

1.5 Range/Leading and Sector Lanterns. Daymarks

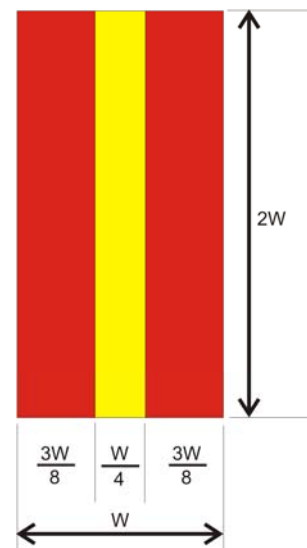
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| 01 | UPDATE | 03.03.2008 | CWQ |
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| Rev | Description | Date | By |

Range/Leading lights are normally used in pairs, to form a leading line or range, to guide vessels in confined waters. The rear light is located at a suitable distance behind the front light above it and in line with the intended channel centreline. When viewed from right ahead, the light beam of the rear lantern appears directly above the front one. Synchronising the lanterns with a distinctive flash character significantly improves the visibility of the arrangement.

IALA has issued guidelines with an Excel Spreadsheet for the design and assessment of Leading Lines; and the Spreadsheet is previewed on the next page.

Daymarks can be used in conjunction with range/leading lights to allow daytime use. They can be rectangular or triangular and striped colours can assist in recognition. The table, below, provides a simple sizing formula that is applicable in most applications.

| Observation Distance (Nm) | Minimum Width | |
|---------------------------|---------------|--------|
| | (metres) | (feet) |
| 0.25 | 0.2 | 0.6 |
| 0.5 | 0.4 | 1.2 |
| 0.75 | 0.6 | 1.8 |
| 1 | 0.8 | 2.4 |
| 2 | 1.5 | 4.8 |
| 3 | 2.3 | 7.2 |
| 4 | 2.9 | 9.6 |
| 5 | 3.7 | 12 |

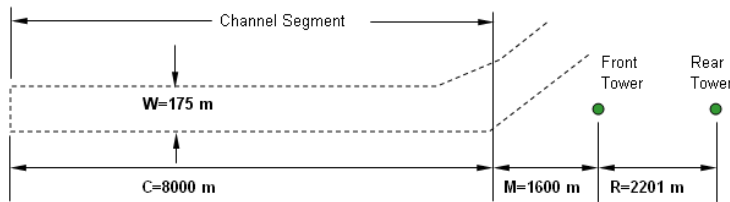


The Spreadsheet requires only the name of the channel and values of “W” and “C” to start the calculation, as illustrated below.

Initial Channel Layout Worksheet

- 1. Leading Line Name: **Test Channel-Aug01**
- 2. Channel Length (C): **8,000** (m)
- 3. Channel Width (W): **175** (m)
- Distance Near End/Front Twr (M): **1,600** (m)
- Distance between Towers (R): **2,201** (m)

Preliminary Values to Enter into Leading Line Design Program for Analysis



Initial Channel Layout

Subsequent pages allow different parameters and values to be set with the final page presenting the solution, as illustrated below:

Final Leading Line Configuration

| | | |
|--------------------------------------|---------------------------|---------|
| Leading Line Name: | Test Channel-Aug01 | |
| Channel Length (C): | 8,000 | Meters |
| Channel Width (W): | 175 | Meters |
| Distance Near End/Front Twr (M): | 1,600 | Meters |
| Distance between Towers (R): | 2,201 | Meters |
| Range Front Light Intensity (Day): | 1,050,000 | Candela |
| Range Front Light Intensity (Night): | 12,000 | Candela |
| Front Dayboard Height: | 10.2 | Meters |
| Range Front Light Height (Night): | 15.5 | Meters |
| Range Front Light Height (Day): | 16.5 | Meters |
| Range Rear Light Intensity (Day): | 2,650,000 | Candela |
| Range Rear Light Intensity (Night): | 30,000 | Candela |
| Rear Dayboard Height: | 12.2 | Meters |
| Range Rear Light Height (Night): | 39.0 | Meters |
| Range Rear Light Height (Day): | 38 | Meters |

Final Channel Layout

Final Tower Configuration

Range lanterns project their light sources through horizontal beam spreaders of varying sizes providing significantly higher intensities than are possible with omni directional signal lanterns – with the narrowest beams producing the highest levels of intensity. Selecting the narrowest beam spreader compatible with channel width makes it possible to minimise both the electrical load imposed by the lantern and the size of its power supply when AC power is not available.

