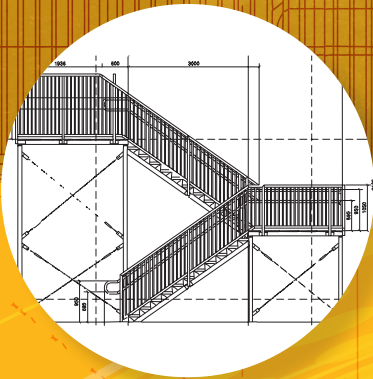


MECHANICAL & CONSTRUCTION  
**Mechcon**  
WELDING & FABRICATION PTY LTD



# Handrail & Balustrade Compliance

for Architectural Steel Fabricators

T: 03 9791 6708 | [www.mechcon.com.au](http://www.mechcon.com.au)

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Having Mechcon Welding and Fabrication help change our system from modular Handrails, that we had done in the past, over to Architectural Stainless Steel Handrails, has been a real game changer for us, the difference is night and day in terms of visual appeal and also installation time frames.

## Jake Crank

Construction Supervisor  
Permanent Modular Construction  
ATCO | Structures

**ATCO** always there.  
anywhere.





# HANDRAIL DESIGN AND ARCHITECTURE IN AUSTRALIA

Based off 15 years of specialising in design, manufacture and installation of custom architectural and compliant Handrails/Balustrades systems we are going to clearly explain in this brochure what we think are some of the most important things during the structural aspects of designing and nominating the appropriate Handrail and Balustrade, factoring in the key requirements and considerations described in the BCA and Australian Standards.

- **What category is the Handrail being considered for (location & environment)**
- **Are you responsible for the design?  
If so, the most important things to consider**
- **Reading and understanding the correct Codes to follow**

**Note:** Some Proprietary or (DIY Handrails ready to install) from local or overseas suppliers will not come with specific detail outlining appropriate category recommendations and structural limitations with regard to the BCA and Table 3.3 AS1170.1

Handrails in our opinion should always be backed up with the manufacturer/fabricator taking reasonability and warranty delivery on both Supply and Installation due to the strict tolerances that are required to be executed on Handrail installation and inspection.

Strict Tolerances: Installed DDA Handrails on inspection can be rejected by the building surveyor from the smallest discrepancies such as height or angles being out by only a few millimetres, and entire sections of Rail and Balustrade having to be rectified.

**Disclaimer Note:** Mechcon Welding and Fabrication Pty Ltd, has prepared this compliance guide as general information guide only. This guide should not be used as a substitute for seeking professional engineering and/ or architectural advice for your specific circumstances.

# HANDRAIL DESIGN AND ARCHITECTURE IN AUSTRALIA

## ENVIRONMENTS:

Australian Standards and the BCA outline Handrail and Access requirements for different environments.

**Australian Standards 1428.1:2021** details the need for different levels of design based off people's movements and abilities.

**Australian Standards 1657:2018** caters for an Industrial setting maintenance and servicing personnel (IMPORTANT: This Code is NOT suitable for areas that are accessible by the general public) focusing less the levels of people's abilities and more on the environment they are in.

**Australian Standard 1170.1** is required to consider structural design of the Handrails and Balustrades allowing design loads from a small balcony at a private home through to theatres and cinemas.

**AS1657-Fixed Platforms**, walkways, stairways and ladders is only suitable for lightly loaded handrails in machinery rooms, boiler houses, lift motor rooms, or non-habitable rooms such as attics or storerooms.

**AS1428.1:2021** Design for access and Mobility is suitable for a number of different environments such as public pools, primary /secondary schools , commercial- public housing, universities, government infrastructure which all need to meet a minimum requirement set out in the standard.

**In our opinion AS1428** gives builders and designers not only a chance to keep mobility safe for all people but also to add class and appeal to buildings, parks, bridges and other infrastructure by means of great Architectural Design of Handrail Fabrication.



