Focus of This Issue: Parking Structures

VA Parking Garage, Syracuse, NY – An Interesting Story

Jason Saner, Lakelands Concrete Products, submitted this interesting story — The VA Parking Garage in Syracuse, NY, is a testament to the benefits of building with Precast. Originally erected in 1989 the Precast Parking Structure was expanded as demand dictated adding vertically two more times over the next 20 years. The precast concrete provided long-term structure and support that could be built upon to meet the needs of an ever expanding medical facility.

Murnane Building Contractors, Inc. built the first two floors in 1989; Crane Hogan Structural Systems added two more floors in 1999; and Northland Construction constructed the last two floors in 2009. Lakelands Concrete Products Inc. supplied the precast spandrel panels for all 6 levels, using their standard 5000 psi mix design each time. Each phase used about 90 panels, equaling around 10,000 sf. These 6" panels were cast with a broom finish topside, to be left exposed on the garage inside, and smooth steel form exterior finish on the bottom side, in preparation for a medium acid wash for the exposed face.

Total Precast Parking Structures

Clark Pacific. Precast. Building for Life. This is taken from their website, and repeated here because we want to share their enthusiasm and rational for precast concrete parking structures. Clark Pacific is a PCI Certified Producer with plants in Fontana, West Sacramento, and Woodland, CA.

One team. Single source. Total control.

Total precast parking has distinct advantages for the owner/developer, project team and end users. We are able to design and build your next parking structure creating a turnkey building solution that combines both

(continued on page 2)
Total Precast
(continued from page 1)

architectural and structural precast concrete to provide exceptional aesthetics and performance.

Total precast parking design includes components that are typically produced in precast concrete, such as columns, beams, inverted tee beams, load bearing spandrels and double tees. Precast can also be used for elements that might otherwise be constructed in cast-in-place concrete, steel or masonry, including bridge elements, elevator towers, stairs, landings, railings, parapets, and shear walls.

Benefits of Total Precast:

SPEED As casting is completed at the plant, the building site can be simultaneously graded and prepared. With precast you will see shortened construction time, accelerated schedules and earlier revenue recognition.

AESTHETICS By integrating architecture directly into our structural system, you are offered an unlimited variety of design choices such as colors, textures, veneers, all supported by a resilient structural design.

COST While first costs are competitive with competing designs and systems, a total precast parking structure’s shortened construction time and long-term durability result in increased efficiency and even greater owner value.

PERFORMANCE Our unique precast systems are designed not only for exceptional aesthetics and cost effective construction, but also for seismic resilience, meeting California’s stringent building code requirements and, with the Precast Hybrid Moment Frame, offering an owner access to something not covered by existing codes – an opportunity to not only preserve life and limb, but to limit damage to the structure itself.

As experts in parking and the leading source for precast concrete innovation and performance, Clark Pacific will provide you with an entire package for design-build parking structures. The company’s unique approach ensures turnkey responsibility and accuracy for meeting design specifications and delivering results.

Parking Structures


Owners, developers, architects and contractors all benefit from using precast, prestressed concrete components to design and build parking structures. Throughout the country, thousands of precast structures are parking millions of cars, with some of the largest structures ever built being created from precast design. A Few Reasons Why:

ENVIRONMENTAL FRIENDLINESS

As communities demand more open green space around developments and concerns rise over water conservation, the need grows for more tiered parking. Precast concrete components address these demands in a cost-efficient way that fits perfectly with tight construction timetables and budgets, all while minimizing the impact on the surrounding environment.

SAFETY & SECURITY

The use of new framing techniques helps designers create light, bright interiors that can completely eliminate shadowy spaces, thus increasing intrinsic security for users.

AESTHETIC VARIATION

Precast concrete can be used to mimic a variety of much more costly facing materials, including limestone, sandstone, brick and terra cotta. This allows the structure to more readily and cost-effectively blend with its neighborhood, if needed. The addition of decorative details can add visual interest and reduce the structure’s visual mass, creating a community-friendly facility.

FAST CONSTRUCTION

Precast’s ability to begin casting prior to and during foundation and site work speeds up construction and reduces the amount of on-site labor required for the project.

DESIGN FLEXIBILITY

Precast concrete offers long, clear spans and compression strengths far above typical expectations. Coupled with Clark Pacific’s Precast Hybrid Moment Frame system, parking structures (especially those designed for essential services) can meet and exceed seismic code requirements, and are designed for immediate re-occupancy after seismic events. These precast benefits accrue to parking structures of all sizes and locations.

