

DSPC ENGINEERS  
C.O.A. 6435235  
07/29/2020

**GENERAL NOTES AND SPECIFICATIONS:**

**MATERIALS:**

CONCRETE: CLASS AA CONCRETE 4000 PSI  
MINIMUM COMPRESSIVE STRENGTH IN 28 DAYS.

REINFORCING: ASTM A-706 GRADE 60.  
REBARS WELDED TO STEEL CONNECTOR PLATES.  
All reinforcing steel will be Grade 60, unless otherwise specified. All welded rebar is ASTM A706. Producers option to use of lifting devices, chairs, spacers, or miscellaneous Rebar to secure cage in form & Handling ASTM A-36 (PLAIN/ MILL FINISH).

**STEEL:**

TOLERANCES:

CONNECTOR LOCATION +/- 1/16"  
WIDTH OF CONNECTOR B + 1/32"  
CONNECTOR PLATE SIZE + 1/8"  
BARRIER LENGTH + 1/4"  
Min 3/4" Steel Cover.

**DESIGN:**

FHWA-APPROVED F SHAPE, JERSEY SHAPE AND CONSTANT SLOPE. J-J HOOKS IS ACCEPTED BY FHWA AS A CRASH TESTED AND OPERATIONAL DESIGN FOR USE ON ALL FEDERAL-AID HIGHWAY PROJECTS.

**MATERIALS LIST**

9 #4 Stirrups Per Barrier  
3 Bolt Down Bars Per Barrier  
6 U-Bars Per Barrier (2) LEFT HAND  
4 Deflection Limiters Per Barrier (2) RIGHT HAND  
2 J-J HOOKS Assembly Per Barrier  
6 #4 Horizontal Bars 11'-8" LG

CONCRETE CY: 1.40  
WEIGHT: 5,670 LBS

REVISIONS	
11	
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4	REVISED PER PENNDOT REVIEW 04.23.20 - 07.24.20 (RETRACTED PER LOCATION CHANGE)
3	REVISED PER PENNDOT INSPECTORS-ALT. STIRRUP (03.07.16)
2	CLARIFIED DEFLECTION LIMITER DETAIL-01.26.17
1	REVISED PER PENNDOT COMMENTS-10.03.14

