



**NOAA Teacher at Sea**  
**Barney Peterson**  
**Onboard NOAA Ship RAINIER**  
**August 12 – September 1, 2006**

**NOAA Teacher At Sea:** Barney Peterson  
NOAA Ship RAINIER  
Mission: Hydrographic Survey  
Day 6, Saturday, August 19, 2006

**Weather Data from Bridge**

Visibility: 8 n.m.  
Wind direction: 240° C  
Wind speed: 8 knts  
Seawater temperature: 10° C  
Sea level pressure: 1012.3 mb  
Cloud cover: Cloudy

**Science and Technology Log**

Friday I got to spend time on the bridge while the ship was moved from one anchorage to another less than a mile away. The reason for the move was to anchor in a more protected spot as the forecast is for higher seas and stronger winds. When weather readings are taken and data is sent, the ship also receives a forecast to help the captain plan for the safety of his vessel and crew. To know where to anchor the captain must understand the geology and topography of the islands where we are working as well as knowing about the surface of the earth under the water.

Our first anchorage was chosen because the water was moderately deep and there was room for the ship to turn on the anchor chain as the wind and tides moved us. The second anchorage was chosen because the prediction was for winds from the southwest. We moved deeper into a bay surrounded by mountains between one and two thousand feet tall. There was protection from the predicted winds and room for the ship to maneuver.

We weighed anchor from our first anchorage. LT Evans took down the flags and the anchor ball (showing the anchor is down) was lowered. With one man working the winch and another carefully watching the anchor chain, the raising process was begun on a command from the bridge. Ensigns McGovern and Greenway were on duty along with Able Seaman Leslie Abramson. Captain Noll was there to observe and I was invited up to watch by Executive Officer Julia Neander. The anchor was raised slowly and the chain fed into a locker under the deck in the bow of the ship. We gathered speed and moved to our new anchorage with Ensigns McGovern and Greenway using the ship's radar to move us according to a predetermined route.

As we approached the new spot, the speed was cut, and finally the engines were reversed to stop us in just the right place. While we were moving all personnel on the bridge watched attentively, sometimes with binoculars, for any indications of problems. There was a large kelp bed to the

starboard side of the anchorage, an indication of shallow water and rocks on the bottom. This was something we needed to miss.

Finally the command was given to drop the anchor. Ensign McGovern ordered that they release five “shots” of chain, thinking that this would reach bottom if the depth in this area was what they thought it would be. The survey boats had not covered this area, so charts did not show depths. A shot of chain is equal to 90 feet. At five shots the anchor had not yet settled on the bottom so McGovern ordered an additional five shots. When eleven shots were out, we began moving the ship slowly with the engines to try and set the anchor. This would be apparent when the bow observer could see heavy tension on the chain and those aboard the ship should have felt a slight tug....we didn't.

After trying several time, the captain determined that the anchor was not on a good surface and was dragging. This could be very dangerous if the wind rose as predicted because the bay we are in is fairly narrow and there would not have been much time to take action to keep the ship a safe distance from the shoreline. The order was given to raise the anchor again.

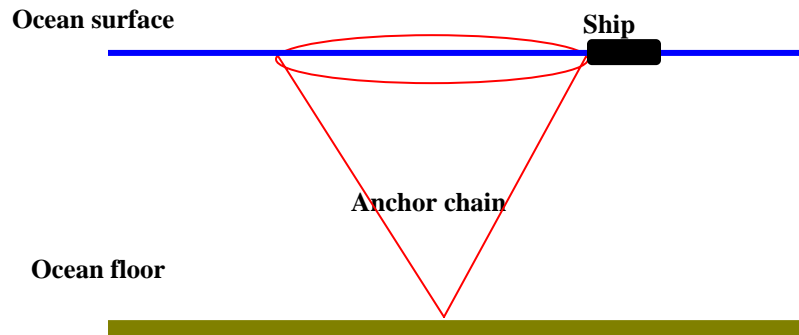
As the chain came up we could smell the foul mud from the bottom. Bits of mud and slime were caught in the links and had to be washed off with a hose and nozzle so the chain locker wouldn't be dirty and smell awful. The captain brought me a sample of the stuff...heavy gray-green-black clay with bits of shell and plants in it. (The smell reminded me of pulling my boots out of the middle of a swamp...rotting stuff! I was happy to toss the mud overboard and wash off my hands.)

The captain picked another spot a few ship-lengths from this one and the ship was moved slowly. Then anchor was lowered again with more than eleven shots of chain being released before the anchor settled on the bottom. This time, as we gently powered up the engines the man on the bow called out “Light tension....Medium....Heavy and holding.” At that point even I felt the slight dip that signaled that the anchor had set.

There is always someone on the bridge on watch, 24 hours a day. If the anchor were to drag tonight, the watch would call the captain, waking him if necessary. They would make a decision about what to do to keep the ship and crew safe.

Of course, once the anchor was down, the person in charge on the bridge had to calculate the distance the ship would move as it swung on the anchor with a chain eleven shots long. There is a chart for this. The pattern is an inverted cone with the anchor being at the point and the bow of the ship at the circumference of the base of the cone. (In real life the chain droops a bit from its own weight so the lines aren't totally straight.) It is important to calculate this carefully and to know that the water all the way around the cone is deep enough that the ship can swing without danger of striking any underwater objects such as rocks or sunken ships.

**Question of the day:** If the anchor chain is eleven shots long, how far is the ship above the ocean floor when the chain is extended straight up?



This diagram show the cone-shaped pattern that the chain will move in as the ship swings around at anchor.

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