WEBFORGE
A valmont COMPANY

EZY-GUARD®

INGAL

2016 V005

INDUSTRIAL GALVANIZERS
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Product Manual

Road Safety Barrier

1.0 Introduction

Introducing Ingal Ezy-Guard™ , a member of the Ingal family, the next generation steel guardrail barrier providing superior motorist safety.

Ezy-Guard™ is crash tested to the latest performance standard distinguishing it from all existing public domain guardrail barriers.

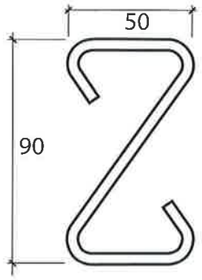
The Z-post profile shields post edges from vulnerable road users and provides sectional strength when driving through difficult ground conditions.

An Ezy-Carriage is used to secure the w-beam rails to the posts eliminating the requirement for blocking pieces and rail stiffening plates. This unique connection provides a soft ride-down for occupants and smooth vehicle containment and redirection.

2.0 Specifications

Ezy-Guard™ (Smart) Z-Post Length:	1,600mm
Rail Height Above Ground:	730mm
Z-Post Height Above Ground:	720mm
Standard Post Spacing:	2,000mm
Ezy-Guard™ (Smart) System Width:	200mm
MASH TL3 Crash Test Deflection:	1.65m

Ezy-Guard™ rails and Z-posts are manufactured from hot-rolled steel flat products in accordance with AASHTO M180 Class A and ASTM A 1011. These items are hot dip galvanised in accordance with ASTM A123 / EN ISO 1461 after fabrication leaving no surface untreated.



3.0 Crash Test Analysis

Crash test guidelines provide a minimum set of requirements that a roadside barrier has to meet in order to demonstrate its satisfactory impact performance.

Whilst crash test guidelines cannot include all possible impact conditions that may be experienced in the real-world, the crash test matrix is selected to represent a "worst practical condition" for a roadside barrier impact.

Ezy-Guard™ has been fully crash tested and evaluated according to the specifications for Test Level 3 (TL3) of the AASHTO Manual for Assessing Safety Hardware (MASH). The MASH specification is an update to and supersedes NCHRP Report 350 for the purposes of evaluating new safety hardware devices.

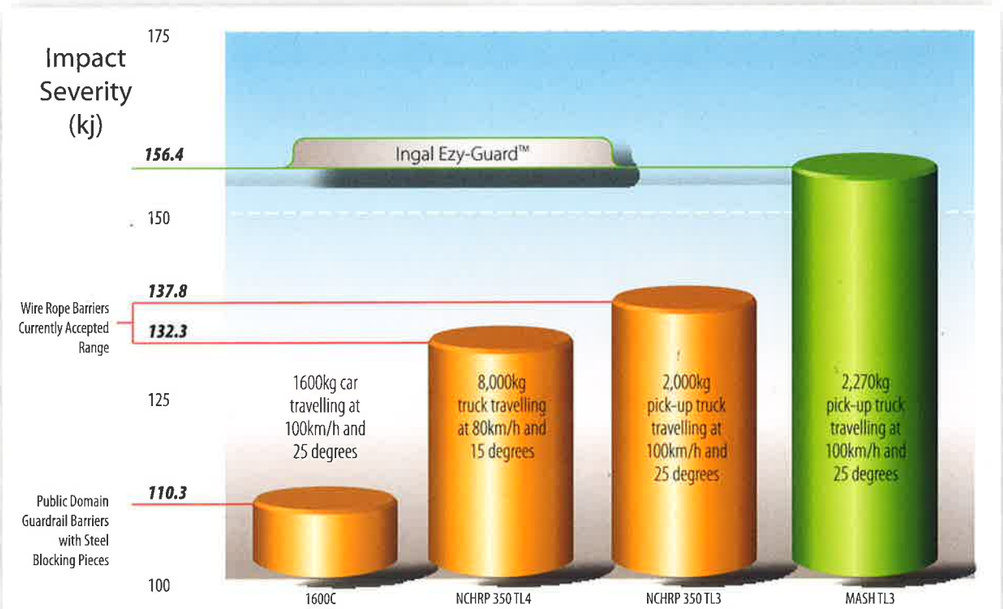
The MASH TL3 crash test matrix requires the following impacts;

- 1,100kg car travelling at 100km/h and 25 degrees.
- 2,270kg pick-up travelling at 100km/h and 25 degrees.

Crash test impact conditions are defined by the mass, speed, and angle of the impacting vehicle. Crash test standards and performance levels can be compared by calculating the impact severity (IS).

$$IS = \tfrac{1}{2} M (V \sin \theta)^2$$

Where IS is the impact severity in joules (J), M is the test inertial mass of the vehicle in kilograms (kg), V is the impact speed in metres/second (m/s) and θ is the impact angle in degrees.



Note: The MASH TL4 impact severity is 209.3kJ

Figure 1: Comparison of Crash Test Impact Severities

4.0 Consideration for Vulnerable Road Users

Vulnerable road users include motorcyclists, pedestrians, cyclists and other road users. Ezy-Guard™ has been designed to provide consideration to vulnerable road users as follows:

Rounded Post Corners.

The Z-post contains smooth, rounded post edges and corners mitigating the risk and severity of fractures and/or contusions.

Energy Absorbing, Ductile Z-Posts.

Unlike traditional guardrail posts, the Z-posts are designed to yield by bending near ground level. This bending action absorbs impact energy reducing the potential for post fracturing. A fractured or split guardrail post presents a significant laceration hazard to vulnerable road users.

The Ezy-Guard™ design does not contain any elements that become projectiles and there are no aggressive edges.

Shielded Posts.