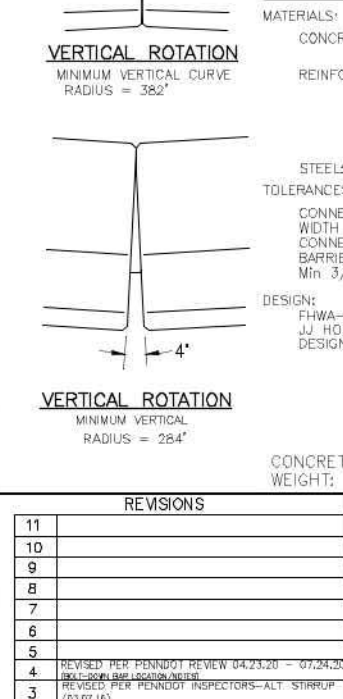
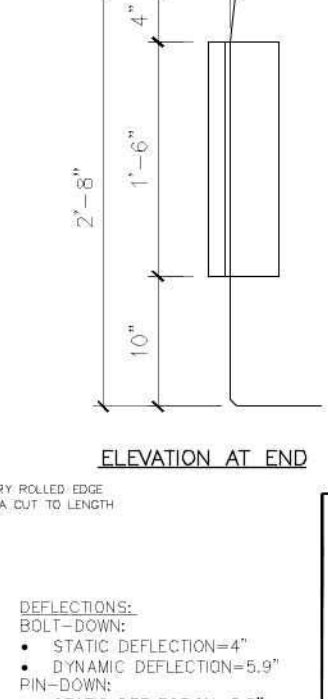
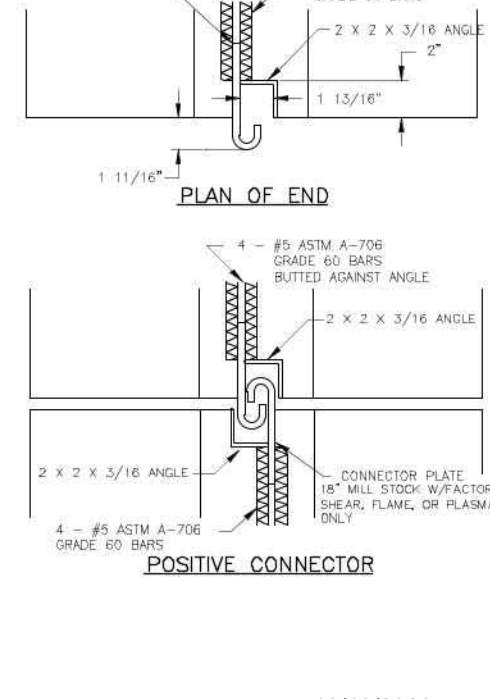
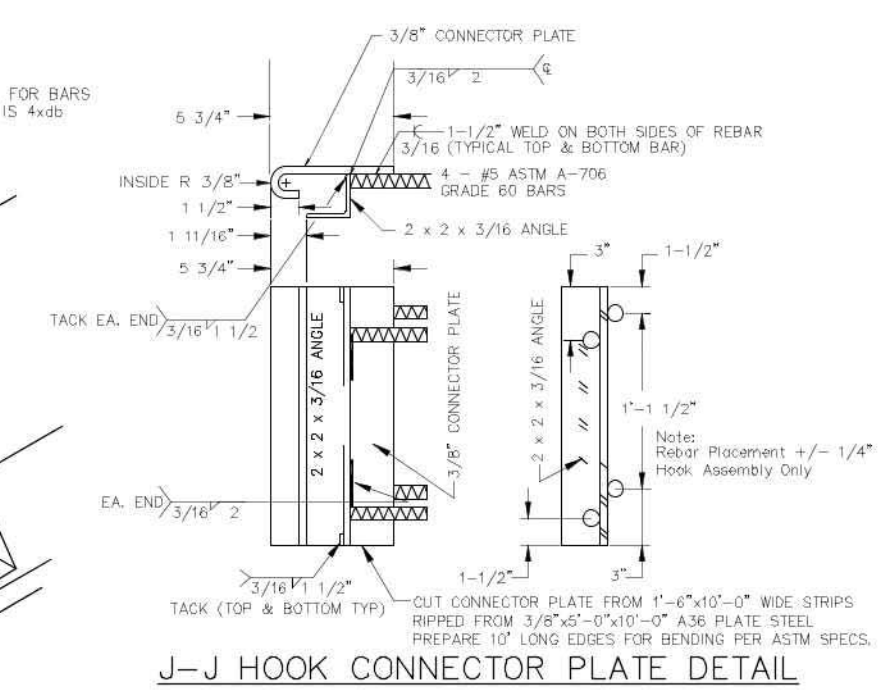
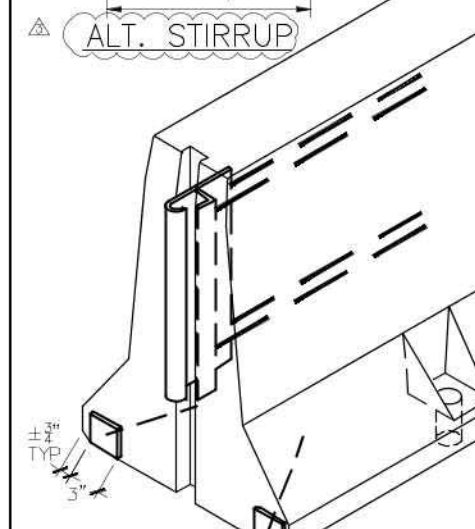
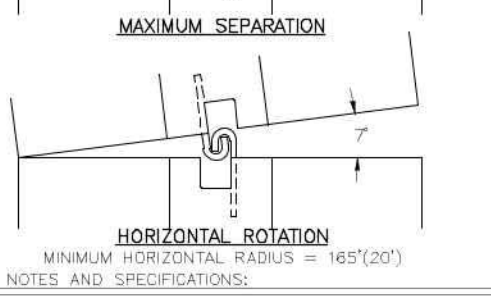
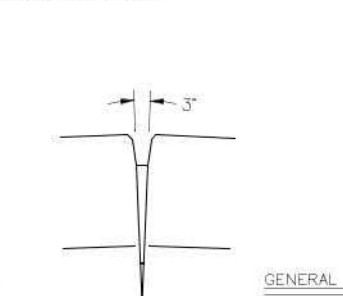
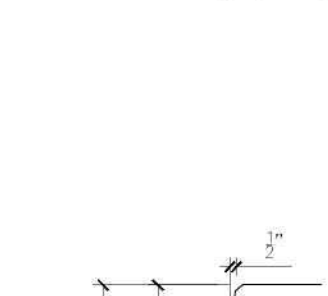
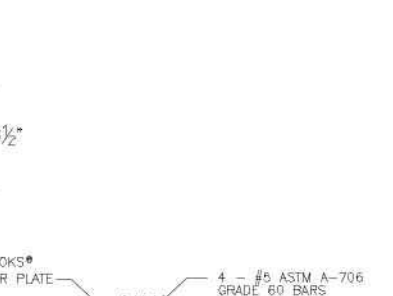
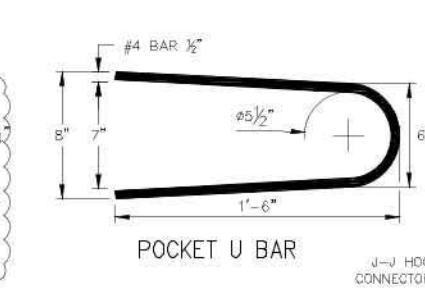
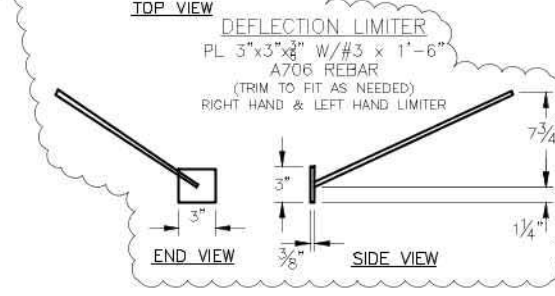
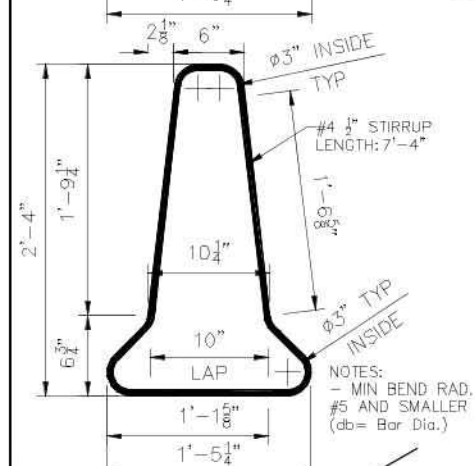
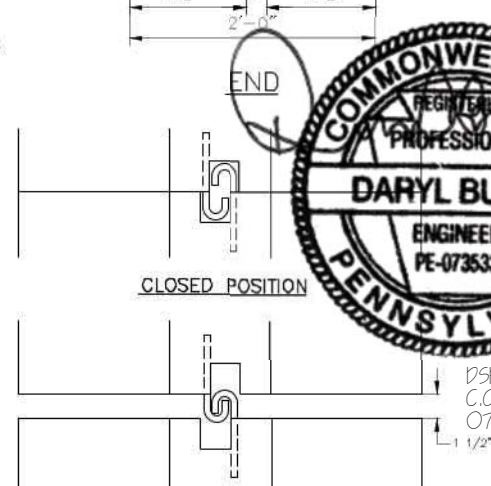
