# **Pedestrian Bridges**

## **Installation Guide**





TrueNorth Steel recommends that the installing contractor conduct a preconstruction meeting in advance of bridge delivery to ensure that all parties are prepared and equipped with appropriate tools to unload, assemble, and set the bridge. This guide is meant to assist the installing contractor but is not necessarily inclusive of all steps, nor is it meant to address site conditions.

The installing contractor is responsible for all aspects of safety including setting and positioning of lifting equipment. Estimated lifting weights are shown on bridge shop drawings.

#### UNLOADING

The bridge will be delivered to the jobsite by highway accessible tractor trailer and the installing contractor will be responsible for location of the truck and lifting equipment as well as unloading the bridge at the site.

Care must be taken to locate loose items such as bearing assemblies and bolts that will arrive with the bridge. The contractor should immediately ensure all loose items are unloaded, accounted for, and placed in a secure location. Refer to the bill of lading.

### **SPLICING OF BRIDGE SECTIONS** (IF REQUIRED)



Bridges are supplied utilizing two types of bolted splice connections. Additional splice details may be utilized and these would be noted on the shop drawings.

Vertical truss diagonals and horizontal brace diagonals will be joined with splice plates on the outside of the truss members utilizing pass through bolts. Each hole will receive one bolt and one nut. Vertical truss diagonal and horizontal brace diagonal plates will arrive loose or wired and bolted to the bridge. Identical plates are interchangeable. Refer to the shop drawings for plate locations and bolt size. Chord splice plates will arrive loose or attached to the bridge by wire and shipping bolts.

The chord splice plates will arrive with all nuts welded to the plate or will be included with the loose items. The plates will be installed inside of the chord member. Identical plates are interchangeable.

Place one bolt in each hole location. For the bolted splice details refer to the shop drawings.

Bolts utilized in shipping and handling are to be removed and discarded.

Plates are then to be held in the proper location for the diagonal splices and bolts installed. All bolts should be loosely installed before any bolts are tensioned.

For plate locations, bolt sizes, and additional splice details refer to the shop drawings.



#### There are three common procedures for splicing bridge sections together:

- 1. When spliced bridges arrive in multiple sections, place one section on a relatively flat surface with the spliced end elevated approximately 2' and securely supported. This will allow for easier fit up and allows room to work under the bridge. The other section should be lifted with a crane or other equipment with sufficient capacity. When the chord splices are lined up, the section will be moved carefully into place. It may be necessary to use come-a-longs to pull the sections together. When the bolted splice(s) are complete (all sections, if multiple), the entire bridge may be lifted as one piece and set on the foundations.
- 2. Supported mid-air splicing can be accomplished when utilizing separate cranes to safely lift each section.
- 3. One section may be placed on it's foundation, while its spliced end is supported on temporary supports. Once the first section is set and supported, the second section is lifted into place to allow the splice connection to be completed.

#### BOLTING

Bolts supplied for assembly are high strength structural bolts. Common bolt sizes are 3/4", 7/8", and 1" diameters with respective socket sizes are 1 1/4 ", 1 7/16", and 1 5/8". All bolts should be installed loose and then tightened from the center of the splice, working to the ends of the splice.

Bolt tightening shall be in accordance with the Research Council on Structural Connections (RCSC) "Specification for Structural Joints using ASTM A325 or A490 Bolts" by using the turn-ofnut procedure described in the table below.

All bolts should be brought to a snug tight condition to ensure the individual plies of the splice joint are brought into contact with each other. According to RCSC, snug tight is defined as the tightness attained by a few impacts of an impact wrench or the full effort of a ironworker using an ordinary spud wrench. Once all bolts are brought to a snug tight condition, all remaining bolts shall then be tightened by the applicable amount of nut rotation as specified in the table below. During this operation, there shall be no rotation of the part not turned by the wrench.

Nut rotation is relative to bolt, regardless of the element (nut or bolt) being turned. For bolts installed by 1/2 turn and less, the tolerance should be plus or minus 30 degreess. For bolts installed by 2/3 turn and more, the tolerance should be plus or minus 45 degrees.

If bolts do not smoothly engage to snug-tight there may be an obstruction within the threads. In this case, the bolt should be removed, the threads on the bolt and nut cleaned and retapped as needed, to allow smooth installation of the bolts.

