



PORT OF TAMPA 30 YEARS LATER

One of the Largest Paver Installations in the Nation Withstands 30 Years of Heavy Use at Port of Tampa Bay Cargo Yard

LOCATION:

Tampa, Florida

PRODUCTS:

80mm Concrete Pavers

PORT ENGINEER:

Carl E. Fielland, Director of Engineering

PROJECT ENGINEER:

David Volkert and Associates, Inc.

GEOTECHNICAL ENGINEERS:

ARMAC Engineers

GENERAL CONTRACTOR:

Kimmins Contracting Corp.

INSTALLER:

Precise Paving, Inc.

SUPPLIER:

Paver Systems,
an Oldcastle Company



Background

The Port of Tampa Bay, Tampa, Florida, currently ranks 16th in the United States by tonnage in domestic trade, 32nd in foreign trade, and 22nd in total trade. It has an economic impact of more than \$15.1 billion and supports more than 80,000 jobs. It also is the largest and most diversified seaport in West Central Florida.

In 1992, the Tampa Port Authority planned

for construction of a new, 900 ft. long wharf to serve as an upland cargo staging area. For that project, Berth 208, engineers completed research that broke from prevalent thinking about pavement systems of the time and introduced interlocking concrete pavers as a sound structural option. The paver system they chose for Berth 208, 80mm thick concrete pavers, has withstood the test of 30 years amidst extremely heavy loads common for port applications.

"The paver system at 208 Uplands Cargo Yard has held up fantastically for about 30 years, with little to no maintenance," Patrick Blair, P.E., S.I. Vice President of Engineering, Port of Tampa Bay. "This area has been used for storage of wood pallets, structural steel, empty containers as well as constant heavy fork lift traffic. The Port will be revisiting the cost to benefit analysis on pavers vs asphalt in the near future when we expand any of our Break Bulk cargo yards."

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The Challenge

As the Port Authority was planning the project in the fall of 1992, interlocking pavers were considered a strictly decorative option. The Authority had previously constructed cargo staging areas utilizing six inches of asphaltic concrete, placed in two lifts over 18 inches of compacted lime rock base. The performance of the asphaltic pavements had never proven to be completely satisfactory. For the Berth 208 project, it was decided that upgraded pavement systems should be examined for longer-term viability.

Ultimately, the pavement system would need to withstand support loads required for port applications. In particular, the TEC-950L Container Handler to be in regular use at the berth has a front axle load of 106,000 lb.

The Solution

The pavement systems considered for the project included: asphalt with limerock base; unreinforced concrete and base; reinforced concrete and subbase; and interlocking concrete pavers and base.

In their paper "Selection of a Pavement System for Heavily Loaded Marine Terminal" for the Ports '95 American Society of Civil Engineers Conference in September 1995, Ross T. McGillivray, president of ARMAC Engineers, Inc. of Tampa, FL, and Carl E. Fielland, director of engineering for the Tampa Port Authority, detailed their pavement research and selection process. An initial evaluation found, based on a 40-year life cycle, the interlocking concrete pavement system would be lower in cost than the unreinforced and reinforced concrete pavements at any time during their lives, while it would be lower in cost than the asphaltic pavement after six years. After visiting a paver installation of nearly 1 million square feet at the Port of New Orleans, engineers decided to specify pavers manufactured by Paver Systems (currently an Oldcastle APG company) for the Port of Tampa Berth 208 cargo staging area.

According to Rob Goossens, VP of Precise Paving, the original installer of the project, "Aesthetically, these systems can be designed to look great, but the durability of segmental paver systems is the greatest strength." He further explained that installing the pavers mechanically greatly increased the production rate, so the project was able to average over 10,000 SF of pavers installed each day. That is 8-9 truckloads of pavers and 2-3 dump trucks of sand each day. "The speed of install was very important to the project," he said. "Overall, 750,000 SF of pavers were installed on schedule even with a tropical storm flooding the area. Also, the Port of Tampa Bay was able to load containers on the pavers immediately after installation which was a huge plus. Most other pavement methods require time to cure before taking traffic."

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*Rob Goossens
VP of Precise Paving*

The Result – More than 30 Years Later

This is one of the largest installed paver projects in the USA. Since being mechanically installed in 1992, the concrete pavers at Berth 208 have required little if any maintenance, despite being used to store unloaded cargo, including container boxes and palletized equipment. The port traffic is non-stop with large cranes and stacks of steel pipes which create extreme point loads.

A 2022 Pavement Condition Index (ASTM E2840) was completed with the Port Authority's cooperation. The field study found the pavers to be in satisfactory condition. According to Kevin Earley, Director, Commercial Hardscapes for

Oldcastle APG, "A satisfactory PCI rating of 78 after three decades of service is noteworthy."

"After walking the Port of Tampa Bay cargo site, the paver system is still in good condition and looks to have many years of life left," said Goossens. "It was great to visit the Port of Tampa in March 2022 to see in person how well the pavers have performed over 30 years of heavy port traffic."

The Port of Tampa Bay engineers' and contractors' assessments, along with a pavement condition survey, all point to this installation as a true testament of the longevity of these paver systems with little to no maintenance. "Pavers are still thought of as a decorative pavement option, when in fact this project proves that paver systems are one of the most durable and cost-effective options over time," Goossens concluded.

About Belgard Commercial®

Belgard Commercial, part of Oldcastle® APG, offers a complete collection of paver and wall products for plazas, terraces, parking areas, roadways, rooftops and retaining walls. Available in a range of styles, premium Belgard Commercial products have been found in the nation's finest developments and award-winning commercial and retail properties since 1995.

Oldcastle APG is part of CRH's Building Products division. As the largest building materials company in North America, CRH provides a single-source solution for commercial construction projects with a full portfolio that also includes structural masonry, masonry veneers, dry mix products, hardscape jointing sands and sealants, stormwater management systems, concrete infrastructure, architectural glass, lawn & garden products, and composite decking.