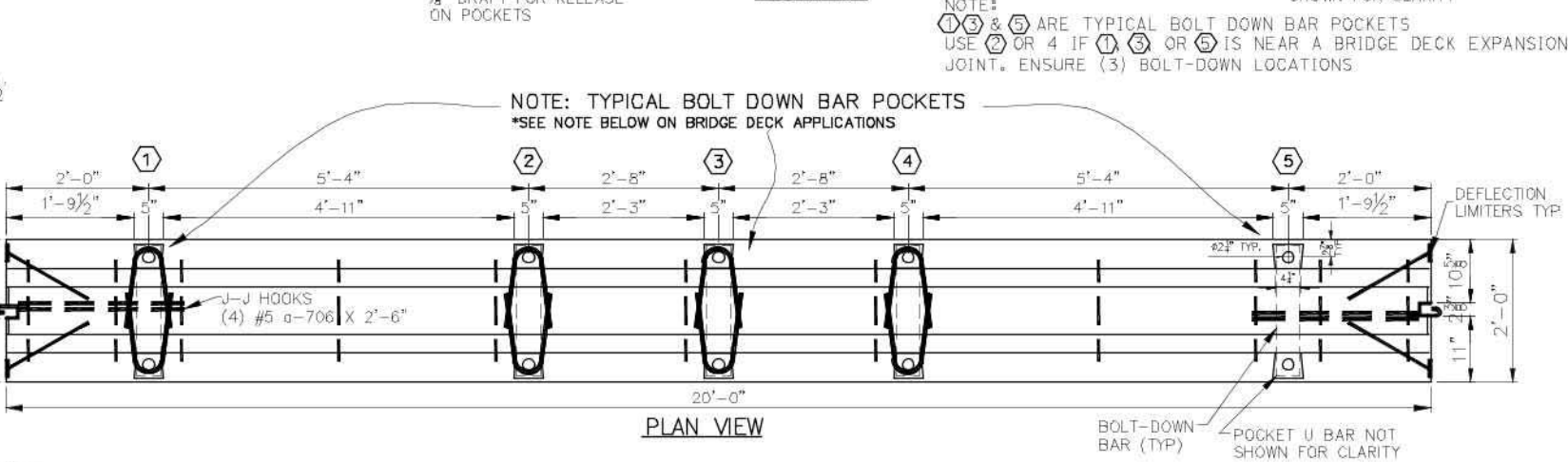
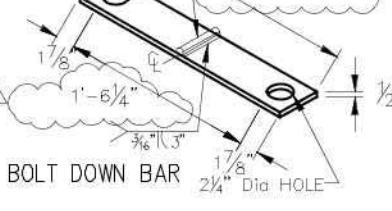
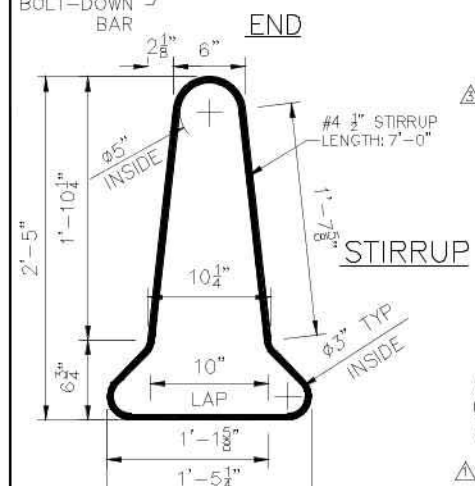
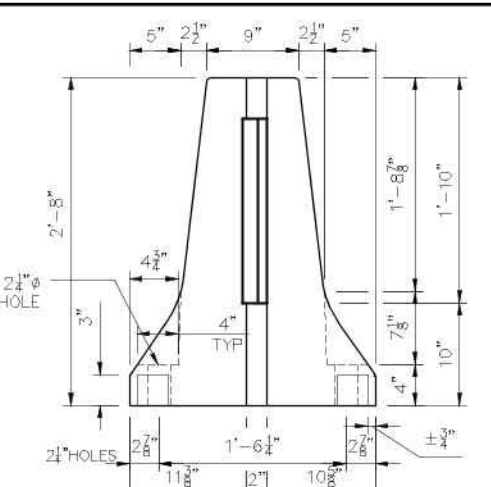
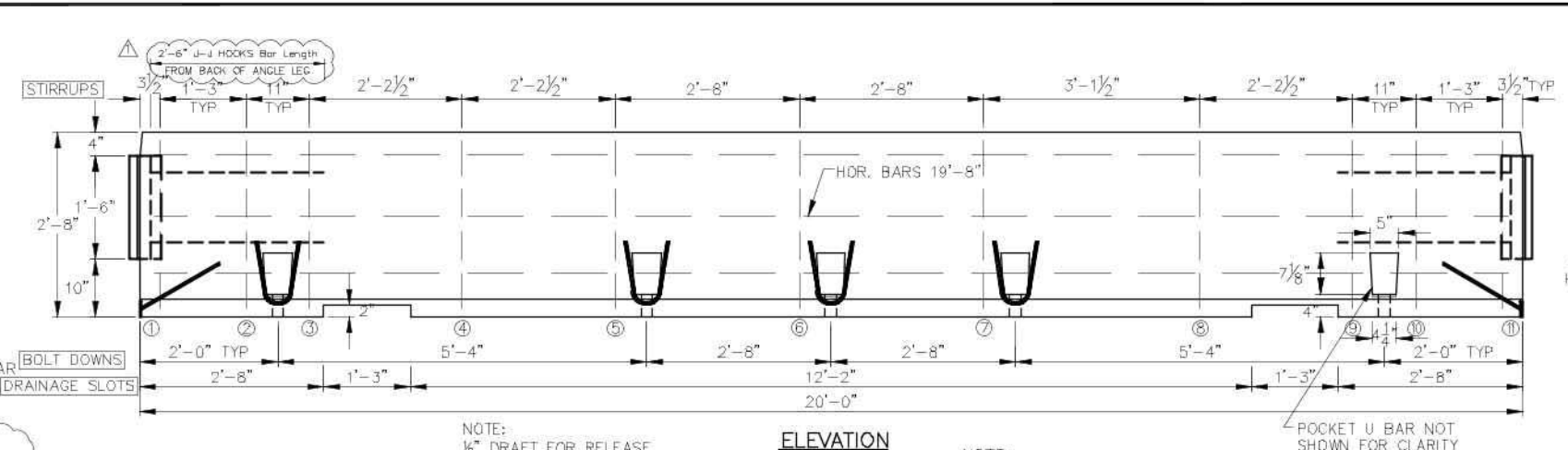
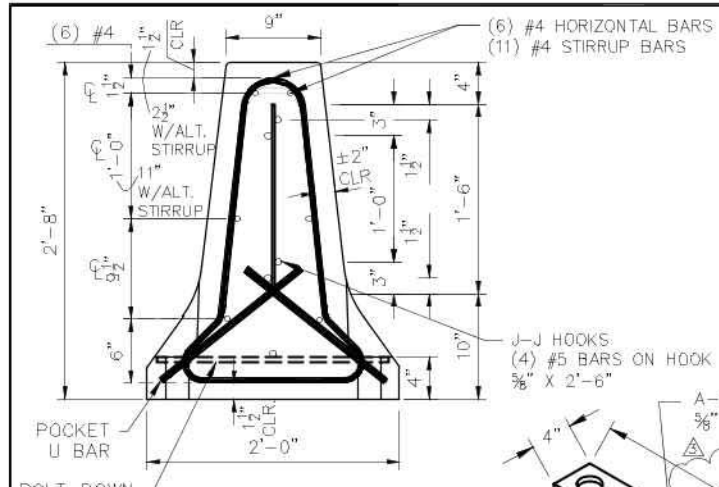
EASI-SET WORLDWIDE	
APPROVED PLANT	
MANUFACTURER	
J-J HOOKS F-SHAPE TEMPORARY CONC. BARRIER BOLTED & PINNED (PENNDOT)	Ref. No. MB-MASHF
DRAWING # 2019-165	Last Rev. 10/03/14
DRAWN BY: WCR	DATE: 2-7-14
CHECKED BY: MT	DATE: 2-7-14
APPROVED BY: -	DATE: -

