

Recommended Aids to Navigation Systems on the Greater Mekong River



June 2002

Economic and Social Commission
for Asia and the Pacific

Mekong River Commission

Recommended Aids to Navigation Systems on the Greater Mekong River

June 2002

This publication is the output of the Economic and Social Commission for Asia and the Pacific (ESCAP)/Mekong River Commission (MRC) project on harmonization of aids to navigation along the Greater Mekong River funded by the Governments of Finland and the Netherlands.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the secretariats of the United Nations and the MRC concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

This publication has been issued without formal editing.

I. Introduction

Aids to navigation are vital element for safe navigation on the Greater Mekong River. The existing aids to navigation installed on the River are extremely insufficient to meet the demand from increasing international and domestic traffic on the River. Therefore, installation and rehabilitation of aids to navigation are accorded high priority in the waterway improvement projects along the River. However, the aids to navigation systems adopted by the six riparian countries, namely Cambodia, China, Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam, varied from country to country. Application of different aids to navigation systems on the same river could cause accidents due to confusion or misunderstanding of the functions of different marks.

In order to promote safe navigation on the Greater Mekong River, the Economic and Social Commission for Asia and the Pacific (ESCAP) and the Mekong River Commission (MRC) jointly initiated a project on harmonization of aids to navigation systems in 1996 to assist the riparian countries in formulating and implementing a harmonized aids to navigation system to ensure safe navigation for the sake of passengers' lives, people's properties and the environment. The project was generously funded by the Governments of Finland and the Netherlands in 1999 and 2000 respectively.

In the implementation of the project, a questionnaire covering waterway properties, waterway administration, waterway use, aids to navigation, education and training, and international cooperation was dispatched to the six riparian countries. The replies to the questionnaire were carefully prepared by the countries.

An ESCAP/MRC team visited all the six riparian countries to acquire an overview of inland water transport systems, existing systems of aids to navigation and points of view on harmonization of aids to navigation from officials and professionals in the ministries responsible for transport, national Mekong committees, government authorities for inland waterways and inland water transport, port authorities, shipping companies, training schools, aids to navigation manufacturers and pilots. In total, the team met 111 people of 48 organizations. The team also visited sites on and along the River to acquire field information on the conditions of the waterway, aids to navigation in use and their maintenance.

Subsequently, an in-house study was undertaken to review the Maritime Buoyage System recommended by the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), the European Code for Inland Waterways (CEVNI) and Signs and Signals on Inland Waterways (SIGNI) by the Economic Commission for Europe (ECE), the Uniform System of Buoys and Shore Marks for Inland Waterways in Asia and the Far East by the Economic Commission for Asia and the Far East (ECAFE, predecessor of ESCAP), and the aids to navigation systems in the United States of America and on Argun/Ergunhe-Amur/Heilongjiang-Ussuri/Wusuli Rivers bounding China, Mongolia and the Russian Federation. The study also reviewed the past studies related to aids to navigation by relevant organizations and some countries.

Based on all the information gathered, the comparison and analysis were undertaken to compare the commonality and differences of the aids to navigation in different countries in connection with the IALA Maritime Buoyage System and CEVNI/SIGNI etc.. The possible conflict or confusion with other types of aids to navigation in different systems were also analysed in this process. Particular attention was paid to the fitness of various buoys and marks to the river conditions and countries' capabilities in production, maintenance and use of them.

Following these extensive activities, the recommendations on the harmonized aids to navigation systems on the Greater Mekong River were drawn up.

On 29-30 October 2001, ESCAP and MRC convened an Expert Group Meeting in Bangkok to review the findings of the study and consider the recommended aids to navigation systems and the recommended measures for implementation of the systems. The meeting agreed to the Recommended Aids to Navigation System on the Upper Mekong River and proposed further discussion on the Recommended Aids to Navigation System on the Lower Mekong River.

On 21 January 2002, ESCAP and MRC organized the Second Expert Group Meeting in Phnom Penh to consider the Recommended Aids to Navigation System on the Lower Mekong River. Through extensive and constructive discussion, the meeting agreed to an aids to navigation system for the Lower Mekong River.

