2020 Outstanding International Project

Skateboarding in Barbados

A Concrete Vision that became a Shotcrete Reality.

By Andy Duck

DEDICATION AND PERSISTENCE

People have been traveling to the small Caribbean island of Barbados to surf the ever-present waves arriving across the Atlantic for as long as humans have pursued wave riding. The same can be said about skateboarding as the parish of Christ Church now boasts a regional concrete skatepark! This was a long and thorough process shepherded by a consortium of firms and associations, all working to provide the Bajans a modern concrete skatepark through proper planning and processes. This all began with one phone call from Paul Wilson, a local skateboarding advocate with the tireless passion to bring proper skateboarding to the youth (of all ages) of Barbados.

After several years of dedicated advocacy on behalf of Paul and his growing number of associates, peers, and local skaters, he and his group created the Skateboarding Association of Barbados and became recognized by the Ministry of Sports. Now they were organized!!

Through several more years of dedicated work, including a couple of site review trips and feasibility studies, the team to design and construct the first skatepark in Barbados was in place. Our frequent partner in the design/build process, Pillar Design Studios, LLC was selected as lead designer for the skatepark aspects of the project. Pillar developed the construction documentation with the aid of a local civil and structural engineering firm, Spencer Thorne. Once funding had been secured by the Maria Holder Trust, the firm of Cooper Kaufman was tasked with managing the project and securing the bid for the general contracting portion of the project. Godson Builders was awarded the contract and Artisan Skateparks was selected as the specialty skatepark contractors. Now it was on!

As is the norm for concrete skatepark construction, shotcrete was specified as the preferred method of concrete placement for much of the new skatepark. Shotcrete has long been the go-to method for skatepark construction. The ability to provide great compaction and full reinforcement encapsulation during placement lends itself well to the typical undulating surfaces a modern skatepark encompasses.

THE PLAN

Working towards a great shotcrete experience takes a fair bit of planning when working in North America. Working towards a great shotcrete experience in a foreign land is another level. Aside from the obvious metric to US standard conversions and any potential language and cultural interpretations required, working abroad can create a variety of challenges. These challenges are best met through extensive research into the locally available materials, environmental conditions (and seasons), batching procedures, mixing capacities, hauling volumes, typical traffic, relative transit times, and who is the best local plant to supply the precious cargo. Lucky for us, this was not our first international project…

Ready Mix of Barbados was selected as the project concrete supplier. The many planning elements were handled via a wealth of email, phone calls, and even text messaging

(the most popular method of communication in Barbados). We knew it was going to be a hot weather shotcrete application and we worked diligently with Ready Mix to find a concrete mixture design as the foundation for our final shotcrete recipe. The specifications called for a mixture with a 4000 lb/in^2 (28 MPa) 28-day compressive strength requirement that required using a water reducing admixture and hydration stabilizer to facilitate the hot weather applications.

The raw material aspects went pretty simply. Once we learned we would be working with an all portland cement mix (pozzolans often comprise a 15-20% proportion in the States), and that all the aggregate to be found was a form of crushed limestone (marl), we knew we were going to be looking at a "thirsty" and rapid setting material. We were looking at historical temperature ranges from 76 °F (24.4 °C) in the morning to as high as 89 °F (32 °C) in the afternoon with maximum humidity on any given day.

Once we factored the generally windy conditions onsite coupled with how close the sun feels so near to the equator, we knew we needed to consult with some admixture gurus to make this project successful. We chose Sika, as we have a history of using several Sika products for long-haul shotcrete applications at home. Sika also has good representation in the Caribbean. After several discussions about conditions on the project, we selected appropriate ratios of hydration stabilizer and water reducing admixtures, and then we put the admixture drums onto our shipping container along with our tools, and other equipment.

Before we started this project, we were told there were about three previous uses of shotcrete on the island. Unfortunately, no one remembered what types of projects or or even when they occurred. We were about to embark on 260 yd^3 (200 m^3) of shotcrete with a plant and crew that had never

rough grading plan were comprised of crushed marl. It had been placed in layers, moistened, compacted, and was waiting for us to move forward. Just like normal.

After moving in, and moving forward those first few days, we learned a lot about marl. One, it compacts so densely that we had to literally drill holes in the ground for pins, stakes, or anything, including nails. Secondly, it dries intensely quickly. This sounds good considering it rains hard at some point every single day (if not more), but considering how quickly it was going to draw water from the concrete mixture was a major concern. Skatepark shotcrete receives a Class-A steel trowel finish (typically with 10 in. (250 mm) peanut trowels). Finishing takes place after hand shaping the finished contours and details in the freshly placed shotcrete. The third and most unexpected aspect of working with marl relates to sunburn. Yes, our families made sure we had all the applicable sun protections one would expect to need in the lower Caribbean. But the sun reflects off marl and sunburn under one's chin and under sunglasses and bottoms of ears were not at all expected nor prepared for (Ouch!)