PENNSYLVANIA  
DEPARTMENT OF TRANSPORTATION  
RECOMMENDED

10/13/2020

Thomas P. Macioco  
CHIEF BRIDGE ENGINEER

- DEFLECTIONS:**
- BOLT-DOWN:
- STATIC DEFLECTION=4"
  - DYNAMIC DEFLECTION=5.9"
- PIN-DOWN:
- STATIC DEFLECTION=5.5"
  - DYNAMIC DEFLECTION=8.76"



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TOLERANCES:

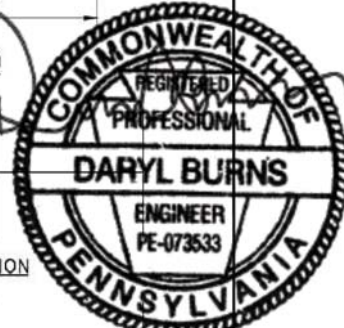
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CONCRETE CY: 2.33  
 WEIGHT: 9,433 LBS

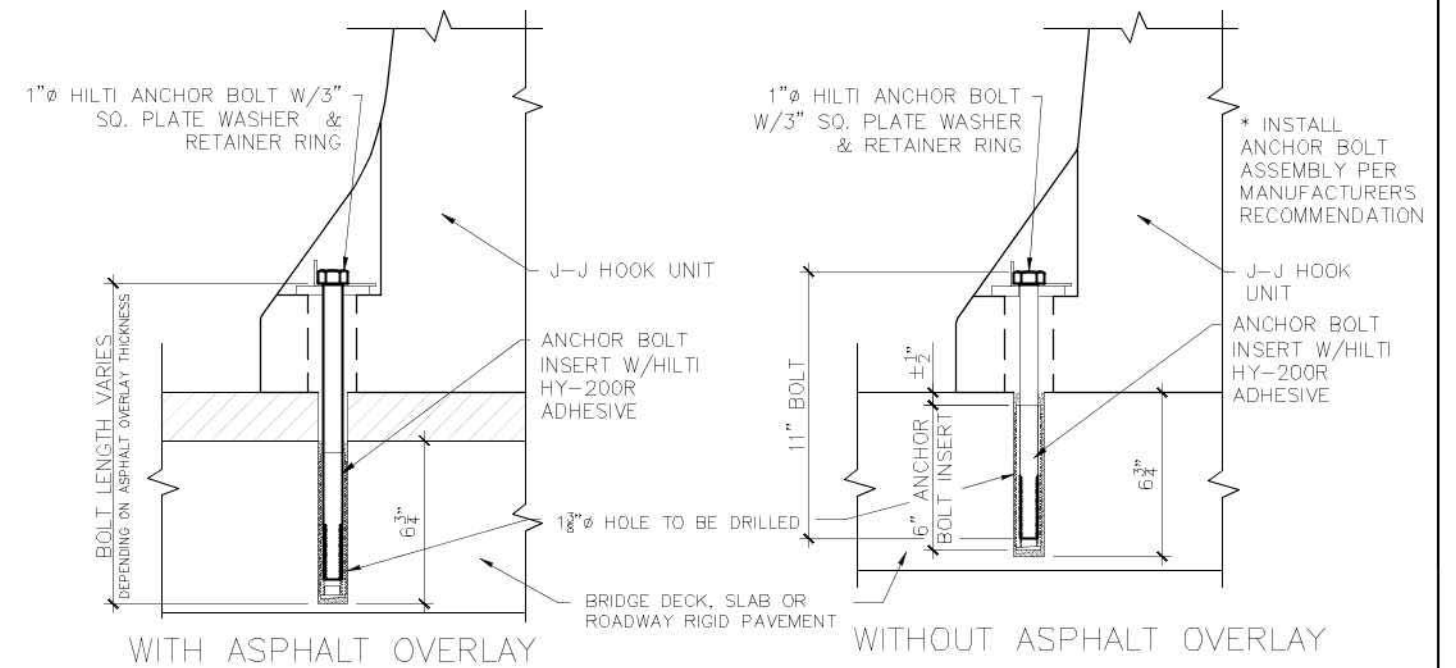
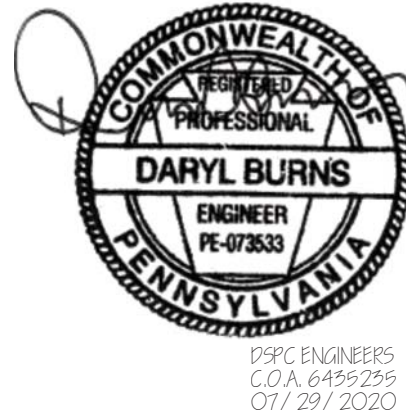
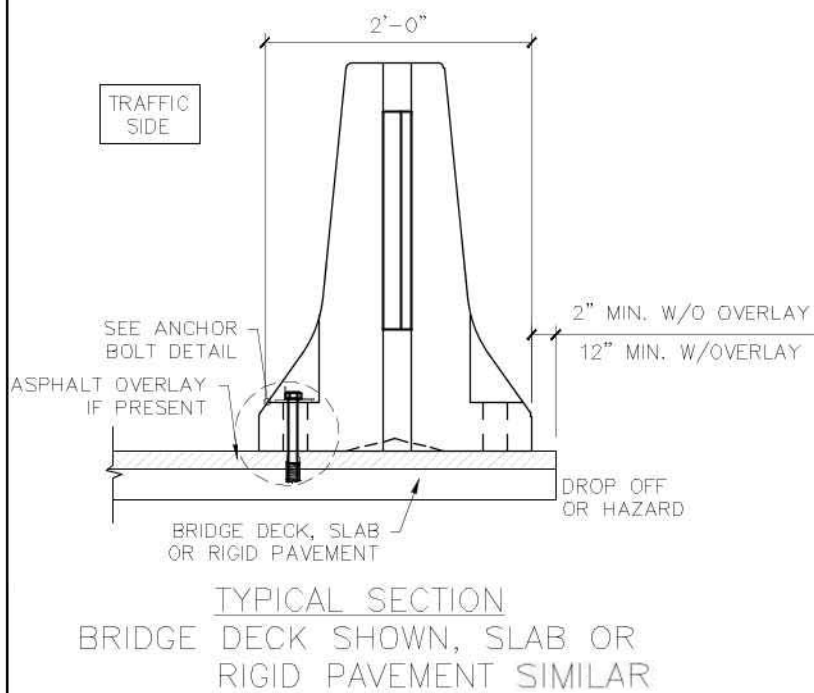


