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INTRODUCTION AND SIGN LOCATION

CHAPTER 1
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Traffic Signs Manual

Chapter 1 – Introduction and Sign Location

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1.1 Introduction

GENERAL

- 1.1.1 Clear and effective traffic signs are essential for the efficient operation of the road network, for the enforcement of traffic regulations and for road safety. This Traffic Signs Manual provides details of the traffic signs which may be used on roads in Ireland, including their layout and symbols, the circumstances in which each sign may be used and rules for positioning them.
- 1.1.2 The Manual also provides guidance on the temporary traffic measures required at roadworks.
- 1.1.3 It has become necessary to revise and extend the Road Traffic (Signs) Regulations and the Traffic Signs Manual due to developments in Ireland's road network since 1996. The programme for the construction of many new roads, especially motorways and dual carriageways with complex grade-separated junctions, has highlighted the need for new types of signs and more comprehensive design guidance. Similarly, developments in urban areas, such as bus and cycle lanes, traffic calming, street-running light rail vehicles and traffic management schemes all require appropriate signing.
- 1.1.4 This introduces a number of new Regulatory and Warning signs, road markings and traffic signals, and revises the designs of others. The Manual has been extended to cover recent developments in signing and to reflect best international practice in areas such as the use of overhead gantries and Variable Message Signs. It also includes typical applications. Detailed designs for symbols and many of the signs are available on the Department of Transport, Tourism and Sport's websites www.dttas.gov.ie and www.trafficsigns.ie.
- 1.1.5 In reviewing the sign designs, the intention has been to improve clarity, provide signs suitable for most situations and reduce the need for supplementary text. The opportunity has also been taken to give more comprehensive guidance on temporary traffic management at roadworks.
- 1.1.6 For the purposes of this Manual, the term 'traffic signs' includes upright signs on posts, road markings, traffic signals, temporary signs, gantry signs, Variable Message Signs, and associated items such as hazard marker posts and bollards.

- 1.1.7 Traffic signs (including road markings) are divided into three broad types:
- Information – signs which give directions and distances to destinations or which provide other information that may be relevant to road users;
 - Regulatory – signs which give instructions, prohibitions or restrictions which road users must obey;
 - Warning – signs which warn of hazards on the road ahead.
- 1.1.8 To be effective, traffic signs must be readily recognised as such and must:
- Have messages which can quickly be read and understood;
 - Be co-ordinated with the geometric road layout so they are conspicuous by day and night; and
 - Be located far enough in advance of the situation to give sufficient time for the road user to take the appropriate action.
- 1.1.9 To help achieve these goals, a combination of consistent message, distinctive shape and colour is used. The message may be a legend, a symbol or both. Standardisation of design, colour, shape, size and location helps to ensure that drivers will recognise the various classes of sign.
- 1.1.10 Signs should only be erected where there is a demonstrable need, because unnecessary, incorrect or inconsistent signs detract from the effectiveness of those that are required and tend to lead to disrespect for all signs.
- 1.1.11 Any references to Chapter numbers indicate references to the other Chapters of the Traffic Signs Manual, while references to a Section or Paragraph refer to a section or paragraph in this Chapter.
- 1.1.12 For the purposes of this Manual:
- **Shall** or **must** indicates that a particular requirement is mandatory;
 - **Should** indicates a recommendation; and
 - **May** indicates an option.
- 1.1.13 For the purpose of this Manual ‘overseeing organisation’ is defined as either Transport Infrastructure Ireland (TII) for national roads or the Department of Transport, Tourism and Sport (DTTAS) for regional and local roads.

LEGAL FRAMEWORK

- 1.1.14 A full and comprehensive guide to the legal aspects of traffic signs is outside the scope of this Manual. Legal matters are dealt with only briefly in this section.
- 1.1.15 The legal framework for traffic signage is contained in a number of Acts and Regulations. These include the Road Traffic Acts, the Road Traffic (Signs) Regulations and the Road Traffic (Traffic and Parking) Regulations.
- 1.1.16 Regulations concerning traffic signs may be made from time to time, so users of this Manual should ensure that they are aware of all the current Regulations. The most up to date information on Acts, Regulations and other publications is available on the Department of Transport, Tourism and Sport's websites www.dttas.gov.ie and www.trafficsigns.ie.
- 1.1.17 The Regulations, which are made under Section 95 of the Road Traffic Act 1961¹, define the regulatory signs and road markings to be used and the significance to be attached to them. They also set out the mandatory requirements for regulatory signs. This Manual provides guidance on the use of regulatory signs, but nothing in the Manual can override the Regulations.
- 1.1.18 The traffic sign Regulations refer only to regulatory signs and not to other categories such as information or warning signs. Those signs are subject of directions by the Minister under Section 95 of the Road Traffic Act 1961. Accordingly, this Traffic Signs Manual together with the corresponding Circular Letter constitute such a direction for the design, provision and use of all traffic signs referred to in the Manual other than regulatory signs.
- 1.1.19 Only traffic signs which are in accordance with this Manual or associated Regulations shall be provided on public roads.**

¹ *Road Traffic Act 1961* (No. 24 of 1961).

GENERAL RESPONSIBILITIES

- 1.1.20 Legal responsibility for public roads is vested in the County Councils and City Councils. These local authorities, in discharging their road functions, are referred to as 'Road Authorities'. The statutory duty of Road Authorities includes responsibility for the specification, construction and maintenance of road signs and markings.
- 1.1.21 Transport Infrastructure Ireland (TII) has overall responsibility for the planning and supervision of works, including signposting, on the national road network. The functions of TII in relation to national roads include preparing, or arranging for the preparation of, designs for construction or improvement works, programmes for maintenance works, and schemes for the provision of traffic signs.
- 1.1.22 It is necessary to consult with the Gardai before installing any regulatory sign or marking.
- 1.1.23 The minimum amount of signage consistent with the use of the road should be provided in any situation. Road Authorities should avoid sign clutter and should remove all unnecessary or unauthorised signage from the roadside. The removal of unauthorised signage from outside the road curtilage may entail action under the Planning Acts.
- 1.1.24 Variable message signage should only be used for traffic management and information purposes. It should never be used for any form of advertising or promotion.
- 1.1.25 It is recommended that Road Authorities undertake a periodic review of the signs within their jurisdiction. The review should be comprehensive, considering the need for signs, their design and location, and also consistency in signing. It should note existing signs which need to be replaced or removed, and whether new signs are required where there are none at present. Based on the reviews, Road Authorities should develop programmes for the replacement of incorrect signs as well as replacement of signs which have deteriorated.

CLASSIFICATION OF SIGNS

1.1.26 As noted in Paragraph 1.1.7, traffic signs are divided into three broad categories: information, regulatory and warning. Special types of signs, which fall into one of the above categories, are required on overhead gantries, on Variable Message Signs and at roadworks. Other types of signs are road markings, hazard marker posts and traffic signals.

1.1.27 The categorisation of traffic signs is illustrated in Table 1.1 and further explained in the following paragraphs.

Table 1.1: Categories of Traffic Signs

	Principal Categories	Sub-Categories	Further Subdivision	Examples	Relevant Chapters
Traffic Signs on Posts	Information Signs	Directional Information Signs	Advance Direction Signs	<i>Stack Type ADS</i>	2 and 10
			Direction Signs	<i>Map Type ADS</i>	
			Route Confirmatory Signs		
		Other Information Signs		<i>Town Name Signs</i>	4 and 10
			<i>Car Park Signs</i>		
			<i>Tourist Facility Signs</i>		
	Regulatory Signs	Mandatory Signs		<i>Keep Left</i>	5 and 10
			Stop and Yield Signs	<i>Stop</i> <i>Yield</i>	
		Restrictive Signs		<i>Weight Limit</i> <i>Speed Limit</i>	
			Prohibitory Signs	<i>No Right Turn</i>	
Warning Signs			<i>Road Narrows</i>	6 and 10	
Roadworks Signs		Warning	<i>Roadworks Ahead</i>	8	
Overhead Gantry Signs		Directional Information	<i>Advance Direction Signs</i>	2 and 10	
		Regulatory	<i>Speed Limit</i>	2, 5 and 10	
Variable Message Signs		Regulatory	<i>Periodic Speed Limit</i>	3 and 5	
		Warning	<i>Lane Closure</i>	3	
		Information	<i>Text message</i>		
Traffic Signals		Regulatory	<i>Red/Amber/Green Signals</i>	9	
		Warning	<i>Flashing Amber Signals</i>	6 and 9	
Road Markings		Regulatory	<i>Solid White Line</i>	7 and 10	
		Warning	<i>Speed Roundels</i>		
Hazard Markers			<i>Hazard Marker Posts</i>	6	
			<i>Bollards</i>	1, 5 and 10	

Information Signs

1.1.28 Information signs are subdivided into two principal types: 'directional information signs', which show the directions and distances to places on the road ahead or on intersecting roads, and 'other information signs', which provide road users with a wide variety of information. Most information signs are rectangular.

1.1.29 Directional information signs are further subdivided into:

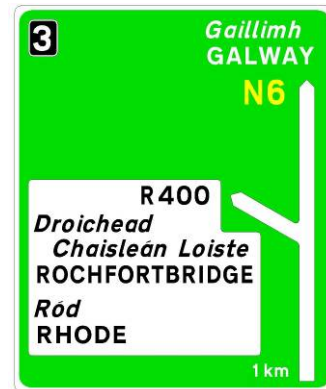
- **Advance Direction Signs** – which are located on the approaches to a junction to give information about the destinations reached from that junction. They may be in the form of a map, showing the junction layout diagrammatically, or as a stack of panels listing destinations.
- **Direction Signs** – which give route information at a road junction. The sign may show destinations, road numbers and, in some instances, distances. Direction signs have a chevron at one end to show the direction to the named destination.
- **Route Confirmatory Signs** – which are placed after a junction to confirm the road number, or the destinations which can be reached along that road and the distances to each.

1.1.30 A system of colouring is used on directional information signs to indicate the type of road:

- Signs for motorways have white lettering, symbols and borders on a blue background;
- Signs indicating national roads have white lettering, symbols and borders on a green background, with yellow lettering for route numbers;
- Signs indicating all other roads have black lettering, symbols and borders on a white background.



a) Stack Type Advance Direction Sign



b) Map Type Advance Direction Sign

Figure 1.1: Advance Direction Signs (Information)



Figure 1.2: Direction Sign (Information)



Figure 1.3: Route Confirmatory Sign (Information)

1.1.31 Other information signs cover a wide variety of uses, but generally fall into the following classifications:

- Signs displaying civic or geographical information, such as the name of a town, county or river;
- Signs indicating facilities ahead that are of interest to road users, such as car parking or a ferry;
- Signs indicating traffic calming measures;
- Signs indicating particular road layouts, such as lane gain and diverge, cul-de-sac, etc.;
- Signs indicating alternative routes;
- Service area signs;
- Toll road signs;
- Tunnel information signs, such as tunnel name and length and emergency facilities;
- Miscellaneous information signs; and
- Signs to tourist attractions. These signs, which have white lettering, symbols and borders on a brown background, are often in the form of directional signs but are included with 'other information' signs.

