



The Presto ATRA® Clip

The ATRA® Clip, illustrated in Figure 1, is a molded, high-strength polyethylene device developed by Presto Geosystems. The ATRA Clip is used on a stake to form the ATRA® Anchor as illustrated in Figure 2 or as a load transfer restraint pin as illustrated in Figure 15.

The ATRA Clip provides time and material savings during the installation of the Presto Geoweb system.

The ATRA® Clip is available in two styles:

- 1) For US applications to fit #4 rebar
- 2) For Metric applications to fit 10-12 mm diameter rods

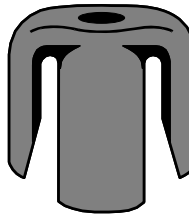


Figure 1 The ATRA® Clip

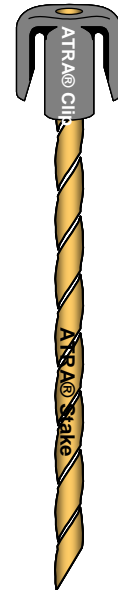


Figure 2 The ATRA® Anchor

The ATRA® Anchor System

Benefits

The ATRA Anchor offers unique advantages over other anchoring methods.

1) Both metal and non-metallic materials can be used as the ATRA stake.

The ATRA stake material can be selected based on site soil conditions. If long-term durability is desirable, the sand coated, Glass Fiber Reinforced Polymer (GFRP) stake is the recommended material rather than more costly corrosion-resistant metals. Presto Geosystems provides pre-assembled ATRA GFRP Anchors in a variety of anchor lengths.

2) Cost savings: ATRA Anchor vs. J-Pins.

J-Pins require an additional 20%-25% material for the bend (the 'J' end) plus the cost of bending the stake. This cost can be substantial when larger quantities of stakes are required.

3) ATRA Anchors are easier and faster to drive than J-pin anchors.

J-Pin anchors are very difficult to drive in harder soils. When hard soils are encountered, driving against the bend of the J-Pin, which is off the major axis of the stake, will result in bending of the stake. This causes further difficulties in driving the stake. The J-Pin's hook also does not make a secure connection with the Geoweb cell wall. The characteristics of the J-Pin lead to greater investment of time and money. The ATRA Anchor saves both time and money over alternative staking methods. Options for driving the ATRA Anchors are either by hand (hammer) or with electric driving tools as illustrated in Figures 3 and 4.

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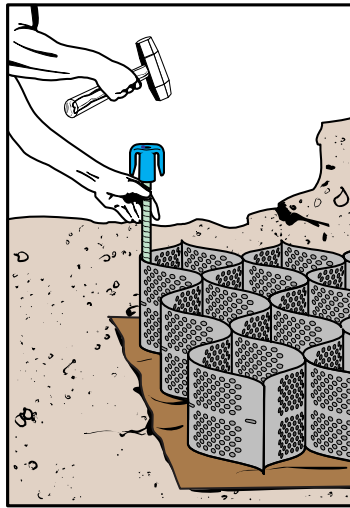


Figure 3 Driving the ATRA Anchor with a Hammer

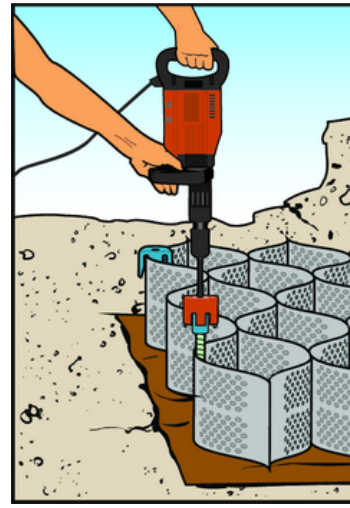


Figure 4 Driving the ATRA Anchor with an Electric Driver

The ATRA® Anchor Installation

Making the ATRA® Anchor

The ATRA Clip easily installs on the end of the ATRA stake to form the ATRA Anchor. The ATRA stake can be a #4 metal rebar or 10-12 mm diameter rod that is cut-to-length to meet the needs of the application. The ATRA Anchor is made by simply hammering the ATRA Clip onto the ATRA Stake or by hammering the ATRA Stake (metal stakes only) into the ATRA® Clip as illustrated in Figures 5 and 6. When properly made, the end of the ATRA Stake should be flush with, to within 3 mm (1/8 in) maximum above the top of the ATRA Clip.

