Permeable Pavers Enhance

an Inland Port Facility in Louisiana

By Sheryl S. Jackson

The permeable interlocking concrete pavement at Port Manchac is designed to support heavy vehicles and shipping containers.

Two factors are expanding ports in the United States. The first was the addition of a third set of huge locks in the Panama Canal in 2016. These allow passage of ships one-and-a-half times larger than the existing locks. The second factor is the growth of e-commerce. This transformed the supply chain as customer expectations for faster delivery times moved retail logistics from centralized to regional distribution networks. In response, ports along the Gulf and Eastern United States have undergone renovations to handle the increased volume, and inland ports are expanding to handle more throughput as well.

"Since the Panama Canal expansion, ports have seen a 10 to 15 percent increase in container shipping, and inland ports are playing a critical role in moving those goods," says Patrick J. Dufresne, Executive Director/CEO of Port Manchac in Akers, Louisiana, about 40 miles northwest of New Orleans. The port is overseen by the South Tangipahoa Parish Port Commission. The Canadian National Railroad's north-south main rail line adjacent to the port's property and easy access to I-55 with nearby direct links to I-12, I-10, and I-59 make Port Manchac's intermodal terminal a prime inland location to store and transload bulk, break bulk, neo-bulk and containerized shipments by barge, rail and truck.

The 140-acre port commissioned some significant renovations to upgrade its facilities to handle increased business, says Mr. Dufresne. One of the new features is a 25,000 sf, paved 'laydown' area designed to accept heavy containers and vehicles. "We evaluated the use of concrete and asphalt to pave the previously unpaved area, but I had seen permeable pavers in a similar use and liked its performance," says Mr. Dufresne. "It can handle the weight of the containers as well as the turns made by trucks without cracking like the other pavements." An added advantage is the ease of replacing a section of pavers if there is damage versus the labor, time and cost of repairing or replacing concrete or asphalt. "We also have a very high water table and needed a material that could improve drainage," he adds.

"The design included interlocking concrete pavers early in the process, but the client had seen another installation with permeable pavers," says Ranjit Gujja P.E., project manager at AECOM. After evaluating the viability of permeable pavers in this application, the design was changed to incorporate them. "Permeable pavers were able to handle the weight and volume of traffic and addressed drainage issues in the area, he says. "They also saved

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money that would be needed to install sewer pipes under a non-permeable paver system." Although a drainage system was not needed under the paver system, drainpipes and an inlet were installed at the edges to direct excess water out of the subbase, he adds.

Geotextile was placed over the subgrade and 10 inches of ASTM No. 4 of compacted stone was placed as a subbase. A 4-inch thick compacted, open-graded base of No. 57 stone served as the base for the bedding layer and the 3 1/8-inch thick concrete pavers with joints filled with permeable aggregate.

"The general contractor prepared the area and placed the subbase and base layers of stone, and then my crew screeded 2 inches of No. 8 stone as the bedding material," says Ivan Bond, owner of Design Pavers. "I was surprised that the total depth of the project was not deeper, but the site had been used for decades as a laydown area and the soil subgrade was very compact and stable." Pavers used for the project were 4 7/8 inches wide and 9 3/4 inches long and were manually placed. "A herringbone pattern was used because it is recommended for vehicular applications because it is stronger than other patterns," says Mr. Bond. Because the pavers did not come in manufactured and placed as a herringbone pattern on the pallets.

This is not the first permeable paver system installed by Mr. Bond, but it is his first in an industrial setting. "I install permeable pavers in commercial and

PROJECT CREDITS

PROJECT LOCATION:
Port Manchac, Akers, Louisiana

OWNER:
South Tangipahoa Parish Port Commission

DESIGNER & PROJECT MANAGER:
Ranjit Gujja P.E., Project Manager, AECOM

CONTRACTOR:
Ivan Bond, Design Pavers

MANUFACTURER:
Keystone Hardscapes

PHOTO CREDITS:
Ranjit Gujja, AECOM

Casting the concrete curb edge restraints

residential applications," he explains. "I was a little apprehensive about an open-graded subbase and base supporting a permeable paver system under the port traffic, but it is working well," he admits.

A concrete curb/edge restraint about 1 sf in cross section holds the paver system in place. This was installed by the general contractor, says Mr. Bond. The pavers were placed in less than three weeks with no surprises, he says. "Overall, the weather cooperated but we did have some rain," he points out. "Of course, rain doesn't slow the installation of a permeable system."

Mr. Bond's pride comes through when he says, "I am hearing more contractors and customers evaluate the use of an open-graded permeable paver system for commercial and industrial projects," he. "The Port Manchac project proves that permeable pavers work well in these settings."

The Port Commission is also pleased with the results of the $250,000 paving project, says Mr. Dufresne. "There were no problems during installation and the Port's customers are happy that forklifts can more easily operate on the pavement rather than on aggregate that was previously used," he says. "Now, we are looking for funds to double the size of the laydown area—with permeable pavers."

The No. 2 subbase aggregate placement

Besides durability, deciding on 25,000 sf of PICP was due to the area receiving about 63 inches of rainfall annually. A herringbone pattern is being completed in this section of the PICP.