New York State Office of Government Services Parking Structure, Albany, NY

**Built Into Hillside, Precast Parking Makes The Grade**

To help alleviate demand for parking spaces around government offices in Albany, N.Y., designers created a new 1,380-car parking structure into a hillside for the New York State Office of General Services. The all-precast concrete structure faced significant site challenges, including the need to build the structure against a steep hillside and designing around a steam tunnel that rises up through the middle of the site.

“We had to create a functional plan that stepped the parking structure into the hillside while also building around the steam tunnel, which runs through the parking structure for some length,” explains John Rom, project architect at Desman Associates in New York.

Forty-foot-tall cast-in-place retaining walls were constructed against the hillside, allowing for a structure with eight levels (seven supported) at the north end and four levels (three supported) at the other. Because the upper levels are built right up to the hillside, every other floor plate varies in length, becoming longer as the structure rises. The building features only one level above grade on the high side and seven on the low side.

Clough, Harbor & Associates in Albany served as the engineer on the foundation and MEP, while Turner Construction Co. was the general contractor. Jim Altland of William E. Dailey Precast, LLC, (precaster) explains that the structure was designed to be four bays wide on a 36-foot module, using 12-foot double tees. Outside bays ramp up from the north to the hillside on the south, while the two inside bays ramp up from south to north. As the levels step up, they feed off the ramp into flat bays that extend out toward the hillside.

All of the tees were pretopped except for some on level two, above a small office and maintenance area, which was covered with a waterproofing membrane and field-cast topping, he notes. The other areas have no waterproofing applied, but the flat surfaces, including the double tees, inverted tees, stair risers and landings, have a corrosion inhibitor integral with the mix design. Columns, which varied from 32 to 45 feet, were cast in two pieces and connected with NMB splice connectors.

Spandrels were designed with a pocket for the double-tee bearing, rather than creating a continuous ledge. The spandrels have a series of 1-inch-deep reveals, tapered from 1-1/2 inches at the face to 1-inch at the base. Ten reveal lines were cast along the length of the spandrel and 16 were cast at the ends to follow the line of the columns. The pattern was formed with machined steel reveal bars bonded to the steel form.

The spandrels had a dual sandblast texture, providing a light over-
NYSOGS Parking Structure (continued from page 1)

all finish with a heavy, almost exposed-aggregate, sandblast applied to a recessed area above the reveals. “We wanted to create some detail to break up the scale of the façade,” Rom notes. A mockup panel was fabricated and approved by Desman for guidance on the desired sandblast textures. Spandrels were positioned end-to-end in the yard during the sandblasting process to ensure a uniform texture from panel to panel, Altland adds.

“The state had a limited budget with which to work, so we were looking for a finish that would give us the most bang for the buck,” Rom says. “I think we achieved quite a bit for the money we were able to spend.” To create consistent base for the unusual design, a two-story base was created, offering a strong visual foundation.

Light walls were used inside to provide structural support while keeping the interiors open for security purposes. To enhance that, a glass-enclosed cantilevered walkway was constructed on level seven that connects the elevator tower to the south entrance. The double tees on this level extend 7 feet past the parking structure on the east elevation to support the walkway.

The roof enclosure frames into spandrels, while the steel mullions are supported by the spandrels on the level lower. The walkway spandrels are also supported by the double tees, which are supported by the beams at the column lines.

The precaster, Dailey Precast, LLC of Shaftsbury, Vermont delivered 1,230 pieces to create the all-precast structure. The erection sequence started at the top of the hill with the crane set on the high side. Three bays were built out from the hill onto the retaining-wall foundations. Then the crane was moved down into the structure and the bays to the east and west were erected. The final phase was to erect the northeast corner.

“We’ve done some projects where we built into hillsides before, but those tend to be lower slopes of maybe 30 feet,” says Rom, whose company does an extensive amount of design work using precast concrete. “This grade was about 70 feet. It was definitely a new experience.”

Precaster: Dailey Precast, LLC, Shaftsbury, VT
Owner: New York State Office of Government Services, Albany, NY
Architect: Desman Associates
Engineer: Clough, Harbor & Associates, Albany, NY
Contractor: Turner Construction Co.

Project Scope: 8 levels, 1,380 parking spaces
1,230 total pieces including—
• Double tees
• Inverted tees
• Stair risers and landings
• Spandrels
• Lite walls

Taken from PCI Northeast website: www.pcine.org/projects

Parking Resources

Visit the Precast/Prestressed Concrete Institute website for an assortment of free downloadable design related publications to help design and construction professionals to understand and use precast, prestressed concrete:

Maintenance Manual for Precast Parking Structures — this manual is intended for the owners, operators, architects, and engineers of precast parking structures in order to assist them in extending their structure’s service life.

Parking Structures – Recommended Practice for Design and Construction
Parking Structures – Snow Removal
Joints in Precast Parking Structures
Precast Concrete Parking Structure Lighting Study
Innovative Parking Structure Puts Cars on Display
Precast Concrete Delivers Parking Brochure
Parking Structure Systems Comparison Chart

You will also find case studies at:
Longview – Cromwell Garage, White Plains, NY

Precaster: Dailey Precast, LLC

Parking Structure Durability — Durability is the intrinsic value that allows precast prestressed concrete parking structures to outlive competing materials. The difference is quality concrete. The combination of low water-to-cement ratio and heat cured concrete, achievable only in a factory environment, equals a high-strength, low-permeability, durable parking structure.

Concrete exposed to moisture and chlorides perform best with low water/cement ratios and a compressive strength of 5000 pounds per square inch (psi) minimum. Precast/prestressed concrete is produced with concrete that exceeds these requirements, whereas cast-in-place concrete normally does not meet these requirements. This criteria meets the recommendation of ASTM C94 and also is endorsed by knowledgeable designers. Additionally, research by the Federal Highway Administration (FHWA) has shown that concrete mixes with water/cement ratios that are .40 or lower have relatively high resistance to chlorides, while concrete with this water/cement ratio have much lower absorption characteristics than traditional cast-in-place concrete with water/cement ratios of 0.5 or greater.

In order to reach its maximum strength, concrete must be cured at the optimum rate, with precise moisture, temperature, and environmental conditions. Precast prestressed concrete products, which use this method, create high strength and impermeability. These optimum conditions are achieved daily in the plant, whereas it is not practical to perform them in the field. Studies of heat cured concrete as used in the precast’s plant have shown decreases in water absorption and volume of permeable voids.

Carriage Park Parking Structure, Lincoln, NE

Albany Medical Center Parking Structure, Albany, NY

Taken from PCI MNL-129-98

Precast Prestressed Parking Structures: Recommended Practice For Design and Construction
Annual Meeting Notice

Plan to attend our Annual Meeting May 9 in Albany; morning 9 to 12; afternoon is the joint meeting with the NYSDOT Structures and Materials, 1:30 to 4:30.

Welcome to Peikko USA, our newest Associate Member. Find them at www.peikkouse.com.