Edgars Creek Primary School  
Victorian School Building Authority  
Completed 2021

# TABLE 3.3 AS1170.1 MINIMUM IMPOSED ACTIONS FOR BARRIERS

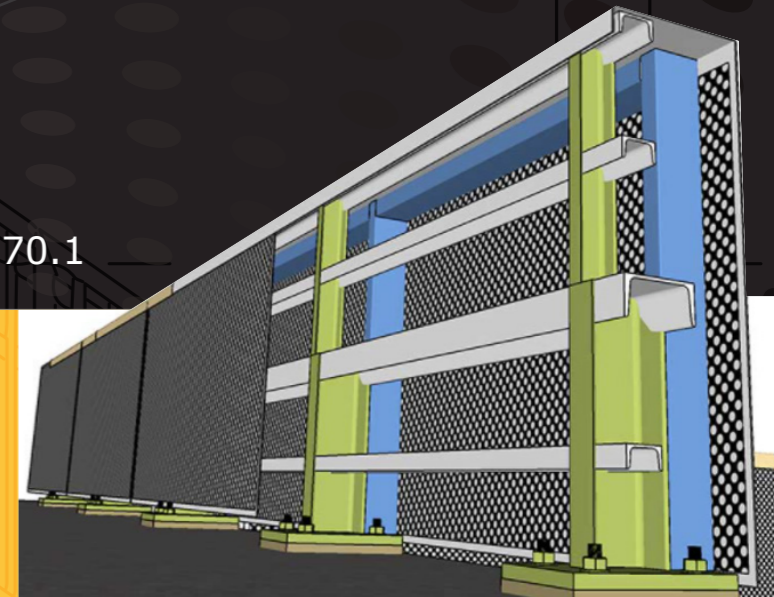
Type of occupancy for part of the building structure	Specific uses	Top Edge			Infill	
		Horizontal	Vertical	Inwards outwards or downwards	Horizontal	Any direction (see Note 2)
<b>A Domestic and residential activities</b>	All areas within or serving exclusively one dwelling including stairs, landings, etc. but excluding external balconies and edges of roofs (see C3)	0.35	0.35	0.6	0.35	0.25
	Other residential, (see also C)	0.75	0.75	0.6	1.0	0.5
<b>B, E Offices and work areas not included elsewhere including storage areas</b>	Light access stairs and gangways not more than 600mm wide	0.22	0.22	0.6	N/A	N/A
	Fixed platform, walkways stairways and ladders for access (see Note 1)	0.35	0.35	0.6	N/A	N/A
	Areas not susceptible to overcrowding in office and institutional buildings also industrial and storage buildings	0.75	0.75	0.6	0.1	0.5
<b>C Areas where people may congregate</b>						
<b>C/1 Areas with tables or fixed seating</b>	Areas with fixed seating adjacent to a balustrade, restaurants, bars, ect.	1.5	0.75	0.6	1.5	1.5
<b>C3 Areas without obstacles for moving people and not susceptible to over-crowding</b>	Stairs, landings, external balconies, edges of roofs, ect.	0.75	0.75	0.6	1.0	0.5
<b>C5 Areas susceptible to over-crowding</b>	Theatres, cinemas, grandstands, bars, discotheques, auditorium, shopping malls (see also D), assembly areas, studios, ect.	3.0	0.75	0.6	1.5	1.5
<b>D Retail Areas</b>	All retail areas including public areas of banks/ building societies, (see C5 for areas where over-crowding may occur)	1.5	0.75	0.6	1.5	1.5

Extracted From - AS/NZS 1170.1:2002 - Page 14 - Table 3.3

Let's talk about the five listed occupancies, building types or structures and the Specified uses for each - Table 3.3 AS1170.1

For example, Type (A) mentions occupancy or category listed would be described as domestic and residential single dwelling building, the Handrail Loading requirements are fairly low, however external stairs and balconies on the same property will require slightly increased Loading requirements. At the other end of the scale nominated Load Testing from AS 1170.1 are up to x10 times greater than the domestic dwelling mentioned earlier, an example Shopping Malls and grand stands.

**Walker Street Dandenong,  
Multi Level Car Park Balustrades  
Dandenong City Council  
Completed 2015**



# TOP 5 ARCHITECTURAL HANDRAIL COATINGS AND MATERIALS USED



- 01 Internal Grade Stainless Steel Grade 304**  
 – Satin Finish ,320 grit, no.4 Finish (Cost effective)



- 02 External Grade Stainless Steel Grade 316**  
 – Satin or Mirror Finish 1.6mm – 3mm Wall Thickness  
 32mm and 50mm Diameter Handrailing including an extensive range of profiles and thicknesses that will cover all requirements for AS 1170.1



- 03 Electropolished Stainless Steel Grade 316**  
 – Significantly improves corrosion resistance, leaving it with a lasting brightness. (No Maintenance)



- 04 Hot Dipped Galvanised Steel Handrails**  
 – (Cost effective) extensive range of profiles and thicknesses



- 05 Powder Coated Handrails and Balustrades**  
 – Ideal for hard to paint fabricated jobs such as thin rounded rods and balusters. Including UV long lasting bright Colour Options



Steps we recommend for preparation of Galvanised Metal Handrails for...