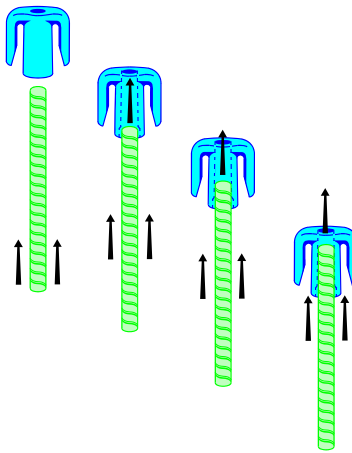


Figure 5 Inserting the ATRA Clip on the Stake

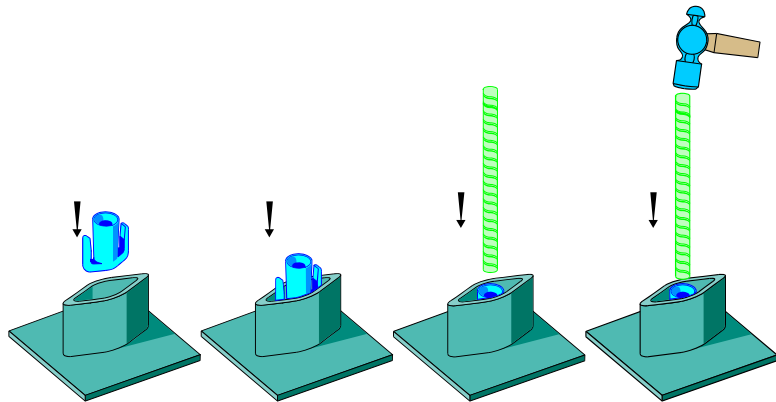


Figure 6 Inserting the Stake into the ATRA Clip



Using the ATRA® Anchor with Geoweb sections

The ATRA Anchor can directly hold Geoweb sections down as illustrated in Figures 7 and 8. The ATRA Anchor is driven so the arm of the ATRA Clip is inserted through the Geoweb cell wall slot, or passes over the Geoweb cell wall providing direct hold-down as well as resistance to sliding and uplift forces.

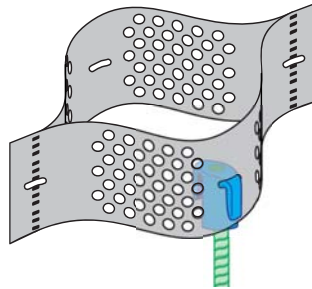


Figure 7 ATRA Anchor Integrated with Cell-Wall Slots

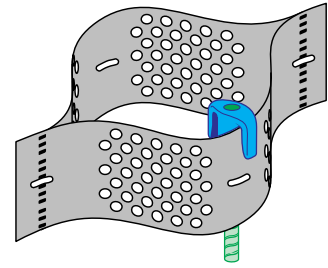


Figure 8 ATRA Anchor Connected Over the Cell Wall

Using the ATRA® Anchor with tendoned Geoweb sections

The ATRA Anchor can indirectly hold Geoweb sections in place when the arm of the clip passes over a tendon as illustrated in Figure 9. Greater hold-down can be obtained by passing the tendon under both arms of the ATRA Clip as illustrated in Figures 10 and 11.

Greater resistance to sliding forces can be obtained when the tendon wraps around the clip and under both arms as illustrated in Figures 12 and 13.