1.1.32 Examples of information signs are shown in Figures 1.1 to 1.7. Detailed requirements for the design and use of information signs are given in Chapters 2 and 4. The designs of some standard information signs are set out on the Department of Transport, Tourism and Sport's websites www.dttas.gov.ie and www.trafficsigns.ie.



Figure 1.4: Town Sign (Information)



Figure 1.5: Cul-de-sac Sign



Figure 1.6: Car Park Sign (Information)



Figure 1.7: Tourist Facility Sign (Information)

Regulatory Signs

1.1.33 Regulatory signs indicate the existence of a Road Traffic Regulation or implement such a Regulation, or both. They may also indicate the existence of a provision in an enactment relating to road traffic. Regulatory signs are mandatory, restrictive or prohibitory, with their type indicated by colour and shape:

- **Mandatory** signs indicate that a road user must take a certain action: for example, 'Keep Left'. They generally have white symbols on solid blue discs, although bus lane signs are rectangular;
- **Stop** (RUS 027) and **Yield** (RUS 026) signs are special types of mandatory signs with distinctive shapes;
- **Restrictive** signs indicate that a limit must not be exceeded: for example, '50km/h' or 'Weight Limit 7.5t'. They have black symbols and text on a white disc with a red border;
- **Prohibitory** signs indicate something which must not be done: for example, 'No Right Turn' or 'No Parking'. They generally have black symbols and text on a white disc with a red border and a red diagonal bar.

1.1.34 Examples of regulatory signs are shown in Figures 1.8 to 1.11. Detailed requirements for the use of such signs are given in Chapter 5 and the designs of each sign are set out on the Department of Transport, Tourism and Sport's websites www.dttas.gov.ie and www.trafficsigns.ie.



Figure 1.8: Mandatory Sign (Regulatory)



Figure 1.9: Stop and Yield Signs (Regulatory)

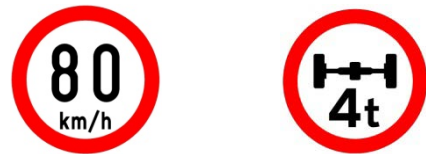


Figure 1.10: Restrictive Signs (Regulatory)



Figure 1.11: Prohibitive Signs (Regulatory)

Warning Signs

1.1.35 Warning signs are used to alert drivers to danger or potential danger ahead. They indicate the need for special caution and may require a consequent manoeuvre or reduction in speed. Examples are 'Crossroads Ahead' and 'Road Narrows'. Most warning signs have a black symbol on a diamond-shaped yellow background. The sign is edged with a narrow black border.

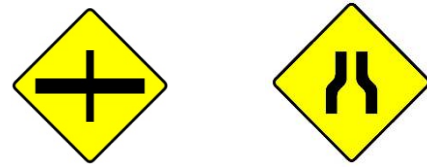


Figure 1.12: Warning Signs

1.1.36 Examples of warning signs are shown in Figure 1.12. Detailed requirements for the use of such signs are given in Chapter 6 and the designs of each sign are set out on the Department of Transport, Tourism and Sport's websites www.dttas.gov.ie and www.trafficsigns.ie.

Roadworks Signs

1.1.37 A special series of warning signs is used to warn road users that roadworks and temporary traffic management measures are in progress. The signs indicate that special care is needed and also warn of hazards such as deviations or lane closures. Roadworks signs generally have orange backgrounds; the majority are diamond shaped with black symbols and borders, similar to warning signs but with an orange instead of a yellow background. Traffic cones are also a form of roadworks sign.



Figure 1.13: Roadworks Signs

1.1.38 Examples of roadworks signs are shown in Figure 1.13. Guidance on the use of roadworks signs, and the design of temporary traffic measures for roadworks and for other occasions when part of the carriageway may be blocked temporarily is given in Chapter 8. Detailed requirements for the design of the relevant signs are set out on the Department of Transport, Tourism and Sport's websites www.dttas.gov.ie and www.trafficsigns.ie.

Gantry Signs

1.1.39 Gantries are required to carry signs on multi-lane roads, where the provision of a sign on the road verge or central reserve may not be adequate. They usually carry directional signs, but may also carry regulatory signs, such as speed limits, traffic signals or Variable Message Signs.

1.1.40 An example of a gantry sign is illustrated in Figure 1.14. Guidance on the use of gantries and the design of signs for gantries is given in Chapter 2 and in the other Chapters relevant to the type of sign to be carried.

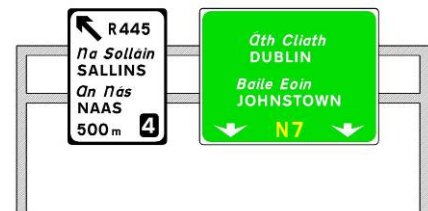


Figure 1.14: Gantry Sign

Variable Message Signs

1.1.41 Variable Message Signs (VMS) are signs which can show different messages at different times. The simplest form of VMS are signs such as Variable Speed Limit signs, which can show one of a range of speed limits, dependent upon the circumstances or be turned off to show a blank face. However, most Variable Message Signs have a sign face in the form of a screen on which a wide range of pictograms, symbols or messages can be displayed. The larger Variable Message Signs can provide detailed information in text form, such as 'Accident after Junction 6'. The message displayed may be regulatory, a warning or for information.

1.1.42 Examples of Variable Message Signs are shown in Figure 1.15. Guidance on the requirements for Variable Message Signs is given in Chapter 3.

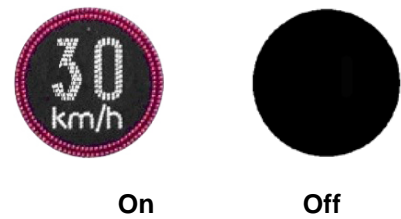
Road Markings

1.1.43 Road markings provide information for the road user in the form of lines, diagrams or text marked on the road pavement. Studs may also be used to supplement road markings, or as markings in themselves. Many road markings, such as Stop Lines and Continuous White Lines, are regulatory, as an offence is committed if they are contravened. For example, a vehicle crossing a lane marking must yield to other vehicles. Details of the requirements for road markings are given in Chapter 7.

Hazard Markers, Bollards, and Junction Definition Posts.

1.1.44 Some traffic signs are in the form of posts or bollards. For example, Hazard Marker Posts are red or white reflectors mounted on low posts, which are used to indicate the edge of a hazard, such as the edge of carriageway on a sharp bend (see Figure 1.16). Similarly, Junction Definition Posts are circular green and white posts used to indicate the location of a side road (see Figure 1.17). Hazard Marker Posts are described in Chapter 6 and Junction Definition Posts in Chapter 4.

1.1.45 Bollards are low posts usually placed on the ends of traffic islands and similar locations to help define the island. They usually contain a small regulatory sign (e.g. Keep Left, Pass Either Side or No Entry). Traditionally they were internally illuminated, but designs are available in which the 'bollard' is a wide flexible post. Bollards are described in Section 1.5 of this Chapter.



a) Variable Speed Limit Sign



b) VMS with Text Message

Figure 1.15: Variable Message Signs

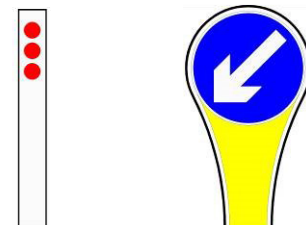


Figure 1.16: Hazard Marker Post and Bollard

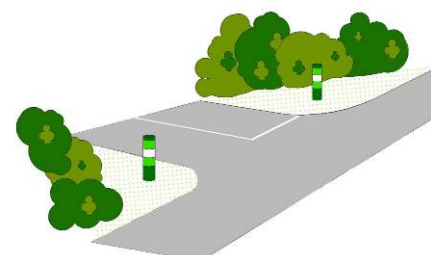


Figure 1.17: Junction Definition Posts

Traffic Signals

- 1.1.46 Traffic signals are a particular form of regulatory sign (see Figure 1.18). They are generally used to control priority at junctions or roadworks. However, a form of traffic signal may also be used on gantries or tunnel soffits to indicate which lanes vehicles may travel in.
- 1.1.47 Details of the different forms of traffic signal are described in Chapter 9. That Chapter provides general guidance on the design of traffic signal layouts, but not on the geometric design of traffic signal junctions.



Figure 1.18: Traffic Signal Head

USE OF IRISH ON TRAFFIC SIGNS

Place Names on Information Signs

- 1.1.48 It is a statutory requirement that place names on information signs be in both Irish and English, except:
- For names of destinations in Gaeltacht areas where there is a direction by statute that only the Irish language version of the placename shall be used; and
 - Where the spelling of a place name is similar in both languages, in which case only the Irish form of the name should be shown.

Forms and Spelling of Place Names

- 1.1.49 It should be ensured that the correct forms and spelling of place names are used on traffic signs. In this regard, the following approach should be adopted:
- Road Authorities should consult the relevant Place-names Orders published as Statutory Instruments;
 - If the place name is not included in a Place-names Orders, the Gazetteer of Ireland (The Placenames Branch of the Ordnance Survey) or www.logainm.ie should be consulted; or
 - In determining the correct Irish form of a place name which is not provided in the above sources, Road Authorities should consult with, and obtain advice from, An Coimisiún Logainmneacha (The Place Names Commission). Before consulting with An Coimisiún, Road Authorities may wish to ascertain through local consultation whether specific place names have a particular local significance or what traditional local usage may exist.

Signs Not Depicting Place Names

- 1.1.50 All other fixed information and warning signs, including supplementary plates, containing text shall be bilingual.
- 1.1.51 Where a considerable amount of text is required, such that there is a danger that the impact of the message may be diluted, separate Irish and English signs should be used.
- 1.1.52 It should be noted that abbreviations such as 'm', 'km' and 'km/h' are Système International units and, as such, are not in any particular language. Similarly, 'STOP' is recognised as an international word which does not require translation.

Format of Text

- 1.1.53 All Irish text shall be in italic print, in lower case lettering with initial letters in capitals. Irish script shall be inclined at 15 degrees to the vertical. For details see Chapter 2. The Irish text shall be placed above the corresponding English.
- 1.1.54 All English text should be in upper case Roman alphabet. For details see Chapter 2.