The expert group meetings recommended the concerned authorities of the riparian countries to incorporate the Recommended Aids to Navigation Systems on the Greater Mekong River in new installation works, rehabilitation and maintenance of aids to navigation on their sections of the Greater Mekong River. They also recommended the countries to inform other countries when they adopt additional marks that must have no conflict and confusion with the recommended aids to navigation.

II. Recommended Aids to Navigation System on the Upper Mekong River

1. GENERAL

1.1. Scope

This system recommends the uniform fixed and floating marks (other than lighthouses, sector lights and marks, lightships and large navigational buoys) on the Upper Mekong River in China, Lao People's Democratic Republic, Myanmar and Thailand, servicing to indicate:

- the lateral limits of navigable channels;
- natural dangers and other obstructions;
- other areas or features of importance to the navigator.

1.2. Definition of “Left” and “Right”

On rivers, the terms “left” and “right” shall respectively mean to the left and to the right of an observer facing downstream.

On canals and lakes, the competent authorities shall decide the matter in the light of local conditions. However, the sides decided must be consistent with that of the connected rivers.

1.3. Types of Marks

The system provides eight types of marks which may be used in combination:

- Lateral marks, to mark the left and right sides of the route to be followed;
- Bifurcation marks, to mark middle grounds, bifurcated channels and isolated dangers in mid-channel;
- Shore marks:
 - Bankwise marks, to indicate the channel at points where it approaches a bank;
 - Crossing marks, to indicate crossings and alignment of the channel from one bank to the another;
- Marks of prohibited areas, to indicate no permission of entry;
- Sound signal marks, to indicate use of horning or other sound signals;
- Marks for traffic control, to control upbound or downbound vessels in one-way or sequential passage or to prohibit navigation;
- Marks on bridges, to indicate passage through bridges;
- Special purpose marks, not primarily intended to assist navigation but to indicate an area or feature referred to in nautical documents, such as anchorage, fishing ground, hydrographic surveying, underwater drilling, dredging, spoil ground, pump station, recreation area.

1.4. Method of Characterising Marks

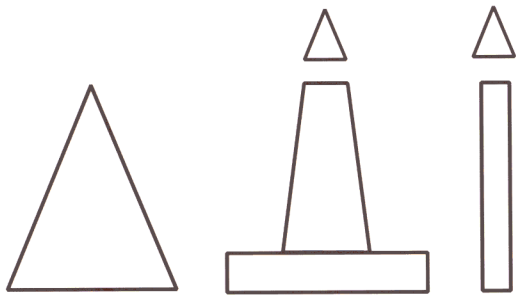
The significance of the mark depends upon one or more of the following features:

- By day, colour, shape, topmark;
- By night, colour and rhythm of light.

2. LATERAL MARKS

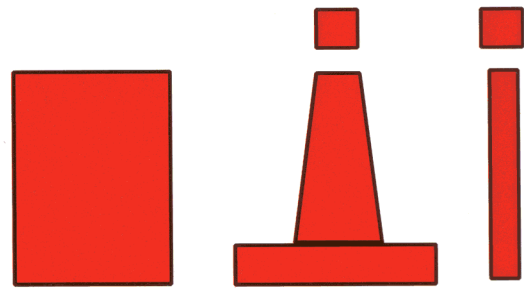
2.1. Left

Colour: White
 Shape: Conical, pillar or spar
 Topmark: Single white cone, point upward
 Light:
 Colour: Green
 Rhythm: Single flashing



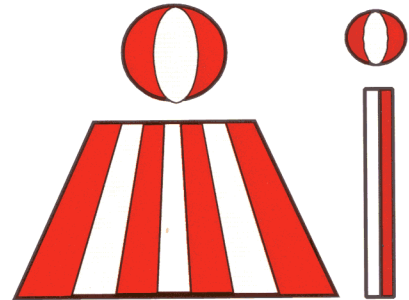
2.2. Right

Colour: Red
 Shape: Cylindrical (can), pillar or spar
 Topmark: Single red cylinder (can)
 Light:
 Colour: Red
 Rhythm: Single flashing



