**Input paper: [[1]](#footnote-1)** ENG15-3.1.1.1

**Input paper for the following Committee(s):** **Purpose of paper:**

(Select as appropriate)

ARM  ENG  PAP  Input

ENAV VTS  Information

**Agenda item** [[2]](#footnote-2) 3.1

**Technical domain/ Task number** 2 WG1

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Clarification to IALA Recommendation R0204

# Summary

During a recent intersessional meeting on Recommendation R0203, the issue of effective intensity was discussed. It became apparent that IALA Recommendation R0204 may not be sufficiently clear in its intent, and this input paper is to suggest changes to clarify how the recommendation is to be used.

## Related documents

IALA Recommendation R0204, Ed. 2, December 2017

# Discussion

IALA Recommendation R0204 provides a standard means of calculating the effective intensity of a flashing light. This method, Modified Allard Method (MAM), is a convolution-based mathematical model that applies an experiment-derived response curve to the flash profile in order to calculate its effective intensity.

Due to the nature of the method, a train of pulses causes the maximum value of the effective intensity to increase with each individual pulse. This was experimentally demonstrated by Mandler and Thacker in their 1987 paper [1] showing that a pulse train has a higher effective intensity than a single flash. The paper is further analysed in CIE Technical Report 229:2018 [2], which illustrates how MAM deals with such pulse trains. It presents examples and shows how MAM deals with them (such as that shown in Figure 1). Since the MAM convolution function does not return to a value of 0 after a short time, the peaks of the curve increase graudually with each flash. Eventually, the peak value settles on a value, and this is considered to be the effective intensity of the infinite train of flashes. The final value depends on the nature of the flash and the time between flashes.

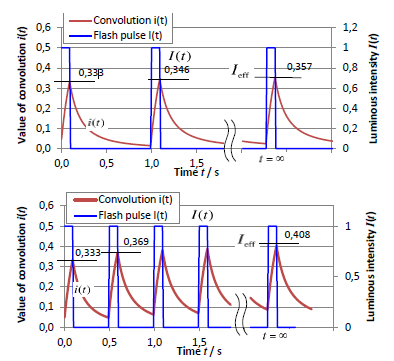
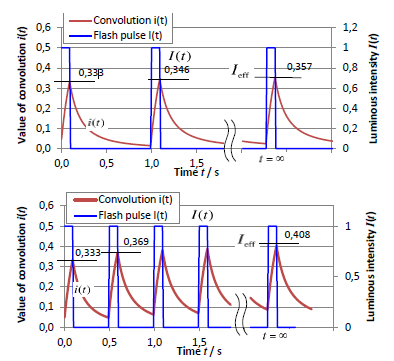


Figure 1 – Example pulse trains and calculated response using MAM (after [2])

As can be seen from Figure 1, the effective intensity of the pulse train is higher than that of a single flash. One could argue that the effective intesity should take into account all the flashes in the character as a single calculation. However, there is difficulty with this. A mariner would rarely be looking at an aid-to-navigation for long enough to capture several repeating periods of a flash character (with the exception of a North cardinal, perhaps).

After considering this, the intention of the MAM process detailed in IALA Recommendation R0204 was to be applied to each flash in a character individually. This is to ensure that the calculated effective intensity of a flash character is not too optimistic, and more closely resembles how the lights are observed in practice. The recommendation, however, does not make this explicitly clear, and this input paper is a proposal to update it.

The proposal is to add the following text to the recommendation on Page 3 between the “RECOMMENDS” and “REQUESTS” paragraphs:

**ALSO RECOMMENDS** that the Modified Allard Method be applied to individual flashes in isolation, with the effective intensity for the flash character being that of the lowest value of all the flashes in the character;

This amendment should be sufficient to clarify the intent of the recommendation to IALA members.

# References

[1] M. B. Mandler and J. R. Thacker, ‘A Method of Calculating the Effective Intensity of Multiple-Flick Flashtube Signals’, *Transp. Res. Rec.*, 1987.

[2] ‘Technical Report 229:2018 - Groundwork for Measurement of Effective Intensity of Flashing Lights’, CIE, Vienna, Austria, 2018.

# Action requested of the Committee

The Committee is requested to consider the proposal to update Recommendation R0204 with the additional text suggested above.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)