Montana Department of Transportation
Research Programs
June 2011

FINAL REPORT

EVALUATION OF REDI-TORQUE MODEL 280 OMNI DIRECTIONAL SLIP BASE SQUARE SIGN SUPPORT

Location:	City of Helena; North Last Chance Gulch (N. Main St.) Pedestrian Crossing for Memorial and Centennial/Bausch Parks – U5807
Project Name:	Redi-Torque Square Sign Support
FHWA No.:	Informal
Project Number:	MT-11-03
Type of Project:	Experimental trial to ascertain effectiveness of the slip base sign support system
Principal Investigator:	Craig Abernathy, Experimental Program Manager
Duration of Analysis:	January 24, 2011 – June 17, 2011

Objective

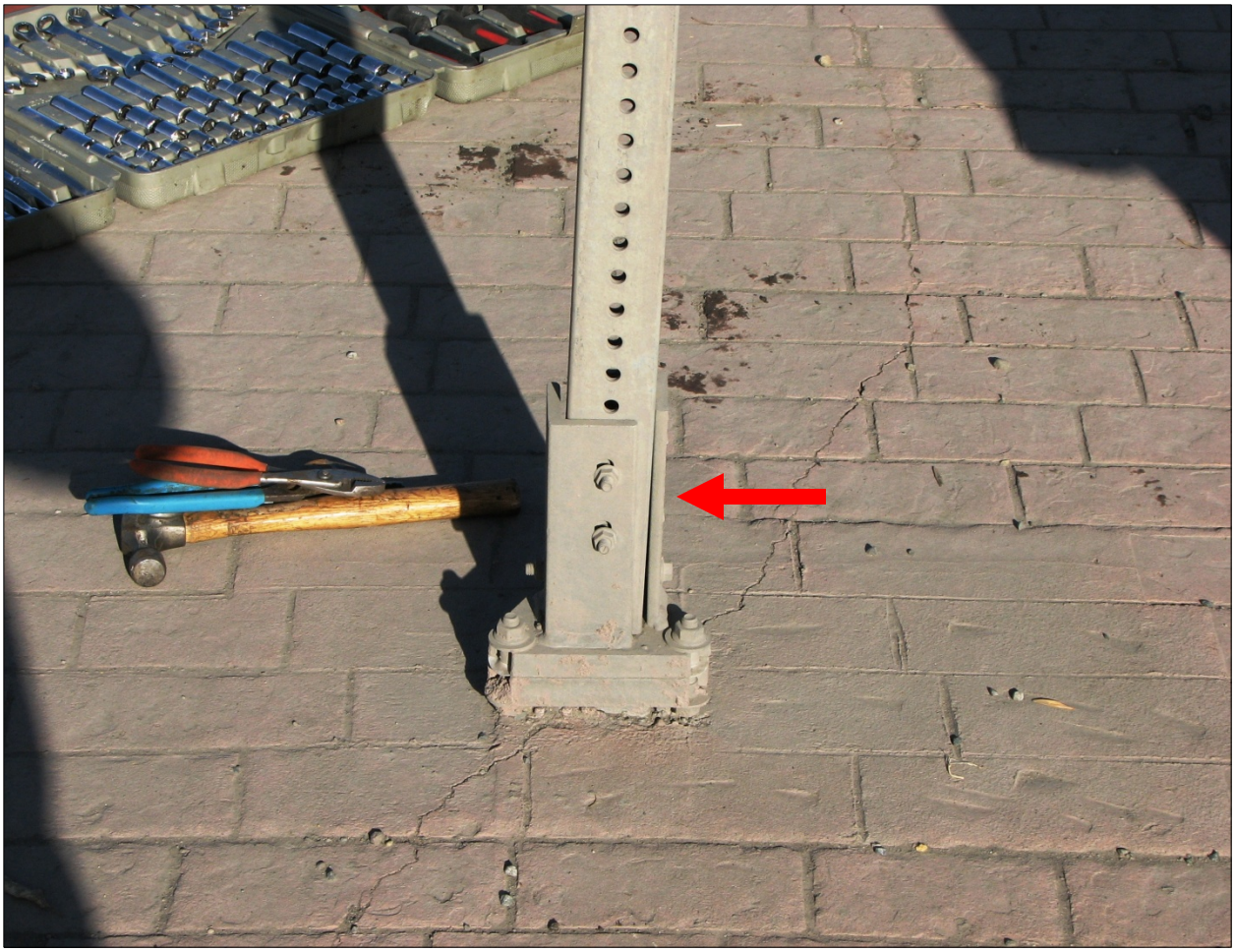
The objectives of the experimental project are to determine the durability and reliability of the Redi-Torque Model 280 system to effectively maintain the integrity of the sign placement. Research will visit the site (at a minimum) biweekly to document the condition of the sign support. The evaluation phase encompassed approximately a six (6) month period.

