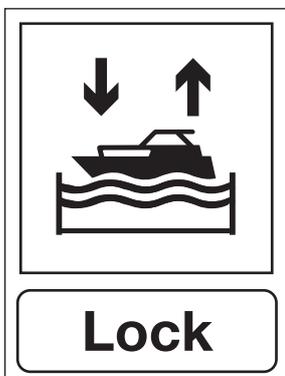


Association of
Inland
Navigation
Authorities

NAVIGATION SIGNS AND SYMBOLS

An industry standard for UK inland waterways



Foreword

This document has been produced following a nationwide consultation process involving navigation authorities and waterway users. The consultation has been concerned with the need to standardise the design of signs, symbols and narrative that exist to allow waterway users to visit or transit waters owned and operated by navigation authorities in safety. It has also considered the timescale required for the process of standardisation and the appropriateness of such action.

The document provides navigation authorities with basic guidance on sign design and 'readable distance'. It also provides guidance for managing the risks to anglers from overhead power lines, in addition to providing a template for strong stream warning systems and signage for variable air drafts at overhead structures such as bridges.

The use of this document as a national standard for inland waterways by all UK navigation authorities will allow users and visitors of both water space and associated land to enjoy their experiences in safety through a consistent regime that is easily understood without the need for formal training. Adoption of this standard will also reduce the design costs of signage to navigation authorities as the vast majority of signs are already in use on the waterways and many of them are contained in British Standards (BSI).

I commend this industry standard to you as a positive means towards ensuring the safety of all users and visitors to our waterways.



Ian White
AINA Chairman

January 2006



About AINA

AINA was set up in December 1996 with strong encouragement from the Government to provide, for the first time ever, a single voice on waterway management issues. The broad purpose of AINA is to facilitate the management, maintenance and development of the inland waterways as an economic, environmental, recreational and social resource.

AINA currently has 30 members. They include local authorities, national park authorities, drainage commissioners, port and harbour authorities, original canal companies, the National Trust and other charitable trusts, in addition to the three large publicly-funded navigation authorities – British Waterways, the Environment Agency and the Broads Authority. Between them, AINA members own, operate and manage some 5,000 km of waterway, which represent almost a complete coverage of Britain's inland waterways.

While each member of AINA has its own constitution, aims and objectives and, in many cases, Acts of Parliament regulating the operation of its waterways, the resource capabilities available to members in financial and human terms vary enormously; a number of members operate almost exclusively through volunteer effort.

AINA's key strategic objectives are to:

- develop, share and promote good practice with regard to the management and use of the UK's inland waterways
- provide a forum for members to develop and agree management approaches that are harmonised and to devise seamless standards of service to waterway users across the UK
- represent the views of owners and operators of the UK's inland waterways to Government and its agencies, local authorities, other policy makers, funders and stakeholders.

In addition, AINA may undertake commissions on behalf of Government, stakeholders or individual members provided that such work is broadly consistent with the key strategic objectives outlined above.

More information about AINA, its work and its membership can be found at www.aina.org.uk.

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1. Introduction

Clear, concise, understandable and appropriate signage is the key to ensuring safe use of our waterways. Users of both the water space and land require information on what is permitted, mandatory or prohibited. The size and style of the signs we use will be dependent on the location and type of information we need to convey.

When identifying the need for signs we also have to consider the impact they may have. Too many may lead to sign clutter; too few and users of the waterway may inadvertently end up at risk. Meeting this balance can be difficult and authorities should weigh up the benefit and balance this against risk, cost and the impact upon the waterway's environment and heritage. Consequently, it is recommended that risk assessment analysis is used to establish the need for all sign installations.

This document provides navigation authorities with a single standard for navigation signs and waterway-related symbols which should be used when updating existing signs or when erecting new installations.

However, it is recognised that some navigation authorities may wish to retain existing historical or unique signage and in such circumstances the signs and symbols contained in this standard could detract from their surroundings.

2. Aim and purpose

The aim of this standard is to allow waterway users to visit/transit waters owned by different navigation authorities without the need for individual sign guidance.

Examples of the signs and symbols are displayed in Appendix 1.

The symbols are not exhaustive and do not cover all sign requirements.

Where an individual navigation authority requires a specific sign or symbol that is not included in this document the authority can use the design criteria for their preparation. Alternatively, British Standard BS5499 Part 11 contains a number of water safety signs for land based users which can be used by navigation authorities.

Section 8 of this document contains initial guidance on the height of lettering and overall size of signs. Where further information is required we recommend that the guidance contained in relevant British Standards and/or the European equivalent is used.

3. Standardisation of conventions

This guidance has been prepared to standardise the design of signs, symbols and narrative utilised by AINA members on UK inland waterways.

