



TITAN™ Code Compliant Modular Access System Assembly Manual

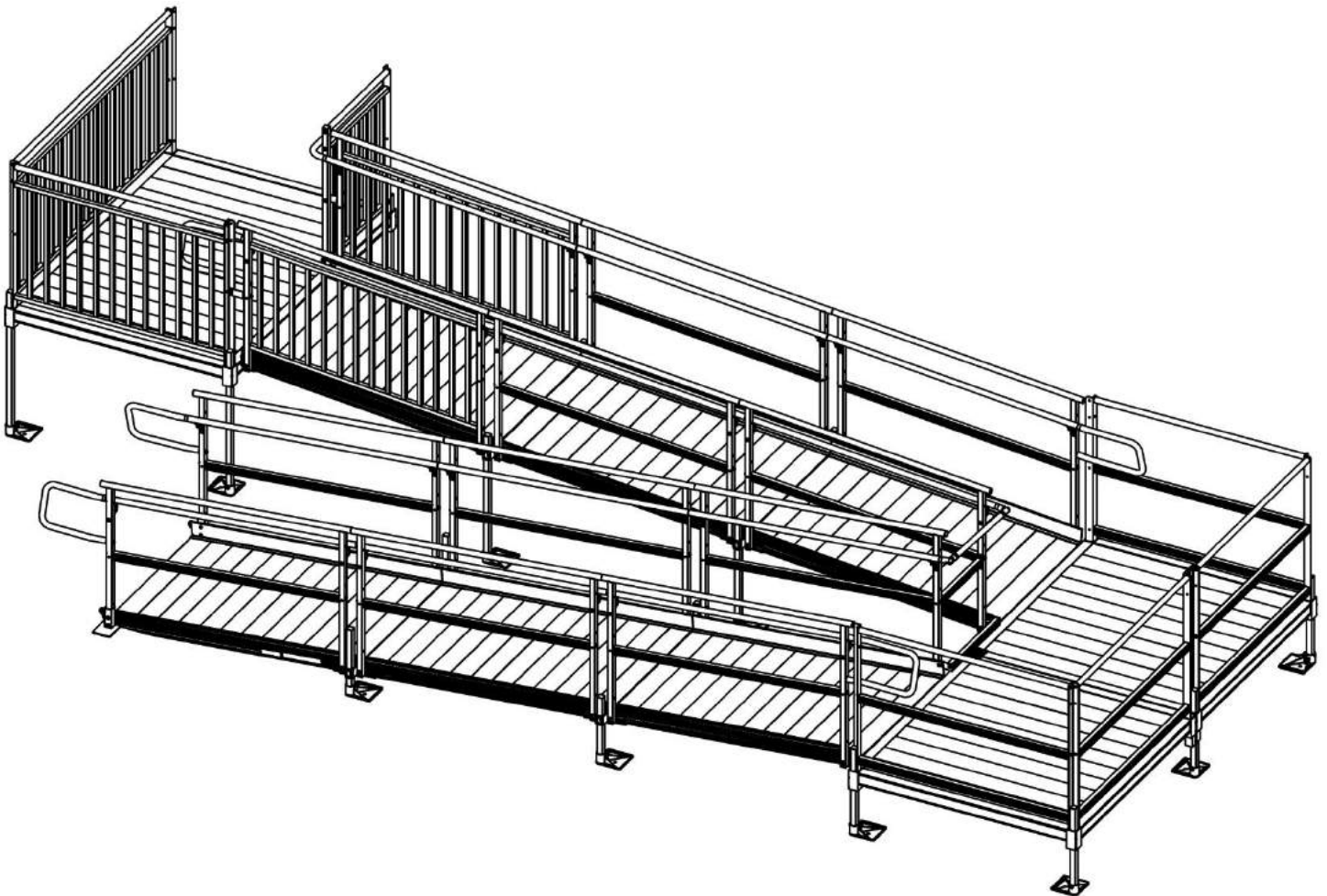


Image shown with multiple ramp and platform rail options.

3-YEAR WARRANTY. Please register at www.ezaccess.com/warranty-satisfaction.

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Manufactured in the USA



17845 REV 05-29-18

TITAN™ Code Compliant Modular Access System Assembly Manual

ATTENTION INSTALLER and END USER

-  Rated Load: 100 lbs. psf live load, 300 lbs. concentrated.
-  **DO NOT EXCEED RATED LOAD.**
-  Read this manual in its entirety, ensuring you understand all instructions and warnings prior to ramp assembly and use.
-  Ensure this ASSEMBLY MANUAL is left with the end user.
-  Please read and become familiar with the 'MAINTENANCE' section of this manual.
-  Fill out online warranty registration.



TOOLS TYPICALLY REQUIRED

- | | |
|--|---|
| ✓ 1/2" SOCKET OR 1/2" WRENCH | ✓ 3/16" ALLEN WRENCH (INCLUDED) |
| ✓ 9/16" SOCKET OR 9/16" WRENCH | ✓ BOX KNIFE |
| ✓ 5/16" SOCKET OR 5/16" WRENCH | ✓ HAMMER |
| ✓ LEVEL | ✓ 1/4" MASONRY DRILL BIT (USED WHEN INSTALLING TO CONCRETE PORCH, STEP, ETC.) |
| ✓ FILE | ✓ DIGGING TOOLS (IF A SURFACE OBSTACLE NEEDS TO BE REMOVED) |
| ✓ RUBBER Mallet | ✓ HACKSAW (FOR OPTIONAL HANDRAIL KITS) |
| ✓ POWER DRILL | ✓ PLIERS |
| ✓ 25' TAPE MEASURE | ✓ CLAMP |
| ✓ #2 PHILLIPS HEAD SCREW DRIVER | |
| ✓ 5/16" DRILL BIT (IF BRACE ASSEMBLIES ARE USED) | |
| ✓ 5/32" ALLEN WRENCH (INCLUDED) | |

VIEW PACKING LIST

Each ramp system is shipped with a packing list. Be sure to check that all items are present before starting installation.

SYMBOL MEANINGS, WARNINGS, AND NOTES

-  The **WARNING** symbol indicates a potentially hazardous condition/situation. The safety warnings throughout this manual, and on your equipment, if any, are for the protection of people and property. Failure by any operator to abide by safety warnings will result in a waiver of all liabilities, loss of your warranty, and could result in equipment damage and or failure, property damage, risk of serious bodily injury, and or death. The symbol may appear in various colors and in conjunction with other symbols and with or without the written word "WARNING".
-  The **NOTE** symbol indicates important information. Failure to obey all notes could result in improper operation, less-than-optimum equipment performance, and at the sole discretion of the equipment manufacturer, may void your warranty. The symbol may appear in various colors and in conjunction with other symbols and with or without the written word "NOTE".

WARNINGS

- ⚠ Do not play on or near ramp.
- ⚠ Do not use handrails or ramp to support planters, decorations, etc.
- ⚠ RAMP SURFACE MAY BECOME SLIPPERY WHEN WET, USE EXTRA CAUTION WHEN THE RAMP SURFACE IS WET.
- ⚠ Use ramp only with a qualified helper.
- ⚠ Always use your mobility device's lap belt.
- ⚠ It is important that you refer to your mobility equipment's Owner Guide for the proper degree of incline/decline and chair direction before attempting ramp use. Never exceed its recommendations.
- ⚠ This product must be installed and maintained in accordance with your applicable local codes and rules. Ask a local contractor for additional information and assistance.
- ⚠ Read and follow all labels, instructions, and warnings prior to assembly and use. To obtain a copy of complete instructions and warnings, call customer service at 1-800-258-8503.
- ⚠ Use caution at all times. Proper maintenance and upkeep to the TITAN™ Commercial Access System and all of its components is vital.
 - 👉 The term "system" refers to the entire TITAN Commercial Access System (also referred to as TITAN), including any gates, steps, ramps, platforms, risers, handrails, supports, transition plates, landing pads, and any/all hardware and components which are intended to be assembled on the TITAN Commercial Access System.
- ⚠ Regularly check that all parts are in good condition and check the system for damage. Ensure all fasteners and locking mechanisms are in place and tightened. If any part of the system is damaged, loose, or missing, DO NOT USE until system repairs can be made by a certified installer or other qualified person.
- ⚠ Do not walk, sit, stand, etc. on the system until the installation is complete.
- ⚠ Consult local building codes regarding securing system for wind loads.
- ⚠ Use system only with a qualified helper.
- ⚠ Keep the system clear of debris and clutter. Do not use if walking surface is unsafe.
- ⚠ At all times, keep the system clear of dirt, leaves, and other debris that may accumulate on the surface. Simply sweeping the system or using a garden hose will usually suffice, but, if needed, a damp cloth or soft brush with mild soap and water can be used (avoid alkaline detergents). Rinse well and use extra caution when system surface is wet.
- ⚠ If system surface is covered with ice and/or snow, DO NOT USE until accumulation is removed and the tread surface swept clean. Please refer to 'DEICING SECTION' of this for more information.
- ⚠ Confirm the system is correctly leveled and positioned securely. Periodically check for ground shifts.
- ⚠ Metal conducts electricity. Do not use near exposed wiring or hang lights from system.
- ⚠ Never place anything on, under, or attach anything to system.
- ⚠ Do not use any other part of the system to support planters, decorations, etc.
- ⚠ Only use components supplied or approved by manufacturer with system.
- ⚠ Do not sit, stand, or climb on guards, gates, or handrails.
- ⚠ Do not play on or around system, including, but not limited to, running, jumping, bicycles, scooters, skateboards, etc.
- ⚠ Properly support and restrain system in transit or storage.
- ⚠ The system may be slippery when wet or icy.
- ⚠ Regularly check that all parts are in good condition and check the system for damage. Ensure all fasteners and locking mechanisms are in place and tightened. If any part of the system is damaged, loose, missing, or unstable DO NOT USE until repairs can be made by a certified installer or other qualified person.
- ⚠ For additional care, usage, or general safety information, please call 1-800-258-8503.

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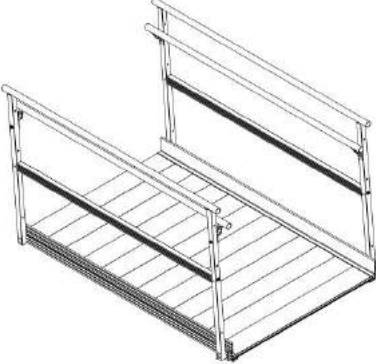
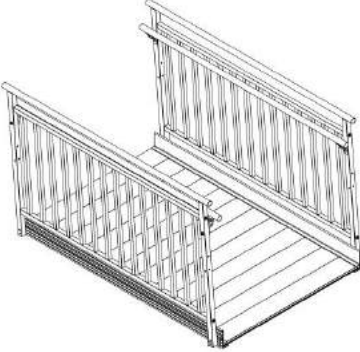
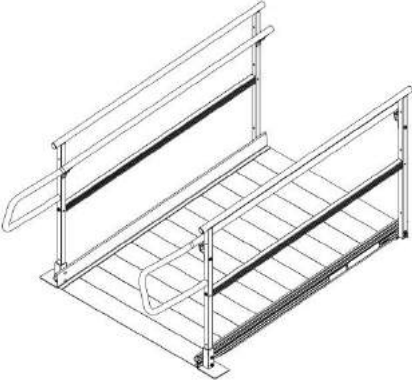
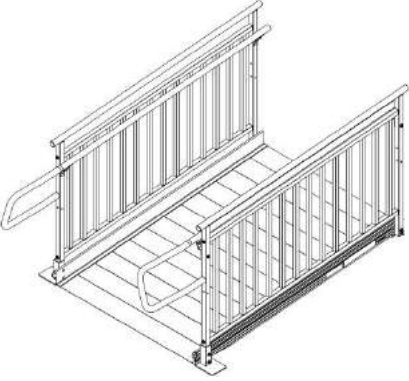
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1. **BASIC SYSTEM COMPONENTS**

Because each ramp configuration will differ from one another, your system may or may not contain all of these basic system components. Identify your system components before you begin.

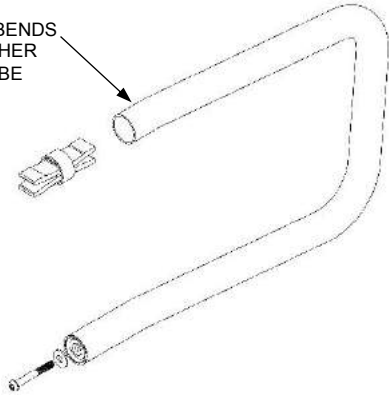
RAMPS AND RAMP HANDRAIL OPTIONS	
RAMP WITH TWO-LINE HANDRAILS	RAMP WITH PICKETED GUARDS
	
STARTER RAMP WITH TWO-LINE HANDRAILS*	STARTER RAMP WITH PICKETED GUARDS*
	

***END LOOPS NOT INCLUDED**

KEY RAMP COMPONENTS

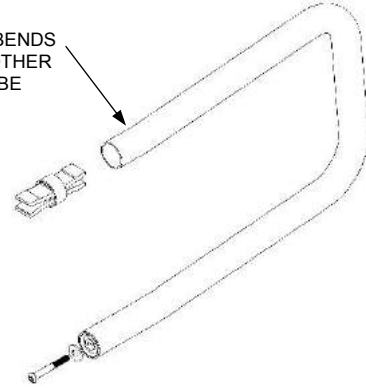
TRHRLU – HANDRAIL END LOOP UPPER

END OF TUBE BENDS
TOWARD OTHER
END OF TUBE

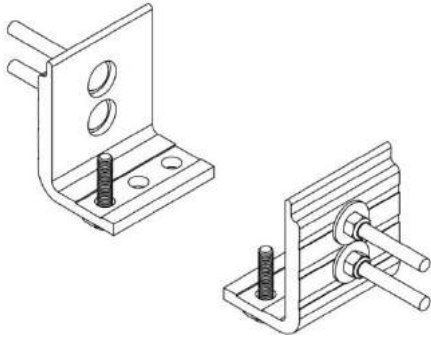


TRHRL – HANDRAIL END LOOP LOWER

END OF TUBE BENDS
AWAY FROM OTHER
END OF TUBE

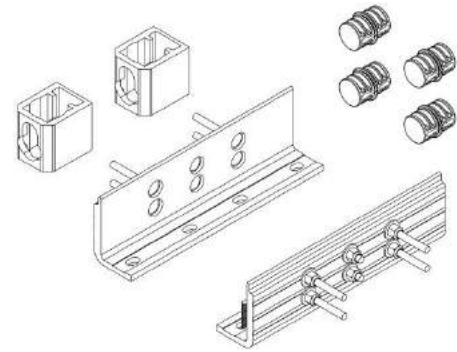


TRHBPR – RAMP HANDRAIL END BRACKET (PAIR)



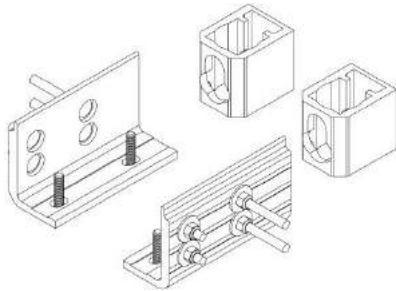
TRRC – CONNECTOR RAMP TO RAMP

INCLUDES
COMPONENTS
TO CONNECT
RAMPS AND
RAMP
HANDRAILS

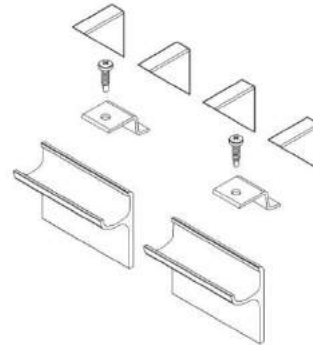


TRST – RAMP SUPPORT

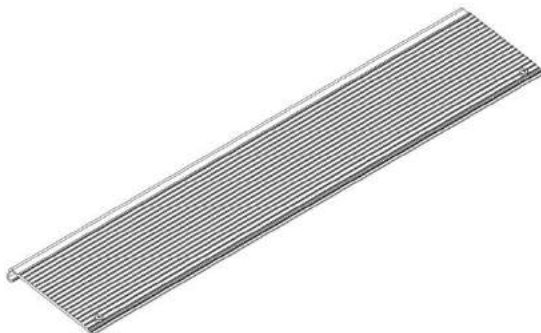
USED WHEN LEGS
SUPPORT UPPER
OR LOWER END OF
RAMP ONLY



TRHP – RAMP HANGER PAIR



TTP48 & TTP54 – RAMP TRANSITION PLATE

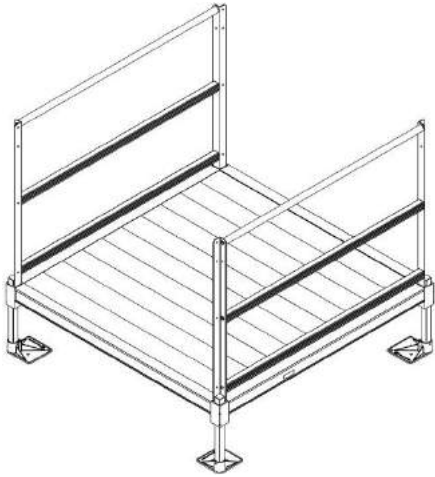


THREP - HANDRAIL END PLUG

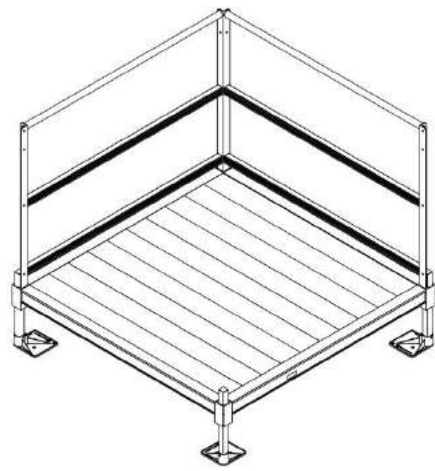


PLATFORMS AND PLATFORM HANDRAIL OPTIONS

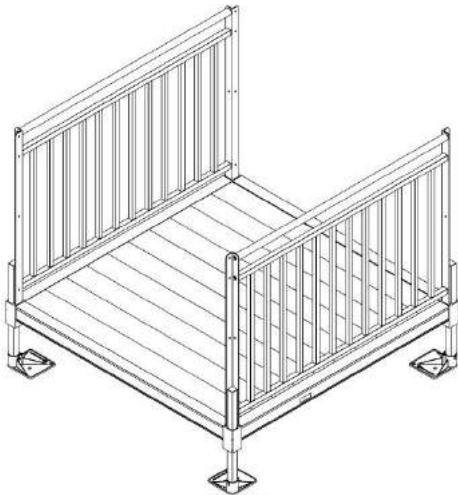
**PLATFORM WITH TWO-LINE RAIL
(STRAIGHT CONFIGURATION)***



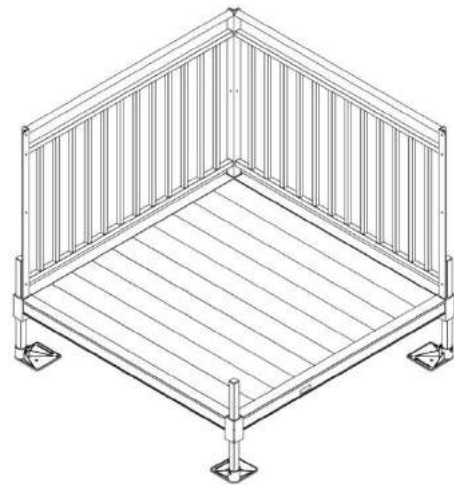
**PLATFORM WITH TWO-LINE RAIL
(TURN CONFIGURATION)***



**PLATFORM WITH PICKETED GUARDS
(STRAIGHT CONFIGURATION)***



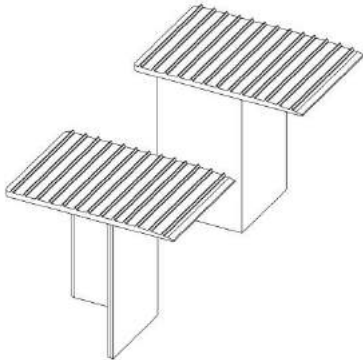
**PLATFORM WITH PICKETED GUARDS
(TURN CONFIGURATION)***



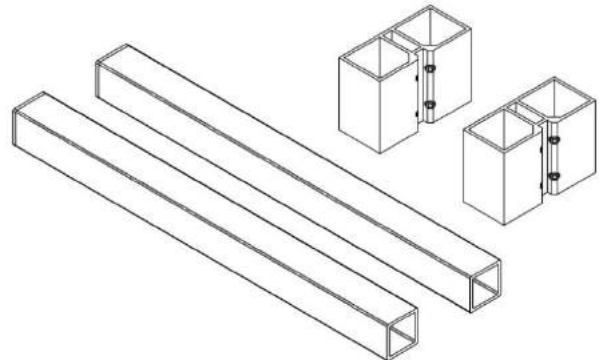
***FEET & LEGS SHOWN FOR CONTINUITY, NOT INCLUDED**

KEY PLATFORM COMPONENTS

TCPCPR – CORNER POCKET COVER PAIR

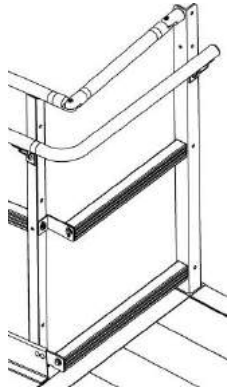


TPPC – CONNECTOR PLATFORM TO PLATFORM

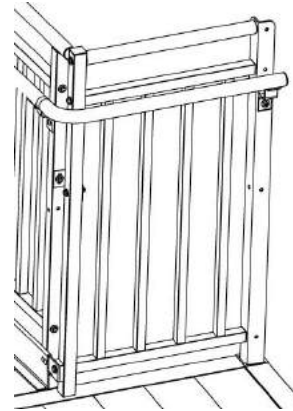


CLOSURE OPTIONS

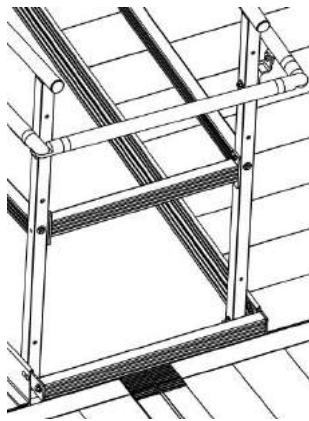
**TCTL5, TCTL6, TCTL7
TWO-LINE RAIL CLOSURE**



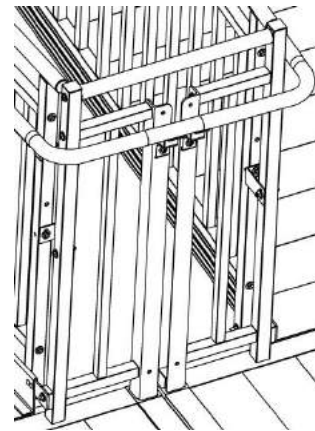
**TCG5, TCG6, TCG7, TCG654, TCG754
PICKETED GUARD CLOSURE**



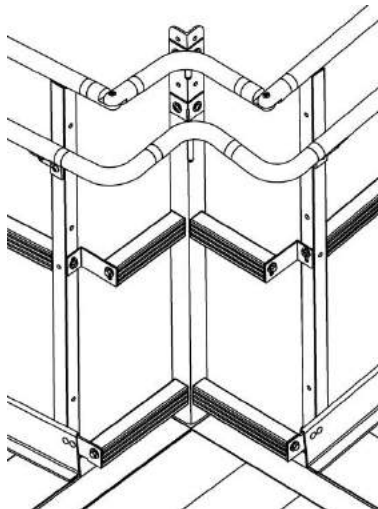
**TTBCTL5, TTBCTL6
TURN BACK CLOSURE TWO-LINE RAIL**



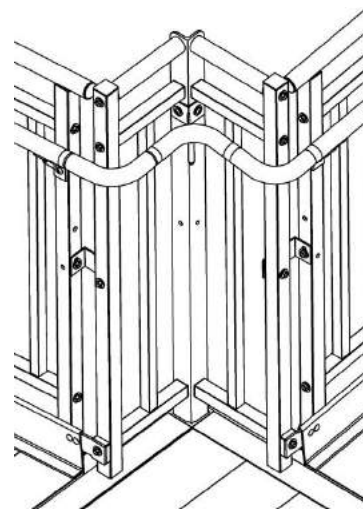
**TTBCG5, TTBCG6, TTBCG554, TTBCG654
TURN BACK CLOSURE PICKETED GUARD**



**TCTCTL5, TCTCTL6
CORNER TURN CLOSURE TWO-LINE RAIL**



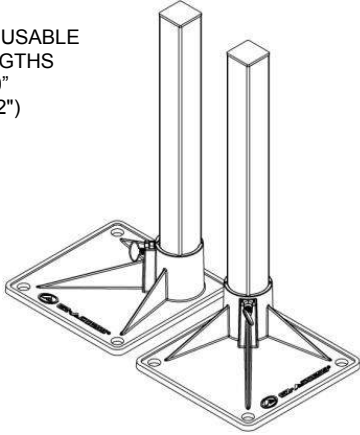
**TCTCG5, TCTCG6, TCTCG554, TCTCG654
CORNER TURN CLOSURE PICKETED GUARD**



ADDITIONAL COMPONENTS FOR RAMPS & PLATFORMS

TSLxxPR RAMP & PLATFORM SUPPORT LEGS WITH FEET (PAIR)

XX DENOTES USABLE
LENGTH (LENGTHS
AVAILABLE 10"
THROUGH 112")



TXB36 & TXB736 – CROSS BRACE

- TXB36 USED ON 5' & 6' PLATFORM SIDES & RAMPS
- TXB736 USED ON 7' PLATFORM SIDE



2. PLATFORMS

2.1. INSTALL PLATFORMS



If your system does not include a platform, skip to 'CONNECT RAMP SECTIONS'.

Platform handrails are shown (FIGs. 2.1, 2.2, and 2.3) for clarity of how to orient platforms in various configurations. It is strongly suggested that all platforms and ramps be installed before installing handrails (see 'HANDRAILS' section).

2.1.1. There are three basic platform arrangements (one or more of these platform arrangements may be used in an installation). All three require the same procedure for assembly except for FIG. 2.3, which requires an additional TPPC (CONNECTOR - PLATFORM TO PLATFORM).

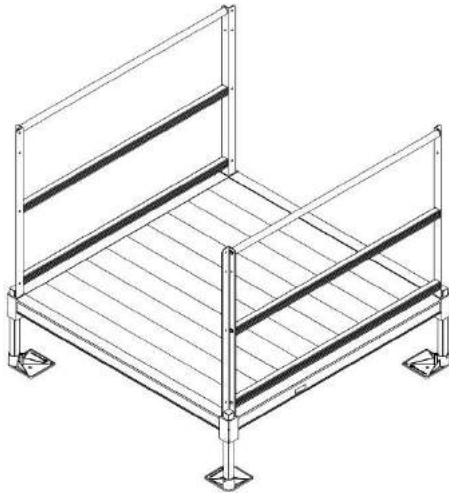


FIG. 2.1

Platform in straight configuration

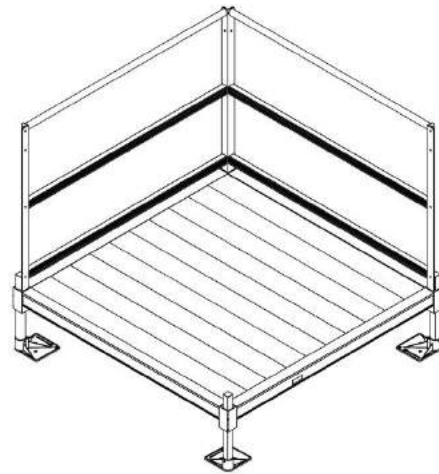


FIG. 2.2

Platform in turn configuration

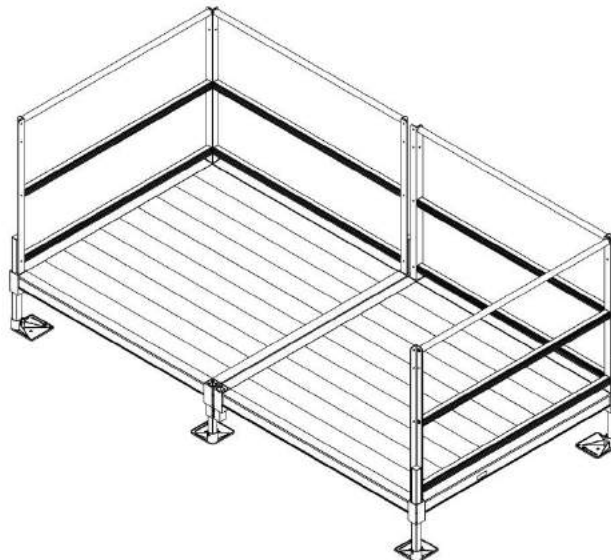


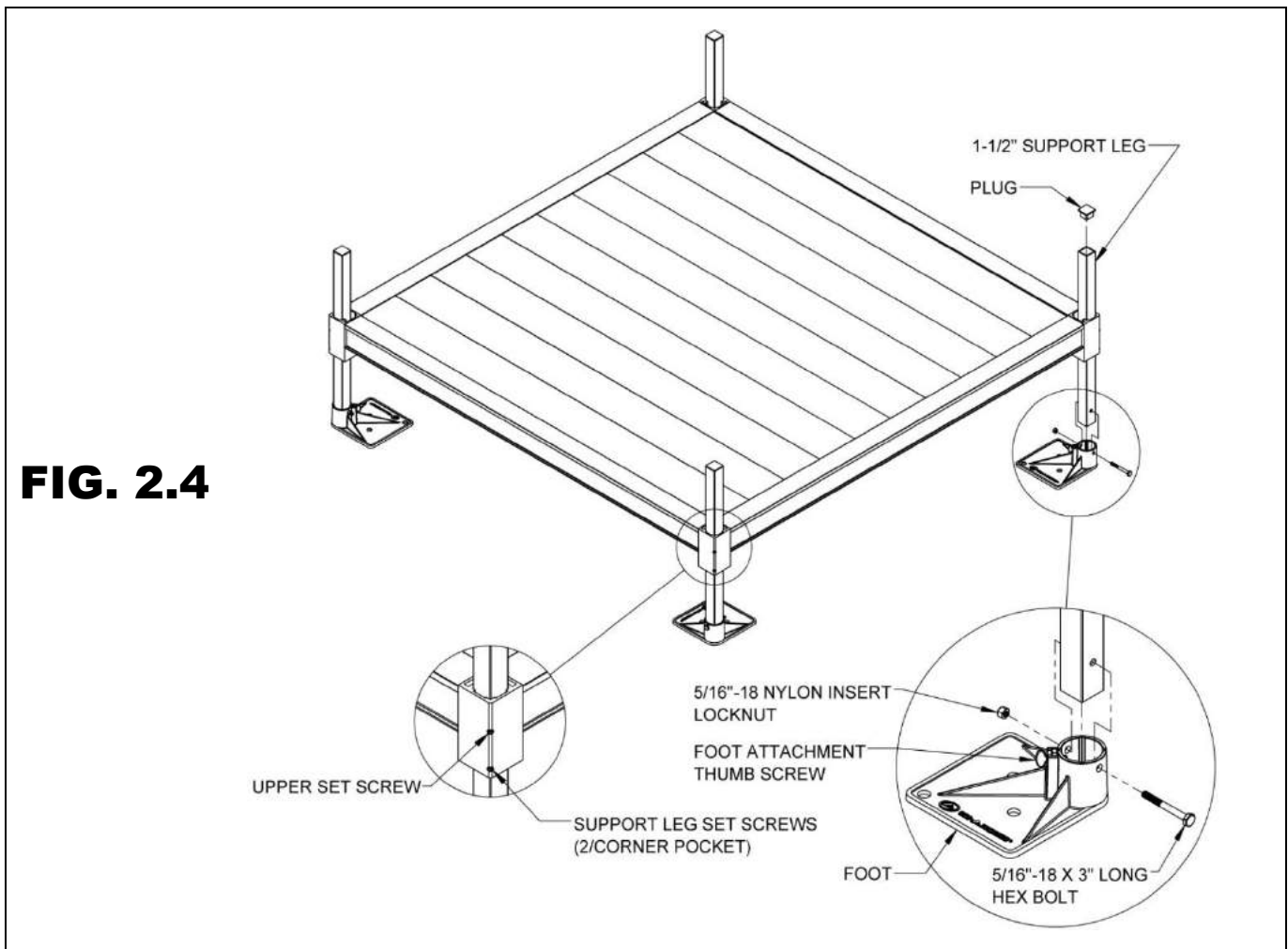
FIG. 2.3

Platforms in turn back configuration

(Any two platforms with equal length sides can be connected in a turn back configuration)

2.2. INSTALL SUPPORT LEGS AND FEET, THEN ADJUST PLATFORM HEIGHT

- 2.2.1. Support legs, plugs, and feet come in pairs. Support legs will come in lengths sufficient for the heights at specific locations.
- 2.2.2. Loosen all set screws in the platform corner pockets.
 - 2.2.2.1 Set screws on the outside of the platform are for the platform support legs.
 - 2.2.2.2. Set screws on the inside of the platform are for the handrail posts.
- 2.2.3. Tip the platform on its side, then slide the support legs into the four platform corner pockets. Adjust the support legs to the approximate platform height needed (FIG. 2.4).
 - 👉 The platform support legs must extend at least 4" above the walking surface (or corner pocket) to reach above the lowermost hole in the 2" x 2" angle post which will be installed in a later step.



- 2.2.4. Use supplied 3/16" Allen wrench to tighten the upper (see FIG. 2.4) of the two set screws in the corner pocket, snug fit just enough to hold the support legs in place but do not over tighten (second set screw will be tightened after final height adjustments).
 - 👉 Platforms configured as a turn back platform (FIG. 2.3) will have six legs to adjust.
 - ⚠ Do not attempt to walk on the platform until all support leg set screws have been tightened securely.
- 2.2.5. Place the platform (with support legs attached) into the upright position.
 - ⚠ Do not let the weight of the platform bear on the support legs while tipping the platform upright.

- 2.2.6. Lift each corner of the platform and install a foot on each support leg, oriented so that the foot extends under the platform (FIG. 2.4).
- ⚠ The feet can be oriented in other directions if necessary due to site conditions but may present a tripping hazard if not oriented under the platform.
 - ⚠ It is the installer's responsibility to install the system in a manner which is safe for the persons on and around the system and clearly mark any hazards created by the installation.
- 2.2.7. Make sure the feet are fully engaged on the legs and tighten the thumb screw on each foot securely.
- 🖐 If installing on soft soil it may be necessary to set the foot on a concrete pad, or make other arrangements. Talk with your local contractor for additional information.
- 2.2.8. Using hole in foot as a template, drill an 11/32" or 3/8" hole through each support leg.
- 2.2.9. Install a 5/16"-18 x 3" long hex bolt through the support leg and foot, then secure with the 5/16"-18 nylon insert locknut.
- 2.2.10. Adjust the final height of the platform by adjusting legs, one at a time, by loosening the outer set screws in the platform corner pockets. Using a level, adjust the platform height and re-tighten.
- 2.2.11. Once the final height has been adjusted, tighten the second, lower set screw in each platform corner pocket.
- 2.2.12. Insert a plug into the top of each support tube; use a rubber mallet if needed (FIG. 2.4).
- 2.2.13. Ensure all set screws are tightened securely.
- ⚠ Do not forget to tighten the upper set screws you previously snug fit.

2.3. CONNECT TWO PLATFORMS TOGETHER

- 2.3.1. Assemble the first platform as described in the previous steps except on the side where the second platform will connect, install two TPPC (CONNECTOR – PLATFORM TO PLATFORM) before installing feet onto the support legs.
- 🖐 Make sure the platform connector set screws are oriented outward so they will be accessible.
 - 🖐 Any two platforms of the same width can be connected. For example, two 5' x 5' or 5' x 6' platforms are often connected to make a turn back platform.
- 2.3.2. Slide the platform connectors up until they contact the bottom of the platform and tighten the set screws securely (FIG. 2.5).
- 2.3.3. Install a support leg stub into the open pocket in each connector until the bottom of the stub is flush with the bottom of the connector, then tighten the set screws securely.
- 2.3.4. Install a plug in the top of each support leg stub.
- 2.3.5. Assemble the second platform as described in the previous section except only install support legs, plugs, and feet on the opposite side of where the platforms will connect (FIG. 2.6).
- 2.3.6. Lift the second platform and slide the open corner pockets over the support leg stubs extending up from the platform connectors. Tighten the set screws in the platform corner pockets securely.
- 2.3.7. Adjust the platform heights and level as needed.
- ⚠ Make sure all the set screws in both the platform corner pockets and the platform connectors are tightened securely before proceeding with installation.