3. BIFURCATION MARKS

Colour: Red and white vertical stripes
 Shape: Truncated cone, pillar or spar
 Topmark: Single sphere with red and white vertical stripes
 Light:
 Colour: White
 Rhythm: Group flashing, with three flashes

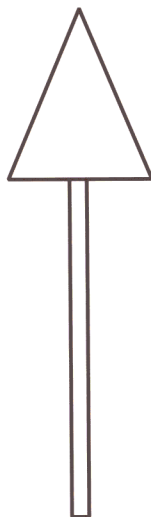


4. SHORE MARKS

4.1. Bankwise Marks

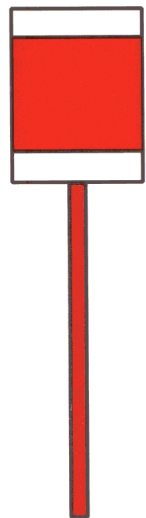
4.1.1. Left bank

Colour: White
 Shape: Post with topmark
 Topmark: Conical
 Light:
 Colour: Green
 Rhythm: Single flashing



4.1.2. Right bank

Colour: Red/white topmark
 Red post
 Shape: Post with topmark
 Topmark: Cylindrical
 Light:
 Colour: Red
 Rhythm: Single flashing



4.2. Crossing Marks

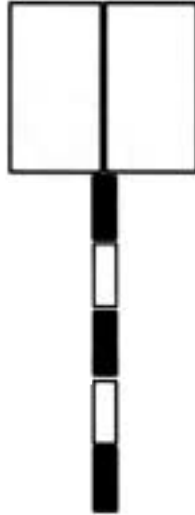
4.2.1. Left bank

Colour: White topmark
White/black post

Shape: Post with topmark

Topmark: Two squares facing upstream and downstream

Light:
Colour: White
Rhythm: Morse code "A"



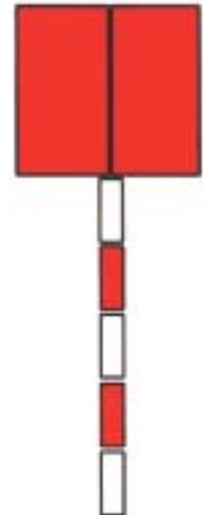
4.2.2. Right bank

Colour: Red topmark
Red/white post

Shape: Post with topmark

Topmark: Two squares facing upstream and downstream

Light:
Colour: White
Rhythm: Morse code "N"



5. MARKS OF PROHIBITED AREAS

Colour: White with red border and slant, and black ship figure

Shape: Circular

Light:
Colour: Red, two on sides in parallel
Rhythm: Fixed



6. SOUND SIGNAL MARKS

Colour: White board with black horn figure

Shape: Hexagon

Light:
Colour: Green
Rhythm: Quick flashing light.



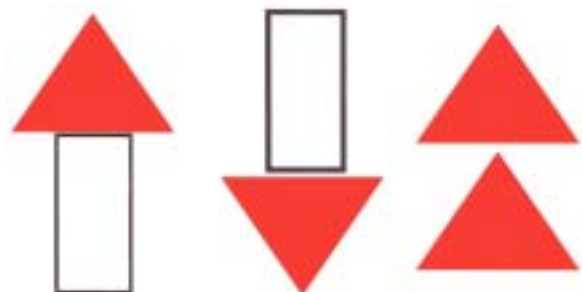
7. MARKS FOR TRAFFIC CONTROL

Colour: Red arrow head or triangular cone with black or white shaft

Shape: Upward arrow for passage of upbound vessel;
Downward arrow for passage of downbound vessel;
Two arrow heads for prohibition of navigation

Light:
Colour: Red above green for passage of upbound vessel
Green above red for passage of downbound vessel
Two red for prohibition of navigation

Rhythm: Fixed.



Upbound

Downbound

No passage

8. MARKS ON BRIDGE

Colour: Red "X" on white for "no pass",
green triangle on white for "pass",
yellow rhombus for "pass with attention"



Light:

Colour: Red for "no pass"
green for "pass"
yellow for "pass with attention"

Rhythm: Fixed.

