Input paper: [[1]](#footnote-1) ENG4-9.12

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

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

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

Agenda item [[2]](#footnote-2) 9 / Action 32 from ENG 3 report

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

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Note: A pdf version of this paper with Times Roman and Greekc fonts is available on the file share server.

Revision of IALA documents on leading lines

# Summary

IALA Recommendation E-112 on Leading Lights and Guideline 1023 on the Design of Leading Lines are going to be reviewed.

The input paper contains:

* proposals for the review of the document,
* corrected formulae (for copy-paste into new documents)
* new figure for geometric definitions (for copy-paste into new documents)

## Purpose of the document

ENG working group 1 may consider the proposals for the revision of the recommendation and the guideline.

## Related documents

IALA Recommendation E-112 on Leading Lights

IALA Guideline 1023 on the Design of Leading Lines

# Proposals

## References

Both the recommendation and the guideline are based on investigations / papers ('laboratory experiments') which are not available for IALA members. I guess the most important papers are from US Coast Guard. I propose to identify the relevant documents and make them available on IALA Wiki.

## Recommendation and/or guideline

It should be considered whether IALA will keep both a guideline and a recommendation or merge both into a single document. The recommendation currently has no information about the daymark of a leading line.

## Using SI units

The formulae used in the existing documents are not consistent according to current standards. For example some formulae require the input of values for the distance in metres and nautical miles at two different positions in the same formula. Other formulae have hidden units which cause a lot of problems to people trying to read and understand the IALA documents.

Although these abbreviations have a long tradition in IALA, a presentation of each formula consistent with the International System of Units (SI Système international d'unités) should be added. Some proposals are presented in this input paper.

The same had already been done in E-200-2. The definitions made there should be used in the revised leading line documents.

The abbreviation for nautical miles in the list of lights and navigation charts is 'M'.

## Spreadsheet program

Excel is not the only computer spreadsheet program. An alternative is Calc from Libreoffice / Openoffice. The French administration has already used the existing spreadsheet with Libreoffice. Some countries have already decided to use the open source format in their administration.

The guideline can be made independent of the program actually used.

All information which is relevant for the specific computer program should therefore be moved to IALA Wiki.

IALA could provide both a XLSX (Excel) and an ODS (Open Document Spreadsheet) document for download.

The spreadsheet should now use the notation of E-200-2.

## Flow chart

The calculations for the design of leading lines should be presented in a flow chart in the guideline.

## Meteorological Visibility

The design process requires 3 input values for the meteorological Visibility (Minimum / Design / Maximum). The values for maximum (20 M) and design (10 M) may be fixed.

However there should be some proposals for the minimum visibility. E.G. German administration uses values between 2.2 M (Tm = 0.25) to 4.3 M (Tm = 0.5) for minimum visibility.

Unfortunately the calculated daymark size is strictly based on minimum visibility leading to very huge daymark length (some thousands of metres) when putting in existing German leading lines.

I propose to change the calculation process for the daymark size.

# Formulae

Some of the equations in the existing documents seem to be corrupted or have some small typing errors. Therefore the equations have been checked and rewritten with Microsoft Word 2010 formula editor in order to 'copy and paste' them into the revised document.

When an equation is not consistent with SI standard a consistent alternative (alt) is presented.

**Chapter 5**

for (1a)

alt:

for (1b)

alt:

for (1c)

alt:

new:

**Chapter 6 a)**

(2a)

(2d)

**Chapter 6 b)**

(3a)

(3d)

**Chapter 6 c)**

(4a)

(4d)

**Annex 11.1**

(5)

(6a)

alt 1:

alt 2: with (preferred version)

(6b)

alt 1:

alt 2: with (preferred version)

Remarks on 6a and 6b:

According to 'IALA-Recommendation E-200-2' may have the values

or

or

.

(7a)

(7b)

(8)

(9)

alt 1:

alt 2: with (preferred version)

(10a)

alt 1:

alt 2: with (preferred version)

(10b)

alt 1:

alt 2: with (preferred version)

Remarks on 10a and 10b:

* According to recommendation 4 'prevention of glare' may have the value or .
* In the Excel-chart the maximum intensity I1 and I2 is calculated by different equations.

(-10a)

(-10b)

where is the maximum visibility, typical 20 M (nautical miles)

**Annex 11.2**

(11)

alt:

**Annex 11.3**

(12)

alt 1:

alt 2:

with

(13)

alt 1:

alt 2:

with

(not numbered)

(14)

alt 1:

alt 2:

with

**Annex 11.4**

(15)

(16)

(17)

**Annex 11.5**

(18)

alt 1:

alt 2:

Remark on 18:

The equation for the geographical range is presented in several IALA documents. However different factors are used, e.g. the guideline on daymarks uses 3760 m instead of 3849 m.

# Figures

The figures are embedded as windows metafile.

figure 1: elevation - vertical section as windows metafile (requires fonts Times New Roman and Greek C)



figure 2: plan - ground plan as windows metafile (requires fonts Times New Roman and Greek C)



# Action requested of the Committee

ENG working group 1 may consider the proposals for the revision of the recommendation and the guideline.

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