The Redi-Torque system is designed as a breakaway device at the base. In case of a vehicle impact (to minimize potential structural damage and increased safety for vehicle

occupants) the unit base is designed to compress releasing tension on the support bolts and allow the sign base to release. This system allows the MDT to install the unit with an existing compatible triangular slip base. The changeover from the existing support to the Model 280 took approximately twenty minutes.

Documentation focused on the stability of the base, specifically the attachment hardware components. The issue of environmental effects (wind movement, vibrations, temperature variances, etc.) and overall product durability were to be addressed in this assessment. The conclusion is found at the end of this report. This report may be found at: **http://www.mdt.mt.gov/research/projects/helena.shtml**

The following images detail the installation:

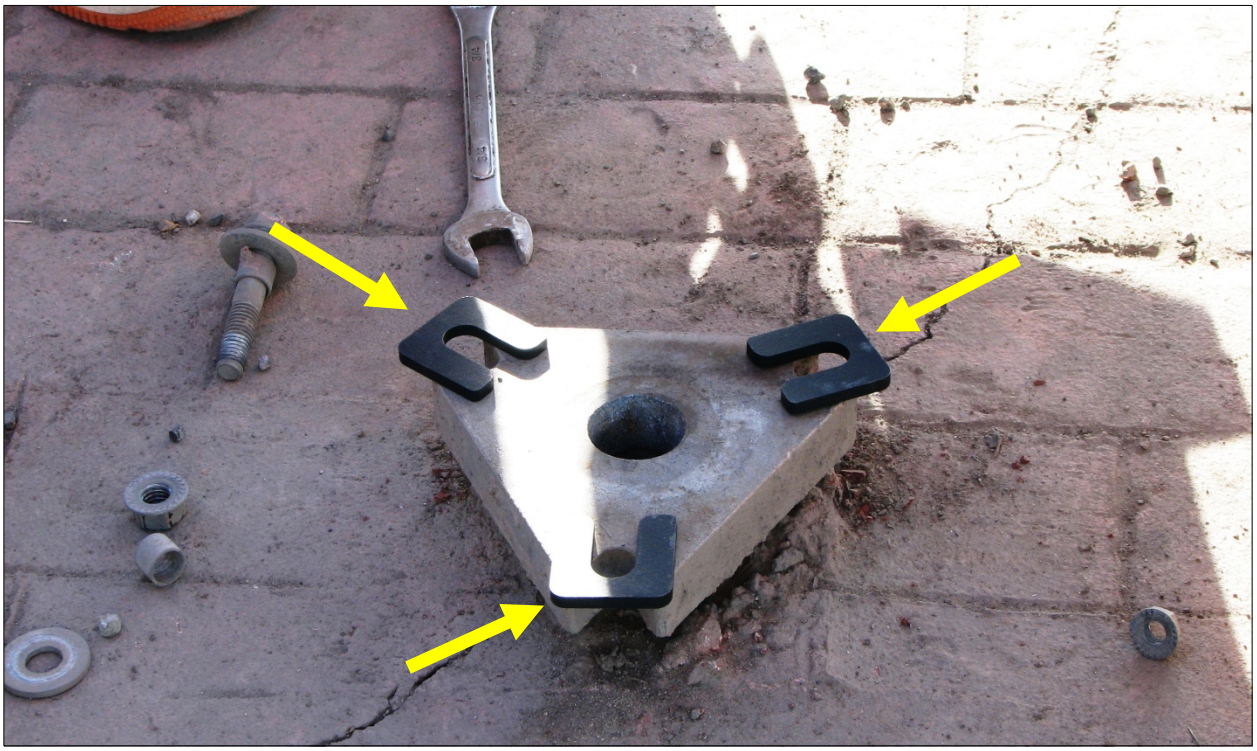


🡅 Image of existing top half (3" outside diameter 'O. D.') post receiver prior to exchange (red arrow).

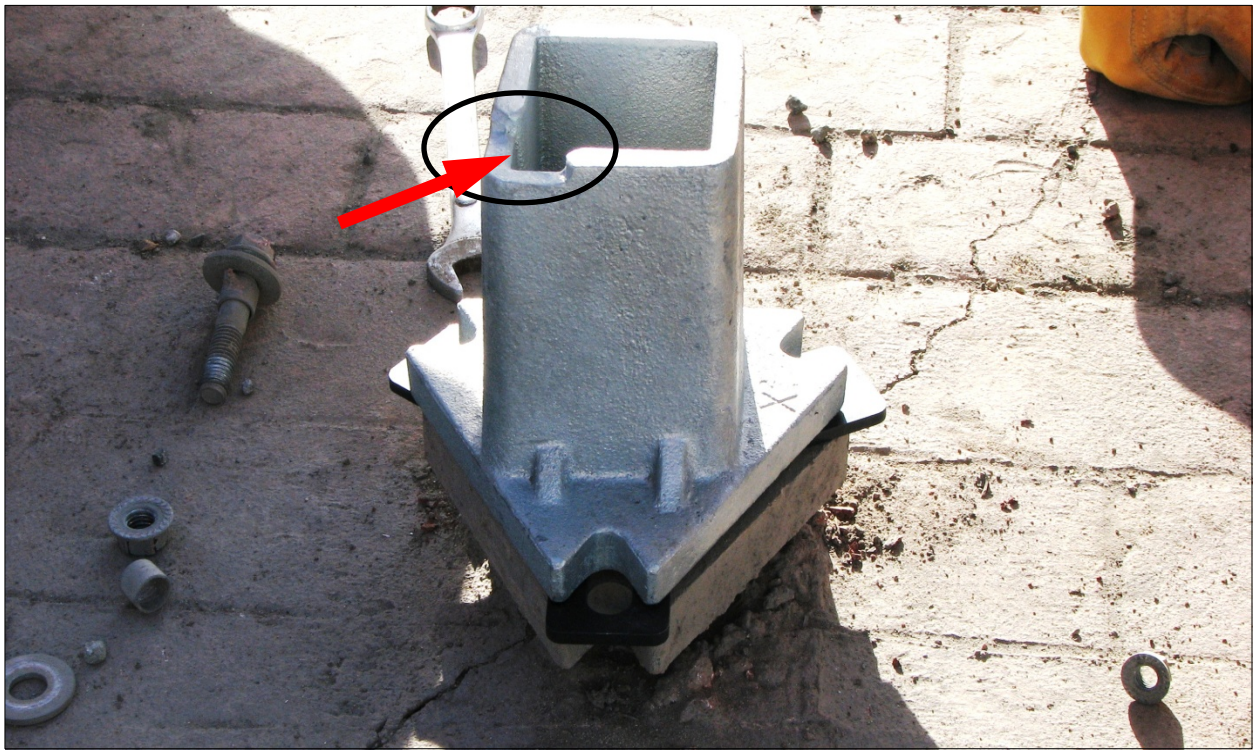
🡸 Overall view of pedestrian crossing sign at median prior to installation of the Redi-Torque slip base. View is looking east.