Whilst developing this standard it was recognised there are a number of existing sign systems. For example, navigation signs are covered by CEVNI (Code Européen des Voies de la Navigation Intérieure or European Code for Inland Waterways) BS5801 and BS5499 Part 11 Water Safety Signs & Symbols. In addition, some navigation authorities have utilised signs and symbols contained within Road Traffic signs guidance and other similar systems.

This document gathers appropriate symbols from these conventions and places them in a standard format.

Where existing symbols are not appropriate, or where they did not exist, new symbols have been developed.

3.1 Use of standard conventions:

Restriction:

black on white within a red circle



Prohibition:

black on white within a red crossed circle



Hazard warnings:

black on yellow within a black edged yellow triangle



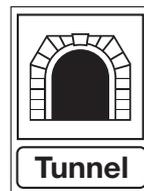
Mandatory:

white symbols within a blue circle



Information:

black lettering/symbols on a white background





4. Use of imperial measurement

This standard provides examples of speed limit and dimension signs in both metric and imperial units.

AINA supports the use of imperial measurement for signage where the use of metric measurement alone would introduce complication for users. For example, where speed limit signs using metric measure may require the sign to be displayed to two decimal places and/or where water depths/craft draft or air draft would be commonly recognised in feet and inches.

Where the navigation is currently signed in metric measure this should continue. Each navigation authority will have to decide on the approach they take and the signing regime they operate, as well as the development of the UK metrication policy.

The metrication of bylaws currently based on imperial units is permitted by the appropriate metrication legislation. However, the altered units are required by legislation to be displayed to two decimal places and are not permitted to be rounded either up or down to the nearest whole number.

5. Application of these standards

The navigation signs are designed for use on narrow waterways, wide waterways and open waters (MCA Category A, B and C waters).

They can be used for new installations or for the replacement of existing signs.

6. Colours

Standard safety colours should be specified when ordering signs from manufacturers. Manufacturers will normally use a pantone reference for the appropriate colour (black, red and yellow). Mandatory and Information signs should be designed to the same standards using white on blue, and black on white backgrounds, respectively. Further guidance is available in British Standard BS5499.

7. Size of signs and use of symbols

The readability/size of signs can be tailored for use in different locations. For example, a sign for use on a narrow waterway may only need a readable distance of 30m. However, a sign for use on a wide or open waterway may require a readable distance in excess of 200m to allow for the width of the navigation/length of craft.

In many cases the use of a symbol alone may provide sufficient information for the intended user. However, additional narrative may sometimes be required and in such circumstances care should be taken to ensure the narrative does not conflict with the meaning of the symbol or other information provided.

8. Sign dimensions

8.1 Size of sign:

The size of signs used will vary depending on location, background conditions/colours, ambient light and required readable distance.

The following simple formula/diagram is used for calculating the size of sign and readable distances in average daylight. Where craft transit a waterway during the hours of darkness, signs may need to be reflective or luminous – alternatively, they may require lighting. Your sign supplier should be able to provide further guidance on a suitable specification.

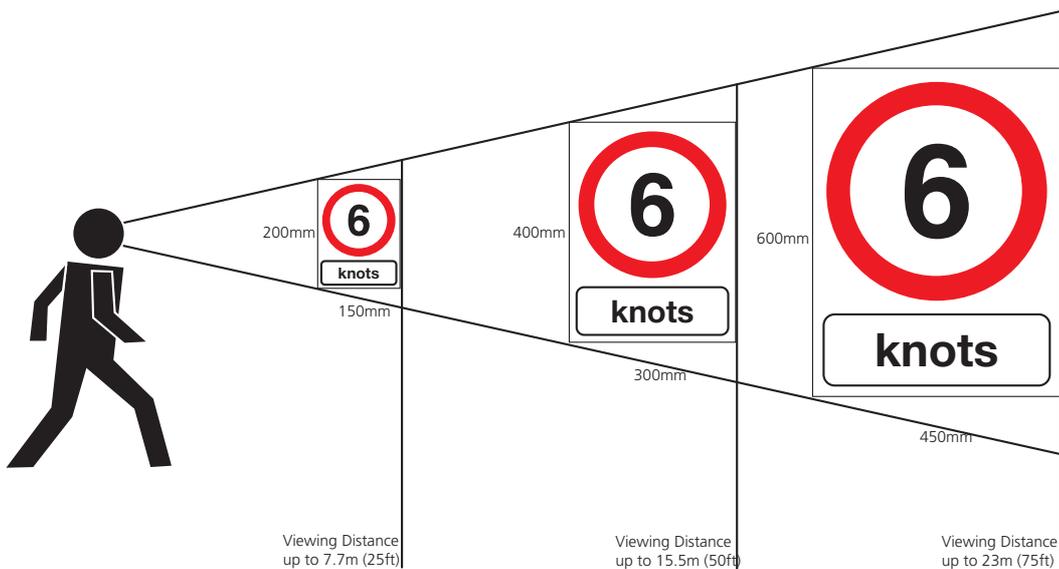
Viewing distance diagram and table

Viewing Distance (m)	Sign height (mm)	Sign width (mm)
30	800	600
50	1300	1000
100	2600	1950
200	5200	3900

