SmartPile Installation Quick Reference – SP_401

- ☐ Unpack SmartPile system and account for all material and tool requirements. (step 1)
- ☐ Open DataPort cover, and remove battery shipping tab. Replace cover, and cover screw heads with tape. (step 2)
- ☐ Measure and mark beds for gauge placement, and record measurements. Mark positions with tape band. (steps 3-5)
- ☐ Size suspension assemblies and install gauge packs. (steps 6-8)
- ☐ Loosen spiral wrap around gauge locations (if applicable). (step 9)
- ☐ Install and secure gauges within strands at markers. (steps 10-13)
- ☐ Install and attach DataPort Assembly to backside of top gauges (using dielectric grease for electrical connections). (steps 14-15)
- ☐ Install Tip Extension Cable and connect both ends (using dielectric grease for electrical connections). (steps 16-22)
- ☐ Mark sides of casting beds for vibrator keep-out areas and DataPort Assembly final placement. (step 23)
- ☐ Inspect work (see check list), and collect pre-cast State Stamps. (steps 24-25)
- ☐ Apply bonding agent (epoxy) to backside of DataPort just before casting, (FDOT only). (step 26)

Note: The steps referenced above are detailed in the SmartPile Installation and Use Manual. This document serves only as a quick reference, and a complete working knowledge including proper training is required before attempting any SmartPile gauge installation.

SmartPile Installation - Inspection Check List

Gauge Packs

- ☐ Verify Suspension Assembly alignment markings with “2D” distance measurements
- ☐ Verify Suspension Assemblies are secured with 2 nylon ties to hold longitudinal positioning
- ☐ Verify cotter pin heads are centered in pile core (bottom up, and left to right)
- ☐ Verify gauges marked for tip use are in pile tip position
- ☐ Verify accel orange decals face outwards (gauge pack cabling faces inwards and each other)

Cabling (- with connections made using dielectric grease)

- ☐ Verify tip gauges are connected to tip connector on radio (marker connected to org. marker)
- ☐ Verify in-line connectors are tight and properly strain relieved
- ☐ Verify cabling is properly secured and dressed underneath / behind steel (top view)
- ☐ Verify excess tip cable is secure enough that concrete flow during pour doesn’t move it into the pile side cover

DataPort Assembly

- ☐ Verify beds are marked for vibrator keep-out and DataPort Assembly positioning
- ☐ Verify DataPort cable is properly strain relieved for vertical tension during casting
- ☐ Verify exposed screw heads are covered by tape

SmartPile System Installation Manual – SP_401

Preparation for SYSTEM INSTALLATION

Material Required:

- SP_401 Installation Kit (p/n 100600), containing:
  - 106100 Gauge Pack - (2)
  - 104300 DataPort Assembly

- 101104-xx0 Tip Extension Cable, sized by pile length "L" (see note below)
- 101105-xxxx Mechanical Suspension Assembly - (2), sized by pile diameter "D"
- 7" Nylon cable ties (approx. 18 pcs. - 7 pcs. (top) + 5 pcs. (tip) + approx. 6 pcs. excess tip cable)
- 4" Nylon cable ties (approx. 40 pcs.)
- SmartPile DataPort Epoxy Patch Kit (p/n 100611), (FDOT only)

Notes:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC ID: V9CSP-X01D2

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The required minimum length Tip Extension Cable (p/n 101104) is the overall pile length "L" minus twice the pile diameter (2 x "D")

Tools Required:

- #2 Philips screwdriver
- tape measure (6 – 10 foot)
- brightly colored electrical tape
- dielectric grease, Permatex (p/n: 22058)

- pliers (for forming cotter pins)
- box wrench - 7/16“ (for tightening lower legs of suspension assembly)
- diagonal cutters (for cutting nylon tie wraps and removing spiral wrap twists)
- tape sections (for covering screw heads to protect from concrete cover)
- carpenter’s crayon (for marking vibrator keep-out areas on bed side walls)
- SmartPile Workstation with BT adaptor (for pre/post-cast State Stamps)
- SmartPile Diverter Assembly (p/n 100607)
- ~~SmartPile DataPort Cavity Tool (p/n 100612)~~
- shop towels (for drying up any surface moisture prior to epoxy application)
- small concrete trowel (post-cast cover clean up)
- industrial durability rubber gloves (covering wrists)

Additional SmartPile Reference Documents:

- 100602 – SP_401 Product Installation Overview
- 100603 – SP_401 Product Installation Detail - 16" Square Pile
- 100604 – SP_401 Product Installation Detail - 18" Square Pile
- 100605 – SP_401 Product Installation Detail - 24" Square Pile
- 100606 – SP_401 Product Installation Detail - 30" Square Pile
- 100609 – SP_401 Product Installation Detail - 12" - 14" Pile
- 100610 – Vibrator Keep-out - SmartPile Installation
- 100611 – SmartPile DataPort Epoxy Patch Kit (application and use instructions)

System Installation Procedure:

1. Un-pack and verify contents of SmartPile installation kit. Also account for all required product installation tools and materials listed above.

2. Remove DataPort access cover via (6) screws, and remove the orange battery shipping tab. Replace cover and place tape over the 6 exposed screw heads to protect from concrete cover.

3. Define a **reference orientation** – for the purposes of this document, the reference orientation chosen was that of while standing in front of the casting beds: the pile top is to the left, and tip to the right. **If your reference is reversed, please flip all references in the procedure below, (left/right, away/towards, push/pull).**

4. Measure 2 diameters (“2D”, in inches) down **from the top** of the pile on the center-most strand (closest to you **from center** if even number of top strands), and mark with a brightly colored band of electrical tape (mid-point), **(figure 4)**.

Figure 4 – “2D” measurement and strand marking for 18” square pile, top

5. Measure 2 diameters (“2D”, in inches) up **from the tip** of the pile on the strand (the **other side of center** if even number of top strands) selected above, and mark with a brightly colored band of electrical tape (mid-point), **(figure 5)**.

Figure 5 – “2D” measurement and strand marking for 18” square pile, tip

Note: If installing gauges in a strand pattern with an even number of top strands, select the inside strand from center (closest to you) for the top marker, and outside strand from center for the tip marker. If you have an odd number of top strands, select (mark) the center strand for both the top and tip gauge locations.

6. Measure the inside distance from the underside of the top center-most strand to the topside of the bottom center-most strand, **(figure 6)**. This measurement will be vertical (for odd # top strands) or slightly diagonal (for even # top strands) and go through the pile cross-sectional mid-point. This dimension will be further referenced to as **Dim. A**

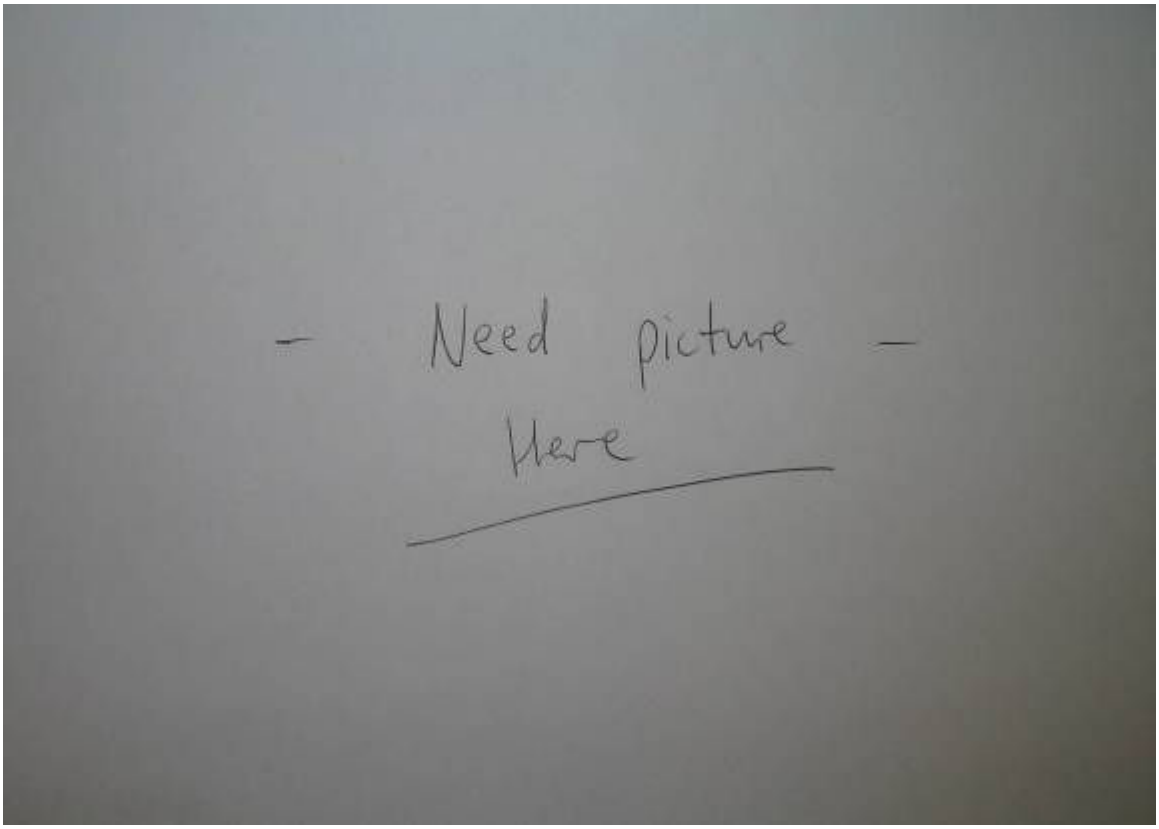

Figure 6 – To Be Added: picture of tape measure in cage making Dim.A measurement

Note: If installing gauges in a strand pattern with an odd number of top strands, the above measurement will be a vertical measurement (underside of top center strand to topside bottom center strand). If the strand pattern has an even number of top strands, this measurement will be from opposing strands either side of center such that the measurement will be –slightly- diagonal and go through the cross-sectional center or mid-point of the pile core.

7. Position the top and tip gauge pack carrier plates (100106) on the rails of appropriately sized (range) suspension assemblies and secure mounting using (2) 7” nylon cable ties each, **(figure 7)**. Trim away excess tie. Next, select the set of locating holes (on the sides of the suspension assembly) that come closest to **half of the Dim. A** obtained above as measured from the tip of the upper “V” wall to the center of the cotter pin hole, and align with the locating holes on the side of the carrier plate, **(figure 7a)**. Insert cotter pins (2 each, from the outside in) and bend in the longer tang.