## Powder Coat (Duplex System) Zinc Phosphate Solution

- Zinc phosphate is applied by dipping the fabricated part in a tank of the solution followed by a freshwater rinse to create rough profile for the powder coating adhesion. (process taken place at powder coaters shop)

## Solvent Cleaning

- Water based emulsifier, alkaline-based cleaners with a pH of 12 or lower.

Steps we recommend for preparation of Perforated Metals for Powder Coating...

## Manual Cleaning

- Apply between 20:1 and 30:1 depending brand recommendations, using a brush or spray Allow 5-10 minutes for degreaser to penetrate the oil left from punching process. Rinse off with water spray pressure machine. Flip Sheets cleaning both sides thoroughly to remove oil-soaked perf sheets.

**Swan Street Widening  
Stainless Steel Handrails and Balustrades  
Completed 2018**

## AS1428.1 ARCHITECTURAL METHODS – DDA COMPLIANT RAMP HANDRAILS



Thankfully we have many great architect's in Australia and in particular this great city of Melbourne who have been creating custom and unique DDA Compliant Ramp Handrails to help enhance buildings and environments being constructed.

It has been a pleasure to have completed many of these Handrail jobs which can be seen across the city and greater Melbourne.

Luke Cahill - Mechcon

# DIFFERENT WAYS TO CREATE COMPLIANT METAL FABRICATED KERB RAIL FOR WHEELCHAIR RAMP HANDRAILS SYSTEMS

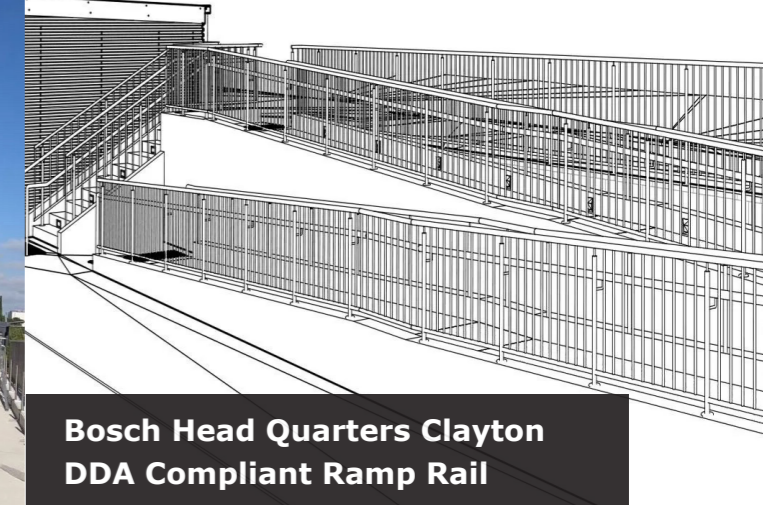
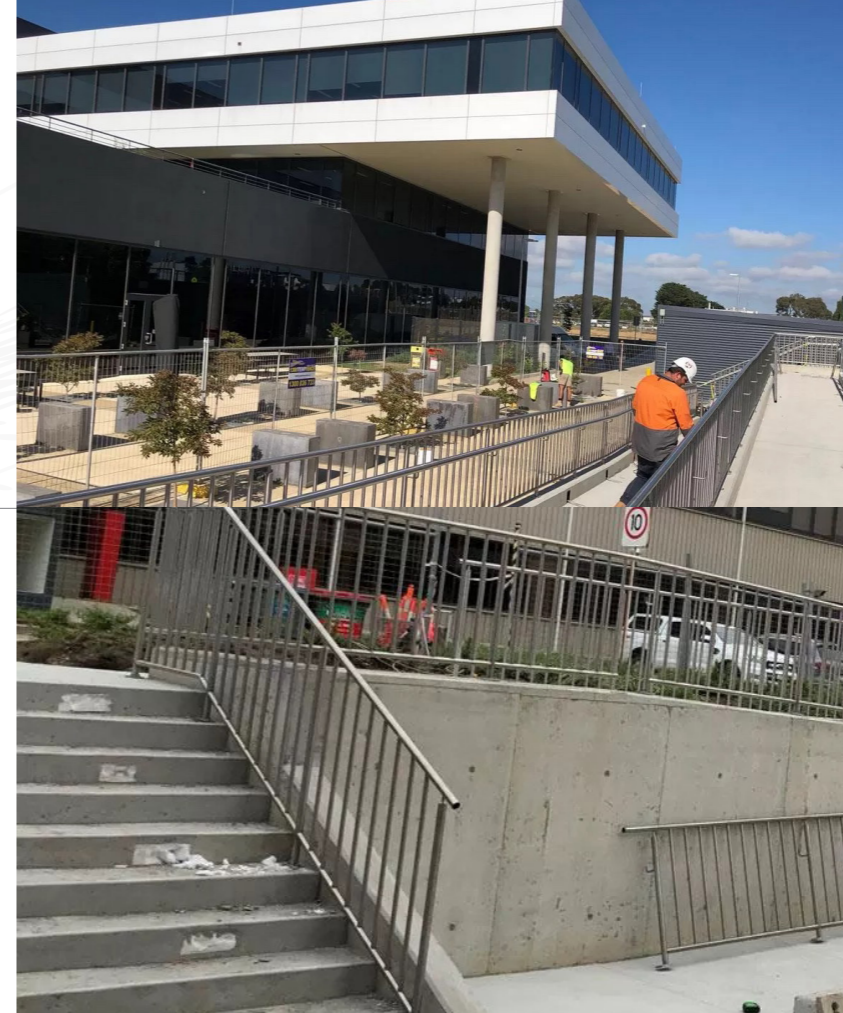
Architects thrive off adding their own design touches and in this instance, the Disability Discrimination Act (DDA) Handrail Systems with its Kerb Rails is often a perfect chance to add a little flair to what could otherwise be a very simple and sometimes architecturally offensive looking extruded section of lightweight metal, riddled with connecting screws and bolts (proprietary system).

