



# IALA RECOMMENDATION (NORMATIVE)

## R0113 (O-113) THE MARKING OF FIXED BRIDGES AND OTHER STRUCTURES OVER NAVIGABLE WATERS

### **Edition 2.1**

**December 2011**

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# DOCUMENT REVISION

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Revisions to this document are to be noted in the table prior to the issue of a revised document.

Date	Details	Approval
May 1998	1 <sup>st</sup> issue	
December 2011	All Information had not been updated since 1998.	
September 2020	Edition 2.1 Editorial corrections.	



# THE COUNCIL

**RECALLING** the function of IALA with respect to Safety of Navigation, the efficiency of maritime transport and the protection of the environment;

**RECOGNIZING** the need to provide guidance on the marking of fixed bridges and other structures over navigable waters which is compatible with the IALA Maritime Buoyage System and other Aids to Navigation (MBS);

**RECOGNIZING ALSO** that such guidance should enable a common approach to be made world-wide, thus greatly assisting mariners, who, while navigating in waters of different authorities, should not be confused by different marking systems being used on fixed bridges;

**ADOPTS** the recommendation on the marking of fixed bridges and other structures over navigable waters as set out in the annex of this recommendation; and,

**RECOMMENDS** that National Members, and other appropriate Authorities providing marine aids to navigation services, ensure that the marking of fixed bridges and other structures over navigable waters conform to the standards and practices specified in this recommendation.



# ANNEX CONTENTS

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## 1 GENERAL

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The following recommendations should be read in conjunction with the IALA MBS. They are intended to supplement the rules of the system where fixed bridges need special marking to ensure their safety and that of vessels navigating beneath them, for example by reason of limited headroom, water depth or the possibility of collision.

Where sea and inland navigation meet, authorities should ensure that the marking of bridges does not conflict with the signs and signals of inland waterway systems.

## 2 SCOPE

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This recommendation should apply to fixed bridges and other structures, including floating bridges, overhead pipelines as well as structures under construction that cross navigable waterways or channels.

## 3 BEST POINT(S) OF PASSAGE

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In some cases, it may be necessary or desirable to indicate to vessels the most appropriate point(s) to pass under a bridge. These are referred to in this recommendation as 'best point(s) of passage'. This recommendation provides suitable day and night signals for this purpose.

The 'best point(s) of passage' will be determined by the Competent Authority taking into account all relevant factors, such as:

- maximum available horizontal and vertical clearance;
- water depth under the bridge, particularly where it is not uniform;
- protection of the bridge piers and other obstructions;
- traffic patterns including one or two directional transits and traffic separation schemes under individual or multiple spans.

## 4 BASIC REQUIREMENTS

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This following section outlines the basic requirements on how to mark 'the best point(s) of passage'. These requirements are illustrated in Figures 1 and 2 in section 6. Additional marking could be realised as described in Section 5.

### 4.1 VISUAL MARKS

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Bridge marking should be in accordance with the direction of buoyage and the MBS.

### 4.2 COLOURS

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For countries in Buoyage Region A:

- Green to starboard;
- Red to port.

For countries in Buoyage Region B:

- Red to starboard;
- Green to port.

### 4.2.1 Marking by day

If navigation is possible in the full passage span the marks should be located on the bridge piers. If navigation is possible only in part of the span, the marks should be located on or under the span, indicating the limits of the navigable channel.

- For countries in Buoyage Region A (in the direction of buoyage):
  - to starboard: a panel showing a solid green equilateral triangle point upwards;
  - to port: a panel showing a solid red square.
- For countries in Buoyage Region B (in the direction of buoyage):
  - to starboard: a panel showing a solid red equilateral triangle point upwards;
  - to port: a panel showing a solid green square.

The 'best point(s) of passage' may be indicated by a circular panel with red and white vertical stripes.

To ensure positive recognition, the Competent Authority should be satisfied that there is a good contrast between the coloured panels and the colour of the bridge structure. Such a contrast may be achieved by mounting the panels against a white background.

If there is more than one navigable channel under the bridge, the same system should be used for each channel.