8.2 Letter height:

The following table provides guidance on letter height (lower case). To find the letter height in millimetres from which the sign must be readable, multiply the distance in metres x 5:

Distance (m)	Letter height (mm)
5	25
10	50
15	75
20	100
30	150
50	250
100	500
200	1000





9. Risk assessment and additional risk controls

The installation of a new sign, or replacement of a life-expired sign should not go ahead without first considering its necessity.

The target audience, the messages conveyed, the likelihood of vandalism/theft, hazard warnings and the impact on the surrounding environment should all be considered and included in the risk assessment process.

At many locations signage will be chosen as the most appropriate risk control measure during the risk assessment process. However, on some waterways (eg rivers and open waters) signs will only be one part of a safe system for navigation users. The information that follows is provided to increase safety where the use of signs alone may not be adequate.

9.1 Buoy and markers

On some navigations buoys and markers are used to denote shipping lanes and obstructions to navigation. This document does not cover buoys and markers as there are appropriate systems already in use eg the IALA System (International Association of Lighthouse Authorities).

9.2 Strong stream warning system/air draft markers

River navigations hold specific hazards for users. For example, water levels/flow rates may be susceptible to changes that affect navigation without warning. At some locations the provision of a single sign warning of such changes may be appropriate. However, on many rivers this may not be sufficient.

The use of strong stream warnings and air draft markers (inverted depth gauges) reduces the risk of incidents/collision by craft during elevated water levels.

The specifications contained in Appendix 2 have been developed to assist navigation authorities convey information to boating users about safe cruising in varying water levels/strong stream conditions.

9.3 Weir signage and weir booms

The weir sign (Hazard sign ref. 2 – Appendix 1) is designed to be used as part of a safe system of operation. At some locations there will be a need to provide further risk controls such as weir booms.

When considering the installation of a boom as part of the safe system of operation the design must be specific to the location where they are to be installed

10. Locating visitors in an emergency

In an emergency, locating visitors and users of waterways can be a problem for the emergency services. Many navigations cross remote areas of our countryside with poor or restricted access. In addition, many navigations and their associated structures have local names which are not recognised on maps.

Provision of appropriate signage and instruction for users to give to the emergency services should be considered when introducing new signage or replacing existing signage. Information such as grid references or (where appropriate) post codes printed on lock, bridge and other signs can assist. In addition, placing location markers at regular intervals on canals and/or river navigations will also assist this process.

Local police, fire, ambulance services and the coastguard will provide details of the best method to aid location in your locality.