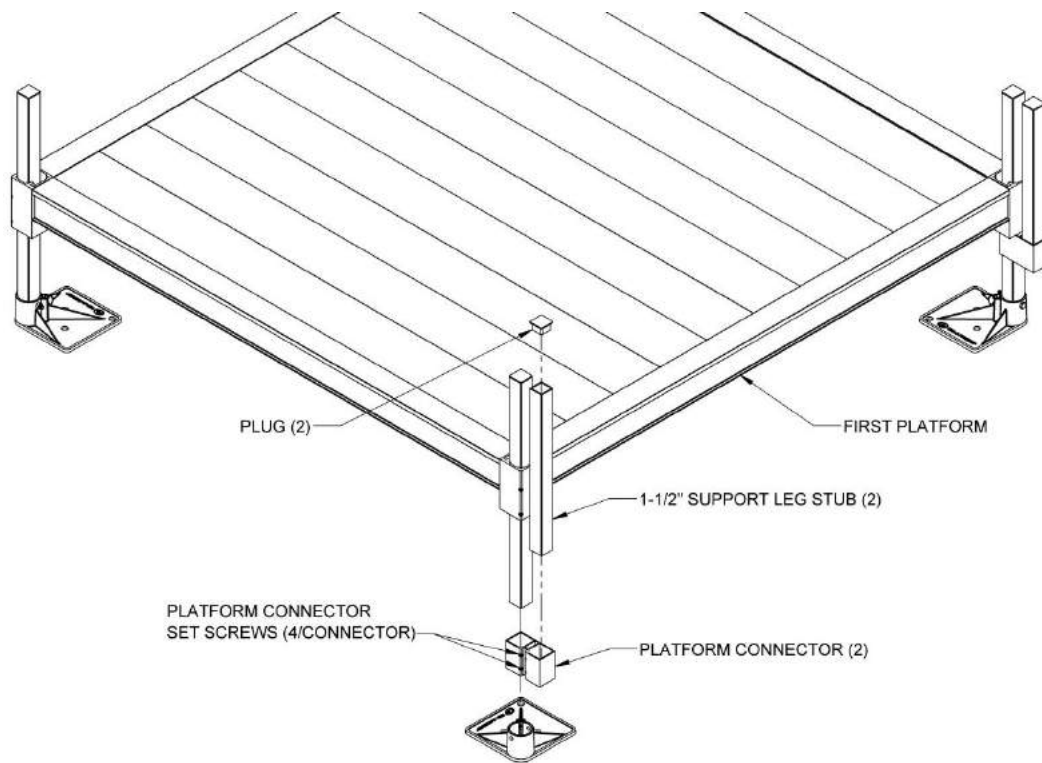


FIG. 2.5

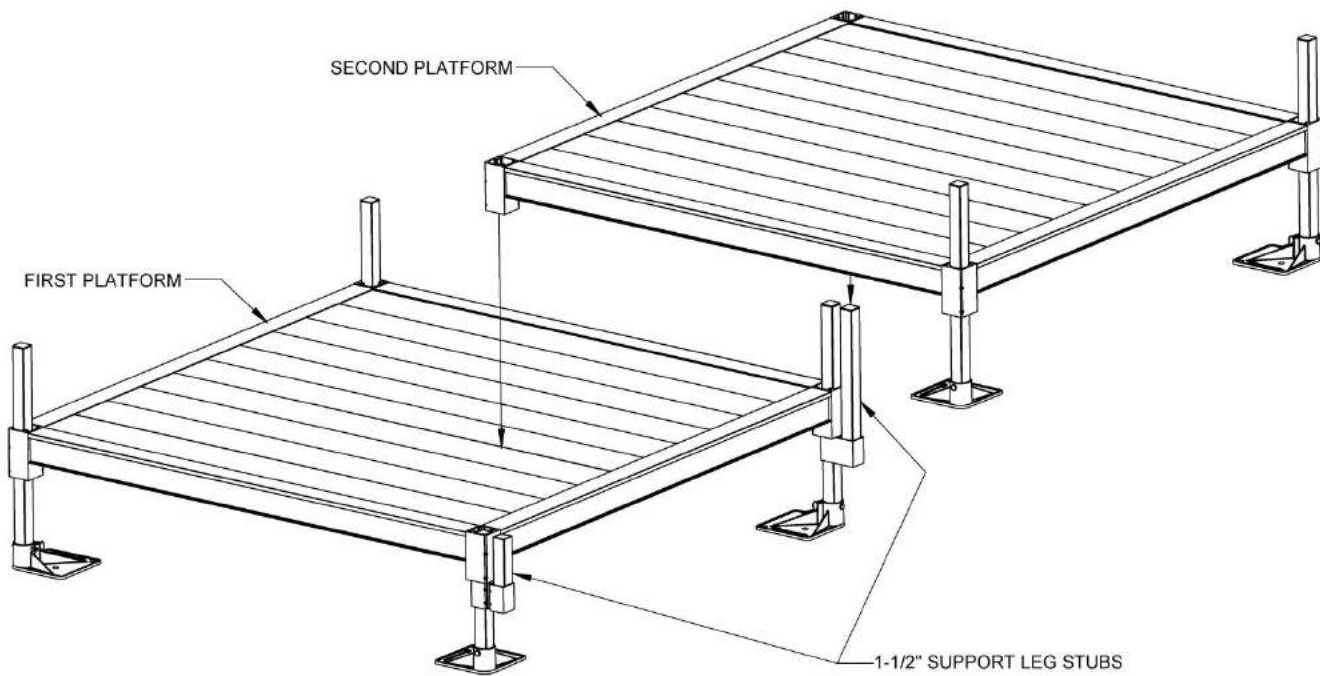
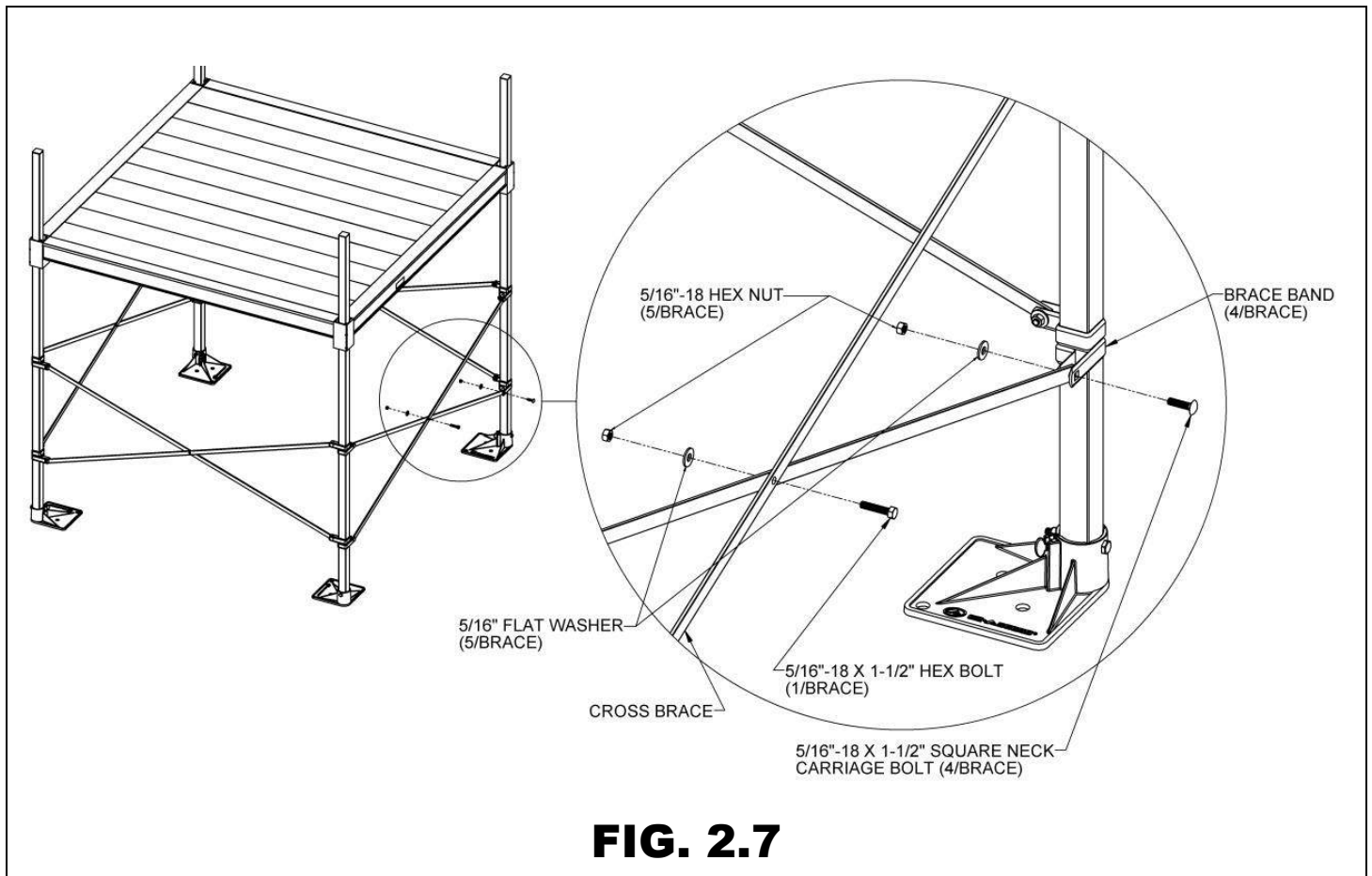


FIG. 2.6

2.4. INSTALL CROSS BRACE

For added stability, platforms with walking surfaces over 36" high require bracing. The TXB36 CROSS BRACE is used for 5' and 6' platform sides and ramps. The TXB736 CROSS BRACE is used for 7' platform sides.

- 2.4.1. Use four braces per platform or six braces when two platforms are connected.
- 2.4.2. Separate ends of brace bands until they fit around the 1-1/2" support leg.
 - 2.4.2.1. Install four bands on each leg with the part containing bolt holes at 90 degrees from each other and in line with the outer edge of the foot (FIG. 2.7).
- 2.4.3. The cross brace should be placed approximately in the middle of the platform legs on all four sides with the top brace bands a minimum of two feet from the bottom brace bands.
- 2.4.4. Assemble the cross brace by installing the 5/16"-18 x 1-1/2" hex bolt, 5/16"-18 hex nut, and 5/16" flat washer through the center hole in the braces. Tighten enough to hold the brace together but still allow it to pivot around the bolt (FIG. 2.7).



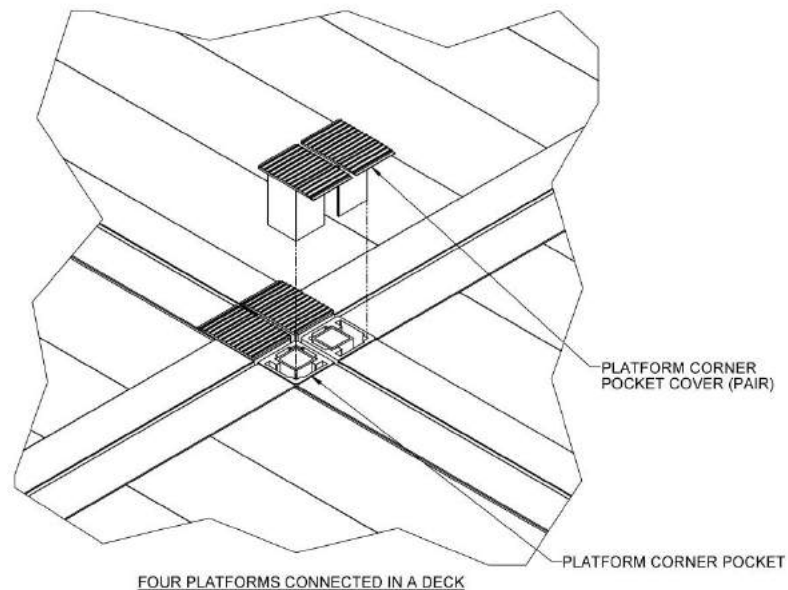
- 2.4.5. If needed for the location, trim the ends of the cross brace to fit.
- 2.4.6. Drill one 11/32" or 3/8" dia. hole on center approximately 1/2" from both ends of each brace.
- 2.4.7. Install the assembled CROSS BRACE between the legs of the brace bands using the four 5/16"-18 x 1-1/2" long square neck carriage bolts, 5/16"-18 hex nuts, and 5/16" washers provided (FIG. 2.7).
- 2.4.8. Tighten all fasteners securely.

2.5. CREATING DECKS FROM PLATFORMS

Decks can be created by combining platforms using TPPC (CONNECTORS – PLATFORM TO PLATFORM). Refer to SECTION 2.3, 'CONNECT TWO PLATFORMS TOGETHER'.


- ⚠ NEVER use two leg stubs at a platform connector; there must always be at least one leg with a foot reaching the ground in the connector.
 - ⚠ Regardless of the location of the platforms and the platform connectors in the deck, use a minimum of two legs per platform.
- 2.5.1. Whenever possible, alternate the direction of the platform connectors from one side of the platform to the other as the deck is being created.
 - 2.5.2. At locations where four platform corners meet, install the platform legs in opposite diagonal corners (whenever possible), and alternate the direction of the opposite diagonal corners at the next connection.
 - 2.5.3. Trim all legs and leg stubs on the interior of the deck at or below the top of the platform corner pockets as the deck is being created (the outer perimeter where two-line rails or picketed guards will be installed should not be trimmed).
 - 2.5.4. Locate the TCPCPR (PLATFORM CORNER POCKET COVERS), then insert the 2" x 2" angled edges into the pockets where the post would normally be installed.
 - 2.5.4.1. Tighten the set screws in corner pocket to hold the covers in place (FIG. 2.8).
 - 2.5.4.2. Refer to SECTION 4.6 and FIG. 4.11 for addition details on set screw locations.
- 👉 PLATFORM CORNER POCKET COVERS come in pairs of left and right hand, but can be installed in either platform corner pocket as long as they extend onto the platform side rail.

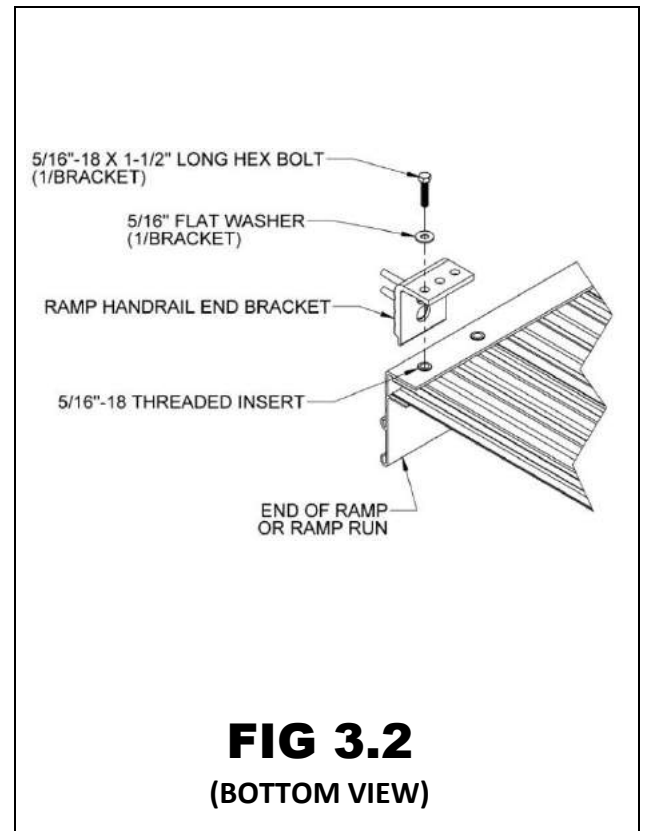
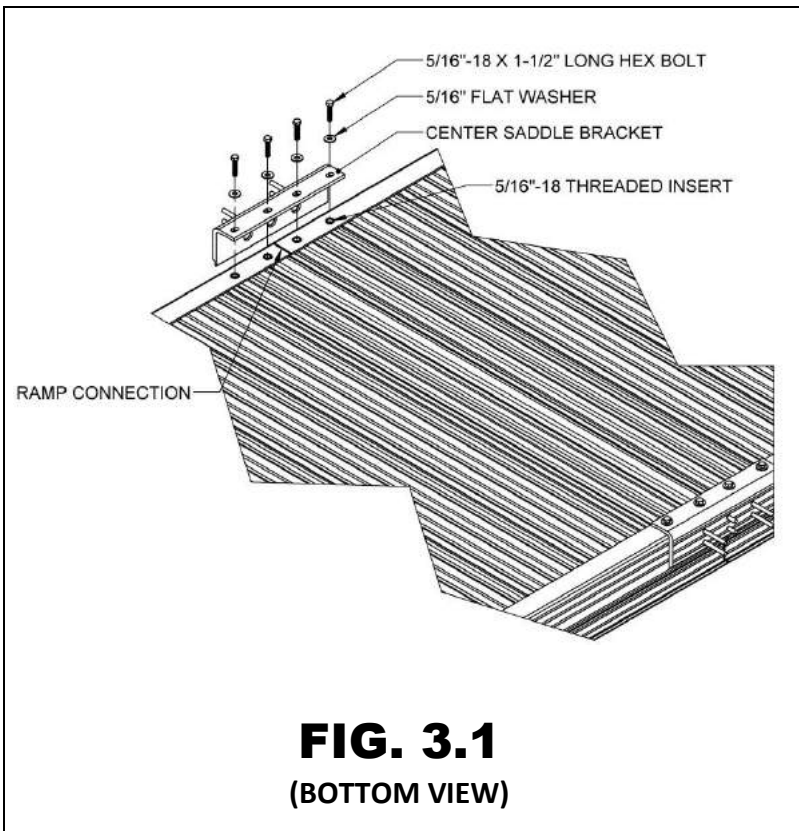
FIG. 2.8




3. RAMPS

3.1. CONNECT RAMP SECTIONS

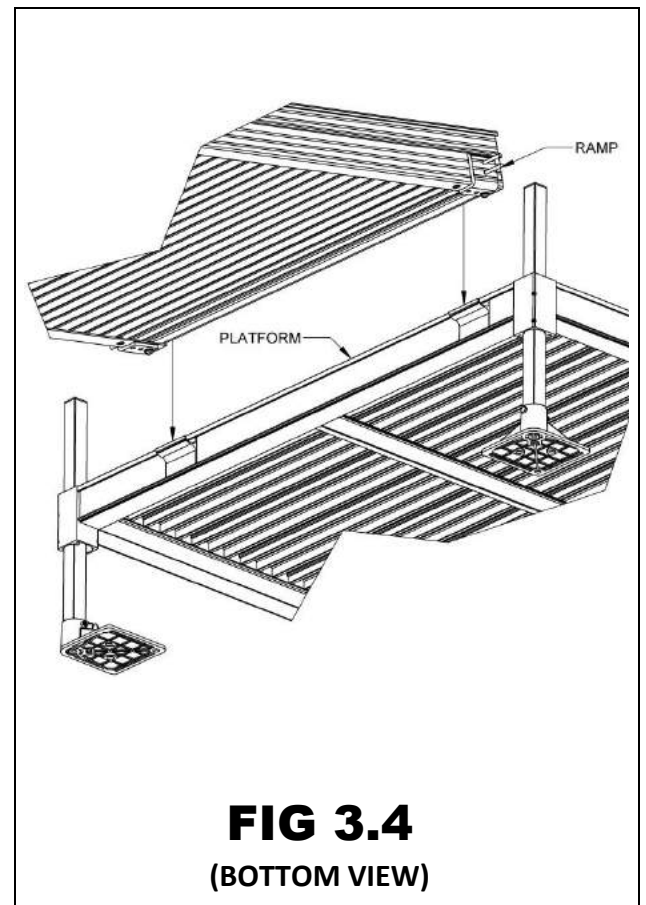
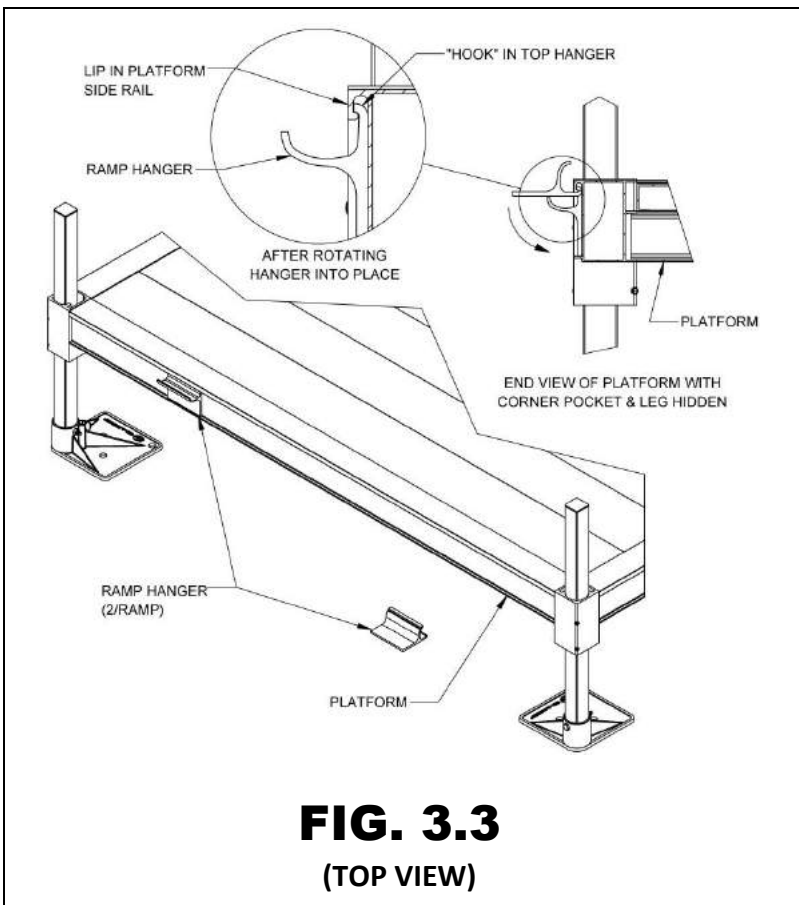
- 3.1.1. Place the walking surface side of the ramp sections face down, onto cardboard or lawn so that the ramp is not scratched, dented, or damaged.
- 3.1.2. Butt the two sections together, end-to-end, ensuring there is no gap, then position the two center saddle brackets, included in the TRRC (CONNECTOR – RAMP TO RAMP), over the threaded inserts at the end of each ramp section (FIG. 3.1).
- 3.1.3. One edge of the center saddle bracket will slide into the groove of the ramp sections.
 To create a run, ramp sections are connected using two interchangeable center saddle brackets per joint. The center saddle brackets are also where the handrails and ramp legs are attached.



- 3.1.4. Attach the center saddle brackets using four each 5/16"-18 x 1-1/2" bolts and 5/16" washers per bracket. Tighten all eight bolts (four each per center saddle bracket).
- 3.1.5. If you chose the TRST (RAMP SUPPORT) option, install as described in the 'OPTIONAL EQUIPMENT' section.
- 3.1.6. Locate TRHBPR (RAMP HANDRAIL END BRACKET PAIR). Install four end brackets (these will be used to attach handrails in a later step). Use one end bracket at each outside corner of the ramp or ramp run using one 5/16" x 1-1/2" bolt and washer into the threaded insert closest to the end of the ramp (FIG. 3.2).
- 3.1.7. Turn the joined ramps to their upright position, being careful not to damage the threaded studs.
- 3.1.8. The starter ramp (see image in 'BASIC SYSTEM COMPONENTS' section) is the ramp with the tapered section for transitioning to the ground and is generally the first ramp in the system. It connects to the other ramps in the system in the same manner described in this section.
 The starter ramp is only intended for use with the tapered section completely supported by the ground; do not use it in an elevated position.

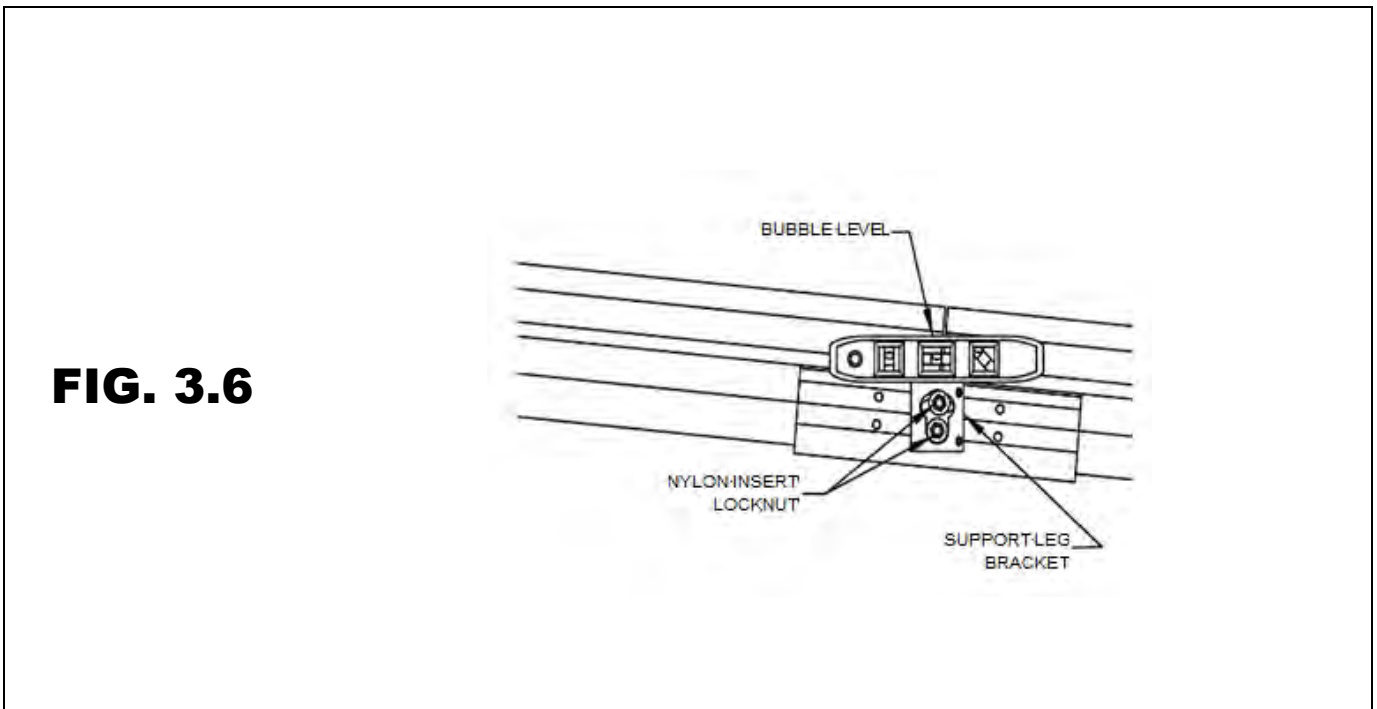
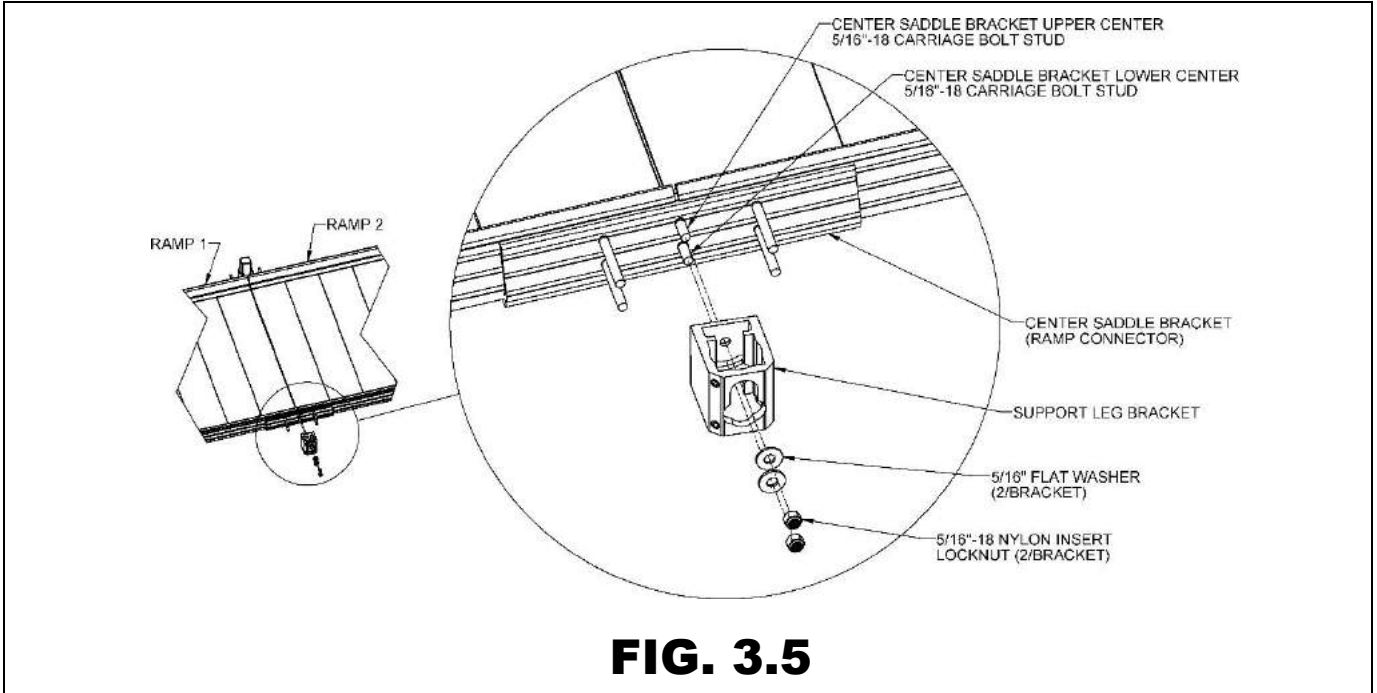
3.2. INSTALL RAMPS ON PLATFORMS

- 3.2.1. The following will address attaching a ramp or ramp run to a platform. If the ramp needs to be angled with respect to the platform or is going to be attached to an existing porch, skip to 'ANGLE RAMPS WITH RESPECT TO PLATFORMS, PORCHES, OR DECKS' in this section.
 - 3.2.2. Ramps are most commonly located toward either the left or right side of the platform. However, they can also be centered. When centered and using a 'TWO-LINE RAIL CLOSURE' (if this option is chosen), a second closure must be ordered to connect the ramp and platform handrails.
 - 3.2.2.1. When the ramp is located toward the side of a platform, the outside of the frame post should be aligned with the inside of the platform post. When placing a ramp in other locations on a guarded platform, custom components may be required. Please consult your sales representative.
 - 3.2.3. Locate a TRHP (RAMP HANGER PAIR) and install the two hangers in the platform side rail where the ramp will be attached.
 - 3.2.4. Hold the hanger perpendicular (approximately) to the platform side rail, then bring the hanger upward until it is against the side rail lip. Rotate the hanger and continue pushing upward in such a manner that the "hook" at the top of the hanger goes behind and catches on the lip in the top of the platform side rail and the hanger sits on the ledge at the bottom (FIG. 3.3).
 - 3.2.5. Set the ramp on the hangers. The hangers should be positioned as close as possible to the ramp side rails (FIG. 3.4). The procedure is the same at both the top and bottom of ramp runs which end at a platform unless a transition plate (installed in a later step; see SECTION 7) is used
- ⚠ Do not attempt to walk on ramps until installation is complete.

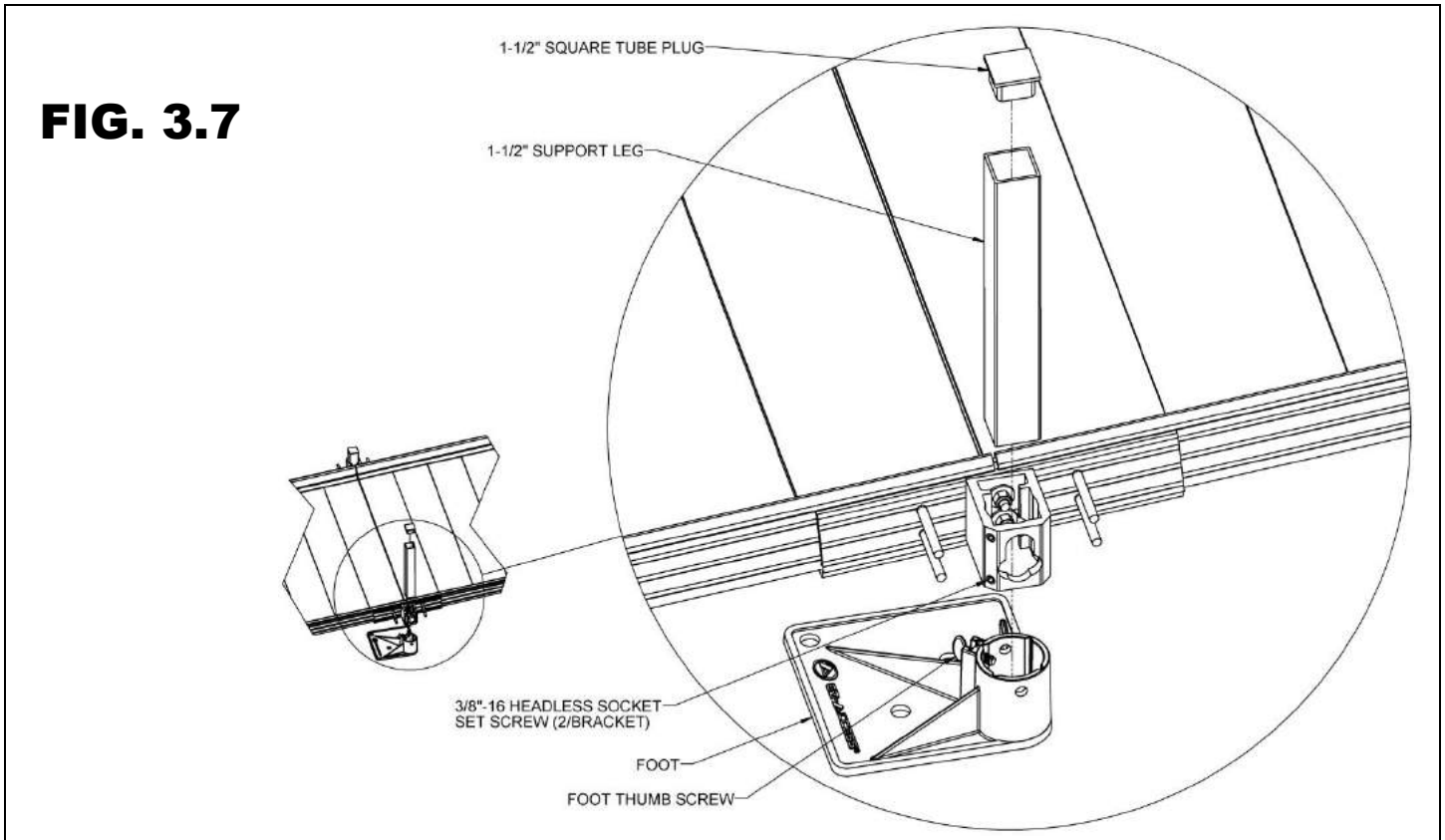


3.3. ATTACH SUPPORT LEGS TO RAMPS

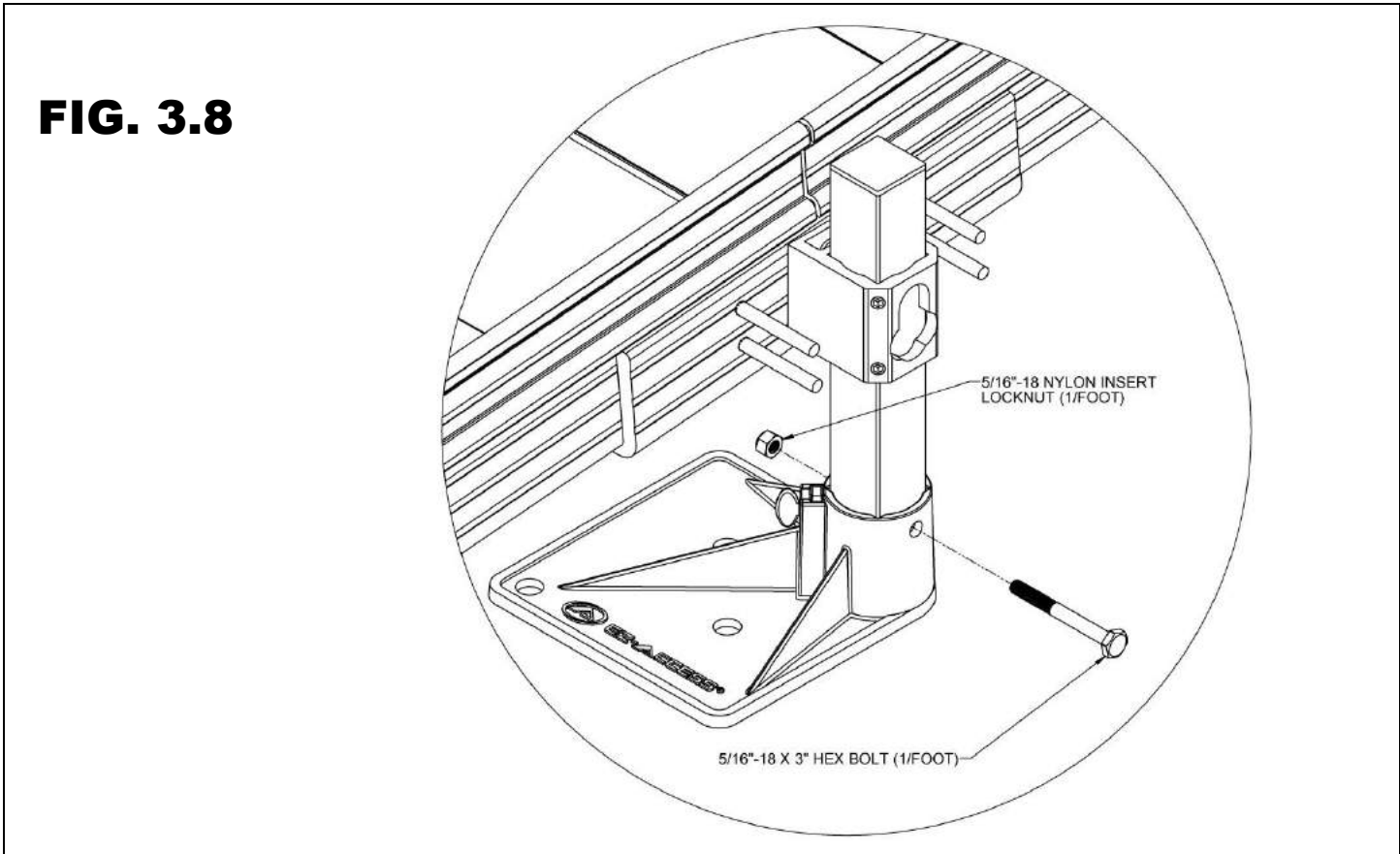
- 3.3.1. Install the support leg bracket, included in the TRRC (CONNECTOR – RAMP TO RAMP), on the center studs of the center saddle bracket with the round hole on the upper stud and the curved slot over the lower stud (FIG. 3.5).
- 3.3.2. Install the provided 5/16" flat washers and 5/16"-18 nylon insert locknuts onto the studs but do not tighten fully until the bracket has been leveled (FIG. 3.5).
- 3.3.3. Level the support leg bracket using a bubble level or similar tool, then torque the 5/16"-18 nylon insert locknuts to 20 ft.-lbs.
 - 3.3.3.1. Level the Leg Bracket using a bubble level or similar tool, then torque the two 5/16"-18 nylon insert locknuts to 20 ft.-lbs (FIG. 3.6).



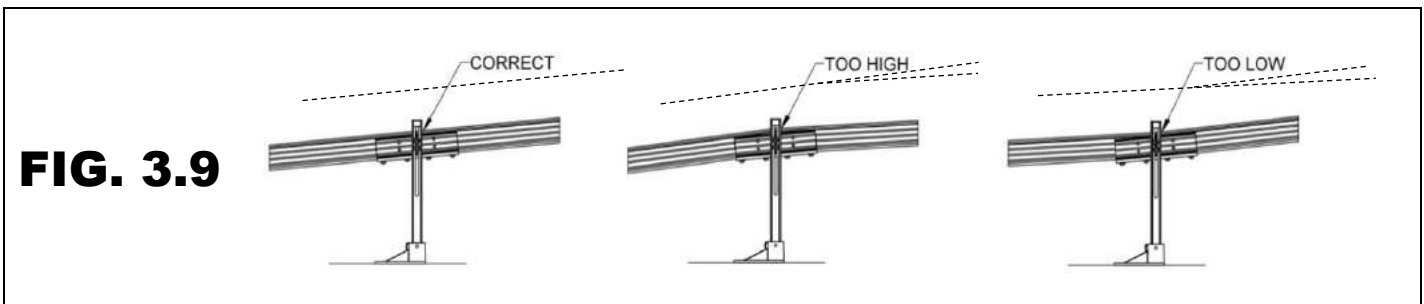
- 3.3.4. Locate the appropriate TSLxxPR SUPPORT LEG PAIR (where “xx” denotes the leg length) for the location. Place a foot under the support leg bracket with the foot extending under the ramp, then insert a 1-1/2” support leg through the support leg bracket into the foot. Loosen the 3/8”-16 headless socket setscrews and the foot’s thumb screw if needed to fully engage the support leg in the foot (FIG. 3.7).
- 🖐 If installing on soft soil it may be necessary to set the foot on a concrete pad.
- 3.3.5. After the support leg is fully engaged in the foot, tighten the 3/8”-16 headless socket setscrews to 15 ft.-lbs. (FIG. 3.7).
- ⚠ Do not attempt to walk on the ramps until all support leg set screws have been tightened as specified.
- 3.3.6. Tighten the foot’s thumb screw and insert 1-1/2” square plug into the top of support leg.