The MDT installation team: At right, Joe Nye, Construction; at rear, Shane Hart, Field Technician, on left, Mike Miller, Maintenance Reviewer.

The square sign support is removed and the existing triangular top half, slip base will be unbolted from the lower slip base.

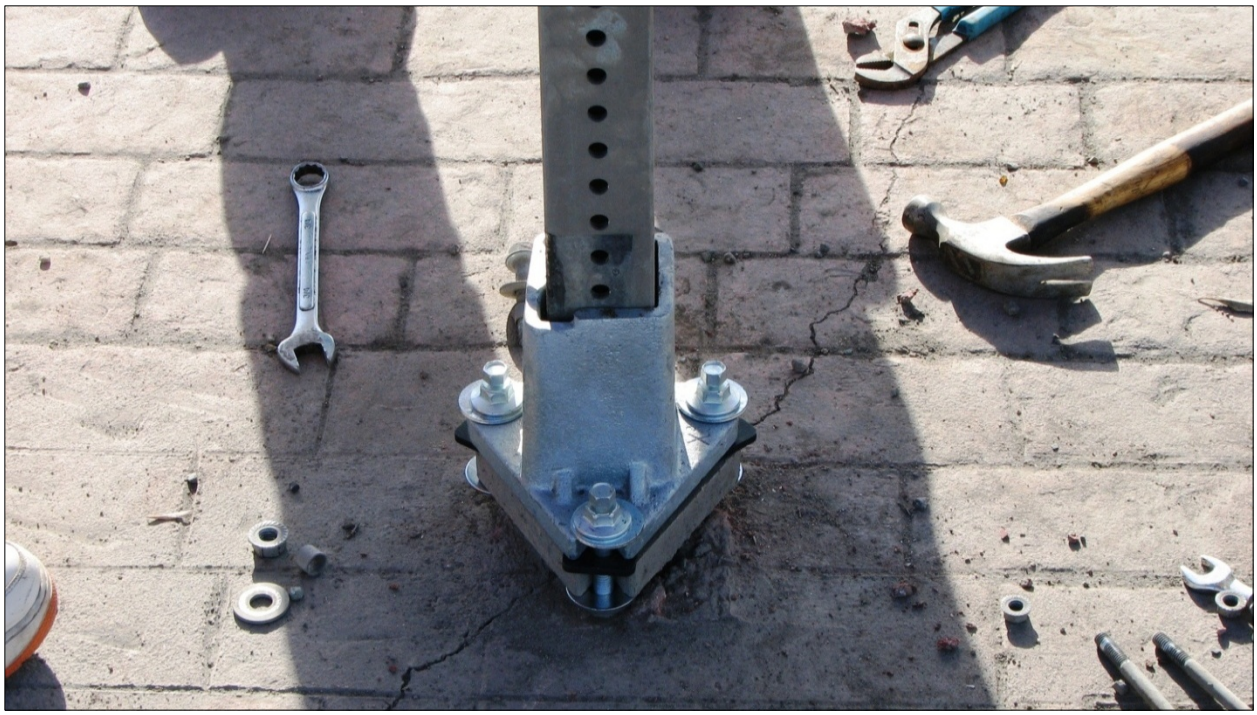


Once the top slip base is removed, 3/16" thick Teflon coated slip washers are placed over the bottom half, bolt holes (yellow arrows). Note that this is the ‘slip’ feature of the system. Upon impact the slip washers are ejected away from the slip plates which allow the top receiver to depress enabling the Redi-Torque bolts to fall out releasing the top half-slip base from the lower half.