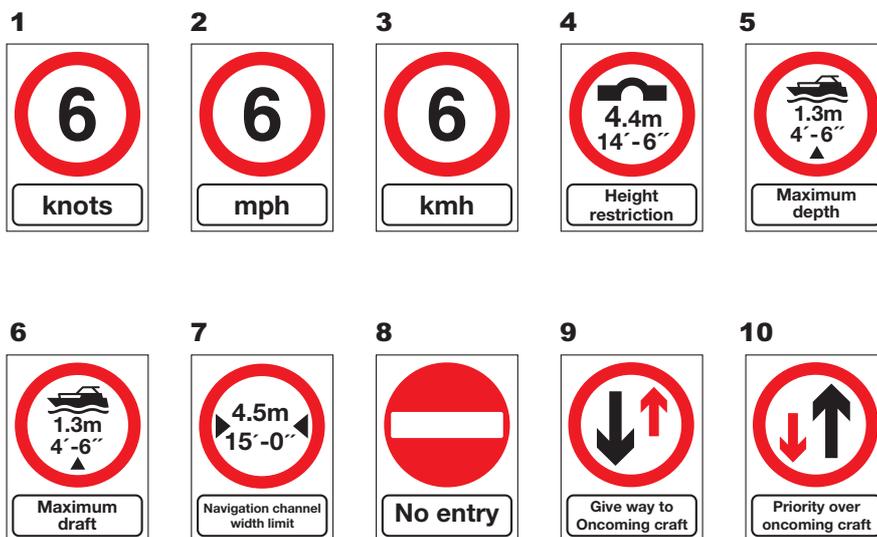
Appendix 1

CORE NAVIGATION SIGNS

Restriction Signs

Colours:
Red, Black
and White

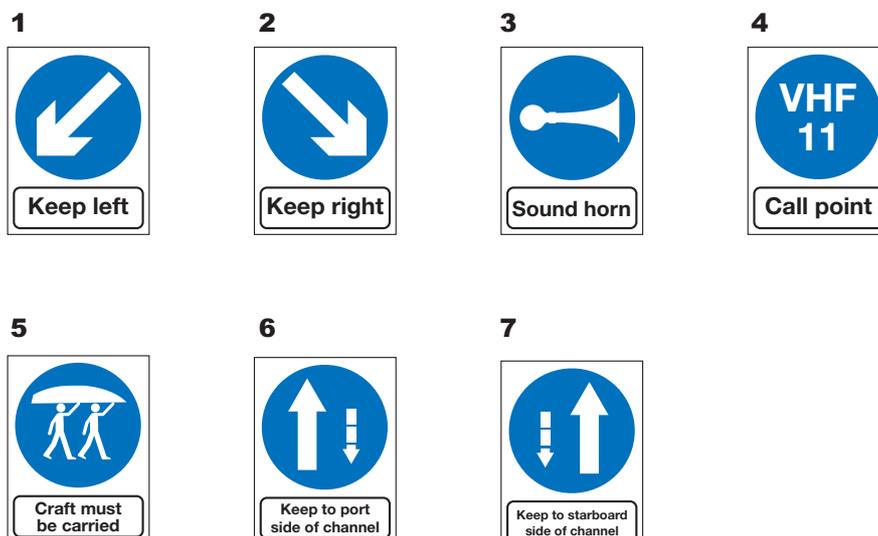
Materials:
3mm thick
aluminium



Mandatory Signs

Colours:
Blue, Black
and White

Materials:
3mm thick
aluminium





Prohibition Signs

Colours:
Red, Black
and White

Materials:
3mm thick
aluminium

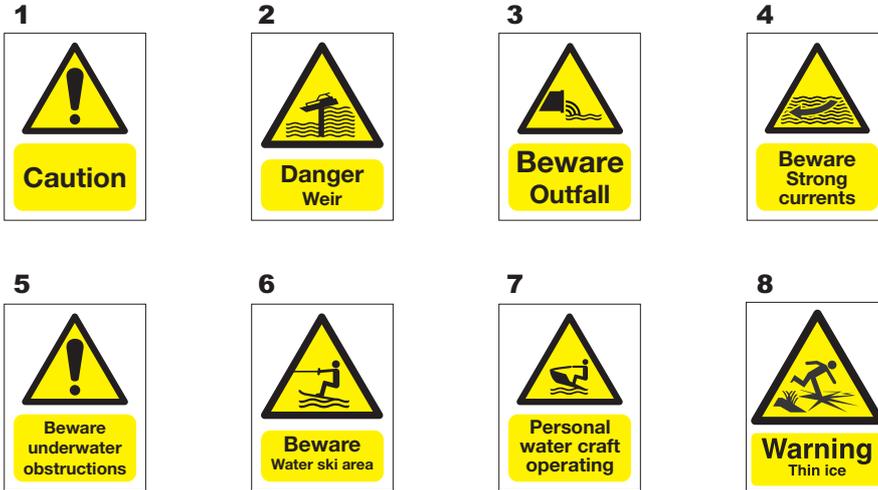




Hazard Signs

Colours:
Yellow, Black
and White

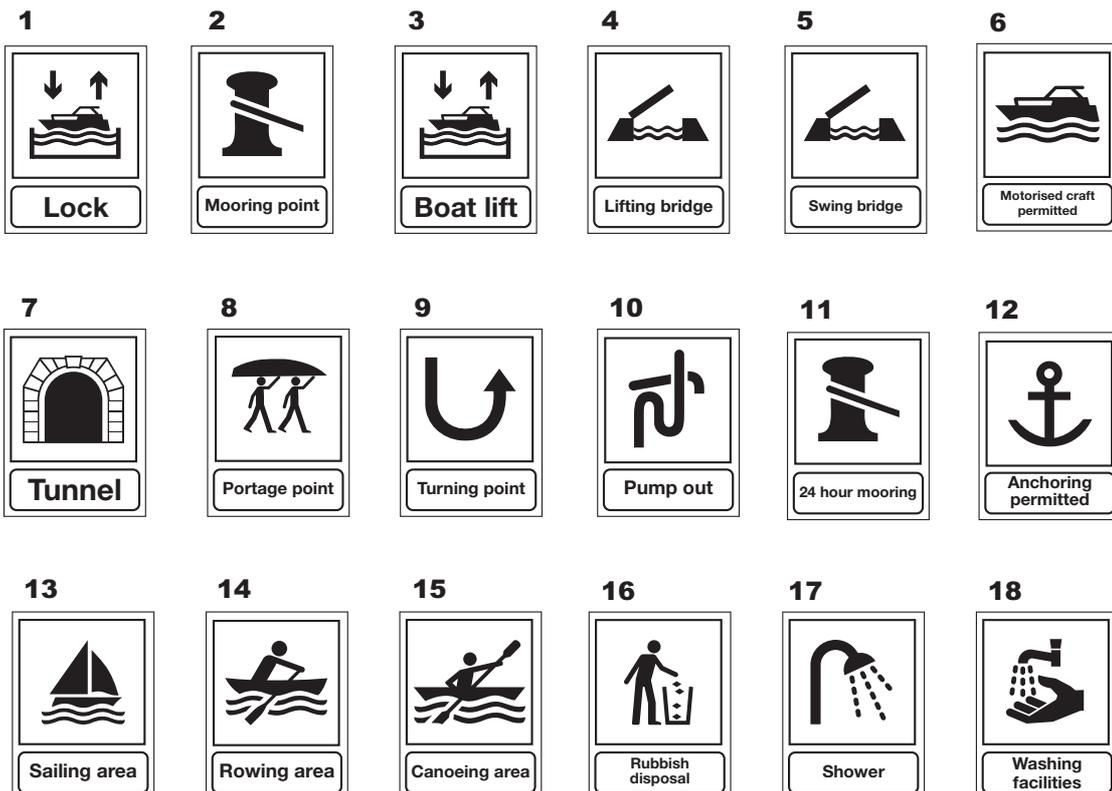
Materials:
3mm thick
aluminium



Information Signs

Colours:
Black and
White

Materials:
3mm thick
aluminium





Appendix 2

STRONG STREAM WARNING SYSTEMS

1. Introduction

The Strong Stream Warning System (SSWS) described below has been developed to provide river users with systems to identify safe/unsafe water levels and/or conditions they may experience whilst travelling on river navigations. Any system of this type needs to be simple and unambiguous, failsafe in operation, cost effective to install/maintain and be available to users with minimal manual intervention.

2. Background

Various flood warning and Strong Stream Warning systems have been used by river navigation operators, for instance, strong stream warnings and colour coded gauge boards. It has already been recognised that many navigations would become unusable long before any flood risk might occur and warning systems activated by the EA/SEPA. It is therefore necessary to provide a specific system to warn navigation users of hazards associated with strong streams and elevated water levels which may occur 'in channel'.

3. Rights of navigation

On some navigations a 'right of navigation' may exist due to legislation or common law rights. Each navigation authority will need to review its own legislation and policy in this matter. Where the navigation authority has the power to give such orders, they should issue instructions and guidance to users and staff that the navigation may be closed when certain safety thresholds are reached. In these circumstances the decision to close navigation should be based on the safety of the user and navigational staff rather than on the individual rights of navigation. In each case the navigation authority will have to give due consideration to existing navigation rights and the requirements of Human Rights Legislation balanced against the need to operate a safety management system.