The revolutionary design of Ezy-Guard™ shields the top of the supporting Z-posts by positioning the top of the rail above the posts. This eliminates dangerous snag points, reducing the potential for the barrier to dismount motorcyclists or cyclists. This is a significant safety benefit compared to all guardrail and cable barrier designs currently used within Asia.

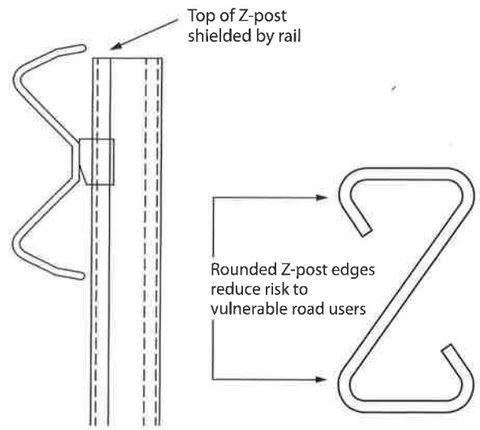


Figure 2: Ezy-Guard™ Considerations for Vulnerable Road Users

5.0 Features and Benefits

5.1 Fully Compliant to MASH TL3

Ezy-Guard™, a member of the Ingal family is fully compliant to MASH TL3 guardrail barrier system.

The MASH TL3 test condition (2,270kg pickup travelling at 100km/h and 25 degrees) represents a 42% increase in impact energy when compared to the current public domain guardrail systems using C-posts and steel blocking pieces, which has only demonstrated 1600C containment (1,600kg passenger car travelling at 100km/h and 25 degrees).

The MASH TL3 test condition also represents a 13% to 18% increase in impact energy when compared to the superseded NCHRP 350 Test Level 3 or Test Level 4 impacts.

MASH COMPLIANT

5.2 Rapid Installation & Repair

Ezy-Guard™ installation can be up to twice as fast to install than conventional guardrail barriers and unlike cable barrier systems, no concrete is required.

The Ezy-Guard™ design uses fewer components and features 1,600mm Z-posts that are rapidly driven into the ground. The Z-post embedment depth is just 880mm, compared to 1,080mm for traditional guardrail posts. This reduces installation time at site.

Since the Z-posts are designed to yield by bending near ground level, damaged posts can be removed easily which reduces the time spent by maintenance crews on the roadside.

5.3 Narrow Width

With a system width of just 200mm, Ezy-Guard™ is up to 55% narrower than the current public domain guardrail barrier systems. Ezy-Guard™ conserves valuable formation width and allows a greater recovery width to be provided for errant vehicles

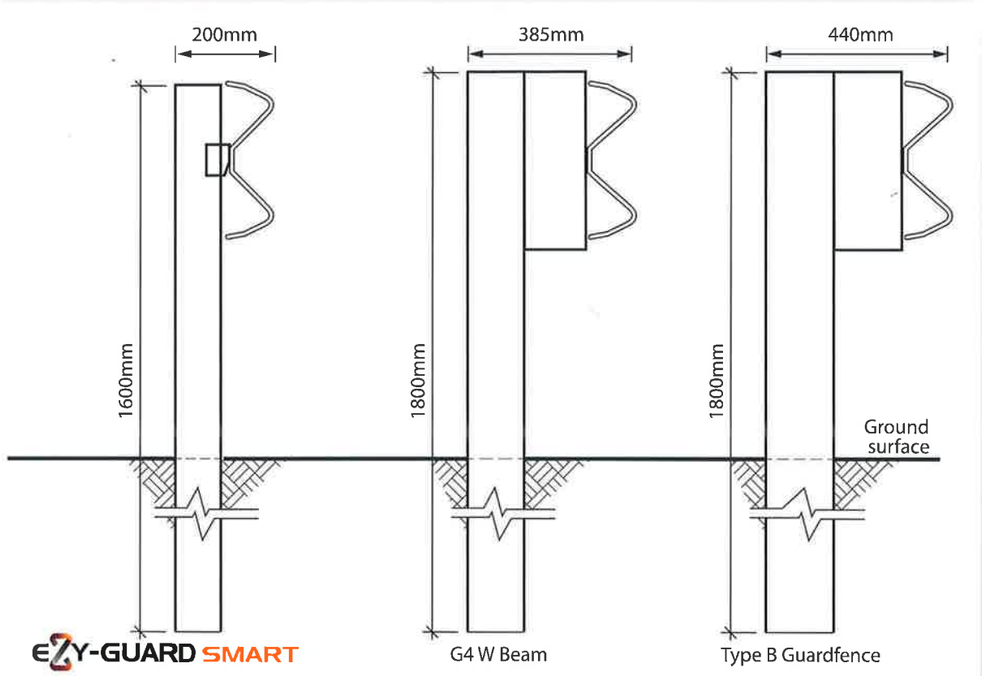


Figure 3: Ezy-Guard Smart Width Comparison with Public Domain Barriers

5.4 Installation in Rock, Asphalt or Concrete Mowing Strips

The design of the Z-post differs from traditional posts in that it relies on the yielding of the post by bending near ground level rather than the yielding of the surrounding soil during a vehicle impact. This makes the Z-post suitable for installation in rock, asphalt or concrete mowing strips.

A traditional guardrail post is designed to absorb some crash energy through post rotation in the soil prior to post failure. Restraining these traditional posts by setting them in narrow holes drilled into solid rock, by setting them in thick asphalt layers or concrete, or by placing a mowing strip around the posts can lead to a failure of the system to safely contain and redirect the errant vehicle.

5.5 Manual Handling

Ezy-Guard™ uses fewer components than the public domain guardrail systems. Z-posts are lighter than traditional C-posts. The lightweight Z-post reduces manual lifting by installation crews.

The rounded edges of the Z-post provide a handle-like grip when lifting, reducing the possibility of hand lacerations. The smooth, handle-like post corners allows the installer to maintain a firm grip and reduces hazards and potential injuries.