Architectural Fabricators have been for a long time accustomed to forming - shaping different types of steel and varying profiles, so when an Architect comes up with an idea such as a circular double rail from the electropolished stainless tube, we just get it done no different to any other custom job we do from week to week year in year out.

In fact, we have manufactured and installed every variation of Kerb Rail that's evolved from the Australian Standard specifications detailing the limitations of Kerb Rails.

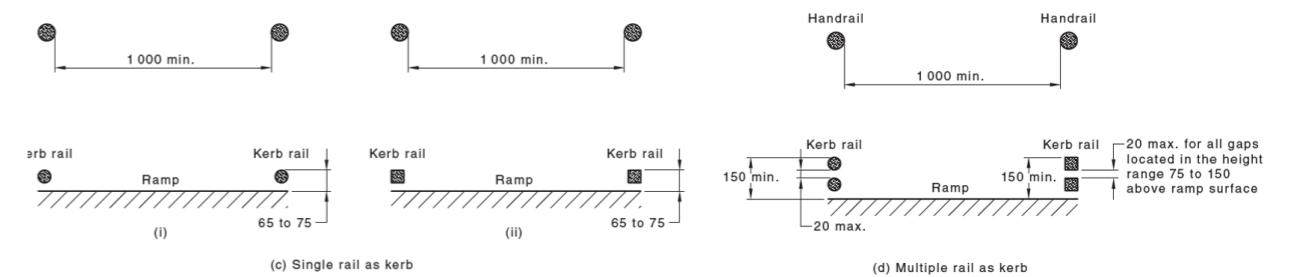
**AS1428.1** once again has given Architects and Fabricators room to create fantastic opportunities to bring our buildings and environments up to world standards in class and sophistication.

Architectural handrails are fabricated 95% completely ready for installation prior to leaving the workshop, carefully detailed shop drawings and qualified fabricators ensure that onsite installation is fast and very compliant with AS1428.1, unlike what we have witnessed with some modular handrails and DIY installations.