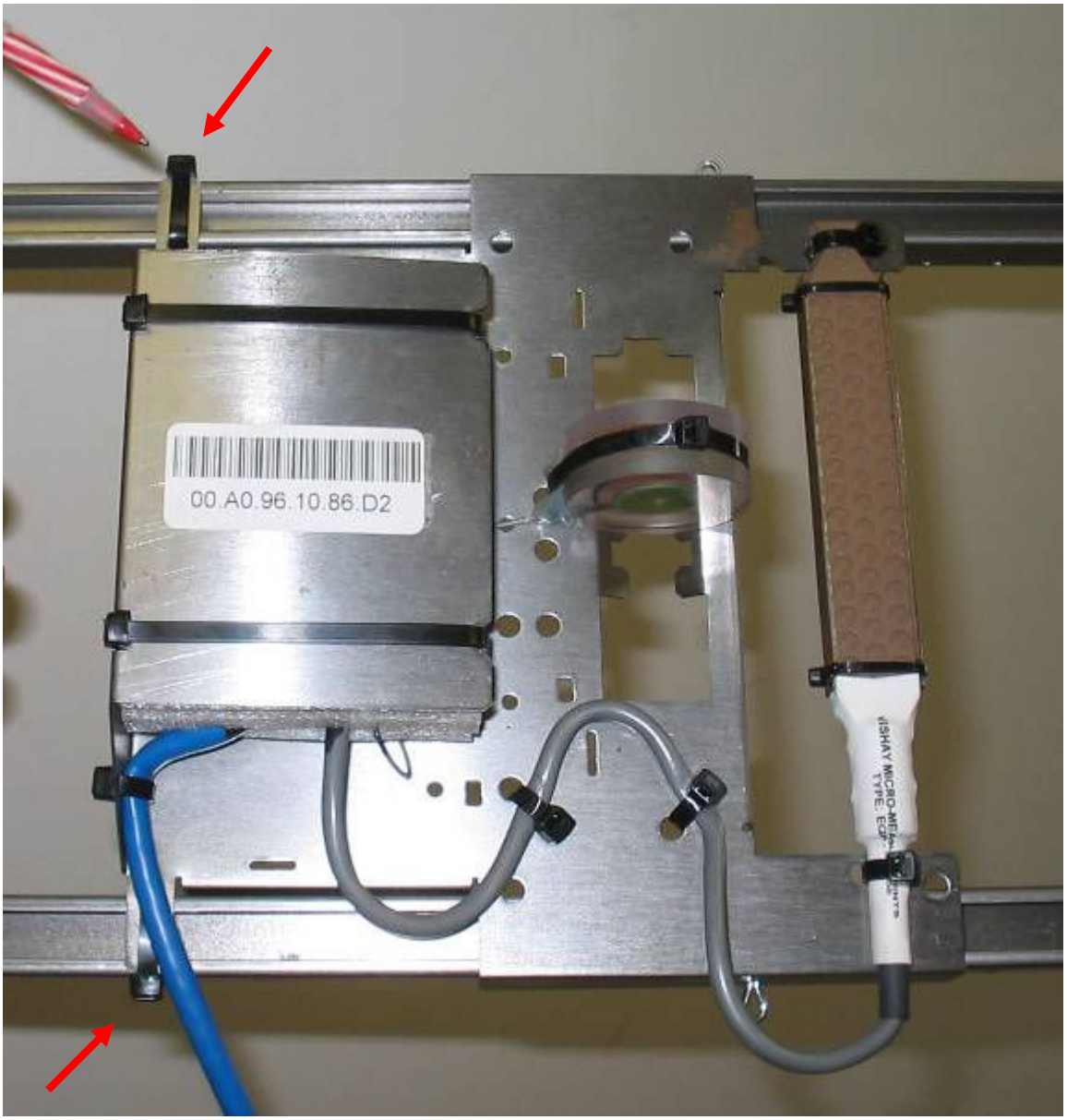

Figure 7 – carrier plate mounted on suspension assembly using (2) - 7” nylon ties

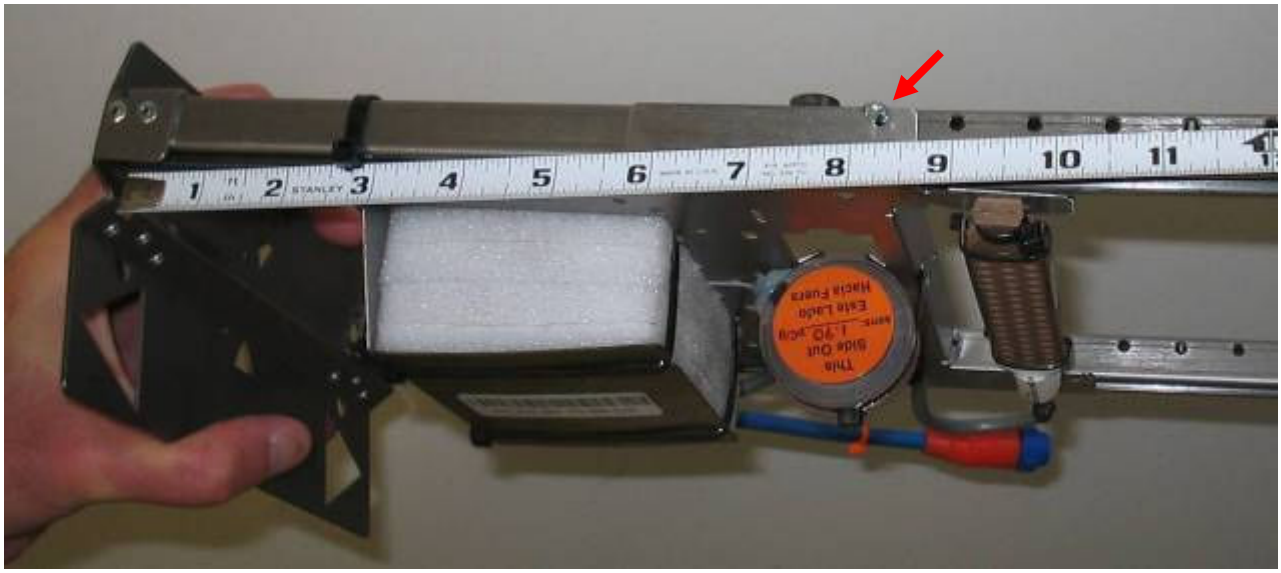

Figure 7a – making “Dim.A/2” cotter pin placement measurement, (~ 8 ¼” for Dim.A = 16 ½”)

8. Adjust the extended length of the two telescoping lower arms of the suspension assembly so that the distance between the inside tips of the upper and lower “V” walls (used to engage the registration strands) equals the **Dim. A** obtained above, **(figure 8)**. Tighten the two hex head bolts on the backside of the upper arms to secure.

Figure 8 – adjusting lower telescoping arm for 16 ½” Dim.A measurement. Note hex head tightening bolts (2) visible around the 14” mark.

9. If applicable – Using diagonal cutters or pliers, remove the wire spiral wrap ties to either side of each of the two upper strand tape markers just enough to allow the integrated suspension assemblies to be inserted into the pile cage. The minimum required spread or opening in the spiral wrap needs to be about 9” wide (with a **2.5” inside strand spacing**) in order to get the integrated suspension assembly (100400) into the pile core.

10. Identify the “Top” suspension assembly by noting that the “Top” assembly **does not have the orange marker** on the interface cable tail. At the top gauge tape marked location, spread the spiral wrap apart enough to feed the suspension assembly into the pile core. Feed the assembly into the pile cage (bottom end first) in between the top marked strand and adjacent strand closest to the top outside corner, **(figure 10)**. Make sure the assembly is oriented so that the calibration barcode is facing up and away from you, and the electronics cabling is to the right.

Figure 10 – spreading the spiral wrap enough to insert the suspension assembly into the pile cage

11. Engage the underside of the lower “V” spring clips of the suspension assembly with the top side of the lower strand the other side of center of the marked upper strand (even upper strands only). Make sure the lower spring clips seat cleanly on the top side of the lower strands by removing any interfering lower spiral wrap wire ties. Pivoting the suspension assembly about the engaged lower spring clip in a direction away from you (pushing), and with the **stamped dot centering markers** of the suspension assembly deflector shield in line with the top strand tape marker mid-point, slide the leading edge of the suspension assembly

deflector shield under the top marked strand and keep pushing until the strand snaps into the “V” groove of the deflector shield, **(figure 11)**. This engagement should be firm and tight. If the fit within the strands feels loose, remove the suspension assembly and provide a slight (**Dim. A**) inside length increase by marking the current position, loosening the (2) hex bolts and slightly extending the lower arms (step 8 above), and repeat the installation step above.

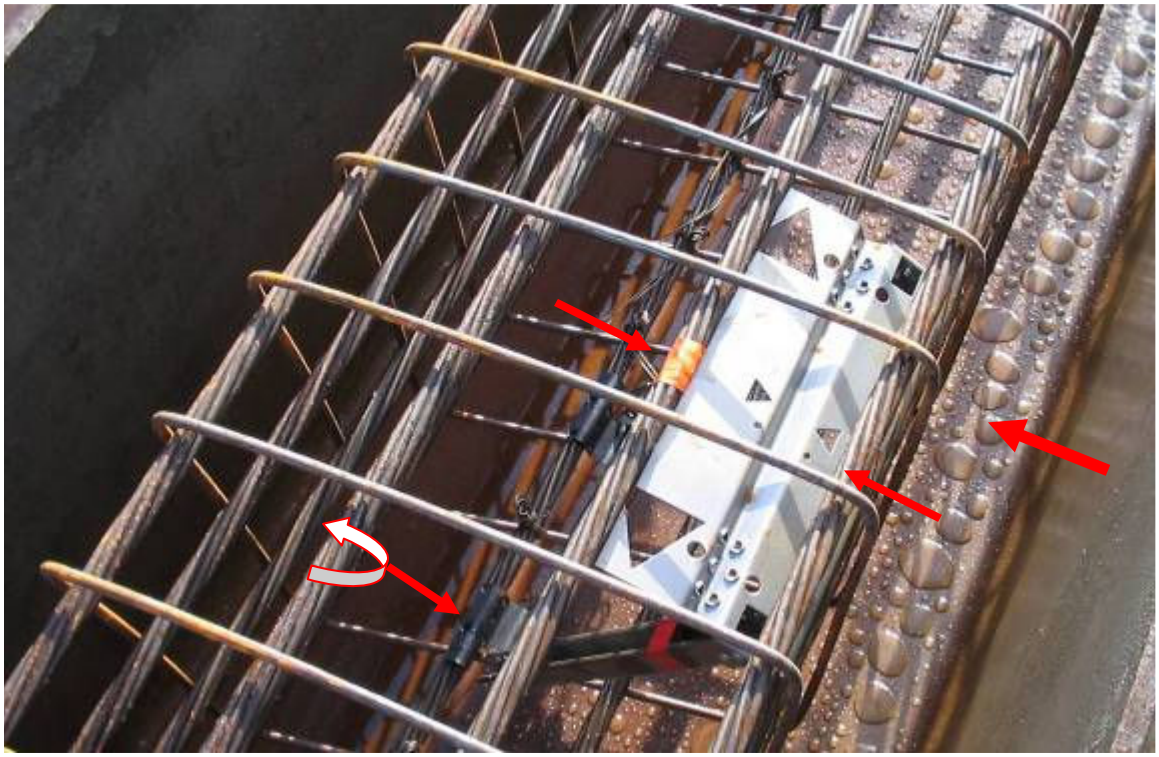

Figure 11 – suspension assembly positioned to engage with upper strand. Note how the assembly pivots about the spring clips on top of the lower strand. Also note the alignment of the dot markers on the deflector shield with the tape band.

12. A final inspection should show the stamped dot centering markers of the deflector shield registered with the mid-point of the top strand tape marker, **(figure 12)**, and the distance from the bottom of the form to the head of the cotter pins (as measured **vertically**) equal to half of the pile D dimension (cotter pin heads should be approximately at the cross-sectional mid-point of the pile). Once these points have been verified, use (2) - 7” nylon tie wraps to secure the top deflector shield against the upper strand using the two outside sets of holes located on either side of the strand gripping feature stamped in the inside wall of the top “V” groove. Enter each tie wrap tip into one of the holes and feed down

and up through the adjacent hole and around the upper strand securing the assembly tightly. Trim away excess tie.

