Index 862 Aluminum Pedestrian/Bicycle Railing

Design Criteria

AASHTO LRFD Bridge Design Specifications, 6th Edition, including 75 year Design Life

U.S. Access Board "***ADA Standards for Transportation Facilities***" November 2006 as adopted with amendments by the USDOT under 49 CFR Part 37.

The Aluminum Association, ***Aluminum Design Manual 2010*** (for weld design only)

DESIGN LIVE LOADS:

Post and Base Plate: Equivalent point load = 200 lb. load + (50 lb./ft. x Post Spacing (ft.)) applied transversely at top rail connection.

Top & Bottom Rails: 50 lb./ft. uniform load applied simultaneously vertically and transversely, plus 200 lb. concentrated point load applied at midspan in the directions for both maximum stress and deflection.

Handrails: Maximum of either 50 lb./ft. uniform load applied in any direction or 200 lb. concentrated load applied in any direction at any point along the top.

Pickets and Infill areas: Concentrated 200 lb. load applied transversely over an area of 1.0 square foot.

GEOMETRY:

Clear Openings: Shall reject the passage of a 6" diameter sphere below 27" height, and an 8" diameter sphere above 27" height. Additionally, for special conditions (see below) a 4" diameter sphere shall not pass through openings below 31" height.

Clear Opening under Bottom Rail: Shall reject the passage of a 4" diameter sphere, except bridge installations over traffic and waterways without curbs directly beneath the railing shall reject the passage of a 2" diameter sphere.

ADA Handrail Height: 34" at centerline of handrail.

Standard Pedestrian/Bicycle Railing Height: 42" minimum.

Special Height Bicycle Railing Height: 54" minimum.

DEFLECTION:

Total combined deflection of the railing system including the resilient or neoprene pads, due to the top rail design live loads, shall not exceed 1 1/2" when measured at midspan of the top rail.

Design Assumptions and Limitations

For the purpose of these instructions, the following definitions shall apply:

4" Sphere Rule - Clear openings of the railing below 31" height shall reject the passage of a 4" diameter sphere and clear openings above 31" height shall reject the passage of an 8" diameter sphere. This rule applies only to special conditions as discussed below.

6" Sphere Rule - Clear openings of the railing below 27" height shall reject the passage of a 6" diameter sphere and clear openings above 27" height shall reject the passage of an 8" diameter sphere.

This railing is not applicable for shielding drop-off hazards for motor vehicle traffic. This railing is applicable for cases where a pedestrian or bicyclist drop-off hazard exceeds 5'-0" or when a drop-off hazard is less than 5'-0" and is required by design or permit stipulations. Refer to PPM, Vol. 1, Chapters 4 & 8, for the definition of vehicular, pedestrian and bicyclist "drop-off hazards".

For FDOT installations subject to Florida Building Code provisions or other applicable locations along FDOT corridors as defined below, the 4" Sphere Rule may apply. Examples of applicable locations include the following:

- Highway rest areas and travel information centers
- Parking garages
- Bridges and their approaches along shared-use paths
- View points on bridges where seating is provided
- Fishing piers or bridges where fishing is permitted along the sidewalk
- "Other public gathering areas with amenities (i.e. seating, interpretive displays, drinking fountains, etc.)

Providing adequate site distance always takes priority over the 4" Sphere Rule. Typically the clear space between the top and intermediate horizontal rails provides for adequate site distances, however, for railing installations adjacent to sloped intersections, the infill area between the intermediate and bottom horizontal rails may still adversely affect the site distance. Of the standard infill alternatives that meet the 4" Sphere Rule, the standard "Type 2 - Chain-Link" infill alternative creates the least obstruction to site distance through the infill areas.

Pedestrian railings on bridges and other structures adjacent to sidewalks having standard widths should generally follow the 6" Sphere Rule.