**Bosch Head Quarters Clayton  
DDA Compliant Ramp Rail**

**FIGURE A.1 – TYPES OF KERBS**



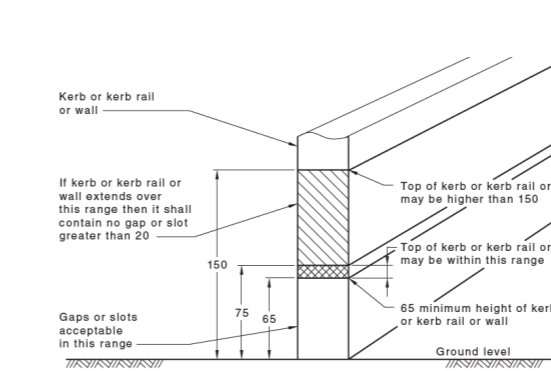
Extracted From – AS1428



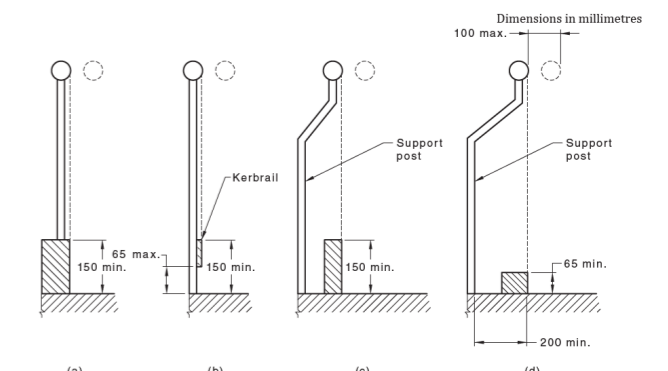
**ATO Building Dandenong  
DDA Complaint Ramp Rail**



