Bottom Grab

Procedure Number: SOP # 3.2.3.6 (F4)
Created: August 26, 2011
Created by: Chris Paternostro
Approved by: Mike O'Hargan Date: September 7, 2011

1. **Title**: **Ponar or Van Veen Bottom Grab Procedure**

2. **Purpose**: To provide guidance on actions required to initialize, deploy, and retrieve bottom substrate using a Van Veen or Ponar (hinged jaw type) bottom grab sampler. This SOP assures the proper usage of the bottom grab sampler.

3. **Background/History**: The grab sampler is cast at every station during reconnaissance to determine the bottom type bottom mounted current meters will be resting upon. The type of bottom can also give clues as to the typical water velocity, i.e., harder, more rocky bottoms are more common in higher velocity waters; whereas softer bottom types (clays and mud) are more common in slower environments where the small particles can settle out of the water column. Sand is an intermediary grain size. (see: http://en.wikipedia.org/wiki/Hjulstr%C3%B6m_curve)

4. **Scope/Applicability**: This SOP is applicable for field parties who take bottom grab casts during field operations**.**

5. **Main Processes:** Upon a steady ship, 1) set the spring loaded pin of the grab sampler with the jaws open, 2) keep tension on the pin by keeping it lifted with the rope, then 3) cast the sampler overboard, upright, and allow it to free fall through the water column. Once on the bottom give it a slight tug, then 4) slowly bring the sampler to the surface. 5) Pull the sampler onboard and 6) open the jaws over a clear area to view the bottom sample taken. 7) Take a picture of the sample and note the contents.

6. **Detailed Processes**:

    1. Determine the station location for the cast.
    2. The ship should try to be as close to zero velocity over ground. In high speed water velocities, the captain should try to lead the sample by going up-current of the station, and then allow the ship to drift over the station.

    Prepare the sampler:

    3. Tie a bowline knot with a rope to the top shackle of the bottom sampler. The length of this rope should be at least 2 times the depth of the station depth.
    4. Tie the other end of the rope to a secure point on the ship, e.g., a ship cleat or a float.

5. Make sure the two mesh screens (if equipped) with the rubber flaps are securely in place over each jaw.
6. Open the jaws of the sampler to the maximum hinged.
7. Place the spring loaded pin in the hole through the 2 arms so the jaws remain open as it is cast downwards. The bottom sampler is now armed. Use extreme caution when handling, as the jaws may close with force, if the spring loaded pin is ejected.
8. From now until deployment, keep upward tension on the arms or else the pin will spring out and the jaws will be able to close.

Deployment:

9. Hold the rope above the sampler overboard such that the sampler is just under the water. The sampler hitting the water may cause the pin to spring out and close the sampler. Rest the pin and jaws if necessary.
10. Let go of the sampler and rope and allow it to free fall through the water column. Some guidance of the rope may be necessary. Use gloves to protect hands from the rope.
11. A free fall of the sampler straight down through the water column will obtain the best sample. Water movement and ship movement may make that difficult. The most important thing is that the sampler hits the bottom square (straight up). Drift of the sampler will not endanger a quality sample. If the sampler lists to a side, then the jaws will unlock when one side strikes the bottom causing them to close before it is fully mounted on the substrate.
12. When the rope has gone slack, the sampler is on the bottom. Give a slight tug of the rope, then relax, then start gradually pulling the rope onto the ship. Don't pull too fast as this may wash out the sample. A winch should be used if available to pull up the line, especially from deep casts.
13. Once the sampler is just below the surface, slow the pull dramatically and start watching the waters around the jaws. Note any sediment that is escaping the jaws. The finer grains such as mud and silt may escape during the assent and when the sampler is pulled from the water.
14. Pull the closed sampler on board the ship by using the rope or the top of the arms. Pulling up on the arms near the jaws will add outward force to the jaws and may open them.
15. Place it in a clear area, either a bare part of the deck of the ship or, preferably, a white cutting board or tub.
16. Slowly open the jaws to release the substrate sample. Take care not to wash the sample away with the water contained in the sampler.
17. Tap the sampler to get the substrate off the walls of the sampler.
18. Remove the sampler.
19. Note the types and quantities of each type of substrate sampled from the bottom on the reconnaissance field log. Noting the percentage or ratio of the sediment is preferable. Note any rocks or life caught. Take a picture of the sample for the record.

20. If the sampler is empty, make a note of that, reset the sampler and try again. There is a bit of art to collecting a large sample.
21. Upon completion of all field activities the sampler should be rinsed with freshwater, dried, and the mechanical linkages and springs sprayed with lubricant prior to storage.

7. **Quality Assurance/Control**:
Verify the sampler is able to close properly upon impact with the sea floor, by tapping the armed sampler on the deck of the ship. This should eject the pin on impact and close the jaws when you lift the rope again.
Verify the screens are secure and covering the top of each jaw.
Verify each side of the rope is securely tied.
Verify the spring loaded pin is not bent.

8. **Management/Responsibility**: The Task Manager oversees contractor performance if this project is an IDIQ task. If it is a CO-OPS project, the project lead or field lead oversees performance of these steps. The responsibility for maintaining this SOP resides with CECAT.