1.2 Sign Sizes

LEGIBILITY

- 1.2.1 A sign must be capable of transmitting its message clearly and at the right time to road users travelling at the normal speed for the road during day and night. To achieve this, a sign must have correct legibility distance, appropriate target value, simple content and layout, and effective reflectorisation. Signs must also be adequate in design and construction.
- 1.2.2 The legibility of signs is of prime importance; it is determined by the size of the symbol or lettering used. Contributory factors include the use of adequate colour contrast between the symbols or lettering and the background and the type of any alphabet used.
- 1.2.3 Target value is an assessment of how well a road user can identify that there is a road sign ahead. It depends on both the colour and size of the sign: a large sign will have adequate target value whatever its colour. However, difficulties can occur with smaller signs in urban areas, where 'busy' backgrounds can make it difficult to distinguish the sign. This aspect is considered further in Section 1.3.
- 1.2.4 The use of a symbol to represent a message is most effective in achieving legibility, together with simple content and layout. Most of the regulatory and warning signs in this Manual are, therefore, intended to be used without text. Where lettering has to be used, it is important to condense the message into as few words as possible without impairing comprehension.
- 1.2.5 As size is the most important factor determining sign cost, signs should be designed to meet the required legibility without wasting space.
- 1.2.6 The factors which determine the distance over which a sign message is legible include:
- The size of symbol or text;
 - The number of messages to be scanned;
 - The lateral distance of the sign from the edge of carriageway; and
 - The speed of the approaching vehicle.

- 1.2.7 As a result of these considerations, different sizes of signs are used to suit different operating speeds. On signs with symbols, the size of the sign is proportional to the speed of approaching traffic.
- 1.2.8 The recommendations for sign size (and also for siting distance and visibility – see Section 1.3) depend upon the ‘speed’ of the road. For this purpose, the ‘speed’ is determined from:
- The Design Speed, or
 - The speed limit, or
 - The 85th percentile approach speed.
- 1.2.9 When designing sign layouts for new or improved roads, the appropriate Design Speed of the road should be used.
- 1.2.10 On existing roads, the Design Speed may be calculated using the same method, or the speed value may be assumed to be the statutory speed limit for the length of road.
- 1.2.11 In some cases, the statutory speed limit can be a poor indicator of actual approach speeds. Therefore, where it is considered that the approach speed of traffic is significantly different from the speed limit, the size and siting of signs may be based on the ‘85-percentile approach speed of private cars’. This is the speed which is exceeded by only 15% of cars in dry weather and may be measured by normal speed survey methods.
- 1.2.12 If the 85-percentile approach speed is to be measured, speeds should usually be surveyed at a point about 200 to 300m in advance of the proposed position for the sign. The actual position of the survey will depend on the horizontal and vertical alignment of the road, the presence and frequency of side roads and the likely visibility of the sign.

INFORMATION SIGNS

- 1.2.13 The sizes of information signs containing text are determined by the size of text required. This is defined in terms of the height of a lower case ‘x’ and is referred to as the ‘x-height’. The rules for determining the x-height and, hence, the size of the sign are set out in Chapters 2 and 4; faster roads require larger text. The sizes of information signs without text are also specified in those Chapters.

REGULATORY AND WARNING SIGNS

- 1.2.14 Full details of the sizes of regulatory signs are set out in Chapter 5 and of warning signs in Chapter 6. Circular regulatory sign sizes vary from 450mm diameter up to 1500mm diameter, with smaller sizes of 270mm or 300mm diameter used in bollards and traffic signal heads. Diamond shaped warning signs are made in four standard sizes, with the length of a side varying from 600mm to 1200mm.
- 1.2.15 Chapters 5 and 6 provide guidance on where to use each size of sign. The size depends primarily on the approach speed of traffic, as noted in Paragraphs 1.2.7 to 1.2.12. Signs on dual carriageways tend to be larger and should be positioned on both sides of the carriageway, not only because of higher speeds but also to allow improved legibility amongst multiple lanes of traffic. Larger than normal sign sizes and signs on both sides of the carriageway may be required in some locations on other roads to provide greater emphasis or to improve legibility where the background is cluttered.

1.3 Sign Location

GENERAL PRINCIPLES

1.3.1 In order to perform the function for which it is intended, a sign must be capable of transmitting its message clearly and in good time. The clarity of the message is dependent on the design of the sign – this should be achieved by following the guidance in this Manual. However, the sign must also be positioned correctly so it can be read in good time.

1.3.2 There are six aspects to be considered when positioning a sign:

- Its siting in relation to the junction, hazard or other feature to which it applies;
- Its placement in relation to the edge of the carriageway and other features of the road cross-section;
- Its height above the road;
- Its orientation;
- safety; and
- Its relationship with other signs and the environment in general.

These factors are discussed in turn below.

1.3.3 The advice in this section should be followed where possible without compromising safe and clear signage. If a conflict does occur, then the overriding concern must be the safety of road users. Signage should not be omitted or moved to an ineffective location to cater for aesthetics at the expense of safety.

1.3.4 Signs should be sited by an experienced engineer or technician who has undertaken a site visit and is aware of all the site constraints including underground services.

1.3.5 Some signs, especially directional information signs, are large so that difficulties can be experienced in providing adequate width to accommodate the sign at the required location. Other signs, such as the direction signs positioned on roundabout splitter islands, need to be sited in locations with little room and many conflicting constraints. When designing a new or improved road layout, therefore, it is essential to consider the traffic signs which will be needed so that adequate provision may be made at an early stage. If signs are not considered until later, problems may occur.

SITING

- 1.3.6 Drivers must be able to read and understand a sign in sufficient time for them to react safely to its message. In order to achieve this, signs should be sited at the correct distances before the junction, hazard or other feature to which they relate. It is also essential to ensure that signs are visible from these distances and are not obscured by intervening obstructions.
- 1.3.7 The siting and visibility distances for the different types of sign are given in tables in the relevant Chapters. The recommendations are classified according to the speed value for the stretch of road on which the sign is to be located, as explained in Section 1.2 above.
- 1.3.8 It is important that siting distances for signs be consistent, so that similar reaction times will apply. In siting signs, the guidance given in individual Chapters should, therefore, be followed closely, although it will not always be possible to adhere precisely to these standards due to site limitations. Variations from the standard siting distance of up to 10% are generally acceptable. However, variations greater than this reduce the effectiveness of the signs and should only be used in cases of extreme difficulty.
- 1.3.9 On steep downhill gradients, it will generally be appropriate to adjust the siting distances to allow for longer braking distances. It is recommended that the distances given in individual chapters be increased by 10% where there is a descending gradient (between the sign and the feature for which the sign is required) of 6% or steeper. Adjustment of the siting distances is less important where there is an uphill gradient: however, the siting distance may be reduced by 10% where there is an ascending gradient of 10% or steeper.
- 1.3.10 Permanent features which cannot be altered, such as bends, hill crests, narrow verges and buildings, will necessitate the special positioning of signs. It is preferable to increase the standard distance between the sign and the hazard rather than reduce it.

1.3.11 The siting of regulatory signs depends on the particular sign. Most are located at the point at which the sign must be obeyed: for example, a Keep Left sign at the start of a central reserve, and a No Entry sign at the end of a one-way street. Some signs, such as Speed Limit signs, must be positioned at the location specified in the relevant bye-law or Manager's Order. As the signs must be obeyed they should be placed in a position of good visibility. It follows, therefore, that the lengths of restrictions themselves may be influenced by the best sign positions; before bye-laws or Manager's Orders are made, due consideration should be given to the precise siting of terminal signs. However, this should not result in appreciable lengths of unnecessary restrictions. Information on the siting of regulatory signs is given in Chapter 5.

1.3.12 Drivers are accustomed to signs being on the left-hand side and such positioning should be the norm. However, siting on the right-hand side is appropriate in certain circumstances: for example, where there are difficulties in siting on the left, or where worthwhile economies can be made, such as at T-junctions where a double-sided sign may suffice instead of separate signs on the left for each approach. At sharp left-hand bends siting on the right may not only be appropriate but preferable. An example from New Zealand of a sign on the right-hand verge is shown in Figure 1.19.

1.3.13 The right-hand siting of signs is also appropriate where signs need to be erected on both sides of the carriageway. Examples include one-way streets and dual carriageways, where duplication of regulatory and warning signs is recommended.

1.3.14 Other methods of siting are sometimes required. For example, directional signs should be offset to the right at the head of a T-junction so that the sign will be visible to queuing traffic on the stem (see examples at www.trafficsigns.ie). At underpasses overhead signs may be more appropriate. Signs on roundabouts are also specially sited. Full details of siting requirements for individual signs and in particular applications are given in the relevant Chapters of this Manual.



Figure 1.19: Bend Sign Mounted on Opposite Verge (New Zealand)

PLACEMENT

1.3.15 The placement of a sign is its position on the cross-section of the road. A sign should be placed so as to maintain a clearance between itself and the traffic on the carriageway.

1.3.16 A horizontal clearance between the edge of the sign and the edge of the pavement (including any hard strip or hard shoulder) of 1200mm is recommended. However, where space is limited, or there are other obstructions or constraints, the clearance may be reduced to 450mm in urban areas and 600mm in rural areas.

1.3.17 In urban areas the obstruction caused by posts located in narrow pedestrian footways should be minimised. Every effort should be made to ensure that the poles do not impede the free movement of vision or mobility impaired people, the elderly, people with pushchairs or small children, or wheelchair users. The following guidelines apply:

- Street furniture should be carefully and consistently located so as not to impede the walking area. Supports should be at the back of the footway or as close to the kerb as practicable (see Figure 1.20);
- Street furniture should be kept to a minimum;
- Street furniture should have rounded edges;
- When at low level street furniture should be detectable to assist long cane users;
- Where difficulties in placement arise, the local authority should liaise with affected local parties.

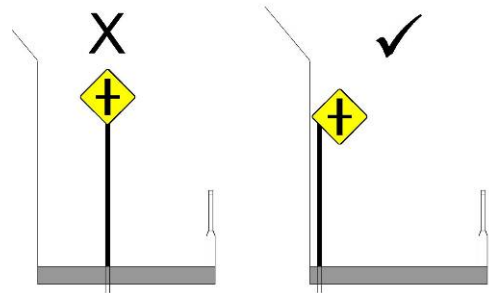


Figure 1.20: Footway to be Kept Clear

1.3.18 Signs supported by a single post should be used where possible; the post may be offset from the centre of the sign (see Figure 1.20). In urban areas, it is often preferable for large signs to be cantilevered from a post at the back of footway, using H-frames where necessary (see Figure 1.21). Alternatively, it may be possible to attach signs to existing structures such as walls, fences and buildings. If signs can be mounted in this way, they should have a clearance from the edge of the sign to the edge of road pavement of not more than 2000mm.

