

## **Alternative Method for Mounting Tidbit Temperature Sensors**

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### **Required Equipment for Mounting**

Submersible Battery Operated Hammer Drill-Nemo Brand Model HD-18-3Li-50 with 6-amp hour battery. Cost: \$1,200.

***New option available, however untested by us*** is the underwater battery operated **Nemo Brand Impact Driver**, which may work with conventional impact concrete bits instead of the diamond bits. Cost: \$3,000.

Montana Brand or equivalent diamond tile drill bit (3/8 inch or 9.5 mm diameter). Cost: \$19.00/each

Hillman Brand strike anchor bolts 3/8 inch diameter by 2-3/8 inch length with 9/16 inch diameter nut. Cost: \$3.50/each

Standard hammer. Cost: \$4.00

Standard 3/8 inch socket drive. Cost: \$20.00

Standard 9/16 inch 6 sided deep socket. Cost: \$6.00

Two pairs of Stanley 84-024 or equivalent channel lock pliers. Cost: \$9.50 each

Standard 6-inch diagonal cutting dikes/pliers. Cost: \$8.00

Schedule 40 PVC threaded 1 ½-inch diameter MPT plug and schedule 40 PVC threaded 1 ½-inch diameter cap. Cost: \$1.25 each piece

Teflon tape. Cost: .50 cents per roll

3/8 inch diameter hole metal washers for using as spacers on the anchor bolts. Cost: .10 cents each

Onset HOBO Tidbit v2 water temperature outdoor data logger. Cost: \$133.00 each

Cable/zip ties- 8 inch long by 3/8 inch wide. Cost: .26 cents each

Metal hacksaw and blade. Cost: \$10.00

Bench top vice. Cost: \$30.00

Dive mask, snorkel and if cold water then wetsuit, hood, and neoprene gloves

## Step-by-Step Process to Mount Tidbits Using Anchor Bolts

1. Pull the center pin from the strike anchor bolt using a bench vice and a pair of pliers (picture #1).
2. Use a metal hacksaw and metal blade to cut the anchor bolt down to 2 inches in length. Cut the threaded end not expansion end (picture #2).
3. Use a metal hacksaw and blade to cut down the center pin of the anchor bolt. Cut the head end of the pin not the pointed end. Cut the pin down to 2 1/8 inches in length (picture #3). Picture #4 shows the diamond drill bit used and the finished cut down anchor bolt compared to the original uncut anchor bolt.
4. Use a 5/16 inch diameter drill bit and drill 6 holes in the PVC solar shield cap as shown in picture #5.
5. Use a 7/16 inch diameter drill bit and drill one hole in the center of the PVC base plug as seen in picture #6.
6. Take the Nemo underwater drill with the 3/8 inch diameter diamond drill bit mounted in the chuck and drill a 1 3/8 inch deep hole in the rock (picture 7).
7. Take the cut down anchor bolt, pin and nut and gently pound the anchor bolt into the hole until it bottoms out and then hammer the center pin in flat to the top of the bolt (pictures #8 and #9).
8. Wrap Teflon tape around the PVC threaded base (picture # 10).

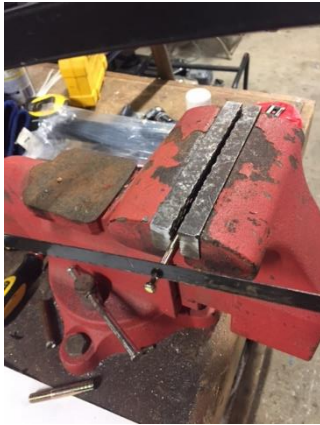
9. Take the nut off the anchor bolt, mount the PVC base, and then reinstall the nut (Picture # 11).
10. Use the standard 3/8 inch drive socket and 9/16 inch 6 sided deep socket to gently tighten the nut onto to anchor pin (picture #12). Picture # 13 shows the correctly installed PVC base.
11. Put the Tidbit sensor unit in the PVC cap with the LED lights facing out and then use the zip tie to run through the top hole then the sensor and back through the hole directly below that top hole (picture #14).
12. Thread the PVC cap with the sensor in it onto the mounted threaded base (picture #15).
13. Use the two pairs of channel lock pliers to gently tighten the cap onto the mounted base (picture #16).
14. Picture # 17 shows snorkeler drilling hole on a warm summer day.
15. Picture # 18 shows snorkeler bolting the PVC base to the rock using the socket drive and socket.
16. Recommend that you practice the process a few times on an above water rock to get hang of it. You will need some water to keep the drill bit and hole wet while you drill.



Picture #1



Picture #2



Picture #3



Picture #4



Picture #5



Picture #6



Picture #7



Picture #8



Picture # 9



Picture # 10



Picture # 11



Picture # 12





Picture # 13



Picture # 14



Picture # 15



Picture # 16



Picture # 17



Picture # 18