



Record-Setting Lock Gates in the Netherlands

Advancements in the ability of FRP structures to resist delamination under heavy loads and withstand significant impact have led to a track record of success in the building of bridges and lock gates, especially in Europe. Last year's installation of reportedly the world's largest FRP lock gates on the Wilhelmina Canal has made an emphatic statement regarding the growth of FRP solutions for infrastructure projects.

The Wilhelmina Canal in the Netherlands is an important waterway and a vital part of the country's transportation system. Eight GFRP miter lock gates (four small and four large) were designed, fabricated and installed by FiberCore Europe using a proprietary product from sister company InfraCore Company. The smaller lock gates, installed in 2015, are 20.3 feet high and 16.4 feet wide. The larger ones are 42.3 feet high and 20.3 feet wide. The entire project was commissioned by the Dutch Ministry of Transport Infrastructure to replace three older locks with one wider and deeper lock comprising all eight lock gates.

The new lock accommodates larger (Class IV) ships and helps the country keep up with increasing water traffic. Since the new lock must hold off a water level difference of at least 25.9 feet, the lock gates needed to be strong and stiff to resist water in continued contact for more than 100 years. (Miter gates feature two leaves that close at an angle pointing upstream to work with instead of against the natural pressure of the water.) GFRP was an ideal solution because of its strength, durability and resistance to corrosion.

According to FiberCore Europe's co-founder and CEO Simon de Jong, "To introduce a new technology to a market where safety is paramount, we had to conduct extensive testing. We also had to prove that our approach would be faster and less costly to build than traditional steel, wood or high-strength concrete."

While FiberCore Europe holds the specifics of the technology close, Ronald Grefhorst, senior engineer with InfraCore Company, describes the technology as a fully fiber-integrated panel-type structure. "The worldwide patented technology was developed for the construction of extremely robust FRP panels to solve the delamination problem found in FRP sandwich structures, which is often problematic after an impact," says Grefhorst. "This new material withstands fatigue and

corrosion. Stress is not transferred between plies so that damage that may occur in the top layer will be isolated and resist further damage or delamination.”

The company produced the Wilhelmina lock gates using InfraCore® technology, standard e-glass and a three-step production process. “The most unique aspect of our concept is the production of individual pre-prepped, wrapped building blocks,” says Grefhorst.