- 3.3.7. Use hole in the foot as a template to drill an 11/32" or 3/8" hole through each support leg (FIG 3.8).
- 3.3.8. Install a 5/16"-18 x 3" long hex bolt through the support leg and foot, then secure with the 5/16"-18 nylon insert locknut.



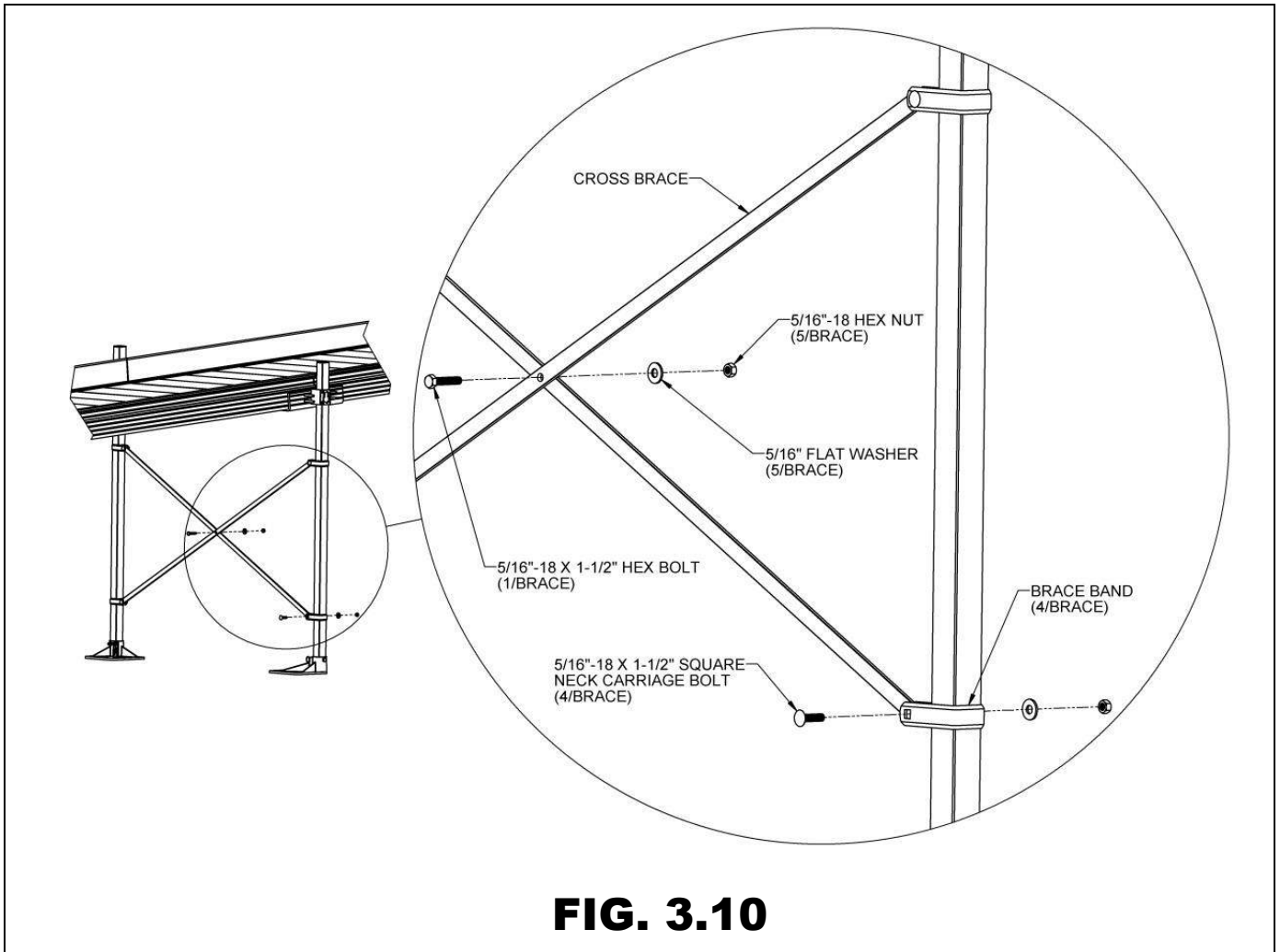
- 3.3.9. Adjust the ramp support legs one at a time.
 - ✎ Building codes and ADA guidelines call for a maximum slope of 1:12 (approximately 5°) and this is the required slope for the TITAN system.
 - 3.3.9.1. Raise (or lower) the ramp sections at the center saddle bracket to take any sag out of the ramp run, then retighten the two set screws in each support leg bracket to 15 ft.-lbs. as specified.
 - ✎ Adjusting sections can be accomplished by having someone sight down the ramp while another person adjusts the ramp height.
 - ✎ It's important to ensure that the ramp sections are parallel to each other. If they are not, it may be difficult to install the handrails (FIG. 3.9).
- 3.3.10. Ensure that all bolts and set screws are tight and the ramp sections are aligned parallel, on the same plane, to one another.



3.4. INSTALL CROSS BRACE - RAMPS

If the ramp walking surface is over 36" high, a TXB36 (CROSS BRACE) must be installed under the ramp (FIG. 3.10).

- 3.4.1. Separate ends of brace bands until they go around the support legs.
 - 3.4.1.1. Install two bands on each leg with the part containing bolt holes extending under the ramp and aligned with the brace bands on the opposite side (FIG. 3.10).
- 3.4.2. The cross brace should be placed approximately in the middle of the ramp legs with the top brace bands a minimum of two feet from the bottom brace bands.
- 3.4.3. Assemble the cross brace by installing the 5/16"-18 x 1-1/2" hex bolt, 5/16"-18 hex nut and 5/16" flat washer through the center hole in the braces. Tighten enough to hold the brace together but still allow it to pivot around the bolt (FIG. 3.10).



- 3.4.4. If needed for the location, trim the ends of the cross brace to fit.
- 3.4.5. Drill one 11/32" or 3/8" dia. hole on center approximately 1/2" from both ends of each brace.
- 3.4.6. Install the assembled cross brace between the legs of the brace bands using the four 5/16"-18 x 1-1/2" long square neck carriage bolts, 5/16"-18 hex nuts, and 5/16" washers provided (FIG. 3.10).
- 3.4.7. Tighten all fasteners securely.

3.5. INSTALL A SINGLE RAMP OR RAMP RUN TO AN EXISTING STRUCTURE

If installing a ramp run to an existing landing other than a TITAN platform, such as a porch, deck, stairs, etc., follow these steps:



Installing a ramp or ramp run to an existing structure requires a TRST (RAMP SUPPORT TOP) and a TTP48 or TTP54 (TRANSITION PLATE 48" or 54"), depending on the ramp width. Assemble and connect the ramp sections, connectors, legs, and feet as described in the preceding sections, then install ramp support top and a transition top plate at the upper end of the run as described in the 'OPTIONAL EQUIPMENT' section.

3.5.1. Maneuver the ramp to the desired position and place the transition top plate onto the supporting surface (platform, porch, etc.).

3.5.1.1. Make sure as much of the transition top plate sits on the supporting surface as possible, then level the transition top plate by adjusting the legs in the ramp support top up or down as described previously.

3.5.2. The same method can be used if a ramp or ramp run begins at an existing structure.

3.6. ANCHOR RAMP TRANSITION PLATE

The TTP48 or TTP54 (TRANSITION PLATE 48" or 54") must be anchored to a substantial surface. Use the pre-drilled holes at each corner of the transition top plate as guides.

3.6.1. IF RESTING ON A WOODEN SURFACE:

3.6.1.1. Secure transition top plate by installing the 1/4" x 1" long self-drilling screw through each hole (fig. 3.11).

3.6.2. IF RESTING ON A CONCRETE SURFACE:

3.6.2.1. Using the transition top plate as a template, transfer the hole locations to the concrete surface and note locations with marking device.

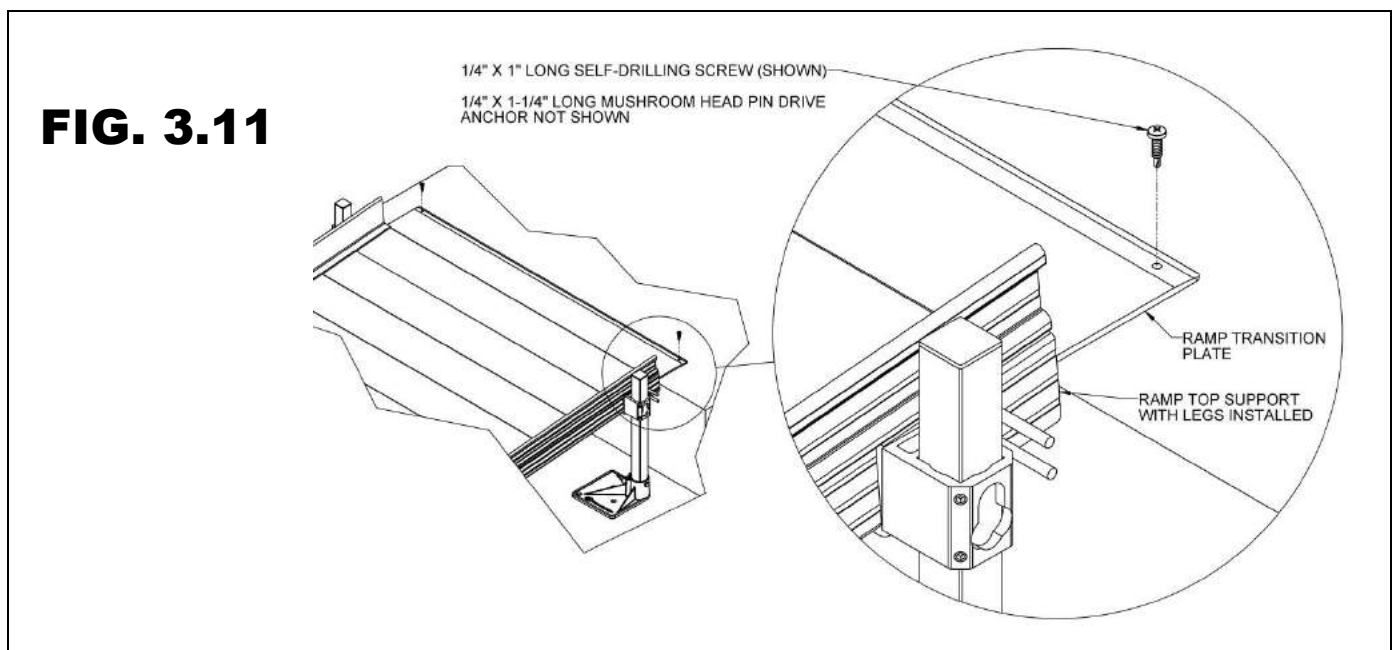
3.6.2.2. Remove transition top plate then, using a 1/4" masonry bit, drill two 1-1/2" deep holes at the marked locations.



After drilling, make sure holes are free of any residue and/or debris.

3.6.2.3. Re-attach the transition top plate and align over the drilled holes.

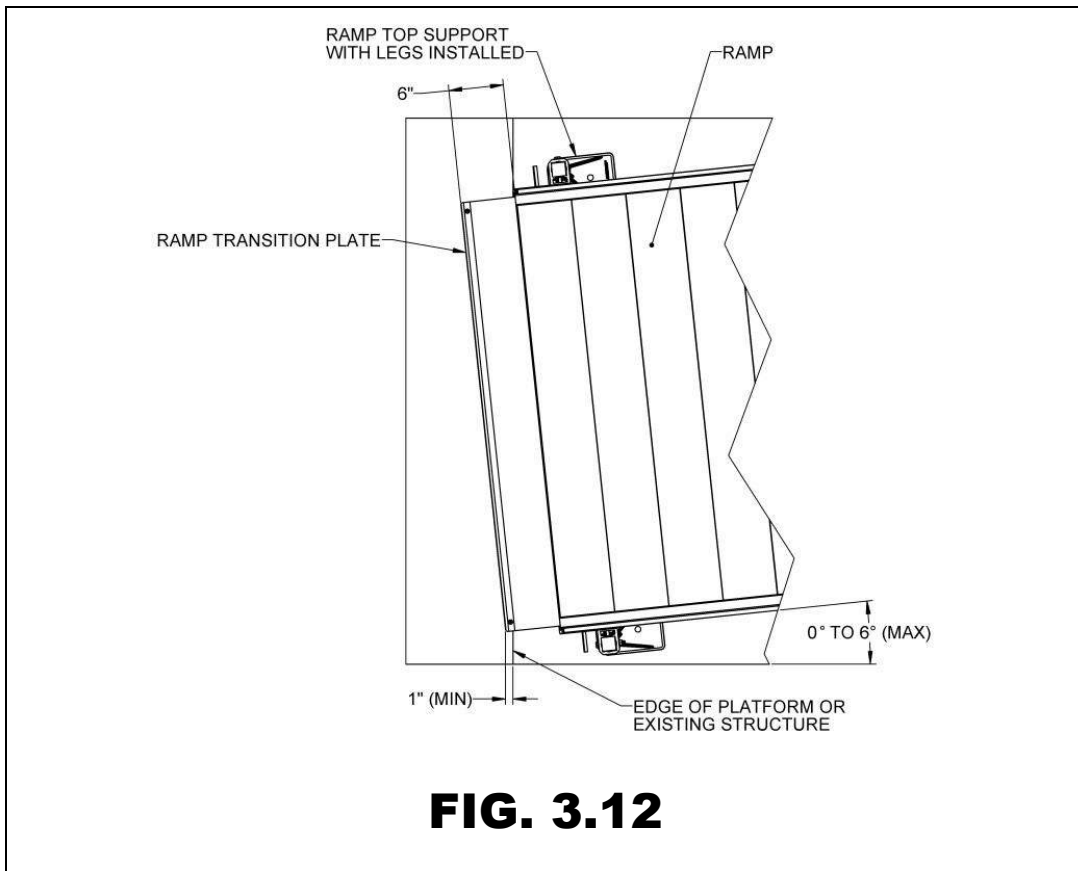
3.6.2.4. Using a hammer, drive the provided 1/4" diameter mushroom head pin drive anchors into the holes in the transition top plate and drilled holes, until the head is seated flush with anchor body.



3.7. ANGLE RAMPS WITH RESPECT TO PLATFORMS, PORCHES, OR DECKS




There are situations where it is necessary to angle ramps with respect to a platform, porch, or deck. The components required are not normally included with a typical system unless it is a ramp or ramp run without a platform. If a ramp must be angled when attaching to a platform, a TTP48 or TTP54 (TRANSITION PLATE 48" or 54") with a TRST (RAMP SUPPORT TOP) must be used instead of the TRHP (RAMP HANGER PAIR). The same components can be used at the top and bottom of ramp or ramp runs.

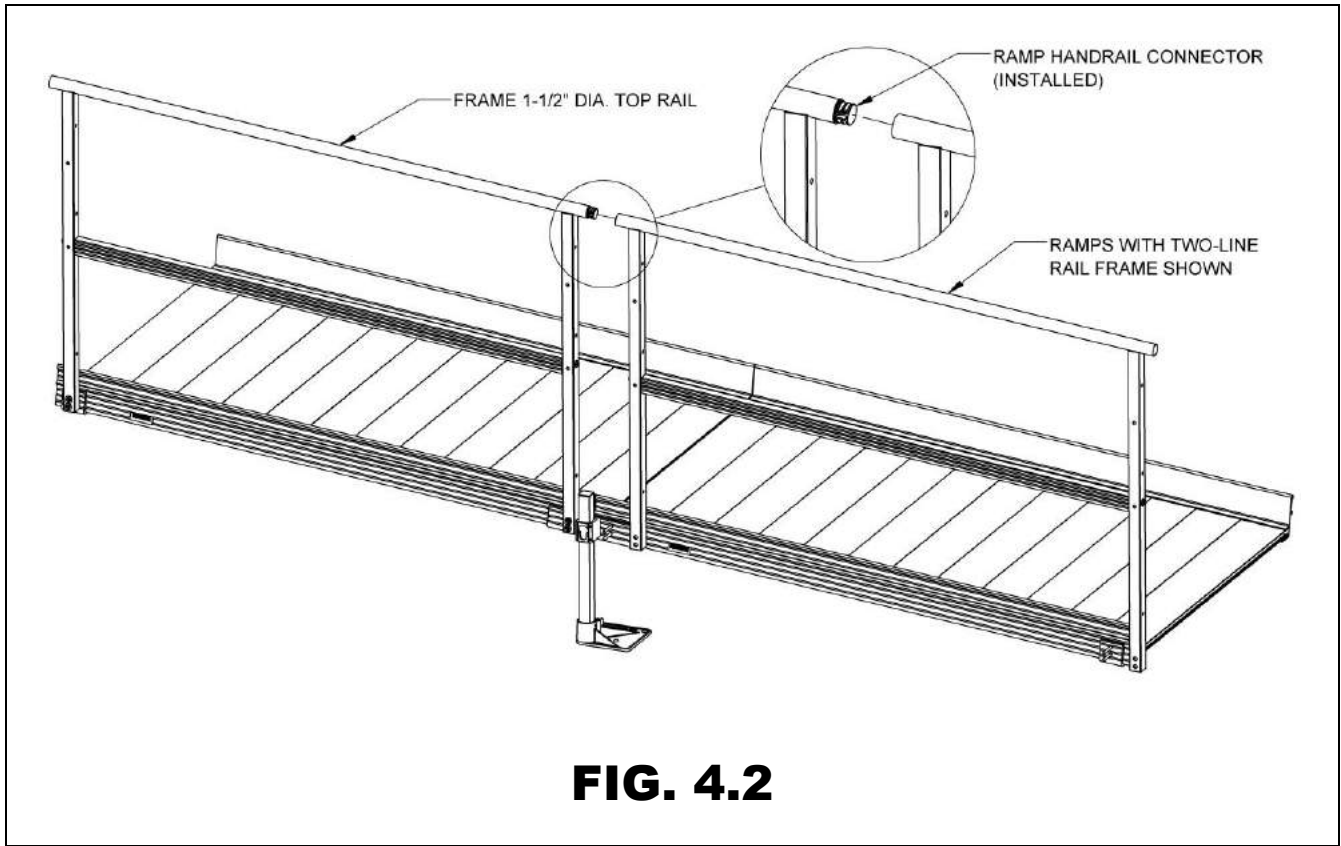
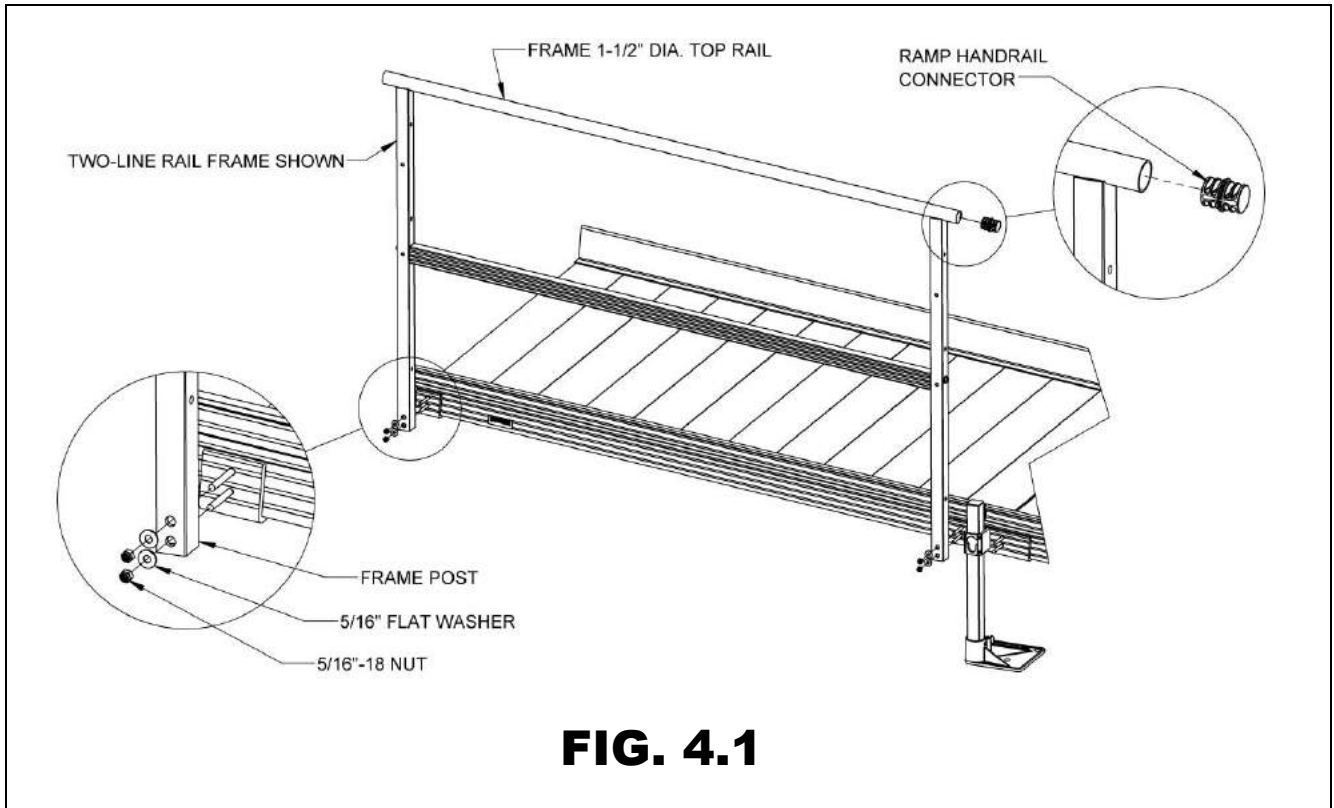
- 3.7.1. Angles up to approximately 6° can be accommodated. Refer to the appropriate sections in the 'OPTIONAL EQUIPMENT' section for installing TTP48 or TTP54 (TRANSITION PLATE 48" or 54") and TRST (RAMP SUPPORT), and the previous sections for installing and adjusting ramp support legs (FIG. 3.12).
- 3.7.2. The transition top plate should overlap the surface of the platform, porch, or deck by at least 1", regardless of the angle required (FIG. 3.12).
- 3.7.3. Anchor the transition top plate as described in SECTION 3.5.
- 3.7.4. Use the 1/4" x 1" long self-drilling screw when attaching to a TITAN platform.



4. HANDRAILS

4.1. FRAMES





- 4.1.1. Two-line rails, picketed guards, and handrails are specific to the ramp length and provided in pairs when ordered with the ramp. The procedure for frame attachment is the same for the two-line rails and picketed guards. The procedure for installing handrails is explained in a later step.
 -  Two-line rails can also be field-converted to picketed guards if needed.
- 4.1.2. One frame is required on each ramp side (frames are interchangeable side-to-side).
- 4.1.3. In a multiple ramp run configuration, handrail connectors (included in the TRRC – CONNECTOR RAMP TO RAMP) are used to join both frame top rails and handrails together. Refer to FIGs. 4.1 and 4.2 for the following steps:
 - 4.1.3.1. The vertical posts of the frames each have two holes which correspond with the studs on the end of center saddle brackets (installed in previous steps).
 - 4.1.3.2. Attach frame to these studs using two each 5/16" flat washers and two each 5/16"-18 nuts per frame post. Tighten 5/16" nuts just enough to hold the frames in place.
 -  If the studs do not align with the posts the frame, the end saddle bracket is most likely installed into the wrong threaded insert in the ramp side rail (see FIG. 3.2 for proper installation location).
 - 4.1.3.3. Slide handrail connector into one end of the frame's 1-1/2" diameter top rail.
 -  If handrail connector does not fit in tube, use pliers to lightly compress the handrail connector while sliding into the 1-1/2" diameter top rail.
 - 4.1.3.4. Slide the next frame section over the handrail connector, ensuring the top rails are pushed firmly towards each other. Compress the handrail connector and/or use a rubber mallet as needed.
 - 4.1.3.5. Rotate frame until the holes in frame post align with studs in saddle brackets.
 - 4.1.3.5.1. Attach with 5/16"-18 nuts and 5/16" flat washers, tightening just enough to hold the handrail in place.
 - 4.1.3.6. Repeat for the remaining frames in the run, then tighten all the fasteners securely.



4.2. STARTER FRAME

- 4.2.1. The starter ramp (identifiable by its tapered section for transition to the ground) includes starter frames which are specific to the starter ramp, lower post supports, and 6' handrails. The procedure for attaching starter frames is the same for both two-line rails and picketed guards.
- 4.2.2. One starter frame is required on each side of the ramp but are interchangeable side-to-side. The shorter starter frame post is the lower post.
- 4.2.3. Connect the starter frame top rails and upper frame post to the ramp in the same manner described in the previous section.
- 4.2.4. Refer to FIGs. 4.3 and 4.4 and the following steps when installing the lower frame post supports:
 - 4.2.4.1. Lower frame post supports are left or right hand (looking up the ramp from the start).
 - 4.2.4.2. Install a lower frame post support on both starter frame lower posts. Orient the set screws in the pocket of the lower frame post support facing outward and toward the start of the ramp (FIG. 4.4).
 - 4.2.4.3. Loosen the set screws in the pocket of the lower frame post support, if needed, to fully engage the lower posts in the post support.

4.3. ANCHORING FRAMES AND CODE COMPLIANCY: If a code compliant system is needed, the lower frame post supports must be anchored to the ground.

- 4.3.1. Drill four holes in each lower frame post support base (FIG. 4.3), then install four 1/4" or 3/8" x 2-1/2" (minimum) concrete anchors (supplied by others) per lower post support. It is the installer's responsibility to ensure the intended mounting surface is of sufficient strength and quality to hold the anchors used.
- 4.3.2. Use the holes lower frame post support base as a template to mark and drill holes for the anchors.
 -  You may wish to remove the lower frame before drilling anchor holes, then reinstall when anchor hole drilling is complete.
 -  Always install concrete anchors per the manufacture's recommendations.
 -  If attaching to a surface other than concrete, consult your structural engineer or the factory for alternate anchoring methods.
- 4.3.3. Attach the lower frame post supports to the ramp side rails using the supplied 5/16"-18 x 3" square neck carriage bolts, 5/16"-18 nylon insert locknuts, and 5/16" flat washers. Ensure that the head of the carriage bolts are on the ramp side as shown (FIG. 4.4).
 -  If the holes in the lower frame post support do not align with the holes in the lower frame post and ramp side rail, the lower frame post support is most likely installed on the wrong side of the ramp.
- 4.3.4. Tighten all fasteners securely, including the 3/8"-16 headless socket set screws in the pockets of the lower frame post supports.
- 4.3.5. The procedure for ramp handrail installation is the same for the starter ramp as other standard ramps; see SECTION 4.3.

**LOWER FRAME POST SUPPORT
(RIGHT HAND SHOWN; LEFT HAND OPPOSITE)**

FIG. 4.3

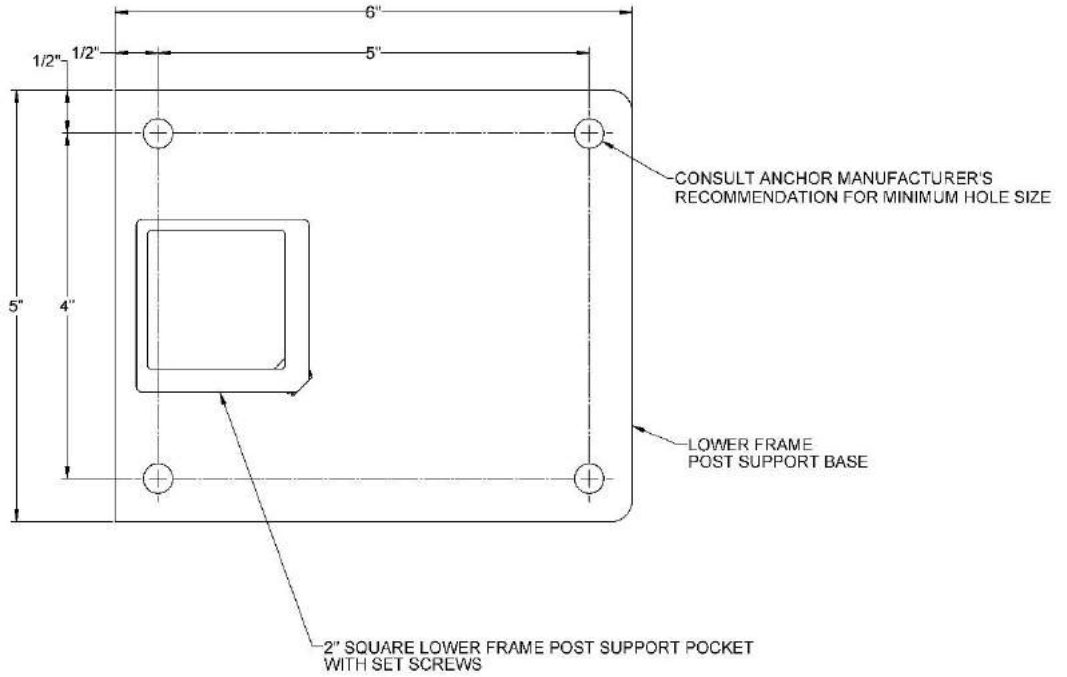
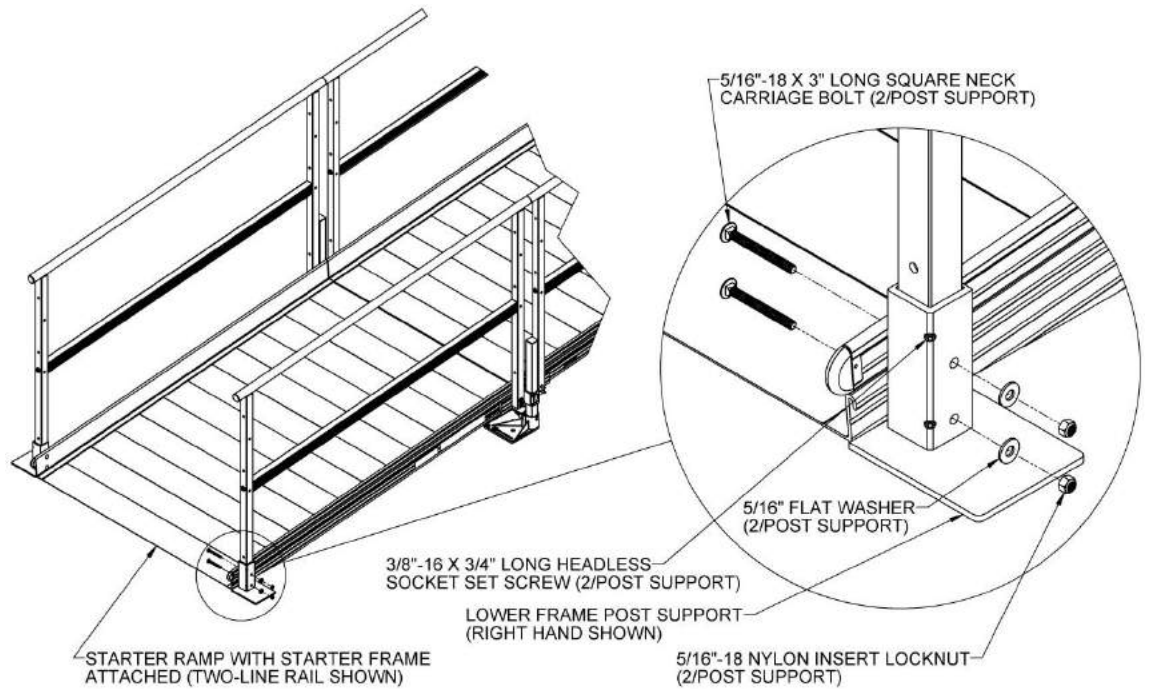


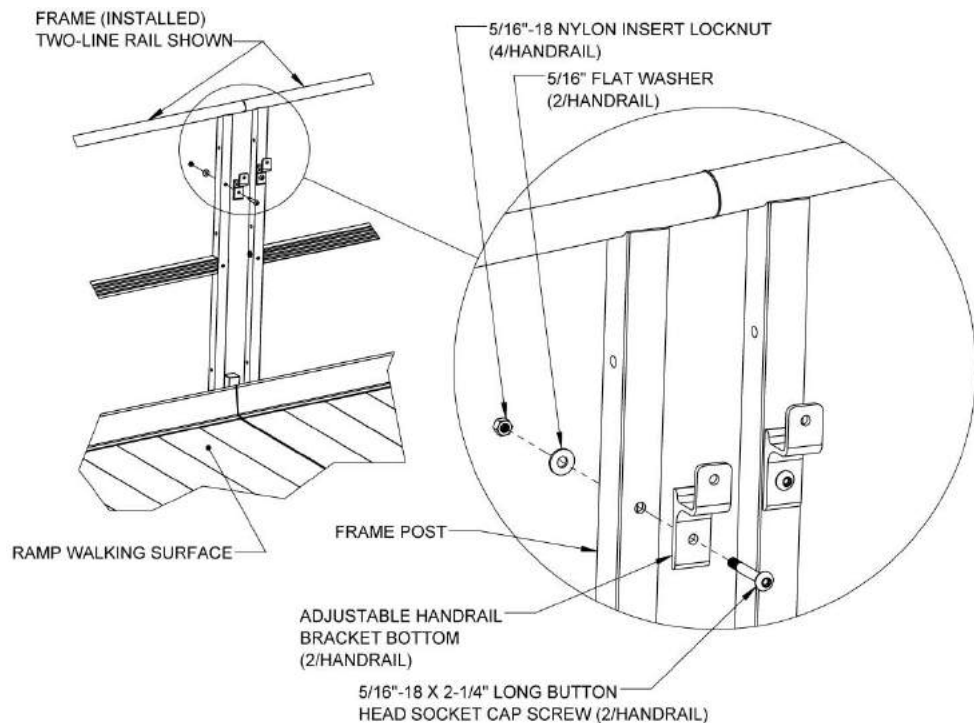
FIG. 4.4



4.4. RAMP HANDRAILS

- 4.4.1. Ramp handrails are specific to the ramp length and provided in pairs when ordered with the ramp. The procedure for attaching ramp handrails is the same for the two-line rails and picketed guards.
- 4.4.2. One ramp handrail is required on each side of the ramp (handrails of the same length are interchangeable side-to-side).
- 4.4.3. In a multiple ramp run configuration, handrail connectors (included in the TRRC – CONNECTOR RAMP TO RAMP) are used to join handrails together.
- 4.4.4. Refer to FIGs. 4.5 through 4.7 for the following steps:
 - 4.4.4.1. Install an adjustable handrail bracket bottom (included with ramp handrail hardware) in the upper holes of the frames facing the ramp walking surface. Use the supplied 5/16"-18 x 2-1/4" socket head cap screws, 5/16"-18 nylon insert locknuts, and 5/16" flat washers.
 - 4.4.4.2. Tighten the 5/16" nuts just enough to hold the adjustable handrail bracket bottoms in line with the frame posts, but still allow the bracket to pivot.
 - 4.4.4.3. If a lower (child) ramp handrail (purchased separately) is being used, install adjustable handrail bracket bottoms in the lower holes in the same manner.

FIG. 4.5



- 4.4.4.4. Slide the handrail connector into one end of the 1-1/2" diameter ramp handrail (FIG. 4.6).
 - ✋ If handrail connector does not fit in the tube, use pliers to lightly compress handrail connector while sliding into 1-1/2" diameter top rail.
- 4.4.4.5. Slide the next ramp handrail over the handrail connector until fully engaged and align the adjustable handrail bracket tops. Compress the handrail connector and/or use a rubber mallet as needed (FIG. 4.6).
- 4.4.4.6. Connect all ramp handrails for one side of the ramp run in the order which matches the ramp lengths, then connect ramp handrails for the opposite side in the same manner.
- 4.4.4.7. Attach assembled ramp handrail run to adjustable handrail bracket bottoms using 5/16"-18 x 3/4" socket head cap screws and 5/16"-18 nylon insert locknuts. Position ramp handrail run and the fasteners as shown (FIG. 4.7).
- 4.4.4.8. Align the ramp handrail runs so that they are parallel to the ramp walking surface and the adjustable handrail bracket bottoms are parallel to the frame posts, then tighten all the fasteners securely.
- 4.4.4.9. Repeat for all ramp handrail runs in the system, including the lower (child) handrails, if present.