Bridge spans other than those marked by red and green lateral marks, such as spans to be used by small craft, may be indicated by special yellow marks in accordance with the IALA MBS.

Consideration should be given to the placement of 'No Entry' signage where appropriate.

### 4.2.2 Marking by night

Red or green lights may be used to mark the navigable limits of the channel in accordance with the IALA MBS.

If navigation is possible in the full passage span, the lights should be located on the bridge piers. If navigation is possible only in a part of the span, the lights should be located under the span, or on buoy and beacons in the water so placed as to indicate the limits of the navigable channel. Synchronized lights may be used to increase conspicuity.

The 'best point(s) of passage' may be indicated by a flashing white light or lights located under the span and exhibiting a safe water mark character.

If there is more than one navigable channel under the bridge, the same system should be used for each channel.

Care should be taken to ensure that all red and green lights have adequate ranges for the given circumstances, especially where background lighting makes identification difficult. The lights must be mounted so as to be visible over all relevant areas of the horizon, and not obstructed by parts of the bridge structure.

Bridge spans other than those marked by red and green lateral, such as spans to be used by small craft, may be indicated by special yellow lights in accordance with the IALA MBS.

As an alternative or supplement to lights the daymarks recommended in paragraph 4.2.1 may be floodlit or displayed on an electronic panel.

Floodlighting of bridge piers may, in some cases, give a satisfactory indication of the navigable area and may be considered.

Retro-reflective material of appropriate colour may be used to enhance night time recognition of daymark panels.

### 4.3 RADAR AND RADIO MARKING

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Bridges crossing navigable water are usually clearly recognisable on a radar display. However, channel boundaries or bridge piers are seldom clearly distinguishable.

#### 4.3.1 Radar reflectors

Radar recognition of the bridge piers or channel boundaries may be made possible by radar reflectors located either on dolphins, buoys or poles fixed to the bridge structure. To ensure that the reflectors can be clearly distinguished from the bridge structure, practical trials should be carried out.

#### 4.3.2 Racons

A racon may be used to mark the 'best point(s) of passage' under a bridge. Administrations contemplating the use of more than one racon to mark one or more spans must take into account the technical limitations that may exist. Where two racons are used to mark a bridge span the preferred codes should be:

- Starboard: Morse code T(-);
- Port: Morse code B(---).

Care should be taken to ensure that the racon trace does not unnecessarily obscure echoes from other targets.

### 4.4 AIS AtoN

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AIS AtoN may be used to mark a fixed bridge or other structure in accordance with related recommendations or guidelines.

### 4.5 SOUND SIGNALS

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One or more sound signals may be used to warn the navigator of the presence of a bridge. Any type of sound signal may be used for this purpose.

## 5 ADDITIONAL CONSIDERATIONS

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'No Entry' marks, as defined by the competent authority, may be considered to inform mariners that passing under a span or one side of the span is forbidden. This is useful in helping to avoid collisions, striking and groundings.


Bridge piers and other obstructions should be marked as determined by the Competent Authority.

Buoys or beacons may be deployed to enhance the identification of the navigable channel and to mark any restricted areas in accordance with the IALA MBS.

## 6 EXAMPLES OF BRIDGE MARKING

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The figures below are based on IALA MBS Region B. Daymarks are shown for illustration purposes only.

The  symbol identifies the conventional direction of buoyage.