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**NOTES FOR BOLTED DOWN BRIDGE, APPROACH SLAB, ROADWAY AND TRANSITION INSTALLATIONS:**

**LIMITATION OF USE:** This installation technique can only be used on rigid pavement and concrete bridge decks as shown. J-J Hook Barriers shall not be bolted down on bridge superstructures that contain post-tensioned tendons within the concrete deck (top flange of concrete box girders) or on bridge superstructures consisting of longitudinally prestressed, transversely post-tensioned, solid or voided concrete slab units.

**ANCHOR BOLTS, ANCHOR BOLT INSERT, NUTS AND WASHERS:** Hilti Anchor Bolts shall be threaded rods in accordance with ASTM A193 Grade B8. Adhesive-Bonded Anchor Bolt Inserts shall be Hilti HRT-I (1"x6") in accordance with DIN/ISO 898-1. Plate Washers/Retainer Ring shall be in accordance with ASTM A 36 or ASTM A 709 Grade 36. \*ANCHOR BOLT "ASSEMBLY" INCLUDES THE FOLLOWING: HILTI ANCHOR BOLT, ANCHOR BOLT INSERT, PLATE WASHER, RETAINER RING, HILTI HY-200R ADHESIVE.

Install two (2) Anchor Bolt Assemblies per 12' J-J Hook Barrier section and three (3) Anchor Bolt Assemblies per 20' J-J Hook Barrier section on the traffic side of the J-J Hook Barrier as shown. Do not drill into or otherwise damage the tops of supporting beams or girders, bridge deck expansion joints or drains.

Move one (1) Anchor Bolt to the center pocket within a single J-J Hook Barrier if a conflict exists between the Anchor Bolt location and a bridge deck expansion joint or drain. Maintain two (2) anchor bolts per 12' barrier section and three (3) anchor bolts per 20' barrier section. The adjacent J-J Hook Barrier must each be installed with the standard two (2) Anchor Bolts per 12' barrier section or three (3) Anchor Bolts per 20' barrier section.

Move one (1) Anchor Bolt to the center pocket within a single J-J Hook Barrier as shown in the Treatment at Bridge Deck Expansion Joint Schematic if the J-J Hook Barrier straddles a bridge deck expansion joint. Maintain two (2) anchor bolts per 12' barrier section and three (3) anchor bolts per 20' barrier section. The adjacent J-J Hook Barrier must each be installed with the standard two (2) Anchor Bolts per 12' barrier section or three (3) Anchor Bolts per 20' barrier section.

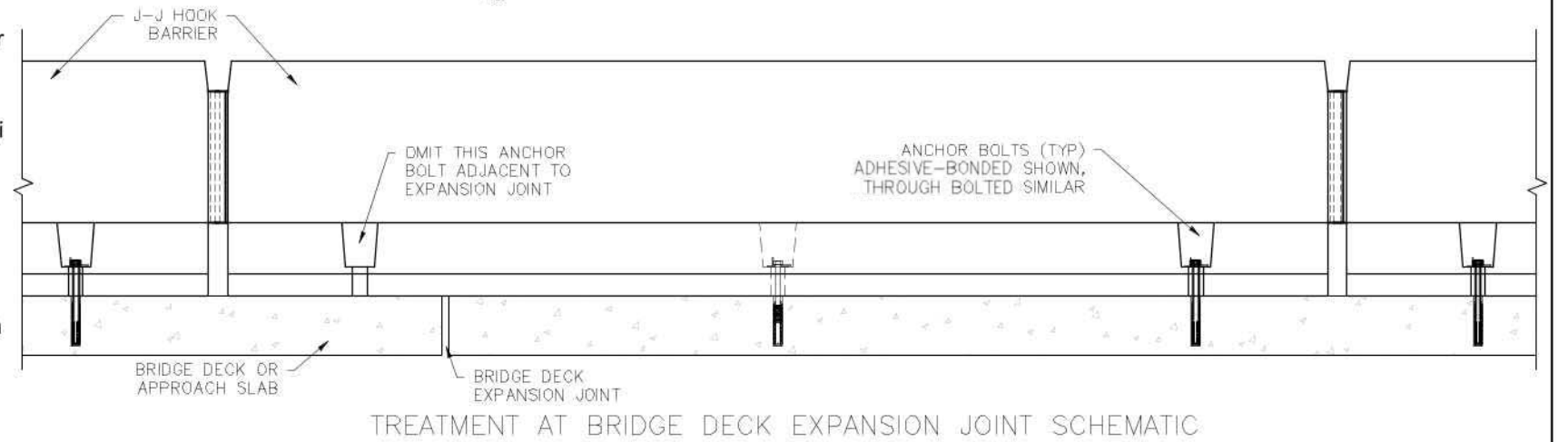
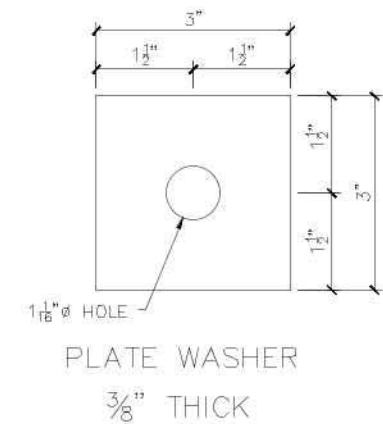
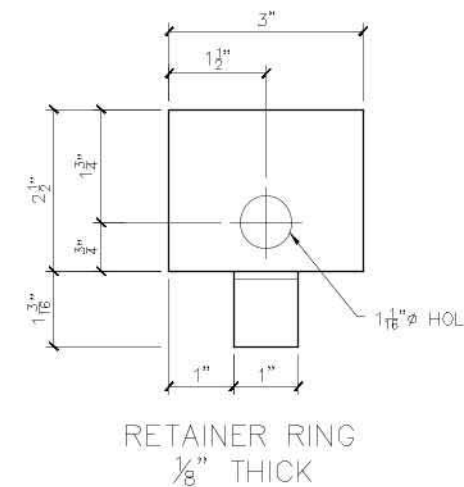
**ADHESIVE-BONDING MATERIAL SYSTEMS:** Adhesive Bonding Material Systems for Anchor Bolt Inserts shall be Hilti HY-200R adhesive installed per manufacturers instructions.