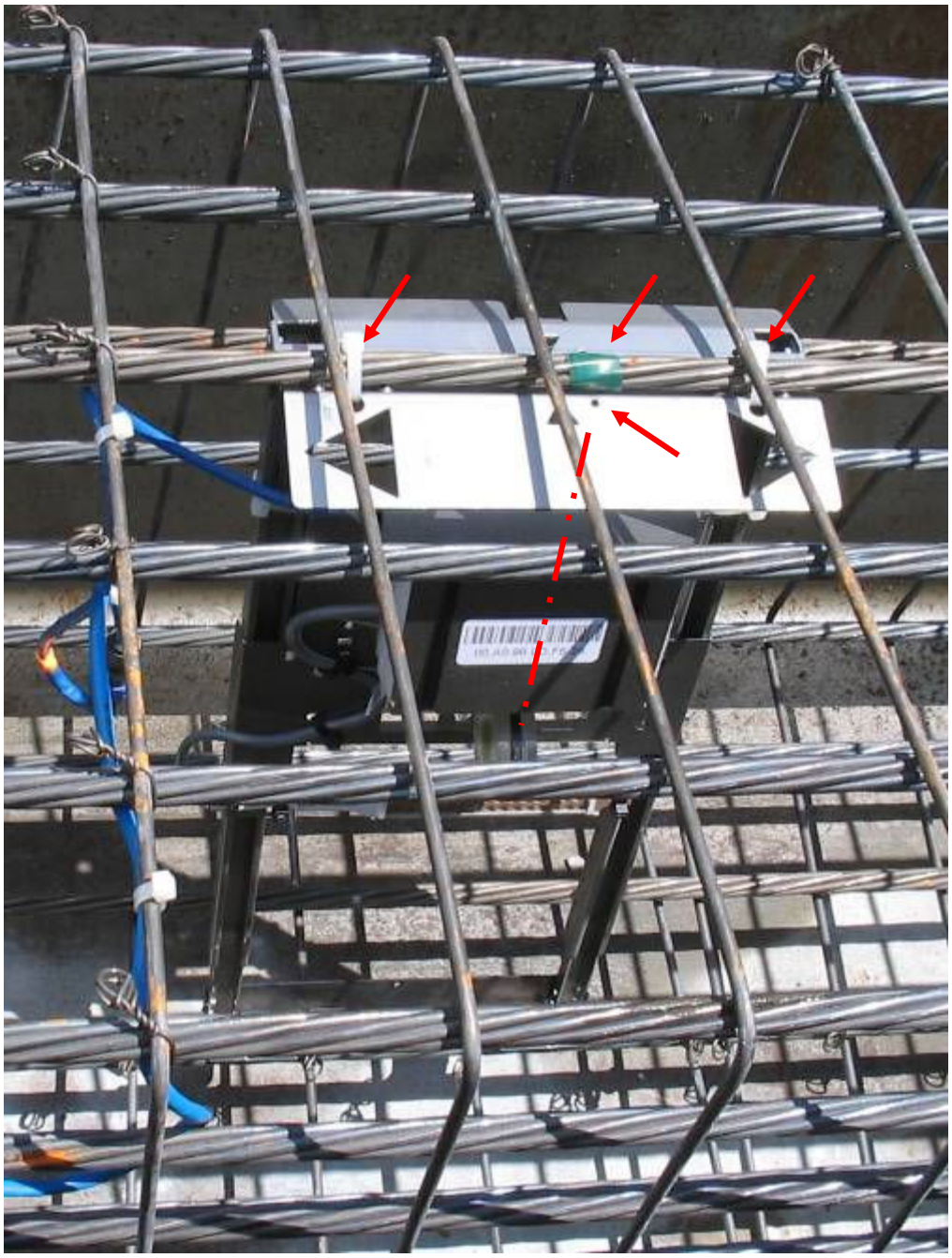

Figure 12 – note gauge pack in pile cage with nylon ties installed, and locating tape band visibly aligned with the two dot hole markers in the diverter shield. The dot markers are mechanically in-line with the center of the accelerometer and strain gauge active area.

13. The remaining integrated suspension assembly should be the “Tip” assembly noted by **the orange marker** on the interface cable tail. Repeat steps 10 – 12 above, but this time **reversing** some of the references. Specifically, the assembly will now be **pulled** under the marked strand **toward** you, with the calibration barcode facing up and **towards** you, and the electronics cabling now to your **left**. When both assemblies have been installed and secured, it is also important to note/inspect the orientation of the orange decal on the face of each accelerometer assembly, **(figures 13, 13a)**. **The orange decal on the face of each accelerometer assembly (both tip and top assemblies) should face outwards towards the closest end of the pile. – THIS SIDE OUT – refers to the orange decals both facing outwards and away from each other.**

Figure 13 – note accelerometer orientation relative to the end of the pile. The red arrow points to the pile end, the same direction as the accelerometer orange decal faces.

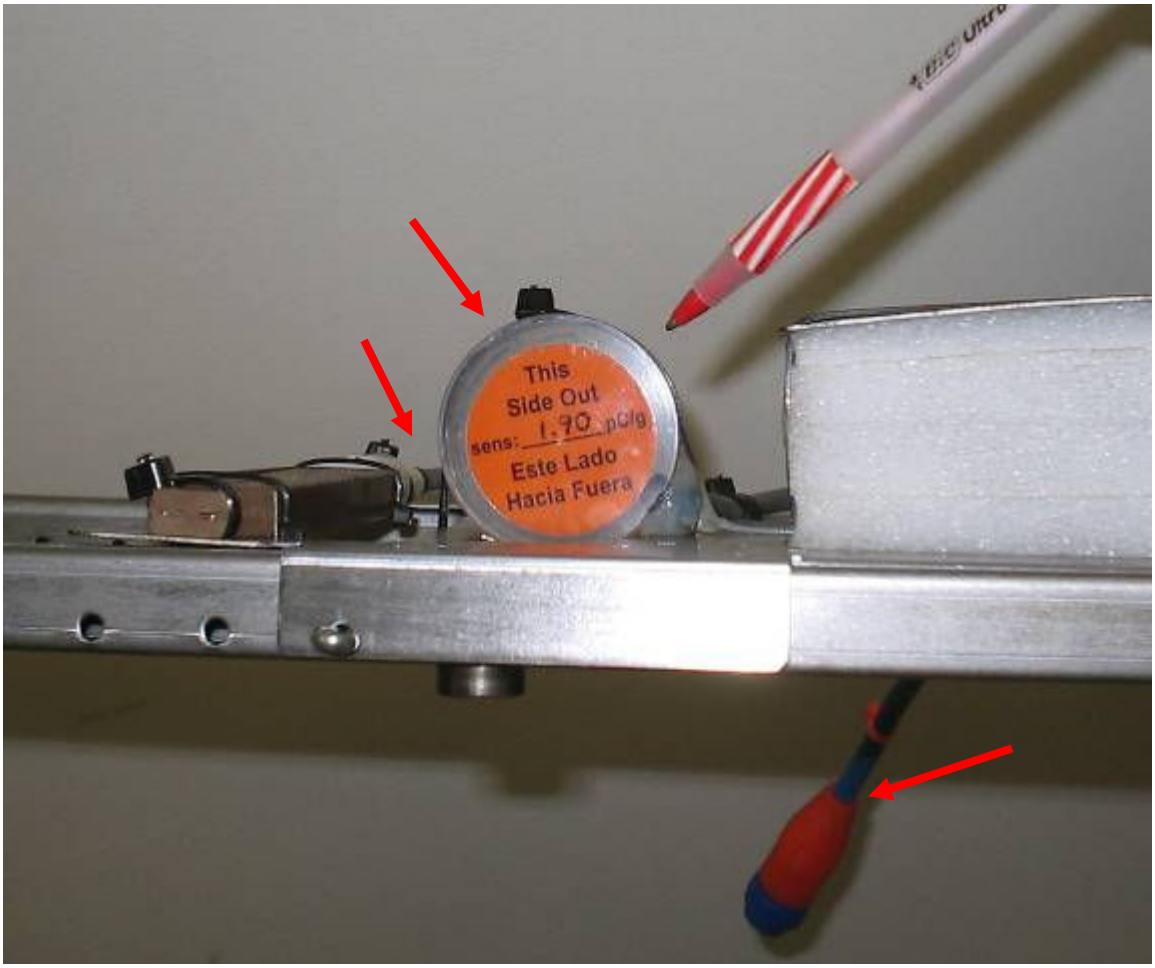

Figure 13a – note orange decal facing opposite the exiting strain gauge and gauge pack interface cabling

14. Lay the DataPort Assembly face-down on the top strands just above the top gauges installed in the pile cage. Feed the radio module assembly into the top center face of the pile cage just below the deflector shield of the suspension assembly, **(figure 14)**. Orient the radio module assembly such that the flat backside of the bracket faces the flat backside of the gauge pack assembly, with both wrap surfaces facing up. Engage the two extended vertical tapered tabs on the backside of the radio module bracket into the two small vertical slots on the backside of the gauge pack assembly, **(figure 14a)**. Pull up on the radio module assembly such that the tapered lead-in of the tabs pulls the two brackets together as the radio module slides up. Pull up on the radio bracket until it stops, at which point the lower horizontal tabs of the radio module bracket should snap into the corresponding slots of the gauge pack assembly. Use (2) - 4” nylon ties to secure the assemblies together using the set of rectangular holes next to each horizontal tab. Use a 7” nylon tie to secure the cable assembly going up to the DataPort

against a section of spiral wrap, providing strain relief, **(figure 14b, 14c)**. Trim away excess tie.

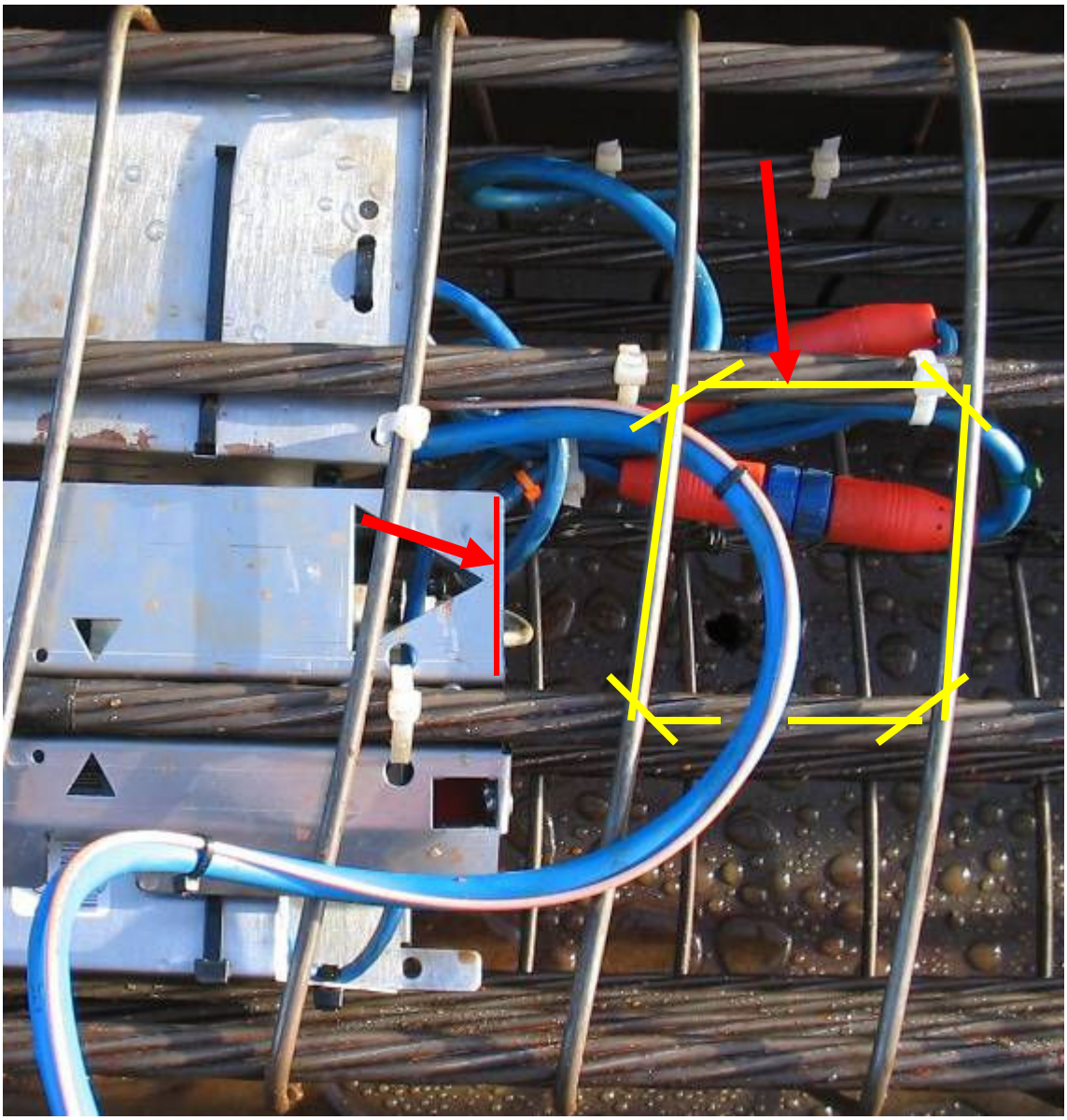

Figure 14 – note the boxed out center section (yellow markings) just below the deflector shield where the radio module assembly is fed into the pile core. Also note how the entry point is bounded by rounded corners on all 4 sides to help protect the cabling during installation.

