

**Guideline**

**Support selection for roadside signs and other  
equipment**

**November 2021**

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## 1 Introduction

This guideline provides guidance on the selection of supports for roadside signs and other devices used beside the road including, but not limited to, cameras, solar panels, and so on. Performance of different types of posts is discussed with limitations of use placed on classes of post as necessary.

There are three types of support that have been certified for use by Transport and Main Roads in Queensland:

- standard support posts
- Lattix energy absorbing posts, and
- Signfix frangible support system.

Selection of each of these support systems require similar design processes using product-dedicated specific wind loading charts to determine the most appropriate and efficient sign support structure.

### 1.1 *Standard support posts*

This option maintains a standard approach for the determination of sign supports in Circular Hollow Section (CHS) pipe, Rectangular Hollow Section (RHS) pipe and truss supports. Supports for signs having a surface area greater than 40 m<sup>2</sup> should be designed and certified by a registered professional structural engineer. Supports for sign with surface areas less than 40 m<sup>2</sup> may be calculated in conjunction with either:

- a) the design procedures outlined in the [Traffic and Road Use Management manual, Volume 3 Signing and Pavement Marking Part 5 Design Guide for Roadside Signs](#) (TRUM Vol 3 Pt 5)

This method of sign support selection enables the designer to determine manually the most appropriate support structures by calculations using sign height, sign surface areas (in three categories of up to 10 m<sup>2</sup>, up to 28 m<sup>2</sup> and up to 40 m<sup>2</sup>), environmental specifications (within wind loading regions A, B, C and D based on Australian Standard AS/NZS 1170.2 *Structural design actions - Wind actions*) and foundation strengths. Post-selection charts are included in TRUM Vol 3 Pt 5.

- b) use of the [TraSiS](#) (Traffic Sign Support) software design tool

TraSiS is a computer software design tool developed by Transport and Main Roads to calculate and select sign supports. The calculations used in TraSiS are based on the same methods outlined in Appendix B of TRUM Vol 3 Pt 5, subject to the input of sign parameters, terrain profiles and environmental conditions.

TraSiS has output capabilities displaying separate support design details and project-based ordering detail summaries to assist in the manufacture of road signs and their supports, as well as standard construction installation details.

### 1.2 *Lattix energy absorbing posts*

- Single post, capable of supporting signs of up to 13 m<sup>2</sup> in Wind Region A. 10 m<sup>2</sup> in Wind Region B and 8 m<sup>2</sup> in Wind Region C.
- Multi-post, capable of supporting signs of up to 28 m<sup>2</sup>.

Lattix support designs should be designed in accordance with the design procedures and charts issued by Lattix.

Signfix frangible support system:

- Single post, capable of supporting signs of up to 9 m<sup>2</sup> in Wind Region A, 6 m<sup>2</sup> in Wind Region B and 4 m<sup>2</sup> in Wind Region C.
- Multi-post, capable of supporting signs of up to 16 m<sup>2</sup> in Wind Region A, 12 m<sup>2</sup> in Wind Region B and 10 m<sup>2</sup> in Wind Region C.

Signfix support designs should be designed in accordance with the design procedures and charts issued by Signfix.

## **2 Discussion**

Signs, road lighting, traffic signals, cameras and other roadside furniture often need to be placed close to the travelled way. This places them inside the clear zone where they, and their supports, become a hazard to motorists. Supports need to be strong enough to resist wind loads, yet safe if struck by an errant vehicle. Currently there are four classes of supports that are considered to be relatively safe for occupants of vehicles that strike them.

### **2.1 Frangible-sized rigid steel posts**

Frangible-sized steel posts are described in [AS 1742.2 Manual of Uniform Traffic Control Devices Part 2 Traffic Control Devices for General Use](#). The concept is that the post is weak and will collapse safely when struck by a vehicle. The vehicle usually runs over the post.

### **2.2 Slip base posts**

Slip base posts are made from steel sections with mechanisms to allow the post to break away at the base and to hinge underneath the sign face, allowing a light vehicle to pass underneath with relatively little damage.

### **2.3 High-energy absorbing posts**

High-energy absorbing posts deform locally where struck and bend around the vehicle, slowing the vehicle in a controlled manner similar to a non-redirective crash cushion on a crash barrier. This type of post usually 'captures' the errant vehicle, stopping it while it is still in contact with the post. High-energy absorbing posts are not designed to detach from the foundation. These posts must be long enough to allow controlled reduction in velocity of the vehicle so that the G-forces generated by the deceleration are survivable. Typically, these posts are used for road lighting as those poles provide the required length to slow the vehicle.

### **2.4 Low-energy absorbing posts**

Low-energy absorbing posts transfer little of the vehicle's kinetic energy to the post. Tests have shown minimal reduction in vehicle speed through impact. The posts can collapse by bending with the vehicle running over the post or the post can break away or do both.

