The Star Pass Lazy River Project

by Warren Bezanson

The area of Tucson, AZ, has been a three-season resort destination since the early 1900s, when western dude ranches provided an opportunity for visitors to experience the romance and adventure of the Old West. Today, Tucson's mild, dry climate; world-class resorts; golf courses; and spas provide an attractive destination for travelers.

Traditionally, the tourist and the convention business slow down during the summer months when midday temperatures can exceed 100 °F (38 °C). The JW Marriott Starr Pass Resort & Spa, a golf and spa resort nestled in the Tucson Mountains, was looking for a way to increase occupancy rates in the hot summer months. A "lazy river" with a slide was a concept that the Marriott decided to explore. The goal of the project was to provide the hotel with an amenity to increase marketing effectiveness and boost summer business.

Wikipedia defines a lazy river as "a water ride found in many amusement parks or water parks. They are also found at some resorts and recreation centers. It usually consists of shallow 2-1/2 to 3-1/2 ft (0.76 to 1 m) pool that flows similarly to a river. There is generally a slow current and usually just enough to allow guests to gently ride along lying on rafts."

The lazy river concept was established to use the space available between the hotel and the golf course. This site comprised natural Sonoran desert with areas of backfill from the original hotel construction and included a grade change of approximately 25 ft (7.62 m) from one end of the area to the other. The function of the site had to tie into existing pedestrian walkways associated with the resort.

Construction of the project began in September 2007 with completion anticipated in February 2008. Aqua Design Inc., an international commercial pool design firm located in Tucson, provided the design for the lazy river project. The scope of the project included a lazy river pool 12 ft (3.66 m) wide, 3 ft (0.91 m) deep, and 625 ft (191 m) in length; a water slide originating from the roof of the equipment building with a chute of 97 ft (29.57 m); a 7800 ft^2 (725 m^2) center island to provide event space; and

The lazy river close to completion

a total deck area of 14,300 ft² (1329 m²). This project complied with the requirements of the 2006 International Building Code (IBC), Pima County Health Code, and Americans for Disabilities Act. The JW Marriott brand design standards were also included in the design. Structural engineering was provided by Pool Engineering Inc., located in Anaheim, CA. The design required the placement of six expansion joints in the shotcrete structure due to the width-to-length ratio creating six interfacing structures and an under-drain system was designed to be constructed beneath the pool to convey groundwater and to allow for monitoring any leakage from the structure.

Patio Pools and Spas, a locally owned Tucson firm in Arizona, was contracted to build the project. Having built the original hotel pools and many other commercial pool projects over a 40-year period, the building of a lazy river water feature was within the scope of the firm's expertise. Commercial Project Manager Steve Curd, with the assistance of Superintendent Lance Sinclair, directed the work of Patio Pools' all in-house crews.

Time and accessibility were constraints on the project. Access to the site was along a golf course cart route with limited or no staging. A critical path schedule was determined to build the lazy river in phases around other contractors doing infrastructure work. Sections of the lazy river were defined by the expansion joints and were constructed from excavation through shotcrete installation at various intervals of the project duration. The last section was left unexcavated for access until the majority of the concrete deck on the project was placed.

The expansion joint detail consisted of a butt joint at the bond beam and walls with a lap joint at the floor. The floor lap was reinforced with No. 5 reinforcing bar added to the typical No. 4 on 8 in. (203 mm) centers for the basic grid. Three foot long (0.91 m) smooth stainless steel bars were placed on 1 ft (0.30 m) centers spanning the joint to control lateral movement. Tile borders along both sides of the joint provided a terminus for the marcite plaster finish while an imbedded 9 in. (229 mm) polyvinyl chloride waterstop with caulking provided a waterproof seal.

Forming the joint required a form constructed from 3/4 in. (19 mm) plywood with a slot to position the waterstop and penetrations to accommodate the stainless steel dowels. Each section required 1 day for a four-member shotcrete crew to place approximately 40 yd³ (31 m³) of 4000 psi (28 MPa) shotcrete. After the forms were removed, the steel reinforcement was placed in the adjacent sections and one of the two sets of forms

Forms are constructed in sections for ease of removal and set prior to completing steel placement. Installing waterstop and 1/2 in. (13 mm) stainless steel rods will finish the form preparation. This photo shows a side view of the shotcrete placement

A finished shotcrete joint section with 5/8 in. (16 mm) foam separation installed, ready for next shoot

A section ready for shotcrete with form joint in place. Peg board installed behind steel to save shotcrete material from filling voids in poorly consolidated soil in excavated walls, later backfilled with pea gravel

Shotcrete section adjacent to the unexcavated final section

Partial excavation of the last section left for access to island. Here is an example where the joint detail was formed incorrectly, where the integrity of shooting the subsequent lap beneath the floor cannot easily be validated

was reused for the next shoot. The last section required no forming as it completed the structure. Cleaning and caulking the joints was performed just prior to the application of the interior finish. The completed lazy river was filled with water on February 15, 2008. There have not been any cracks in the structure or water loss noted to date.

The grand opening event celebrating the first lazy river in Tucson, AZ, took place on March 28, 2008. The event was attended by many media personalities, and Mayor Bob Walkup of Tucson was the guest of honor and keynote speaker. Mayor Walkup "cut the ribbon" as he personally tested the thrill of the water slide.

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Tom Norman*, ASA member and Chair of ASA's Pool and Spa Committee, wants your input. Your comments, suggestions, and the topics you'd like to see covered are welcome. Perhaps you'd like to become a contributing author to Pool & Spa Corner. Norman and the ASA staff encourage you to contact ASA with your questions and comments at: info@shotcrete.org.*