## 6.1 ONE WAY TRAFFIC (REGION B)

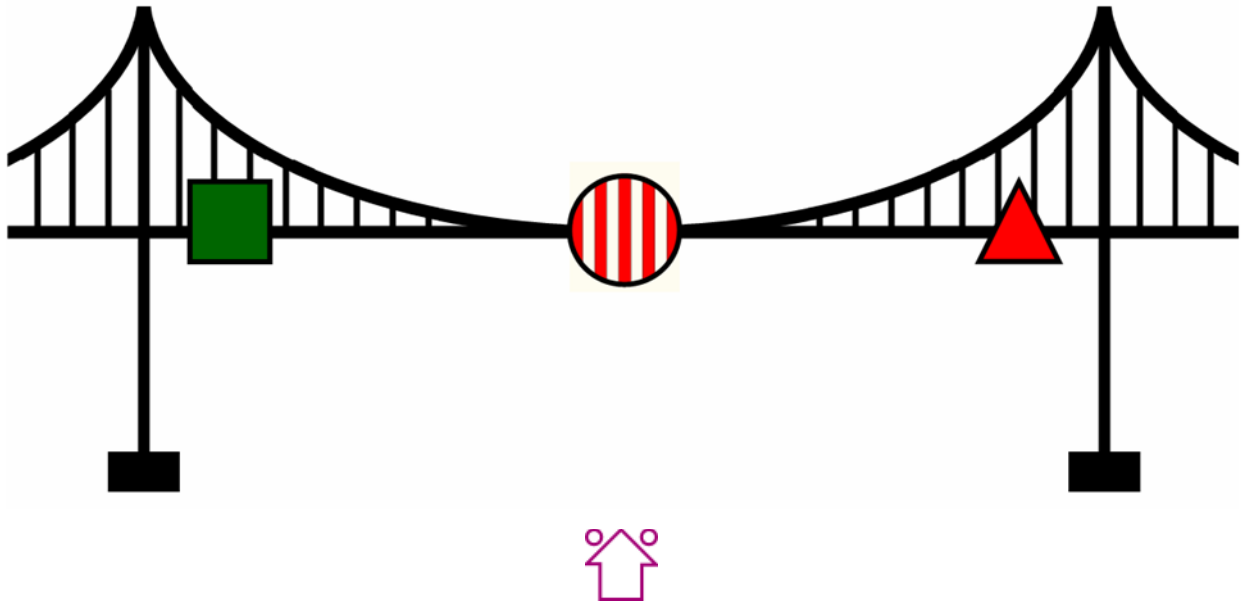


Figure 1 One way traffic - Elevation View

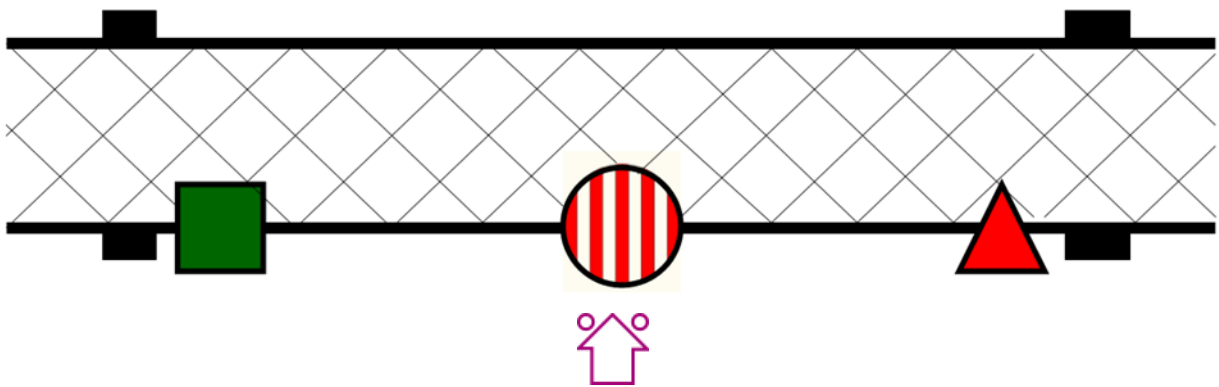


Figure 2 One way traffic - Plan View