4. Operating systems

There are two different situations when Strong Stream Warning advice may need to be given. These are triggered by an increase in flow as a result of rainfall or, in some instances, releases of water from regulated reservoirs:

Type 1: Where moveable weirs or gates are used to control water levels which results in an increase in velocity, but little or no change in water level. Such changes may only be detected by flow gauges or by operators' knowledge of the openings in weirs and gates.

Type 2: Where fixed weirs are used which result in a rise in water level and increase of velocity. These can be easily identified by increase in 'head' over weirs and can be measured directly against a gauge board.



5. Assessing risks

Prior to any decision to install a strong stream warning system a review should be carried out of all river navigations (including 'connections' to canals, owned or operated by the navigation authority) to identify whether any risks exist to craft navigating the waterway in elevated or strong stream conditions. If so, the assessment should quantify the level of risk that may be encountered by users in both 'normal' and strong stream conditions.

At locations where the risk assessment process has highlighted the need for a warning system, consideration will need to be given to the type of system to be put in place. Regardless of location, it will need to be failsafe such that failures of power systems (which are likely to occur at a time of rising water levels and/or the remoteness of locations where the system needs to be operated) must also be taken into account. Consideration needs to be given to the availability of staff:

- who are on site for manually operating systems
- who can attend the site to operate signs manually
- who can remotely trigger electronic/coded warning systems.

The competence and skills of crews and the handling/power characteristics of the craft may need to be acknowledged/recognised by the navigation authority. However, this must not detract from the purpose of the warning.

6. Provision of information

Provision of up-to-date information for users may also need to be considered, not only at locks/weirs, but also in advance of a journey, and possibly for craft whilst in passage. Information can be provided from staff at the site via:

- telephone messaging systems
- websites
- adjacent boatyards, marinas etc.