5.6 Patented Technology from Australia

Ezy-Guard™ is manufactured in Asia by Webforge (KL) Sdn. Bhd. using proprietary system developed by sister company Ingal Civil Products of Australia. Hot dip galvanising is performed by an associate company and daily inspections ensure zinc thickness readings are in accordance with ASTM standards.

5.7 Soft Ride-Down Decelerations

The Ezy-Carriage controls the release of the w beam rail from the Z-posts. This controlled release reduces the potential for vehicle pocketing and provides a soft ride-down for vehicle occupants.

6.0 Performance

Ezy-Guard™ provides protection from roadside hazards located close to the edge of the travelled way. The sectional strength of the Z-post reduces lateral deflection whilst providing controlled containment and redirection.

Crash testing guidelines provide a set of requirements that is "worst practical conditions" in order to demonstrate the barriers impact performance. When the combined effects of vehicle mass, impact speed and angle of impact are considered, the testing criteria represents the extremes of impact conditions to be expected in real-world situations.

6.1 Deflection

The transverse deflection of a barrier during a crash is dependant upon the following;

- Mass of the impacting vehicle;
- Speed of the impacting vehicle; and
- Angle of the vehicle impact.

Since crash testing typically represents the extremes of these parameters, a review of the proposed barrier location can be undertaken to assess the following;

- Maximum attainable impact angle;
- Design speed; and
- Design vehicle.

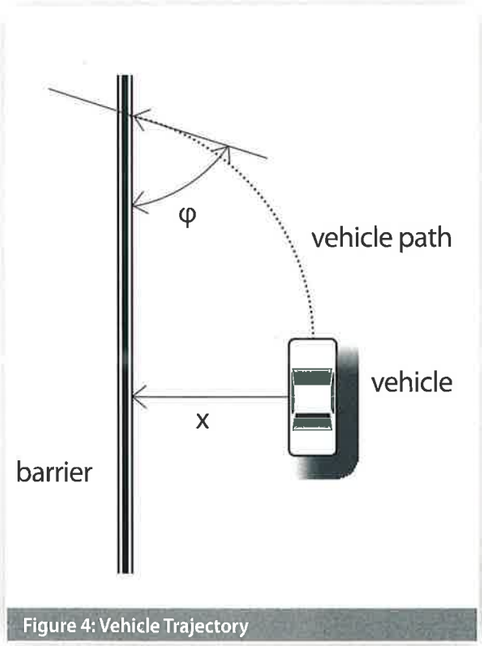


Figure 4: Vehicle Trajectory

Figure 4 illustrates the vehicle trajectory when turned towards the barrier. The maximum attainable angle, Ø is limited by the speed of the vehicle and the lateral offset, x to the barrier.

The maximum attainable angle for various speeds and offsets is shown in Figure 5 and is derived using a point mass model and assumes maximum steering and a coefficient of friction of 0.7 (dry pavement). Once the impact angle is determined, dynamic deflections for various design vehicles can be selected from Tables 1 or 2.

Example:

A barrier is to be installed on a roadway with a posted speed of 90km/h. The lateral offset to the barrier is 5m.

Step 1: Using Figure 5, the maximum attainable angle is calculated as 20 degrees.

Step 2: The design vehicle is selected as 2,000kg or 2,270kg.

Step 3: The deflection value from the corresponding table is selected. This is as follows;

- 2,000kg design vehicle – 0.8m
- 2,270kg design vehicle – 0.9m

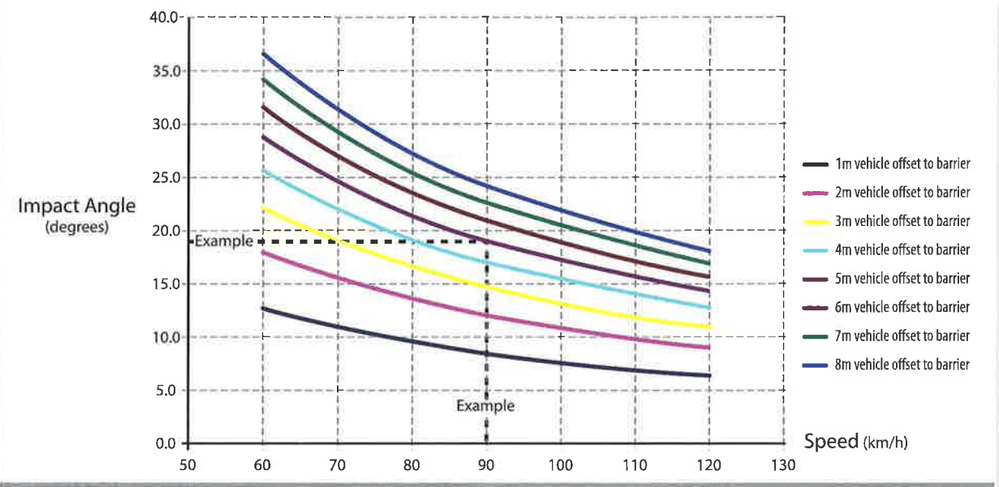


Figure 5: Maximum Attainable Angle by Speed and Offset.

Table 1. Ezy-Guard™ Deflections - 2,000kg Vehicle

Speed (km/h)	Dynamic Deflection (m)		
	15°	20°	25°
60	0.2	0.4	0.5
70	0.3	0.5	0.7
80	0.4	0.6	0.9
90	0.5	0.8	1.2
100	0.6	1.0	1.5
110	0.7	1.2	1.8

Table 2. Ezy-Guard™ Deflections - 2,270kg Vehicle

Speed (km/h)	Dynamic Deflection (m)		
	15°	20°	25°
60	0.2	0.4	0.6
70	0.3	0.5	0.8
80	0.4	0.7	1.1
90	0.5	0.9	1.4
100	0.6	1.1	1.7
110	0.8	1.3	2.0

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7.0 Installation

7.1 Terminals

Guardrail end terminals are designed to provide soft gating impact thus preventing end rail from spearing an impacting vehicle. Terminals also introduce tensile and flexural strength necessary to ensure redirection performance of the length-of-need section.