QUALITY CONTROL

Clark Pacific is a PCI-certified plant and we adhere to the comprehensive quality control procedures. An added benefit of precast construction is the inherent increased durability that minimizes the need for continuous on-site inspections and costly long-term maintenance. Thanks to Clark Pacific for the above article. You can find the PCI Certified Plant Producer Members who are PCANY Members on our website, www.pcany.org.
Cubist Pharmaceuticals Parking Garage, Lexington, MA

Dailey Precast, LLC of Shaftsbury, VT recently supplied all precast structural and architectural components for a new three-level parking structure to serve a new manufacturing plant addition for the growing Cubist Pharmaceuticals company. In addition to the typical parking deck components (double tees, beams, columns, spandrels, etc), included in Dailey’s work were two stair towers and an elevator well, plus the striking pedestrian bridge between the new parking structure and the new manufacturing plant addition.

The very tight site presented several logistic challenges. There is a protected wetland to the north of the work which had to be protected; the site allowed limited access around the structure; there was no room for a staging area for product or equipment; access to the new work was through a heavily-used active parking area, with only a very narrow entrance and exit road. Obviously, this required complete careful traffic control and carefully timed loads to the crane hook – for every piece!

Project credits are: Construction Manager - The Richmond Group; Structural Engineer - Capobianco consulting Engineers, Inc; Architect - Spagnolo, Gisness & Associates, Inc; Precast Supplier - Dailey Precast, LLC. Our thanks to Robin Outwater, Project Executive, Dailey Precast for this article. Photos by Dailey Precast, Inc.

New Design Guidelines for Precast Concrete Parking Garages ...

an article by BergerABAM

When driving to any urban city, a typical concern is where to park your car when you get there. Fortunately, many options abound in the form of precast concrete parking garages. Built solely for the purpose of automobile parking, these multi-level structures present many factors that must be considered by the engineer responsible for their design, such as safety, efficiency, and the economic aspect during construction.

To keep up with the rapid growth of urban areas, engineers must also seek ways to improve the design process through simplification so that parking garages can be built with greater speed and efficiency, but with consistent accuracy and quality.

Catrina Walter, a civil engineer with BergerABAM’s offshore group at the Federal Way office, recently completed a research program to develop new design guidelines that are already being followed by designers and precasters to build parking garages, as mentioned above, faster and more economically than before, but with the same safety standards. With four colleagues, she began her research while studying for her master’s in civil engineering at North Carolina State University and co-authored a two-part paper that details the results of final reports from her research.

“Development of a Rational Design Methodology for Precast Concrete Slender Spandrel Beams: Part 1, (continued on page 4)
New Design Guidelines (from page 3)

Experimental Results" was published in the spring 2011 issue of the PCI Journal and, as the title suggests, focuses on precast concrete slender spandrel beams, vital structural members of parking garages. Catrina explains that the primary purpose of these beams is to transfer vertical loads from deck sections (the area of the garage on which your car sits) to columns in order to transfer loads safely to the foundation. She further explains that spandrel beams often serve as railings or barriers around the exterior edge of a parking structure usually as half-height walls that prevent cars from driving over the edge.

To gain a better understanding of the primary role of slender spandrel beams, Catrina provided an explanation of loading. Consider the double tees that usually make up the floor of parking garages and typically span 40 to 60 feet. Each end of a double tee is placed on the ledger of a spandrel beam; this is how the spandrel beams are loaded. Your car sits on the deck of the double tee and the double tee transfers the load from your car to its supported ends. Each stem from the double tee then loads the ledge of the spandrel beam as individual point loads. The spandrel beam then transfers the load to the column and the column then transfers the load into the ground.

Catrina made it clear that this project was not at all about failure of current spandrel beams. Current slender spandrel beams were actually overloaded and, therefore, were not as cost effective as they could be, although they were as safe then as they are now with the new design guidelines in place. She goes on to explain that during the research project, the full-scale spandrel specimen was overloaded until they failed so that the failure mechanism could be identified. Spandrels would not be loaded to such an extreme degree in a real-life situation.

While the experimental results of the research were detailed in Part 1 of the paper, Part 2, “Development of a Rational Design Methodology for Precast Concrete Slender Spandrel Beams: Part 2: Analysis and Design Guidelines,” details the analysis and resulting design guidelines and was published in the fall 2011 issue of the PCI Journal. BergerABAM has headquarters in Federal Way, WA, and offices in Seattle and Vancouver, WA, Portland, OR, San Diego and Irvine, CA, Las Vegas, NV, and Houston, TX.