The correct trigger for the relevant operating procedures needs to be well defined and staff need to be competent in its application. The systems available to monitor actions and changes in navigation conditions need to be regularly monitored so as to either enhance the level of warning, or to relax it to allow normal navigation to be resumed.

7. The three phase approach

This warning system operates on a three phase approach. Users are warned of conditions as follows:

- 1) 'Normal' conditions**

No adverse increase in water level, velocity or flows. Information sheets/advice from lock keepers and others needs to be available with regard to any normal currents, shelves, tidal effects, etc, that would be reasonably encountered.
- 2) 'Caution' phase**

This will be determined by the various reaches of the river and the way in which it behaves either on a rising or falling hydrograph. On some rivers the 'Caution' phase may be over quite a long period, whereas on others it may not have any application whatsoever. In this phase, local arrangements may dictate that certain types of craft/users should not navigate and should seek safe moorings.
- 3) 'Strong Stream Warning' phase**

When users are advised to moor up and not proceed beyond the warning point. In some instances the navigation may be physically closed.

The signing system adopted needs to be unambiguous and readily understood by all, including foreign visitors to the UK's waterways. The system should be structured around the following two types of operations.

Type 1: Navigations where, at the appropriate trigger point, 'Strong Stream Warning' signs will be unveiled, locks may be closed, and any traffic control systems such as traffic light(s) should be set to advise against use. Prior to this point, the 'Caution' phase may be introduced at which time the lock keeper may be able to give discretionary advice as to the suitability for different types of craft in the prevailing conditions. An appropriate sign needs to be displayed to show the Strong Stream Warning is in force.

Type 2: Navigations where there is variable height of water level. At such locations, colour coded gauge boards and information signs should be installed. Where traffic lights exist at locks or other control points a single red light should be shown as per the CEVNI requirements to close the navigation. Alternatively, where specific flood warning signals are installed, then these may consist of a single red flashing light/beacon which can be triggered manually, automatically or remotely depending on the circumstances of the navigation. It is important that consistency applies to the signing system on each particular waterway.



8. Signage

In all cases, reference should be made in any local cruising notes about the purpose and type of signing of the gauge boards/warning signs to educate users of the dangers. Arrangements should also be made with hire boat companies, day boat operators, etc, that in the event of the 'Strong Stream Warning' phase being in place, then their craft and crews should be instructed to moor up at the nearest safe location and should not worry about meeting the contractually agreed return times.

Arrangements can be made by the various navigation authorities for manual signs to be operated either by their own staff, or by other competent organisations provided there are failsafe checks in place to ensure the signs have been displayed. It may be appropriate for local marinas, etc, to display Strong Stream Warning and Caution signs in conjunction with the navigation authority.

In the immediate vicinity of each warning sign there should be adequate provision for craft to moor up in safety so as to be able to wait out the strong stream event.

Signage must be placed to give sufficient warning/time for craft to moor up safely. There must be consistency on each waterway as to location and operation of the signs. It would be all too easy to inundate navigations with warning signs, which apart from disfiguring operational structures may well frighten existing and prospective users from the navigation. Care should be exercised to ensure that only a minimum number of signs appropriate with conveying the relevant warning messages are installed and that there is no saturation of structures with warning signs, gauge boards, etc.

9. Reduced headroom

The introduction of the Strong Stream Warning System described above will reduce the risk to navigation users associated with varying water levels/strong stream conditions. However, there may be a need to highlight the risk associated with variable air draft due to the rise in river levels. This document provides a standard for signage and/or a warning system to meet this need.

The requirement to introduce a warning system will vary from navigation to navigation. This need should be quantified as part of the risk assessment process for the waterway. Where, following risk assessment, it is established that there could be a risk posed by reduced air draft as a result of rising water level, a variable headroom warning sign should be installed.

10. Positioning of signs

Signs should be located at least 100m up and downstream of an 'at risk' bridge/overhead crossing. This will allow craft to firstly read the sign, and then take evasive action. The gauge boards may either be fixed to an adjacent structure or mounted free-standing on a support in the river.