## 6.2 TWO WAY TRAFFIC (REGION B)

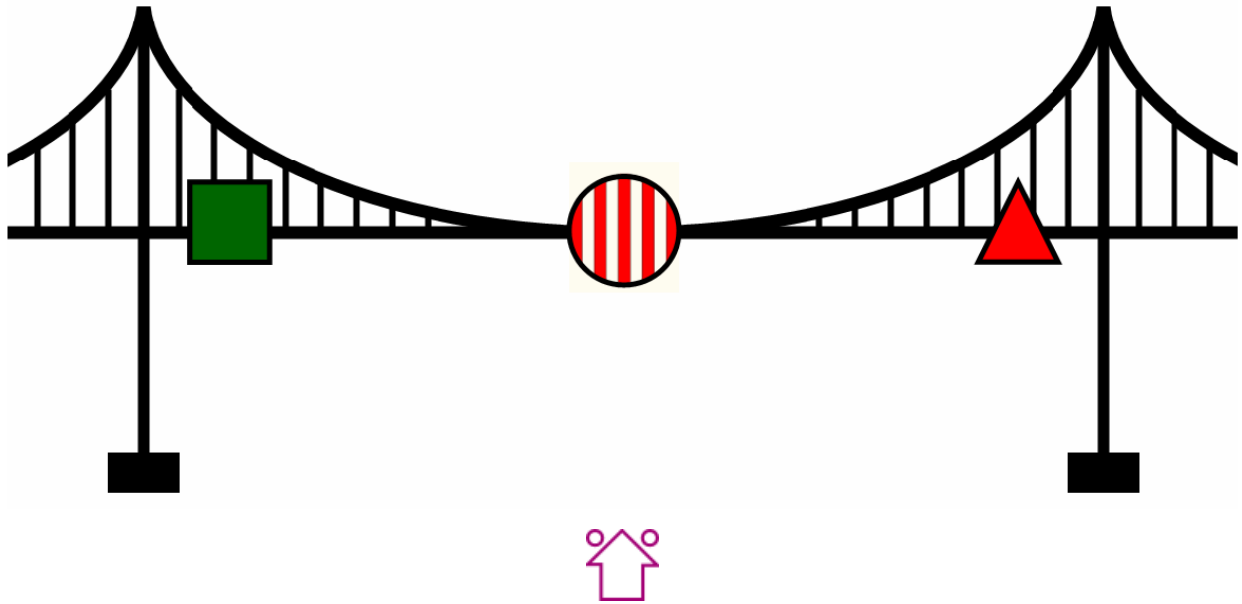


Figure 3 Two way traffic - Elevation View

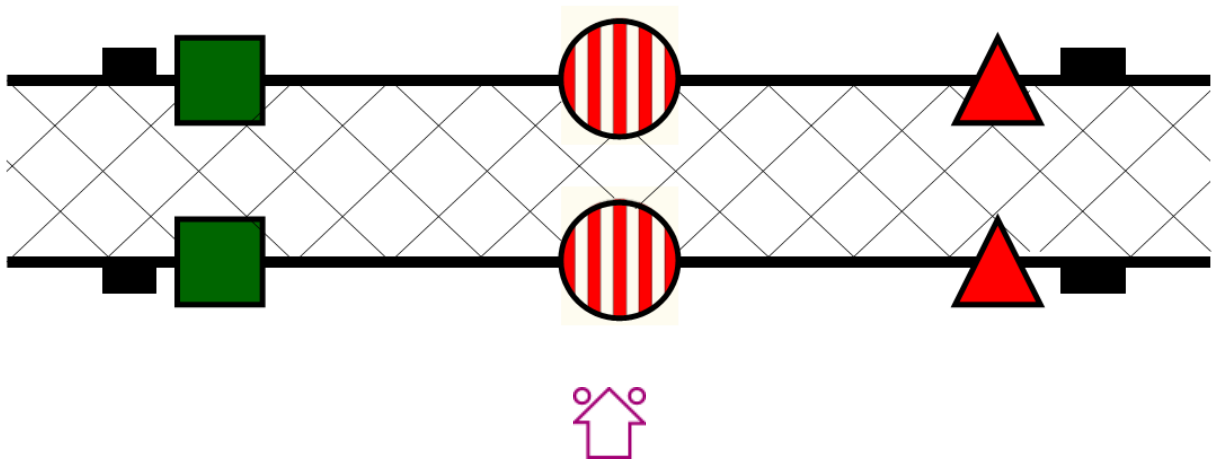


Figure 4 Two way traffic - Plan View