Nonetheless, although a narrow beam range light offers greater range for less power, a 360° omni directional lantern may be required when a leading light stands on a bend in a channel and needs to be seen over a wider arc than that covering the leading line/range.

Each range lantern in a typical range/leading line arrangement is equipped with a lamp changer or LED light source, flasher, sunswitch, and levelling and mounting hardware. When specifying range lanterns, separate the requirements of front and rear lights, and identify the beam spreader angle, the required luminous range with the T factor that applies and any background lighting or, ideally, the effective intensity, the colour, flash character and whether the lights are to be synchronised.

Two examples of range lanterns are shown below. Each is capable of different angled sectors and both can accept incandescent lamps or LED's.



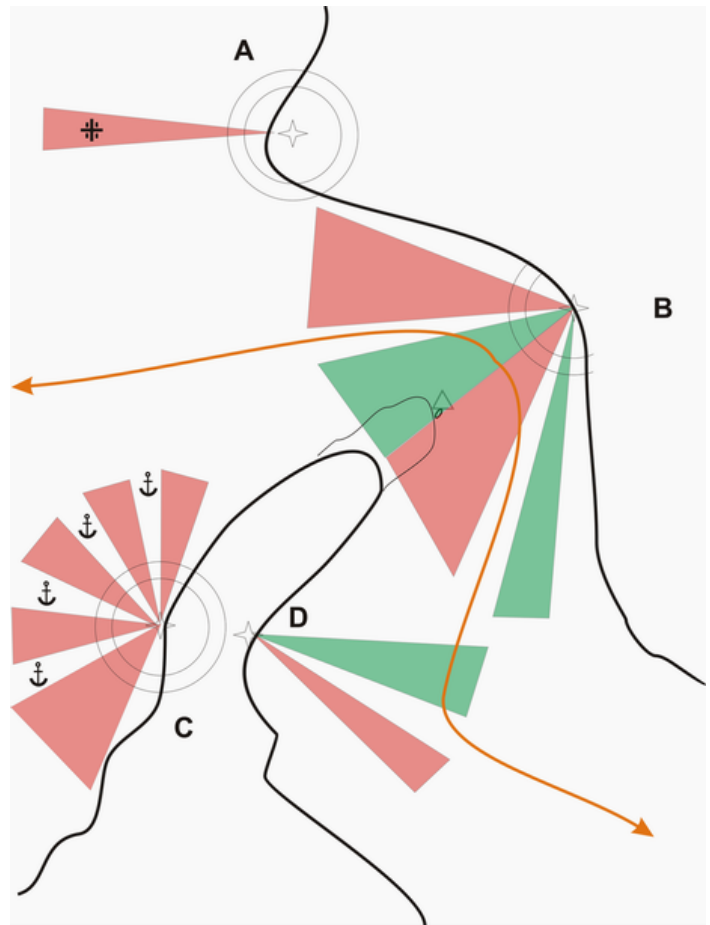
RL-200



RL-355

Sector lights can also play an important role in marking channels with omni-directional lanterns sectored with coloured panels to provide the effects, illustrated opposite:

- A.** Is a coastal white light with a red sector covering a hazard.
- B.** Is a sector light obscured over the shore, with two white sectors indicating safe channels. The boundary between the red and the green sector also indicates the position of a buoy.
- C.** Is a sector light with a red light and 4 white sectors indicating four anchorage positions.
- D.** Is a sector light with white light indicating a safe channel.



ML-300 and ML-155 with different colored sectors are examples of such sector lights.

