig-zag) line in magenta, or the appropriate colour on 'multicoloured' charts, instead of the conventional flare, for example:

P64

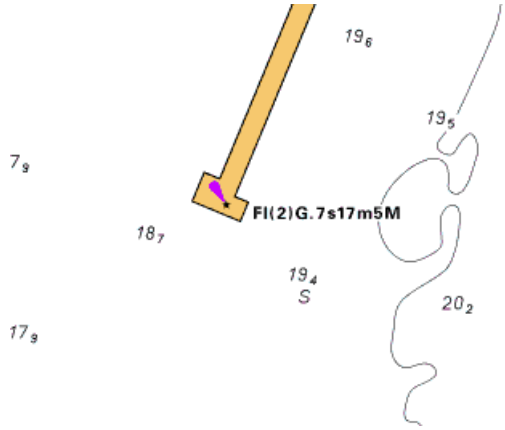
5. The existing description in S-4 does not really adequately describe these new high intensity lights, which are rather different from the comparatively low wattage fluorescent tubes, usually placed horizontally. However, strip lights are rarely charted (and they are not mentioned in M-12), so perhaps the same symbol could be used for lite pipes. If the range is included, that could be sufficient to differentiate them from fluorescent tubes.
6. Possible charting guidance include:

   6.1. add a new sub-paragraph at B-478.5, for example:

   '**A 'Lite pipe ®'** is a luminous system made up of high-intensity LED diodes in a linear array (from 2-6m in length): other similar systems may be developed. It can be used, for example: to reinforce the conspicuity of an aid to navigation; to enhance port entrance lights; as leading lights; as an emergency (reserve) light in a lighthouse. It is much brighter than conventional strip lights (up to 22 nautical miles range) but should be depicted by the same symbol, differentiated by including the range. It should not be charted where used as a reserve light in a lighthouse, (B-470.4a.vi).

   6.2. Use a conventional light symbol and description. Given its long range, its linear shape may not be important or even apparent until relatively close. The mariner is more likely to be interested in its navigational purpose. We do not know that they will always be 'in linear array' – other manufacturers may produce them in circular array, for example.

   6.3. Such lights have been deployed in Valencia Harbour (light E0200.2). Nothing is shown on the chart (see below) or ENC, but a description is included in the LL.



7. Note that we do not chart reserve lights (B-470.4a.vi) and highlighting is described in B-478.4.

8. According to B-471.8, the description '(vert)' should only be used to imply two or more lights vertically disposed. There should therefore be an additional clarification to state that 'The legend '(vert)' may also be used to describe the disposition of strip lights and [possibly] 'lite pipes', see B-478.5.'

Conclusion:

9. Some guidance on charting high intensity LED lights used for navigation lights would be useful. A 'Lite Pipe' in not a conventional strip light, so if charted as one, some way of distinguishing it is required. However, it may be more appropriate to chart as a conventional light (in accordance with its navigational purpose, such as lateral mark, leading light), with details of its structure only provided in Lists of Lights.

Recommendations:

10. Add a clarification at B-478.5 on the charting of high intensity LED strip lights, either:

    10.1. High intensity LED lights in linear array (eg 'Lite Pipes') should be treated as strip lights, with the legend '(vert)' or '(hor)' as appropriate and always include the range to differentiate it from more conventional low intensity strip lights.

    10.2. High intensity LED lights in linear array (eg 'Lite Pipes') should be not be treated as strip lights. Instead they should be charted as conventional lights, but with a description of the light structure included in the List of Lights.

11. Add a clarification relating to the use of '(vert)' to include strip lights at B-471.8.

Justification and Impacts:

12. Guidance is required for charting such lights, to avoid different local solutions being developed.

13. Minor clarifications to S-4.

Action required of NCWG:

14. The NCWG is invited to:

    consider the above recommendations and options and decide how S-4 should be clarified.

MLP 2000 LED Lite Pipe

The MLP 2000 Led Lite Pipe is a luminous system made up of high-intensity LED diodes, with linear array, very useful since it reinforces the conspicuity of an aids-to-navigation light (can be integrated in day marks).

This system is conceived to enhance port entrance lights, in order to avoid that they are confused with other lights polluting the background. It can also be used as leading light in those places where two stations are needed, or as emergency light in lighthouses.

With only 30W power, it can be visible at a distance of 21.8 nautical miles, thus it may be installed in places where electrical mains supply is not available. The quality and resistance of the materials used in the manufacture allow for a long service life in severe marine environment.

Designed according to IALA Recommendations.

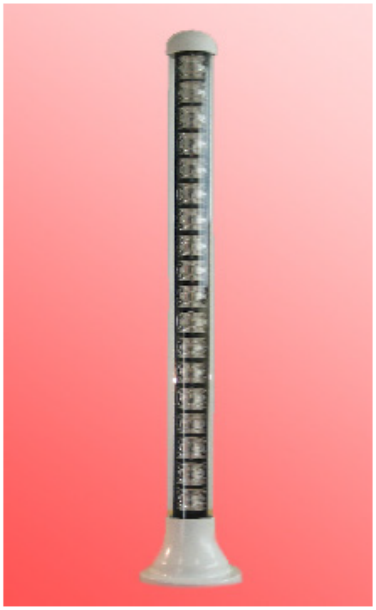
FEATURES

Optical System

- Maximum luminous efficiency thanks to the high-precision lens, especially designed for LEDs.
- LED light source consisting of 18 nos. high-power Led diodes (2m height).
- UV stabilized, methacrylate lens cover of 80mm diameter.
- Luminous nominal range (2m height) up to 14.5 n.m. (T = 0.74). Range of 21.8 n.m. (T = 0.85)
- Vertical divergence (at 50% Io): 4° .
- Horizontal divergence (50% Io): 120°.
- Colour chromaticity according to IALA Recommendations.
- Clear, red, green or amber colours are available.
- Average life of LEDs: 100,000 hours.
- Adjustable power consumption.
- Modular manufacturing allowing heights of 2, 4 or 6 metres.
- Easily synchronizable with main beacon, if any.

Electronic Flasher MF 12

- Microprocessor based circuit.
- 256 flash characters, selectable by using minidips.
- Solar charge regulation up to 8A.
- Internal photocell.
- Lux-adjustable day/night threshold and hysteresis cycle.
- LED failure detection.
- LED intensity adjustment by PC.
- Individual LED current adjustment, lineal and high-precision.
- Integrated temperature sensor .
- Short-circuit protection.



PATENTED OPTICAL SYSTEM

- Reverse-polarity and transient-overvoltage protections.
- Operation status and alarms ready for connection to a remote monitoring system.
- Double RS-232 serial port for settings adjustment by PC and remote monitoring system.