TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:
1. Slip base must be permanently marked as to manufacturer, material, design, and location of marking are subject to approval of the Texas TxDOT Traffic Standards Engineer.
2. Waterers used in open air FIM systems shown conform to the following specifications:
   - 10 BWG tubing (0.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electro-galvanized schedule 80 tubing or pipe
   - Other steel may be used if they meet the following:
     - 20% minimum elongation
     - 70,000 psi minimum tensile strength
     - 55,000 psi minimum yield strength
     - 0.0276" minimum wall thickness
     - Bolt length is 2 1/2".

3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is:

4. Sign supports shall not be utilized except where shown. Sign supports shall not be applied.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may require samples of concrete less than 2 cubic yards to be tested with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing is acceptable. Samples may be directed by the Engineer, Contractor, or other agencies.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing to open the concrete so as to create a good bond between the concrete and stub.
4. Push the stub into the concrete until it is between 2 to 4 inches above the ground.
5. The Triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. All supports shall be placed so that the bottom of the sign is 3 to 5 feet above the edge of the roadway. This shall ensure the minimum clearance between each sign and Texas Universal Triangular Slipbase System components. See SMD(SLIP-2) for clearance based on sign types.

CONCRETE ANCHOR

Concrete anchor consists of 5/8" diameter steel bolt with UNC series threads. The anchor shall have a minimum yield strength of 3900 and 3100 psi, respectively.

- 5/8" diameter Concrete Anchor - 8 pieces (minimum of 2 per sign) anchor may be expansion or adhesive type.
- 6" min. to edge of flange
- 30" min.
- 42" min.

Steel tubing per ASTM A500 Gr C
- Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
- Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
- 20% minimum elongation in 2"
- 46,000 PSI minimum yield strength
- 70,000 PSI minimum tensile strength
- 20% minimum elongation in 2"

Other steels may be used if they meet the following:
- 0.134" nominal wall thickness
- 20% minimum elongation
- 70,000 psi minimum tensile strength
- 55,000 psi minimum yield strength
- 2 1/2" bolt length

3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is:

4. Sign supports shall not be utilized except where shown. Sign supports shall not be applied.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may require samples of concrete less than 2 cubic yards to be tested with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing is acceptable. Samples may be directed by the Engineer, Contractor, or other agencies.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing to open the concrete so as to create a good bond between the concrete and stub.
4. Push the stub into the concrete until it is between 2 to 4 inches above the ground.
5. The Triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. All supports shall be placed so that the bottom of the sign is 3 to 5 feet above the edge of the roadway. This shall ensure the minimum clearance between each sign and Texas Universal Triangular Slipbase System components. See SMD(SLIP-2) for clearance based on sign types.
FRICTION CAP DETAIL

Friction caps may be manufactured from hot rolled or cold rolled steel sheets, the minimum sheet metal thickness shall be 24 gauge for all cap sizes. The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a live-in friction fit and have no tendency to rock when placed on the sign plate. The depth shall be sufficient to give positive retention against removal of cap, they shall not be free of sharp creases or indentations and show no evidence of metal fracture. Caps shall have an electroplated coating of zinc in accordance with the requirements of ASTM B63 Class F296.

Shall be free of sharp creases or indentations and show no evidence of metal fracture. Caps shall have an electroplated coating of zinc in accordance with the requirements of ASTM B63 Class F296.
**DISCLAIMER:** The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

Item 445, galvanized per "Galvanizing." 2 flat washers, nut, lock washer, 5/16" x 4 1/2" Nylon washer, Item 445, "Galvanizing." 2 flat washers, nut, lock washer, 5/16" x 2 1/2" hex bolt with nut, lock washer, 2 flat washers per ASTM A307 galvanized per Item 445, "Galvanizing." Dilts 1/2" hole through after drilling and inserting bolt, nut, 2 flat washers and lock washer.

*Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel off Support. This will allow each support to act independently when impacted by an errant vehicle. Splices shall only be allowed behind the sign substrate.*

<table>
<thead>
<tr>
<th>SIGN DESCRIPTION</th>
<th>SUPPORT</th>
<th>MAX. SIGN AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>48-inch School X-ing sign (S2-1)</td>
<td>Sch 80</td>
<td>64 SF</td>
</tr>
<tr>
<td>48x48-inch signs (diamond or square)</td>
<td>Sch 80</td>
<td>32 SF</td>
</tr>
<tr>
<td>48x60-inch signs</td>
<td>Sch 80</td>
<td>32 SF</td>
</tr>
<tr>
<td>36x48, 48x36, and 48x48-inch signs</td>
<td>10 BWG</td>
<td>16 SF</td>
</tr>
<tr>
<td>48-inch STOP sign (R1-1)</td>
<td>12 BWG</td>
<td>8 SF</td>
</tr>
</tbody>
</table>