**REMOVAL OF ANCHOR BOLTS:** Upon removal or relocation of J-J Hook Barriers, flatten the retaining ring tabs, remove all Anchor Bolts and completely fill the remaining holes in bridge decks, approach slabs and roadway rigid pavements that are to remain. If a flexible pavement overlay is present and is to remain, completely fill the remaining holes in the flexible pavement with hot or cold patch asphalt material.

The condition and strength of the existing deck concrete must be validated to meet the requirements contained in the adhesive anchor manufacturers product data.

FOR INSTALLATION PROCESS, REFER TO  
INSTALLATION GUIDE- J-J HOOKS TEMPORARY PRECAST BARRIER

**ADHESIVE BONDED ANCHOR INSTALLATION ON BRIDGE DECK, APPROACH SLAB OR RIGID PAVEMENT**



**BOLTED DOWN BRIDGE, APPROACH SLAB AND TRANSITION INSTALLATIONS**

10/13/2020

DRAWING # 2019-165



**EASI-SET® WORLDWIDE**

## INSTALLATION GUIDE

### J-J Hooks Temporary Precast Barrier



**J-J Hooks®**

## **INSTALLATION GUIDE**

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Removing  
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## **PURPOSE:**

This Guide provides some basic installation guidelines for the installation and removal of J-J Hooks TL3-NCHRP Report 350 & AASHTO MASH tested free-standing & restrained temporary, concrete barriers (TCB). It also contains ancillary information detailing its performance when tested to NCHRP 350 and MASH. Selected videos showing J-Hook connection engagement, setting, and removal are available for viewing at [www.jjhooks.com](http://www.jjhooks.com).

As this Guide is updated, the pages/sections affected will contain a revision date in the lower left corner of the page(s).

## **PRODUCT DESCRIPTION:**

### **General:**

All J-J Hook barriers are a high strength, steel-reinforced, precast concrete safety barrier containing the J-J Hooks positive connection system. This connection system contains no loose hardware and the barrier end-design incorporates a self-aligning system for ease of installation and removal. Identical ends allow the barrier to be turned end-for-end when setting.

The J-J Hooks restrained (bolted) barrier provides easy installation requiring only 2 bolts for 12' section, 3 bolts for 20' section, and additional bolts for 30' section. The bolts are reusable. The restrained (pinned/staked) barrier requires 3 pins/stakes for 12' section, 4 pins/stakes for 20' section, and for 30' section additional pins/stakes per State DOT requirements/approvals.

### **Self-Aligning Connection Feature**

Each end of a J-J Hooks barrier contains a recessed alignment slot running the full height of the precast section. The J-Hook connector is located within this slot which maintains and guides the Hook engagement.



## **HANDLING, SETTING AND REMOVAL**

A visual inspection of each barrier segment is required prior to shipping. Should visible damage be evident in any segment, repairs should be made in accordance with the DOT guidelines for repairing temporary concrete barriers.

**SUGGESTED EQUIPMENT:**

Lifting Device(s):

Any load-rated, suitable lifting device (see photos below) may be used. When using a suitable lifter, ensure that you follow the manufacturer’s operating and safety instructions.

**NOTE:** Lifting devices should be load-tested and inspected, per applicable codes, on a periodic basis and should have the appropriate safety and certification markings on the device.



**BARRIER LIFTING, SETTING AND RETRIEVING EQUIPMENT**



**BACKHOE IN USE**



**GRADALL IN USE**

## **TYPICAL PERSONNEL RECOMMENDED FOR INSTALLATION/REMOVAL AT WORK SITE:**

### **Off-Loading:**

**Recommendation**– up to one (1) person on the trailer to attach the lifting device – this could be the truck driver or one of the barrier setting crew. Certain lifting devices may not require a person on the trailer.

### **Setting:**

**Recommendation**– up to two (2) persons, one at either end of the suspended barrier, depending upon the length of barrier and lifting equipment being used. Experienced setting crews using certain lifting devices may choose to use only one person to guide/connect the suspended barrier.

### **Removing/Loading:**

**Recommendation** - Reverse of instructions for Off-Loading / Setting

## **PRECAUTIONS/SAFETY:**

**CAUTION:** Prior to delivery/removal of barrier to/from the project, all associated personnel will have reviewed the DOT/provincial/etc. safety requirements, contract/job/site-specific safety requirements and, when appropriate, received safety training. All activities will also comply with applicable OSHA guidelines.

## **SITE PREPARATION:**

### **Setting Area:**

Barriers should be placed on a flat, stable and compacted surface. Ideally the surface should be paved and free of swales, ditches or other irregularities.

Align the segments according to the specified configuration and layout in the project traffic control plan.

## **PRODUCT DELIVERY:**

Typically, precast concrete barrier are delivered on a flatbed trailer. Depending upon the shape and length of the barrier, a varying number of pieces can be placed on the trailer and remain within legal load limits.

## **PRODUCT UNLOADING:**

The person on the trailer guides the lifting device toward the barrier to be lifted (as required depending upon lifting devices). The lifting device should be placed near the center-of-gravity of the barrier (typically near the center of the section). When it is lifted, the section should hang in a nearly level position.

