Attaching 2″ Square Metal Posts to Wood Structures

The framing members where wood screws are to be attached must be of a specific density equal to or greater than Southern Yellow Pine (.55) Screws must fully penetrate without splitting. Pre-drilling may be required. Structural members must be secure without any movement or fasteners may fail.

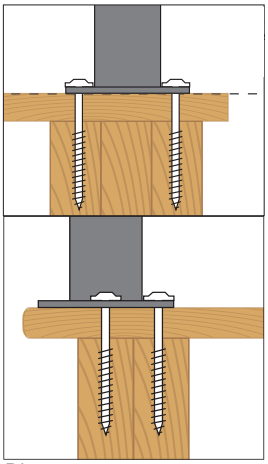

Diagram 1

Standard Surface Mounting Posts

The standard Viewrail Surface Mounting Post has a foot plate that is 3 3/4″ square. It requires a framing structure that is 4 1/2″ wide or wider (triple 2x8 recommeded). Each post must have (4) fasteners (5/16″ x 4″ GRK screws) installed full depth. Balcony posts must have screws in the (4) corner holes of the mounting foot. 36″ or shorter posts installed on stairs can have screws mounted in holes as shown in Diagram 1, when the mounting plate needs to extend onto the bullnose.

Standard Surface Mounting Posts on Thick Treads

Tread material must be red oak (or a wood more dense than red oak) and at least 2 1/4″ thick to mount with screws. If wood does not meet these specifications, mount posts using bolts, or bolts and a mounting plate (following instructions below).

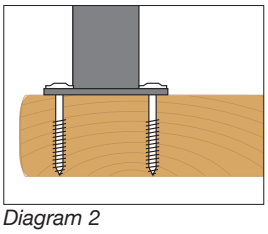

Diagram 2

Mounting to Thick Tread with Screws (See Diagram 2.)
Minimum tread thickness for mounting posts with screws is 2 1/4″.
(4) fasteners (5/16″ x 2 1/2″ GRK screws) must be used. Pre drill holes to keep wood from splitting.

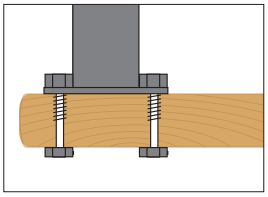

Diagram 3

Mounting to Thick Tread with Bolts (See Diagram 3.)
Minimum tread thickness for mounting posts with bolts is 1 1/2″.
• Drill 3/8″ holes through treads to match the corner holes in the post foot.
• Drill 1/2″ holes 1/4″ deep on bottom side of tread to allow carriage bolt to seat itself into the tread.
• Insert carriage bolts of appropriate length from the bottom so threads are up.
• Tighten bolts.
• Cut off excess threads with cutting wheel in angle grinder.

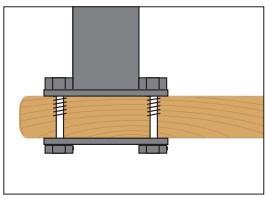

Diagram 4

Mounting to Thick Tread with Mounting Plate (See Diagram 4.)
Minimum tread thickness for mounting posts with a mounting plate is 1″.
• Drill 3/8″ holes through treads to match the hole pattern in the post foot.
• Place mounting plate underneath tread.
• Insert carriage bolts of appropriate length from the bottom so threads are up.
• Tighten bolts.
• Cut off excess threads with cutting wheel in angle grinder.

Surface Mounting Posts on Reduced Width Structures

Only use this option when standard is not practical since the fastener strength safety factor is reduced.

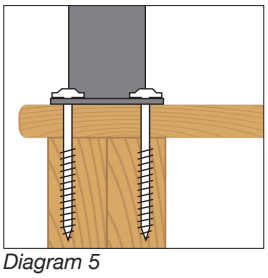

Diagram 5

One application is a double 2x10 joist where the flooring and ceiling are already installed. A special order post with a slim foot plate (3/8″ thick x 3 1/4″ x 3 3/4″) is used and has a handrail height ***limited to 36″***. This post material must be steel or stainless steel. ***Aluminum is not acceptable***. (4) fasteners (3/8″ x 6″ GRK screws) must be installed to full depth and inserted at a slight angle so that they will have maximum penetration into the structure. Pre-drill holes to avoid splitting wood. (See Diagram 5.)

Surface Mounting Posts to Reduced Thickness Framing
(such as sleepers over a membrane roof. See Diagram 6.)

This is a reduced safety factor installation with a safety factor of 2.75 instead of the standard 4.0 based upon a 200lb lateral load on the handrail.

The substructure must be very secure. A special order post is needed with a large area foot plate (5/16″ thick x 5″ x 7″ with 6 holes). All (6) holes must be populated. Use (6) fasteners (5/16″ x 2 1/2″ GRK screws) at least 2 1/2″ in length. Use longer screws if framing material will allow. ***Maximum handrail height for this method is 36″. Posts must be steel or stainless steel. Aluminum is not acceptable.***

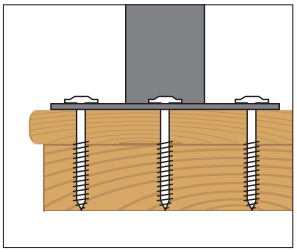

Diagram 6

Standard Side Mount Post

Mounting with Screws (See Diagram 7a.)
(4) fasteners (5/16″ x 6″ GRK Phoenix screws) must be used at full depth into triple 2x8 or equivalent. The side mount plate holes are slotted to allow for vertical adjustment of posts.