Aesthetics play a crucial role in the determination of which railing infill type should be specified for a particular project. Infill Panel alternates within the Design Standard, include those that meet the 6" Sphere Rule and others that meet the 4" Sphere Rule. Custom designs for the In-fill Panels may be designed in accordance with the Design Criteria above, specified in the Data Tables and detailed in the plans. Ensure dimensions of the elements within the Custom Infill Panels have adequate strength to resist the loads specified in the Design Criteria above. See ***PPM***, Volume 1, Section 8.8 for responsibilities of Local Maintaining Agencies. Contact the District for further guidance.

When a colored coating is desired and the addition cost is justified or reimbursed by the requesting local agency, then specify a coating complying with AAMA 2605, "Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels", (American Architectural Manufacturers Association, 2005) except that only fluoropolymer based powders are permitted. See ***PPM***, Volume 1, Section 8.8 for responsibilities of Local Maintaining Agencies.

Adequate foundation support for anchorage and stability against overturning must be provided. When necessary, design a site specific railing or anchorage system for unusual site conditions.

A handrail is required for use on ramps with a grade steeper than 5% to conform to the requirements of the Americans with Disabilities Act (ADA).

Expansion joints shall be spaced at a maximum 30'-0" (differs from Index 852). Railing must be continuous across a minimum of two posts.

Indexes 852 and 862 are similar in form and function. Select which of these railings to use at a given site based on District preferences, aesthetic or finish color requirements, corrosion concerns, theft potential issues, fabrication issues, weight of railing and any other project specific requirements. In some cases, both of these railings are acceptable for use and the selection of which to provide is left to the contractor by the use of Pay Items 515-2-1BB or 515-2-1BB.

See Index 861 for special requirements and modifications for use on bridges.

Plan Content Requirements

In the Structures and/or Roadway Plans:

Show Pedestrian Railings on sidewalks and walls as required. Designate locations where handrails are required.

Include cross references to Design Standards Index 862 as appropriate.

When either Index 852 or 862 are acceptable, include cross references to both indexes and use Pay Items 515-2-1BB or 515-2-1BB as appropriate.

Prepare project specific Infill Panel details when required using the Pedestrian/Bicycle Railing Custom Infill Panel CADD cell and include them in the plans. Designate each individual project specific Infill Panel with a unique name for identification and cross reference purposes.

All custom Infill Panels shall be fully detailed in the contract plans. A Custom Type Infill Panel Cell (00862-CTIP.cel) as shown below is available through the Structures CADD bar menu.

Complete the following Data Tables and include them in the plans. See Introduction I.3 for more information regarding use of Data Tables.

In the HEIGHT column of the Data Table, enter either "42" for standard height railings or "54" for special height railings.

In the STYLE column of the Data Table, enter either "Type X" (where X = 1 thru 5 for the standard Infill Panel options) or "Custom" where custom Infill Panels are fully detailed in the plans.