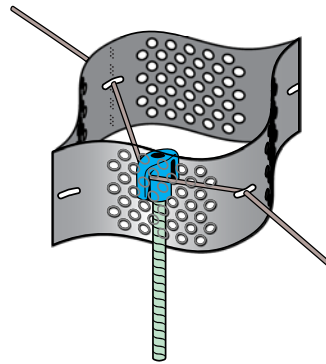


Figure 9 ATRA Anchor and tendon anchoring

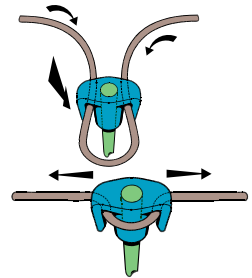


Figure 10 Half Wrap

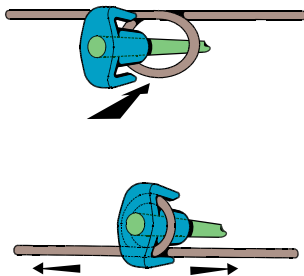


Figure 11 Full Wrap

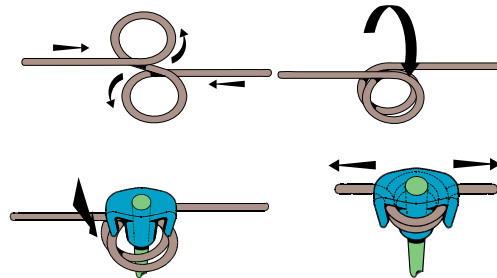


Figure 12 Double Wrap

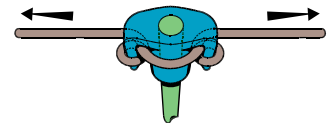
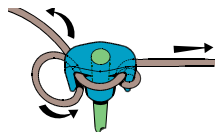
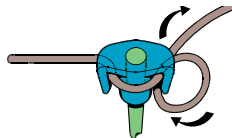


Figure 13 Under-Arm Wrap



The ATRA Anchor is also used at the end of the tendons as shown in Figure 14 to provide crest and toe anchorage for Geoweb sections used in slope and channel protection applications.

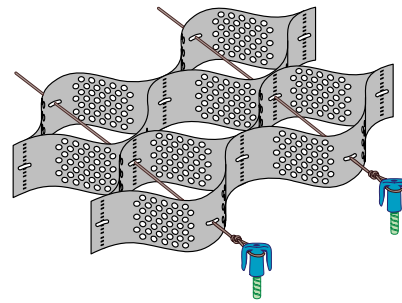


Figure 94 ATRA Anchor for Crest and Toe Anchorage

The ATRA® Clip Restraint Pin

Benefits

The ATRA Clip used as a restraint pin, transfers sliding load forces from the Geoweb cell to the tendon. See Figure 15.

Cost savings can be realized when using the ATRA Clip. Securing tendons to other mechanisms, such as straight pins, is difficult. The ATRA Clip arms allow for the rapid securing of tendons using the Moore Hitch. See Figure 17 for the Moore Hitch illustration.

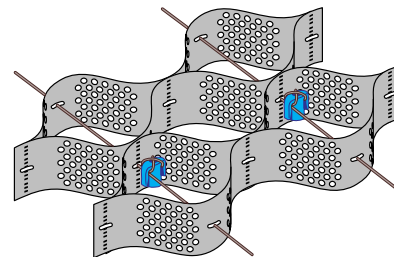


Figure 15 ATRA Load Transfer Restraint Pin

ATRA® Clip Restraint Pin Installation

1. After the tendons are inserted in the collapsed Geoweb section and the section is expanded, determine the cells that are the load transfer points by referring to the engineering details. ATRA Clips are to be inserted in these cell locations.
2. The location on the tendon where the ATRA Clip is to be tied is the point where the tendon intersects the up-slope cell wall as shown in Figure 15.
3. The ATRA Clip can be attached to the tendon either moving down slope or up slope.
 - If moving up slope, secure the tendon at the bottom of the slope to an ATRA Anchor before starting. See Figure 14.
 - If moving down slope, secure the tendon at the top of the slope to an ATRA Anchor illustrated in Figure 14 or deadman anchor illustrated in Figure 17 before starting.
 - In both cases, cut the tendon long enough to allow for all the knots. Leave plenty of extra slack in the tendon for the Moore Hitch to be used for the load transfer.
4. Use the Moore Hitch as illustrated in Figure 18 to secure the tendon to the ATRA Clip. Other knots are not acceptable.

