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By Tim Rogers

Panamá Canal Expansion Breaks Ground

Third in a three-part series on Panama's first-world aspirations



PANAMA CITY, Panama – The Panama Canal, completed in 1914, is perhaps the greatest engineering feat of all time. “A Man, A Plan, A Canal – Panama,” is perhaps the greatest palindrome of all time. And now, the \$5.2 billion canal-expansion project, which just broke ground and is scheduled to be completed in time to mark the 100th anniversary of the canal in 2014, is perhaps the greatest remodeling project of all time.

The expansion of the world's most important commercial route consists of building a third set of locks that are 40 percent longer and 60 percent wider than the original locks, allowing the Panama Canal to double its shipping capacity by 2025.

Times have changed the way the project is being planned and executed. Whereas the first lock system was built based on 20th century navigation experience, today engineers from all over the world are collaborating on developing complex, three-dimensional design models based on new technologies and sophisticated water-use studies.

Panama's tropical environment, once considered an obstacle to progress, is now viewed as key to making the project sustainable for the next 100 years.

And basic advances in hygiene, health and safety have essentially eliminated the threats of malaria and yellow fever, which claimed tens of thousands of lives during construction of the original canal.

Jorge de la Guardia, head engineer and executive manager of the new Locks Project Management Division, said the Panama Canal's success over the past century can be credited as much to good luck as good engineering.

“Everything about the original canal and the decisions that were made worked in many cases thanks to lots of luck,” De la Guardia told The Nica Times during a recent interview in his office inside the Panama Canal Authority.

For example, the head engineer said, the fact that the lock system has three chambers instead of two prevents – quite unintentionally – the intrusion of salty ocean water into the fresh water of Lake Gatun, which serves as the main source of drinking water for Panama City.

Diluted ocean water filters through the first two chambers of the lock system when a ship is being lifted to the level of the Gatun Lake, 26 meters above sea level. But by the third chamber, the fresh water from the lake flushes out the remaining salt water before it can reach the lake, De la Guardia said.

“That wasn't by design,” De la Guardia said.

The engineer said the original designs had nothing to do with environmental concerns or water-quality considerations.

“But it turned out well,” he said, adding that the saline level of Lake Gatun remains “basically unperceptible” after almost a century of canal use.

This time around, however, engineers are not leaving the environment to chance. De la Guardia says the design of the new lock system is very deliberate about protecting the environment and conserving Panama's natural resources as much as possible.

“This time everything is very scientific,” the engineer said. “We have done very profound studies of water quality and we are developing a new three-dimensional model to monitor the quality of water in Lake Gatun.”

If there is any measured increase in the lake's saline content from the new locks, the whole system can be flushed and cleaned, De la Guardia said.

The Need for New Locks

Before the 1960s, virtually every commercial ship on the seas could fit through the Panama Canal, whose locks measure 1,000 feet long (305 meters) and 110 feet wide (33.5 meters). But as shipping companies started building larger tankers and cargo freighters, the term “Post-Panamax” was coined to describe ships that are too big to fit through the canal.

Today, Post-Panamax ships still represent a minority of all ships plying the oceans (less than 5 percent of all shipping trade). But, since the Panama Canal Authority announced expansion plans four years ago, new shipping orders are already being placed based on the new dimensions of the third locks (1,400 feet long, 180 feet wide), De la Guardia said.

The expanded dimensions have already been dubbed the “New Panamax” and have become the new standard measurement for ship makers, De La Guardia said. Though there is at least one make of ship that is too big for the new locks, “that ship has already lost value because it won’t be able to use the new canal,” the engineer said.

The “New Panamax” freighter can carry 12,000 containers, or roughly three times the cargo load of a largest ship that can currently fit through the canal. The Panama Canal Authority expects that once the new locks are open and fully operational, the widened canal will handle 12 to 15 New Panamax ships per day, in addition to the normal traffic from the old canal.

Within 25 years, Panama plans to recover the nearly \$3 billion it has invested of its own money in the expansion project. The other \$2.3 billion is in the form of credit from five multilateral investment agencies. Despite the rumors, China – the canal’s No. 2 client after the United States – is not one of the investors in the expansion project, according to the Panama Canal Authority.

The canal is already a proven cash cow under Panamanian management, which started when the United States handed over the canal Dec. 31, 1999. Even now, during a global recession that has reduced worldwide shipping traffic, the canal continues to turn record profits.

Last year, the Panama Canal grossed \$1.4 billion in revenue, 9 percent more than in 2008. The canal’s revenue has increased each year under Panama’s management.

The most a ship has ever had to pay to use the canal is \$375,600, while smaller ships pay an average of \$70,000 for transit. The least expensive fare was \$.36, paid by Richard Halliburton who swam the canal in 1928.

Water Management

As the canal sets its sights on increasing its use in the future, the issue of water management has been a leading concern, both for environmentalists and engineers alike. Simply put, larger ships and increased traffic means a greater strain on the water supply from Chagres River and the Gatun Lake, which represents the majority of the 80 kilometer transoceanic waterway.

Currently, the Panama Canal uses some 55 million gallons of water each time a ship passes through the locks. The canal averages 38 transits per day, for a total water consumption of more than 2 billion gallons every day.

By comparison, the entire population of Panama City consumes around 200 million gallons of water each day – about the same amount used in four canal transits.

Given the dimensions of the new lock system, the third set of locks should use 230 percent more water than the current system. But based on a German-inspired system that uses reservoir basins to reuse water from one chamber to the next, the new locks will actually reuse 60 percent of the water, and consume 7 percent less than the current lock system, according to De la Guardia.

“It’s not the cheapest solution, but it makes sure we are maximizing the use of the existing watershed without affecting other areas,” De la Guardia said. “It would have been cheaper to build a new lake, but this was the solution that was the most environmentally and socially acceptable.”

According to the canal's 25-year planning horizon, the current watershed is sufficient to supply both the old and new lock systems running at full capacity, he said.

To further reduce the canal's environmental footprint, engineers are building the new locks on a site that was partially excavated by U.S. engineers prior to World War II.

In 1939, the United States started a project to expand the canal to move war ships from the Atlantic to Pacific and back. But when the Second World War started, the project was suspended.

"When the war ended, the U.S. didn't need to expand the canal anymore because they already had fleets of warships in both oceans," De la Guardia said.

But the footprint of those early excavation sites remain, and are being used as a guide for the new canal expansion project, the engineer said.

"On the Pacific side, the locks are going to be built right next to where the U.S. was going to build its new locks, and on the Atlantic side, the locks are going exactly where the U.S. was going to put them. So the area has already been intervened," De la Guardia said.

Still, he said, animals found in the area have been relocated to other protected forests, and architectural artifacts turned over the ministry of culture.

'Vote of Confidence'

Aside from the future economic benefits of handling increased shipping, the canal expansion is also helping Panama survive the global economic crisis by creating a massive public works project and bolstering the country's image as safe place to invest.

At its peak, the expansion project will employ 7,000 workers, paying salaries well above Panama's minimum wage.

And the fact that five multilateral investment organizations decided to invest in the government project has given the private sector 2.3 billion reasons to feel secure about investing in Panama.

"For these five (multilaterals) to invest \$2.3 billion here shows that Panama is a very safe place," De la Guardia said. "This gives other investors a lot of confidence. You see the buildings that they are putting up here – they keep building and building."

The Panama Canal Authority also keeps building and building. Though they are only now breaking ground on the third locks, De la Guardia says a second future expansion is not out of the question.

"We are building the third lane but we are already thinking of the fourth lane," De la Guardia said.