 Input paper: [[1]](#footnote-1) ENG4-9.16

Input paper for the following Committee(s): check as appropriate Purpose of paper:

**□** ARM **X** ENG **□** PAP **X** Input

**□** ENAV **□** VTS **□** Information

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Technical Domain / Task Number 2 TD#1 - Light and vision physics, Visual Signalling / 34

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Comments on the Present IALA Guidelines on Design of Leading Lines

# Summary

In ENG3 members were requested to familiarise themselves with the documents relating to Recommendation E-112 for Leading Lights and Guideline 1023 on the Design of Leading Lines and provide input papers to ENG4 to support the update.

## Purpose of the document

The input is presented for information with the aim of amending the IALA Guideline 1023.

## Related documents

Guideline 1023 on the Design of Leading Lines

# Background

The paper includes comments and recommendations on the present content of the IALA Guideline 1023.

# Discussion

## Comments and additions to consider in the existing IALA Guideline by section numbers

Section 2.3

*„The preliminary decision in designing a leading line is to specify the segment of water to be defined by the leading line.“*

I would say „to be marked with the leading line“. Defining segments of a water body are already done by the nature.

Section 2.5.1 Figure 2-5.

Showing the difference in cross-track factors graphically too would be more illustrative.

Section 2.9 Standard Leading Line Characteristics

Actually there is not much written about standard characters there.

For example Russian guideline says about selecting the characters for leading lights:

* *When using flashing lights they should be synchronised if possible.*
* *If leading lights are not synchronised, the duration of the flashes and the periods of the lights on the front marks must be shorter than on the rear marks.*
* *Duration of flashes must not be shorter than 0,5 s.*
* *Duration of flashes on rear marks is to be selected so that maximum possible overlap of the flashes of the leading lights is acquired in both frequency and duration.*
* *As a rule, the lights of front and rear lights have to be of the same colour.*

Section 2.8 Considerations Regarding Intensities.

Uniform recommendations about different additional factors for making leading lights “even better” would be good.

The IALA Guideline 1023 recommends to use 90%-of-the-time-visibility, Frank Hermann mentioned using 95%-of-the-­time-visibility in Germany, E-200-2 says that *„when selecting a light, this [prevailing visibility conditions] should be taken into account“*. Could there be one common recommended value of percentage and some standard values in the absence of more detailed data?

In addition to the worst visibility 10 times more intensity is recommended „for better signal“ in the IALA Guideline 1023. It is not recommended anywhere else. Is it leading line specific? Is it still recommended?

Considering background lighting Finnish guideline recommends factors of 2 and 10, IALA recommends 10 and 100 for multiplying the intensity. Could there be danger of blinding after adding up all these coefficients? And there are also factors for service conditions and aging of the light source.

Section 4.3 Problem codes and fixes – editorial

4. – There is one *dayboard* among all the *daymarks*.

Section 4.4 Maximum Intensity less than Minimum Intensity

*“Another way to reduce glare is to set the focal heights of the lights so as to be significantly different from the primary HOE for vessels using the channel.”*

Could tilting/directing the lantern a bit upwards do the trick as well?

Section 4.5 Maximum Intensity less than Recommended Intensity *editorial*

The sixth word in the third sentence should be *then* instead of *than*.

Section 5 Leading Line Configurations & Design Constraints

Are all of them (safety, servicing conditions etc) somehow leading marks specific? There is an IALA recommendation for safety aspects.

Section 5.8 Daymarks

*“Use of day/night lights is encouraged on ranges requiring marks in excess of 3 m in length, as these marks are the most hazardous to replace.”*

Wooden planks are used for building daymarks in Estonia and there has not been any problems with using daymarks higher than 3 m. In Finnish guideline the heights of daymarks start from 3 meters.

Section 5.9 Enclosure 1 : Leading Line Category Selection Aid. Leading Line Category Selection Aid Notes

“...choosing between a single intensity, 24-hour signal or a dual intensity, day/night signal...”