**Hallam Primary School  
DDA Compliant Stair and Ramp**



Extract AS1428.1 Figure 18



Extract AS1428.1 Figure 18

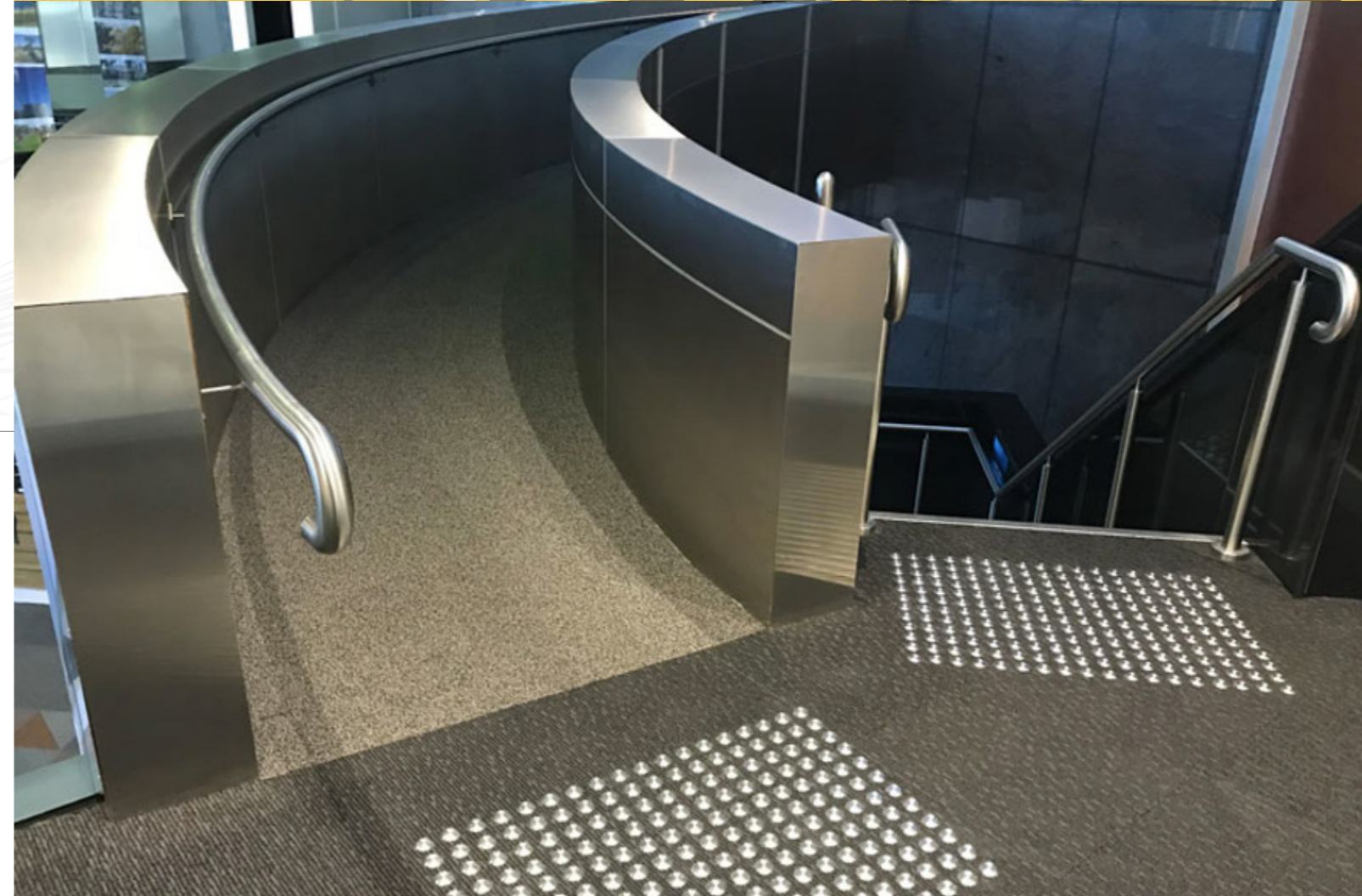


# ALTERNATIVE DESIGN FOR RAMP HANDRAILS COMPLIANT TO AS1428.1

## The alternative design methods used to construct custom Architectural Handrails and critical things to consider at concept stages:

- Breakdown and life span of galvanised Handrails on beaches and coastlines
- When and why Electropolishing stainless steel Handrail is critical
- Choosing proven materials with respect to AS1170.1 still achieving Architectural appeal
- Considering why stainless Handrails are more cost efficient than realised.
- Selecting Companies who specialise in Fabrication and Installation of Handrails
- Understanding Paint Warranties with different materials on Handrails
- Benefits of Pre-Fabricated Architectural Handrails
- Importance of Suppliers with proven project installation compliance experience

Construction term often seen: Disability Discrimination Act (DDA) Compliant Handrails are all about people with impaired vision and varying physical capabilities dealing with mobility safely, which intern created the need for infrastructure to match our lovely buildings and environments being architecturally designed.



ARCHITECTS AND STEEL FABRICATORS HAVE DEvised VERY DISCRETE AND EFFICIENT WAYS TO CONNECT AND INSTALL HANDRAILS WITHOUT SIGHTLY SCREWS, BOLTS AND PROTRUDING HARDWARE OFTEN LOOKING ARCHITECTURALLY OFFENSIVE AS SEEN WITH MODULAR SYSTEMS AND DIY INSTALLATIONS

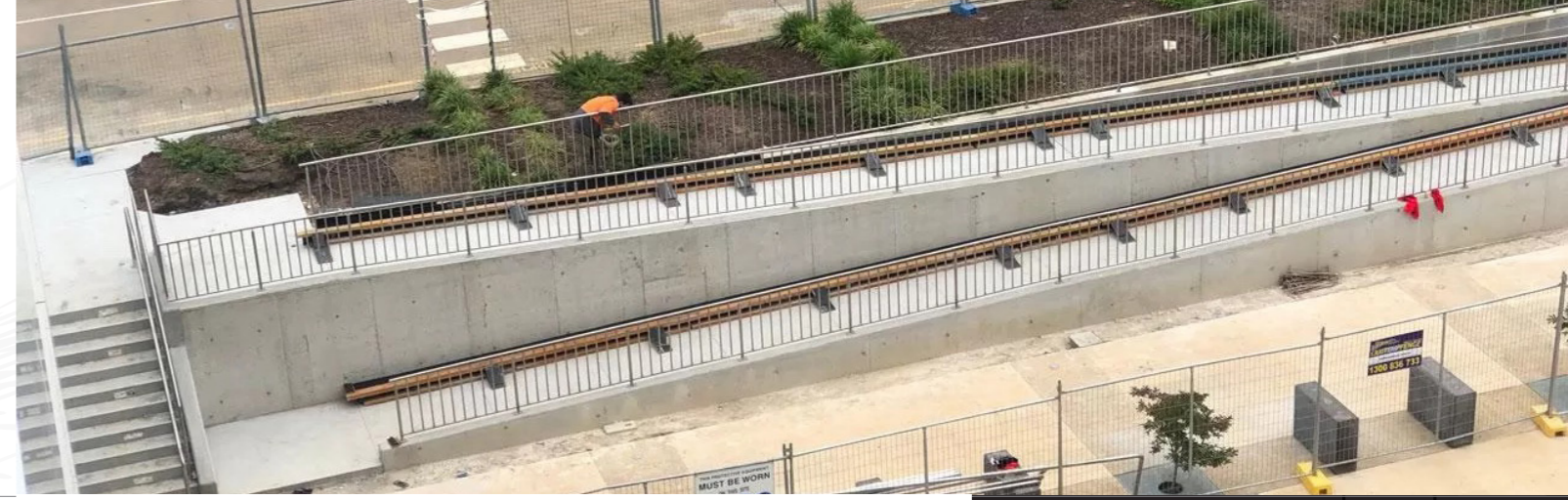
Architects rely heavily on fabricators to detail handrail shop drawings showing exacting measurements for approval by building surveyors and principle in charge of projects.