Figure 14a – view of tapered tab and slot engagement used for radio module bracket mounting and support

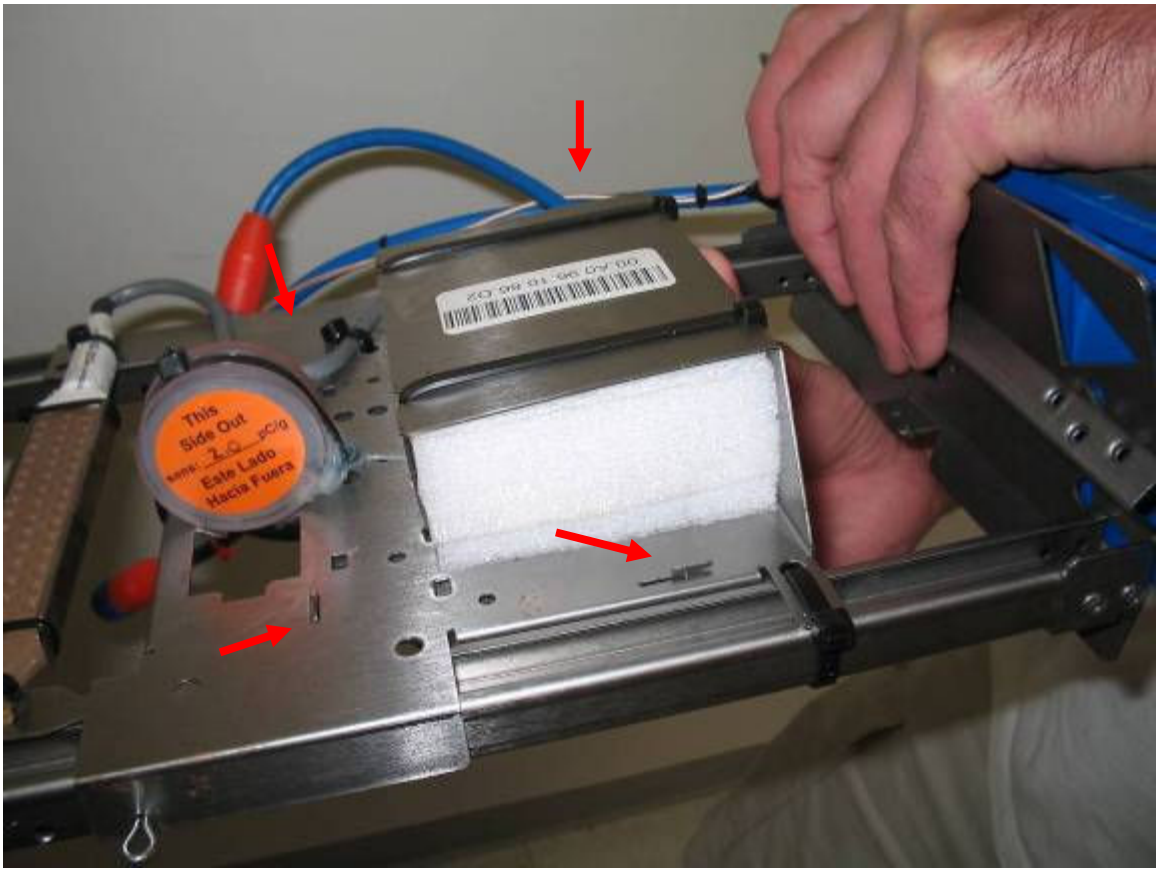

Figure 14b – view of tab and slot engagement of radio module with the back side of the gauge pack carrier plate

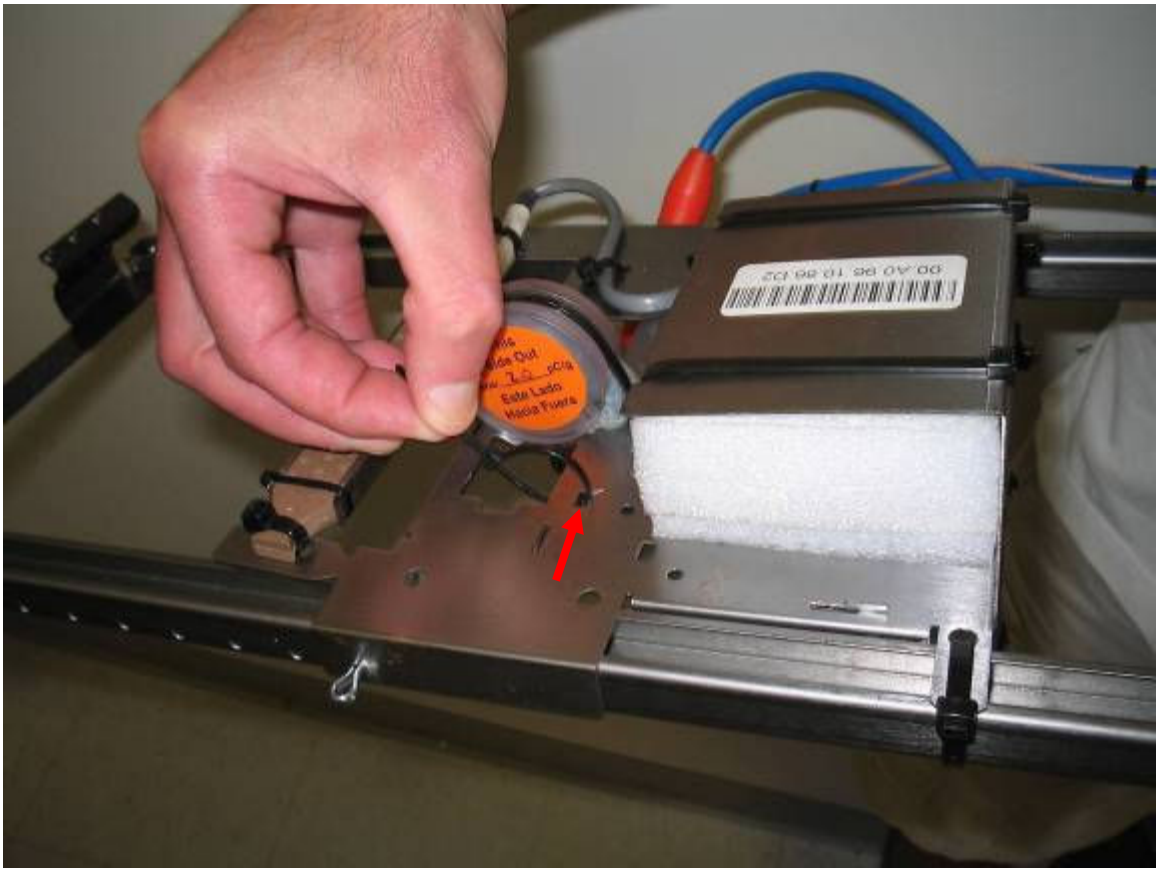

Figure 14c – view of the nylon tie used to secure the mechanical engagement of the radio module with the gauge pack

15. Using a **dab of dielectric grease in the male pin connector cavity**, connect the interface cable tail **without the orange marker** coming out of the radio module assembly to the interface cable tail from the top gauge pack assembly. Make sure the connector is tightened securely, and apply a strain relief using a 7" nylon tie as shown, **(figure 15, 15a)**. Trim away excess tie.

Figure 15 – applying the dielectric grease in the **male pin connector cavity** of the gauge pack interface cable (typ.)

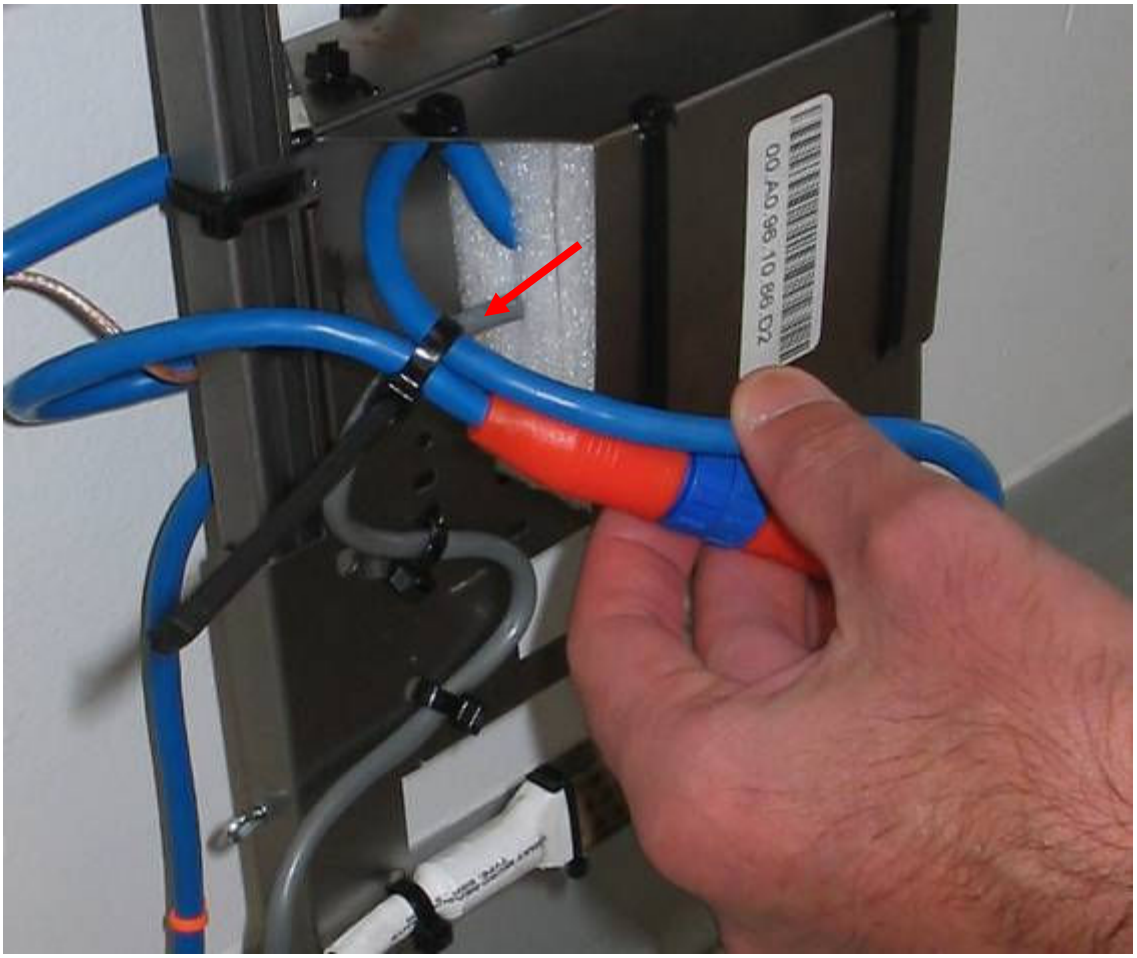

Figure 15a – strain relief for the in-line connectors (top gauges)

16. Pick a point along the pile cage closest to you about 4D feet up from where the tip gauges are located. Taking the tip extension cable (101104-xx0) and leading with the cable end having the **colored length marker**, uncoil and begin feeding the tip extension cable into the pile cage and follow all the way up towards the radio module assembly attached to the backside of the top gauges.