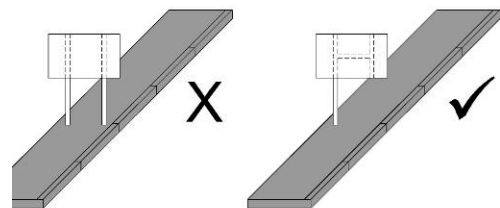


Figure 1.21: Cantilever Sign With H-Frame

1.3.19 Where 'build-outs', projections from the footway, are provided for the control of parking or as a traffic calming measure, it may be helpful to use these for the erection of signs.

1.3.20 When designing and locating signage for cycle facilities, the designer should refer to any guidelines for cycling facilities issued by the Department of Transport, Tourism and Sport.

MOUNTING HEIGHT

1.3.21 Signs in rural areas should normally be erected with the lower edge of the sign or supplementary plate at the greater of 1500mm above the level of the adjacent paved surface and 1000mm above ground level below the sign. Signs should be mounted clear of any vegetation.

1.3.22 In urban areas or locations where pedestrians are likely to walk under the sign, the desirable mounting height is 2300mm. Where cyclists are likely to pass under the sign, the desirable mounting height is 2500mm. See Figure 1.22.

1.3.23 Low-level direction signs at roundabouts and junctions may be mounted at lower heights, but not less than 750mm above ground level. However, care must be taken to ensure that the signs do not obstruct sight lines.

1.3.24 In city centres where congested conditions prevail, higher mounting heights may be required if standing vehicles consistently prevent signs from being seen. Alternatively cantilever signs or gantries may need to be considered.

1.3.25 If signs are erected on structures, mounting heights less than 2300mm may be used, provided that the signs can still be seen, do not obstruct pedestrians and are out of the range of spray thrown up by passing vehicles.

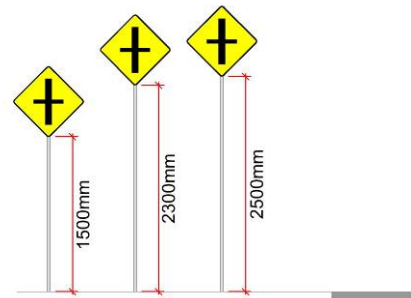
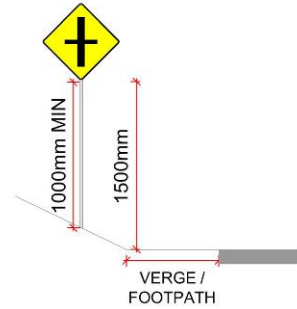


Figure 1.22: General Mounting Heights for Signs

ORIENTATION

- 1.3.26 Sign orientation is important, as signs need to be sited so as to avoid specular reflection caused by the headlights of approaching vehicles. Specular reflection can be particularly troublesome where drivers need to use headlights on full beam.
- 1.3.27 To eliminate or minimise the effects of specular reflection, signs should be set at an angle to the direction of approaching vehicles.
- 1.3.28 On a straight carriageway, the horizontal axis of a sign should be set at an angle of 95° away from the general alignment of the left-hand side of the carriageway on the approach side. This is illustrated in Figure 1.23.
- 1.3.29 On right-hand bends it will generally be adequate for a sign to be set at an angle of 90° to a line tangential to the left-hand edge of carriageway at the point where the sign is erected (see Figure 1.24).
- 1.3.30 Signs erected on left-hand bends should be oriented at 95° from a line joining the edge of carriageway at the sign with a point on the same edge of carriageway 200m in advance of the sign (see Figure 1.25). However, on some bends and complicated winding alignments, compromise solutions may have to be adopted.
- 1.3.31 Signs are normally to be set transverse to the line of travel of approaching road users. The main exceptions to these are signs and plates indicating parking restrictions and taxi ranks, which should be set parallel to the kerb, and also some direction signs, which need to point approximately in the direction to be taken.
- 1.3.32 Overhead gantry signs are normally set at 90° to the lane(s) which the sign extends over and with a vertical face.

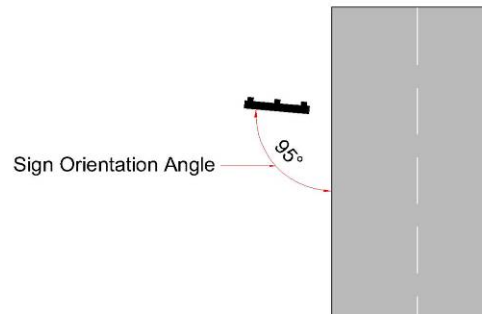


Figure 1.23: Orientation of Sign on a Straight Road

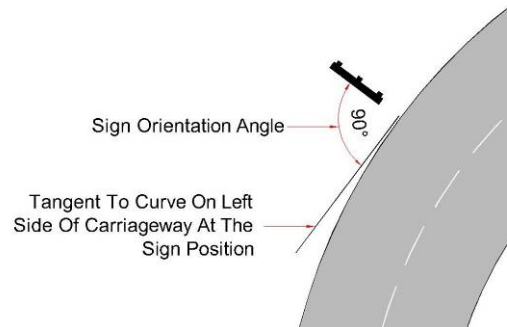


Figure 1.24: Orientation of Sign on a Right-Hand Bend

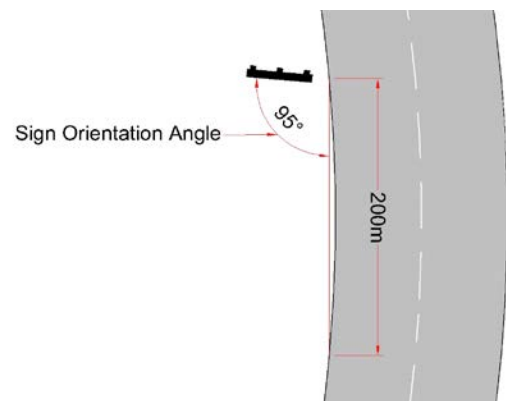


Figure 1.25: Orientation of Sign on a Left-Hand Bend

SAFETY

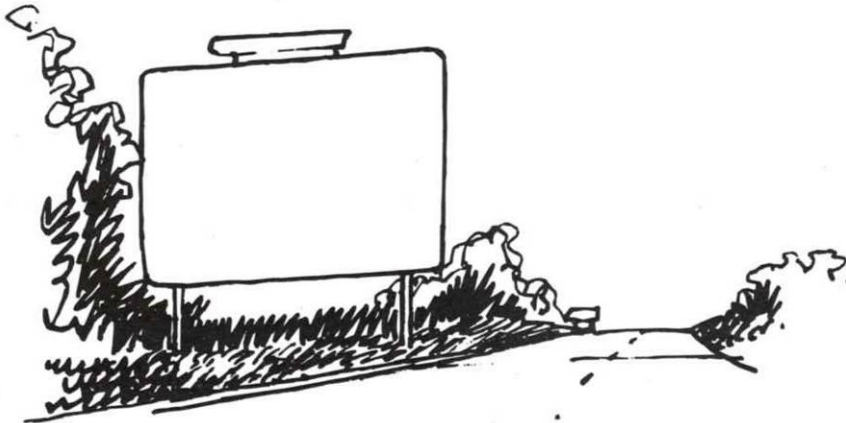
- 1.3.33 Large traffic signs, especially those with large posts, erected on the road verge or central reserve are potential hazards to errant vehicles leaving the carriageway. Many large signs may, therefore, require safety barriers to protect the occupants of vehicles in case of impact. The requirements of Transport Infrastructure Ireland's standard DN-REQ-03034 (formerly NRA TD 19), *Safety Barriers*², should be followed where appropriate.
- 1.3.34 DN-REQ-03034 defines the 'Clear Zone', which is an area alongside the carriageway which should be kept free from obstructions. Ideally, large signs should be positioned outside the clear zone, but this is rarely practicable, since the zone is generally too wide (10m or more on a 120km/h road). In cases where large signs are positioned outside of the clear zone, consideration should be given to increasing the x-height on the sign face to compensate for the additional distance to the sign. The sign face design in such instances shall be agreed with the overseeing organisation prior to installation.
- 1.3.35 Where safety barriers are provided, either because of the sign or for some other reason, the sign posts must never be erected in front of or straddling the safety barrier. Similarly, the sign face must not project in front of the safety barrier. Posts behind safety barriers should be sited clear of the working width of the barrier (see DN-REQ-03034).
- 1.3.36 Frangible or lattice construction posts which are less likely to cause serious injury or damage when struck by vehicles are available and should be considered for use in appropriate circumstances. The use of such posts may avoid the need for a safety barrier in front of the sign.

² Transport Infrastructure Ireland. DN-REQ-03034, *Safety Barriers*. Part of TII Publications (Standards). TII, Dublin.

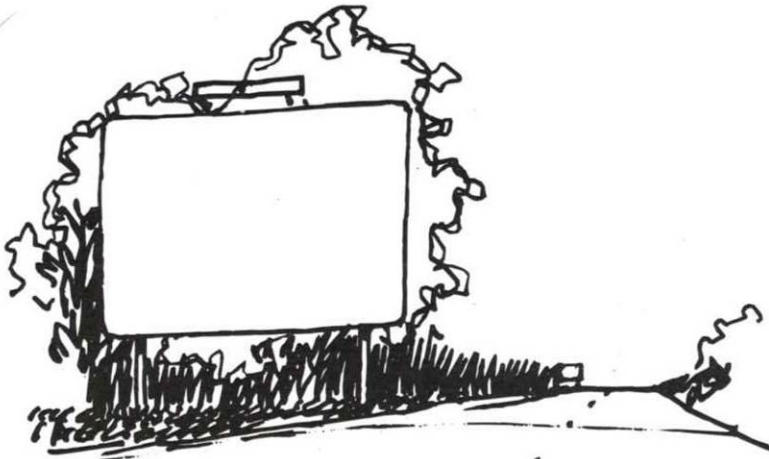
SURROUNDINGS

- 1.3.37 In determining the location of a sign, its relationship with other signs and its surroundings in general should be considered.
- 1.3.38 When considering a sign in relation to other signs in the area, the following should be taken into account:
- Is there a need for both the new sign and for all the existing ones, or can one or more signs be eliminated?
 - Does the message on the new sign conflict with the messages on other signs?
 - Does the sign obstruct, or is it obstructed by, other signs?
 - Can the sign be mounted together with another sign? See Section 1.5.
 - The sign should be positioned such that the approaching driver sees the sign and then the feature to which it refers. Where possible, no other signs should be mounted between the sign and the feature to which it refers.
 - Care is needed to avoid confusion which may arise, such as when a minor junction, possibly unsigned, intervenes between a directional or warning sign and the junction that it serves.
- 1.3.39 The sign should be clearly visible to road users: steps should be taken to deal with any obstructions. Overhanging trees and shrubs should be cut back to allow approaching drivers to see the sign. In some cases, the vegetation may need to be removed completely.
- 1.3.40 Standing vehicles that continually mask a sign may have to be prohibited. Similarly, it may be necessary to move bus stops. Subsequent building development and other features such as shop signs and blinds should not be allowed to obscure traffic signs. Directional Signs opposite T-Junctions (see figure 1.28) should be off-set to the right in order that the information on the sign may be read by traffic queuing at the junction.
- 1.3.41 The sign should not block the sight line of any vehicle, pedestrian or other road user. For example, a vehicle waiting at the exit from a side road should not have its sight line blocked by a sign on the mainline.
- 1.3.42 It is preferable to mount signs in front of any vegetation. The vegetation provides a background for the sign and allows it to stand out from the surrounding area. The vegetation also masks the back of the sign (see Figure 1.26).

