

A Quality Katt Repairs a Reef

STURTEVANT, Wisconsin (July 25, 2002) – It takes a special breed of cat to help save a fish. But that's what happened when a Thom-Katt® was called upon to assist – that is a Putzmeister Thom-Katt trailer pump. The special Katt-Kreter™ model placed concrete underwater to help repair a damaged reef and restore the home of fish and other marine life.

Eighteen years ago on August 4th, a 400-ft freighter traveling in 18-feet of water ran aground on the famous Molasses Reef, which is the third largest barrier reef system in the world. It is also a sanctuary preservation area and high profile tourist destination for divers and snorkelers. For twelve days, the Wellwood ship was grounded about six miles southeast of Key Largo, Florida. As a result, 55,000 square ft of living corals were destroyed and over 7,000 square feet of reef framework injured. It caused widespread destruction of bottom dwelling organisms and displaced fish and other water creatures. Due to the major catastrophic damage, the reef did not regenerate over the years.

Finally this summer, man intervened to restore the reef, which should help put it on the road to recovery. The National Oceanic and Atmospheric Administration (NOAA) worked with the construction contractor, Underwater Engineering Services to place 22 man-made modules at 14 locations on the grounded site.

The modules were built by hand using small limestone boulders, a special composite rebar, concrete and sand. Weighing about 3500 pounds each, they were designed to replicate the older spur-and-groove formations of the grounding site as closely as possible and provide the maximum amount of habitat for fish, coral and other marine life.

Building the modules was one feat, placing them underwater was yet another. In mid-May, a 40 x 150-ft barge was loaded with materials and equipment to handle the restoration work. As it was a 150-mile ocean journey from loading dock to grounding site, the objective was to load *all* essential supplies to avoid returning to land during the anticipated one month time schedule.

Therefore, the extremely crowded barge held an array of heavy equipment including a crane, a mixer truck and all the ingredients to make concrete along with 8,000 gallons of fresh water. In addition, a hydraulic concrete pump was on board, but only after it had performed flawlessly during a test run to ensure pumpability of the special mix design.

The pump utilized for the job was the Katt-Kreter from Quality Concrete Pumping's fleet of over twenty Putzmeister pumps. Having successfully assisted with a similar reef restoration project three years ago, Quality Concrete Pumping of Coral Springs, Florida had once again been called upon for their expertise and for their reliable Putzmeister equipment.

Quality had purchased the 20th anniversary edition Putzmeister trailer pump directly from the 2002 World of Concrete show so the unit featured all the latest product advances. These included more rugged material and hydraulic cylinders, a specially designed hopper with angled sides for a better flow, and proximity switches in the hydraulic cylinders instead of the water box for added reliability.

George White, Vice President of the 13-year-old Quality Concrete Pumping Company said, *"The primary reason for choosing the Katt-Kreter boiled down to reliability. There was no place within 30 miles for the barge to unload due to shallow water near the shoreline. That's why a pump that would not fail was an absolute 'must' to keep the project moving without equipment delays."*

Jeff White, President of Quality Concrete Pumping commented that, *“The unique reversibility feature of the pump’s stroke was also an important feature critical to this job. If a plug up occurred, we could have moved the concrete back to the hopper. This was important because we wouldn’t have been able to take the hoses apart while in the water or the concrete would have dispersed.”*

Once the barge with tug reached the site, prep work began by removing the algae off the necessary surfaces so concrete would adhere properly when poured. The first module was then positioned on June 3, 2002.

First, the 100-ton crane lowered the man-made module precisely in its designated place. The Katt-Kreter then delivered concrete through a 3” 150-ft long hose to surface supplied divers. The module was anchored to the natural reef by a process of pumping tremie concrete beneath and around the base of each module, gradually filling the basin to its desired depth and locking it into the natural reef structure. Pre-cut fiberglass reinforcement bars were inserted during the process for added strength.

To assist, Quality designed adapters to help the divers better grab and easily drag the hose in the water. At the end of the 3” hose, they clamped on a 3” to 2” reducer and welded handles on each side. The divers could also talk to the pump operator via radio controls, giving instructions each step of the way.

Approximately 4 to 5 yards of concrete were required to secure the first module. Then, selected rocks were placed around the base to disguise any appearance of restoration work. A similar approach was done to the remaining 21 modules. Besides placing concrete for the modules, 22-1/2 yards were also needed to build up and seal the deep V-shaped impression left by the ship’s hull.

George White added, *“A typical batch of the concrete amounted to 3-1/2 cubic yards made in a special 4-yard mixer truck on board the barge. The Katt-Kreter’s*

harsh mix pump with hydraulic remixer was ideal for handling the special 5000-psi mix, which set in less than 30 minutes.”

The specially designed anti wash-out mix was developed by an engineering firm in California to reduce the gray cloudiness that occurs when regular concrete goes into water. It combined varying amounts of special admixtures and silica fume to achieve the desired outcome. As a result, the divers could clearly see the entire area while placing material, and more importantly, fish and other marine life were unharmed.

Joe Frederickson, Project Manager for Underwater Engineering Services said, *“The people at Quality were great to work with and the performance of the pump was outstanding. Although the mixture was extremely sticky, the trailer pump still pumped it without a problem.”*

Frederickson added, *“In fact, all equipment on board had to be the best on the market because if there were any mechanical failures, we would have lost four working days. We just couldn’t afford that. Fortunately, there were no breakdowns, clogs or equipment malfunctions. We just had to deal with the worst boating weather ever remembered in the Keys history.”*

Initially, weather played havoc and delayed the process for more than two weeks. However once Mother Nature cooperated, the commercial divers, engineers, marine biologists, construction personnel and even a cook who made the daily meals worked long 9 to 14 hour days to try making up for some of the lost time. Consequently, completion of all 22 module placements occurred on Sunday, July 21, using a total of 112 yards concrete.

The project was funded through money received from the Wellwood Shipping Company, the Hanseatic Shipping Company and the ship captain. They settled on December 1986 with the federal government for a total of \$6.275 million,

which was paid out over 15 years. This amount included a civil penalty as well as assessment and restoration costs.

A web site managed by NOAA at www.sanctuaries.nos.noaa.gov/special/wellwood provides more detailed information and photography for additional viewing.

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JOB SPECS:

General contractor: Underwater Engineering Services – Port St. Lucie, FL

Pumping contractor: Quality Concrete Pumping – Coral Springs, FL

Equipment: Putzmeister Katt-Kreter™ trailer-mounted concrete pump