**NOTE:** “Levelness” is one of the most important factors in easing the setting process. Then lift it from the trailer and move it toward the barrier installation area.



**UNLOADING BARRIER FROM TRAILER**

## **INSTALLING PRODUCT:**

The suspended barrier is moved toward the end of the last barrier section that has been set in the roadway installation.

The person(s) on the ground guide the suspended barrier into place. The connecting end is moved toward the already-set barrier

One end of the suspended barrier is guided over the J-Hook end of the set barrier. With the ends aligned, the suspended barrier's J-Hook connector is guided toward and over the set barrier's cast-in alignment guide. As the barrier is lowered vertically, the J-Hooks automatically engage.

While the suspended barrier is being lowered with the J-Hooks engaged, the unconnected end is guided into place.

Barrier should be set in accordance with Traffic Control Plan Details.

Once the barrier is set and the lifting device is released it can be moved toward the trailer and attached to the next barrier to be set.



**BARRIER BEING INSTALLED**

***J-J Hooks easily work a curve***

The maximum angle between barriers is approximately 7 degrees. The minimum achievable radius is dependant on barrier length. Examples:

- 8-foot barriers = 68' radius
- 10-foot barriers = 84' radius
- 12-foot barriers = 100' radius
- 20-foot barriers = 165' radius
- 30-foot barriers = 246' radius

**INSTALLATION HOOK ENGAGEMENT**

Remove slack in hook engagement. (Permissible tolerance +0, -5/8 inch.)

## **REMOVING AND LOADING PRODUCT ON TRAILER:**

Reverse of instructions for Off-Loading / Setting

## **RESTRAINED J-J HOOKS BARRIERS - ROADWAY SURFACES ANCHORING:**

Examples of roadway surfaces anchoring systems drilling equipment:



**MANUAL DRILL**



**MULTIPLE HEADS DRILL**

## **ANCHORING**

### **Pinning/Staking**

#### **Tools/Equipment Required**

Hammer drill w 1 ½-inch diameter bit/w extension up 48” in length

#### **Installation/Removal Process**

When pinning/staking the J-J Hooks restrained barrier, the barriers are set in accordance with the Traffic Control Plan Details.

Once the barriers are placed, holes for receiving the 1 ½-inch diameter pin, 48” long are drilled through each pocket into the roadway on the traffic side. The pin is dropped into the receiving hole until the washer under the pin head “bottoms” in the pocket. When fully installed, the top of the pin should not project above the top of the pocket profile.

Removing the pin, requires that the removal device be attached to the top of the pin and then pulled out.



## PIN-DOWN: MASH, Test Level 3 (8.8" Dynamic Deflection)

Meets MASH requirements (Manual for Accessing Safety Hardware) - FHWA Letter B-52C



Crash Test Installation photos

### Pin-Down System for Lane Reconstruction Applications

MASH crash tested at 6" from a 36" deep vertical cut. The J-J Hooks® Pin-Down Barrier system provides: unprecedented protection, maximum lane utilization, and superior performance.

### Pin-Down Features & Benefits:

- Easy Installation (3 pins for 12' section, 4 pins for 20' section, additional pins for 30' section)
- Headed 48" pin with mating tools for speedy installation and removal
- Maximum protection for excavations located within 6 inches of pinned barrier
- Available for Private Applications: wharf & dock, sports & convention centers, railroad, and perimeter security.



Threaded removable pin extension used for installation & removal



Pins installed - 3 minutes each

Pin installed

Accept only the original! **J-J Hooks®**



Look for the unique J-J Hooks design features

The J-Hook Connector and the V-Taper are U.S. trademarks of Easi-Set Worldwide.



Removing pin



Pin removed

**NOTE:** Prior to bolting, validate that the condition and strength of the existing deck concrete meet the requirements contained in the insert-adhesive manufacturer's product data.

### Bolting:

#### Tools/Equipment Needed

Hammer drill with 1 3/8 -inch diameter bit 23-inches long

Wire brush

Air hose

Inserts 1" X 6"

Hex head bolt 1" X 10" (\*)

Plate washer 3" X 3" X 3/8" per test

Retainer ring

As tested

(\*) 11" without asphalt overlay.

Bolt length to be determined, if asphalt overlay is present.

Adhesive Hilti HIT HY 200R  
Pressurized adhesive gun  
Air compressor – portable self-contained  
Torque wrench  
Open-end/box-end wrench for 1-inch hex bolt  
Hammer  
Large screwdriver  
Large pliers  
Approved Non-shrink grout (after barrier is removed)  
1-inch putty knife (for grout)

**Installation Process** (See Illustrations on Page 11)

Align the segments according to the specified configuration and layout in the project Traffic Control Plan Details.

Drill holes, through the bolt pocket, into the concrete deck or concrete pavements to allow 1”x 6” insert to be fully embedded into concrete.

Using the compressor and air hose, blow out the drilling residue from the hole

Clean hole with wire brush

Insert air nozzle to bottom of hole & blow out all dust and debris with compressed air.

Fill hole with adhesive about 2/3 full

Install the bolt insert, with the hex bolt threaded about half way into the insert. Washers should also be on the hex bolt at this point.

Allow adhesive to cure. Cure time to be in accordance with manufacturer’s recommendation. Do not disturb anchor during the set and cure time.

Reinstall the hex bolt with the plate washer and retaining ring in place

Tighten hex bolt hand-tight and torque to 92.2 (125 n/m) foot pounds

Lift the retaining ring tab against the hex bolt flat to lock the bolt in place

**Removal Process**

Flatten the retaining ring tab.