- 1.3.43 Clutter of signs and other street furniture should be avoided as far as possible. This may be achieved by:
- Reducing the number of signs as much as possible, consistent with road safety;
 - Mounting signs together where appropriate (see Section 1.5);
 - Attaching signs to existing structures such as walls, fences, buildings, railings and lampposts;
 - Siting posts at the back of footways or close to boundaries; and
 - Removing unnecessary and unauthorised signs.
- 1.3.44 Care should be taken to avoid the screening of heritage buildings, monuments or buildings of architectural significance where possible. Care should also be taken to minimise the blanking out of shop fronts and general streetscapes.
- 1.3.45 Signs may lose their effectiveness because of their setting. Smaller signs may fail to stand out against a background which is variegated and colourful and others may be overpowered by a stronger background. Advertisements behind or near signs may prove distracting. Poor and distracting backgrounds should be partially screened in an appropriate manner: for example, by planting or the provision of backing boards on signs.
- 1.3.46 Figures 1.26 to 1.30 illustrate some of the aspects of the siting of signs.
- 1.3.47 Typical Applications for Traffic Signs and Road Markings, formerly Chapter 10, has been removed from the manual. Updated illustrations from that chapter are available at www.trafficsigns.ie showing examples of typical layouts and sign placement and road markings.



Sign sited against sky.



Sign sited against trees is preferred.



Trees mask the rear of the sign.



Figure 1.26: Use of Vegetation to Mask Signs

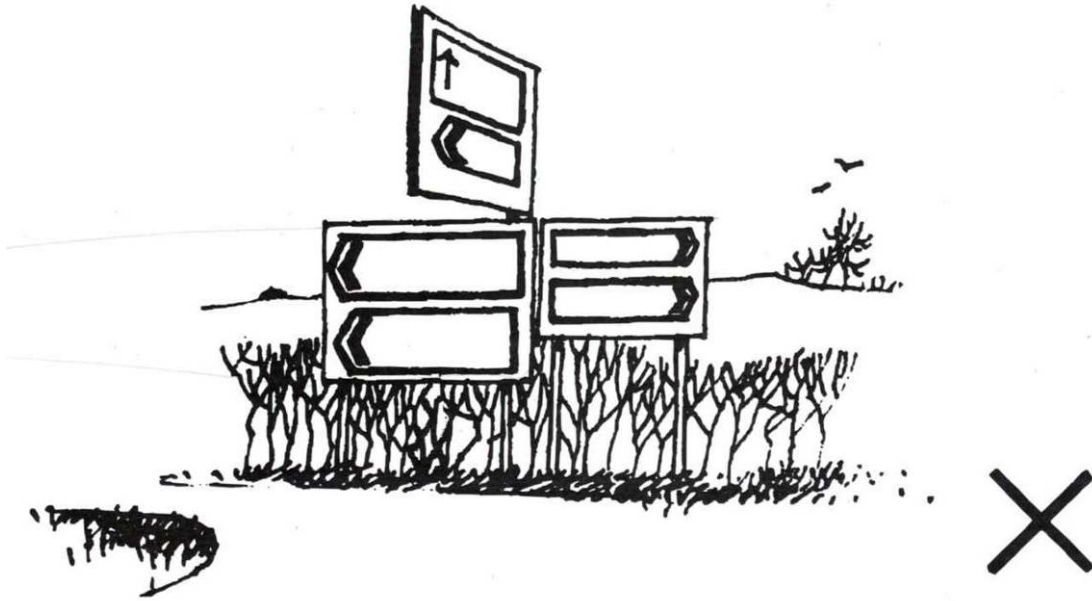


A badly placed sign clutters the street and blocks the view

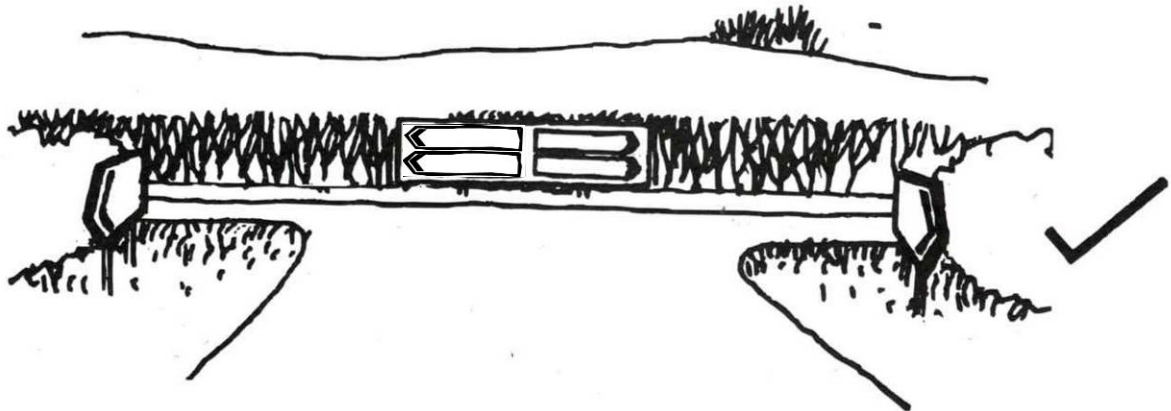


A sign sited against a house silhouette may be preferable.

Figure 1.27: Unobtrusive Siting of Sign in Urban Area

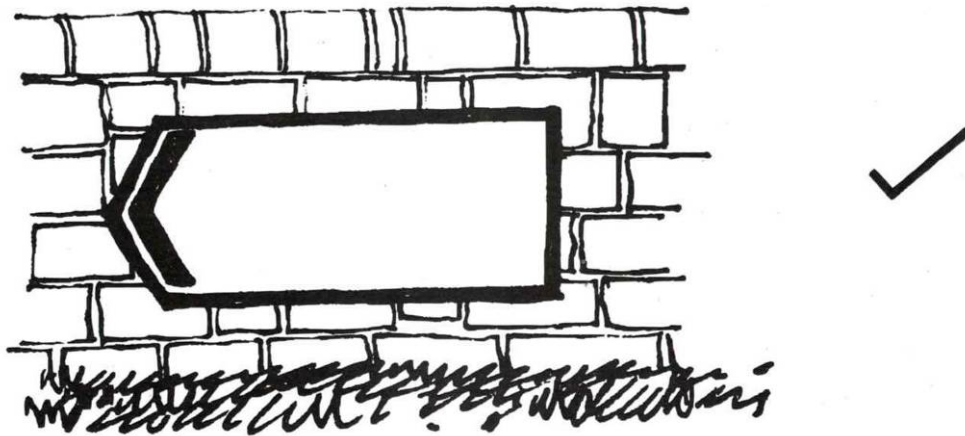
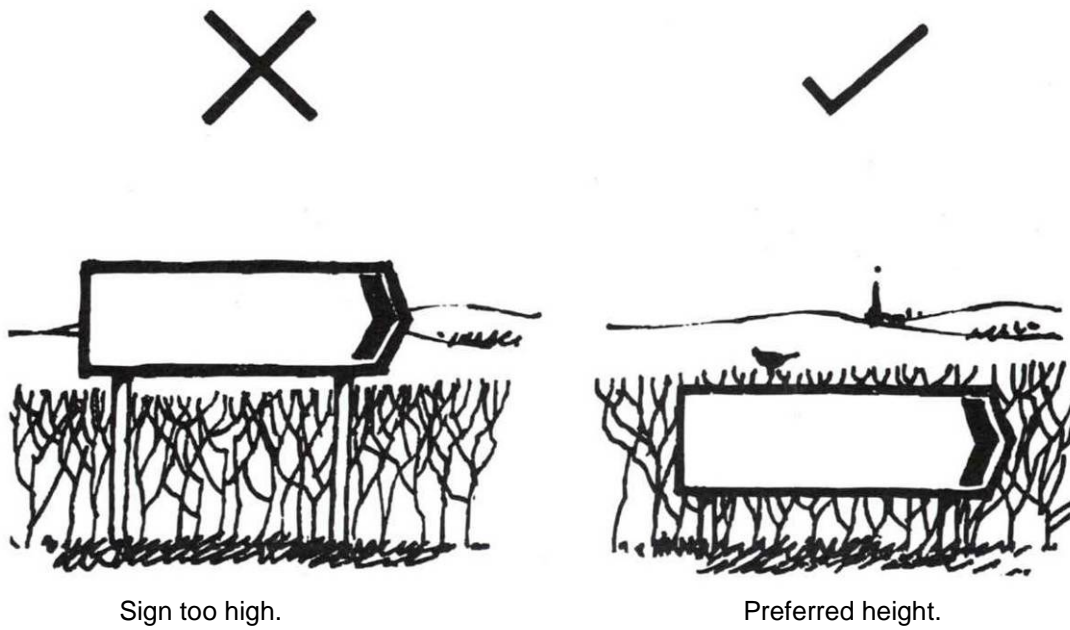


Complicated arrangements are obtrusive.