17. Using a **dab of dielectric grease in the male pin connector cavity**, connect the marked end of the tip extension cable to the interface cable tail coming out of the radio module assembly having the orange colored marker, **(figure 17)**. Note that both connected cable ends for the tip gauge have colored markers, **(remember – marked ends connected, and markers apply to tip gauges)**. Make sure the connector is tightened securely, and apply a strain relief using a 7" nylon tie. Add a second 7" nylon tie to secure both in-line connector cables together. Now working backwards towards the tip of the pile, bring the tip extension cable out along the underside of a section of spiral wrap, securing with

a third 7” nylon tie about 3” from your closest outer upper-corner strand. Drop the cable down one strand below this top outside corner strand and add a fourth and final 7” nylon tie. Trim away excess tie. The configuration detailed for the top of the pile is shown in the figures below, **(figure 17a, 17b)**.

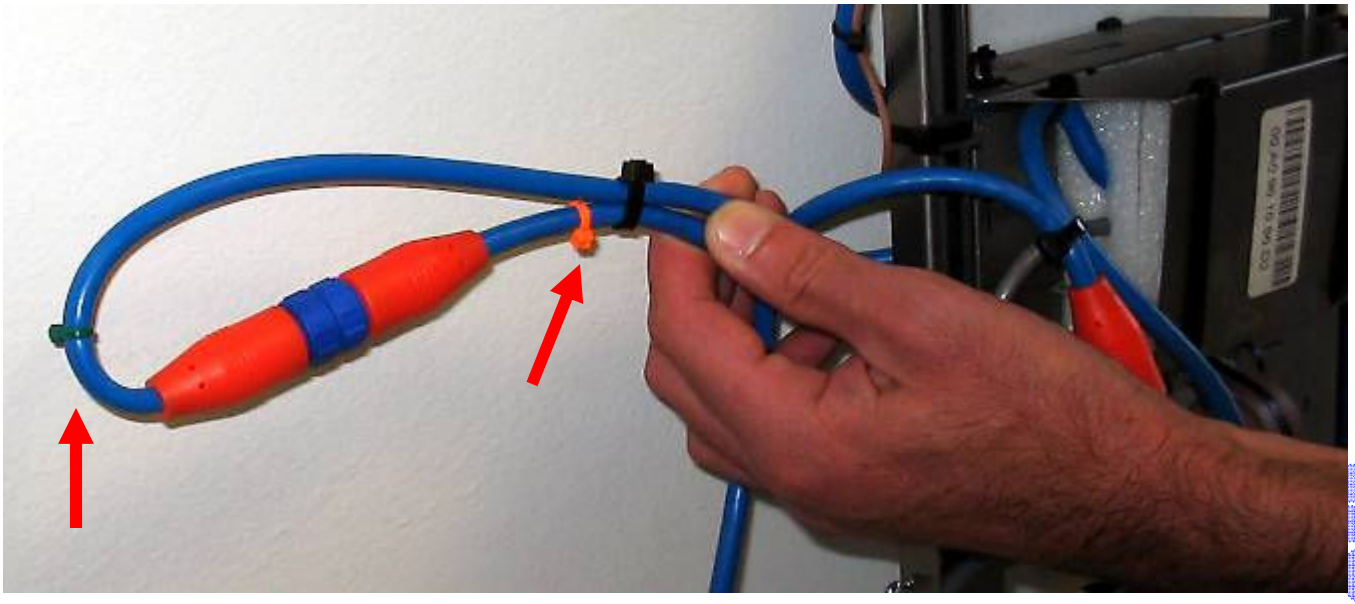

Figure 17 – tip strain relief (marked ends connected, and markers apply to tip gauges)

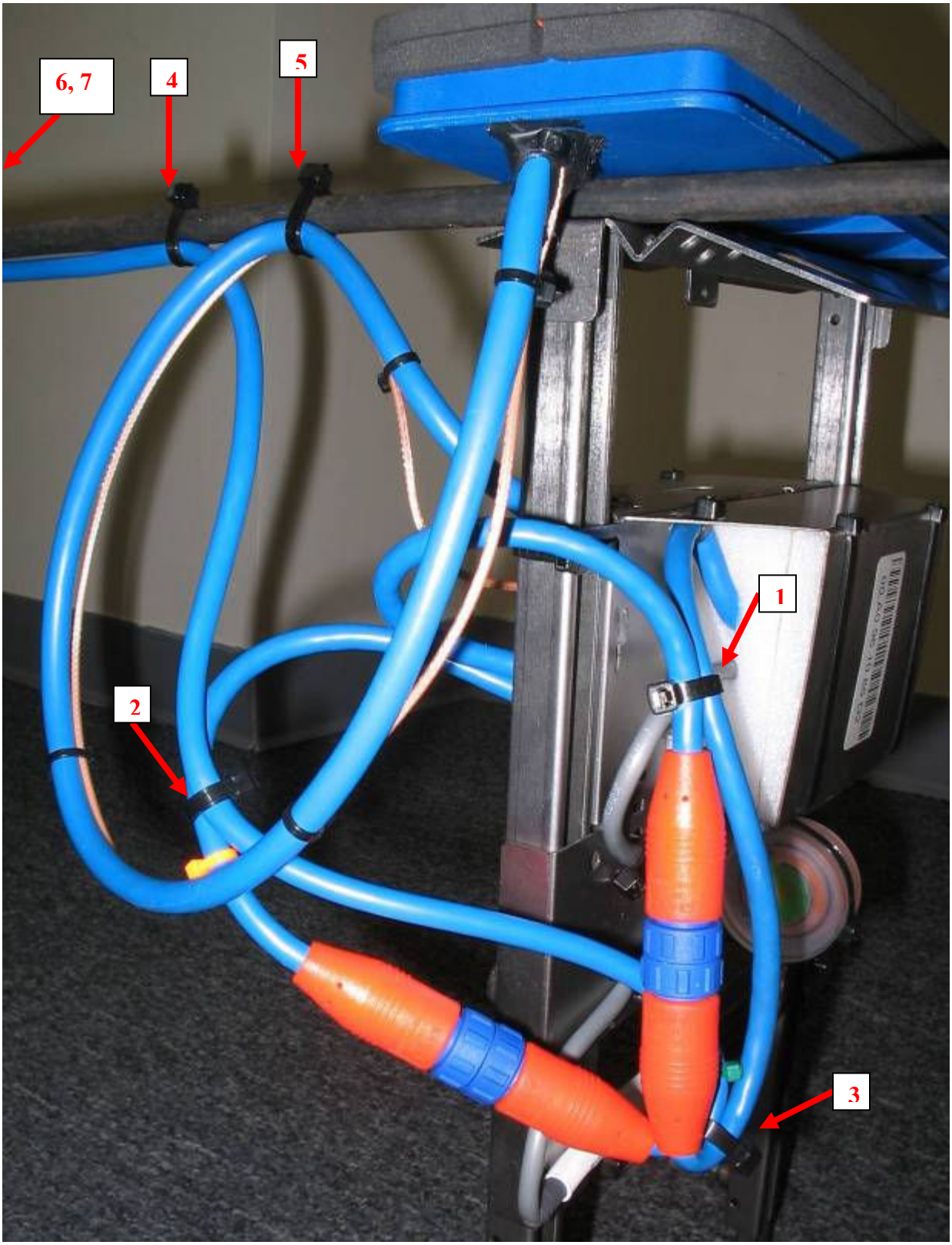

Figure 17a – final pile top cable tie-in details, (7 nylon ties required)

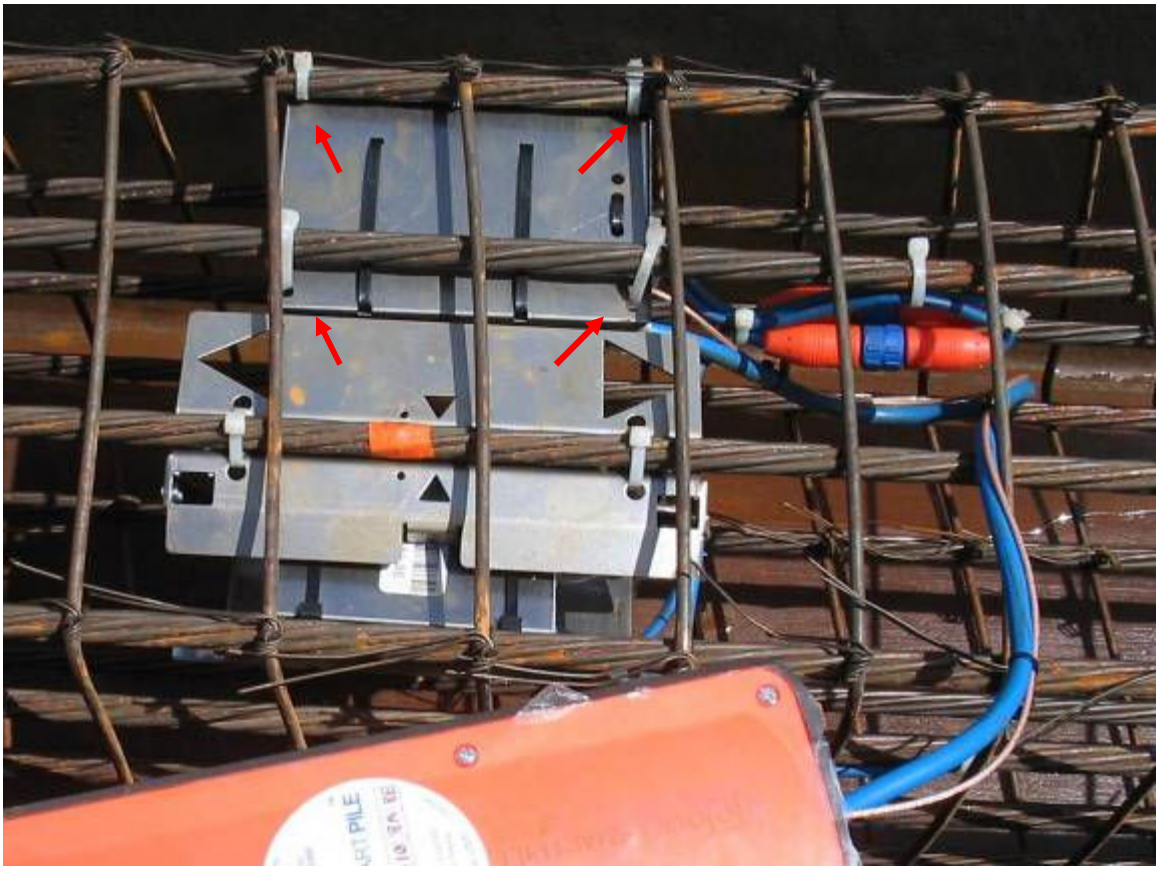

Figure 17b – final pile top cable tie-in (alternate view) for smaller diameter pile. Note the positioning and mounting of the radio module.

18. Begin dressing the remaining tip extension cable to the underside of this lower strand by placing a 4” nylon tie wrap approximately every 6 feet. Make sure the tie wrap is only tight enough to hold the tip extension cable snug to the underside of the strand, and that the wrap only goes around the cable and the strand, and does not include/contain the spiral wrap. Following these important points will help prevent the cable jacket and internal wires from being cut, pinched or damaged by the tie wrap during installation or subsequent concrete flow.