FIG. 4.6

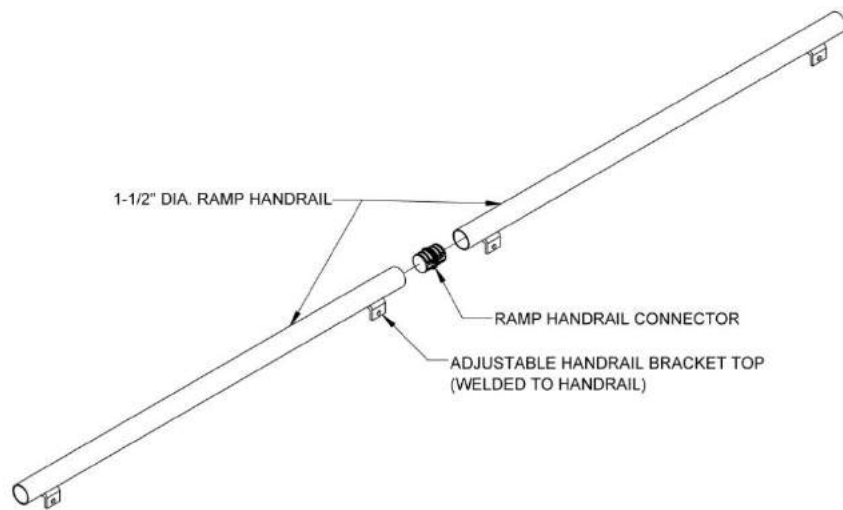
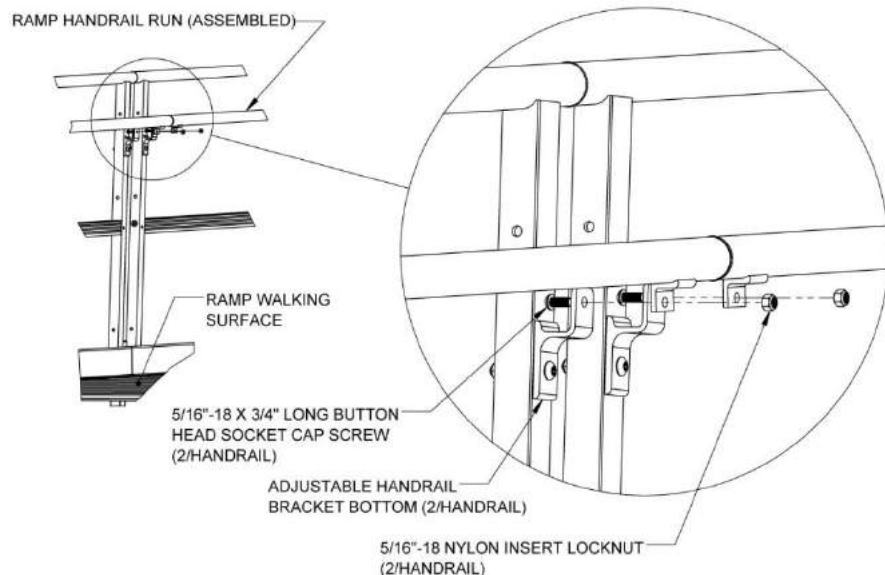
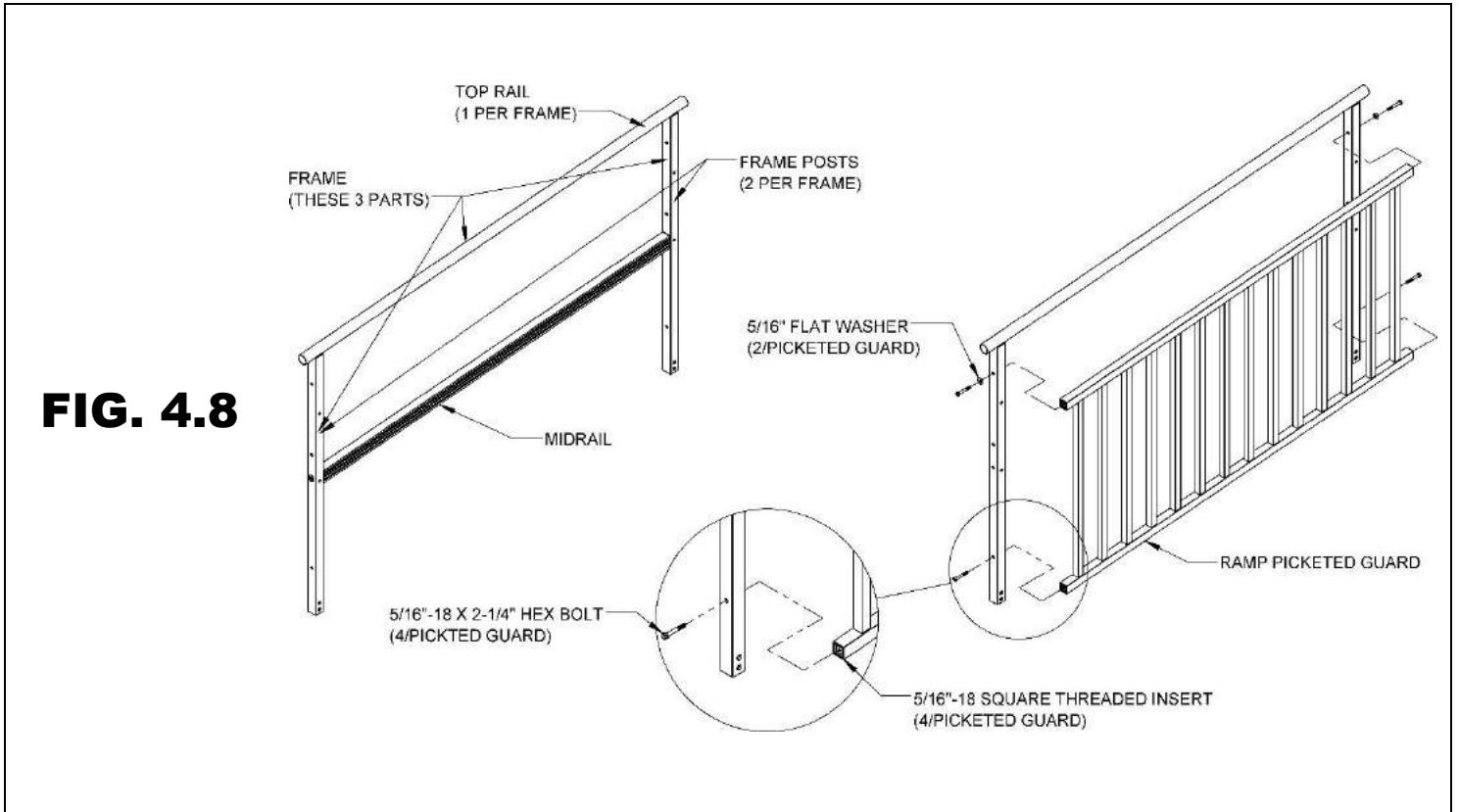


FIG. 4.7



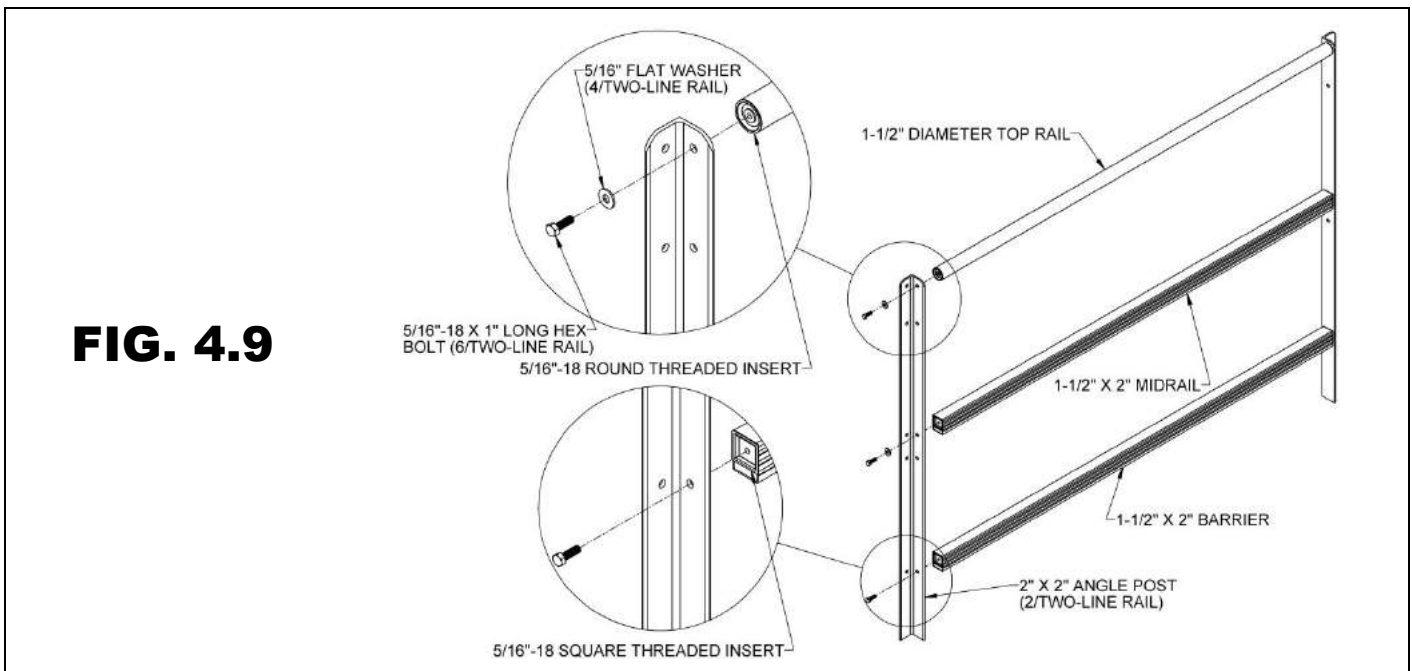
4.5. FIELD CONVERT RAMP TWO-LINE RAIL TO A PICKETED GUARD

- 4.5.1. Remove the two-line rail frame from the ramp (if installed), then remove the midrail from the two-line rail frame (FIG. 4.8).
- 4.5.2. Install the ramp picketed guard into the two uppermost and lowermost holes in the frame using the provided 5/16"-18 x 2-1/4" hex bolts and 5/16" flat washers.
 - 🖐 It is strongly recommended that the bolts be assembled loosely (not fully tightened) until all four have been installed and the picketed guard has been installed onto the ramp.
- 4.5.3. Install (or reinstall) the picketed guard on the ramp and connect the ramp handrails per the 'RAMP HANDRAIL' section.



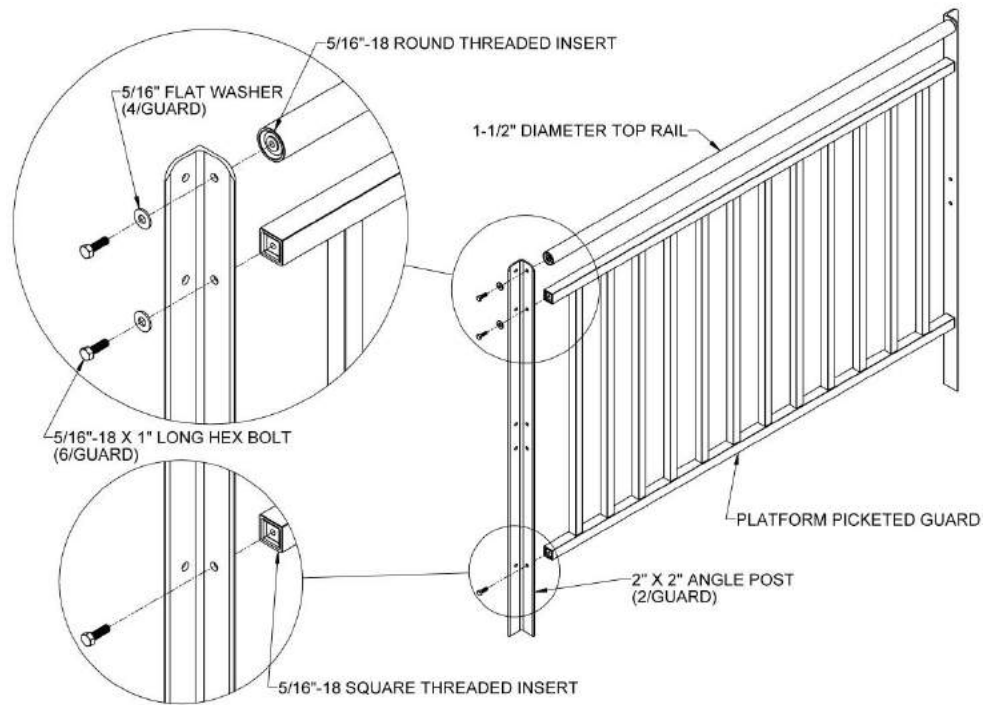
4.6. ASSEMBLE PLATFORM TWO-LINE RAILS AND PICKETED GUARDS

- 4.6.1. Two-line rails and picketed guards are provided in pairs when ordered with the TITAN platform.
- 🖐 Two-line rails can also be converted to picketed guards in the field, see SECTION 4.7.
- 4.6.2. Regardless of style, it is strongly recommended the bolts be assembled loosely (not fully tightened) until all have been installed and the handrail has been installed in the platform.
- 4.6.3. For two-line rails, pre-assemble the top rail by inserting a 5/16"-18 x 1" long hex bolt through a 5/16" flat washer, the uppermost hole in the angle post, and into the 5/16"-18 round threaded inserts in the top rail.
- 🖐 The rounded end of the post is the upper end.
- 4.6.4. Pre-assemble the barrier and midrail by inserting 5/16"-18 x 1" long hex bolts through 5/16" flat washers (for the midrail only, do not use a washer on the lowermost holes), the angle post, and into the 5/16"-18 square threaded inserts in the barrier and midrail (FIG. 4.9). Do this for both sides.



- 4.6.5. For platform picketed guards, pre-assemble the top rail by inserting 5/16"-18 x 1" long hex bolts through a 5/16" flat washers, the uppermost hole in the angle posts, and into the 5/16"-18 round threaded inserts in the top rail.
- 4.6.6. Pre-assemble the platform picketed guard by inserting a 5/16"-18 x 1" long hex bolt through a 5/16" flat washer (use flat washer for the upper rail only; do not use a washer on the lowermost holes), the angle post, and into the 5/16"-18 square threaded inserts in the picket panel (FIG. 4.10).

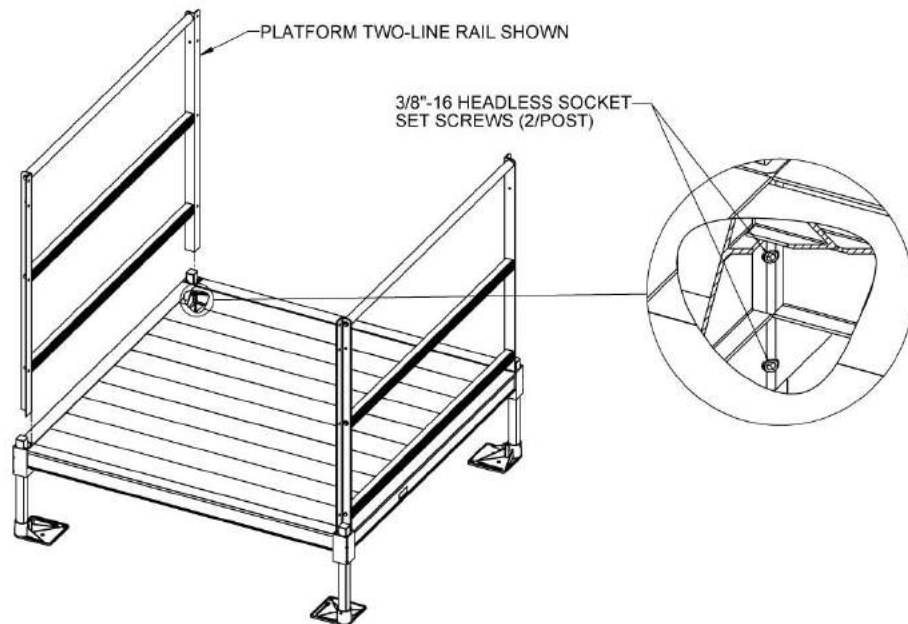
FIG. 4.10



4.7. INSTALL PLATFORM TWO-LINE RAILS AND PICKETED GUARDS

- 4.7.1. Platform two-line rails and picketed guards are installed in the same manner. Depending on the configuration, refer to FIGs. 4.11 and 4.12 as needed.
- 4.7.2. Pre-assemble the platform two-line rail or picketed guard for both sides of a straight configuration and the “first” handrail of a turn configuration as described in SECTION 4. Make sure the angle posts (attached to guards, midrails, and or barriers) are oriented on the same side with respect to the top rail or barrier or midrail, and are pointing outward as shown (FIG. 4.12).
- 4.7.3. For the “second” rail or picketed guard in a turn configuration, only assemble one angle post as described above, paying attention to how it will connect to the “first” handrail so the angle post will be oriented correctly.
- 4.7.4. For straight platform configurations and the “first” two-line rail or picketed guard on a turn platform, drop the platform two-line rail or picketed guard into the corner pockets. Align the bottom of the angle post with the bottom of the platform corner pockets.
 - 4.7.4.1. Securely tighten the 3/8”-16 headless socket set screws on the inside of the platform and below the platform deck (FIG. 4.11).
- 4.7.5. For the “second” two-line rail or picketed guard on a turn platform, insert the angle post into a corner pocket at 90° from the “first” rail. Align the bottom of the angle post with the bottom of the platform corner pockets and tighten the 3/8”-16 headless socket set screws on the inside of the platform and below the platform deck securely.

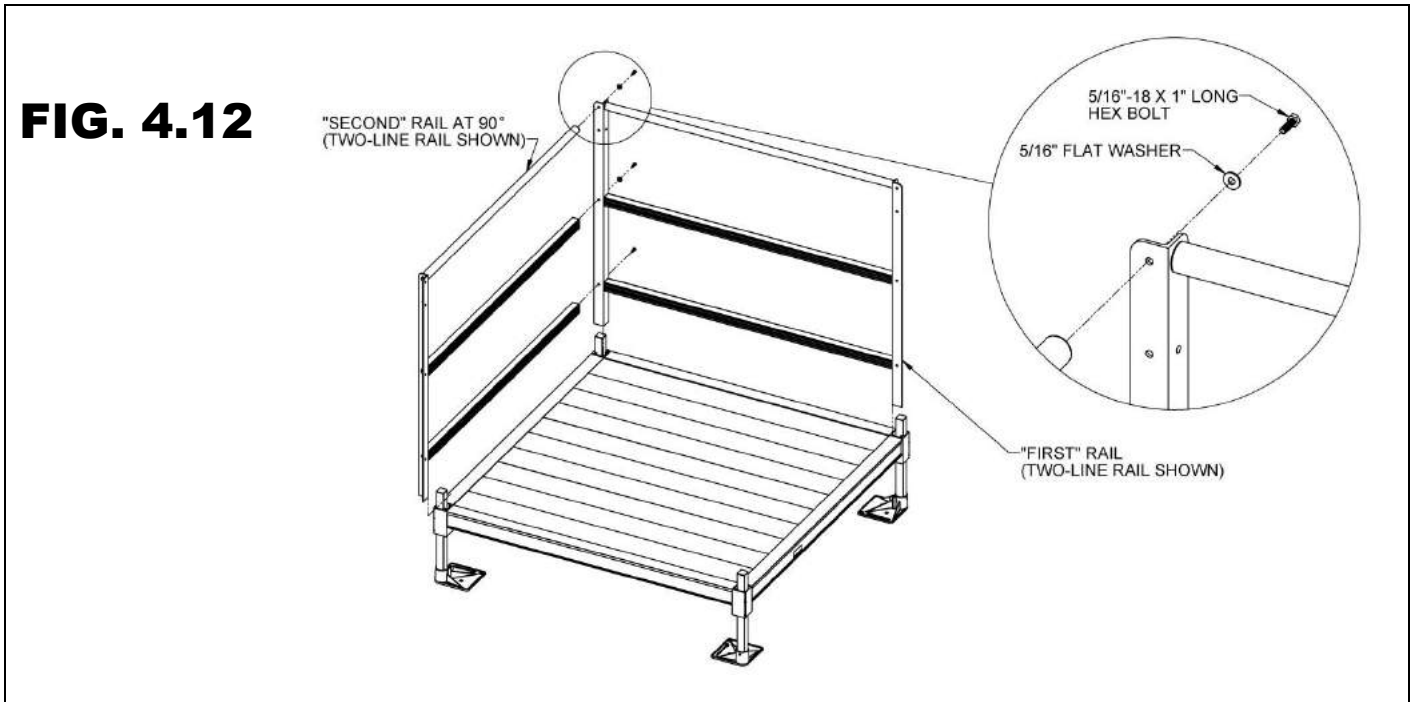
FIG. 4.11



- 4.7.6. Install 5/16"-18 x 1" long hex bolts through a 5/16" flat washer for the top rail, midrail, and angle post (do not use a flat washer on the lowermost holes). Tighten all fasteners securely (FIG. 4.12).

4.8. CONVERT TWO-LINE PLATFORM RAILS TO PICKETED GUARDS

- 4.8.1. To convert a two-line rail to a picketed guard in the field, leave the top rail in place but loosen the attachment bolts on both sides and remove the barrier and midrail.
- 4.8.2. Install the picketed guard panel in the same manner described in 'ASSEMBLE PLATFORM TWO-LINE RAILS AND PICKETED GUARDS' section.



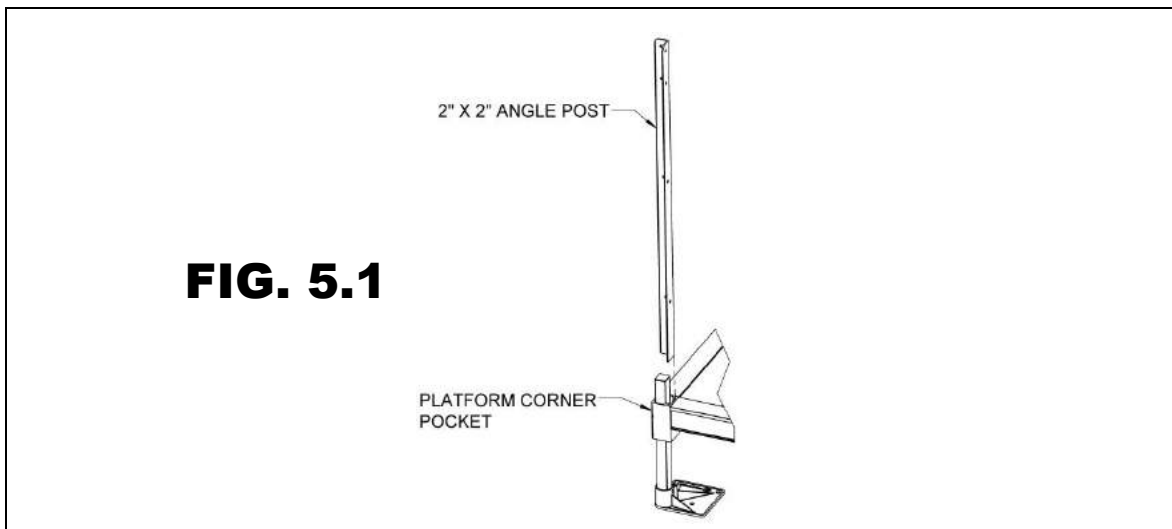
5. CLOSURES

Closures fill the space between ramp posts and platform posts. Like the ramp and platform handrails, they are available in two-line rails and picketed guards. The closures come with components which require the ramp to be mounted to one side or the other of a platform but the ramp can be centered or mounted in any location on a platform side using the two-line rail closure (refer to SECTION 5.3). When centering or just off-centering (mounting in a location other than the side) the ramp, a second two-line rail closure must be ordered and is installed in the same manner as described below. When mounting to the side, the frame post should be aligned with (or just slightly inside of) the inside of the platform angle post.

✎ If the frame post is outside the platform angle post (are these the same item?), you will not be able to install the end loops (refer to the 'INSTALL RAMP HANDRAIL END LOOPS' section).

✎ The Two-Line Rail or Picketed Guard should be installed before installing the handrail or connecting the frame top rail.

- 5.1. If installing a closure on a platform in the "straight" configuration, the 2" x 2" angle post will already be in place; skip to SECTION 5.3.
- 5.2. If installing a closure on a platform in the "turn" configuration, install the 2" x 2" angle post not attached to a platform Two-Line Rail or Picketed Guard in the open platform corner pocket. Align the bottom of the post with the bottom of the corner pocket and tighten the set screws securely (FIG. 5.1). Refer to SECTION 4.6 for additional details on securing the post.



5.3. TWO-LINE RAIL BARRIER AND MIDRAILS

- 5.3.1. The 1.5" x 2" barrier will come in the length required for the platform side and should not need to be trimmed. Insert 1-1/2" square threaded inserts into both ends of the barrier. Use a rubber mallet or similar tool to fully seat the threaded inserts as needed (FIG. 5.2).
- 5.3.2. Attach the lower 1.5" x 2" barrier to the lowermost hole in the 2" x 2" angle post using a 5/16"-18 x 1" long hex bolt (do not use a flat washer at this location). The 1.5" x 2" barrier is commonly installed with the larger cavity (into which the 1-1/2" square threaded insert is inserted) on top and the smaller cavity on the bottom (FIG. 5.2).
- 5.3.3. Locate the appropriate barrier attachment plate. If the upper end of the ramp or ramp run terminates at a platform use the "up sloping" version of the plate. If the lower end of a ramp or ramp run starts at a platform use the "down sloping" version. Note the orientation of the larger 3/8" diameter hole with respect to the 1-1/2" x 2" section of the plate as shown (FIG. 5.3) to identify the barrier attachment plate needed.

FIG. 5.2

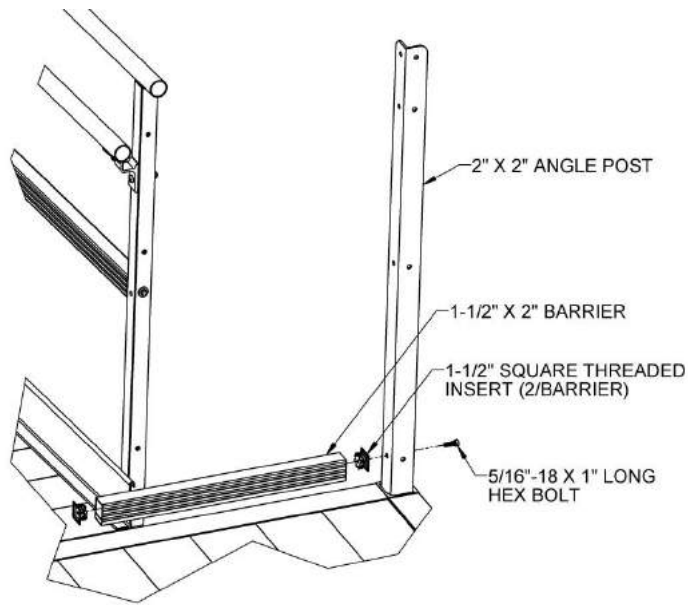
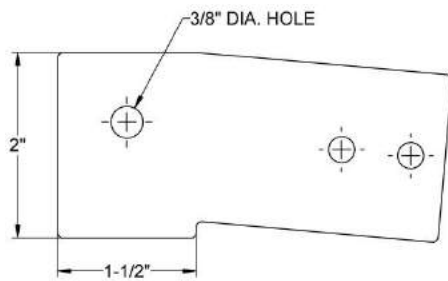
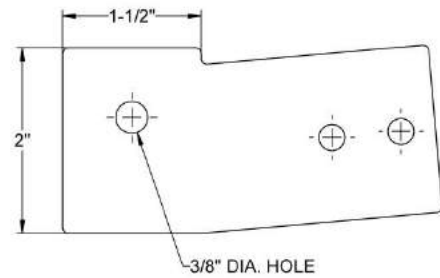


FIG. 5.3



BARRIER ATTACHMENT PLATE FOR RAMP WHICH ENDS AT A PLATFORM ("UP SLOPING")



BARRIER ATTACHMENT PLATE FOR RAMP WHICH STARTS AT A PLATFORM ("DOWN SLOPING")

- 5.3.4. Attach the barrier attachment plate to the barrier using a 5/16"-18 x 1" long hex bolt and 5/16" flat washer. Make sure the leg of the attachment plate with the two smaller holes is captured under the upper hook and in contact with the ramp side rail. Move the ramp or platform slightly if needed and clamp the attachment plate to the side rail, if possible, before drilling (FIG. 5.4).
- 5.3.5. Use the two smaller holes in the barrier attachment plate to drill two 1/4" or 9/32" holes through the ramp side rail (FIG. 5.5).
- 5.3.6. Connect the barrier attachment plate to the ramp side rail using 1/4"-20 x 3/4" long ribbed neck carriage bolts, 1/4"-20 nylon insert locknuts, and 1/4" flat washers. Orient the head of the carriage bolt on the ramp side as shown (FIG. 5.5).
- 5.3.7. Tighten all fasteners securely.

FIG. 5.4

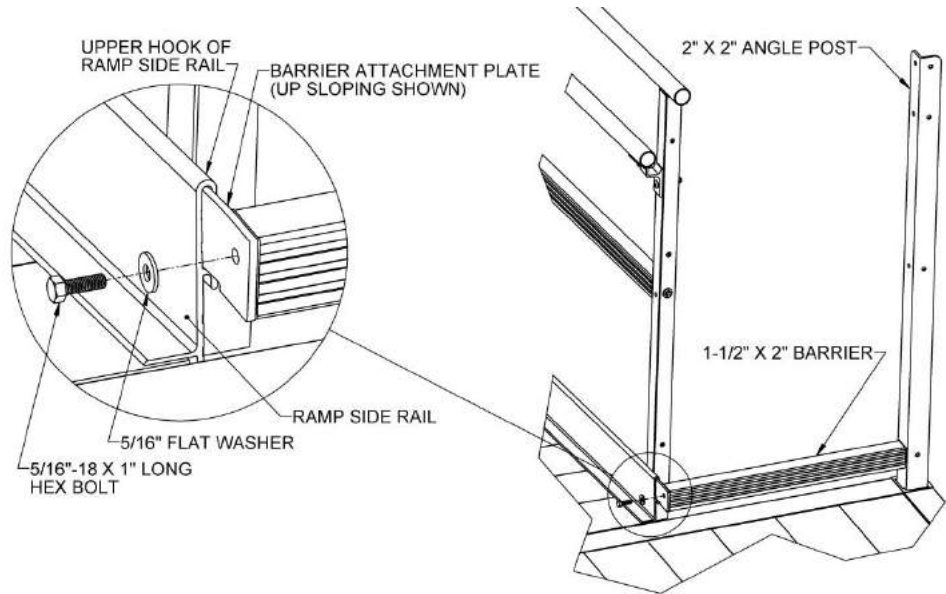
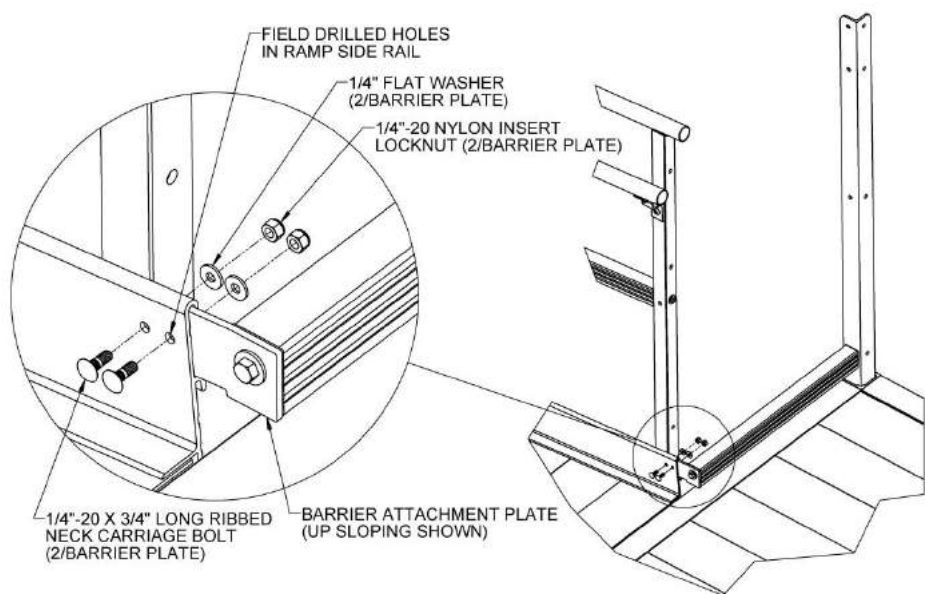
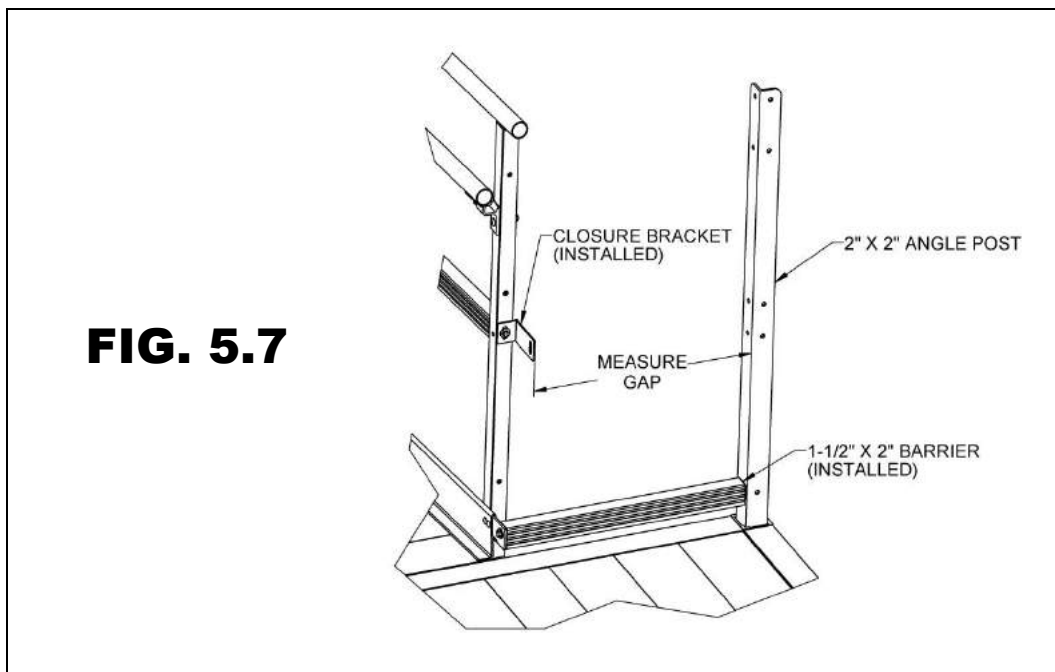
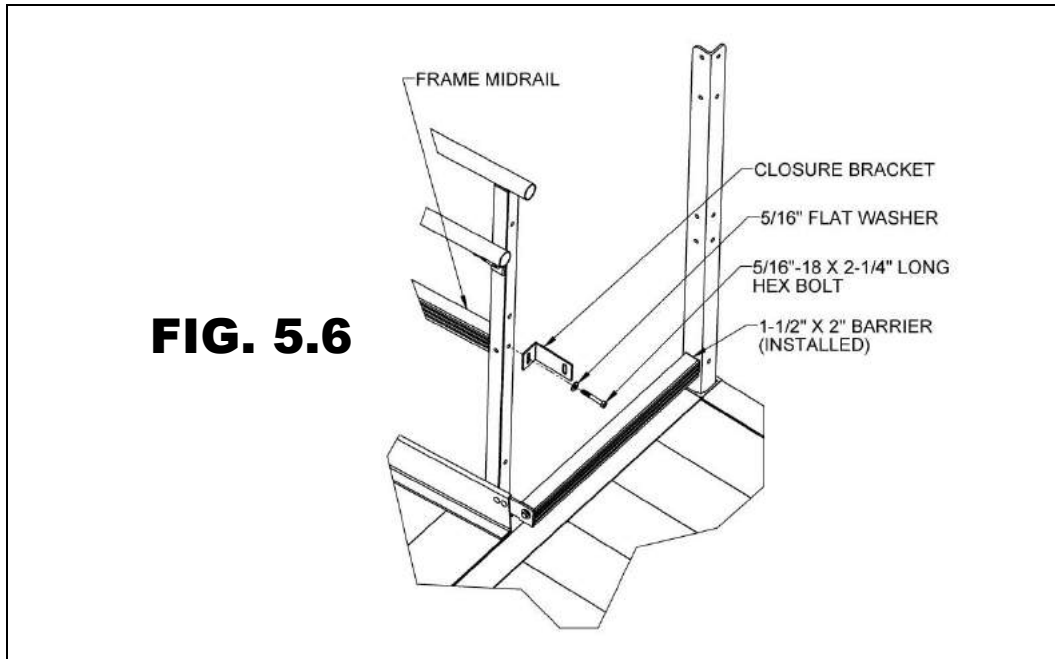


FIG. 5.5

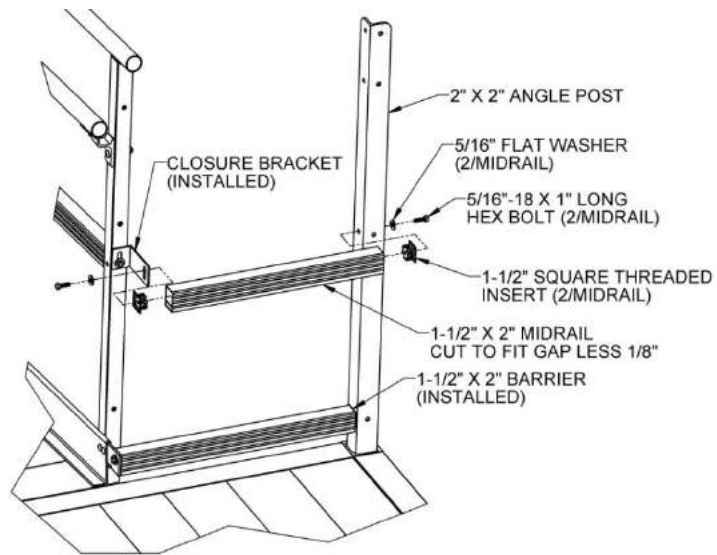


- 5.3.8. Referencing FIG. 5.6, locate a closure bracket. Remove the 5/16"-18 x 2-1/4" hex bolt and 5/16" flat washer attaching the midrail of the Frame, then reinstall the bolt and washer through the slot in the short leg of the bracket, the Frame post, and back into the threaded insert in the midrail. Orient the bracket so the long leg is on the same side as, and parallel to, the 2" x 2" angle post, then tighten lightly (enough to hold the bracket against the post but still allow it to rotate).
- 5.3.9. Measure the gap between the long leg of the closure bracket and the 2" x 2" angle post (FIG. 5.7).
- 5.3.10. Cut the 1.5" x 2" closure midrail to the measured length less 1/8" to account for the threaded inserts which will be installed after cutting.
- 5.3.11. Using a metal file, smooth any sharp edges from cutting.