Maybe a bit off-topic, but how is such single intensity 24-hour signal meant to be presented in List of Lights, for example? As it does not have same nominal range at day, it can´t be officially 24 h light. Does it just have information in Remarks that the light is on at daytime as well but with reduced range?

Section 6.5 Separation of Front and Rear Towers

Could conversion from this

R = (M + C) / [W/ (10 (0.34 \* 10-3 )( M + C) – 1]

to this

R = (M + C) / [1000W/ (3.4 \* 10-3 )( M + C) – 1]

be incorrect?

Section 6.7 Minimum Intensity – editorial

*“lights shall be sized such that the illuminance be* ***nearly equal as possible****”*

Could „*as equal as possible*“ be better?

In the first formula Distance from the light to the far end of the channel in meters is a lowercase d, in the second one capital D.

Section 6.9 Equality of Illuminances – editorial

In „T = 0.05 1/V,“, the comma has slipped to the exponent.

Section 6.10 Separation of Lights

*“Refer to Recommendation Equation 18, (geographical range).*

*3849 \* (SQRT(H – c) + SQRT (b))”*

Shouldn´t there be two sides in an equation?

Page 35

At the bottom of the page 35 some addition-clarification seems to me necessary – *“The entire rear dayboard (if used) must be visible* ***above the front dayboard*** *at the far end of the useful segment and at least one-half of it visible* ***above the front dayboard*** *at the near end of the segment.”*

Same for the next page: *“Likewise, the entire rear dayboard (if used) must be visible* ***above the front dayboard*** *when viewed at the far end...”*

Finnish guideline has recommendations for using retroreflecting film on leading marks. See my input paper with aspects from Finnish guidelines.

Section 6.11 Sensitivity (Cross Track Factor)

“CD = Position in channel segment being evaluated in meters”

„Distance of the observer from the front light in meters“ would seem more clear to me.

Section 6.12 Dayboards

**Finnish guideline** has simple formulas for sizes of daymarks:

*“Dimensions of dayboards are calculated by the following formula:*

*k = d × 0,00052 + v1*

*l = d × 0,0004 + v2*

*where*

*k = height of dayboard (m)*

*l = width of dayboard (m)*

*d = observing distance (m)*

*v1, v2 = constants*

*Observing distances:*

*Front mark: d = far end of useful segment*

*Rear mark: d = far end of useful segment + distance between marks*

*Constants:*

*Merchant fairways at sea: v1 = 1,9 ja v2 = 1,4*

*Inland and small vessel routes: v1 = 1,3 ja v2 = 0,9*

*On merchant fairways at sea minimum dimensions of the dayboards are k×l = 4,5×3,0 m2 and inland and small vessel routes 1,5×1,0 m2. Rear dayboard can, in special cases, be remarkably higher. Dayboard’s maximum size is 100 m2.“*

**Russian guidelines** calculate the width of the daymarks according to the distance to the far end with the formulas 2b1 = 0.58D (front dayboard) and 2b2 = 0.58(D+d) (rear dayboard) and „in most cases“ multipliy it with 3...5 to get the height of the marks.

Finnish guidelines result in biggest daymarks among the guidelines under discussions here.

Would reference to IALA Guideline on Daymarks for AtoN be relevant in the Guildeine on Leading Lines?

On daymarks see also my input paper with aspects from Finnish guidelines.

# References

1. *Инструксия по навигационному оборудованию (ИНО-2000). Санкт-Петербург: Министерство Обороны Российской Федерации Главное Управление Навигаций и Океанографий, 2001* (There might be a newer one than 2001 but I don´t have one.)
2. *Vesiväylien linjalaskennan perusteet. 2-2013. Liikennevitaston oppaita* <http://www2.liikennevirasto.fi/julkaisut/pdf3/lop_2013-02_vesivaylien_linjalaskennan_web.pdf>

# Action requested of the Committee

The Committee is requested to:

1. Review the input paper during the discussion of Guideline 1023 for the Design of Leading Lines

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