Mounting with Bolts (See Diagram 7b.)
(4) fasteners (3/8″ carriage bolts) must be used through face with thick large area washers under the nuts. The minimum framing material required is a double 2x8.

Slim Side Mount Posts

Mounting with Screws (included with Post)
(2) fasteners (modified 3/8″ coated steel screws, not for coastal use) must be used into framing material; minimum is triple 2x8. Pre-drill holes to avoid splitting wood.

Mounting with Bolts (included with Post)
(2) fasteners (5/16″ x 4″ stainless steel socket head bolts) must be used with rear mounting plate to prevent bolts from pulling through. Minimum framing material is a double 2x8.

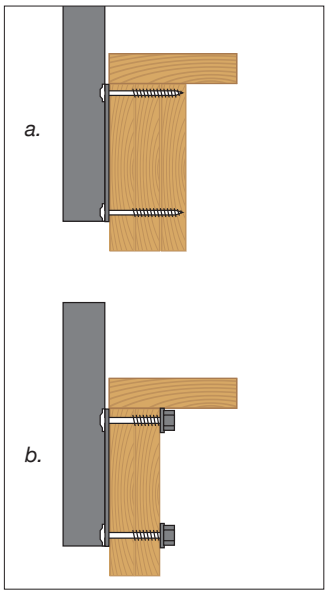

Diagram 7

Slim Side Mount Posts require a rear mounting plate when mounting with bolts. (not shown)

Angle Foot Posts

(4) fasteners (5/16″ x 4″ GRK screws) must be used into framing material that is at least 3 1/2″ wide. Pre-drill holes and run screws at an angle toward center of beam. Maximum angle foot post height supports 10 cables. (See Diagram 8.)

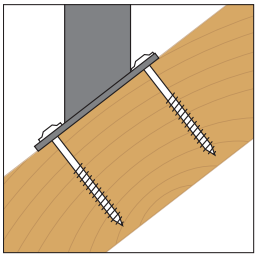

Diagram 8

Angle Foot Posts on Reduced Width Structures

A special order post with a slim foot plate (5/16″ thick x 2 1/2″ x 4 1/2″) is used. This post must be steel or stainless steel (aluminum is not acceptable) and is limited to a height of 30″ (not including the mounting structure). The framing material must be a minimum of 2 1/2″ wide.

High Side Fasteners:
- Install 5/16″ x 3″ dowel screws.
- Pre-drill holes.
- Place post over dowel screws.
- Attach with nuts on top of mounting plate.

Low Side Fasteners: use standard screws (5/16″ x 4″ GRK screws).
(See Diagram 9.)

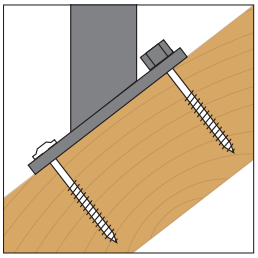

Diagram 9

Attaching 2″ Square Metal Posts to Concrete

These requirements for attachment of posts to concrete are based upon information supplied by ITW Redhead Wedge Anchors, the industry leading concrete fastener. The ITW Redhead wedge anchor is IBC 2006 compliant and tested to U.S. Government Specification A-A-1923A Type 4.

Hole drilling bits and technique are critical to a safe install. Find complete information at itwredhead.com.

There are several other attachment methods such as large diameter tapcons or adhesive anchors. None of these methods have been tested. User may choose other methods based upon their research and experience.

Load calculations are based upon uncracked 3000 PSI concrete. If your concrete is different, please consult the tables at itwredhead.com for ratings.

Surface Mount Posts

Special order mounting plates (6″ x 6″ x 3/8″ thick for concrete mounting) are required in order to achieve a standard 4 to 1 safety factor. Consult a design engineer for the safety factor needed for your project.

- 3/8″ wedge anchors 4 1/2″ or longer in 4 holes at the corners of mounting plate
- Anchor must be embedded 3″ or deeper in concrete
- Concrete should be 4.5″ or thicker
- Edge of concrete to fastener should be 3″ or greater
- Anchors to have 5 1/4″ separation
- Use a torque wrench to tighten anchor bolt to 25 foot pounds

Side Mount Posts

Special order mounting plates (7″ x 7″ x 3/8″ thick for concrete mounting) are required in order to achieve a standard 4 to 1 safety factor. Consult a design engineer for the safety factor needed for your project.

- 3/8″ wedge anchors 4 1/2″ or longer
- Anchor must be embedded 3″ or deeper in concrete
- Slab must be 11 1/2″ thick where side mounts are being installed
- The edge of concrete to the edge of top hole to be 3″ minimum
- Concrete must be normal weight 3000 psi or stronger
- Use a torque wrench to tighten anchor bolt to 25 foot pounds