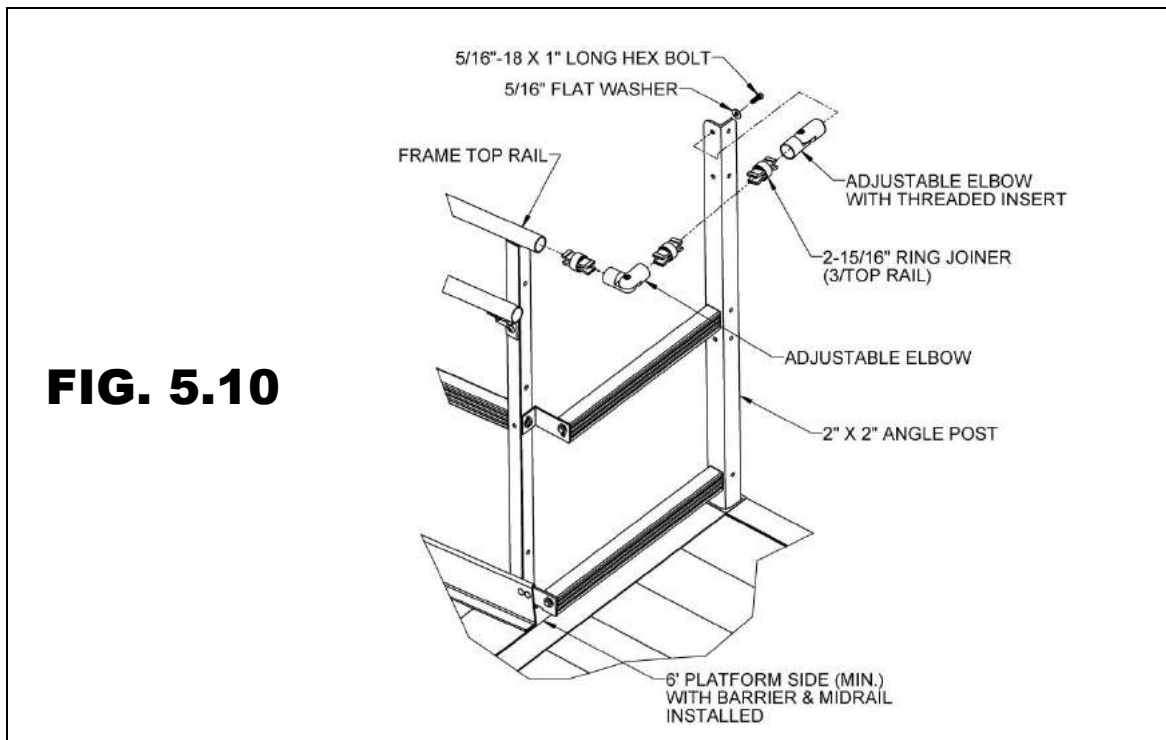
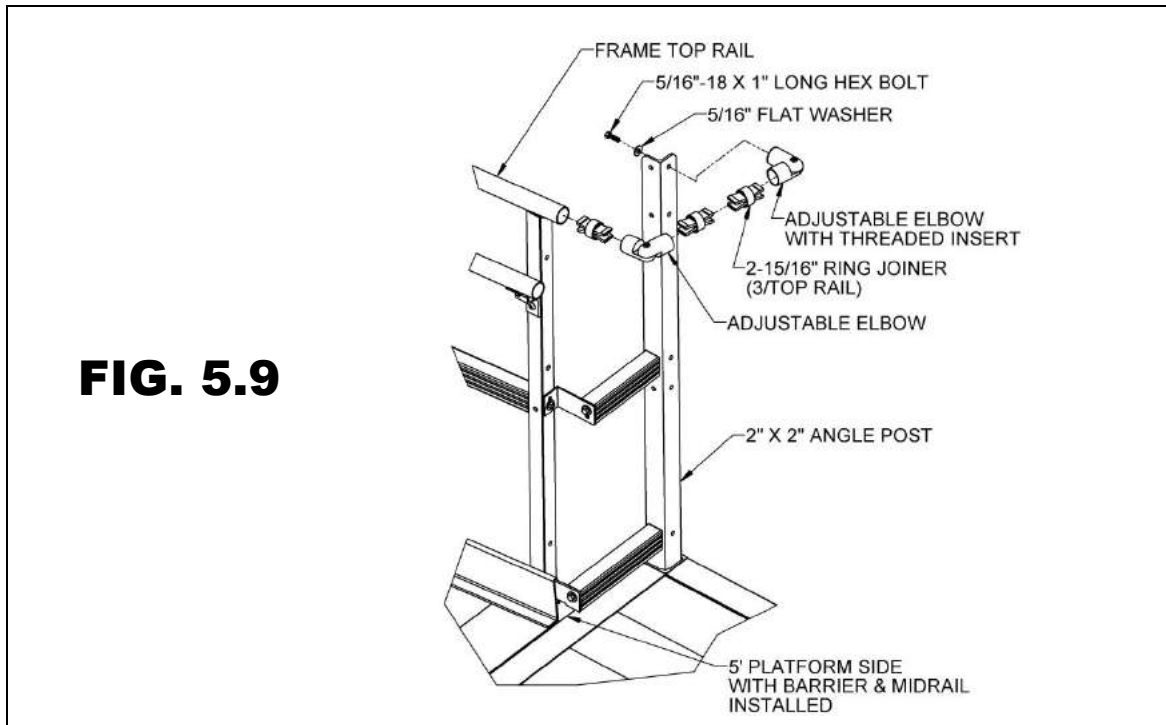
- 5.3.12. Insert 5/16"-18 square threaded inserts into both ends of the midrail. Use a rubber mallet or similar tool to fully seat the threaded inserts as needed (FIG. 5.8).
- 5.3.13. Install 5/16"-18 x 1" hex bolts through a 5/16" flat washers, the long leg of the closure bracket, and the 2" x 2" angle post into the 5/16"-18 square threaded inserts installed in the midrail. Use the hole approximately in the middle of the 2" x 2" angle post as shown (FIG. 5.8).
- 5.3.14. Tighten all fasteners securely.

FIG. 5.8



5.4. TWO-LINE RAIL TOP RAIL

- 5.4.1. Insert a 2-15/16" ring joiner in the Frame top rail and install an adjustable elbow with another 2-15/16" ring joiner as shown (FIGs. 5.9 and 5.10).
- 5.4.2. Assemble an adjustable elbow with threaded insert to the uppermost hole in the 2" x 2" angle post where the closure will connect using a 5/16"-18 x 1" long hex bolt and 5/16" flat washer.
 - 5.4.2.1. For a 5' platform side use the hole shown (FIG. 5.9). For larger platforms use the hole (FIG. 5.10.).
- 5.4.3. Tighten only enough to hold the elbow in place.
- 5.4.4. Insert a 2-15/16" ring joiner in the opposite end of the adjustable elbow with threaded insert (FIGs. 5.9 and 5.10).



- 5.4.5. Loosen the elbow assembly screws and align the round faces of the adjustable elbows, then tighten the elbow assembly screws and joiner set screws enough to hold them in position (FIG. 5.11).
- 5.4.6. Measure the gap between the faces of the opposing rings of the 2-15/16" ring joiners (FIG. 5.11).
- 5.4.7. Cut the 1-1/2" diameter round tube to the length measured.
- 5.4.8. Using a metal file, smooth any sharp edges from cutting.
- 5.4.9. Install the cut 1-1/2" diameter round tube between the 2-15/16" ring joiners.
 - ✎ To facilitate assembly you will need to remove and reinstall the adjustable elbow with threaded insert from the 2" x 2" angle post (FIG. 5.12).
- 5.4.10. Tighten the adjustable elbow assembly screws and all 2-15/16" ring joiner set screws securely.

FIG. 5.11

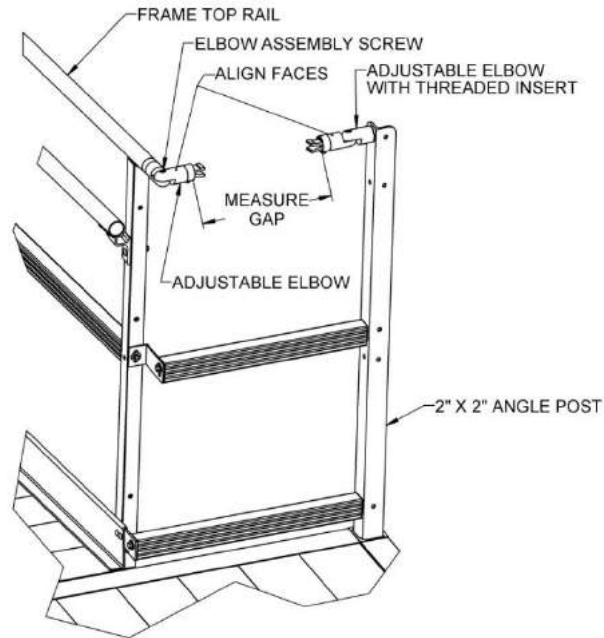
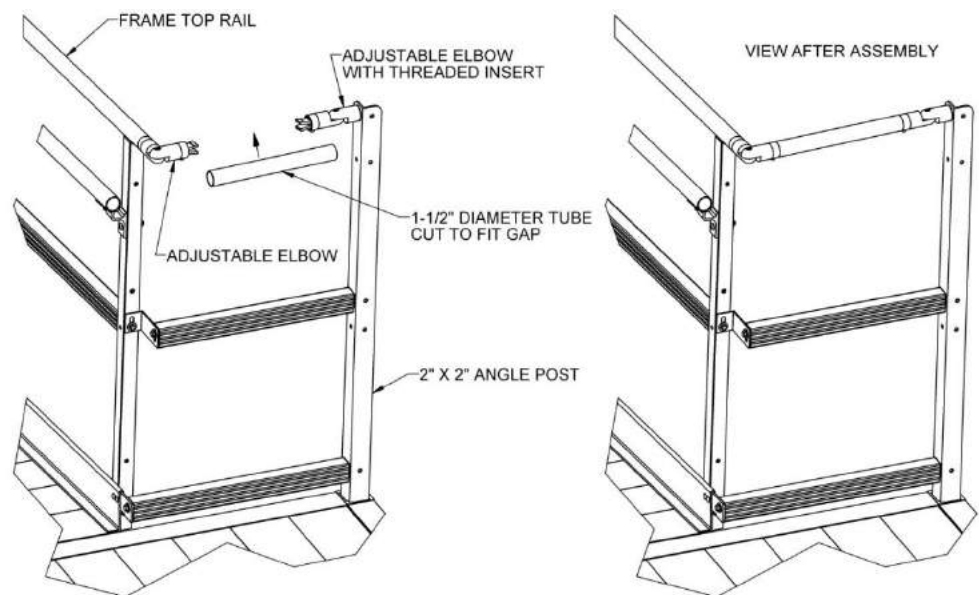


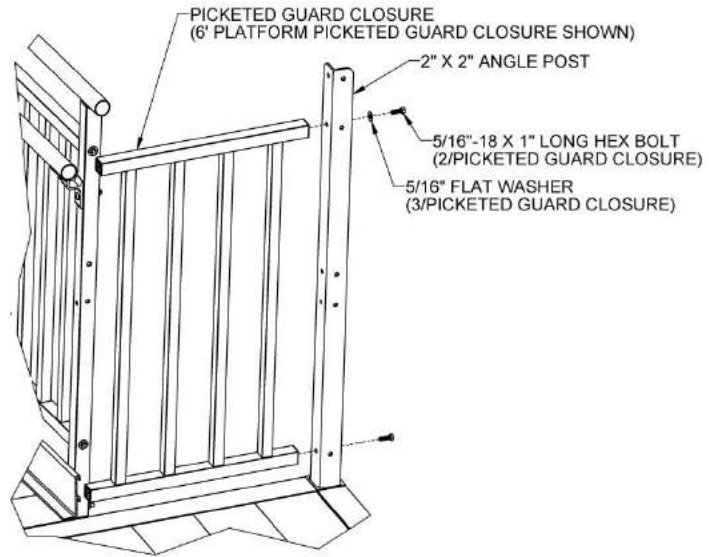
FIG. 5.12



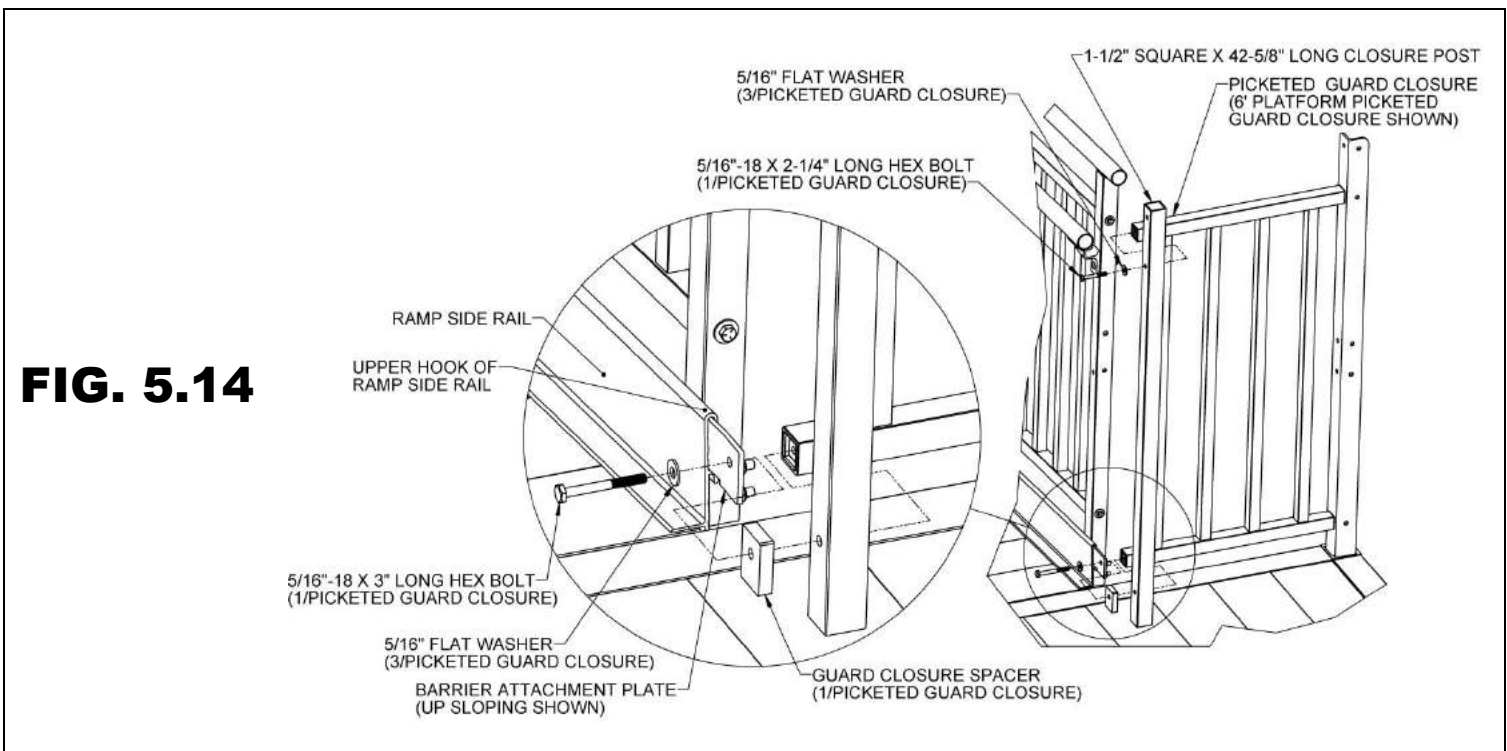
5.5. PICKETED GUARD CLOSURE

- 5.5.1. Picketed Guard Closures are specific to the platform size (5', 6', or 7') and require the ramp to be mounted to one side or the other of a platform. If the ramp is to be placed anywhere other than the side of a platform, custom components will be needed. Consult your sales representative for the required components.
 - 5.5.2. Attach the Picketed Guard Closure to the 2" X 2" angle post.
 - 5.5.2.1. Upper Rail: Use 5/16"-18 x 1" long hex bolts and 5/16" flat washers to attach the upper rail.
 - 5.5.2.2. Lower Rail: Use 5/16"-18 x 1" long hex bolt (do not use a flat washer at this location) (FIG. 5.13).
- 🖐 Picketed Guard Closures are symmetric, so the "upper" or "lower" rail can be installed on top or on bottom.

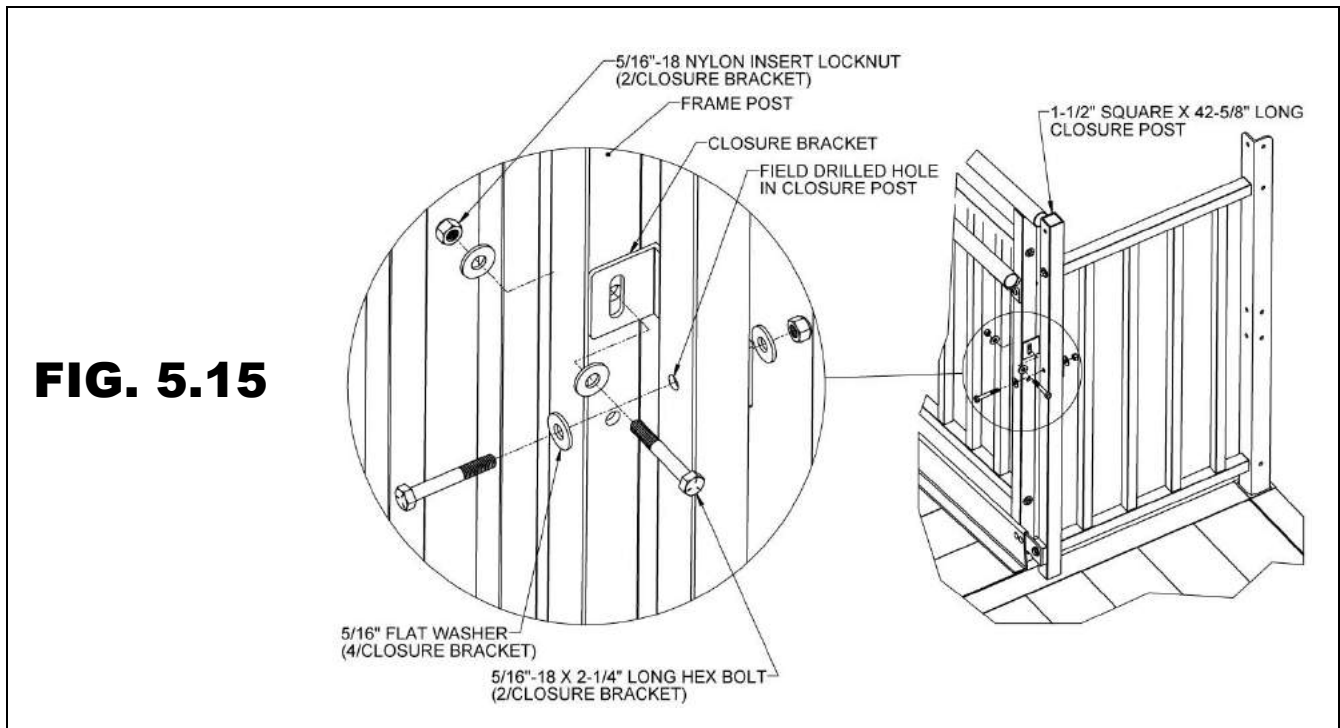
FIG. 5.13



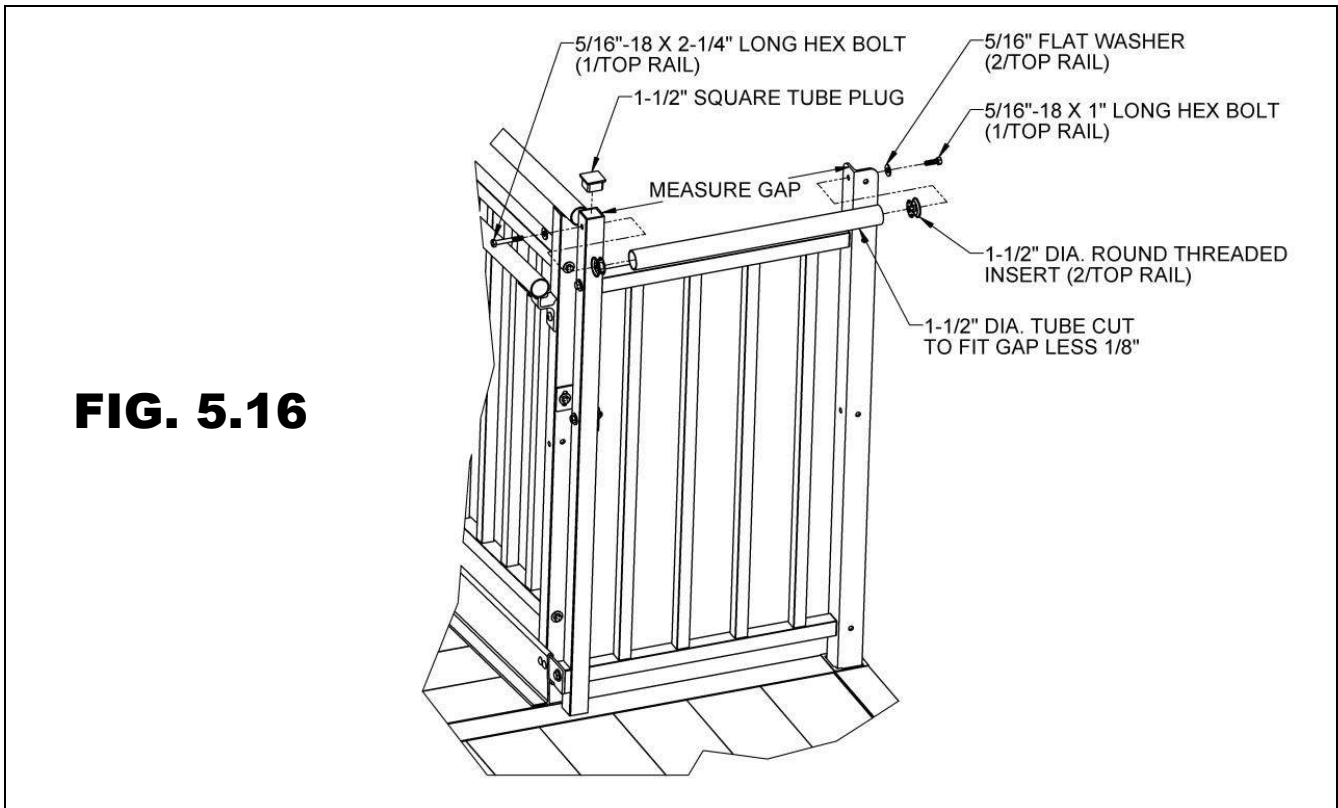
- 5.5.3. Locate the appropriate barrier attachment plate. If the upper end of the ramp or ramp run terminates at a platform, use the “up sloping” version of the plate. If the lower end of a ramp or ramp run starts at a platform, use the “down sloping” version. Note the orientation of the larger 3/8” diameter hole with respect to the 1-1/2” x 2” section of the plate as shown (refer back to FIG. 5.3) to identify which barrier attachment plate is needed.
- 5.5.4. Fasten the barrier attachment plate to the lowermost hole in the 1-1/2” square x 42-5/8” long closure post and lower rail of the Picketed Guard Closure using a 5/16”-18 x 3” long hex bolt and 5/16” flat washer with the guard closure spacer between the barrier attachment plate and the closure post.
 - 5.5.4.1. Orient the closure post with the two holes which are the closest together on top. If the uppermost hole in the closure post does not align with the uppermost hole in the 2” x 2” angle post, the closure post is upside down. Make sure the leg of the attachment plate with the two smaller holes is captured under the upper hook and in contact with the ramp side rail. Move the ramp or platform slightly if needed and clamp the attachment plate to the side rail if possible before drilling (FIG. 5.14).
- 5.5.5. Attach the upper rail of the Picketed Guard Closure to the closure post using a 5/16”-18 x 2-1/4” hex bolt and 5/16” flat washer through the second hole from the top of the closure post (FIG. 5.14).
- 5.5.6. Drill holes in the ramp side rail and attach the barrier attachment plate to the side rail in the same manner described earlier (SECTIONS 5.3.5 and 5.3.6 and shown in FIG. 5.5).



- 5.5.7. Locate a closure bracket and attach the short leg of the bracket to the Frame post with a 5/16"-18 x 2-1/4" hex bolt, 5/16" flat washers, and 5/16"-18 nylon insert locknut oriented as shown (FIG. 5.15). Use the uppermost hole available or field drill at a higher location on the post if desired.
- 5.5.8. Orient the bracket so the long leg is on the same side of the closure post as the Picketed Guard Closure and in contact with the closure post, then tighten lightly (enough to hold the bracket against the post but still allow it to rotate).
- 5.5.9. Drill a 5/16" or 11/32" hole through the 1-1/2" square x 42-5/8" long closure post at the slot in the long leg of the closure bracket (FIG. 5.15).
- 5.5.10. Attach the long leg of the closure bracket to the closure post with a 5/16"-18 x 2-1/4" hex bolt, 5/16" flat washers, and 5/16"-18 nylon insert locknut oriented as shown (FIG. 5.15).
- 5.5.11. Tighten all fasteners securely.



- 5.5.12. Measure the gap between the 1-1/2" square x 42-5/8" long closure post and the 2" x 2" angle post (FIG. 5.16).
- 5.5.13. Locate the 1-1/2" diameter round tube and cut to the length measured in the previous step. Using a metal file, remove any sharp edges left from cutting.
- 5.5.14. Place 5/16"-18 round threaded inserts into both ends of the 1-1/2" diameter round tube. Use a rubber mallet to fully seat the threaded inserts as needed (FIG. 5.16).
- 5.5.15. Attach 1-1/2" diameter round tube to 2" x 2" angle post using a 5/16"-18 x 1" hex bolt through a 5/16" flat washer and into the 5/16"-18 round threaded insert installed in the tube.
- 5.5.16. Attach the other end of the tube to the closure post using a 5/16"-18 x 2-1/4" long hex bolt through a 5/16" flat washer, the uppermost hole in the closure post and, into the 5/16"-18 round threaded insert (FIG. 5.16).
- 5.5.17. Insert a 1-1/2" square tube plug into the top of the closure post.
- 5.5.18. Tighten all fasteners securely.



5.6. CLOSURE HANDRAILS



Closure handrails are installed in the same manner for the Two-Line Rail and the Picketed Guard Closure. The images in this section show the installation using a Two-Line Rail closure.


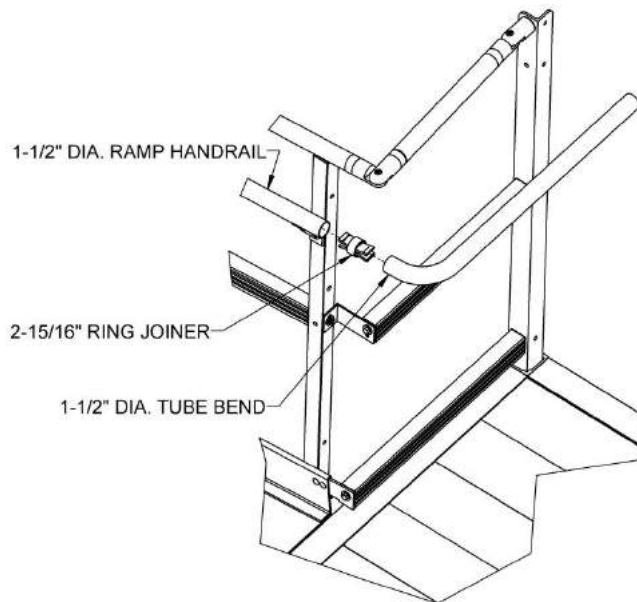
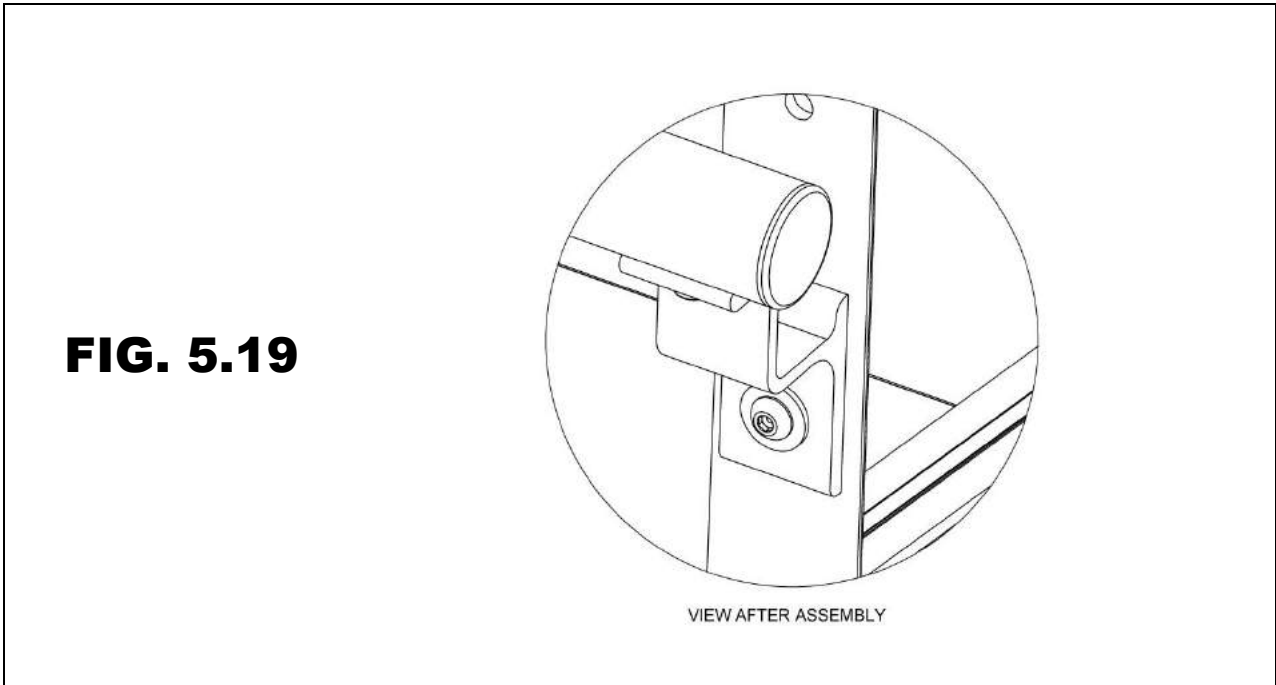
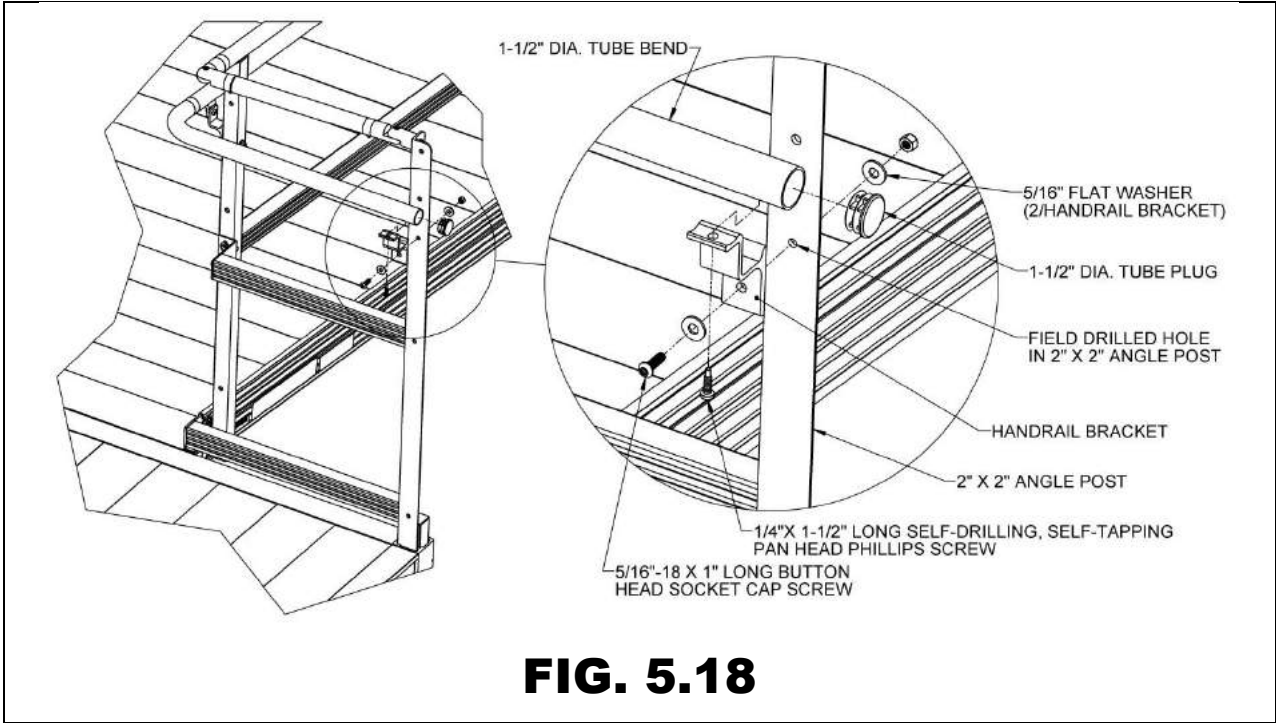
- 5.6.1. Insert a 2-15/16" ring joiner in the Ramp Handrail and install a 1-1/2" diameter tube bend onto the other end of the joiner. Orient the joiner set screw toward the underside of the handrail (FIG. 5.17).
 - 5.6.1.1.  The tube bends are specific to the length of the platform side but may still need to be field trimmed.
- 5.6.2. Level the tube bend with respect to the platform deck, then tighten the joiner set screw to hold the tube bend in place (FIG. 5.17).
- 5.6.3. Locate a handrail bracket and hold in place centered on the 2" x 2" angle post with the saddle in contact with the tube bend (FIG. 5.18).
- 5.6.4. Use the hole in the handrail bracket as a template to drill a 5/16" or 11/32" hole through the 2" x 2" angle post.
- 5.6.5. Attach the handrail bracket to the 2" x 2" angle post using a 5/16"-18 x 1" button head socket cap screw, 5/16" flat washers, and 5/16"-18 nylon insert locknut oriented as shown (FIGs. 5.18 and 5.19).
- 5.6.6. Attach the handrail bracket to the tube bend with a 1/4" x 1-1/2" long self-drilling, self-tapping pan head Phillips screw through the hole in the handrail bracket saddle.
- 5.6.7. If needed, trim the open end of the tube bend then insert a 1-1/2" plastic end plug into the open end. Use a rubber mallet or similar tool to fully seat the plug if needed.
- 5.6.8. Tighten all fasteners securely.

FIG. 5.17





5.7. TWO-LINE RAIL TURN BACK CLOSURE



There are four special closures available for filling the space between two ramps in a turn back configuration: Two-Line Rail for a 5' platform side; Picketed Guard for a 5' platform side; Two-Line Rail for a 6' platform side; Picketed Guard for a 6' platform side. Turn back closures for a 7' platform side are uncommon and are ordered as a custom closure.

5.7.1. Install Corner Pocket Covers in the two platform corner pockets between the ramps which do not have 2" x 2" angle posts first. Make sure the 1-1/2" support legs and platform connector stub tubes are flush or slightly below the tops of the platform corner pockets, then drop the 2" x 2" angles on the underside of the Corner Pocket Covers into the pockets where the post would normally be installed.

5.7.2. Tighten the set screws in the corner pocket to hold the covers in place (FIG. 5.20). Refer to SECTION 4.6 and FIG. 4.11 for additional details on set screw locations.



Corner Pocket Covers are "left" and "right" hand pairs, but can be installed in either platform corner pocket, provided they extend onto the platform side rail.

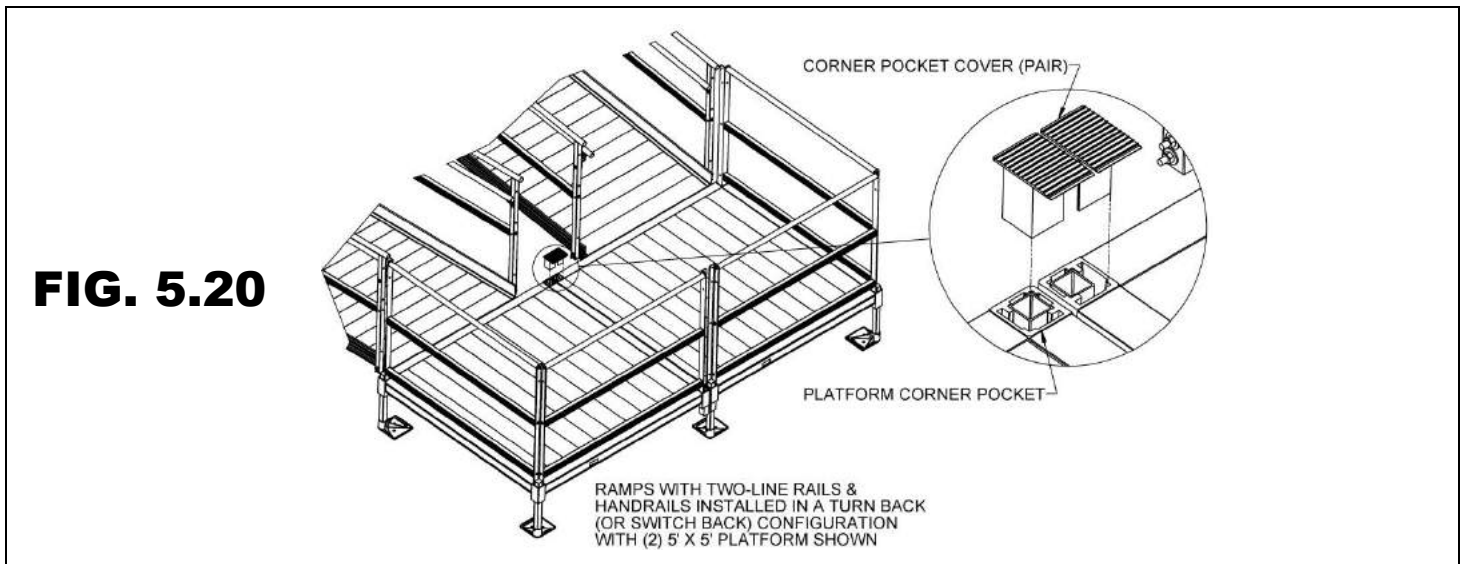
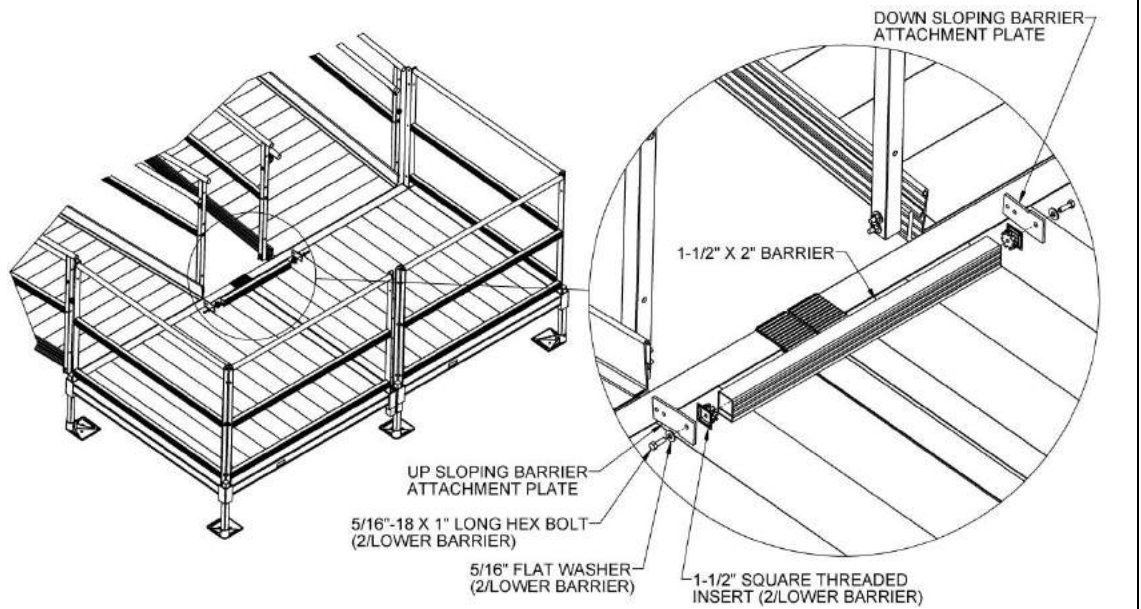


FIG. 5.21



- 5.7.3. The barrier is provided in the length needed for the platform side and should not need to be trimmed. Insert 1-1/2" square threaded inserts into both ends of the 1-1/2" x 2" barrier. Use a rubber mallet to fully seat the insert if needed (FIG. 5.21).
- 5.7.4. Assemble barrier attachment plates to barrier using a 5/16"-18 x 1" long hex bolts and 5/16" flat washers. Note which side of the barrier the plates are attached to and match the direction of ramp slope. If the upper end of the ramp or ramp run terminates at a platform, use the "up sloping" plate. If the lower end of a ramp or ramp run starts at a platform use the "down sloping" plate.
- 5.7.5. Note the orientation of the larger 3/8" diameter hole with respect to the 1-1/2" x 2" section of the plate as shown (refer back to FIG. 5.3) to identify which barrier attachment plate is needed.
- 5.7.6. Align the barrier attachment plates with sides of the barrier and tighten the fasteners securely (FIG. 5.21).