Ezy-Guard™ is installed at a system height of 730mm, measured to the top of the rail. This height is compatible with most public domain terminals.

Departure terminals should only be installed if they are located outside the clear zone of approaching traffic. See Figure 6. The clear zone is the horizontal width of space available for the safe use of an errant vehicle.

The clear zone is dependant upon the speed of the vehicle. Guidelines are contained with regulatory publications.

Terminals should be installed in accordance with the proprietor's drawings and specifications. Z-posts are not to be used in the terminals unless approved by the proprietor.

The installation of terminals will typically incorporate the use of blocking pieces positioned between the posts and rail. This will require the supporting posts to be offset from the set-out line used for the installation of the Z-posts which do not require blocking pieces.

In addition, the post spacing used in the terminals and transitions may vary from the 2m spacing used for the installation of Ezy-Guard™. The required post spacing for terminals and transitions will be shown in the proprietor's drawings.

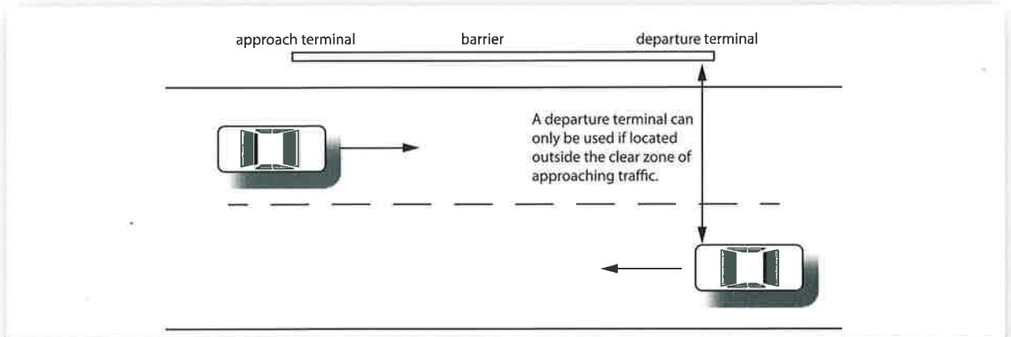


Figure 6: Clear Zone Requirement for the use of Departure Terminals

7.2 Minimum Length Requirements

The recommended minimum length-of-need for Ezy-Guard™ is 20m. The 20m recommendation includes any length-of-need provided by the end terminals.

Approach end terminals undergo a re-directive test in order to identify the terminal point-of-need. This is the location where the terminal is capable of re-directing an errant vehicle.

7.3 Sequence of Work

Where Ezy-Guard™ is being constructed on a road open to traffic, it is recommended that the work commence at the end closest to the approaching traffic. Leading terminals and transitions shall be commissioned at the earliest practical time.

7.4 Modifications

Ezy-Guard™ shall be installed in accordance to the configuration as detailed in Webforge's drawings. This is the configuration in which the system has been crash tested. No modifications shall be made to the system unless verified by Webforge.

Flame cutting of rails or posts is not permitted. Saw cutting and drilling is permitted in the event that a post is to be installed at an irregular spacing and/or rock is encountered and the post embedment depth has been modified in accordance with Table 3.

Any modification carried out after fabrication will require repair to the galvanized coating. This is undertaken by applying two coats of organic zinc rich epoxy paint to the repair area.

7.5 Soil Requirements & Embedment Depth

The Z-post is designed to yield by bending near ground level during impact. The Z-posts will provide lateral resistance until the impacting vehicle causes deformation of the posts. At this point the Ezy-Carriages will provide a controlled release of the rail from the Z-posts resulting in safe vehicle containment and redirection.

7.5.1 Standard Soil

Ezy-Guard™ has been evaluated for installation in standard soil in accordance with AASHTO standard specifications for 'Materials for Aggregate and Soil Aggregate Subbase, Base and Surface Courses," designation M 147.

When installed in standard soil, the 880mm embedment depth of the Z-post is sufficient for installation up to the rounding point on 2:1 embankment slopes.

7.5.2 Weak Soil

Ezy-Guard™ has been evaluated for installation in weak soil in accordance with AASHTO standard specification for 'Fine Aggregate for Hydraulic Cement Concrete," designation M 6.

When installed in weak soil, the 880mm embedment depth of the Z-post is sufficient for installation up to 500mm from the rounding point on 2:1 embankment slopes. If installation is required within 500mm from the rounding point, the post embedment depth is required to be increased to 1,050mm. A longer Z-post is available from Webforge for these applications.

7.6 Post Pullover Test

In the event that the soil type cannot be verified, the suitability of the post foundation can be established through a post pullover test.

This is undertaken by applying a 1kN load to the post, 700mm above ground level. The load is applied prior to the attachment of the rail. Displacement at the base of the post shall not exceed 1mm whilst the load is applied.

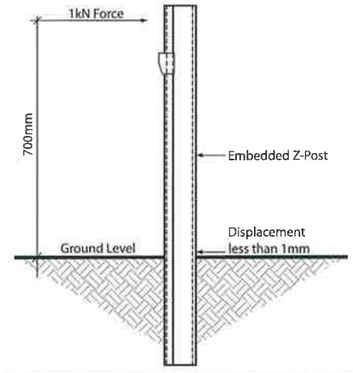


Figure 7: Z-Post Pullover Test

7.7 Posts on Base Plates

In the event that the Z-post cannot be installed to the required embedment depth, the use of a base plate mounted on a suitable foundation can be adopted. Posts on base plates are typically used at culvert locations, on bridges and in areas where underground services restrict posts from being driven into the ground. Refer to Webforge for the installation of posts on base plates.