No pass

Pass

Pass with
Attention

9. SPECIAL MARKS

Colour: Yellow

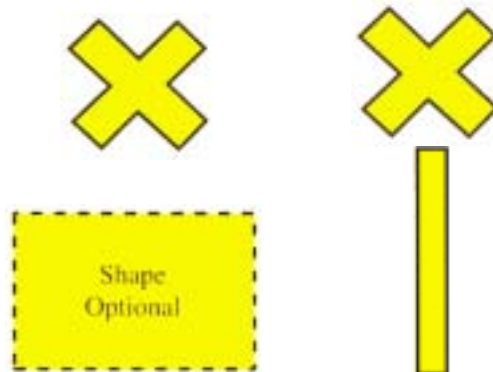
Shape: Optional, but not conflicting with
navigation marks

Topmark: Single "X" shape

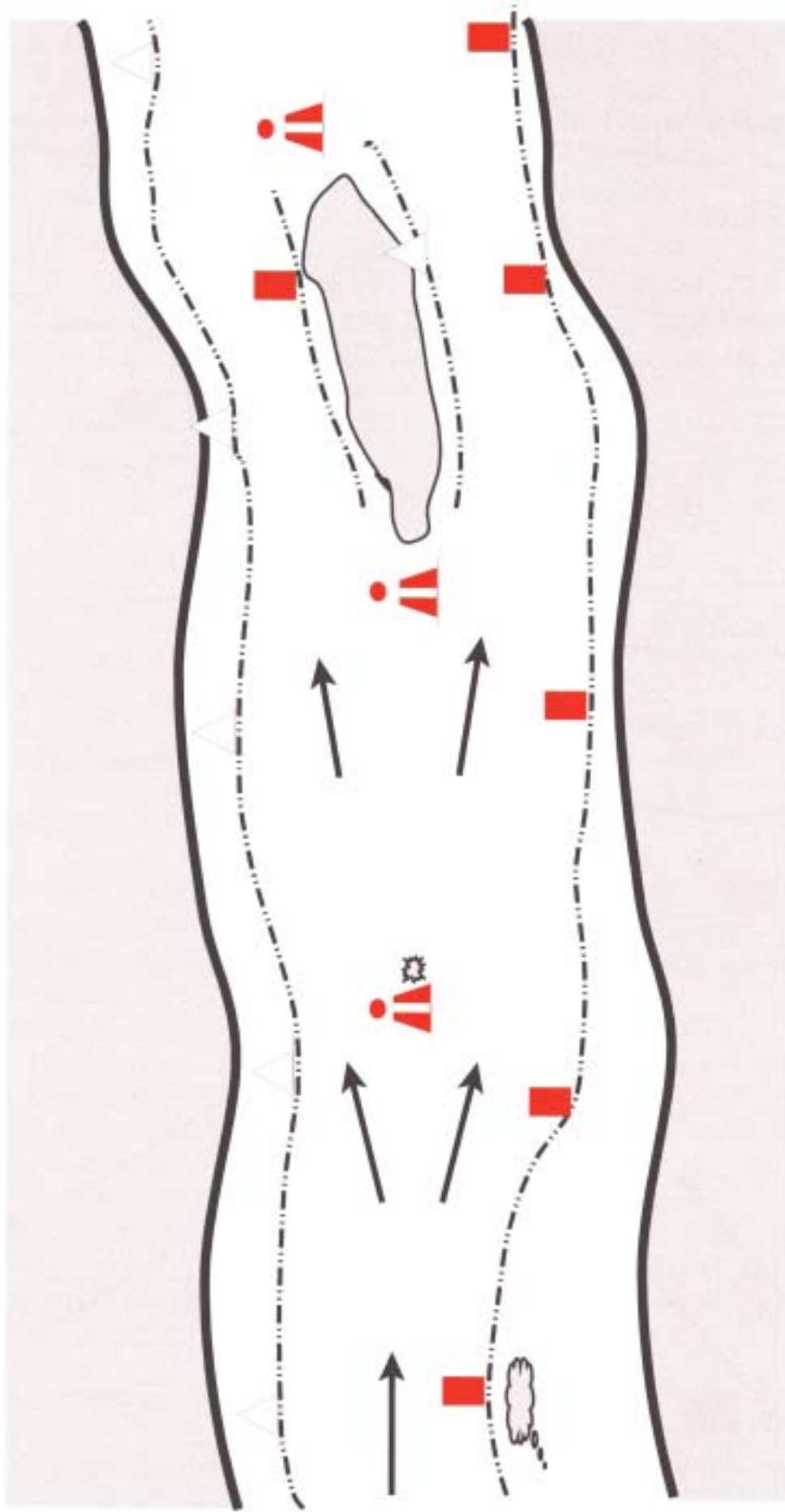
Light:

Colour: Yellow

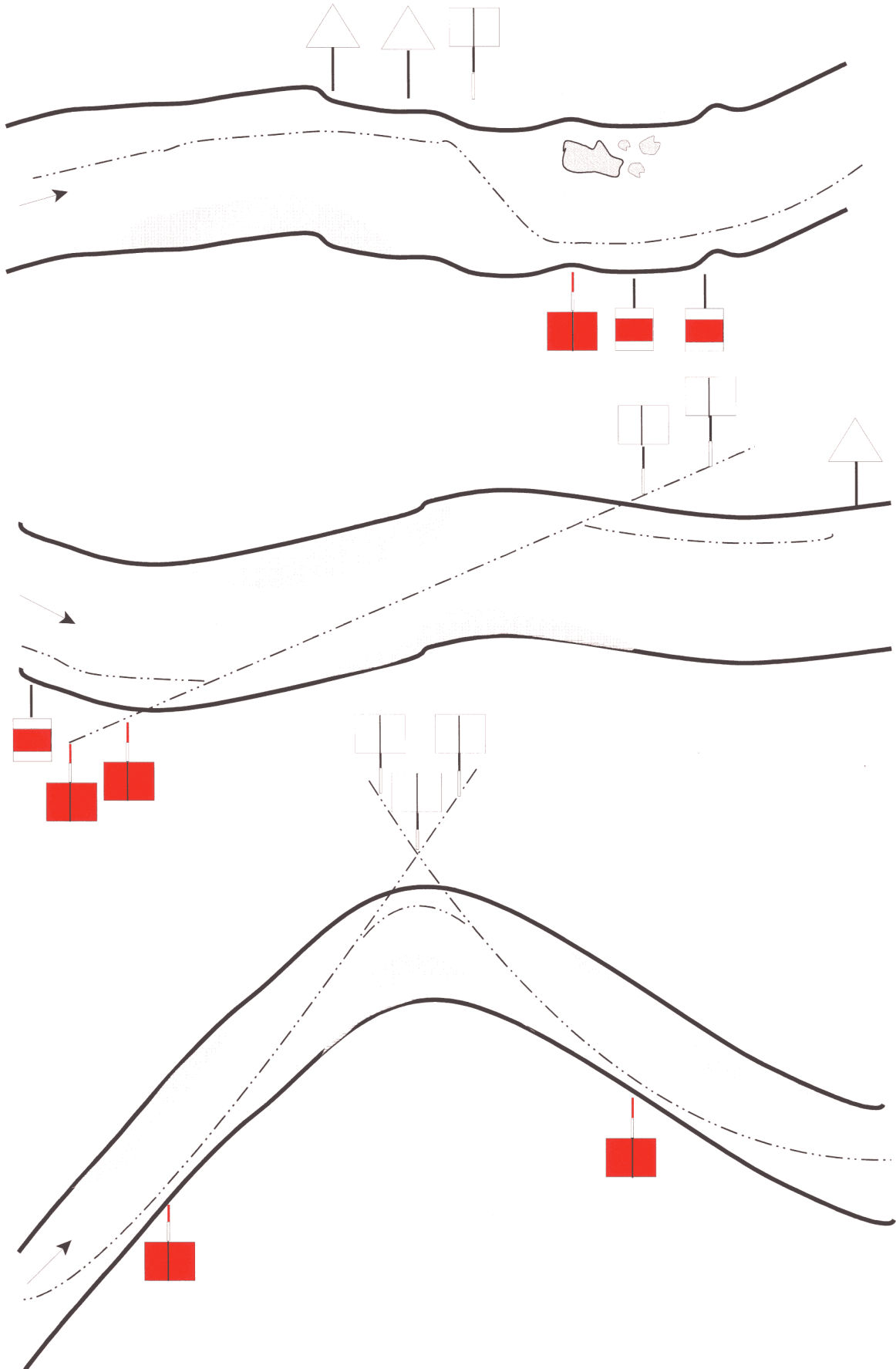
Rhythm: Any, other than those used by
navigation marks