FIG. 5.22

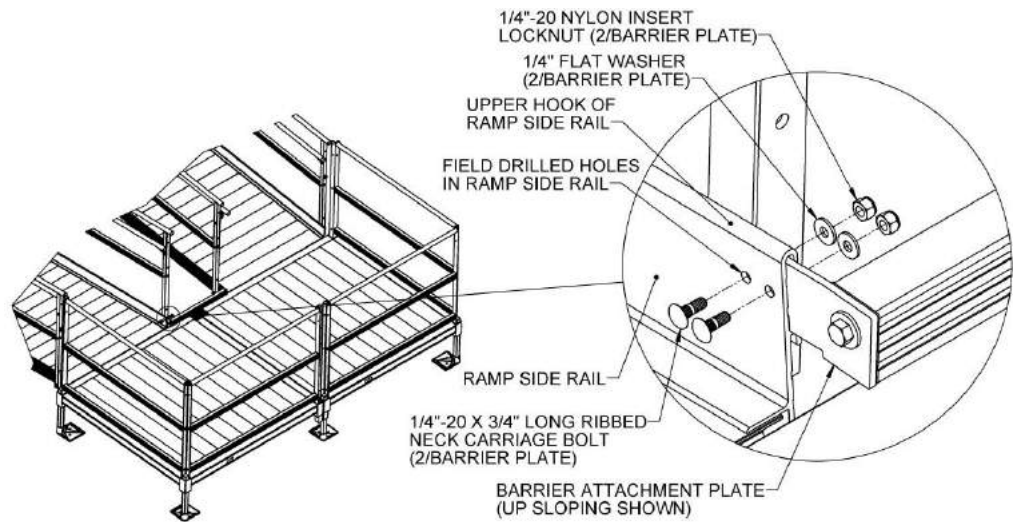
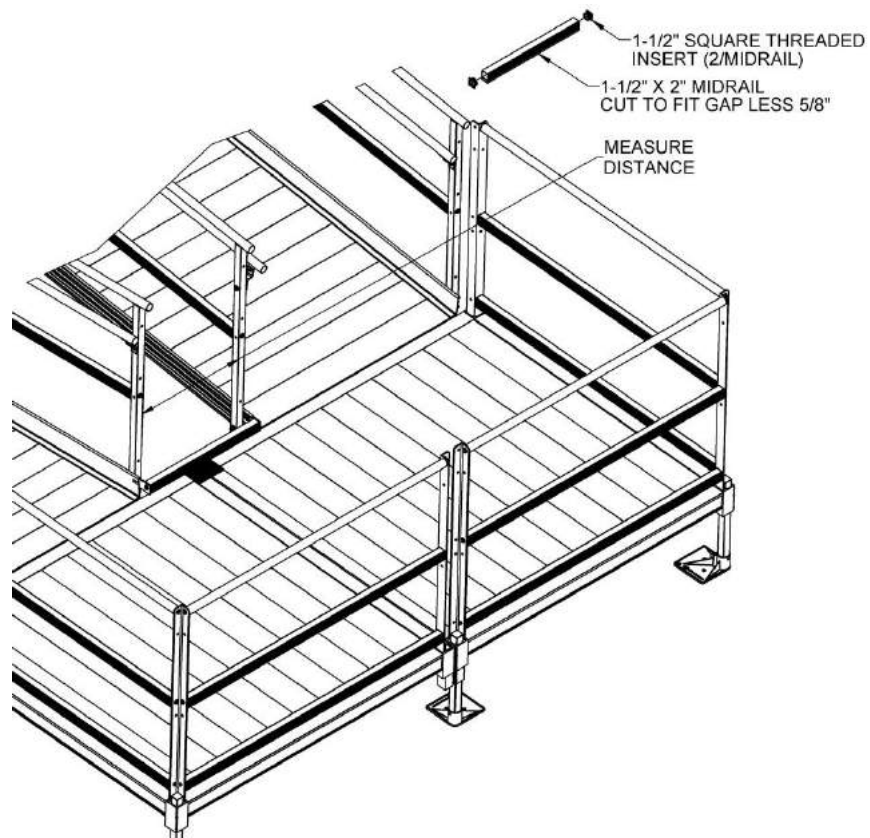
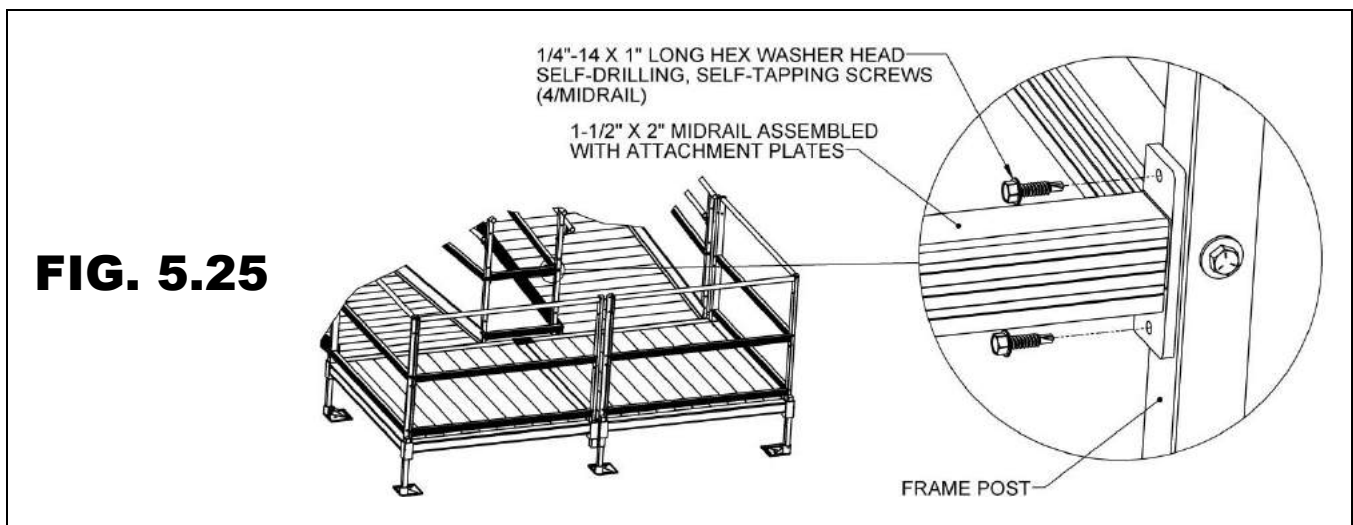
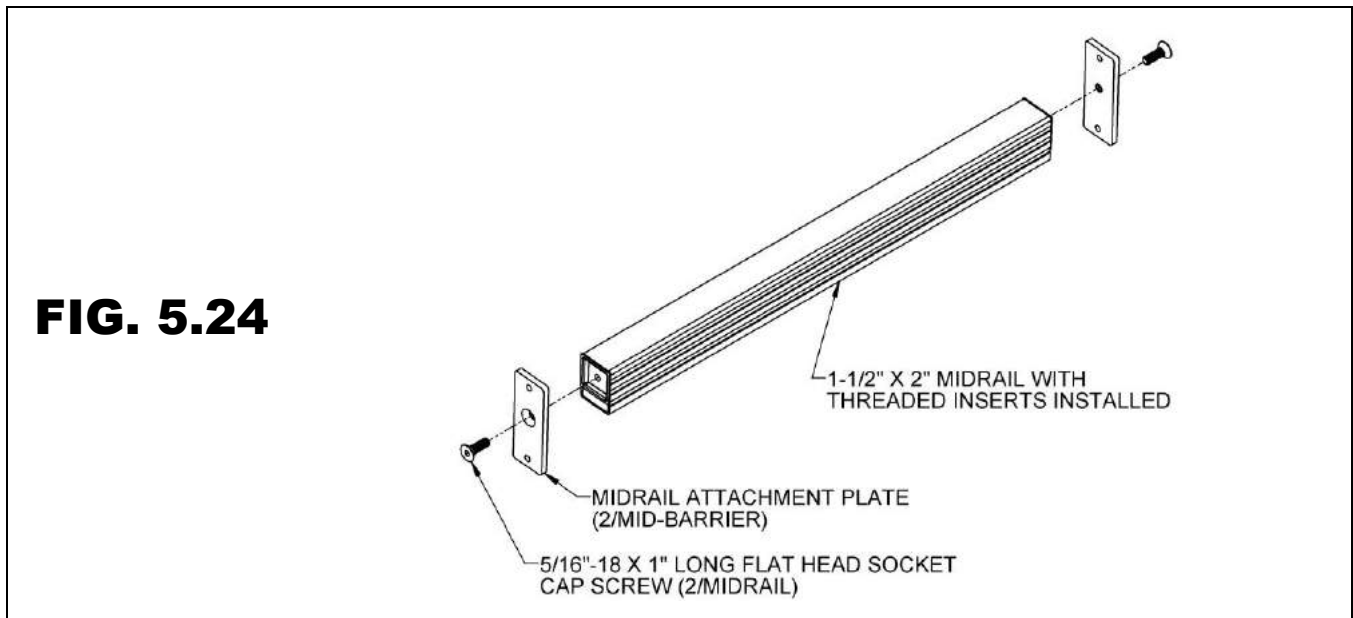


FIG. 5.23

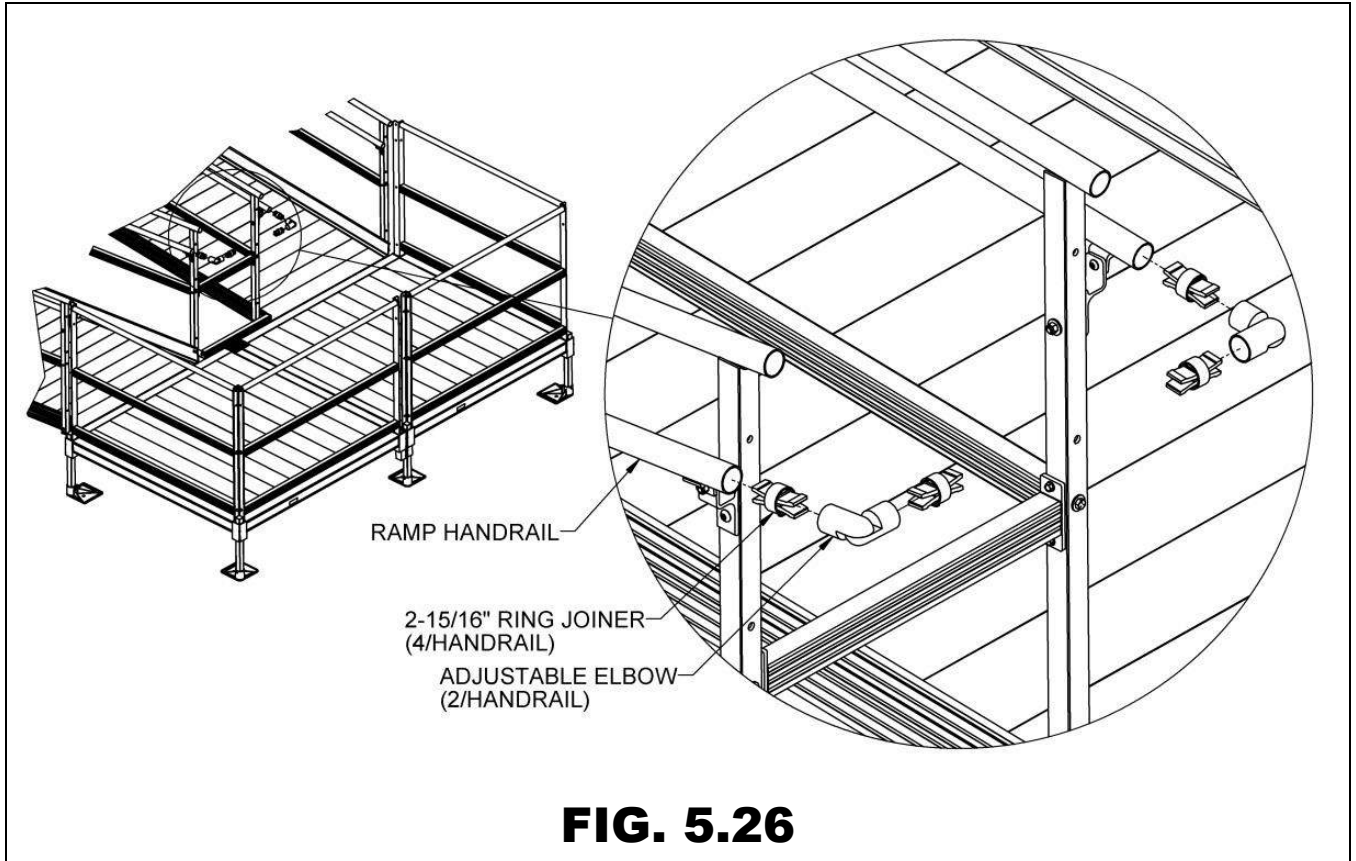


- 5.7.7. Place the assembly into the space between the ramp side rails. Make sure the legs of the barrier attachment plates with the two smaller holes are captured under the upper hooks and in contact with the ramp side rails. Move the ramps slightly if needed. Level the barrier with respect to the platform and clamp the attachment plates to the side rails if possible before drilling (FIG. 5.22).
- 5.7.8. Use the two smaller holes in the barrier attachment plates to drill two 1/4" or 9/32" holes through each ramp side rail (FIG. 5.22).
- 5.7.9. Connect the barrier attachment plates to the ramp side rails using 1/4"-20 x 3/4" long ribbed neck carriage bolts, 1/4"-20 nylon insert locknuts and 1/4" flat washers. Orient the head of the carriage bolt on the ramp side as shown (FIG. 5.22).

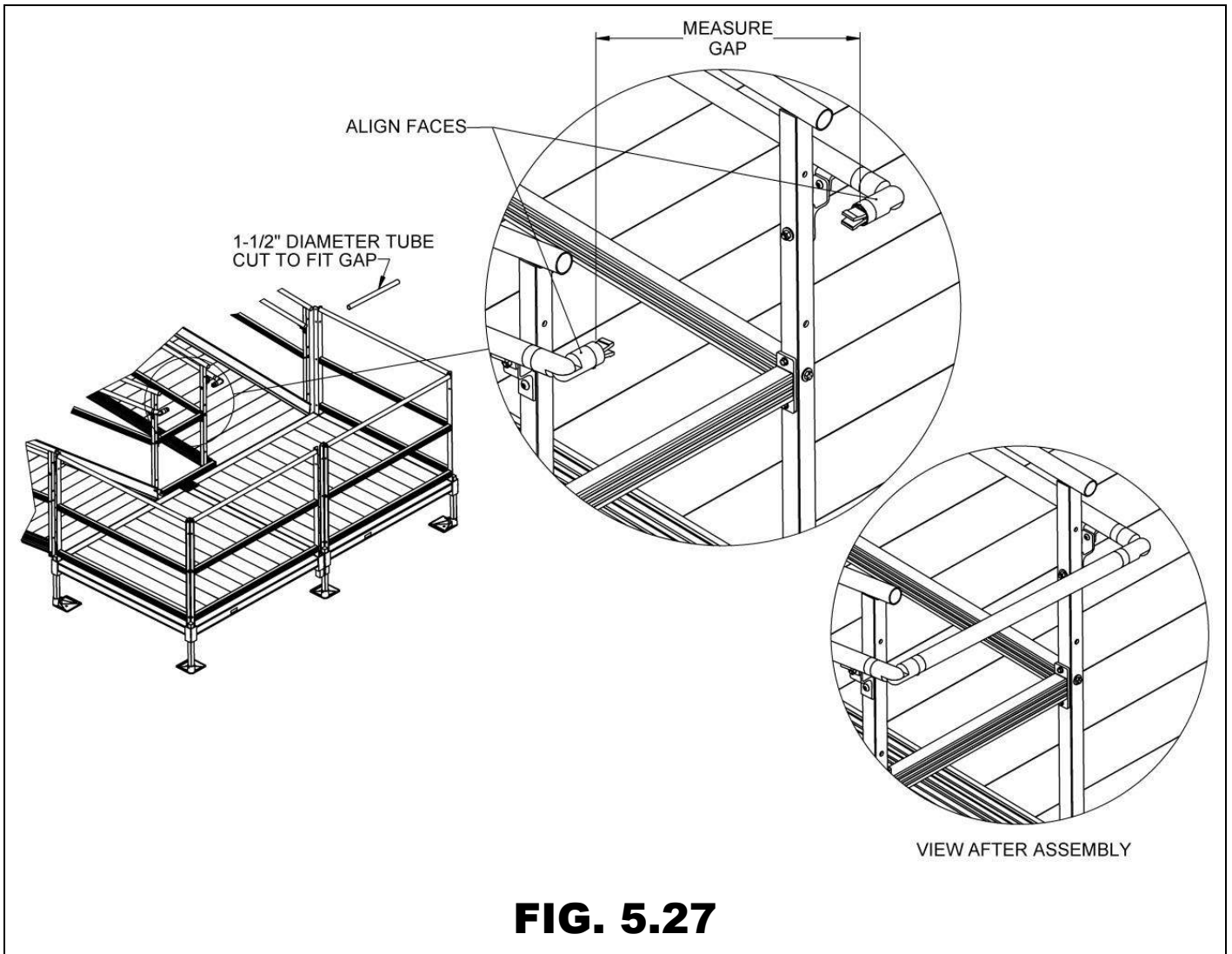
- 5.7.10. For the midrail, first measure the distance between the Frame posts at the turn back, then cut the 1-1/2" x 2" midrail to the measured length, less 5/8" to account for the threaded inserts and attachment plates, which will be installed in the following steps.
- 5.7.11. Using a metal file, smooth all sharp edges from cutting the midrail.
- 5.7.12. Insert 1-1/2" square threaded inserts into both ends of the 1-1/2" x 2" midrail. Use a rubber mallet or similar tool to fully seat the insert if needed (FIG. 5.23).
- 5.7.13. Attach the Midrail Attachment Plates to the midrail with 5/16"-18 x 1" long flat head socket screws. The hole in the Midrail Attachment Plate is offset to account for the offset of the threaded insert in the midrail. Orient the plate such that the midrail is centered on both sides then tighten the screws securely (FIG. 5.24).
- 5.7.14. Attach the midrail assembly between the Frame posts using two each 1/4"-14 x 1" long hex washer head self-drilling, self-tapping screws per attachment plate. Center the midrail assembly (approximately) between the Frame midrails (about 18" to 18-1/2" above the lower barrier) (FIG. 5.25).



- 5.7.15. Connect the Ramp Handrails at the turn back by first inserting 2-15/16" ring joiners in the open ends of the Ramp Handrails and adjustable elbows on the opposite end of the ring joiner. Then, install another 2-15/16" ring joiner into the other ends of the elbows. Orient joiner set screw toward the underside of ramp handrail (FIG. 5.26).
- 5.7.16. Referencing FIG. 5.26, loosen the elbow assembly screws and align the elbows to the joiners as shown, then tighten elbow assembly screws and joiner set screws enough to hold the components in position.



- 5.7.17. Measure the gap between the faces of the opposing rings of the 2-15/16" ring joiners (FIG. 5.27).
- 5.7.18. Cut the 1-1/2" diameter tube to the length measured. Using a metal file, smooth any sharp edges from cutting.
- 5.7.19. Install the cut 1-1/2" diameter round tube between the 2-15/16" ring joiners. Remove and reinstall the adjustable elbows, if needed (FIG. 5.27).
- 5.7.20. Securely tighten the adjustable elbow assembly screws and all 2-15/16" ring joiner set screws.



5.8. PICKETED GUARD TURN BACK CLOSURE



There are four special closures available for filling the space between two ramps in a turn back configuration: Two-Line Rail for a 5' platform side; Picketed Guard for a 5' platform side; Two-Line Rail for a 6' platform side; Picketed Guard for a 6' platform side. Turn back closures for a 7' platform side are uncommon and are ordered as a custom closure.

5.8.1. Install two 2" x 2" turn back angle posts into the open platform corner pockets with rounded end oriented upward, first. Align the bottom of the posts with bottom of the corner pockets, then tighten set screws in the corner pockets to hold the posts in place (FIG. 5.28). See SECTION 4.6 and FIG. 4.11 for additional details on set screw locations.

5.8.2. Attach Picketed Guard Closures to the 2" X 2" turn back angle posts using 5/16"-18 x 1" long hex bolts and 5/16" flat washers to attach the upper rail. To attach lower rail, use 5/16"-18 x 1" long hex bolts (do not use a flat washer at this location)(FIG. 5.29).



Picketed Guard Closures are symmetric so what becomes the "upper" or "lower" rail depends on how the closure is positioned at installation.

FIG. 5.28

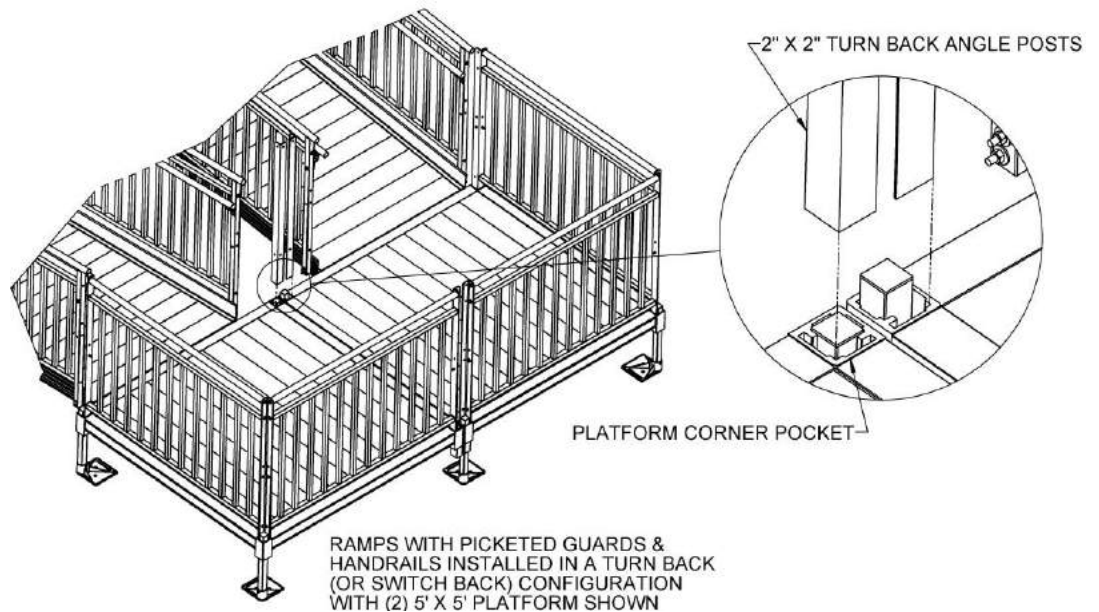
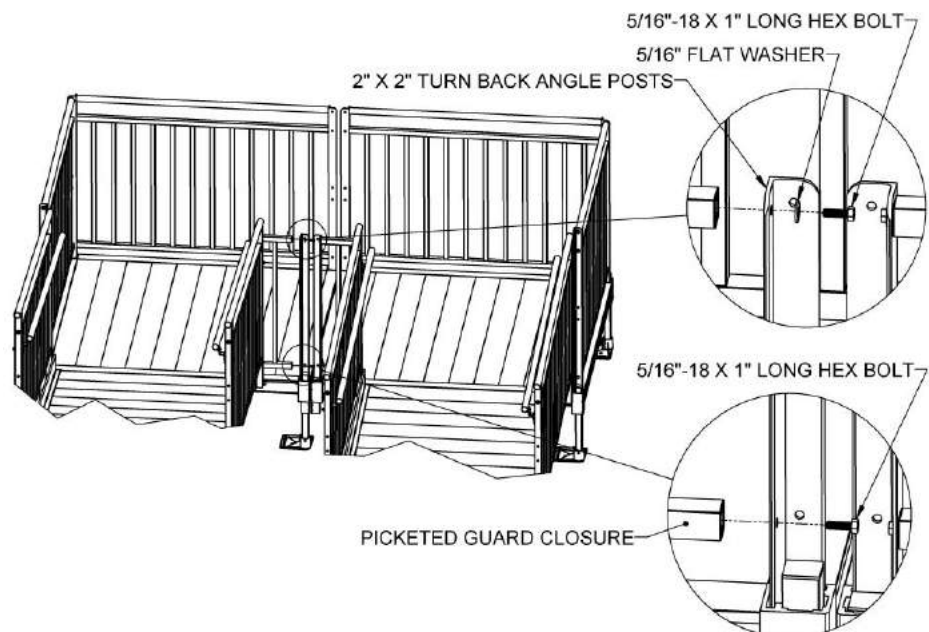
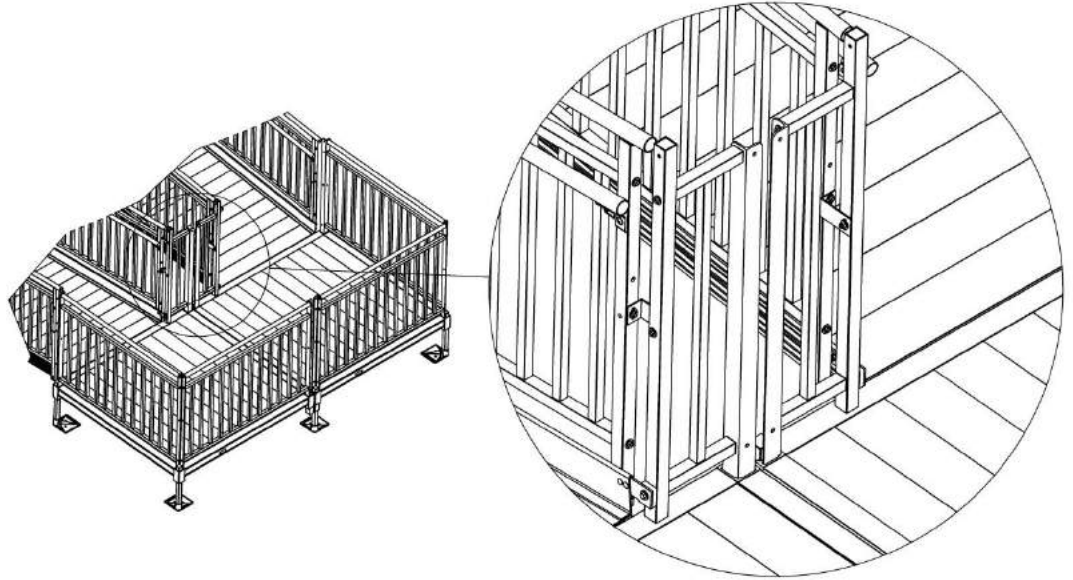


FIG. 5.29



5.8.3. The 1-1/2" square x 42-5/8" long closure posts, barrier attachment plates, picketed guard closure spacer, and closure brackets are all installed at a guarded turn back in the same manner shown in the 'PICKETED GUARD CLOSURE' section (refer to 5.5.3 through 5.5.10 for assembling these components). FIG. 5.30 shows the components installed.

FIG. 5.30



- 5.8.4. For the turn back top rail, first measure the distance between the 1-1/2" square x 42-5/8" long closure posts at the turn back, then cut the 1-1/2" diameter tube to the measured length, less 1/8" to account for the threaded inserts, which will be installed in the following steps.
- 5.8.5. Using a metal file, smooth all sharp edges from cutting the 1-1/2" diameter tube.
- 5.8.6. Insert 1-1/2" round threaded inserts into both ends of the 1-1/2" diameter tube. Use a rubber mallet or similar tool to fully seat the inserts if needed (FIG. 5.31).
- 5.8.7. Attach the top rail between the 1-1/2" square x 42-5/8" long closure posts using a 5/16"-18 x 2-1/4" long hex bolt through a 5/16" flat washer, the uppermost hole in the closure post, and into the 5/16"-18 round threaded insert (FIG. 5.32). Repeat this process for the opposite side.

FIG. 5.31

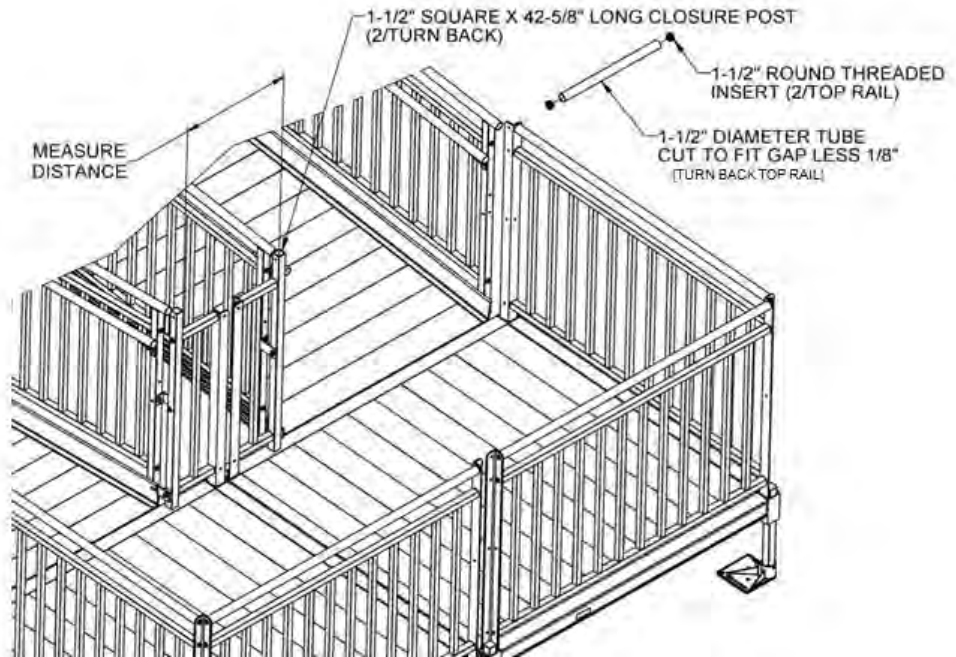
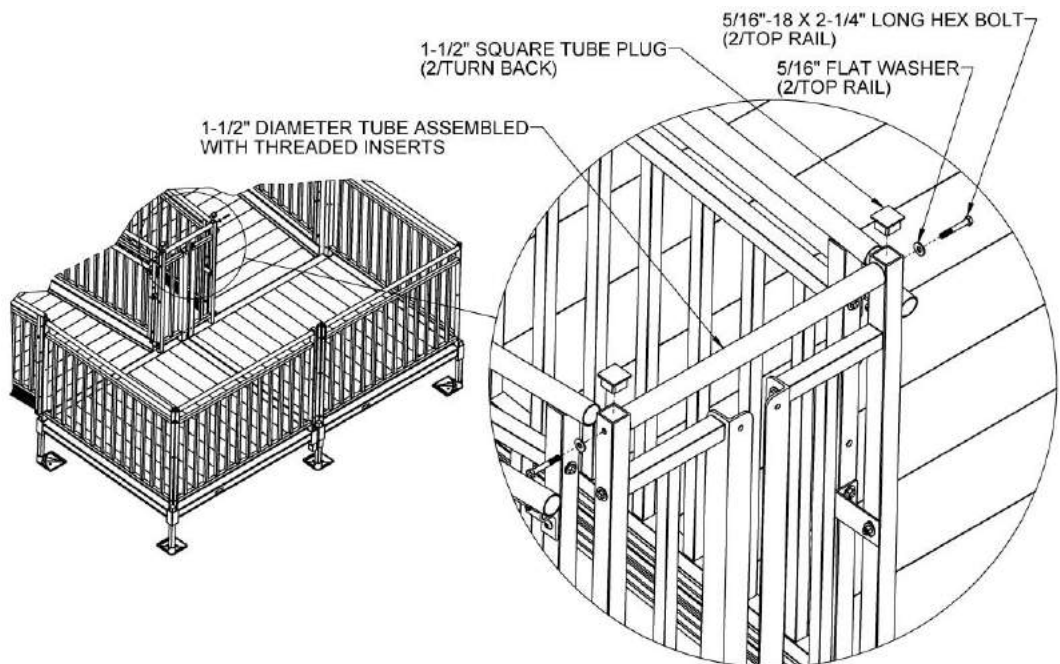
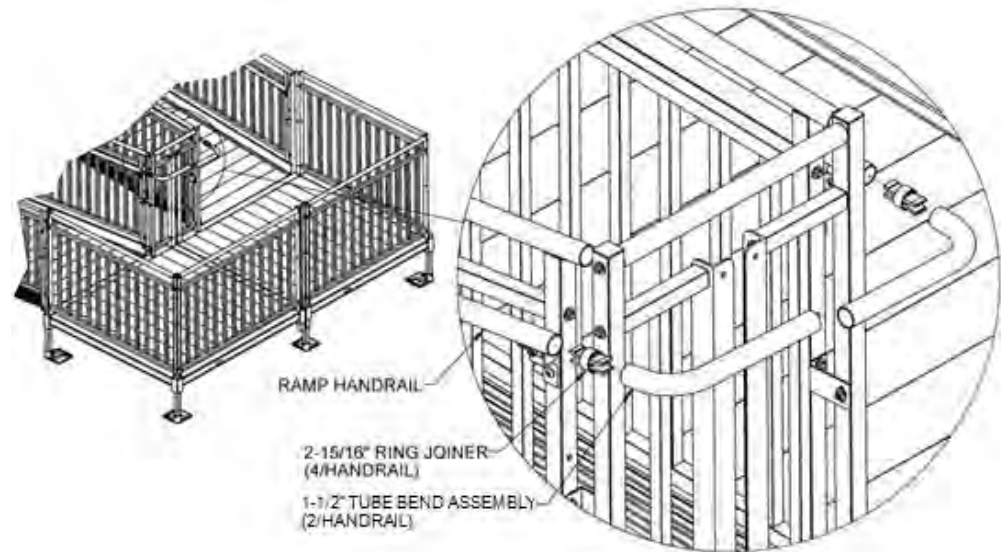


FIG. 5.32



- 5.8.8. Connect the Ramp Handrails at the turn back by first inserting 2-15/16" ring joiners in the open ends of the Ramp Handrails. Install a 1-1/2" diameter tube bend on the opposite end of the joiner. Orient the joiner set screws toward the underside of the ramp handrails (FIG. 5.33).