Figure 8: Z-Post on Base Plate

7.8 Z-Posts in Rock

Traditional guardrail posts are designed to yield in the surrounding soil and their placement in rock or concrete is problematic. Restraining the traditional posts by setting them in narrow holes drilled into rock, setting them in concrete or placing a mowing strip around the posts can lead to a failure of the system to safely contain and redirect the errant vehicle.

The specially engineered Z-post dissipates energy by yielding through bending near ground level. This means that typical recommendations for the installation of a traditional guardrail post in rock are not applicable to the Z-post. When rock is encountered, the installation guidelines as detailed in Table 3 are applied.

7.9 Non-Standard Post Spacing

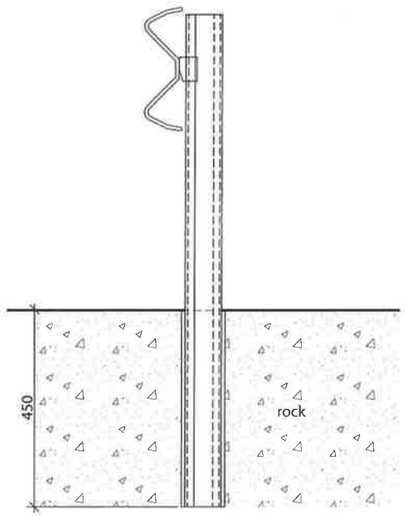
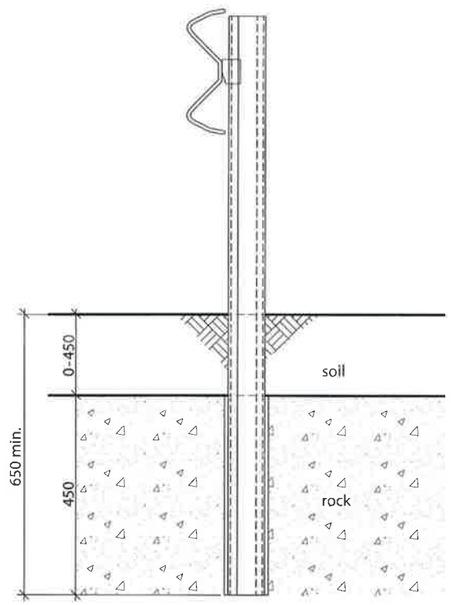
Occasionally, a roadside hazard may prevent a post from being installed at the recommended spacing. In these instances it is permissible to span a distance of up to 4m provided a nested (double) w-beam rail is used.

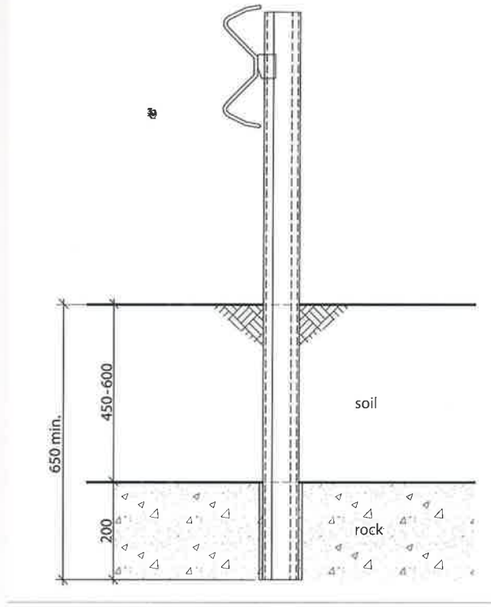
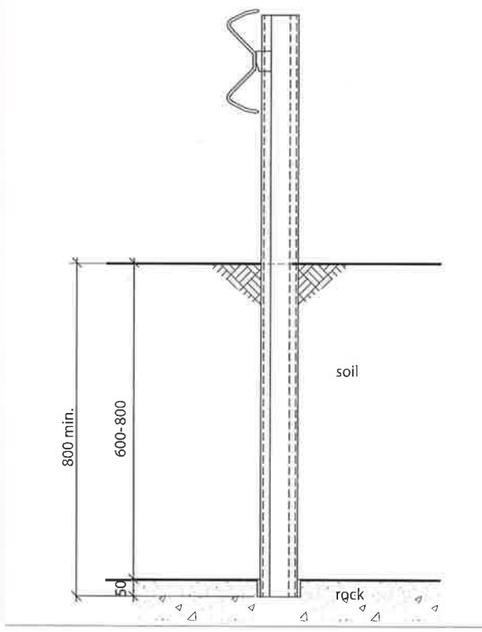
7.10 Delineation

A specially designed delineator is attached to the Z-post upon request.

The spacing of delineators is dependant upon driver line of sight. As a general rule delineators are provided for installation every 20m on straight alignments. Installation on curves will require a closer spacing dependant upon the radius of the roadway.

Table 3: Installation of Ezy-Guard™ Z-Posts in Rock

Site Condition	Installation Requirements	
Rock is encountered at the surface.	Drill a 110-300mm diameter hole to a depth of 450mm, install the post in the hole and backfill.	
Rock is encountered within 450mm of the surface.	Drill a 110-300mm diameter hole 450mm into the rock or to a minimum total post embedment depth of 650mm, whichever comes first, install the post and backfill.	

Site Condition	Installation Requirements	
Rock is encountered 450mm to 600mm below ground.	Drill a 110-300mm diameter hole 200mm into the rock or to a minimum total post embedment depth of 650mm, whichever comes first, install the post and backfill.	
Rock is encountered 600mm to 800mm below ground.	Drill a 110-300mm diameter hole 50mm into the rock or to a minimum total post embedment depth of 800mm, whichever comes first, install the post and backfill.	