it is critical to have handrail fabrication completed as much as possible in Australian workshops to assist with quality control on aspects with checking and measuring strict DDA tolerances

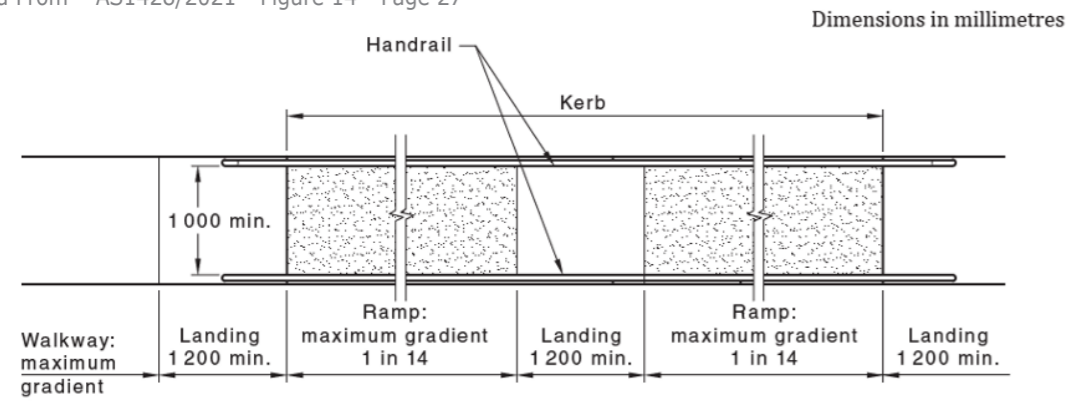
on critical angles that require to follow ramp gradients, including posts that are to be 90 degrees and parallel to each other. Often we see (DIY) or propriety handrail systems with generic parts not exactly suiting the specific ramp or stair construction, consequently being installed incorrectly and not compliant, rectifying these issues can run project time lines over causing financial fallout.



# KEY THINGS TO KEEP IN MIND WHEN SITE MEASURING FOR RAMPS, LANDINGS AND STAIRS ADHERING TO AS1428.1

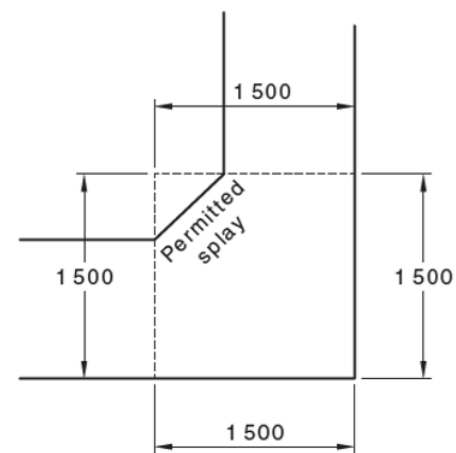


Extracted From - AS1428/2021 - Figure 14 - Page 27

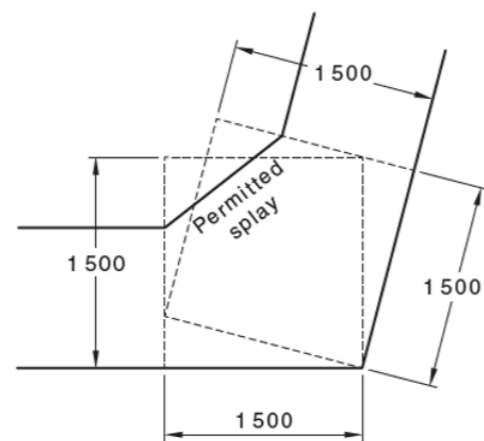


**Wheelchair Ramps overall width checked for minimum of 1200mm to comfortably fit Post and securely fix Base plates to achieve loading and deflection AS1157.1 -**