**SIGN MOUNTING DETAILS**

**SMALL ROADSIDE SIGNS**

**REQUIRED SUPPORT**

<table>
<thead>
<tr>
<th>SIGN SUPPORT</th>
<th>SUPPORT</th>
<th>MAX. SIGN AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] 48-Inch Sign (R1-1)</td>
<td>Sch 80</td>
<td>64 SF</td>
</tr>
<tr>
<td>[ ] 60-Inch Field Sign (R1-2)</td>
<td>Sch 80</td>
<td>32 SF</td>
</tr>
<tr>
<td>[ ] 48-inch DX Mark Sign (S10)</td>
<td>10 BWG</td>
<td>16 SF</td>
</tr>
<tr>
<td>[ ] Stalks, 48x48, and 48-inch Signs</td>
<td>10 BWG</td>
<td>8 SF</td>
</tr>
<tr>
<td>[ ] 48-inch DX Mark Sign (S10)</td>
<td>Sch 80</td>
<td>32 SF</td>
</tr>
<tr>
<td>[ ] 48-inch School X-ing Sign (S2-11)</td>
<td>10 BWG</td>
<td>8 SF</td>
</tr>
<tr>
<td>[ ] 48-inch School X-ing Sign (S2-12)</td>
<td>10 BWG</td>
<td>8 SF</td>
</tr>
<tr>
<td>[ ] Large Arrow Sign (W6 &amp; W7)</td>
<td>10 BWG</td>
<td>8 SF</td>
</tr>
</tbody>
</table>

**GENERAL NOTES:**

1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be splice except where shown.
3. Sign support posts shall not be splice.
4. A minimum of 0.080 thickness shall be used for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Discretion may be required due to reasons of durability and ground conditions. These are used for signs of less than 7.5 sq. ft. in height. Insigns are used for signs of greater heights.
6. When two triangular slipbase supports are used to support a single sign, they should not be "rigidly" connected to each other except through the sign panel. This will allow both supports to act independently. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 795.

**REGULATORY**

**WARNING**

**TEXAS DEPARTMENT OF TRANSPORTATION**

Traffic Operations Division

SMD(SLIP-3)-08

July 2002

Texas Department of Transportation

Traffic Operations Division
Concrete anchor consists of 5 1/4" diameter steel bolt with 1/2" diameter expansion or compression ring. The insert should be cut to approx. 4 1/2" when used with the Universal Anchor System. The insert should be approx. 10" long and 3 1/8" in diameter.

**WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE**

1. Dig foundation hole, where solid rock is encountered or ground level, the foundation depth shall be a minimum of 18".
2. Insert base post in hole to depths shown and backfill hole with concrete. The inner surfaces of the socket/stub must remain free of concrete or other debris.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain 6" min above the top of the concrete foundation.
4. Place concrete into hole until it is approximately flush with the ground. Concrete shall be Class A.
5. Attach the sign to the sign post.
6. Insert the sign post into socket and align sign face with roadway.
7. Drive the wedge into the socket to secure post. This will leave approximately 3 inches of the wedge exposed.

**NOTE**

The products shall be installed per manufacturer's recommendations. Installation procedures shall be provided to the Engineer by Contractor.
GENERAL NOTES:
1. FRP sign supports for a single sign type support may be used for signs up to and including 16 square feet. Dual post installation may be used for signs up to and including 32 square feet.
2. All nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing."
3. See the Traffic Operations Division website for detailed drawings of sign clamps. The website address is:
   http://www.txdot.gov/publications/traffic.htm

FRP POST REQUIREMENTS
1. Materials shall conform to the requirements of Specification DMS-4410 and shall be furnished in a yellow or gray color as specified elsewhere in the plans.
2. Drills holes in concrete and insert the 5/8" diameter bolts with wedge anchors, and tighten to specified torque.
3. Attach sign to FRP post.
4. Place base post from bottom and ensure a minimum of 18" embedment for placement.
5. Level and plumb the base post with coupler using a torpedo level and let concrete set a minimum of 4 days, unless otherwise directed by Engineer.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURES

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be at least 6' or provide a minimum foundation depth of 35". If solid rock is encountered, the foundation shall be at least 6' or provide a minimum foundation depth of 35". If solid rock is encountered, the foundation shall be at least 6' or provide a minimum foundation depth of 35". If solid rock is encountered, the foundation shall be at least 6' or provide a minimum foundation depth of 35". If solid rock is encountered, the foundation shall be at least 6' or provide a minimum foundation depth of 35".
2. All nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing."
3. See the Traffic Operations Division website for detailed drawings of sign clamps. The website address is:
   http://www.txdot.gov/publications/traffic.htm

BOLT-DOWN DETAILS

For FRP Support with Single Sign

- Drill 1/4" holes in FRP support and sign face

For FRP Support with Back-to-Back Signs

- Drill 1/4" holes in FRP support and sign face
- Insert bolts through FRP support and sign face
- Tighten nuts to specified torque

**NOTICE:**
- FRP sign supports for a single sign type support may be used for signs up to and including 16 square feet. Dual post installation may be used for signs up to and including 32 square feet.
- All nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing."
- See the Traffic Operations Division website for detailed drawings of sign clamps. The website address is:
  http://www.txdot.gov/publications/traffic.htm