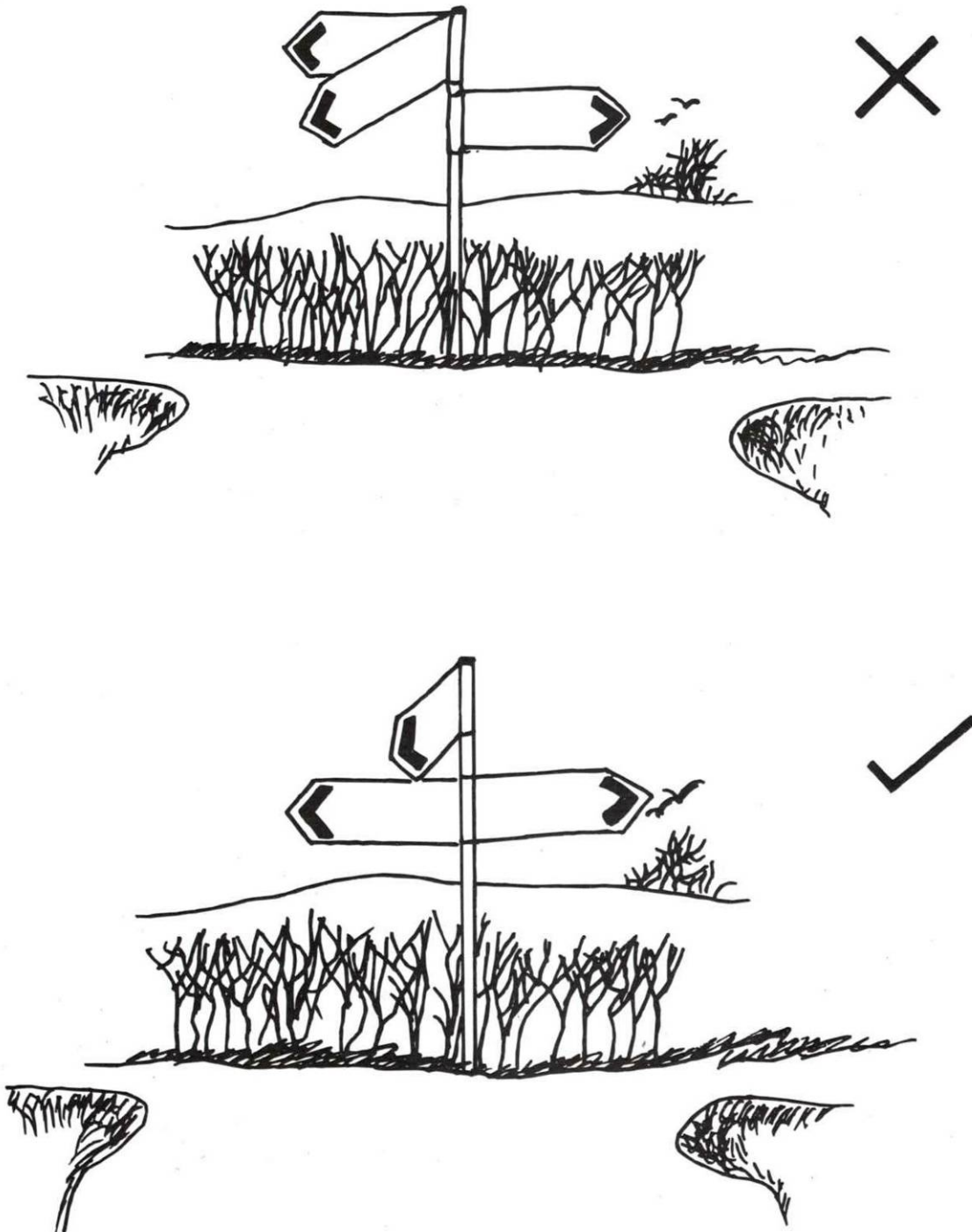
Horizontal layouts are preferred. Directional signs to be offset to the right so that they are not directly in line with traffic approaching the T-Junction.

Figure 1.28: Signs at T-Junction



Sign fixed to a wall: takes advantage of an existing structure and lessens the environmental impact.

Figure 1.29: Adjustment of Sign Heights to Lessen Environmental Impact



Signs in the same plane should be on the same level.
Signs in other planes should not obstruct the view of other sign faces.

Figure 1.30: Arrangement of Finger Post Signs

1.4 Gantries and Variable Message Signs

1.4.1 The general principles for sign location described in Section 1.3 apply also to gantries and Variable Message Signs. However, the following additional aspects need to be considered.

GANTRIES

1.4.2 Gantries should be provided to carry the directional signs on the approaches to junctions on motorways and dual carriageways where one of the following warrants is met:

- Where there are three or more traffic lanes in either direction; or
- Where the design year Annual Average Daily Traffic (AADT) exceeds 50,000 vehicles; or
- At motorway / National Primary intersections; and
- For National Roads at any other locations on motorways or dual carriageways as directed or approved by the National Roads Authority.

1.4.3 Gantries at the above locations will generally be portal frame gantries, spanning the carriageway, or cantilever gantries (see Figure 1.31).

1.4.4 Cantilever gantries (single posts in the verge carrying a high level sign cantilevered towards the carriageway) should be provided to carry the final Advance Direction sign at exits from grade separated dual carriageways and motorways with a speed limit of 80km/h or more. Such gantries should be provided at the start of the diverge taper.

1.4.5 Portal gantries may also be required to carry speed limit signs where different limits apply to different lanes, and also to carry lane control signals, usually in the form of Variable Message Signs over each lane.

1.4.6 Cantilever or portal gantries may also be required to carry large Variable Message Signs (see Figure 1.15).

1.4.7 For the design of directional signs carried by gantries see Chapter 2; for Variable Message Signs see Chapter 3; and for Speed Limit signs see Chapter 5.



a) Portal Gantry



b) Cantilever Gantry



c) Gantry Carrying Directional Signs and Casings for Lane Control Signals, and VMS

Figure 1.31: Typical Gantries

1.4.8 The structural design of gantries shall be in accordance with DN-STR-03010³. Lateral clearances and headroom shall be in accordance with DN-GEO-03036⁴.

VARIABLE MESSAGE SIGNS

1.4.9 Variable Message Signs (VMS) may be divided into two broad types:

- Regulatory VMS, providing a limited range of regulatory instructions to drivers; and
- Text/pictogram VMS, capable of providing a wide range of warning and information messages.

1.4.10 A verge mounted Periodic Speed Limit sign is one of the simplest forms of regulatory VMS. At certain times of day, the sign is illuminated to show the required speed limit, whereas at others the sign is turned off, showing a blank black face (see Figure 1.32a).

1.4.11 On busy multi-lane roads there may be a need to vary the speed limits, either in individual lanes, or across the whole carriageway. In such cases, gantries may be erected at intervals across the carriageway, with a Variable Speed Limit VMS mounted centrally over each lane.

1.4.12 In similar circumstances there may be a need to provide Lane Control Signals over each lane. These display a green arrow or red cross and are frequently used at tunnels.

1.4.13 Text VMS are generally large signs with a face divided into a large number of pixels which can be illuminated as required to display text or pictograms, in one or more colours (see Figure 1.32b).

1.4.14 The locations of Variable Message Signs will be determined by the particular requirements of each road where they are to be deployed.

1.4.15 For details of the types of VMS available and their uses, see Chapter 3.



a) Periodic Speed Limit VMS



b) Cantilever VMS Displaying Text

Figure 1.32: Typical Variable Message Signs

³ Transport Infrastructure Ireland. DN-STR-03010, *Portal and Cantilever Sign/Signal Gantries*. Part of TII Publications (Standards). TII, Dublin.

⁴ Transport Infrastructure Ireland. DN-GEO-03036, *Cross Sections and Headroom*. Part of TII Publications (Standards). TII, Dublin.

1.5 Sign Construction and Mounting

DESIGN OF SIGNS

1.5.1 Signs shall be designed in accordance with the requirements of this Manual. For Regulatory and Warning signs, only the standard designs illustrated in Chapters 5, 6 and 8 and detailed on the Department of Transport, Tourism and Sport's websites www.dttas.gov.ie and www.trafficsigns.ie shall be used. For directional information signs and other signs requiring text or combinations of text and symbols, the design rules set out in Chapters 2 and 4 shall be followed. The detailed designs of some information signs are also set out on the Department of Transport, Tourism and Sport's websites.

1.5.2 Signs shall not display logos, advertising or company names on their faces. With the sole exception of County Boundary Signs, traffic signs shall only display the relevant symbols described in the Traffic Signs Manual. County Boundary Signs (see Chapter 4) may display the county crest.

BACKING BOARDS

1.5.3 Signs may be mounted on backing boards. A backing board is any extension of a sign face beyond the specified sign, or a board on which the sign is mounted: see Figure 1.33. It may be used for the following purposes:

- To help a sign stand out from a complex, distracting or dark background (see Section 1.3);
- To emphasise a sign;
- For mounting assemblies of signs.

1.5.4 A backing board can also make for a neater assembly, for example when a sign requires a supplementary plate or when two signs are mounted on the same post. It also eliminates the risk of a supplementary plate becoming misaligned.

1.5.5 Backing boards shall be coloured grey. Yellow boards have been used in the past. Except for speed limits for specific lanes (see Paragraph 1.5.20 and Figure 1.38), no colour other than grey is permitted without specific approval from the overseeing organisation. Backing boards shall normally be rectangular in shape, but a grey board may be non-rectangular, for example to enable a diamond shaped sign to be bracketed off a lamp column. The backing board must not be provided with an additional black border and no legend may be attached directly to the board.

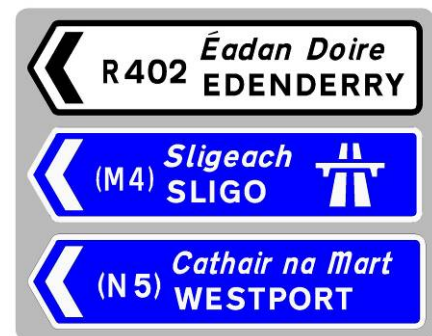


Figure 1.33: Backing Board

- 1.5.6 There are, however, potential disadvantages to the use of backing boards. A board can deprive diamond shaped and circular signs of a primary recognition aid: their distinctive silhouettes. A better way of increasing a sign's conspicuity may simply be to provide a standard sign of larger size. Not only will this be more noticeable than a smaller size, but it will also improve legibility and hence reading distance, which a backing board cannot do.
- 1.5.7 Where it seems that a sign is not being noticed by drivers despite the use of a grey backing board, it should be checked to ensue that it is well sited, not obscured by foliage or other obstructions, of the appropriate size and in good condition. Only then should the use of a yellow backing board be considered and an application for its use must be submitted to Transport Infrastructure Ireland (for national roads) or the Department of Transport, Tourism and Sport (for other roads).
- 1.5.8 Grey backing boards may be used to mount an assembly of signs, as described below. The minimum width of backing board around a sign should normally be 0.13 times the diameter of a circular sign or 0.10 times the length of a side of a diamond sign (see Figures 1.34 and 1.35). Rules for the design of information signs are given in Chapters 2 and 4.
- 1.5.9 Stop Signs (RUS 027) and Yield Signs (RUS 026) shall not be mounted on backing boards, as backing boards would reduce the distinctiveness of the shapes of these signs.