FIG. 5.33



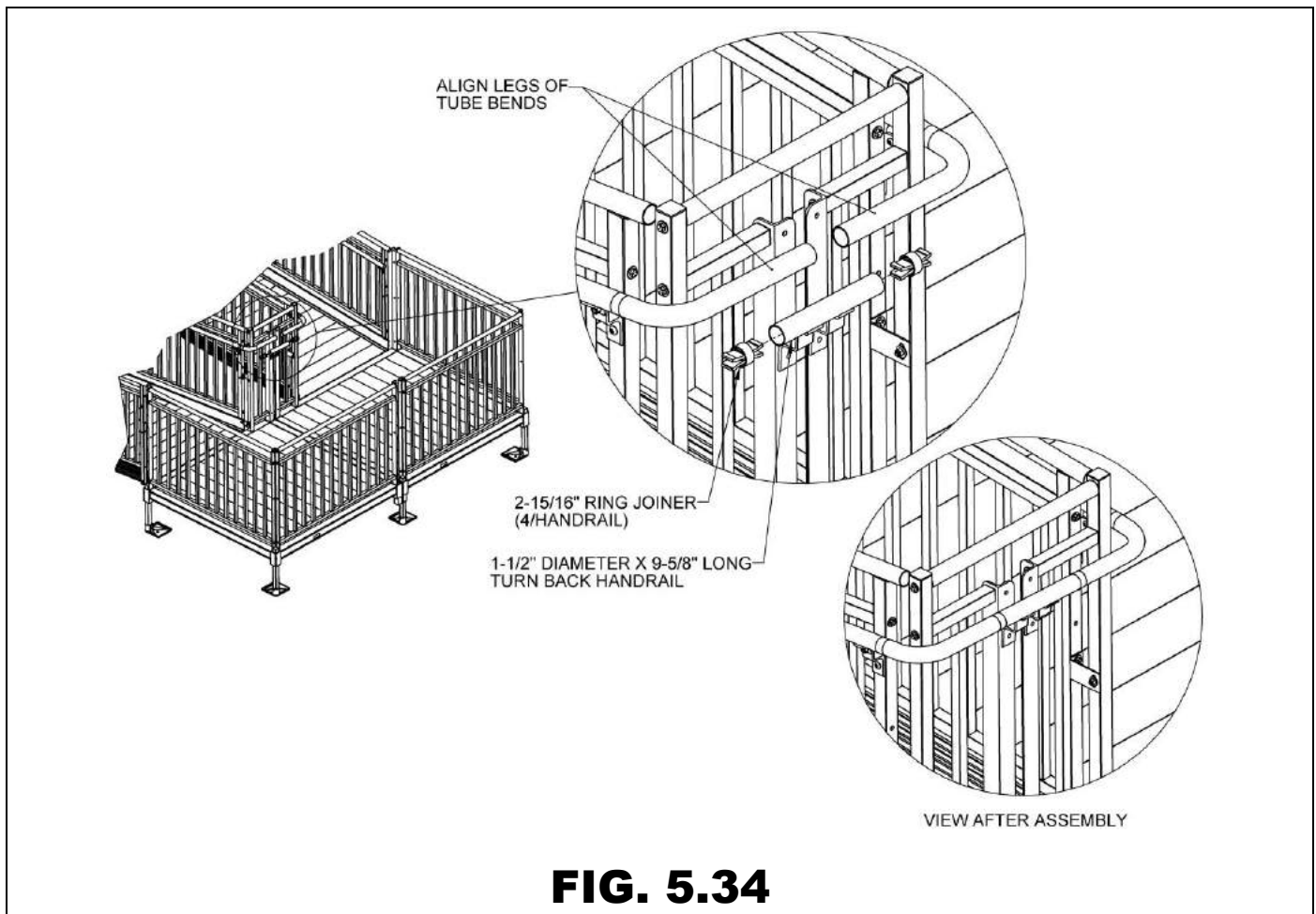
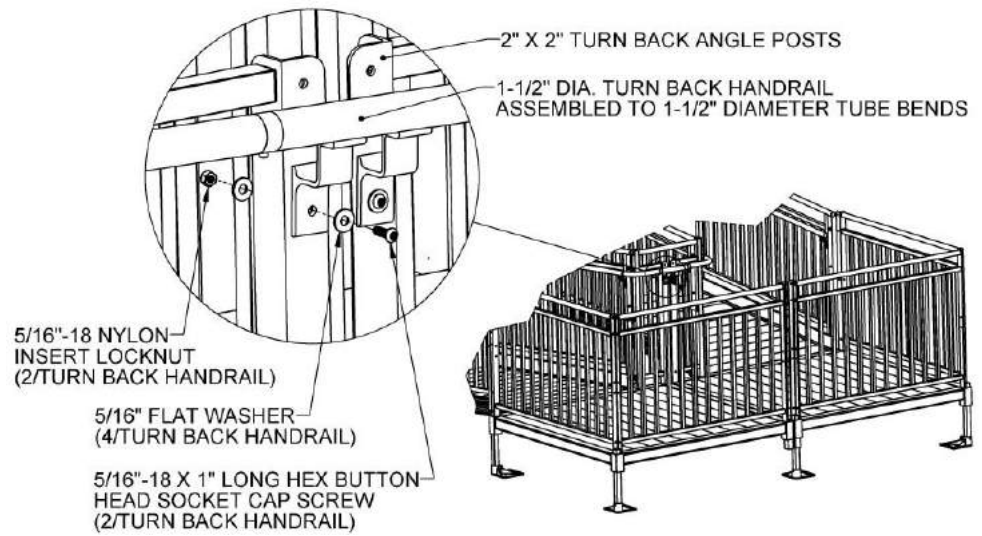


FIG. 5.34

- 5.8.9. Locate the special turn back handrail and the 1-1/2" diameter x 9-5/8" long tube with two welded brackets.
- 5.8.10. Insert 2-15/16" ring joiners into both ends. Orient the joiner set screw toward the brackets on the underside and tighten the joiner set screws securely (FIG. 5.34).
- 5.8.11. Loosen the tube bend assembly screws and align the long leg of the 1-1/2" diameter tube bends, then tighten the elbow assembly screws and joiner set screws enough to hold the components in position. Hold the turn back handrail under the 1-1/2" diameter tube bends to assist in the alignment. It will be necessary to trim the short leg of one of the tube bends to align properly. Remove and reinstall the tube bends as needed (FIG. 5.34).
- 5.8.12. Once the 1-1/2" diameter tube bends have been aligned, use the turn back handrail with the ring joiners installed to mark the tube bends for trimming (FIG. 5.34).
- 5.8.13. Cut the 1-1/2" diameter tube bends at the marked locations. Using a metal file, smooth any sharp edges from cutting.
- 5.8.14. Install the cut 1-1/2" diameter tube bends onto the 2-15/16" ring joiners installed in the turn back handrail (FIG. 5.34).
- 5.8.15. Align the short legs of the tube bends with the 2-15/16" ring joiners installed in Ramp Handrails and install the assembly onto the joiners. Tighten all ring joiner set screws securely.
- 5.8.16. Use the holes in the handrail brackets welded to the turn back handrail as a template to drill 5/16" or 11/32" holes through the 2" x 2" turn back angle posts.

- 5.8.17. Attach the turn back handrail to both 2" X 2" turn back angle posts using 5/16"-18 x 1" long button head socket cap screws, 5/16"-18 nylon insert locknuts, and 5/16" flat washers (FIG. 5.35).
- 5.8.18. Tighten all ring joiner set screws fasteners securely.

FIG. 5.35



5.9. TWO-LINE RAIL CORNER TURN



There are four special closures available for filling the space between two ramps in a corner turn configuration: Two-Line Rail for a 5' x 5' platform; Picketed Guard for a 5' x 5' platform; Two-Line Rail for a 6' x 6' platform; and Picketed Guard for a 6' x 6' platform. Corner turn closures for a 5' x 7' and 5' x 6' platforms are uncommon so must be ordered as customs for the specific arrangement.

- 5.9.1. Install the 2" x 2" angle post (not already attached to the platform), two-Line Rail, or picketed guard in the open platform corner. Align the bottom of the post with the bottom of corner pocket, then tighten the set screws securely. Refer to SECTION 4.6 for additional details on securing the post.
- 5.9.2. The barrier and midrail of a two-line corner turn are installed in the same manner as a closure at an upper landing. Refer to SECTION 5.3, 'TWO-LINE RAIL BARRIER AND MIDRAILS', and complete the steps described to connect both Frames to the 2" x 2" angle post in the corner. FIG. 5.36 shows the assembly at this stage.

FIG. 5.36

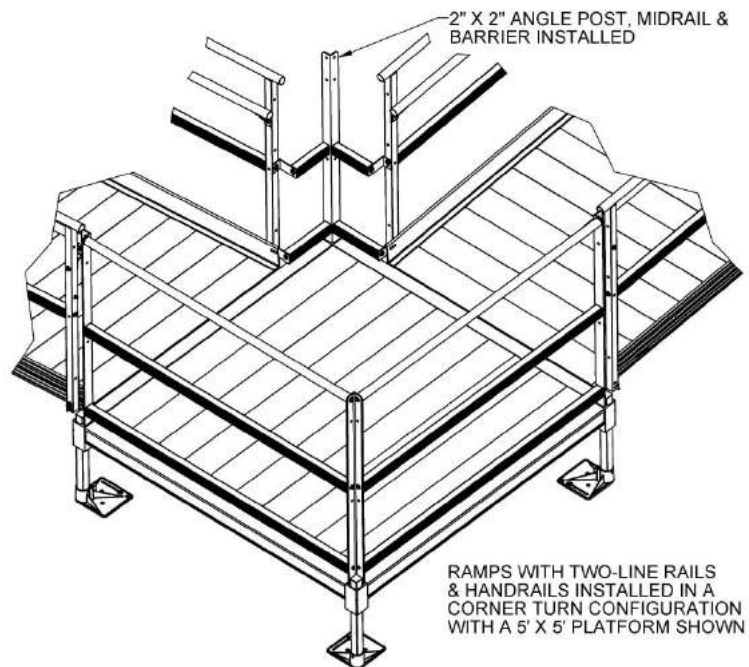
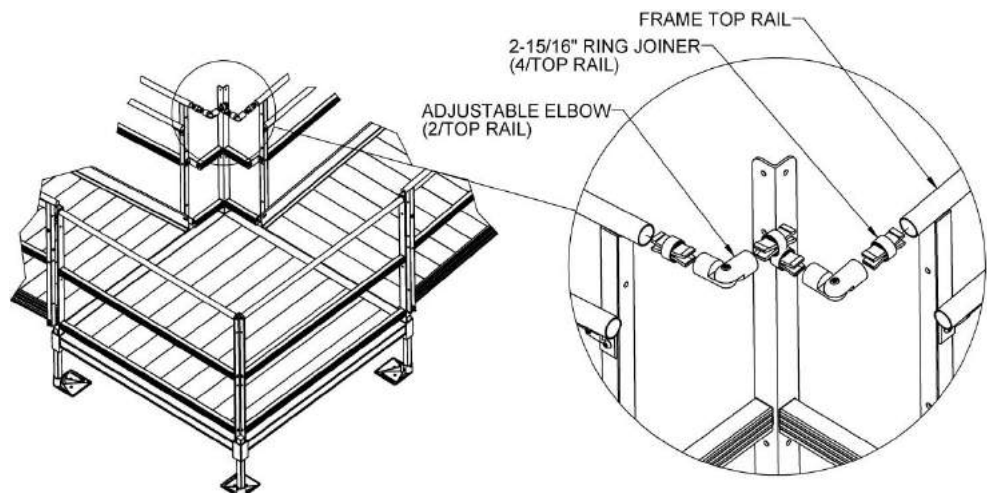
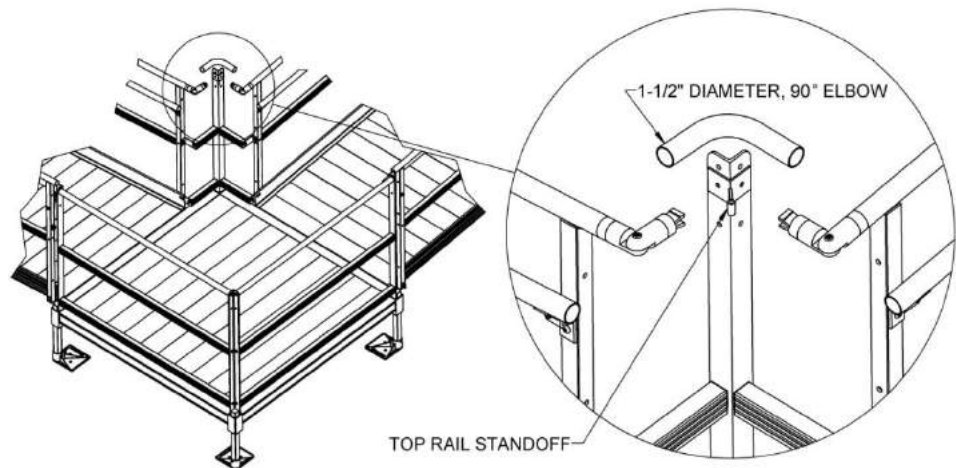


FIG. 5.37



- 5.9.3. Connect the Frame top rails at the corner turn by inserting 2-15/16" ring joiners in the open ends of the Frame top rails and adjustable elbows on the opposite end of the ring joiners. Install 2-15/16" ring joiners into the other ends of the elbows. Orient the joiner set screw toward the underside and the legs of the adjustable elbows, toward the 2" x 2" angle post in the corner, then tighten the joiner set screws and the adjustable elbow assembly screws enough to hold in place (FIG. 5.37).
- 5.9.4. Clamp the Top Rail Standoff to the 2" x 2" angle post in the corner at 1-1/2" from the top of the post. Hold a 1-1/2" diameter, 90° elbow such that the middle of the bend is centered on top of the Top Rail Standoff. Rotate the adjustable elbows with the joiners until they are parallel, as shown (FIG. 5.38).
- 🖐 There are two standoffs used at the corner turn post. The Top Rail Standoff is the smaller, shorter one of the two.
- 5.9.5. Mark the 1-1/2" diameter, 90° elbow at the ends of the ring joiners and trim at the marked locations. Using a metal file, smooth all sharp edges from cutting.
- 5.9.6. Install the 1-1/2" diameter, 90° elbow between the joiners. Remove and reinstall the adjustable elbows and ring joiners, then tighten all joiner set screws and elbow assembly screws securely.

FIG. 5.38



- 5.9.7. Adjust the Top Rail Standoff to contact the underside of the elbow, then use the holes in the standoff as a template to drill 5/16" or 11/32" holes through the 2" x 2" angle posts (FIG. 5.39).
- 5.9.8. Attach the Top Rail Standoff to the 2" X 2" angle posts using 5/16"-18 x 1" long button head socket cap screws, 5/16"-18 nylon insert locknuts, and 5/16" flat washers (FIG. 5.39).
- 5.9.9. Drive a 1/4"-14 x 1-1/2" self-drilling, self-tapping screw up through the underside of the Top Rail Standoff into the 1-1/2" diameter, 90° elbow. Put pressure on the elbow until the threads engage and pull the components together (FIG. 5.40).
- 5.9.10. Tighten all fasteners securely, including all ring joiner set screws and elbow assembly screws, if not completed previously.

FIG. 5.39

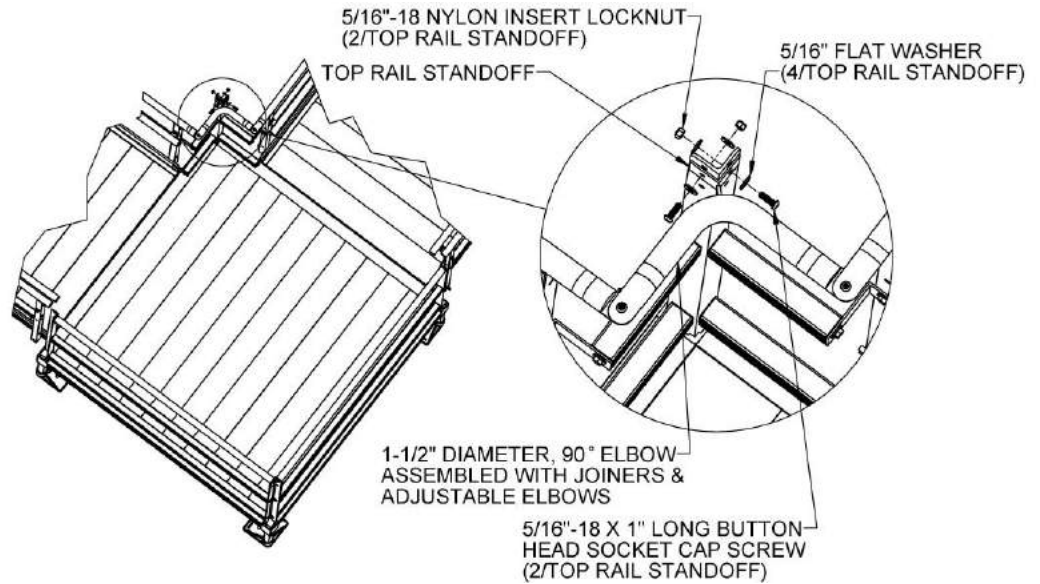
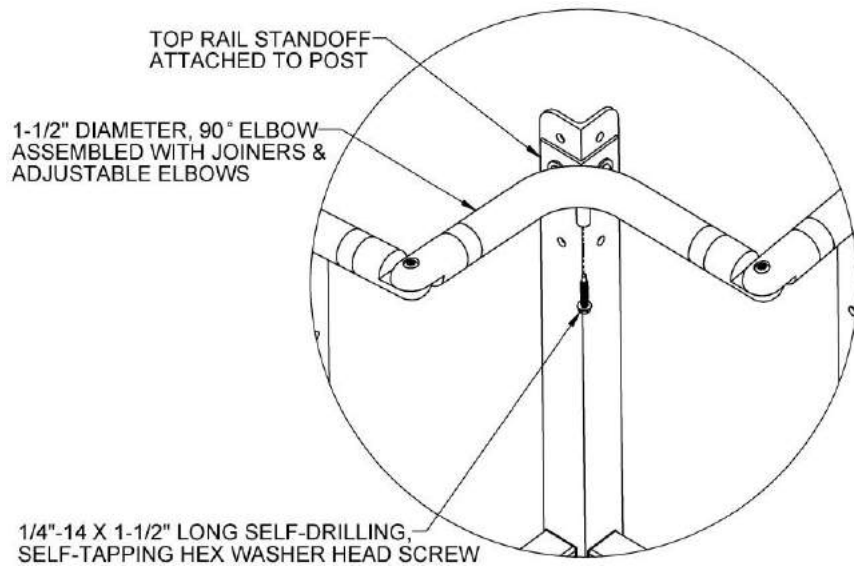
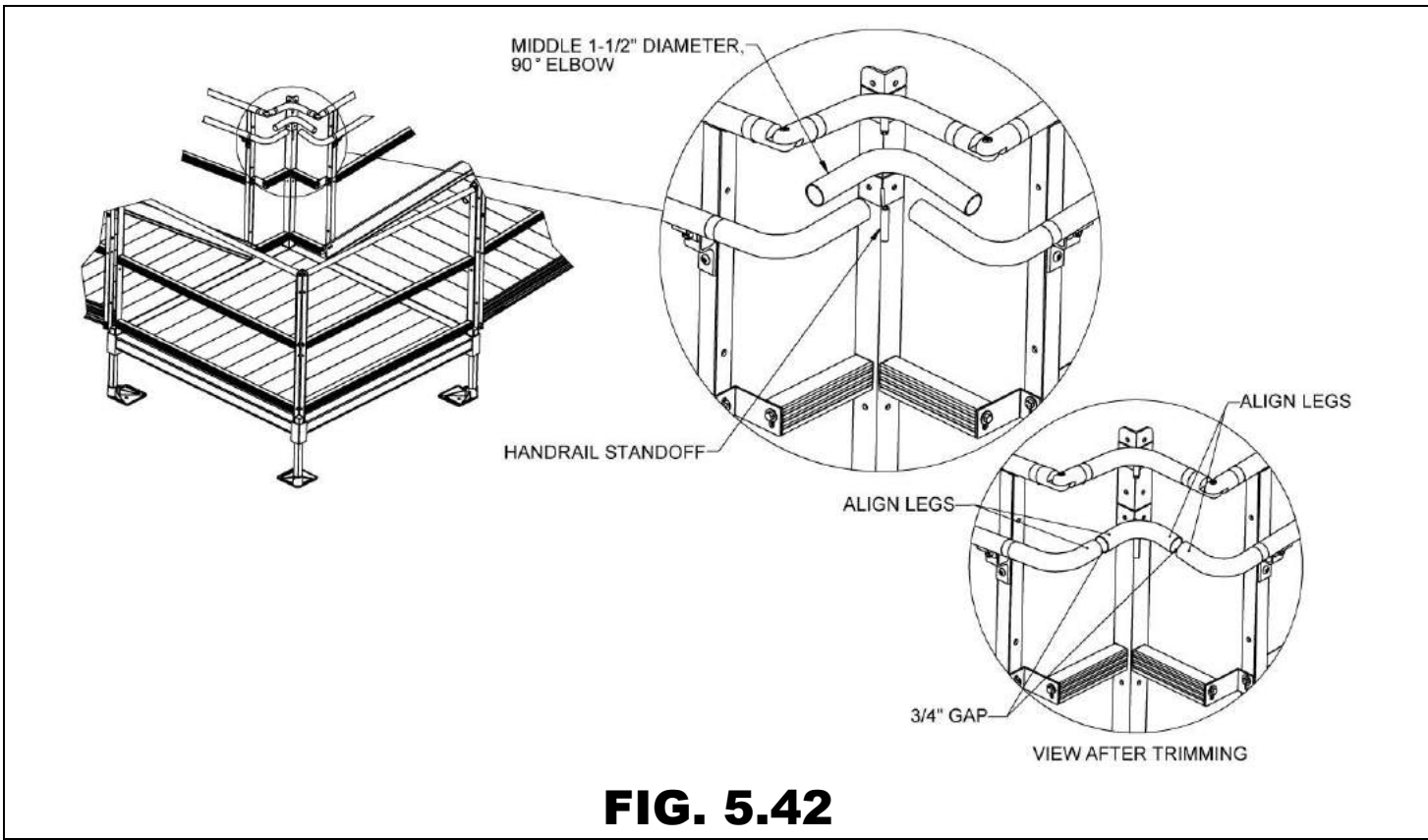
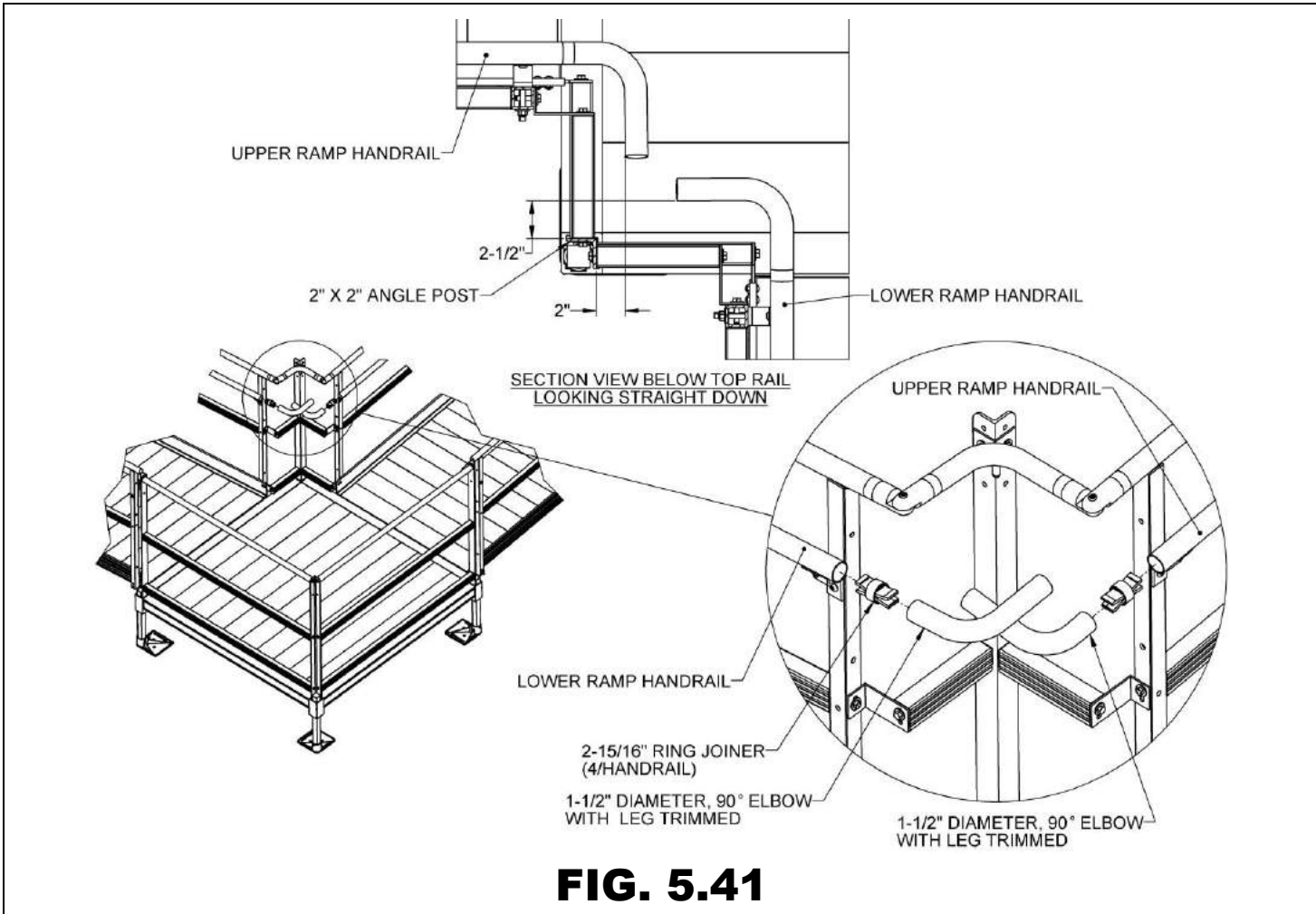


FIG. 5.40



- 5.9.11. Connect the Ramp Handrails at the corner turn by first trimming one leg of two 1-1/2" diameter, 90° elbows. Trim the elbow leg which will be installed on the lower Ramp Handrail such that the leg pointing toward the 2" x 2" angle post in the corner is 2-1/2" (approximately) from the angle post. Trim the elbow leg which will be installed on the upper Ramp Handrail such that the leg pointing toward the 2" x 2" angle post in the corner is 2" (approximately) from the angle post (FIG. 5.41).
- 🖐 The "lower" ramp is the ramp with the upper end which ends at the platform; the "upper" ramp is the ramp with the lower end which starts at a platform. The 1-1/2" diameter, 90° elbows are trimmed to different lengths because the relationship of the Frame posts to the platform is not the same for "upper" and "lower" ramps.
- 5.9.12. Using a metal file, smooth all sharp edges from cutting.
- 5.9.13. Insert 2-15/16" ring joiners in the open ends of the Ramp Handrails. Install the 90° elbow leg trimmed for the lower Ramp Handrail to the joiner in the lower Ramp Handrail and the 90° elbow leg trimmed for the upper Ramp Handrail to the joiner in the upper Ramp Handrail. Orient the joiner set screws toward the underside of the ramp handrails and the 90° elbows toward the 2" x 2" angle post in the corner then tighten the joiner set screws enough to hold the elbows in place (FIG. 5.41).
- 5.9.14. Clamp the Handrail Standoff to the 2" x 2" angle post in the corner at 7-3/8" from the top of the post. Hold a 1-1/2" diameter, 90° elbow such that the middle of the bend is centered on top of the Handrail Standoff. Rotate the 90° elbows attached to the Ramp Handrails until they are parallel to the ends of the elbows as needed (FIG. 5.42).
- 🖐 There are two standoffs used at the corner turn post. The Handrail Standoff is the larger, longer one of the two.
- 5.9.15. Trim all three 1-1/2" diameter, 90° elbows until the legs of the elbows align and there is a 3/4" gap between the legs. Use a ring joiner centered (approximately) between the legs of the bends to assist in estimating where the cuts should be and use caution not to trim too much off any one elbow leg (FIG. 5.42).
- 5.9.16. Using a metal file, smooth any sharp edges from cutting.
- 5.9.17. Assemble the three 1-1/2" diameter, 90° elbows using 2-15/16" ring joiners. Remove the elbows from the Ramp Handrail if needed but be sure to keep track of the cut ends so they can be reinstalled in the same orientation with respect to the handrails and each other. Orient all joiner set screws toward the underside and tighten all joiner set screws securely (FIG. 5.43).
- 5.9.18. Adjust the Handrail Standoff to contact the underside of the middle elbow then use the holes in the standoff as a template to drill 5/16" or 11/32" holes through the 2" x 2" angle posts (FIG. 5.43).
- 5.9.19. Attach the Handrail Standoff to the 2" X 2" angle posts using 5/16"-18 x 1" long button head socket cap screws, 5/16"-18 nylon insert locknuts and 5/16" flat washers (FIG. 5.43).
- 5.9.20. Drive a 1/4"-14 x 3" self-drilling, self-tapping screw up through the underside of the Handrail Standoff into the middle 1-1/2" diameter, 90° elbow. Put pressure on the elbow until the threads engage and pull the components together (FIG. 5.43).
- 5.9.21. Tighten all fasteners securely including all ring joiner set screws and elbow assembly screws if not completed previously.



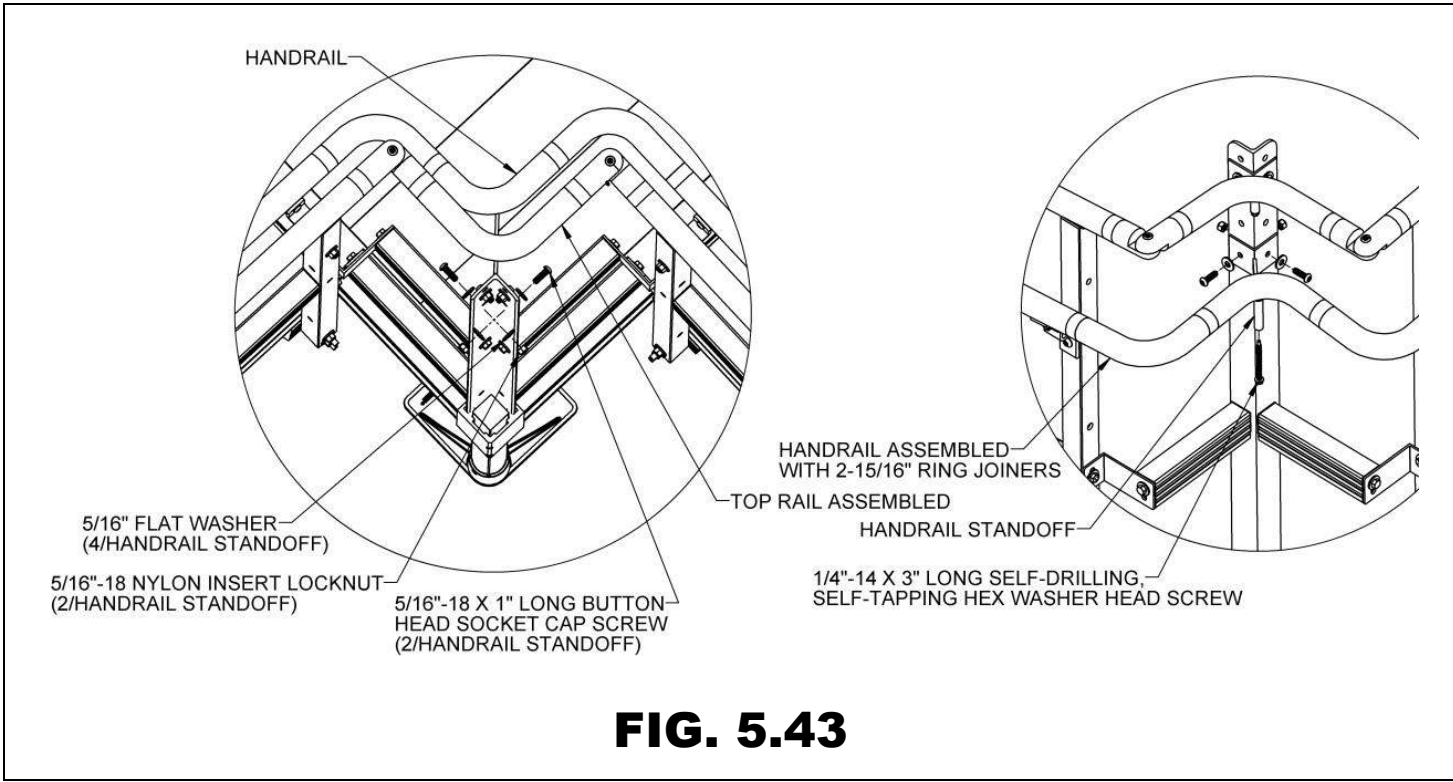


FIG. 5.43

5.10. PICKETED GUARD CORNER TURN



There are four special closures available for filling the space between two ramps in a corner turn configuration: Two-Line Rail for a 5' x 5' platform; Picketed Guard for a 5' x 5' platform; Two-Line Rail for a 6' x 6' platform; and Picketed Guard for a 6' x 6' platform. Corner turn closures for 5' x 6' and 5' x 7' platforms are uncommon and must be ordered as customs for the specific arrangement.

5.10.1. Install the 2" x 2" angle post (not attached to a platform) and two-line rail in into the open platform corner pocket. Align the bottom of the post with the bottom of the corner pocket and tighten the set screws securely. Refer to SECTION 4.6 for additional details on securing the post.

5.10.2. The picketed guards and top rails of a guarded corner turn are installed in the same manner as a picketed guard closure at an upper landing. Refer to SECTION 5.5, 'PICKETED GUARD CLOSURE', and complete the steps described to assemble the picketed guards and connect the top rails to the 2" x 2" angle post in the corner. FIG. 5.44 shows the assembly at this stage.

5.10.3. The handrails of a guarded corner turn are installed in the same manner as the handrails Two-Line Rail Corner Turn. Refer to SECTION 5.9.12 through 5.9.22 and complete the steps described to assemble the handrails. FIG. 5.45 shows the completed assembly.

FIG. 5.44

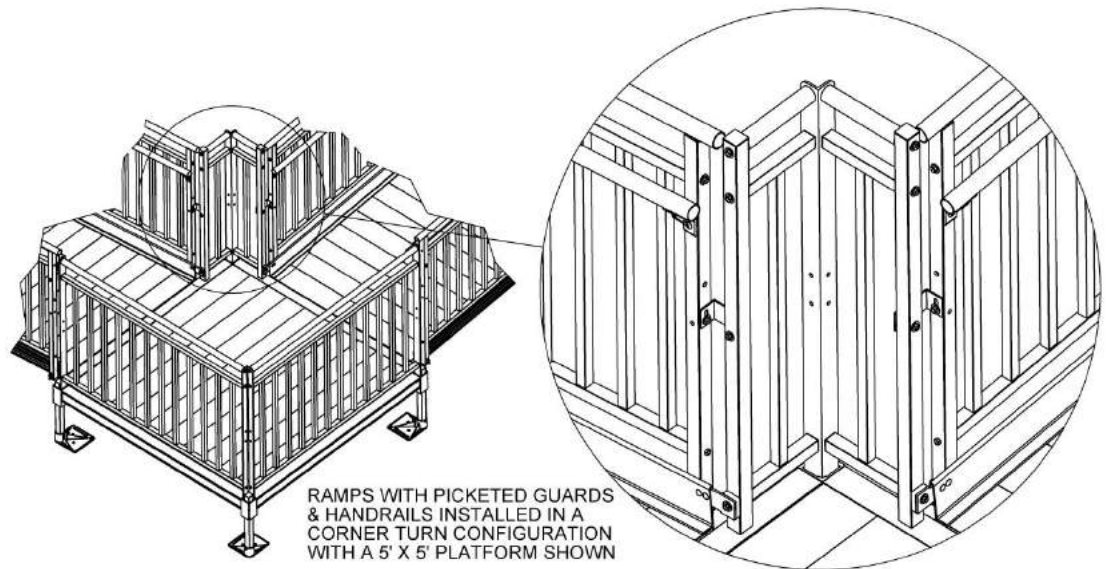
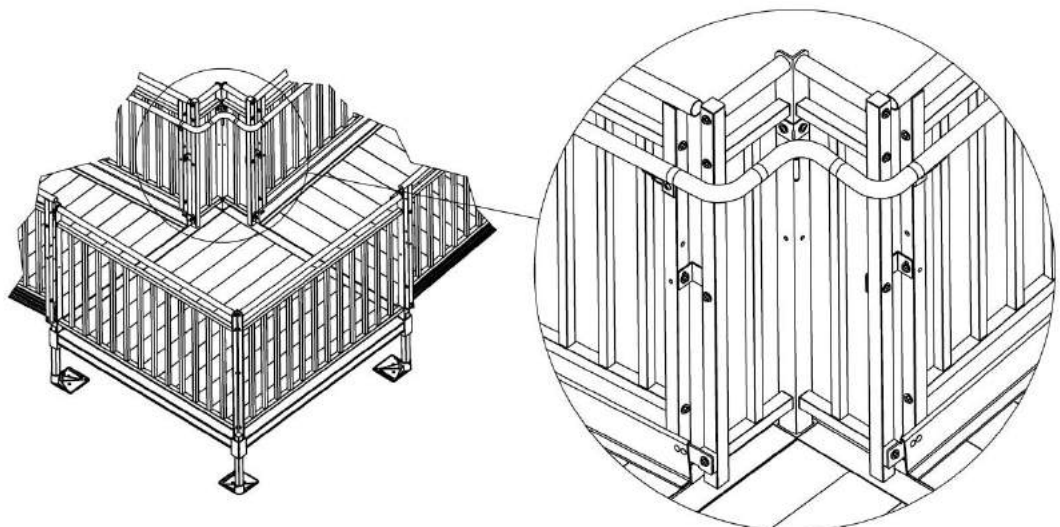


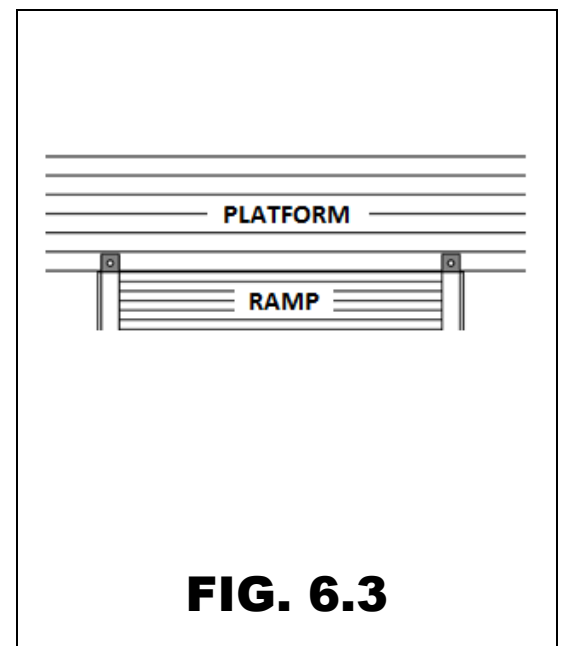
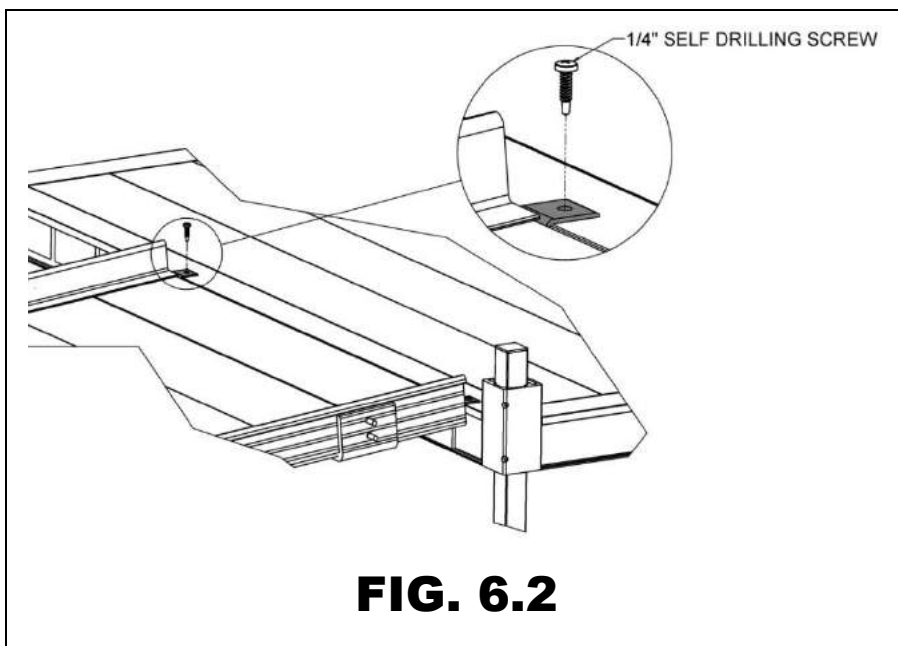
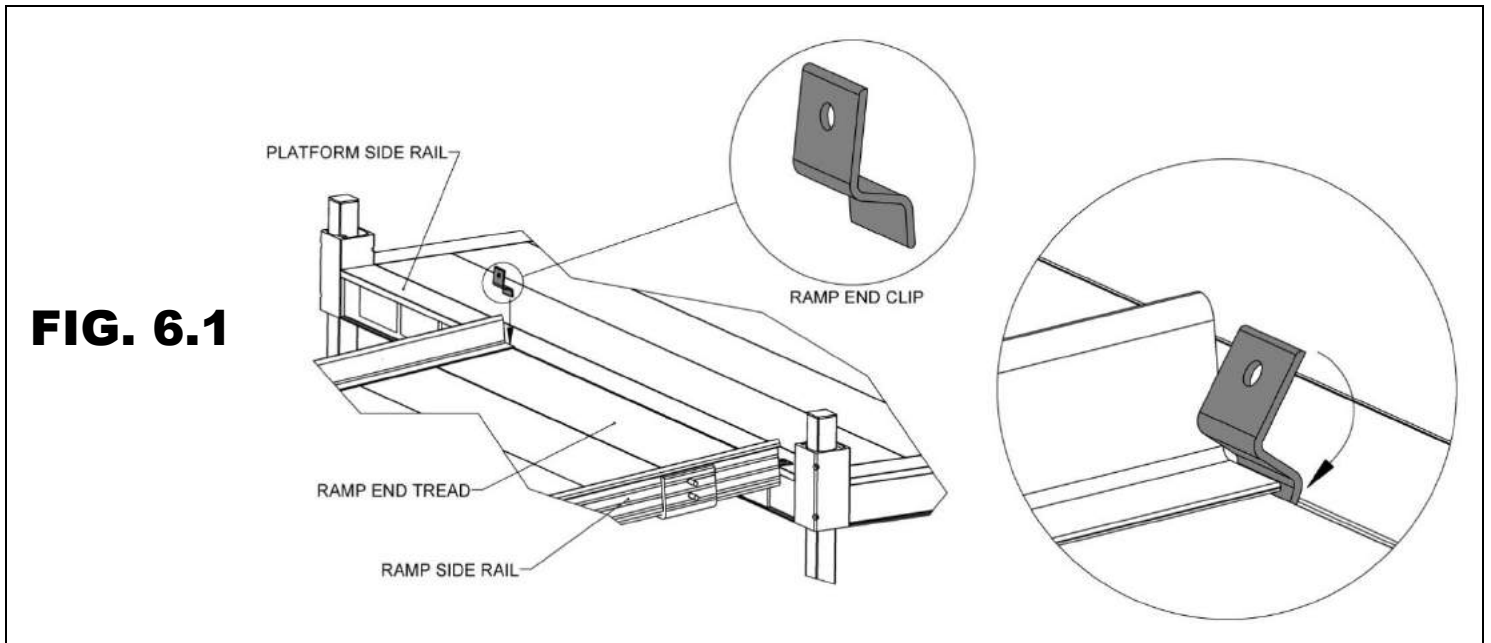
FIG. 5.45