- Locate any items such as down pipes or drains that come within (1000mm) clear path inside Handrail to insure minimum requirement AS1428.1
- Measure Landings checking whether they suit and achieve 1540mm minimum inside Handrail on Ramp transition/direction change locations as per detail in AS1428.1



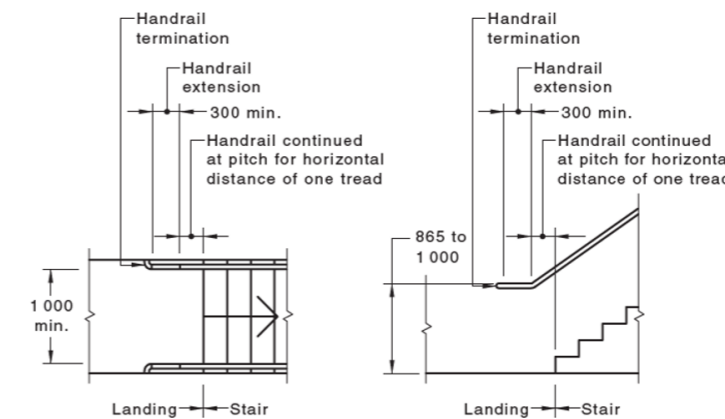
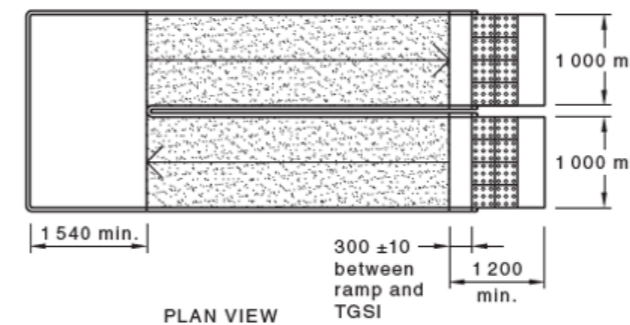
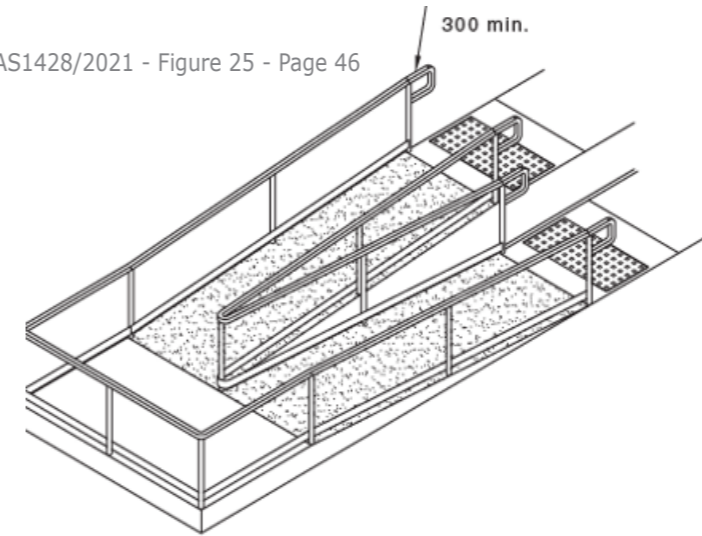
Turn 90° in path of travel  
Corridor less than 1 500 mm wide requires widening at turn



Turn 75° in path of travel  
Corridor less than 1 500 mm wide requires widening at turn

Extracted From - AS1428/2021 - Figure 4 - Page 9

Extracted From - AS1428/2021 - Figure 25 - Page 46



- Carry out substrate inspection checking if builder and architect have allowed sufficient strengthening and accommodation for Handrail Post and Plate connections to be secured/fix down following AS1170 minimum loading
- Stairwells to be inspected for minimal width of 1200mm creating 50mm clearance off wall AS1428.1
- Checking if builder has provided fixing battens in the correct location for walls that are not solid or have cavities for Handrail brackets to be properly secured





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