ASSEMBLIES OF SIGNS

- 1.5.10 There can be advantages in combining more than one sign into one assembly and mounting them together. This reduces clutter and also mounting and foundation costs. Assemblies of two or more directional information signs are described in Chapter 2 (see also an example in Figure 1.33), so the following guidance applies to other types of sign (Regulatory, Warning, other information and roadworks).
- 1.5.11 Research has shown that the greater the number of signs which drivers are presented with simultaneously, the greater the difficulty they are likely to have in assimilating the information. This problem in dealing with information overload increases with age, so older drivers suffer disproportionately. Generally, therefore, not more than two signs should be mounted on one post (or as one assembly on two or more posts). When a sign is accompanied by a supplementary plate, the assembly of sign and plate should be regarded as one sign for this purpose.

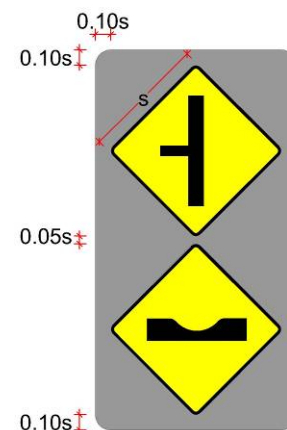


Figure 1.34: Backing Board for Warning Sign

- 1.5.12 Exceptionally, three signs may be mounted on one post, provided none requires a supplementary plate.
- 1.5.13 No other signs facing in the same direction shall be mounted on the same post as a Stop Sign (RUS 027) or Yield Sign (RUS 026).
- 1.5.14 When mounted with other types of sign, the diamond shaped warning sign shall be mounted at the top. Where two or more warning signs are mounted together, the sign relating to the hazard first encountered shall be placed uppermost. When a new sign is added to an existing post, it is important to ensure that the correct order is maintained, if necessary adjusting the position of the existing signs, and also that the correct clearance to the edge of carriageway and ground level is maintained.
- 1.5.15 Generally, no assembly should exceed a height of 4m above ground level. High-mounted signs may receive little light from vehicle headlamps, particularly on dipped beam. Where such signs are not directly lit but rely on reflectorisation, they are likely to be less legible.
- 1.5.16 In urban areas it is preferable to mount signs as assemblies, ideally on a backing board, rather than as individual messages mounted separately.
- 1.5.17 The space between a sign and its associated supplementary plate should normally be equal to 0.05 times the nominal size of sign (the diameter of a regulatory sign or the length of a side of a warning sign). The same space should be provided between two signs on the same post; where the signs are of different types or sizes the space should be based on the larger sign.
- 1.5.18 A special case for the spacing of an assembly of signs occurs when one of the signs requires an 'End' plate to indicate the end of a prohibition or restriction. In order to avoid ambiguity, the sign to which the End plate refers must be the lower sign and shall have the plate butted directly up to its lower edge. A space equal to twice the normal spacing shall be left between the upper and lower signs.

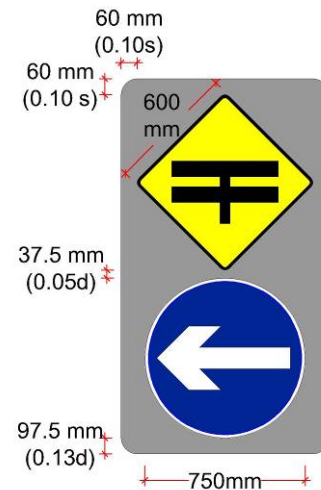


Figure 1.35: Spacing of Sign Assemblies

1.5.19 Assemblies of signs may be used with effect at the entrance to traffic calming schemes. Thus, a Speed Limit sign (e.g. RUS 043) may be mounted as an assembly with the town name and a Barrier Board (W 183): see Figure 1.36. Also, as a special case, the Road Narrows sign (W 071) may be mounted as an assembly with the Traffic Calming supplementary plate (P 063), but with Irish text above the sign and English at the bottom: see Figure 1.37. For further information, see Chapter 4 and TII Guidelines on Traffic Calming⁵.

SPEED LIMITS FOR SPECIFIC LANES

1.5.20 Special speed limits may be applied to specific lanes or parts of a road, rather than the whole width of the road. One method of displaying the speed limits is to mount the speed limit signs on special backing boards: see Figure 1.38. For details see Chapter 5.

BACK-TO-BACK SIGNS

1.5.21 Signs may sometimes be mounted back-to-back on the same post. Where the signs are of the same size and shape, they should be erected in line with each other, so the back of one is covered by the other. However, where the signs are of different sizes or shapes, they should both be mounted on rectangular grey backing boards of the same size and the boards aligned.

1.5.22 Signs shall not be mounted on the back of a Stop Sign (RUS 027) or a Yield Sign (RUS 026) unless the sign is small enough to fit entirely within the outline of the Stop or Yield Sign. This is to ensure that the distinctive shapes of these signs are not obscured.

SIGN CONSTRUCTION

1.5.23 Signs shall be constructed in accordance with the Guidelines, Certification Scheme and Specification for the Construction of Traffic Signs, TS4⁶.



Figure 1.36: Traffic Calming Gateway Sign



Figure 1.37: Road Narrows Sign at Traffic Calming

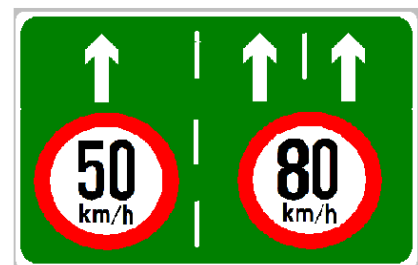


Figure 1.38: Typical Sign Assembly for Speed Limits for Specific Lanes

⁵ Transport Infrastructure Ireland. *Guidelines on Traffic Calming for Towns and Villages on National Roads*. TII, Dublin.

⁶ Department of the Environment, Heritage and Local Government. *TS4, Guidelines, Certification Scheme and Specification for the Construction of Road Traffic Signs*. DoEHLG.

POSTS FOR SIGNS

- 1.5.24 In urban areas signs should be mounted using as few posts as practicable. A proliferation of posts can present unnecessary hazards for those with vision or mobility impairments and create obstructions for those with pushchairs or wheelchairs (see Section 1.3).
- 1.5.25 Sign posts should be designed to accommodate the total area of signs attached to them. The attachment of larger or additional signs to existing posts should only be undertaken after checking the adequacy of the posts, taking account of any reduction in strength due to corrosion.
- 1.5.26 Purpose-made metal posts are normally circular tubular cross-section and of uniform diameter along their length. The post should be fitted with a pole cap and should not protrude above the sign (see Figure 1.39). Where enlargement of a post is needed to house control equipment, it should be provided at the base of the post.
- 1.5.27 The use of passively safe posts should be considered, especially for large signs. Mounting a large sign on passively safe posts may avoid the need for a safety barrier in front of the sign. However, such posts (other than bollards) should not be used in the central reserve, since an impact could cause the sign to fall into the opposing carriageway. Where passively safe posts are used, they shall comply with IS EN 12767⁷. Information on the use of passively safe posts is given in the National Roads Authority Standard TD 89⁸.
- 1.5.28 Direction signs on roundabout splitter islands should be constructed with retention sockets in the foundations so that the signposts can be replaced easily. Similar consideration should be given to any signs in locations where they are liable to be struck: for example, exit signs at diverges on motorways and dual carriageways.
- 1.5.29 Posts for signs may be of any single colour, although distinctive bands of colour may be added to posts on footways or in other pedestrian areas, to make it easier for them to be seen by those with vision impairment.

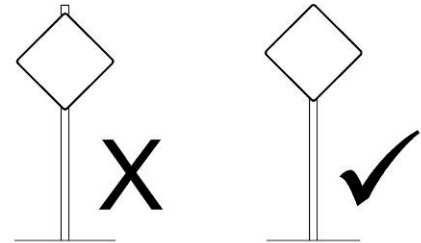


Figure 1.39: Post Should Not Protrude Above Sign

⁷ National Standards Authority of Ireland. *IS EN 12767: Passive Safety of Support Structures for Road Equipment – Requirements and Test Methods*. NSAI, Dublin.

⁸ National Roads Authority. *TD 89, Use of Passively Safe Signposts, Lighting Columns and Traffic Signal Posts to BS EN 12767*. Part of the NRA Design Manual for Roads and Bridges. NRA, Dublin.

- 1.5.30 The backs of signs and bracing should be grey or black, as should the fixing clips where these are painted. However, it may be appropriate for the backs of some signs to be a different colour in order to reduce their visual impact (see Section 1.3).
- 1.5.31 Where signs are to be mounted on single posts, the posts should be drilled through near the bottom and a pin inserted to prevent rotation in the ground. The use of rectangular posts also helps prevent rotation. Where possible, the mounting should allow angular movement for adjustment before the sign is locked in its final position.
- 1.5.32 It is important that signs mounted on single posts be fixed securely to avoid rotation. The use of rectangular posts assists this but makes it difficult to achieve the precise orientation for the sign. Fixing clips for mounting signs on single circular posts should have anti-rotational grooving. Alternatively, they may be provided with a tapped hole to facilitate the insertion of a screw to fix the orientation of the sign. Only the clip size specific to the post diameter should be used.
- 1.5.33 Should a sign be subjected to extreme wind loading, beyond the design value, it is safer for the posts to bend rather than the fixings to fail. Therefore, the design of posts and mountings should be such that, at ultimate limit state, the posts would fail before the mountings.
- 1.5.34 On embankments where signs are mounted on the side slope, it may be appropriate to extend the bank out to accommodate the sign base. This avoids the need for a stepped or deeply set base with longer posts.

ILLUMINATION

- 1.5.35 The requirements for the illumination of traffic signals are described in Chapter 9 and for Variable Message Signs in Chapter 3.
- 1.5.36 Pedestrian Crossing Beacons (part of RPC 001) shall be internally illuminated with a flashing light, flashing at between 35 and 45 flashes per minute (see Chapters 7 and 9).
- 1.5.37 Other traffic signs do not normally require illumination. However, if signs are to be lit, externally illuminated retroreflective signs should be used in preference to internally illuminated signs, as they are likely to be less expensive, require less maintenance and be more legible in the event of a lighting failure. The exception to this recommendation is trans illuminated bollards.