19. Continue working back and dressing the tip cable until you reach the point where the tip extension cable entered the pile cage, (and where the remainder of the tip extension cable exists). At this point, uncoil a section from the other end of the tip extension cable and feed into the pile cage down towards the tip gauge pack assembly as shown below, **(figure 19)**.

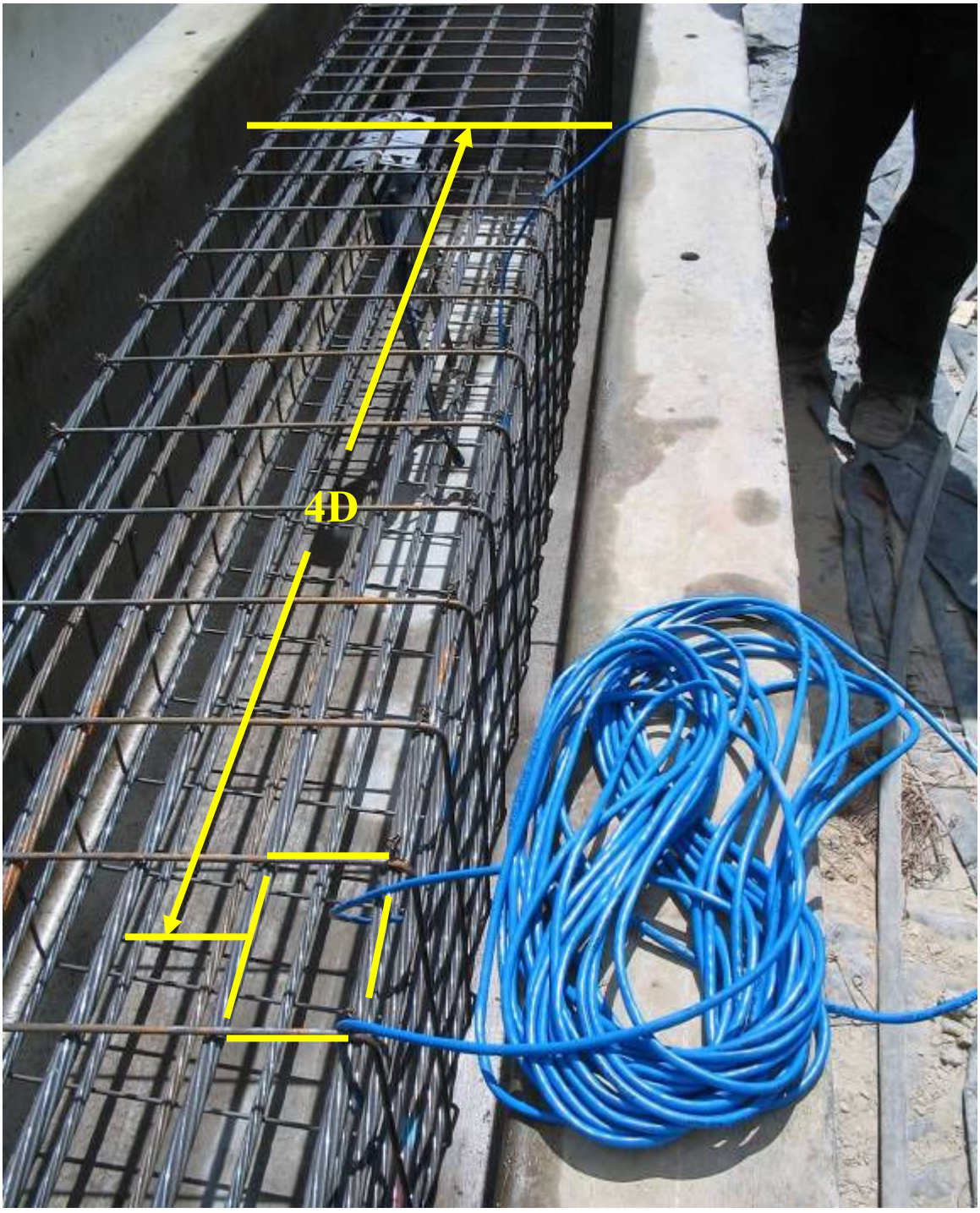

Figure 19 – tip extension cable pile feed point. Note position of cable entry approx. “4D” up from tip gauges

20. Using a **dab of dielectric grease in the male pin connector cavity**, connect the tip extension cable end to the interface cable tail from the tip gauge pack located in the cage. Make sure the connector is tightened securely, and apply a strain relief using a 7" nylon tie as shown below, **(figure 20)**. Add a second 7" nylon tie to secure the tip extension cable to the underside of the closest spiral wrap, and a third as a strain relief for the cable exiting the gauge pack. Trim away excess tie.

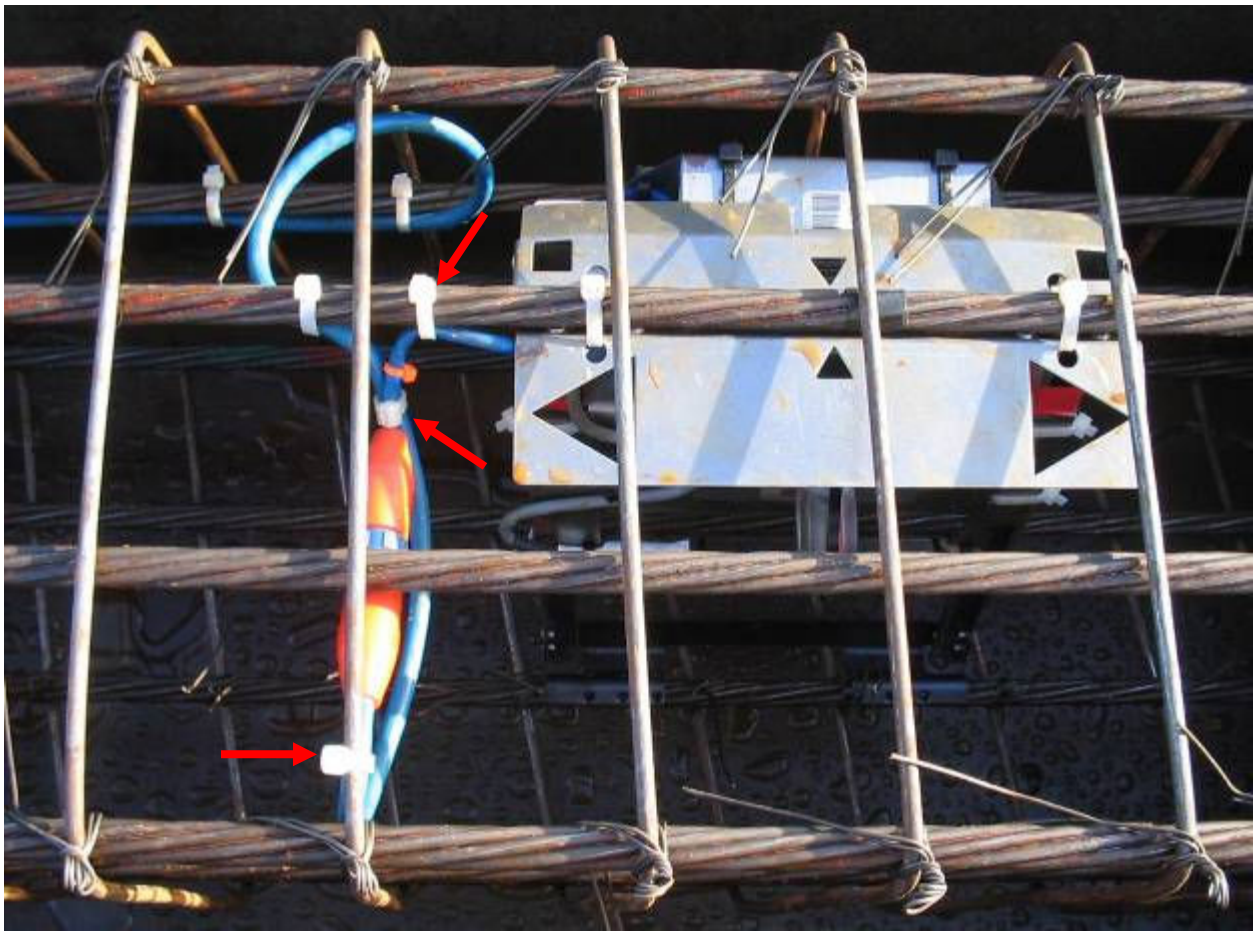

Figure 20 – note final cable dressing (including strain relief's) for tip gauges

21. Now working back towards the excess loop of cable located up the pile, bring the tip extension cable out along the underside of same section of spiral wrap used above, securing with a fourth 7" nylon tie about 3" from your closest outer upper-corner strand. Drop the cable down one strand below this top outside corner strand and add a fifth and final 7" nylon tie support. Trim away excess tie. The configuration detailed for the tip of the pile is shown in the figure below, **(figure 21)**.

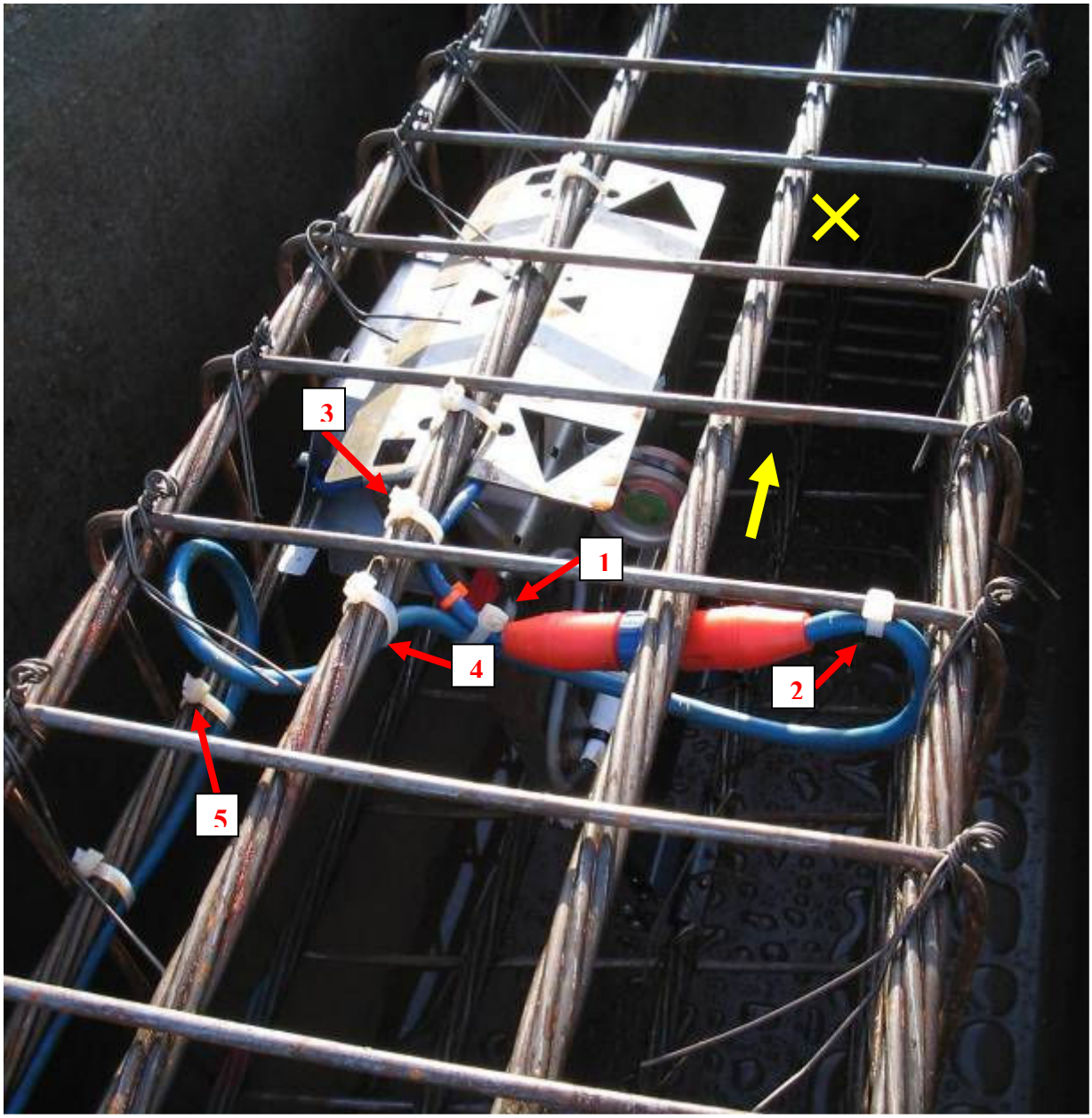

Figure 21 – pile tip cable tie-in details, (5 nylon ties required). Note orientation of the accelerometer (backside visible) relative to the pile end (typ.), and how all cables coming out of gauge pack assemblies (top and tip) face each other in the pile.