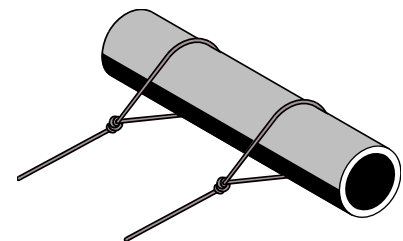


Figure 10 Tendon Secured to Deadman Anchor

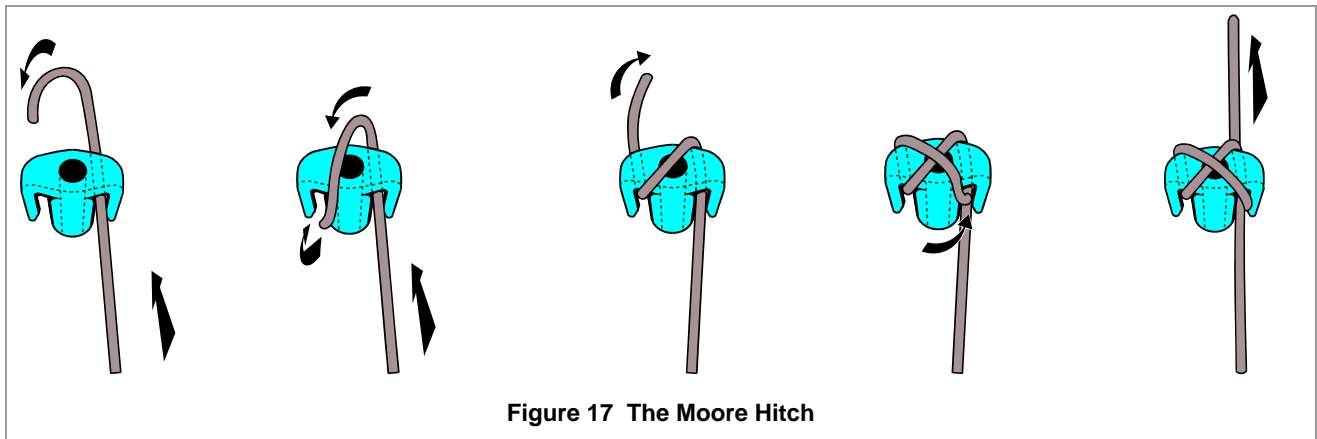


Figure 17 The Moore Hitch

5. Place the arm of the ATRA Clip over the tendon and move the clip up or down on the tendon to ensure contact with the Geoweb cell wall. Once the ATRA Clip is properly positioned, the Moore Hitch should be finished.
6. Move to the next cell along the tendon and repeat the appropriate steps.

Special Construction Technique Using ATRA® Clip Restraint Pins

When slopes are steep or difficult to work on, such as working over a geomembrane, the following procedure is used to avoid working directly on the steep slope.

- After inserting the tendons through the unexpanded Geoweb section, expand the Geoweb section at the top of the slope embankment or other flat area.
- Attach all ATRA Clip Restraint Pins to the tendons using the Moore Hitch in the proper cells to make a pre-assembled section.
- Maintain a sufficient amount of tendon length for the top-of-slope anchoring method.
- Collapse the pre-assembled Geoweb section with the tendons and ATRA Clip Restraint Pins.
- Move the pre-assembled Geoweb section into its position at the top of the slope and secure the up-slope end with the appropriate anchoring system.
- Expand the pre-assembled Geoweb section down the slope and secure the down-slope end with the appropriate anchoring system.
- Prior to the infilling process, visually inspect ATRA Clip Restraint Pins to ensure they have maintained their position on the tendon.

NOTE: ATRA® is a registered trademark of Presto Products Company. The ATRA® Clip is patented.