BOLLARDS

1.5.38 Bollards are frequently used to indicate the ends of traffic islands and central reserves. Bollards normally display a regulatory sign such as Keep Left or Pass Either Side (RUS 001 or RUS 003) (see Figure 1.40). The sign face may be 270mm, 300mm or 600mm diameter, the size being chosen to suit the speed of traffic and the nature of the road. On major roads, 600mm diameter sign faces are preferred.

1.5.39 Bollards may be either trans illuminated (i.e. internally illuminated) or retroreflective.

1.5.40 Trans illuminated bollards shall be Type 1 Trans illuminated Traffic Bollards in accordance with IS EN 12899-2⁹. Under impact, the bollard shall be either break away, spring back or be deformable, in accordance with that standard. With such bollards, the electrical equipment is all mounted below ground level, so that it is not damaged in an impact.

1.5.41 Retroreflective bollards shall conform either to IS EN 12767, or to IS EN 12899-2 except that they shall be retroreflective instead of trans illuminated. The mountings shall either break-away, spring-back or be deformable in accordance with those standards.

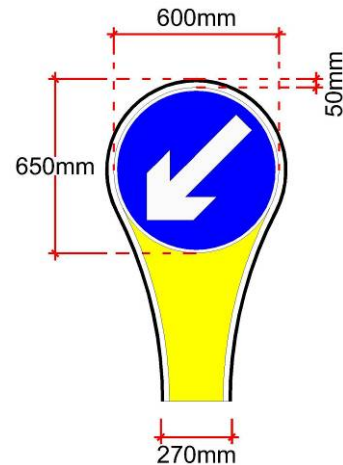


Figure 1.40: Typical Bollard (Trans illuminated or Retroreflective)

HAZARD MARKER POSTS

1.5.42 Hazard marker posts shall be in accordance with the requirements for delineator posts in IS EN 12899-3 (see Chapter 6).

⁹ National Standards Authority of Ireland. *IS EN 12899: Fixed, Vertical Road Traffic Signs: IS EN 12899-2: Part 2: Transilluminated Traffic Bollards; IS EN 12899-3: Part 3: Delineator Posts and Retroreflectors.* NSAI, Dublin.

1.6 Maintenance

1.6.1 Signs, road markings and traffic signals should be maintained to preserve their effectiveness and general condition. Signs become less effective when characters or colouring deteriorate, when obscured by vegetation or other obstructions, when external illumination fails or when damaged by accident or vandalism. Similarly, road markings and studs deteriorate over time. Also, sign and signal supports will deteriorate.

Signs

1.6.2 In general, it is recommended that a Road Authority arrange for the following inspection and maintenance of its signs:

- A programme of regular inspection, cleaning and maintenance on all signs encompassing:
 - a) Inspection of each sign and recording of substantial defects;
 - b) Thorough cleaning of each sign;
 - c) All minor repairs not requiring sign face or post replacement; and
 - d) Trimming and removal of vegetation to ensure adequate visibility.
- More frequent cursory inspection and maintenance encompassing:
 - a) Cleaning and minor repairs; and
 - b) Recording of substantial defects or damage.
- Non-routine repair and replacement.
- Creating and maintaining an inventory of signage.

Road Safety

1.6.3 Inspection and maintenance personnel should be suitably trained and qualified and should operate the applicable safety regulations and procedures for any activity.

1.6.4 Whenever inspection or maintenance of traffic signs or road markings is likely to interfere with the free flow of traffic, the applicable traffic management measures shall be installed, in accordance with the requirements of Chapter 8.

INSPECTION OF SIGNS

- 1.6.5 Periodic inspections of signs should be carried out to ensure prompt repair or replacement. Illuminated or retroreflective signs should also be inspected regularly after dark. Similarly, night-time inspections of road markings, hazard marker posts and studs should be carried out, particularly in wet weather.
- 1.6.6 Inspections of signs should check the following aspects:
- Visual performance:
 - a) Obscuration of the sign by foliage or other obstructions (including by other signs);
 - b) Correct orientation of the sign;
 - c) Obscuration of the sign face by dirt or graffiti;
 - d) Loss of sign face material; and
 - e) Sign face degradation.
 - Structural Integrity:
 - a) Condition of the sign plate;
 - b) Condition of clips, rails or other fixings; and
 - c) Condition of the sign posts or other supporting structure and of the pole caps.
 - Electrical safety and operation.
- 1.6.7 Signs are frequently obscured by vegetation. It is, therefore, essential that signs be inspected regularly during the growing season and that any encroaching vegetation be cut back.
- 1.6.8 In urban areas, care should be taken to ensure that signs do not become obscured by subsequent building development or other features, such as shop blinds. The erection of new or relocated street furniture, such as lighting columns or bus stops, may also obscure signs. Furthermore, changes to the background, such as new buildings or advertising, behind a sign may render the sign less noticeable.
- 1.6.9 The electrical safety and operation of lit signs should be checked at intervals. This should include:
- General condition and safety;
 - Operation of luminaries;
 - Alignment of luminaries; and
 - Operational effectiveness.
- 1.6.10 For lit signs, night-time patrols should also be carried out to check for poor lantern alignment, bulb outages and lighting failures.

MAINTENANCE OF SIGNS

Cleaning

- 1.6.11 All signs require regular cleaning. No firm advice on the frequency of cleaning can be given, since dirt deposition varies with the location, the weather and the time of year. Low level signs, such as bollards and follow-on direction signs at roundabouts are likely to require cleaning at particularly short intervals.
- 1.6.12 Sign faces can be damaged by inappropriate cleaning with abrasives or aggressive power washers. Sign face materials should, therefore, be cleaned in accordance with guidelines issued by the manufacturers of the sign materials concerned.

Visibility

- 1.6.13 Signs should remain clearly visible for the appropriate approach distances. The clear distances recommended in the relevant Chapters should be restored when practicable, for example by cutting back overhanging foliage. If a reasonable minimum distance cannot be restored, alternative action such as relocating the sign, should be considered.
- 1.6.14 Where trees or shrubs persistently obscure a sign, consideration should be given to relocation of the sign or removal of the trees or shrubs.

Sign Posts

- 1.6.15 Sign posts should be repaired or replaced as soon as practicable once structural or mechanical defects have been reported.
- 1.6.16 Painted steel posts should be repainted in accordance with an agreed schedule, or when inspection proves it necessary. All paint should be compatible with the existing protective coating. Galvanised or plastic-coated steel posts do not normally need painting.

Electrical Safety

- 1.6.17 All lighting units, feeder pillars and cabling systems should be inspected and tested at regular intervals, in accordance with the relevant codes of practice.

ROAD MARKINGS

- 1.6.18 Road markings should be inspected at intervals to identify when deterioration is such that safety could be impaired. Many markings (e.g. Yellow Lines prohibiting parking) give effect to certain Regulations and the legal status may be affected by deterioration.
- 1.6.19 Inspections of road markings should be carried out at intervals to check the following aspects:
- Retroreflectivity;
 - Wear; and
 - Luminance factor.

ROAD STUDS

- 1.6.20 Retroreflecting road studs should be inspected at intervals to identify when deterioration is such that safety could be impaired.
- 1.6.21 Single carriageway roads should be inspected for defects in both directions where bi-directional studs have been installed. It is recommended that inspections be undertaken in the spring, to identify any defects occurring during the winter, and that maintenance be completed by the end of September, before the winter season.
- 1.6.22 Inspections of road studs should be carried out to check for the following defects:
- Wear, corrosion or damage;
 - Loose or missing studs or lenses;
 - Loss or damage to retroreflective lenses;
 - Punching – when surface mounted studs are pushed down into the road surface. This may be due to insufficient strength of the road surfacing, often in very heavily trafficked areas;
 - Settlement – when embedded studs have settled below the intended level within the cavity into which they were set. This may be due to inadequate support from the layer of asphalt compound under the stud or incorrect installation;
 - Detritus on lenses;
 - Integrity and security of the casings (housings) of embedded studs;
 - Loss of adhesion or breaking up of surface mounted studs under traffic loading; and
 - Misalignment with other road markings.

- 1.6.23 Inspection of all road studs for looseness is a time-consuming and costly operation, particularly on heavily trafficked roads. Therefore, detailed inspections for looseness should, whenever possible, be carried out when lane closures are required for other purposes. However, displacement or looseness of significant groupings of studs may be indicative of a general fault which would warrant a specific lane closure.
- 1.6.24 Inspections should also be undertaken at night to check on the reflective conspicuity of retroreflecting road studs.

TRAFFIC SIGNALS

- 1.6.25 Regular maintenance of traffic signals is clearly important because any failure can cause considerable uncertainty and confusion to drivers with consequent accident risk. Consideration should be given to the importance of a junction and the impact should a serious fault occur.

Remote Monitoring

- 1.6.26 Either Remote Monitoring Systems (RMS) or Urban Traffic Control (UTC) systems can monitor some operational functions remotely. Where such monitoring is provided, the fault log should be checked regularly. This will ensure that faults occurring on the monitored functions are identified quickly, so a repair can be affected without delay.

Inspection

- 1.6.27 A complete site inspection of each installation should be carried out at intervals. Where signals can be obscured by trees or other vegetation, the site should be inspected at least twice between March and October.
- 1.6.28 Where reliance is placed on fault reporting by third parties (e.g. Gardaí or the general public), consideration should be given to the display of a fault reporting telephone number near the signals.

Routine Maintenance

- 1.6.29 A maintenance service should be available to repair signal malfunctions at short notice.
- 1.6.30 Signal maintenance is a specialist area and should only be undertaken by suitably qualified and experienced staff. If an authority does not have this facility, then an arrangement with a specialist contractor should be considered. The following issues should be examined (see the DoT (now DTTAS) Traffic Management Guidelines¹⁰):
- A fault reporting and logging system;
 - A priority rating system for different types of fault;
 - Agreed times for attending faults of different priorities;
 - A method of monitoring attendance times;
 - Temporary arrangements if the lights are out of commission or have to be switched off for repair;
 - An agreed method for dealing with problems that require longer to correct;
 - An annual or six-month inspection of the condition of the signal equipment condition; and
 - A programme of routine maintenance.
- 1.6.31 Electro-mechanical parts including relays should be inspected and replaced at regular intervals. Back up batteries should be replaced in accordance with the manufacturers' schedules.
- 1.6.32 Lamps should be bulk changed before they have exceeded their normal specified life. Signal lenses and regulatory signs should be cleaned regularly.

¹⁰ Department of the Environment, Heritage and Local Government, Dublin Transportation Office and Department of Transport. *Traffic Management Guidelines*. DoT, Dublin.