Bolt Length	Flat Surfaces Under Bolt Head & Nut
≤ 4D	1/3 Turn
4D ≤ 8D	1/2 Turn
8D ≤ 12D	2/3 Turn



#### **Splicing and Decking Considerations**

**Wood decking -** It is allowable for the installing contractor, but not required, to remove 2-3 wood deck planks from each side of the splice to make room for bolting the floor diagonal and stringers below the deck. It is recommended that boards be placed back in their original location for fastener and hole alignment.

**Concrete deck** - Galvanized concrete form decking will be shipped factory installed except for the pieces that directly cover the splice. Upon completion of splicing, the contractor shall install the remaining form decking connected to the floor beams utilizing self-tapping screws. Pre-drill all holes prior to installing the screws. Screws will be provided as loose items with the bridge. Bridges spliced lengthwise will have all decking shipped loose for field install by contractor.

#### LIFTING INSTRUCTIONS

A minimum of four (4) lifting points are required when lifting any bridge. It is recommended that the bridge be lifted from the end to the 1/3 point of the bridge span.

Underhung and H-section bridges are to be lifted from the bottom chord or floor beams only. For underhung bridges with a gap between deck and chord face; wrap the chain, cable, or sling over the top of floor beam, under the bottom chord, up and inside of truss over the deck. For H-section bridges, wrap chain, cable or sling inside the vertical below the floor beam, around the vertical crossing over on the outside of the vertical, up and inside the truss over the deck.

Alternatively, bridges may be lifted from the top chord if a spreader bar is used to keep any tangential forces from being applied to the bridge. The top chords should never be pulled towards each other during the lifting process. When an underhung bridge has a concrete deck that extends all the way to the chord face, lifting may be done by wrapping cable, choker or sling around a diagonal and vertical member where they meet on the top of the bottom chord at deck level. Box truss bridges may be lifted by wrapping chain, choker, or sling around the top chord at the joint of a vertical, diagonals, and top strut.

#### **BEARING PREPARATION**

Setting plates need to be installed with 3/4" steel shims under the center, unless directed differently on bridge plans.

Lightly apply grease to tops of all base plates except Teflon/stainless steel bearings.

All Teflon/stainless bearing assemblies will be factory supplied and welded to bearing plates. Make certain that the setting plate (lower bearing that sits on the foundation) has the teflon facing up and the top bearing (physically welded to the bridge) has the stainless facing down. Remove any protective coatings from the teflon and stainless surfaces.

After the bridge is set, shims can be adjusted to make the deck flush with the backwall and to obtain full contact between the setting plate and the bearing plate.

After all adjustments are made, place high strength non-shrink grout under setting plate to create full contact between the setting plate and the foundation seat.



### SETTING INSTRUCTIONS

Bridge shall be set as directed in notes on the shop drawings. Note: If the bridge foundations have an elevation difference, be sure to set the high end of the bridge on the higher foundation per the shop drawings. Refer to the shop drawings for correct alignment.

Bridges with an elevation difference will have a welded mark (H) for high, (L) for low, located on the outside face of the corresponding end floor beam.

Each anchor bolt will receive one (1) washer and two (2) nuts. One end of the bridge is designed to be fixed and the nuts are to be installed tight. The expansion end of the bridge will have the first nut tightened finger tight to the washer placed on the bearing plate. The second nut will be installed tight to the first. Refer to the shop drawings to determine which end of the bridge is to be the fixed and which is to be the expansion end. Teflon/stainless steel bearings will always be on the expansion end. TrueNorth Steel recommends destroying the threads on the anchor bolt, after bridge is fully installed.

When handling and installating painted bridges, the installating contractor must be careful to minimize damage to the painted finish. Padding should be used to protect the paint from chain, choker, or sling. It will be the responsibility of the installing contractor to perform any and all touch up painting from delivery, unloading, assembly, and setting, as necessary.

A nominal amount of touch up paint will be supplied. If additional paint is needed, TrueNorth Steel will assist contractor in locating a local supplier, for contractor purchase.

This is often an epoxy system and attention will need to be given to mixing and applying the paint products. Touch up must be applied to blend with factory application as much as possible. Please follow manufacturers latest recommendations found online.





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