RECOMMENDATION

R0204(E200-4)

MARINE SIGNAL LIGHTS - DETERMINATION AND CALCULATION OF EFFECTIVE INTENSITY

Edition 2.0
December 2017
Revisions to this IALA document are to be noted in the table prior to the issue of a revised document.

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<th>Date</th>
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<tr>
<td>December 2008</td>
<td>1st issue</td>
<td>Council 44</td>
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<td>Review and alignment with IALA strategy.</td>
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RECALLING:

1. the function of IALA with respect to Safety of Navigation, the efficiency of maritime transport and the protection of the environment;
2. Article 8 of the IALA Constitution regarding the authority, duties and functions of the Council;

RECOGNISING that:

1. for the adequate performance of marine signal lights the performance of flashing lights needs to be determined;
2. there are several methods of determining the performance of flashing lights at the threshold of visual perception;
3. there are no adequate methods for determining the performance of flashing lights at observer levels above the threshold of illuminance;

NOTING that:

1. defined standards for the determination of the performance of flashing lights should be used worldwide to ensure the quality of signal lights for mariners;
2. this document only applies to Marine Aid-to-Navigation signal lights that are installed after the publication date of this document;

CONSIDERING the proposals of the AtoN Engineering and Sustainability Committee, the Committee lights experts and the Committee IALABATT/IALALITE working group;

ADOPTS the Recommendation on Marine Aid-to-Navigation Signal Lights - Determination and Calculation of Effective Intensity;

RECOMMENDS that IALA Members and other appropriate Authorities providing Marine Aids to Navigation adopt the Modified Allard Method described in ANNEX A for the determination and calculation of effective intensity of a rhythmic light;

REQUESTS the AtoN Engineering and Sustainability Committee or such other committee as the Council may direct to keep this Recommendation under review and to propose amendments as necessary.
ANNEX A  MODIFIED ALLARD METHOD

A 1. MATHEMATICAL DESCRIPTION

In the Modified Allard Method, the effective intensity, $I_e$, of a finite length flash is determined by the maximum value of the convolution result between the flash profile and the visual system response function. Thus,

$$I_e = \max_t \left\{ \int_{-\infty}^{+\infty} I(t - t') \cdot q(t') \ dt' \right\}$$

*Equation 1: Modified Allard Method*

Where:

$I(t)$ is the instantaneous luminous intensity of the flash at a time $t$.
$q(t)$ is the visual system response function.

The visual system response function, $q(t)$, is determined by:

$$q(t) = \begin{cases} \frac{a}{(a + t)^2} & \text{for } t \geq 0 \\ 0 & \text{for } t < 0 \end{cases}$$

*Equation 2: Visual System Response Function*

Where:

$$a = \begin{cases} 0.1 \text{ s} & \text{for all signal colours except blue at night} \\ 0.2 \text{ s} & \text{for blue signal colour at night} \end{cases}$$