7.11 Curving of Rails

Guardrail used for the assembly of Ezy-Guard™ may be shop curved to fit any radius from 2.4m to 45.0m. Curves in excess of 45m do not require shop curving as the rail can be field installed to suit. Guardrail may be curved either concave or convex to the traffic face and can be part-curved along its length to suit site requirements.

7.11.1 Measuring Curvature

1. Mark along the arc of the curve at 4m intervals.
2. Measure the corresponding chord length (C) - refer to Figure 9
3. Measure the corresponding centre offset (H) - refer to Figure 9
4. Use the values for C & H to select the radius from Table 4.
5. Determine the curvature orientation from Figure 10.

7.11.2 Identification of Curved Rails

Where a rail has been factory curved by Webforge , the radius of curvature is marked on the rear face of the rail.

Table 4: Rail Curvature Values

Radius (m)	Ø Degrees	C (mm)	H (mm)
2.4	95	3553	786
3	76	3710	642
4	57	3835	490
5	45	3894	395
6	28	3926	330
7	33	3946	284
8	29	3958	249
9	26	3967	221
10	23	3973	199
12	19	3982	166
14	16	3986	143
16	15	3990	125
20	12	3993	100
24	10	3995	83
28	8	3997	71
32	7	3997	62
35	7	3998	57
40	5	3998	50
45	5	3999	44

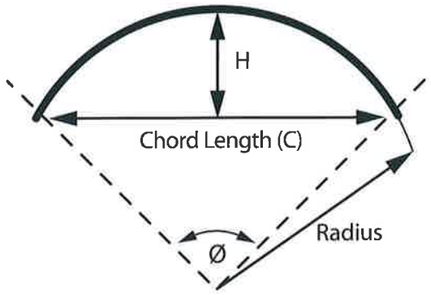


Figure 9: Curvature Measurements

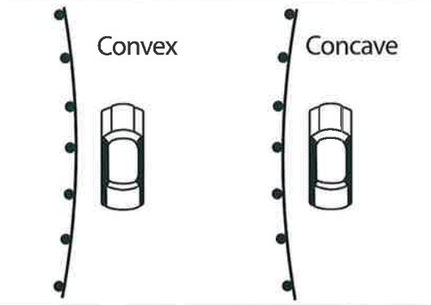


Figure 10: Curvature Orientation

7.12 Installation Sequence

The following written instructions should be read in conjunction with Webforge drawings.

Only items purchased from Webforge shall be used for the construction of Ezy-Guard™.

1. Ensure the area has been inspected for underground hazards and that suitable traffic control is in place.
2. Post locations are marked ensuring any protected fixed object is located outside the dynamic deflection of the barrier.
3. Posts are driven directly into the ground and should be vertical. The post installation process should not cause damage to the post that could reduce the effectiveness of the safety barrier and its design life. It also should not have sharp tearing edges or parts that could cause damage to pavement. If the Ezy-Carriage cannot move freely while it is attached to the post as a result of deformation of the post during installation, the post shall then be replaced.

   The use of a vibrating post hammer will reduce deformation at the top of the post and allow post installation at a controlled rate.
4. As an alternative to driving the posts, a minimum 110-300mm hole can be augured and the post placed in the hole. The posthole is then backfilled with the material that was excavated. If installed in soil, the material should be placed in layers of 150mm thick and suitably compacted to not less than the density of the surrounding layers.
5. The posts are spaced every 2m.
6. The height of the Z-post above ground level is 720mm.
7. The Ezy-Carriage is attached to the face of the post. The Ezy-Carriage will come to rest on the positioning lug fabricated on the Z-post.

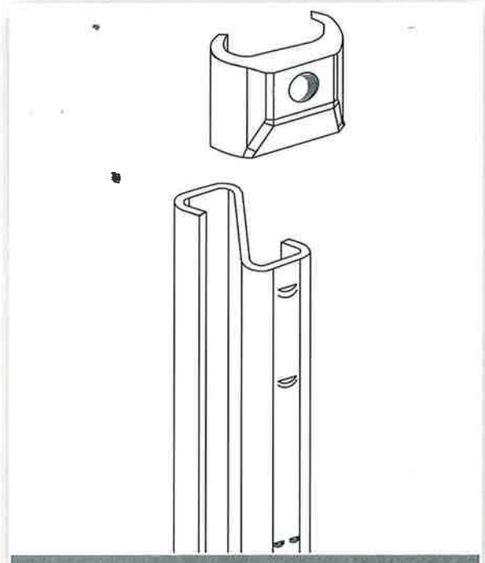


Figure 11: Ezy-Carriage Orientation

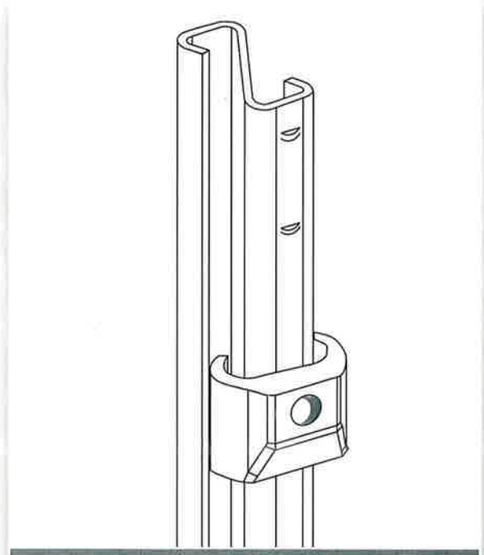


Figure 12: Attachment of Carriage to Z-Post

8. Rails are attached to the Ezy-Carriage using M16x30mm post bolts. The post bolts are identified by the socket recess located in the head of the bolt. The bolts are tightened to snug tight using a 10mm hexagon key.