EXAMPLE OF USE OF THE LATERAL AND BIFURCATION MARKS



EXAMPLES OF USE OF SHORE MARKS



III. Recommended Aids to Navigation System on the Lower Mekong River

1. GENERAL

1.1. Scope

This system recommends the uniform fixed and floating marks (other than lighthouses, sector lights and marks, lightships and large navigational buoys) on the Lower Mekong River system in Cambodia and Viet Nam, servicing to indicate:

- the lateral limits of navigable channels;
- natural dangers and other obstructions;
- other areas or features of importance to the navigator.

1.2. Definition of “Left” and “Right”

On rivers, the terms “left” and “right” shall respectively mean to the left and to the right of an observer facing downstream.

On canals and lakes, the competent authorities shall decide the matter in the light of local conditions. However, the sides decided must be consistent with that of the connected rivers.

1.3. Types of Marks

The system provides six types of marks which may be used in combination:

- Lateral marks, to mark the left and right sides of the route to be followed;
- Bifurcation marks, to mark middle grounds, bifurcated channels and isolated dangers in mid-channel;
- Shore marks,
 - Bankwise marks, to mark the channel at points where it approaches a bank;
 - Crossing marks, to indicate crossings and alignment of the channel from one bank to the another;
- Marks of prohibited areas, to indicate no permission of entry;
- Sound signal marks, to indicate use of horning or other sound signals;
- Special purpose marks, not primarily intended to assist navigation but to indicate an area or feature referred to in nautical documents, such as anchorage, fishing ground, hydrographic surveying, underwater drilling, dredging, spoil ground, pump station, recreation area.

1.4. Method of Characterising Marks

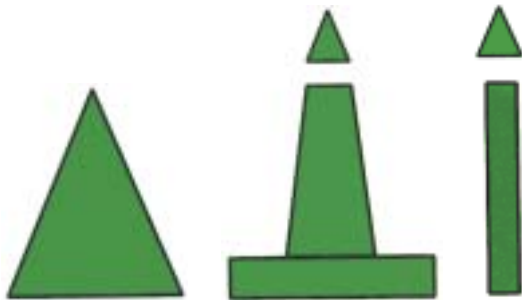
The significance of the mark depends upon one or more of the following features:

- By day, colour, shape, topmark;
- By night, colour and rhythm of light.

2. LATERAL MARKS

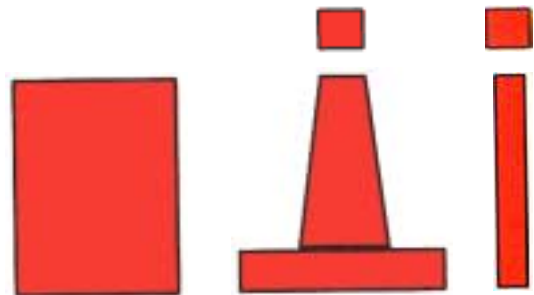
2.1. Left

Colour: Green
Shape: Conical, pillar or spar
Topmark: Single green cone, point upward
Light:
Colour: Green
Rhythm: Single flashing