For a litany of reasons, the decision was made to use a tented area for each shotcrete placement, and shade became our mantra.

THE WORK

As the final excavations were completed, we installed the formwork and subsequent reinforcing steel throughout the shotcrete portions of the project. We selected a sequential order to the shotcrete that began with a simple smaller placement to work out the process with the batch plant and to put the new concrete mixture design to the test. We ordered a 7 yd^3 (5.4 m^3) load with what we had calculated necessary for the Sika 440 Hydration Stabilizer to give us 2 hours to experienced it previously. Luckily for us, Godson Builders invested in a new REED A30 HP concrete pump. We have used this type of pump for over 10 years. This allowed us to easily teach their crew how to operate the machine and also gave us the confidence in the pumping equipment to get the job done. Time to head to Barbados.

THE ENVIRONMENT

The humidity strikes you the second you leave the the plane. Lush greenery and palm trees abound, showing the fairly constant wind patterns. Different cloud sets, high and low, move graciously throughout the abundant blue canopy of the sky. The concrete around the airport showed that it had rained not too long before we arrived, adding to the humidity… "Glad we packed those big tarps on the shipping container" was all I could think of in the back of my mind.

Later that day, we visited the job site, met all the local workforce, and took in the site-specific environmental conditions. The entire site had been stripped of organic materials down to what we would refer to as ledge. From there, the contours that made up the

transport, shoot, and shape the placement. We set up the tent structure from available lumber and draped our poly blue tarp over the wood frame to achieve the needed shade.

The shotcrete application went according to plan. The pump was delivered, the ACI-certified nozzleman placed the material, the shapers shaped the placed concrete, and then we waited for hours for the final set to stiffen up for the final troweling passes. Aside from too much of the 440 Hydration Stabilizer, we felt like we were on the right road to complete the tasks at hand.

At the end of each placement, we laid out relief cuts that were made with a Medusaw (wet process worm drive 7¼ in. (184 mm) saw with diamond blades). We would complete the saw cuts with mini grinders, moisten the slabs, cover with plastic to seal in the moisture for hydration, and drop our tarp on top of everything to secure the plastic from the windy conditions. The day after the placement, we would remove the plastic and apply

a Sika curing compound and re-cover the slabs with plastic to try and seal as much moisture in the slabs as possible for curing.

Each subsequent day, we increased our output, while making incremental changes in the chemical admixture volumes and slump, etc. By the end of the first week, we had achieved confidence in the mixture, the batch plant, and our new shotcrete team (local pump operator in training and a local finisher/helper – Paul Wilson – the main advocate for the project). It was time to jump into the bowl!

The Bowl was completed in four shotcrete placements and included a deep end section (8 ft [2.4 m]) that was designed to receive the pool coping and tile. We created an indentation in the shotcrete of approximately 6 in. (150 mm) from the top of the beam so that we could set the impending tile flush with the finished shotcrete surface. Daltile ceramic tile, rated for exterior use, was sourced and shipped over in our original container, along with the Federal Stone pool coping and Laticrete setting materials. We collectively chose the Barbadian Blue and Yellow colors from the Barbados national flag for the tile band underneath the white pool coping.

2020 OUTSTANDING INTERNATIONAL PROJECT

Project Name
The Kaitif Skatepark

Location
Christ Church, Barbados

Shotcrete Contractor
Artisan Concrete Services Inc.*

Architect/Engineer
Pillar Design Studios, LLC

Materials Supplier
Ready Mix of Barbados

Equipment Manufacturer
REED Concrete Pumps*

General Contractor
Godson Builders

Engineering
Spencer-Thorne

Project Managment
Cooper-Kaufman

*ASA Sustaining Corporate or Corporate Member

COMPLETION

We completed the entire project, from arrival to final flatwork and subsequent joint sealing, etc. in four months. The shotcrete process took approximately 5 weeks and went pretty smoothly for one, if not the only, shotcrete project on the island of Barbados. Luckily, this was not our first venture to international shotcrete. We spent a great deal of time planning what we needed to ship in for the project. If you don't bring it with you or you cannot fabricate whatever tool or accessory that you need for the job, you will be going without. Adapting to the environment and using good communication skills with all the various suppliers, trades, and craftsmen was crucial to the success of the project. We planned ahead, brought two of everything we would need, and relied on our skilled crew members to shape the future of skateboarding in the island paradise of Barbados.

Andy Duck: *The Artisan Group, Ltd.; Artisan Pools NC, Inc.; Artisan Concrete Services, Inc.; and Artisan Skateparks*