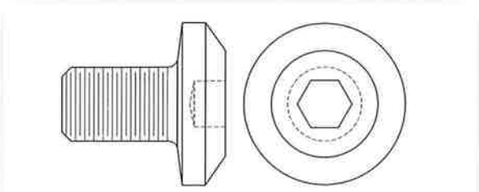


Figure 13: Post Bolt

9. Rails are spliced together at every second post using M16x32mm mushroom head bolts and oversized nuts. There are 8 bolts required per splice connection. A pinch bar may be used to assist in the alignment of splice holes. Driving pin to elongate the slots should NOT be used since this may cause tearing of the rail at the slot location. The bolts are snug-tightened.

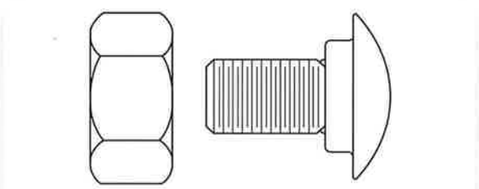


Figure 14: Splice Bolt & Nut

10. Rails are overlapped so that no leading edge shall face the traffic direction as shown in Figure 16.

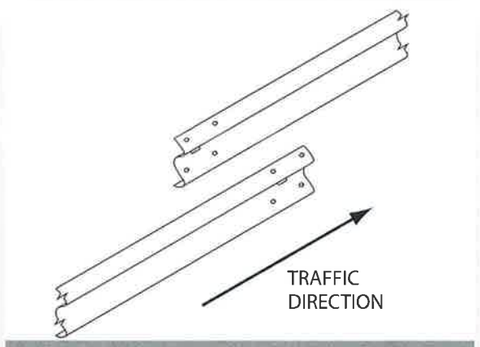


Figure 15: Orientation of Rail Lap

11. It is recommended that posts be installed only a few metres ahead of rail assembly to ensure correct post spacing and alignment. On curves, the rails can be used as a template and laid on the ground to determine post locations.
12. The construction of Ezy-Guard™ shall form a smooth line vertically and horizontally when viewed along the line of the system, free from humps, sags or other irregularities.
13. The Ezy-Guard™ components are to be free from splits or sharp edges after installation. Any minor damage is to be repaired by applying two coats of organic zinc rich paint.
14. Any disturbed pavement or material around a post shall be left compacted and smooth so that resistance to water penetration is similar to that of the adjacent surface.

7.13 Installation Tolerances

- The tolerance on height of the barrier shall be plus or minus 20mm.
- The tolerance for the line of the barrier shall be plus or minus 20mm in plan view.
- The tolerance for departure from the upright axis shall be plus or minus 15mm at the top of the barrier.
- The tolerance on post spacing shall be plus or minus 25mm.

8.0 Maintenance

It is recommended that annual inspections be performed to ensure the following;

- The system is appropriately delineated;
- Debris has not accumulated around the system that may impede the performance of the barrier or the trajectory of an impacting vehicle;
- The system is suitably anchored with appropriate terminals and/or transitions. If the system is anchored with terminals, the cable assembly shall be taut and tensioned to its recommended value; and
- All splice bolts and post bolts are snug-tightened.

9.0 Repair

9.1 Bush Fire Damage

Ezy-Guard™ does not contain any plastic, timber or rubber components that will burn.

The performance of galvanized coatings when subjected to fires depends upon a number of factors, such as flame duration, intensity and the characteristics of the galvanized coating.

Typical bushfire conditions may expose steel structures to an air temperature of 800°C for periods of up to 120 seconds, however zinc coatings are generally reflective and will not absorb heat at the same rate as an uncoated steel surface. Depending on the section thickness of the steel, the actual steel surface temperature may not exceed 350°C.

Typically, the bushfire flame duration and intensity are not high enough to compromise the structural strength of the steel. The hot dip galvanized coating will also typically remain unaffected through a bushfire event. If the bushfire causes damage to the galvanized surface, then the item(s) shall be replaced.

9.2 Damage Assessment

In the event of a vehicle impact, damage to the barrier is to be assessed in accordance with Table 5.

Only items purchased from Webforge shall be used for the repair of Ezy-Guard™.