2.2. Right

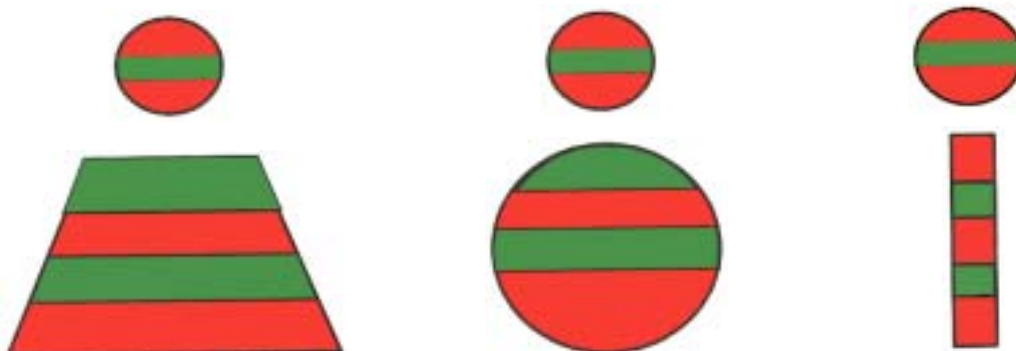
Colour: Red
Shape: Cylindrical (can), pillar or spar
Topmark: Single red cylinder (can)
Light:
Colour: Red
Rhythm: Single flashing



3. BIFURCATION MARKS

Colour: Red and green horizontal bands
Shape: Truncated cone, pillar, sphere or spar
Topmark: Single sphere with red and green horizontal bands for two way bifurcation, cone for preferred channel to the right, cylinder for preferred channel to the left
Light:
Colour: White
Rhythm: Group flashing, with three flashes

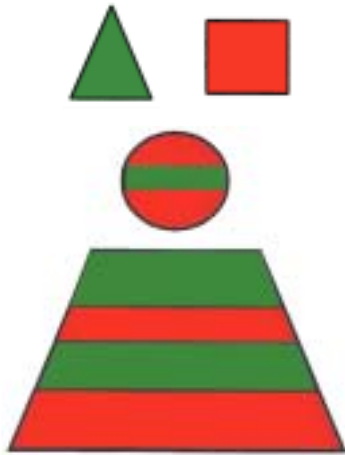
Two-way bifurcation



One-way bifurcation

Optional

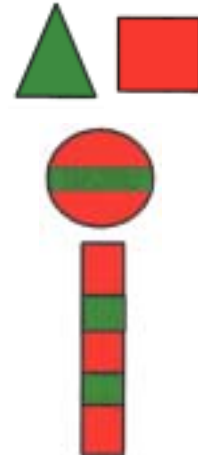
To the right To the left



To the right To the left



To the right To the left



4. SHORE MARKS

4.1. Bankwise Marks

4.1.1. Left bank

Colour: Green/white topmark
 Shape: Post with topmark
 Topmark: Diamond
 Light:
 Colour: Green
 Rhythm: Single long flash



4.1.2. Right bank

Colour: Red/white topmark
 Shape: Post with topmark
 Topmark: Cylindrical
 Light:
 Colour: Red
 Rhythm: Single long flash



4. SHORE MARKS

4.2. Crossing Marks

4.2.1. Left bank

Colour: Yellow/black
Shape: Post with topmark
Topmark: Yellow/black vertical stripe rhombus
Light:
Colour: Yellow
Rhythm: Single flash



4.2.2. Right bank

Colour: Yellow/black
Shape: Post with topmark
Topmark: Yellow/black vertical stripe square
Light:
Colour: Yellow
Rhythm: Single flash



5. MARKS OF PROHIBITED AREAS

Colour: White with red border and slant, and black ship figure
Shape: Circular
Light:
Colour: Red, two on sides in parallel
Rhythm: Fixed



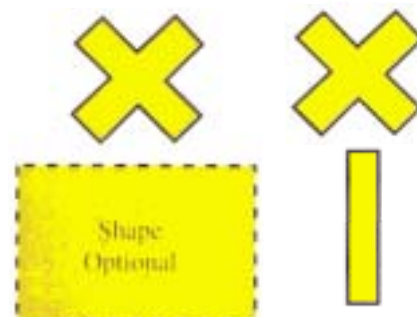
6. SOUND SIGNAL MARKS

Colour: White board with black horn figure
Shape: Hexagon
Light:
Colour: Green
Rhythm: Quick flashing light.