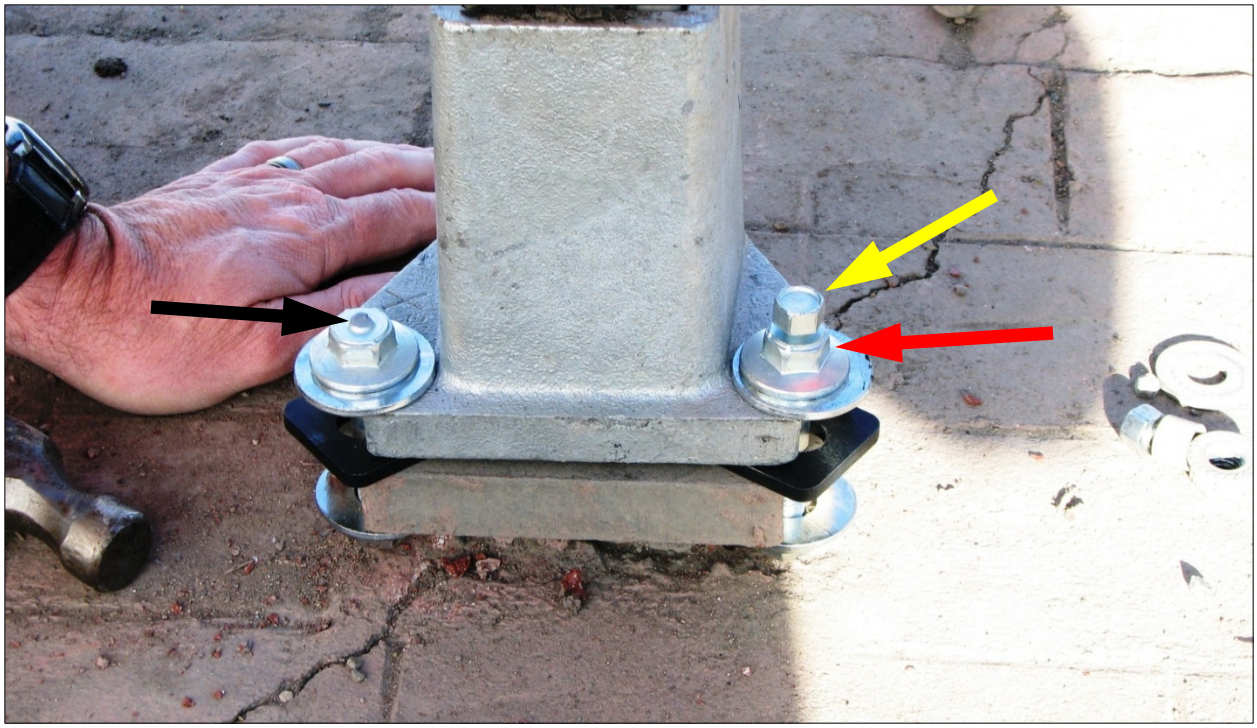


The top receiver is then placed atop the teflon slip washers. Note the indent in the top receiver (red arrow); this will be used for the locking wedge as explained later in this report.

Double Hex Redi-Torque bolts are then attached and hand tightened.



The torque bolts have been pre-tightened to allow the sign support to be inserted into the top receiver.



The Double Hex Redi-Torque bolts are designed to apply the proper force (ft./lbs.) for the desired clamp load for the Model 280 system. The bolts can be partially tightened with the lower 3/4" hex head, enough to keep the bolt in place (red arrow); the top smaller, 9/16" hex head (yellow arrow) is to complete the tightening sequence by snapping off at the desired torque. The black arrow shows an example of the breakaway bolt.

🡸 Using a hammer, the square sign support locking wedge is positioned in the pre-determined corner and driven until firmly locked into place.

🡻 The image below shows the completed installation.

🡅 Overall view of the completed installation of the Redi-Torque Model 280 Omni Directional Slip Base.