9.3 Dismantling Sequence

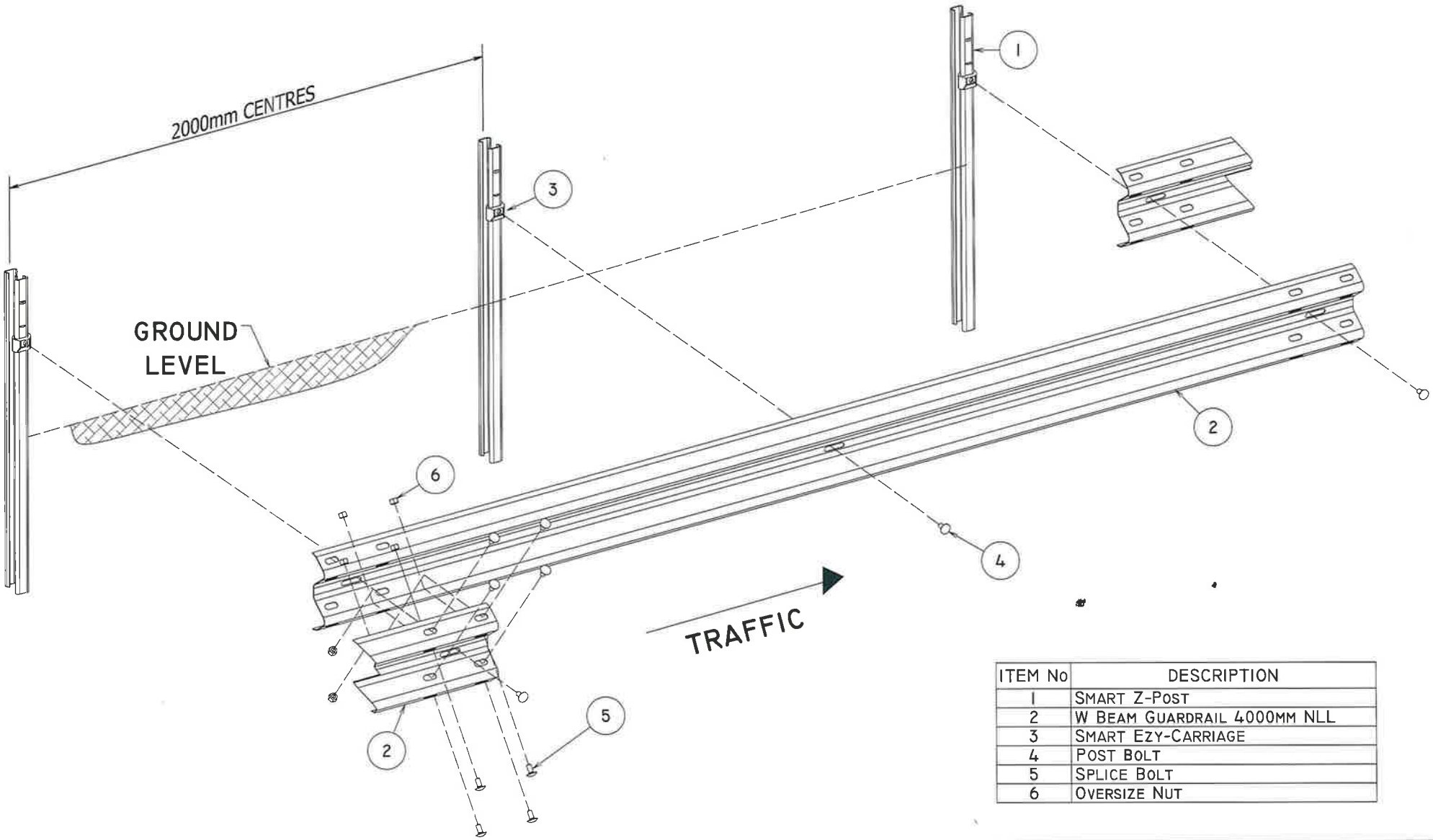
Prior to undertaking dismantling due to a vehicle impact, the area should be assessed for hazards. These include trip hazards, sharp edges and snag points.

During a vehicle impact, the rail will disengage from the posts as they yield by bending at ground level. The recommended dismantling sequence is as follows;

1. Dismantle the rail splice by removing the M16x32mm mushroom head bolts and nuts. There are 8 bolts located at each splice location.
2. Rails that are still attached to posts outside the impact area are disconnected by removing the M16x30mm post bolts. A 10mm hexagon key is required.
3. Once the area is clear of damaged rail, the posts can be removed. Since the posts yield by bending near ground level, a sling or chain can be attached below the bent section.
4. The damaged post can be lifted using a backhoe or post extractor attachment.
5. Any disturbed pavement material shall be left dense, tight, and smooth prior to the installation of replacement posts.

Table 5: Damage Assessment of Ezy-Guard™

Type of Defect	Description of the Defect	Action to be Taken
Galvanizing damage on Z-Post.	The total damaged area does not exceed 35cm² (0.5% of the total surface area). The total damaged area exceeds 35cm²	An organic zinc-rich epoxy paint is to be applied to the repair area in two coats. The Z-post is to be replaced.
Galvanizing damage on rail.	The total damaged area does not exceed 200cm² (0.5% of the total surface area) and individual damaged area does not exceed 40cm². The total damaged area exceeds 200cm² (0.5% of the total surface area) and/or an individual damaged area exceeds 40cm².	An organic zinc-rich epoxy paint is to be applied to the repair area in two coats. The rail is to be replaced.
Mechanical damage on Ezy-Carriage.	The Ezy-Carriage has chips or cracks.	The Ezy-Carriage is to be replaced.
Mechanical damage on Z-Post.	The post is bent. The Ezy-Carriage cannot slide freely along the post due to distortion.	The post is to be replaced. The post is to be replaced.
Mechanical damage on rail..	The rail is dented, twisted or flattened. There are tears in some part of the rail. The slots in the rail are distorted.	The rail is to be replaced. The rail is to be replaced. The rail is to be replaced.
Mechanical damage on bolt.	The body of the bolt is distorted. The thread of the bolt is damaged.	The bolt is to be replaced. The bolt is to be replaced.
Disturbance of material around post.	The material around the post is loose or uncompacted.	Any disturbed pavement or material around a post shall be left compacted and smooth so that resistance to water penetration is similar to that of the adjacent surface.



ITEM No	DESCRIPTION
1	SMART Z-POST
2	W BEAM GUARDRAIL 4000MM NLL
3	SMART EZY-CARRIAGE
4	POST BOLT
5	SPLICE BOLT
6	OVERSIZE NUT

REVISIONS

REV	DATE	DESCRIPTION	DRAWN	CHECKED	APPROVED
0	01/04/11	ISSUED FOR INFORMATION	DJB	TC	

REFERENCES

DRAWING NUMBER	REFERENCE DRAWINGS

	NAME	DATE
DRAWN	DJB	01/04/2011
CHECKED	TC	01/04/2011
APPROVED		
SCALE	NTS	
SIZE	A1	

WEBFORGE
A valmont COMPANY

PROJECT: EZY-GUARD SMART

REFERENCE No.:

TITLE: ASSEMBLY DETAIL

DRAWING No.: EZY-SM-005

REV

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