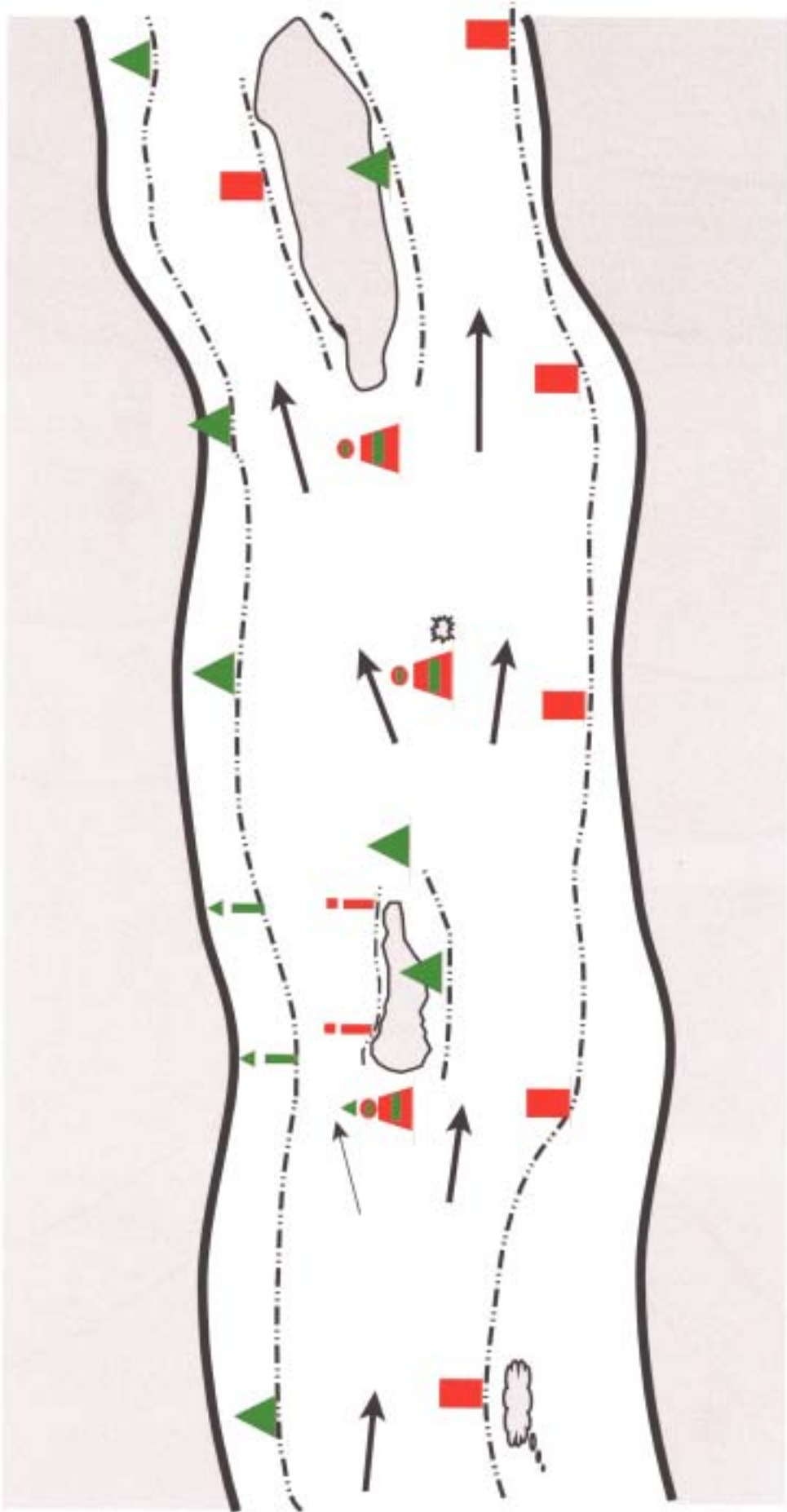


7. SPECIAL MARKS

Colour: Yellow
Shape: Optional, but not conflicting with navigation marks
Topmark: Single "X" shape
Light:
Colour: Yellow
Rhythm: Any, other than those used by navigation marks



EXAMPLE OF USE OF THE LATERAL AND BIFURCATION MARKS



EXAMPLES OF USE OF SHORE MARKS

