Our Ocean Backyard

Gary Griggs

Article No. 414

Building a Harbor

In 1962, after many years of yearning for a place to park boats, Granite Construction Company was selected as the primary contractor for the new Santa Cruz Small Craft Harbor and the project got underway. While today it may seem like the harbor has always been there, it took a lot of engineering, heavy equipment, labor and materials to create what we see there today developed from what was once Woods Lagoon, much like nearby Schwann Lake. And I need to correct my last column where I should have written that the harbor is celebrating its 60th anniversary this year, not its 50th.

A lot of big rocks were required to construct the two jetties, and the Davenport quarry was the site where the rock was to come from. This wasn’t a simple job and to get to the stone entailed removing 200 to 250 feet of overburden to get to the hard marble beneath. Blasting was required at some places and the objective was to get smaller 2.5-3.5-ton stones for the core of the jetties and 12-15-ton blocks for the exterior. Locals know that the central coast can get large waves in the winter months and the jetties needed to remain stable through whatever the Pacific Ocean could throw at it. Rock from the same Davenport quarry was also used for the Half Moon Bay outer breakwater.

Large blocks of quarried stone are not always perfectly stable when piled up, particularly when they are attacked by very large waves, simply because of the irregular shapes of the rocks. At Santa Cruz the decision was made to armor the outer end of the west jetty, which is more exposed to the more common northwesterly swells, with large concrete tetrapods. Anyone who has sailed out or into the harbor, walked out on the jetty or along Seabright Beach will have seen these giant jacks. These were created by pouring concrete into steel forms to produce 28-ton tetrapods. These were poured on a site owned by Granite not far from the harbor.

A challenge arose, however, in the size of the crane necessary to get out onto the newly constructed rock jetty, pick up the 28-ton tetrapods and reach out far enough to place them around the outer end of the jetty. There is a complex engineering explanation for this challenge, and Granite’s chief engineer on this project, George Wagner, wrote a detailed summary of every stage of the harbor construction and the issues that had to be resolved. I have borrowed extensively from his excellent report for this column.

And as with any large (and even small) construction project, there are almost always unforeseen difficulties that arise. From start to finish the engineer and contractor have to stay on design, on schedule, and on bid. At that time, Granite’s total bid for the entire harbor project was $2,575,000. Using a simple inflation calculator produces a cost of about $26,687,000 in 2023 dollars, which seems very low to me, however.

Granite searched around and was able to locate a very large capacity crane working in an iron mine in northern Minnesota. The crane was purchased and then arrangements were made to have it disassembled with the individual components placed on five railroad flatcars for shipment across the country. This sounds complicated and it was because this was a massive piece of equipment even when taken apart. It was also made more challenging due to tunnels along certain rail routes that the crane couldn’t pass through. These were all overcome along with some other challenges. The individual parts of the crane finally arrived in Capitola near the old railway depot, were loaded onto flatbed trucks and transported to the site where they had to be carefully reassembled.

At the same time, the lagoon had to be drained and the bottom excavated to the design depth. During this stage the contractor was surprised to encounter some old car bodies that had been dumped at some earlier time, and which had to be removed. The shoreline Atlantic Avenue crossing of the old lagoon mouth had to be removed and the Murray Street Bridge constructed, which was another major project.

Jetty construction got underway next, which initially required excavation to a depth where stability of the jetty stone could be achieved with no settlement. The basal layer consisted of a three-foot thick filter blanket of gravel sized material so that sand wouldn’t wash out from beneath the jetty. Rock of different sizes had previously been separated and staged at the quarry in Davenport in lots ranging from approximate weights of 500 pounds up to 15-18 tons. Once delivered to the site, smaller rocks were first laid down to begin to build the base of the jetty. Several different trucks were used to transport rocks of different sizes. Because the crest of the jetty was only 22 feet wide, the loaded trucks could either drive out forward and then back out, or back out and head back going forward.

Throughout this entire process there was the ocean and waves to contend with, which became more challenging as the jetty was extended farther into the bay and into deeper water. Constant surveying was also required in order to keep the jetty construction on the correct alignment and at the right elevation. As the jetty building progressed into deeper water where wave energy would be greater, larger and larger stone was used to face the jetty. The voids between all of the stones were filled with concrete in order to provide a more impermeable and stable structure. The tetrapods were then carefully placed around the end of the west jetty for maximum stabilization. The process of construction of the west jetty alone was to ultimately take about two and a half months. But there is more work yet to be done.