



Lifting 3.3-million pound pre-cast beams into place proved to be a challenging task for contractors trying to meet an aggressive May 1 deadline on the new Florida Marlins stadium. The construction team of general contractor Hunt/Moss and concrete contractor Formworks/Baker JV LLC utilized concrete pumps to cast some of the track-beam sections in place for installation of the retractable roof's track system, while lifting of the pre-cast sections progressed. Cherokee Pumping provided the long booms to accomplish the high level placements, while also continuing to pump decks for the five levels of seating and public areas.

A Design Challenge

The stadium is being built on 42 acres of historic land that housed the original Orange Bowl in Miami's Little Havana

neighborhood, less than two miles from downtown. When complete, the 37,000 seat stadium will occupy nearly one million square feet of the site. The 8,300-ton retractable roof, required by Miami's changeable weather, spans 560 feet and can be opened in just 13 minutes. The two parallel tracks that allow the stadium's roof to open and close are 760 feet long and are supported by 12 super columns.

Four of those columns are splayed tree designs that Formworks/Baker's project manager Hans Rowland describes as "a unique design and some of the most difficult that we have built." The splayed columns are "plus sign"-shaped structures at the base that branch into three separate support members for the track beam. These architectural features on the north and south ends of the stadium rise to 140 feet.

Schwing S 58 SX pours one of five levels in the new Marlin's Stadium that will be completed for the 2012 season.

"The splayed columns were pumped in lifts," according to Rowland. "The columns have multiple curves and are very congested with steel and required tight tolerances." Given the difficulty of forming the columns, installing the reinforcing and consolidating the mix, a single 13-foot lift took up to a week. Because of the impending deadline to get the track beams in place, the columns were poured whenever the forms were jumped. "We preferred to pour in daylight because of the complexity of the pours, but the schedule forced us to light the site if a column lift was ready at eight o'clock at night," Rowland said. "The cooperation of the pumping company to be available whenever we needed them was extremely valuable."

SPECS

Project: **Florida Marlins Stadium**—Miami, Florida

Owner: **Miami-Dade County**

Architects: **Populous**—Kansas City, Missouri

General Contractor: **Hunt/Moss, A Joint Venture**—Miami, Florida

Concrete Contractor: **Formworks/Baker JV LLC**—Fort Lauderdale, Florida

Pumping Contractor: **Cherokee Pumping**—Pompano Beach, Florida

Equipment: **Schwing S 58 SX and Schwing KVM 52 truck-mounted concrete pumps with placing booms**



Splayed columns can be seen at the end of the track. Track beams were cast-in-place on the first section in order to speed construction while pre-cast beams were hoisted into position.

Containing Costs

Three Schwing long booms pumped the majority of the 65,000 yards that would be consumed by the stadium. “Because of the reach requirements to place the columns, track beams and upper levels, very little could be accomplished with shorter booms,” Rowland commented. Cherokee had three boom pumps on-site—two S 58 SXs and a KVM 52-meter—all with overhead Roll and Fold booms. One of the S 58 SX pumps with 187’ 9” boom reach was leased from Cherokee for the project and was on-site full time. “We kept three operators available to this project at all times,” explained Ralph Englert, Cherokee’s manager in south Florida. “All of the operators are ACPA certified, which is just good business and important to the overall safety of everyone on the project.” The visibility of the project meant cost containment was a priority

and three operators allowed Englert to shuffle them to avoid overtime on the six-day 12-hours-a-day schedule.

Staying Flexible

Prior to mobilizing, Cherokee had certified boom inspections performed on their pumps. The weekly yardage of pumped concrete on the project accelerated from approximately 1500-cubic yards to 3,000-cubic yards, and more than 12 mix designs were incorporated into the project, ranging from pea-gravel 10,000-psi high-strength mixes in the columns to 5,000-psi deck mixes. All concrete was provided by Cemex. Five levels of decks—mezzanine, suite, press, club and concourse, totaling 490,000 square feet—were pumped by the long booms.

“The logistics dictate that we set up in the interior of the stadium,” Englert explained, “and with the set-back it took



Forming and pouring of the splayed super columns occurred simultaneously in order to meet the May 1 deadline for track beam construction.

long booms to reach into the depths of the stadium levels. This is where the Super X outriggers on the S 58 SX paid off—by maximizing the horizontal reach.” The curved outriggers also allowed easier setup in the confined area of the ground level by telescoping out and around job site obstructions.

“The beauty of these 2525 pump kits with the large diameter pumping cylinders and long stroke is that they provide smooth controlled output for the column pours and crank up to 200 yards per hour when we need the output,” explained Englert. He also mentioned the reduced wear from the efficient, slow-stroking action. “We have not encountered any problems with the wide variety of mix designs on this project



Jump forms were used to place 13-foot lifts which took up to a week to pour due to the shape and tight tolerances of the super columns.



Hydraulic strand jack was used to lift precast track beam sections that were pumped at the lifting point.

and the fast wash-out of the Rock Valve lets us switch to other locations and alternate mix designs quickly.”

Clock-Watching

The pre-cast track beams sections were pumped at their lifting points and were hoisted atop the super columns by a hydraulic strand jack. Meanwhile, the pumping company’s 58-meter booms were pumping the two track beams formed on top of the splayed columns. With the May 1 deadline approaching, it was all hands on deck. “We would work on high level pours to tie the pre-cast beams in place while also pouring at 150 feet up to form the cast-in-place track beams,” noted Englert. “Sometimes we would be on-site all day waiting for a beam to be placed and that’s when the operators would perform preventative maintenance checks and clean the pumps up.” Baker reported no lost time to pumping equipment problems on the stadium project, which is scheduled to open for the first pitch in the spring of 2012.

“The ability for Cherokee to react and be proactive with pumping ideas provided good solutions for this fast-track

project,” according to Rowland. “Most projects down here are high-rise condos where pumping equipment input is important. On this project, it is all powered by booms and that’s where experience pays off.”

Going Green

The Florida Marlins, together with general contractors Hunt/Moss and architectural firm Populous, announced the New Marlins Ballpark is implementing several green initiatives in order to achieve LEED Silver Certification. “We are excited to shine light on these important green initiatives,” said Claude Delorme, Florida Marlins executive vice president of ballpark development. “Efficient waste management, use of recycled materials and storm water runoff safeguards are some of the key components of our green efforts.”

The New Marlins Ballpark construction team has initiated an aggressive waste management recycling program. Currently, more than 90 percent of the construction waste is being recycled. Primary items being recycled are: asphalt, cardboard, concrete, metal,

steel, paper, plastic and wood, among others. And water. “Cherokee’s pumps are well-received on the site due to the labor savings, fuel efficiency and limited water required for washing out the Rock Valve,” commented Englert.

Coming Home

Once the stadium is completed the Florida Marlins will be renamed the Miami Marlins and will move from their temporary home at Dolphin’s Stadium in Miami Gardens to their new location. The stadium will become only the sixth major league stadium to have a retractable roof. The Marlins will provide \$155 million and fund any and all construction cost overruns except those that are governmentally-caused. Additionally, the team will purchase from the city \$100 million worth of space for a parking garage to be constructed and pay for all maintenance, repairs, operations and insurance on the facility. Owner Miami-Dade County will provide \$50 million of Building Better Communities General Obligation Bond funds that were specifically allocated for the Orange Bowl site and \$297 million of county tourist-tax revenues. □