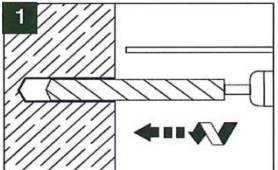
Remove the hex bolt

Remove the barriers

Fill/Repair roadway surface in accordance to DOT guidelines

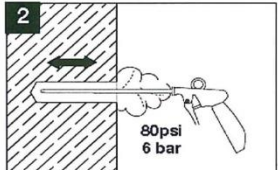
## Bolt Installation Instructions : HRT-I 1" x 11" (1/2)

**DRILLING**

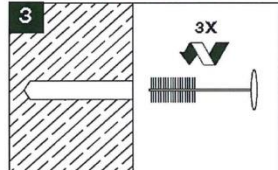


1. Drill anchor hole with a carbide bit. **Use 1-3/8" diameter.**

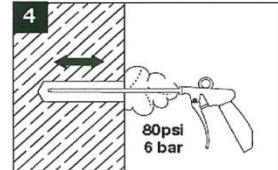
**CLEANING**



2. Insert air nozzle to bottom of hole and blow out all dust and debris from the hole using compressed air.\*

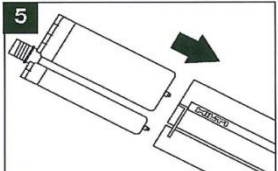


3. Clean hole with wire brush. Proper hole cleaning is essential.

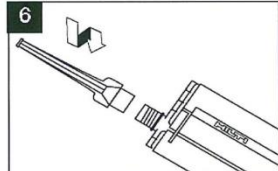


4. Insert air nozzle to bottom of hole and blow out all dust and debris from the hole using compressed air.

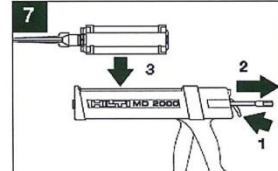
**PREPARING ADHESIVE DISPENSER**



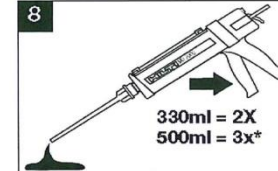
5. Put foil pack into foil pack holder. Remove cap covering threaded projection.



6. Screw on static mixer.



7. Put holder/ foil pack into appropriate dispenser.

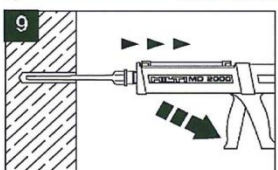


8. Discard first trigger pulls of adhesive from each foil pack. \*Below 41°F (5°C) discard four trigger pulls.

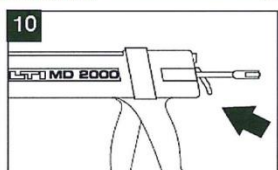
**For HY-200, ensure holder is colored RED and proper static mixer is used.**

## Bolt Installation Instructions : HRT-I 1" x 11" (2/2)

**APPLYING ADHESIVE**

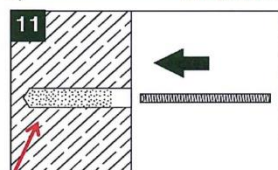


9. Inject adhesive into hole without forming air pockets starting at the bottom until 1/2 to 2/3 full. Use mixer filler tube extensions when needed to reach the hole bottom.

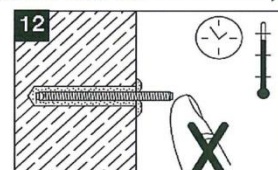


10. After injecting adhesive depressurize the dispenser by pressing the release button.

**INSERTING BOLT INSERT**



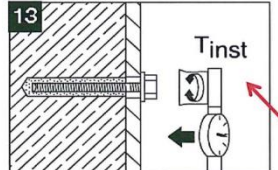
11. Insert bolt insert. Twist during installation. Fastener may be adjusted during specified gel time.



12. Do not disturb insert between specified gel time & cure time. Cure time to be in accordance with manufacturer's recommendation

**When installing the insert, please ensure the bolt threaded into the insert, approximately halfway, not completely threaded. Do not install Insert without including the bolt. This may lead to issues with installation and removal.**

**INSERTING BOLT INSERT**



13. Apply specified torque as required to secure items to be fastened. Do not exceed maximum torque specified.

Torque value was set to 125 N/m\* during FHWA approved testing, MASH Level 03.  
92.2 FT/LBS

When removing the barrier system, remove the bolt, move the barrier, then proceed to grout over countersunk insert, thus leaving a flush concrete surface.

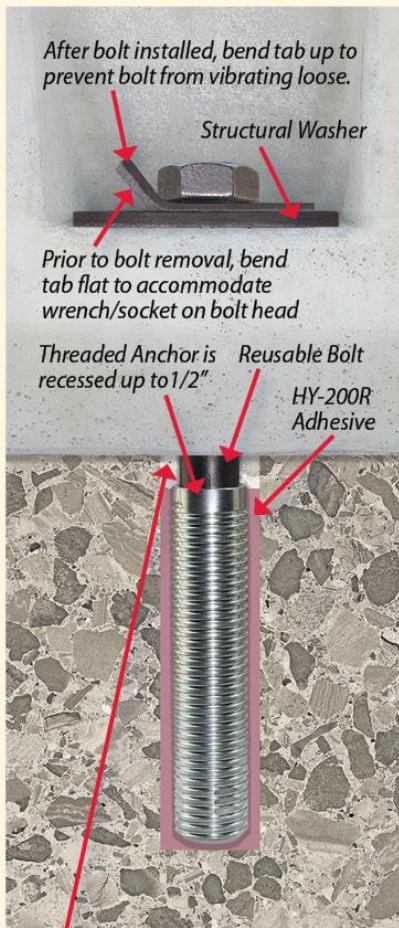
\* 1 N/m = 0.73756 FT/LB

## BOLT-DOWN: MASH, Test Level 3 (5.9" Dynamic Deflection)

North America's Only **2 Bolt** MASH-Tested Barrier - FHWA Letter B-52B



### Proprietary Bolt Assembly



Hole is filled with grout after bolt removal

### Easi-Set/Hilti Bolt, Anchor & Adhesive System for Bridge Applications

Partnering with international brand, Hilti Corporation, Easi-Set Worldwide offers a proprietary Bolt Assembly and Adhesive System for anchoring precast barrier to bridges.

### Bolt-Down Features & Benefits:

- Allows fast, easy removal of barriers without flame-cutting bolts or damage to the bridge deck
- Easy installation (2 bolts for 12' section, 3 bolts for 20' section, additional bolts for 30' section), bolts are reusable
- Anchoring system used with HY-200R Adhesive (Hilti)
- Six inch anchors are recessed for easy bridge deck patching

#### Crash Test Installation Photos



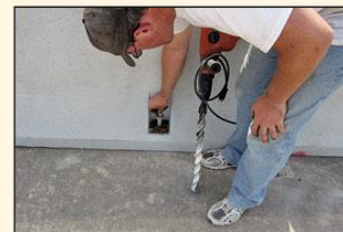
Drilling hole



Cleaning hole with air and brushing



Injecting HY-200R Adhesive



Installing Anchoring System