22. Continue working back and dressing the remaining tip cable until you reach the point where the tip extension cable enters the pile cage, (and where any remaining slack from the tip extension cable exists). Pull the remaining cable slack out of the pile cage, and neatly bundle the remaining loop of cable in a bow-tie fashion placing a 7” nylon tie in the center, and one more each through the end loops. Finally, return the bundle to the inside of the pile cage and secure to the steel of the upper-inside side wall. Trim away excess tie. Reference below for additional details, **(figures 22, 22a)**.

    Note - It is important to secure this bundle enough such that the concrete flow in the form during casting does not cause any loops of this excess cable to extend into the side wall cover section of the pile.

Figure 22 - remaining tip extension cable slack neatly bundled in a bow-tie fashion with a 7” nylon tie in the center, and one more each through the end loops

Figure 22a - remaining tip extension dressed cable bundle inside the pile cage and secured to the steel of the upper-inside side wall using 7” nylon ties

23. Using a carpenter’s crayon (or other means such as brightly colored magnetic strips), mark the side walls of the casting beds to indicate (box out) where the top and tip gauge packs are located length-wise within the form. These markings will provide after-pour reference for both the concrete vibrator keep-out areas (top and tip), and centering placement of the DataPort access cover of the antenna assembly at the pile top, **(figure 23)**.

Figure 23 – note vibrator “keep-out” crayon markings on side wall of casting beds relative to gauge pack placement within

24. Inspect work using the check list contained at the beginning of the document. A couple of figures shown below for supplemental reference, **(figure 24, 24a, 24b)** -

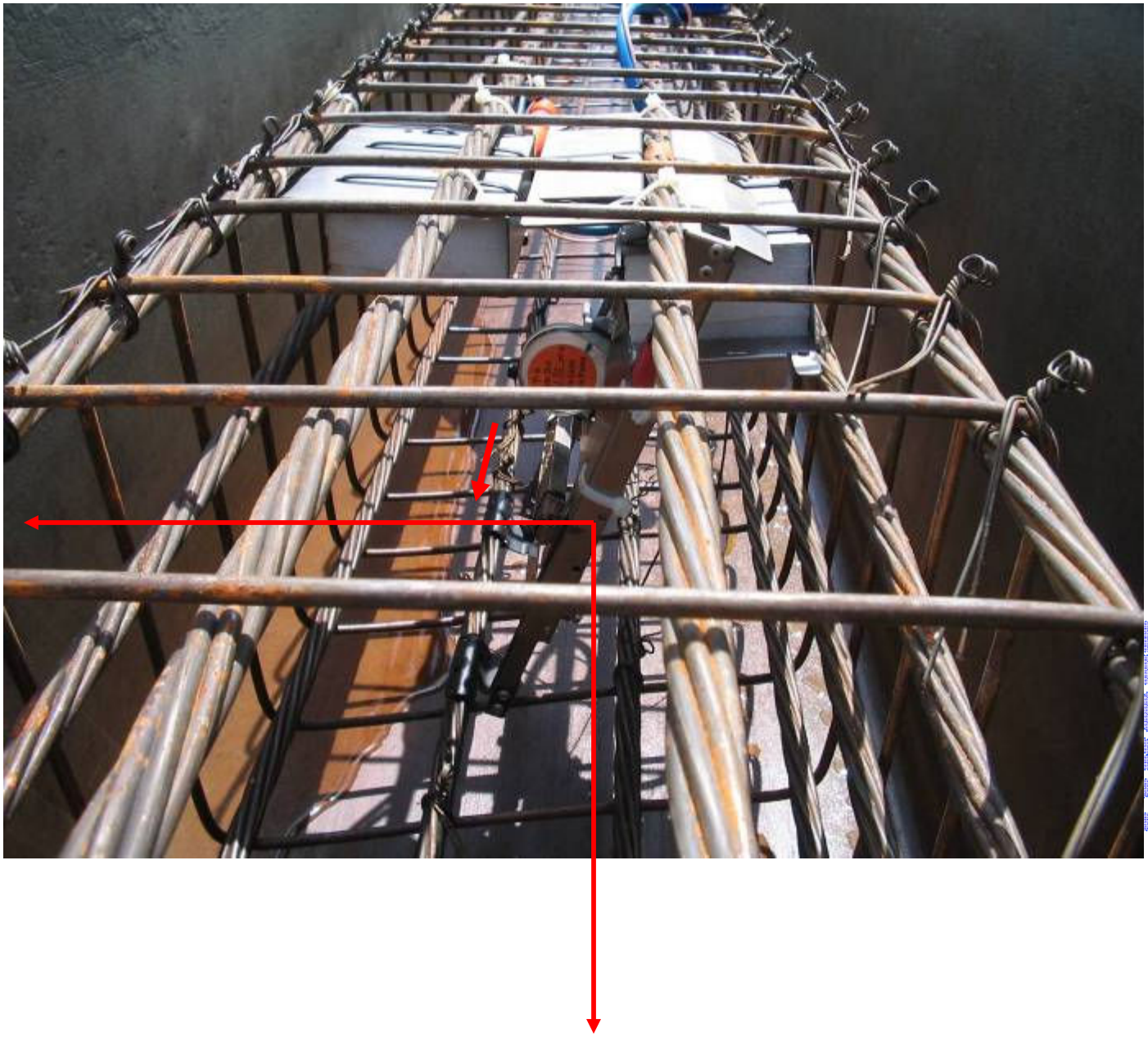

Figure 24 – pile ready for cast (top). Note final components placement, orientation of gauge pack relative to end of pile, and gauge pack centering measurement axis's (in red)

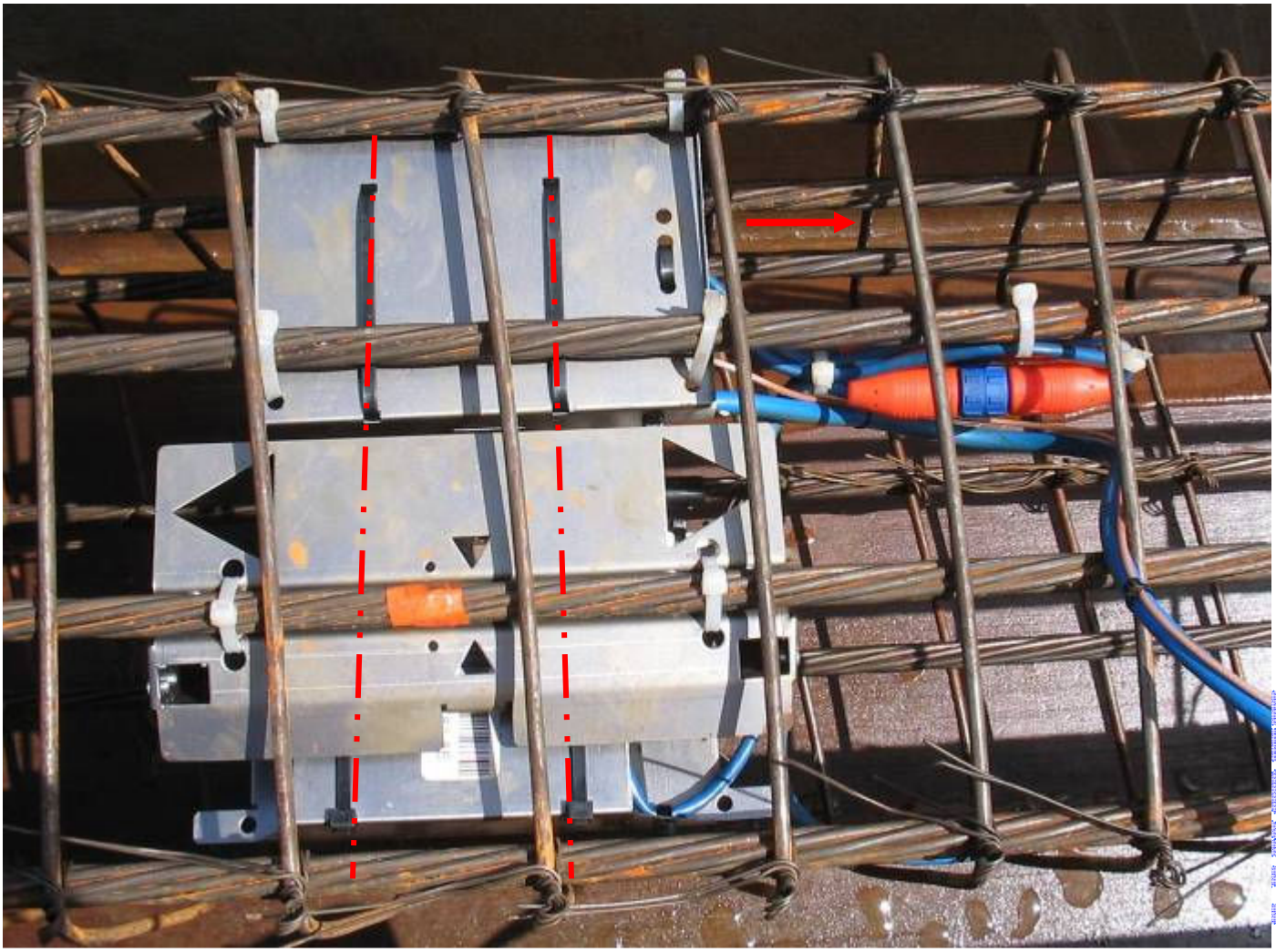

Figure 24a - pile top view (top gauges) using alternate radio module mounting for smaller diameter pile. Note the exiting direction of the cabling and how the radio module is centered relative to the gauge pack using the black nylon tie bands as a reference.

Figure 24b - pile top view (tip gauges) as seen in the direction of concrete flow. Note final cable dressing and that how cables are all behind steel in pile cage as viewed looking down from the top. **Steel cuts the flow of concrete during the pour, not cables.**

25. Collect a pre-cast State Stamp as outlined in the SPW user's manual to verify system functionality and performance.

26. Verify the casting yard will be pouring concrete within the next 2-3 hours (latest) before proceeding with this step. Using the SmartPile DataPort Epoxy Patch Kit (p/n 100611), reference the enclosed DataPort Epoxy Application Procedure for application and use details. Although the figures below are provided for supplemental reference, complete all steps as outlined in the procedure, **(figures 26, 26a)**.

Figure 26 – remove all surface dirt and moisture from the exposed blue areas of the DataPort base enclosure before applying the bonding agent

Figure 26a – apply the prepared epoxy bonding agent to the exposed blue surfaces of the DataPort base enclosure

27. Once the epoxy bonding agent has been applied to the back and sides of the DataPort enclosure (blue areas), place the DataPort enclosure face-down on the casting bed side wall, **(figure 27)**. The bonding agent must still be tacky at the time of installation, or a re-application of fresh bonding agent must occur.