6. FINAL PLATFORM/RAMP STEPS AND CHECKS

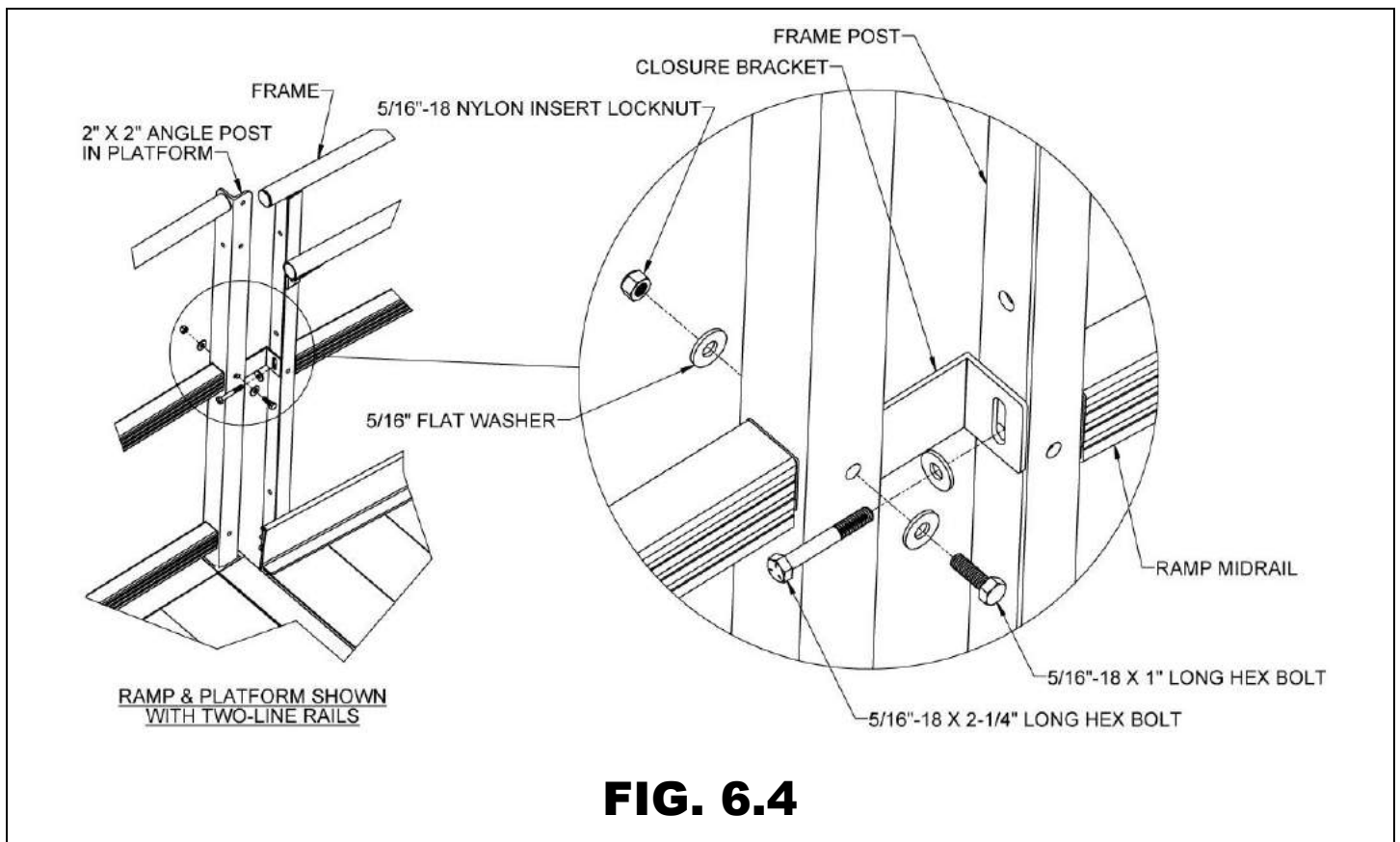
6.1. SECURE RAMPS TO PLATFORMS

- 6.1.1. Once positioning of all ramps and platforms, and installation of all handrails, connectors, and end loops are complete, you will need to secure ramps to platforms with Ramp End Clips (included in PRHP - RAMP HANGER PAIR).
 - ▲ Use two Ramp End Clips at all locations where ramps meet platforms.
- 6.1.2. Position each Ramp End Clip with the hole pointing up and oriented as shown (FIG. 6.1), then insert the short end of the Ramp End Clip into small gap between the ramp and the platform in the area where the ramp side rail overlaps the ramp end tread.
- 6.1.3. Before the Ramp End Clip contacts the ramp side rail, rotate the Ramp End Clip so the short end extends into the recess under the ramp end tread (FIG. 6.1).
- 6.1.4. Use the hole in the Ramp End Clip as a template to drill 1/8" pilot hole in the platform side rail, then use the 1/4" x 1" long self-drilling screws to secure the Ramp End Clip to the platform side rail (FIG. 6.2).
- 6.1.5. FIG. 6.3 shows the top view of the completed process.



6.2. ATTACH FRAME POST TO PLATFORM POST

- 6.2.1. At all locations where a Frame post is not connected to a rail, picketed guard or closure component, it must be connected to a platform 2" x 2" angle post using a closure bracket (FIG. 6.4).
- 6.2.2. If installing the closure bracket on a ramp with a two-line rail, first remove the 5/16"-18 x 2-1/4" long hex bolt and 5/16" flat washer from the midrail, then reinstall through the short leg of the bracket, the frame post, and back into the threaded insert. Orient the bracket as shown in FIG. 6.4 with the long leg contacting the platform 2" x 2" angle post.
- 6.2.3. If installing the closure bracket on a ramp with a picketed guard, install a 5/16"-18 x 2-1/4" long hex bolt through a 5/16" flat washer, the short leg of the bracket, and the hole approximately in the middle of the frame post, then secure with another 5/16" flat washer and a 5/16"-18 nylon insert locknut. Orient the bracket as shown in FIG. 6.4 with the long leg contacting the platform 2" x 2" angle post.
- 6.2.4. Attach the long leg of the closure bracket to the 2" x 2" angle post using a 5/16"-18 x 1" long hex bolt, 5/16" flat washer, and a 5/16"-18 nylon insert locknut. Use an existing hole in the angle post if possible or field drill a new 11/32" or 3/8" hole.
- 6.2.5. Tighten all fasteners securely.

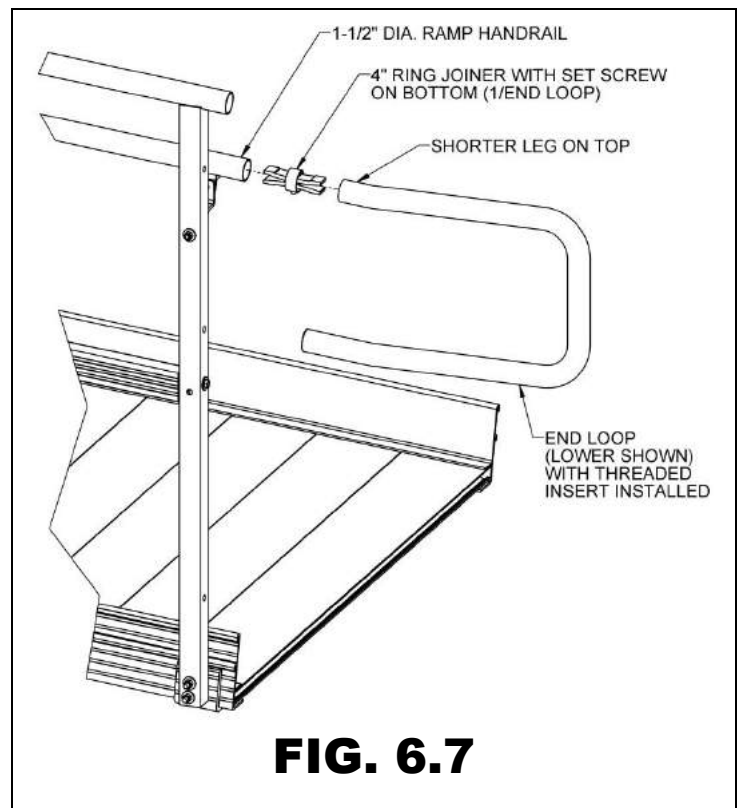
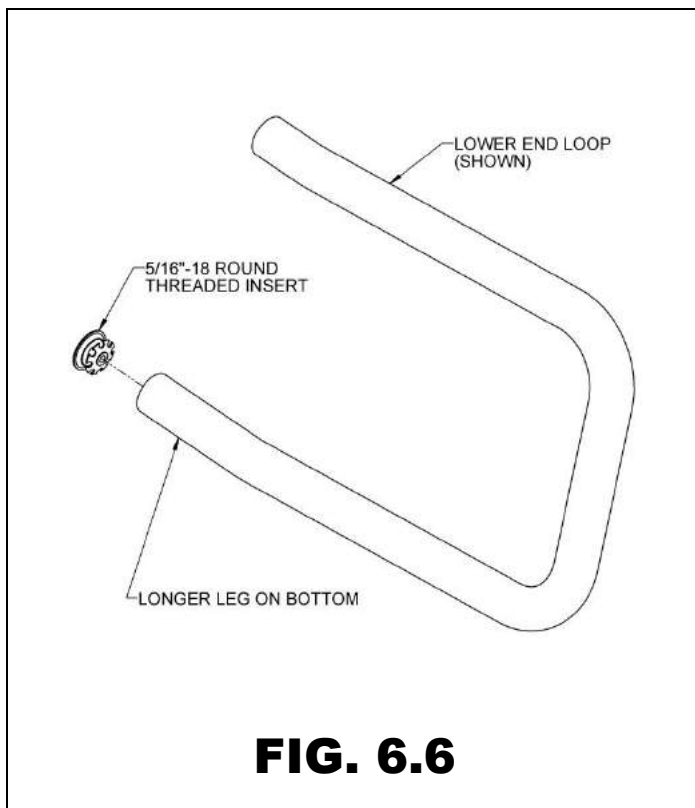
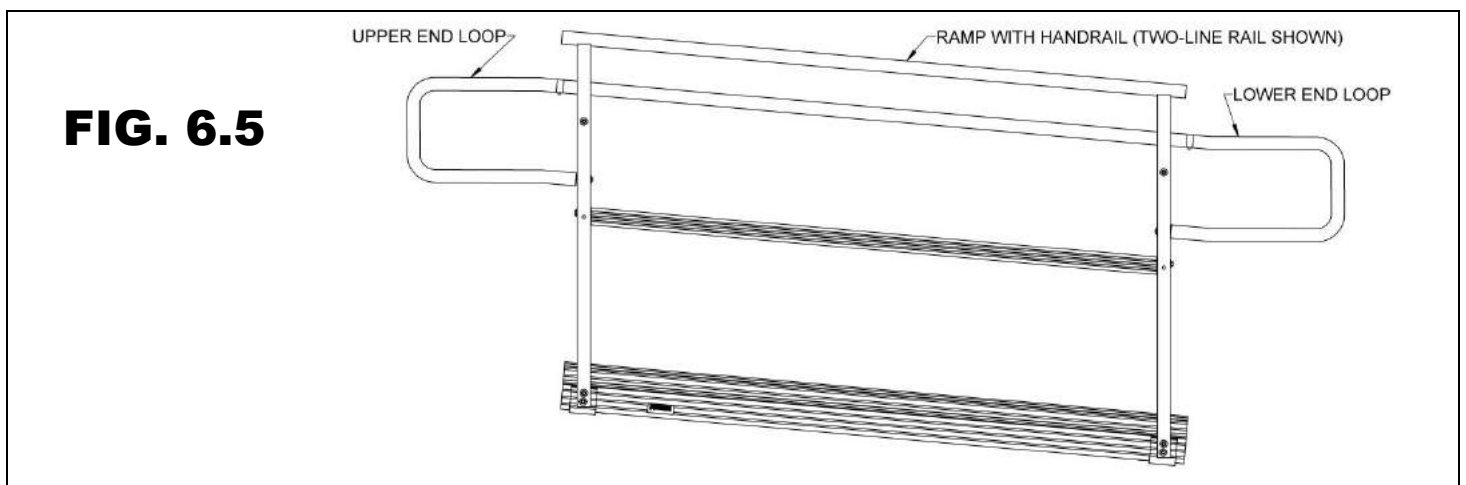


6.3. INSTALL RAMP HANDRAIL END LOOPS

6.3.1. The TITAN system may include both upper and lower end loops (FIG. 6.5). Install a Handrail End Loop in all locations where the handrail does not terminate in some other manner (for example, a return to a building or guard), including both Starter Ramp handrails. Upper and lower end loops are installed in the same manner. If the end loop being installed does not fit correctly, you are most likely trying to install it on the wrong end of the ramp or ramp run. Referencing FIG. 6.5, note how the cut ends of the lower end loop angle upward, and the upper end loop cut ends angle downward.

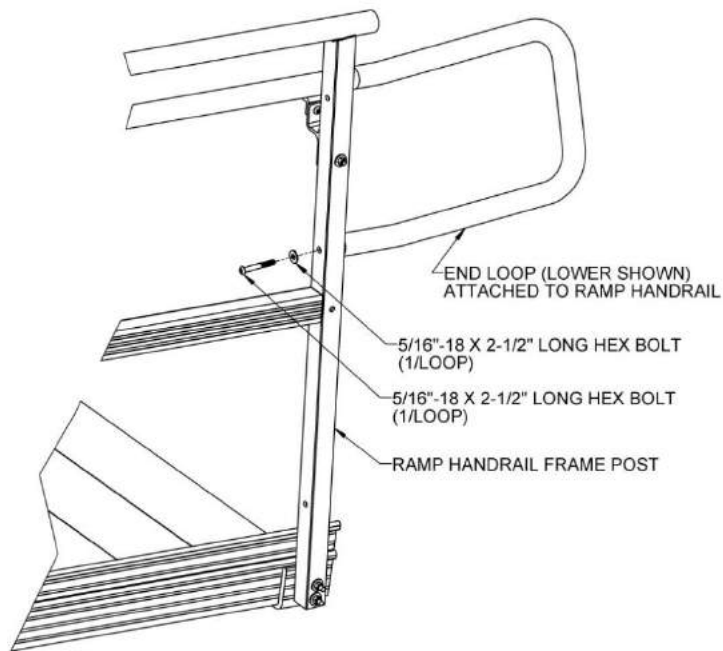
6.3.1.1. The longer leg of the end loop is always the lower leg. Insert a 5/16"-18 round threaded insert into the lower leg. Use a rubber mallet if needed to fully seat the insert into the loop (FIG. 6.6).

6.3.1.2. Install a 4" ring joiner in the end of the 1-1/2" diameter ramp handrail and place the upper leg of the end loop over the other end of the ring joiner. Orient the set screw in the ring joiner toward the underside of the handrail and rotate the loop until it aligns with the post in the frame, then tighten enough to hold the loop in place (FIG. 6.7).



- 6.3.1.3. Install a 5/16"-18 x 2-1/2" long hex bolt through a flat washer, the frame post and into the threaded insert in the lower leg (FIG. 6.8).
- 6.3.1.4. Tighten all fasteners securely including the joiner set screw.

FIG. 6.8

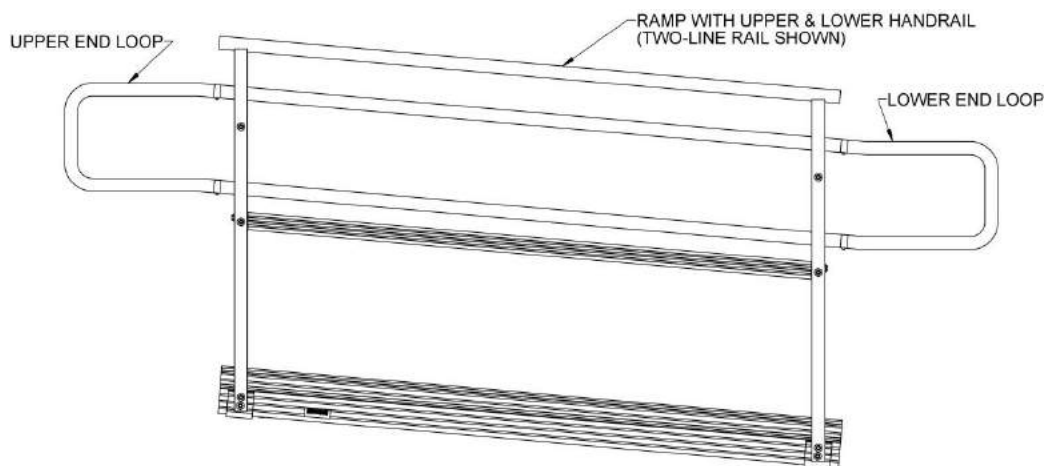


6.4. INSTALL RAMP HANDRAIL END LOOPS WITH LOWER (CHILD) HANDRAIL

6.4.1. Upper and lower end loops are also used when lower (child) handrails are present (FIG. 6.9). Install a Handrail End Loop in all locations where the handrail does not terminate in some other manner (like a return to a building or guard) including both Starter Ramp handrails. Upper and lower end loops are installed in the same manner. If the end loop being installed doesn't fit correctly, you are most likely trying to install it on the wrong end of the ramp or ramp run. Referencing FIG. 6.9, note how the cut ends of the lower end loop angle upward, and the upper end loop cut ends angle downward.

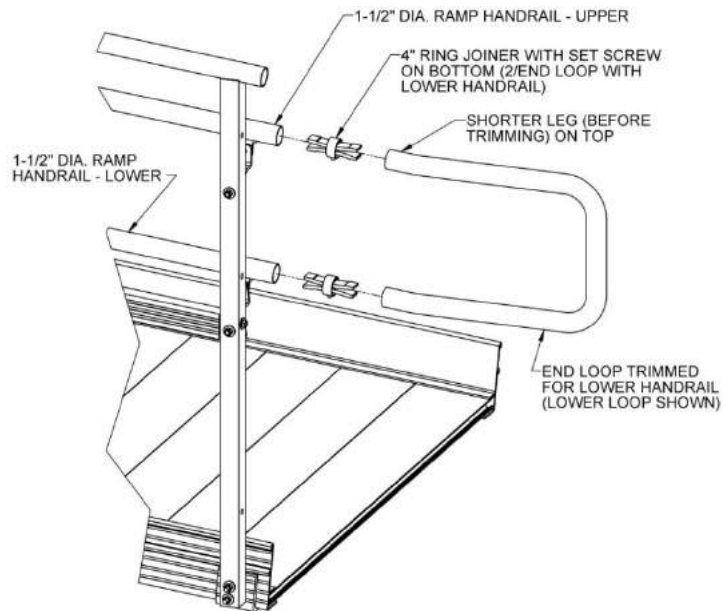
- 6.4.1.1. Install the 4" ring joiner in the upper handrail as described in 6.2.1.2 except do not rotate the loop until it aligns with the post in the frame and do not tighten the set screw more than necessary to hold in place.
- 6.4.1.2. Install a second 4" ring joiner in the end of the lower 1-1/2" diameter ramp handrail. Orient the set screw in the ring joiner toward the underside of the handrail (FIG. 6.9).

FIG. 6.9



- 6.4.1.3. Mark the lower leg of the end loop at the ring of the ring joiner in the lower handrail and trim the lower leg at the marked location. Remove the end loop to achieve a square cut (FIG. 6.10).
- 6.4.1.4. File or sand the cut end to remove any sharp edges.
- 6.4.1.5. Reinstall the end loop over both the joiners in the upper and lower handrails then tighten all joiner set screws securely.

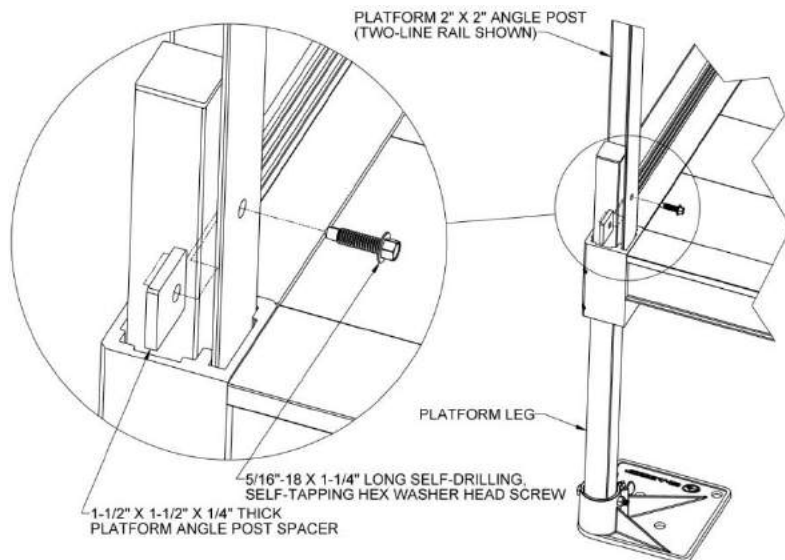
FIG. 6.10



6.5. INSTALL PLATFORM LEG INSERTS

- 6.5.1. At all locations where a platform 2" x 2" angle post is not connected to a secondary frame, picketed guard, or midrail at 90°, additional support is required. Hold a 1-1/2" x 1-1/2" x 1/4" thick platform angle post spacer between the 2" x 2" angle post and the platform leg with the hole in the insert aligned with the lowermost hole in the unconnected side of the angle post and the longer portion of the insert oriented outward (FIG. 6.11).
- 6.5.2. Insert a 5/16"-18 x 1-1/4" long self-drilling, self-tapping hex washer head screw through the holes in the 2" x 2" angle post and the platform leg insert then drive into the wall of the platform leg until tight (FIG. 6.11).

FIG. 6.11



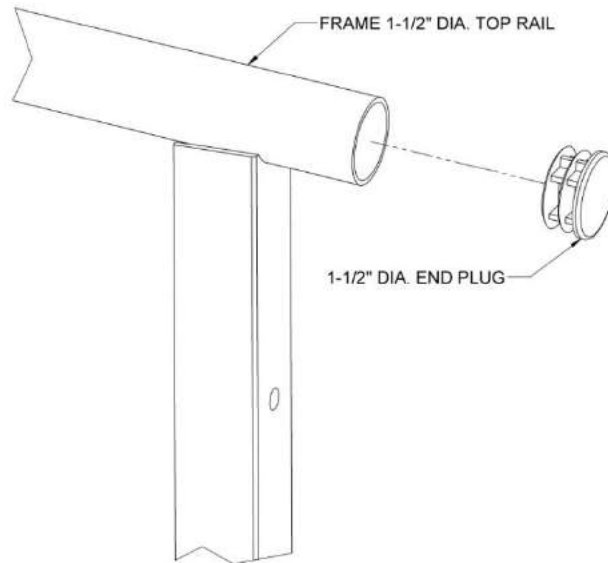
6.6. INSTALL FRAME TOP RAIL END PLUGS AND RAMP CORNER PROTECTORS

- 6.6.1. Use 1-1/2" plastic end plugs on all open ends of the frame top rails (FIG. 6.12). Push them in by hand or use a rubber mallet. If necessary, use construction adhesive to bond the plug into the rail.
- 6.6.2. Install protective caps over side rail corners by placing one cap on each side at both the top and bottom of the ramp or ramp run (FIG. 6.13). If necessary, use construction adhesive to bond the cap to the ramp side rail.

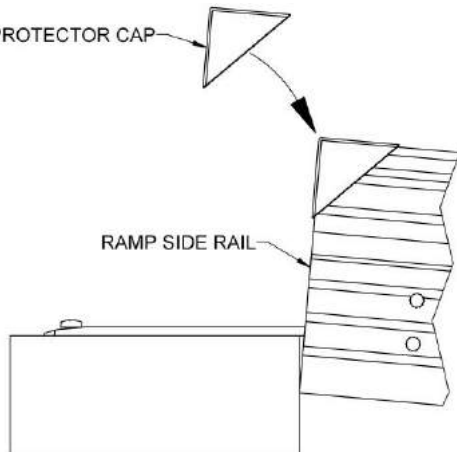
6.7. TOUCH-UP HANDRAILS

- 6.7.1. As needed, use sandpaper (180 grit or equivalent) for blending scratches on handrails. Sand in direction of the grain as shown (FIG. 6.14).
 - ✎ Do not use on painted or powder coated surfaces.

FIG. 6.12



CORNER PROTECTOR CAP



RAMP SIDE RAIL

FIG. 6.13



FIG. 6.14

6.8. FINAL CHECKS

- 6.8.1. Ensure that all fasteners are in place and secure.
- 6.8.2. Walk on the assembled system checking for any undue movement.
- 6.8.3. Remove any debris and metal chips.
- 6.8.4. Ensure that the level and slope has not shifted during installation.
- 6.8.5. Check that all handrail ends are terminated with loops or returned to a guard or building.
- 6.8.6. Check that all Frame Top Rails are covered with end plugs and ramp side rails have corner protectors installed.
- 6.8.7. CONGRATULATIONS! The EZ-ACCESS® TITAN™ System is assembled.

7. OPTIONAL EQUIPMENT

7.1. RAMP SUPPORT

7.1.1. The TRST (RAMP SUPPORT) provides supplemental support at the upper or lower end of a ramp. When used, the TRST (RAMP SUPPORT) replaces the TRHBPR (RAMP HANDRAIL END BRACKET PAIR).

7.1.1.1. Attach the ramp supports with two each 5/16"-18 x 1-1/2" hex bolts and 5/16" flat washers (FIG. 7.1).

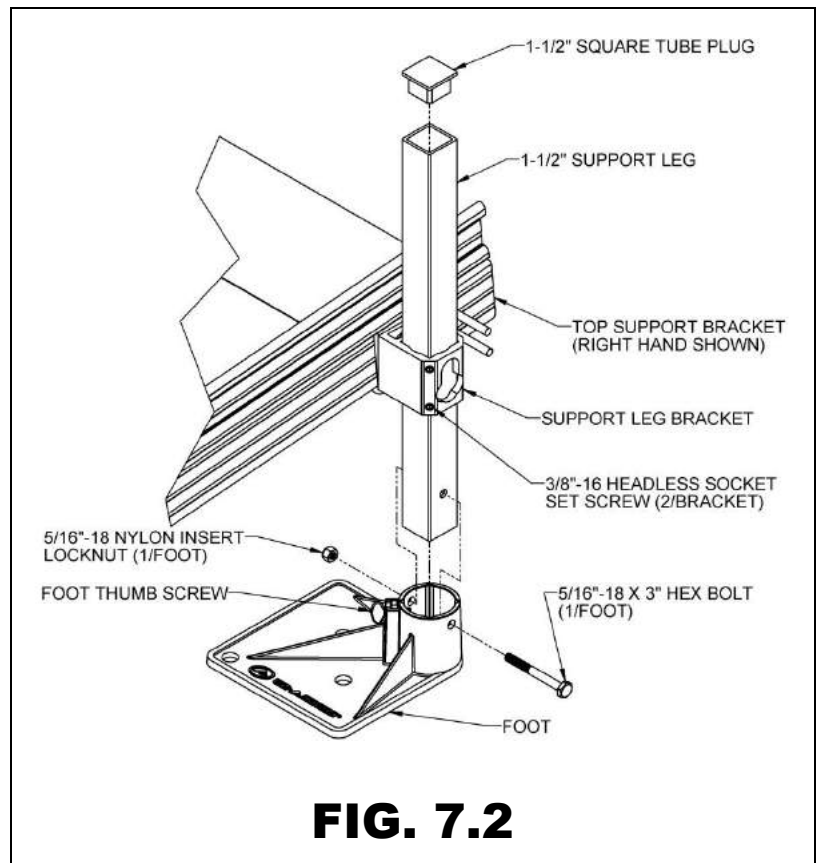
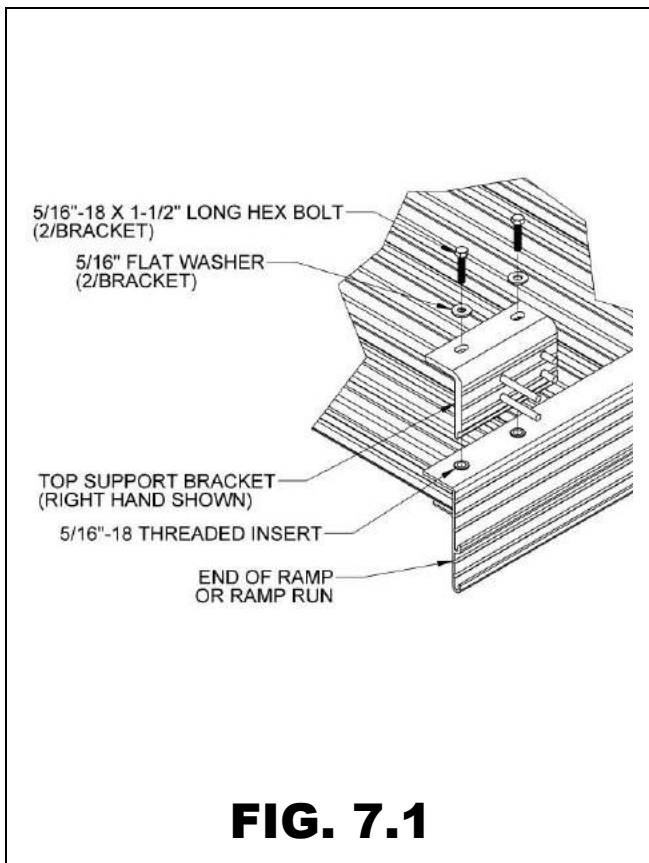
🖐 There is a "left" and "right" support bracket but they can be installed on either side of the ramp, depending on whether they are used at the upper or lower end of the ramp or ramp run. The two longer studs must be oriented toward the end of the ramp regardless of which side they are being installed.

7.1.1.2. Install support leg brackets on the two shorter studs of the ramp supports. Support leg brackets are installed and adjusted in the same manner as the ramp to ramp connector; refer to SECTION 3.3.

7.1.1.3. Support legs are installed, attached, and braced in the same manner as other ramp support legs. Refer to SECTION 3.3 and complete the remaining steps.

7.1.1.4. If used with a TTTP48 or TTTP54 (RAMP TRANSITION PLATE) (optional – see SECTION 7.2), it may be necessary to lift the end of the ramp or ramp run to install the transition plate and adjust the height such that the transition plate lays flat on the platform or landing.

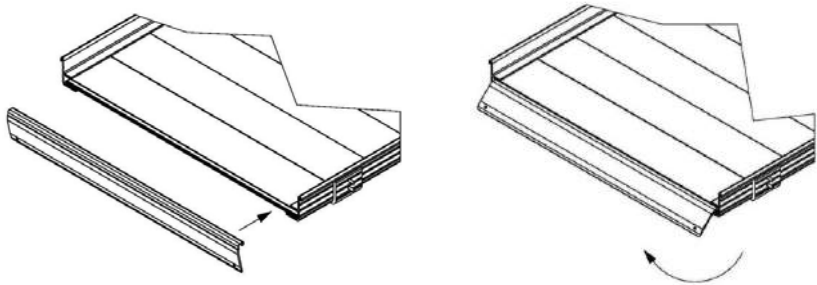
7.1.1.5. Refer to SECTION 3.5 for anchoring ramp transition plate.



7.2. RAMP TRANSITION PLATE

- 7.2.1. The TTTP48 or TTTP54 - RAMP TRANSITION PLATE, in combination with a TRST - RAMP SUPPORT, is commonly used to span wider gaps or accommodate angular misalignment but can be used (with the TRST) instead of the TRHP (RAMP HANGER PAIR). It can also be used when transitioning from a TITAN ramp to an existing porch or deck, or when transitioning to the ground instead of the starter ramp in some situations. The ramp transition plate can be used at either end of a ramp or ramp run.
- 7.2.2. Lift the end of the ramp and install the ramp transition plate as shown (FIG. 7.3).
- 7.2.3. If a ramp transition plate is resting on any type of raised area (i.e. a platform, deck, or porch), it must be anchored. Refer to 'ANCHORING RAMP TRANSITION PLATE', SECTION 3.5
- 7.2.4. If the ramp transition plate is resting on the ground, anchoring is optional.

FIG. 7.3



7.3. SINGLE BRIDGE PLATE (TBPxx - BRIDGE PLATE)

- ▲ Intended to be used to bridge gaps up to a maximum of 6" between a platform and a porch or deck. THE BRIDGEPLATE IS NOT INTENDED TO BE USED AS A RAMP OR ON AN INCLINE.
- 7.3.1. Securing to WOODEN SURFACE OR PLATFORM:
 - 7.3.1.1. To secure to a wooden deck or platform, use the four supplied 1/4" x 1" self-drilling self-tapping screws.
- 7.3.2. Securing to CONCRETE OR ASPHALT:
 - 7.3.2.1. To secure to concrete or asphalt, drill a 1/4" diameter hole at least 1 1/4" deep. Ensure that all debris from the hole is removed using a shop vacuum, blower or other suitable type of equipment.
 - 7.3.2.2. Insert the four supplied pin head mushroom anchors and secure by using a hammer to drive the pin in flush with the mushroom.
- ▲ Use in the horizontal (flat) position only.
- ▲ Ensure that at least 1" on each of the supporting edges of the plate is supported on a good, sound construction surface that is free from defects (FIG 7.4).

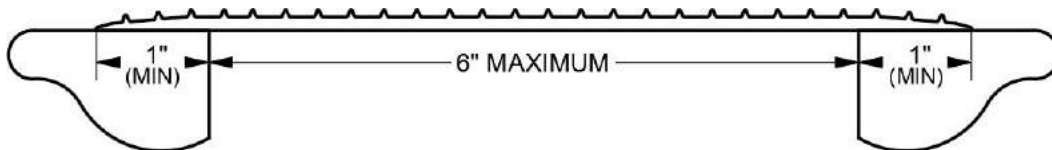


FIG. 7.4

8. **MAINTENANCE**

8.1. **PERIODIC MAINTENANCE**

- 8.1.1. Caution should be used at all times. Proper maintenance and upkeep to the ramp system is vital.
- 8.1.2. Periodically check the ramp for damage and tighten any loose fasteners to ensure safety.
- 8.1.3. At all times, keep the system clear of dirt, leaves, and other debris that may accumulate on the surface. Simply sweeping the surface or using a garden hose will usually suffice, but, if needed, a damp cloth or soft brush with soap and water can be used (avoid use of alkaline detergents).
- 8.1.4. If system surface is covered with ice and/or snow, **DO NOT USE** until accumulation is removed and the tread surface swept clean. Please refer to 'DEICING SECTION' of this for more information.
- 8.1.5. If any part of the ramp is damaged or loose, **DO NOT USE UNTIL REPAIRS ARE MADE BY A CERTIFIED INSTALLER OR OTHER QUALIFIED PERSON.**

9. **DEICING**

- ⚠ For the safety of all users, it is important to keep your system clear of snow, ice, and other debris.
- ⚠ Always follow the deicing agent manufacturer's directions.
- ⚠ EZ ACCESS will not be held responsible for any injuries or damages that arise from the information provided. **ALWAYS** check with the deicing product's manufacturer or your local supplier to determine which method is best for your situation.
- ⚠ After the snow and/or ice threat has cleared, be sure to clean the tread surface with mild soap and water (avoid alkaline detergents) to remove deicing residue.
 - 👤 Sodium Chloride (salt) and Calcium Chloride are particularly damaging to newly poured concrete. In addition, these chemicals should not be applied to brick and stone surfaces.
 - 👤 While care has been taken to ensure that the table below is accurate, the information shown is not all-inclusive. Manufacturers of deicing products may make changes to their products as well as recommended functions and usage requirements. The deicing method you choose should be researched with your deicer supplier so you can determine which method is best for your situation.
 - 👤 The information below is taken from Fact Sheet 707, Cooperative Extension Service, University of Maryland at College Park, University of Maryland Eastern Shore and was up-to-date at the time of this manual's publication.

PRODUCT	MIN. WORKING TEMP (°F)	SPEED OF ACTION	DAMAGES CONCRETE AND METALS?	HARMFUL TO PLANTS?
MAGNESIUM CHLORIDE	-13	VERY FAST	NO	MODERATE
CALCIUM CHLORIDE	5	FAST	YES	YES
SODIUM CHLORIDE (SALT)	18	MODERATE	YES	YES
POTASSIUM CHLORIDE	25	SLOW	OK ON OLD CONCRETE	MODERATE
CALCIUM MAGNESIUM ACETATE (CMA)	25	SLOW	NO	NO

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