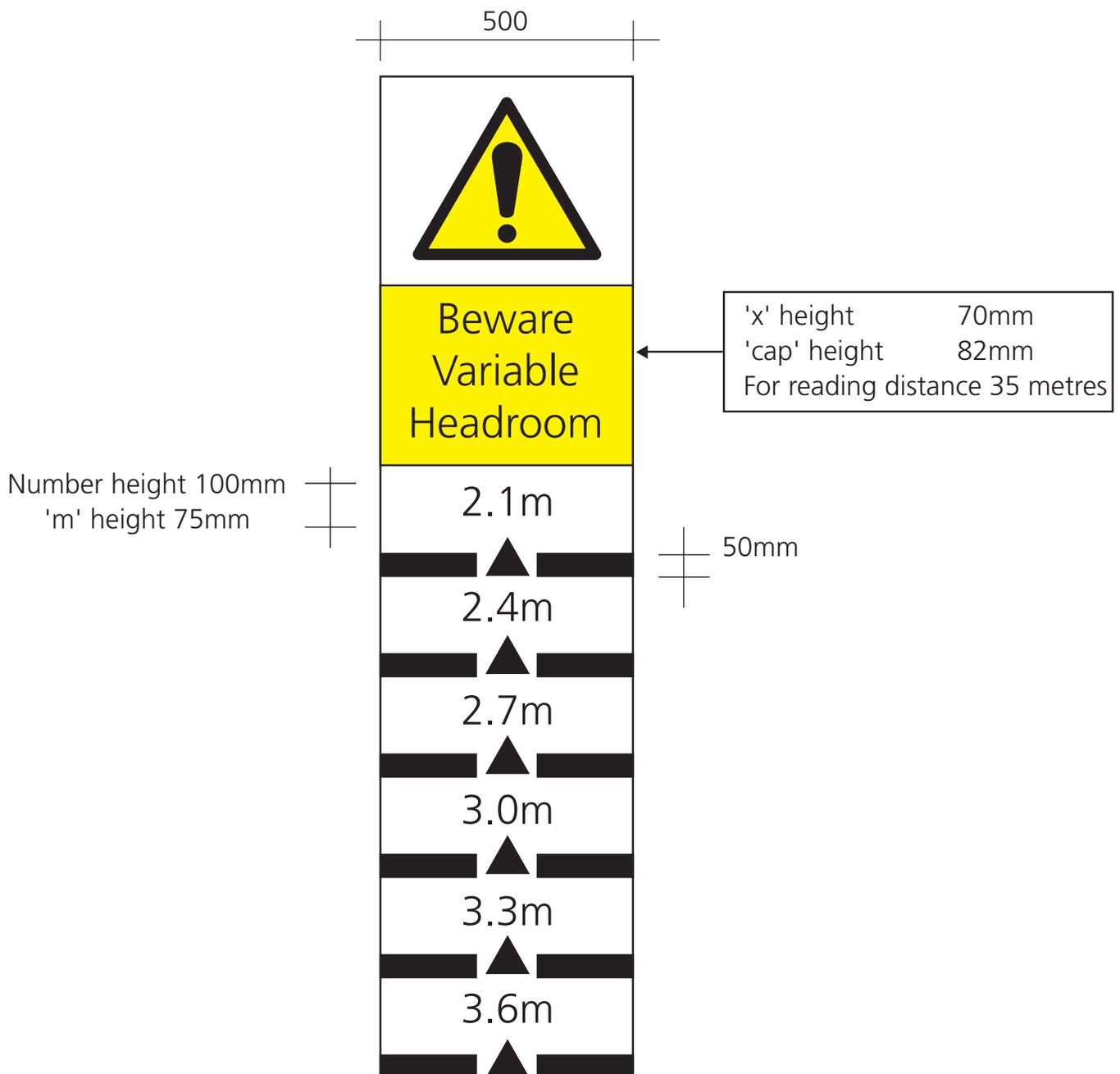
All signs should be positioned to be readily visible, appropriately robust and not form an obstruction to flow or navigation. Reference to their use should be included in cruising notes, etc.

The gauge board will be calibrated with '0' being taken as the soffit level of a flat span bridge or the chord level of an arch bridge where the chord length is up to 1½ times the recognised beam dimension or maximum lock width for that waterway.

An appropriate sign is shown in Diagram 1.

Diagram 1

Variable headroom sign



Appendix 3

OVERHEAD POWER LINE WARNING SYSTEM

Overhead power lines cross and/or run parallel to many waterways. Hazards from these lines are usually associated with inadvertent contact with the conductors. Local electricity suppliers and generating companies can provide guidance on the hazards and measures that should be taken to minimise the risk.

The sign specification that follows has been developed by members of the Angling & Overhead Power Lines Working Group as a single standard for signing the hazards to anglers from overhead power lines.

Current good practice states that a minimum exclusion zone to angling must be in place where overhead power lines cross or run parallel to the water/fishery.

The default exclusion zone to angling is currently 30m, and this distance should only be reduced where the findings of a 'suitable and sufficient' risk assessment allow.

For a risk assessment to be 'suitable and sufficient' it is essential that people with the appropriate knowledge and experience are involved and that all necessary information is available and considered.