Figure 27 – epoxy bonding agent application complete, and ready for concrete

28. The SmartPile system is now ready for concrete pour within the next 2-3 hours.

~~~~~~
~~~~~~

Preparation for PILE CASTING

Tools Required (sub-set from list above):

- SmartPile Diverter Assembly (p/n 100607)
- ~~SmartPile DataPort Cavity Tool (p/n 100612)~~
- Dwg. 100610 – Vibrator Keep-out - SmartPile Installation **(ref. document)**
- small concrete trowel
- industrial durability rubber gloves (covering wrists)
- SmartPile Workstation with BT adaptor (for post-cast State Stamps)

Pile Casting Procedure:

29. Determine the direction of travel in which concrete for the pilings will be poured. Position the Diverter Assembly (p/n 100607) on top of the strands, centered above the first set of gauges, **(figure 29)**.

Figure 29 – Diverter Assembly positioned over top gauges and ready for concrete

Caution: It is important to note at this point the limitations of vibrator use around the gauge packs in the pile core. Please reference dwg. 100610 for specific vibrator use details. Make sure the pile crew supervisor has been properly informed about the procedure details. Also warn about keeping shovels out of, and being careful with trowels in the areas boxed out on the form sidewalls, specifically watching for and being careful around the DataPort Assembly cable at the top.

30. Starting with the piling end, instruct to have concrete poured in one location in the end section between the gauges and the pile end. Use vibrators if necessary to help get the concrete to flow down the form. Continue pouring in this location until the level of the concrete in the bottom of the form begins to touch the bottom of the accelerometer on the gauge pack. At this point, stop, and move the concrete chute to a center position just above the resting Diverter Assembly. With the diverter centered above the gauges and the concrete chute centered above the diverter, instruct to have the concrete released on top of the diverter (while holding the diverter in position). The concrete flow should be split by the top edge of the diverter such that the flow of concrete will be coming down equally on both sides, **(figure 30, 30a)**. Continue the flow of concrete until the level is even with the top of the form.

Figure 30 – stop at this point and move the concrete chute over top the diverter

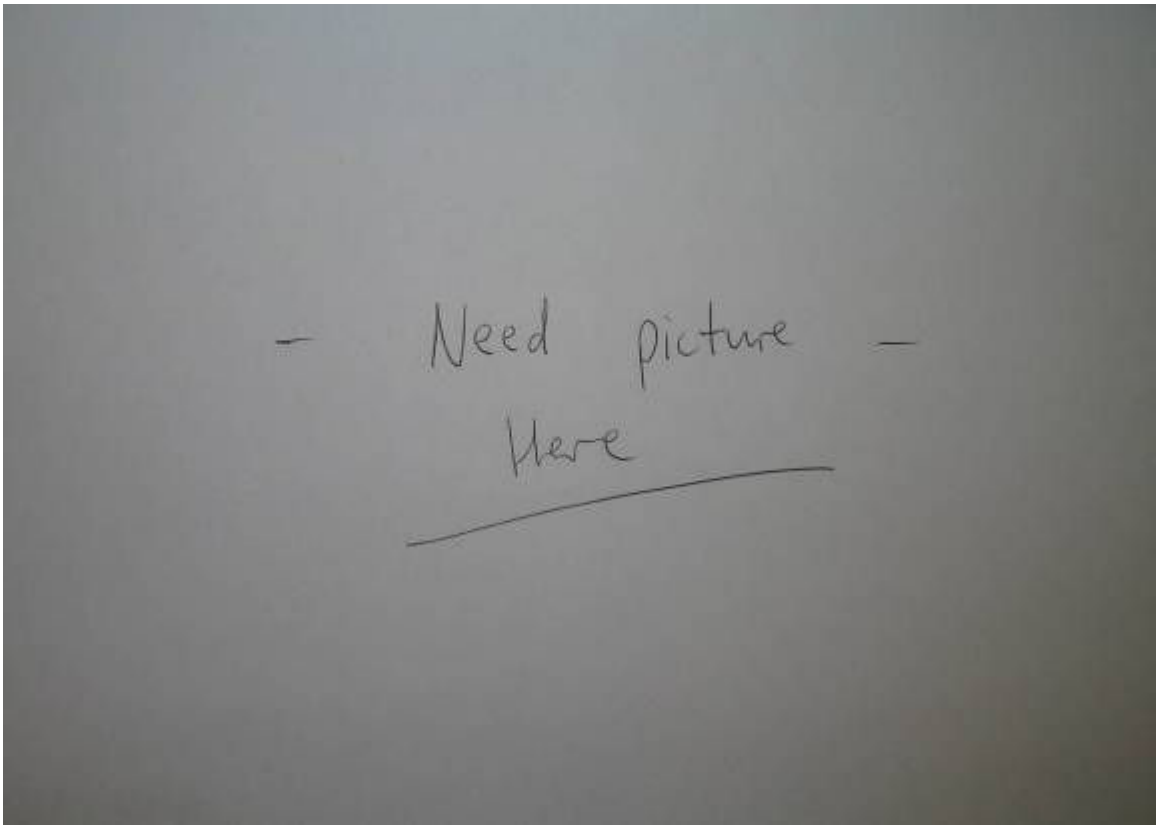

Figure 30a – To Add: Diverter Assembly controlling the flow of concrete from side to side

31. Remove the diverter currently resting on top of the strands (and covering the gauges), and continue pouring concrete on top of the gauges. If this is the pile top, **hold the DataPort cable** coming out of the concrete center face taught and generally vertical while the balance of the concrete is poured in and around this area, **(figure 31, 31a)**. This is important as the weight of the concrete falling into the form and contacting the cable could potentially pull the DataPort enclosure along into the mix.

Figure 31 – holding the DataPort cable up and out of the way of the concrete pour

Figure 31a – concrete pour around top gauges complete, DataPort ready for installation

32. Once having moved past the location boxed-out with crayon markings on the bed side walls denoting the position of the gauges, continue moving down the form and filling with concrete in a normal pile casting manner.

33. While approaching the next boxed-out section on the side of the forms, stop just prior to the markings. As done with the first approach at the other end of the piling, hold the pour position and use vibrators as and if necessary to help the flow of concrete along the bottom of the form. Continue pouring at this location until the level of the concrete in the bottom of the form begins to touch the bottom of the accelerometer on the gauge pack. At this point, stop, position the Diverter Assembly, and center the concrete chute just above the resting diverter. With the diverter centered above the gauges, and the concrete chute centered above the diverter, instruct to have the concrete released on top of the diverter as before (while holding the diverter in position). The concrete flow should be split by the top edge of the diverter such that the flow of concrete will be coming down equally on both sides. Continue the flow of concrete until the level is even with the top of the form.

34. Remove the diverter currently resting on top of the strands (and covering the gauges), and continue pouring concrete on top of the gauges. If this is the pile top, hold the DataPort cable coming out of the concrete center face taught and generally vertical while the balance of the concrete is poured in and around this area.

35. Once this second boxed-out area has been filled with concrete, move past and complete filling the remaining end section of the pile. It is important to note when pouring concrete around the gauge packs, that once the gauge packs are sufficiently submerged in concrete, it is safe to pour any remaining and required concrete directly on top without the use of the pour diverter.

36. While the concrete pour has been moving down the form, the finishing crew has been following up from behind. Leading the team will be the vibrators. At the pile top position, **allow the vibrators and rough trowel to move past this point before attempting to place the DataPort in the face of the pile.** Continue to hold the DataPort cable going into the concrete up and out of the way of the pile crew until they pass.

37. Locate the markings on the sides of the form boxing out the position of the top gauges buried below. ~~Using the DataPort Cavity Tool (p/n 100612), make a ¾" deep longitudinal impression in the face of the wet concrete~~ **centered within the markings on, and the sidewalls of the bed**. Use one hand, and in a vertical up and down stitching motion, feed/push the DataPort cable slack from the DataPort enclosure directly into the pile core while lowering the DataPort in your other hand towards ~~the impression in~~ the wet concrete, **(figure 37)**. The cable exit point from the DataPort should be **away from the top end of the pile**. The DataPort should be placed ~~in the impression~~ using one motion to minimize any

agitation between the wet concrete and epoxy bonding agent coating. Once placed in the face of the concrete, a quick and small side to side rotational motion ("wiggle") will ensure complete concrete coverage around the DataPort enclosure, **(figure 37a, 37b)**. An appropriately sized small weight may be required to hold the DataPort at the proper depth in the face of the wet concrete if the DataPort tends to float up.

Figure 37 – using an up and down "stitching" motion to feed the DataPort cable into the pile core while moving the DataPort enclosure towards the wet concrete

Figure 37a – once the DataPort enclosure is in the face of the concrete, a slight "wiggle" will help to seat the enclosure by providing a good uniform concrete coverage around the unit

Figure 37b – DataPort enclosure center positioned, seated and awaiting trowel finishing

38. After the DataPort has been final positioned, the area around can be finish troweled by the pile crew. After the finishing crew has passed, use the small concrete trowel to come back around to inspect and remove any wet concrete flashing present on the side and face of the DataPort cover, **(figure 38)**. A little bit of cleanup work now will make the pile activation process a lot easier in that a hammer and chisel will not be required to remove flashing in order to remove the cover.

Figure 38 – SmartPile installation complete, and awaiting final State-Stamp……

39. Collect a post-cast State Stamp as outlined in the SPW user's manual to again verify system functionality and performance. This step is used as another quality control measure to help determine if the system survived the casting process. The SmartPile System installation process is now complete. Please reference the SmartPile Workstation user's manual for pile activation, and for additional application software use information.

~~~~~~
~~~~~~

THE FOLLOWING PROCEDURE NEEDS TO BE INCORPORATED INTO THE SMARTPILE WORKSTATION USERS GUIDE……..

System Activation in Preparation for PILE DRIVING and DATA ACQUISITION

Material Required:

- Fresh SmartPile Battery Pack (p/n 101302)

Tools Required:

- #2 Philips screwdriver
- flat blade screwdriver (to help pry DataPort access cover)
- small sponge and some paper towels (to dry out radio compartment in case of any post-casting water ingress)
- SmartPile Workstation with antenna stand

System Activation Procedure:

1. Remove the (6) screws securing the DataPort cover by first removing the tape covering them.

2. Remove the DataPort cover by getting into the foam surround gasket area between the lid and concrete using a flat blade screwdriver, and gently prying up.

3. Once the cover has been removed, peel away and discard the gasket material around the outside perimeter.

4. Dry up any moisture found on the inside surfaces of the DataPort enclosure using the small sponge or paper towels.

5. Using your finger tip in the cavity area near the circuit board battery connector, pull up on the battery pack to remove the old battery.

6. Properly discard of the old battery pack, and replace with a fresh one. Care should be taken during battery pack installation to insure that the exposed ends of the battery pack make contact with the spring clips in the enclosure in one quick and continuous motion. It's best to bring the battery pack in from the side and compress the spring clips until the battery drops down into the cavity all in one continuous motion.

7. Once the new battery pack has been snapped into place, it is important to note the red and green LED's blinking in an alternating pattern signifying proper system initialization. If no LED activity is detected, please remove the battery and allow one minute before repeating step 6 above.

8. Only after proper system initialization has been verified using LED activity as an indicator, should the cover be replaced. Make sure there are not any physical obstructions between the underside of the outer lip on the lid and the foam seal around the base enclosure, as well as the lid seal gasket contact area with the base enclosure top rim. In order to provide a proper water tight seal, make sure the cover is tightly secured using the (6) screws.

9. Set up a session using SPW, and connect to the system. Capture a couple of baseline blows using a free-running trigger, and properly disconnect from the system. The accelerometers should be centered at 0 g's, and the strain gauges should be reporting a static pre-stress level of between 200 – 400 ustrains compression. Once the proper levels have been confirmed, the system is ready for pile driving.