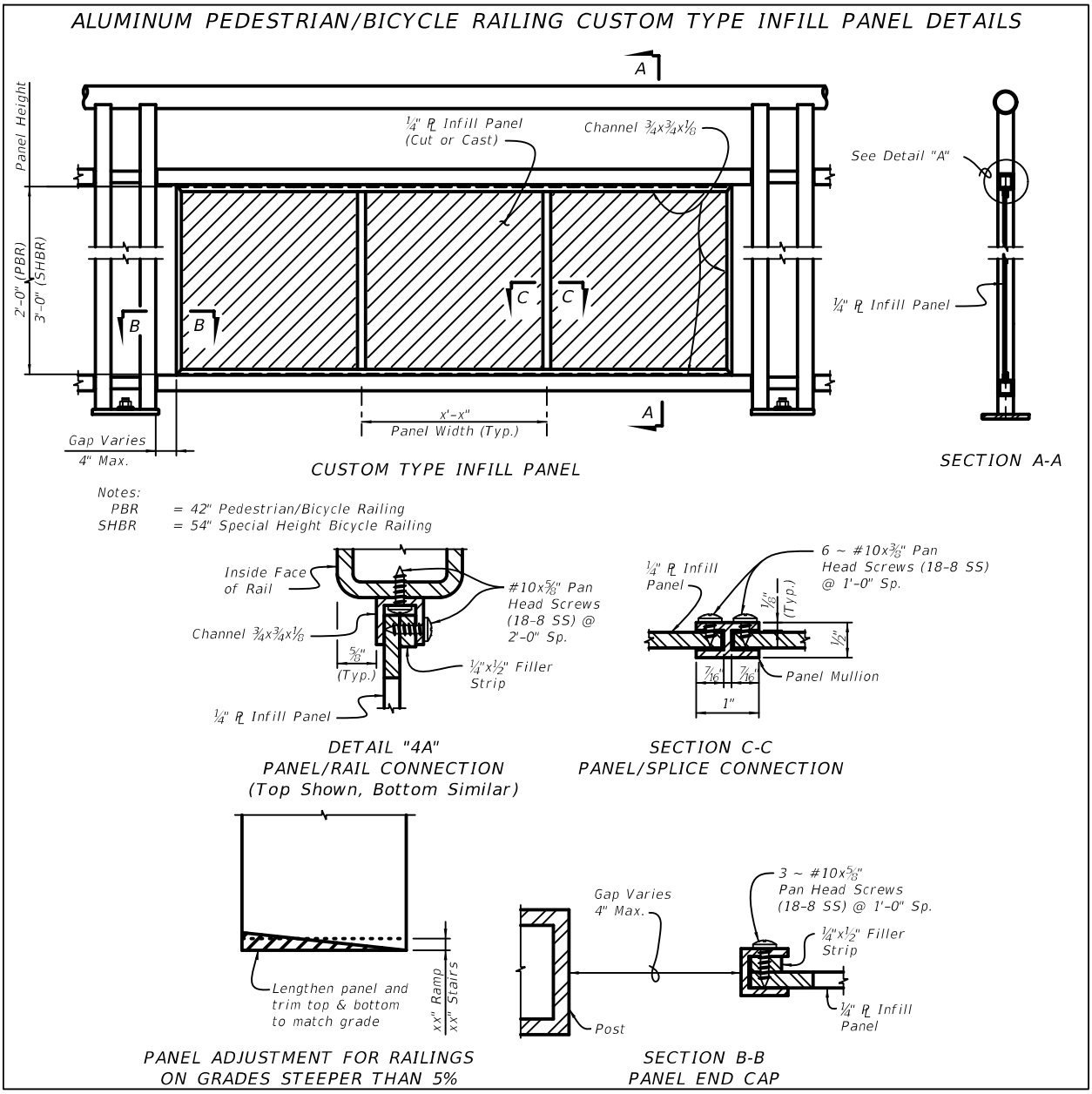
ALUMINUM PEDESTRIAN/BICYCLE RAILING DATA TABLES

PROJECT REQUIREMENTS					Table Date 01-01-11
Station to Station (Lt. or Rt.)	Height (in.)	Style Type (1)	Required: (Yes/No)		
			Bottle Guard	Colored Coatings (2)	Infill Panel to Reject Passage of 4" Sphere (Special conditions only)

(1) For "CUSTOM" Style Types, see plans for in-fill panel details.
(2) The color shall be per Federal Color Chart, Federal Standard No. 595B, Table _____, Color ____.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY

NOTES:
1. Work this Data Table with Index No. 862.



Payment

Item number	Item description	Unit Measure
515-2-1BB	Pedestrian, Bicycle Railing, Non Specified, 42" (Type___)	LF
515-2-1BB	Pedestrian, Bicycle Railing, Non Specified, 54" (Type___)	LF
515-2-3BB	Pedestrian, Bicycle Railing, Aluminum Only, 42" (Type___)	LF
515-2-3BB	Pedestrian, Bicycle Railing, Aluminum Only, 54" (Type___)	LF