In considering the risks to anglers from overhead electric power lines the risk assessment team should make reference to, and involve the following:

- An individual who has experience of the methods of angling used at the location and who is familiar with the various types of tackle available. This person is likely to be an experienced angler familiar with practices at the site and is the typical age profile of users.

- A representative of the electricity company (or other overhead electric power line equipment operator) who has expert knowledge of the type of overhead electric power line involved and who can provide advice on the risks presented at a specific location.
- Representatives of the angling club or association who use the location. These should include those who have an understanding of the club's legal obligations and of constraints in terms of cash or resources.
- A representative of the land owner (if this is not the fishing club or association).
- A person who has an understanding of the risk assessment process and who is competent to co-ordinate and record the process and to identify and implement any actions identified.

Craft with masts, eg yachts, sailing dinghies and vessels with high superstructures involving radar, aerials, etc, must also be warned of the risks associated with overhead power and cable crossings. Appropriate 'Hazard' signs need to be erected 100m and 200m upstream and downstream of the crossing and at adjacent locks, marinas and moorings to give adequate warning.

Further guidance on angling exclusion zones, signage and the risk assessment process can be obtained from the Energy Networks Association, 18 Stanhope Place, Marble Arch, London, W2 2HH

Overhead Electric Power Line Warning Signs

How and where warning signs should be used

These are the three types of warning signs:-

Warning Notices

Warning notices should be used at access points to provide a general warning of the presence of overhead electric power lines on approaches to the fishery and/or affecting the fishery itself.



Danger
Overhead electric power lines

Size
170x170
Colours:
Black onto
Yellow
(RAL 1023)

Lowercase letter
9mm Readable
distance: 18M

Fishery/Access affected by overhead electric power lines.

Always carry rods, poles and other equipment at a low level, parallel to the ground.

Size
170x230
Colours:
Black onto
White

Lowercase letter
9mm Readable
distance: 18M

Angling Exclusion Zone Signs

Exclusion Zone Signs should be used at the extremities of the angling exclusion zone. This type of sign is designed to warn anglers as they approach the overhead electric power lines and should be erected in a prominent position, at right angles to the water, to face the anglers as they approach the exclusion zone.



Danger
Overhead electric power lines

Size
170x170
Colours:
Black onto
Yellow
(RAL 1023)

Lowercase letter
9mm Readable
distance: 18M



No fishing
beyond this point

Size
170x230
Colours: Red
(RAL 3020) and
Black onto
White

Lowercase letter
9mm Readable
distance: 18M

At high risk locations individual tiles with the wording "Always carry rods, poles and other equipment at a low level, parallel to the ground" can also be incorporated alongside the Exclusion Zone signs and/or the Repeater/Under Line Signs.

Repeater/Under Line Signs

At some locations overhead electric power lines may run parallel to the water for long distances. Where this occurs it is recommended that 'repeater signs' are erected at frequent intervals in line of sight but not exceeding 200m. These signs can also be used as a reminder sign directly below the overhead crossing.

Note: This type of sign should be used in addition to the Angling Exclusion Zone Signs.



Danger
Overhead electric power lines

Size
170x170
Colours:
Black onto
Yellow
(RAL 1023)

Lowercase letter
9mm Readable
distance: 18M



No fishing

Size
170x230
Colours: Red
(RAL 3020) and
Black onto
White

Lowercase letter
9mm Readable
distance: 18M

Specification note: Due to the effects of weathering, notably the fading of the printed message caused by the sun's UV rays it is advisable to ask your sign supplier about the life expectancy of the signs. Sign life can be increased by overlaminating the panel with a clear UV inhibiting film.

The Exclusion Zone and under line signs are supplied as units for use in a vertical format as displayed above, or side by side on one sign panel as shown below.. This allows those purchasing the signs to decide on the most suitable layout/design style for the location to be signed.



Fishery/Access affected by overhead electric power lines.

Always carry rods, poles and other equipment at a low level, parallel to the ground.

SIZE: 360mm x 230mm




SIZE: 360mm x 230mm




SIZE: 360mm x 230mm

Acronyms and contact information

AINA	Association of Inland Navigation Authorities www.aina.org.uk
BSI	British Standards www.bsi-global.com
CEVNI	Code Européen des Voies de la Navigation Intérieure or European Code for Inland Waterways, BS5801
EA	Environment Agency www.environment-agency.gov.uk
ENA	Energy Networks Association www.energynetworks.org
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities www.iala-aism.org
MCA	Maritime & Coastguard Agency www.mcga.gov.uk
SEPA	Scottish Environment Protection Agency www.sepa.org.uk





**Association of
Inland
Navigation
Authorities**

Fearn's Wharf
Neptune Street
Leeds
LS9 8PB

T: 0113 2433125
F: 0113 2458394
www.aina.org.uk