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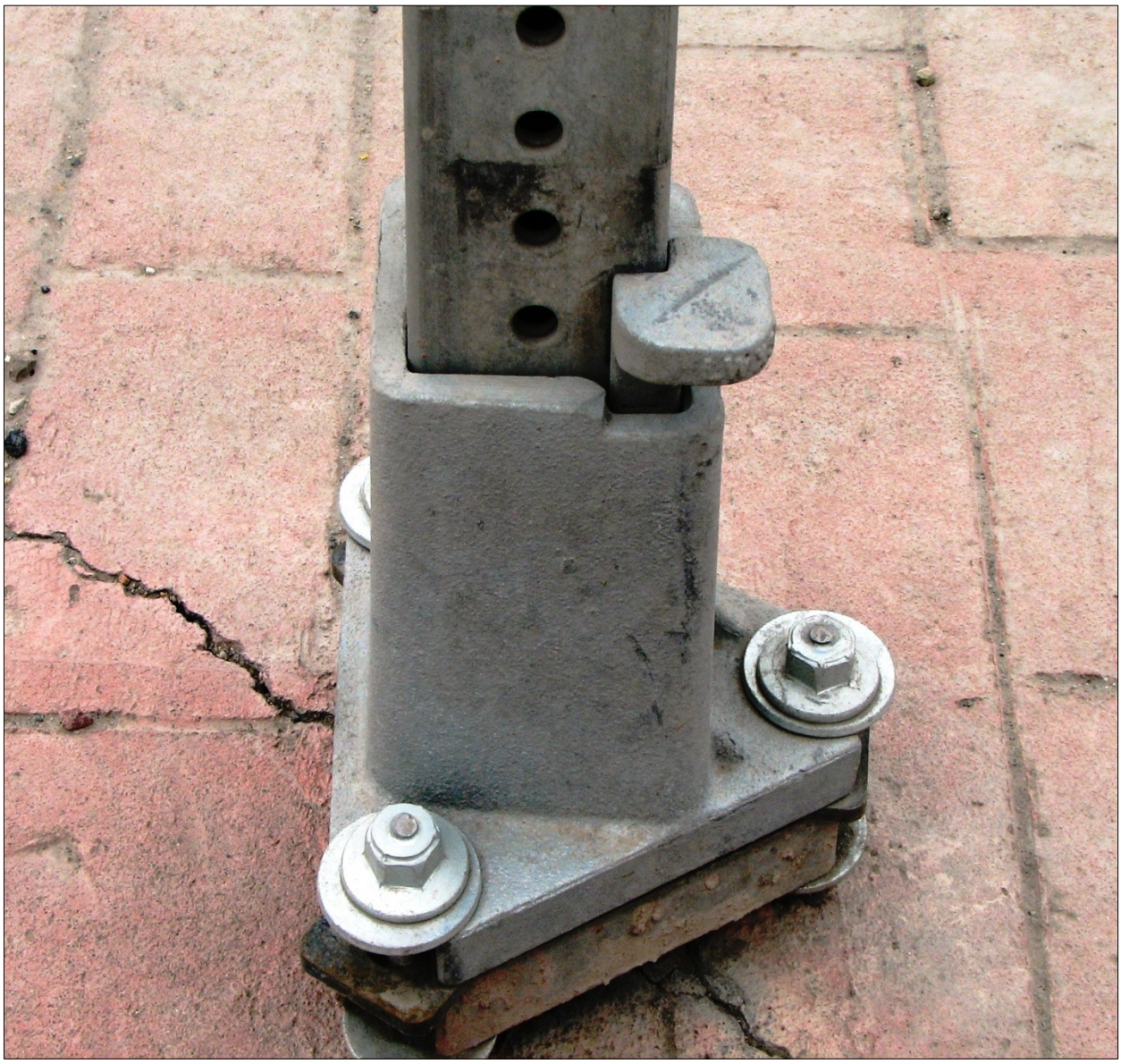
Conclusion

Research visited the site every two weeks to document performance of the Redi-Torque device. The locking wedge, bolts, and Teflon slip washers were scribed in a way to determine if any movement or shift of the attachment hardware occurred during the duration of the study. To date all of the components of the base exhibited no movement or release. All attachment hardware remained as rigid of the day it was installed. Research has rated the Redi-Torque Model 280 as having satisfactory performance.

The following are images of the last inspection:



🡸 Overview of sign placement as of June 17, 2011