## **3 Summary of approved sign support systems**

The following is a summary of approved sign support systems.

### **3.1 Rigid steel posts**

Rigid steel posts of any size may be used behind a road safety barrier that is shielding another hazard and the barrier is in a suitable position for the sign location. Rigid steel posts may also be located unprotected where they cannot be reached by vehicles which run off the road.

### **3.2 Frangible-sized rigid steel posts**

Rigid steel posts conforming to [AS 1163 Cold-formed structural steel hollow sections](#) may be used at any place where the size of the post is considered frangible for the likely impact speed. For multiple post signs, post spacing must be at least 1.5 m between the posts.

### **3.3 Steel slip base posts**

Only steel slip base posts complying with [Standard Drawings 1363, 1364, 1365, 1368](#) and fabricated by companies on the Transport and Main Roads [Approved Supplier List – Approved sign supports](#) are allowed.

### **3.4 High-energy absorbing posts**

There are currently no products approved by the department for this class of post.

### **3.5 Low-energy absorbing posts**

#### **3.5.1 Lattix energy absorbing posts**

Lattix energy absorbing posts are approved by Transport and Main Roads. Lattix is made from marine-grade aluminium extrusion that is slotted and stretched. The unique expanded shape gives them strength for wind load and softness in a collision. The post is factory bolted to a base plate which, in turn, is bolted to the foundation on site. In an impact, the post deforms locally and may detach from the base plate. Lattix posts can be hit at any angle.

Manufacturer's specifications and recommendations shall be followed in the installation of the Lattix post system.

#### **3.5.2 Signfix aluminium frangible pole system**

Signfix poles are available in 50, 65, 80, 90 and 100 NB sizes.

The Signfix aluminium frangible pole system is approved by Transport and Main Roads. Signfix poles are manufactured from high-strength marine-grade alloy with typical yield strength of 275 MPa. It is a patented system that works with a purpose-made ground sleeve designed to be a snug fit between the pole and the sleeve.

Sleeves are supplied up to 1 metre in length, depending on the pole diameter and length. The sleeves are set in concrete foundations designed to meet local engineering requirements.

The sleeve top acts as a shear point and, combined with the molecular structure of the alloy, will, under sudden impact, bend the pole at the point of impact and will ultimately shear and breakaway at the sleeve top. The pole flues are designed to further assist in the breakaway process by reducing the external surface area of the pole. Frangibility is multidirectional.

Manufacturer's specifications and recommendations shall be followed in the installation of the Signfix aluminium frangible pole system.

## **4 Other sign support considerations**

It should be noted that some of these supports have inherent limitations on their performance due to their design.

Due to their low strength, frangible sized steel posts are not suitable for large signs.

Their low strength, while supporting the small sign, still allows the supports to bend when struck by a vehicle or subjected to high wind forces (thereby protecting the sign from being dislodged and becoming a projectile).

Where large signs are to be installed in a clear zone and there may be a requirement to use either slip base or energy-absorbing supports that will 'give way' in order to minimise the impact of the vehicle, a slip base design may be used.

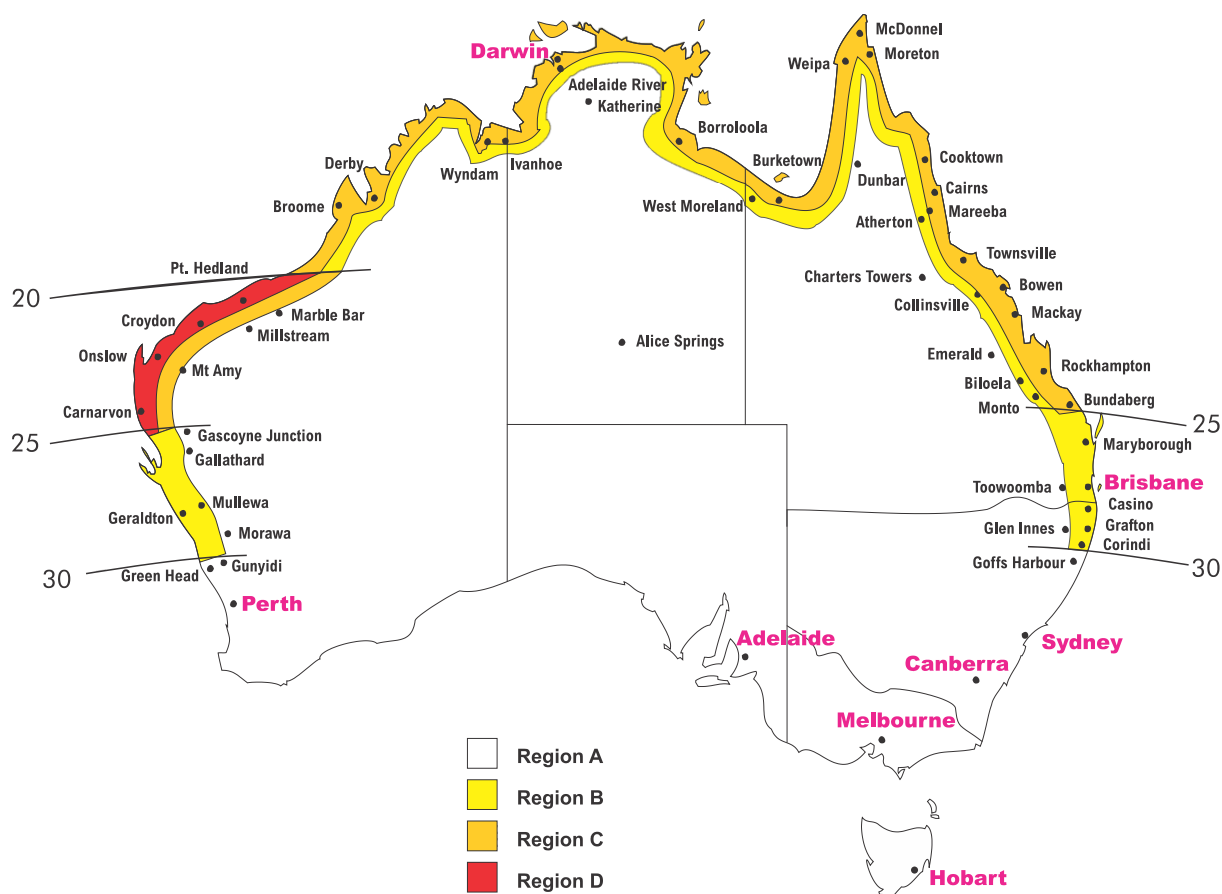
For slip base supports to operate effectively, all design specifications must be adhered to. These include:

- a) fuse plates welded as per Standard Drawing 1365, oriented correctly and located 100 mm from the bottom edge of the sign
- b) base plate bolts tensioned to allow both base plates to slip when the support is struck by a vehicle (it is very important that the securing bolts are tensioned to the correct tension; incorrectly tensioning may interfere with the 'slipping' action of the two matched base plates)
- c) the foundation stubs installed according to Standard Drawing 1363, which requires the base plates to be installed at 100 mm above the surrounding terrain – not adhering to these specifications may cause 'snagging' of the impacting vehicle's chassis and affecting the operation of the slip base or the possibility of an undesirable rapid deceleration of the vehicle
- d) ensuring single slip base post designs (Standard Drawing 1368) and multi-post slip base designs (Standard Drawing 1365) are not mixed or interchanged
- e) the height of the support posts is to be sufficient to allow the bottom of the sign to be no less than 2.1 metres from the ground to allow the vehicle to pass under the sign / load on impact
- f) the spacing of any two slip base supports being no less than 1500 mm to minimise the risk of a vehicle sweeping through more than one of the supports, thereby affecting the slipping action
- g) careful consideration when slip base posts are installed on steep filled slopes to ensure the impact of the vehicle will still be low on the supports to allow the correct operation of the slip base
- h) ensuring the orientation of the slip bases are correctly installed to operate on a proposed impact angle
- i) use of accredited manufacturers to supply certified slip base supports. A full list of accredited manufacturers is available from Transport and Main Roads.

Where supports are required in a clear zone, Lattix and Signfix type supports may also be used.

For all support options to operate effectively, they must be installed according to the manufacturer's specifications and proper engineering processes.

Figure 4 – Australian wind regions



## 5 Use of standard support selection charts

Refer to TRUM Vol 3 Pt 5 Appendix B.

Note: TraSiS (Traffic Sign Support) may be used. This is a software program that can be downloaded from the Transport and Main Roads website. This automatically selects sign supports according to the relative specific user data input.

## 6 Use of Lattix selection charts

Use Figure 3.1 from [AS 1170.2 Structural design actions – Wind actions](#) to determine the wind region of the site. Figure 4 has been reproduced from AS 1170 for convenience of the reader.

Lattix sign supports for signs with surface areas and wind regions are available on separate specific single and multiple support selection charts at [Australian Lattix supplier Artcraft](#).

For signs with larger surface areas, other support options mentioned in this guideline should be considered.

Note: If the sign site is installed in an exposed location, a selection chart for the next higher wind region should be used.



## **7 Use of Signfix selection charts**

Use Figure 3.1 from [AS 1170.2 Structural design actions – Wind actions](#) to determine the Wind Region of the site. Figure 4 has been reproduced from AS 1170 for convenience of the reader.

Signfix sign supports for signs with surface areas and wind regions are outlined at [Signfix](#).

For signs with larger surface areas, other support options mentioned in this guideline should be considered.

## **8 Standard post selection charts (CHS / RHS / TRUSS)**

Standard post selection charts are contained in the [Traffic and Road Use Management manual, Volume 3 Signing and Pavement Marking Part 5 Design guide for roadside signs](#).

