EXTERIOR WATERPROOFING AND STORM DRAIN REPAIRS

AT THE KAY BAILEY HUTCHISON CONVENTION CENTER

BY RYAN GRIGSBY

Formerly known as the Dallas Convention Center, the Kay Bailey Hutchison Convention Center is one of the largest in the nation and is the site of major national and international conventions, concerts, auto shows, and other special events. The center is over 2,000,000 ft^2 (185,806 m^2) in size and contains 1,000,000 ft^2 (92,903 m^2) of exhibit space. Also housed on the campus is 65,124 ft^2 (6050 m^2) of ballrooms; 88 meeting rooms; a 21,290 ft^2 (1978 m^2) arena; and a 1740-seat theater. Additionally, the world's largest heliport sits atop the structure and 75 truck berths line its docks.

Built in 1957, the convention center underwent four significant expansions over the years. While the additions contributed greatly to the facility, the existing structure was in need of repair. When this project commenced in November 2012, the convention center was plagued with persistent leaks. Some areas needing improvement had not been renovated since the original construction. Additionally, the storm drain system's deficient capacity caused water overflow problems during heavy storms. The facility's rehabilitation, completed in 2014, covered many areas of the campus, including the main loading dock, A/B Hall, The Black Academy of Arts and Letters Building, the Arena Building, and Ceremonial Drive.

Fig. 1: Hot fluid rubberized waterproofing was applied at approximately 450°F (232°C) to achieve a 90 mil (0.09 in.) layer

The numerous events hosted at the convention center draw over a quarter million people to Dallas each year. During repair construction, multiple trades had to be scheduled around these operations that affected accessibility of the loading dock, imposed noise-level restrictions, and caused frequent work start-and-stops. The project team met biweekly to keep the project moving forward as efficiently as possible. The owner issued a color-coded events calendar indicating "work days," "no work days,"' and "'possible work days.'" On "possible work days," the decision to work or not sometimes could not be made until that morning. Even on "work days," construction could get shut down due to noise or other event factors.

THE LOADING DOCK

To allow the loading dock to remain in use throughout the project and accommodate the events, the project team decided to complete the repair construction in two phases. The entire scope—

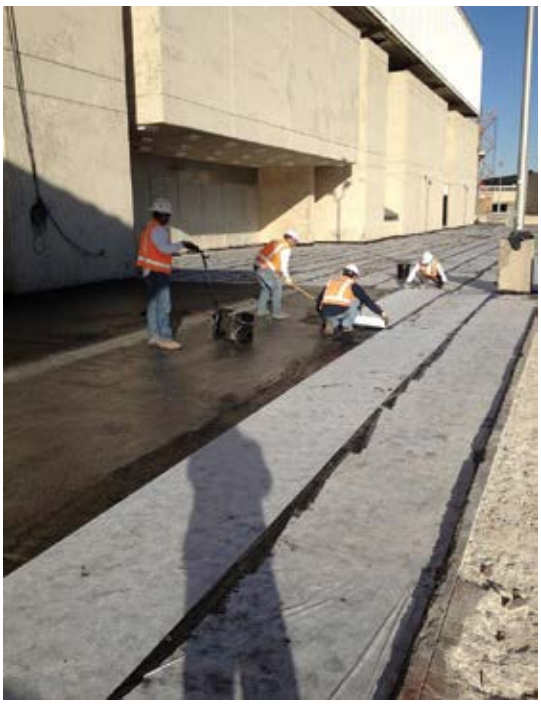

Fig. 2: A geotextile reinforcing fabric was applied between layers of the hot fluid rubberized waterproofing

Fig. 3: A low-modulus epoxy resin binder was applied to the loading dock to allow for movement of the substrate and withstand the heavy traffic sustained during multiple events at the convention center

concrete demolition, removal of old waterproofing, concrete repair, application of hot-fluid waterproofing, and epoxy deck coating—was completed on only one half of the loading dock at a time, leaving the other half available for use.

In its entirety, the loading dock received 18,000 ft^2 (1672 m^2) of waterproofing replacement to resolve water infiltration issues. To begin, the topping slab was demolished and the old, failing waterproofing was removed with handheld grinders. A versatile, single-component repair mortar was used on the damaged areas of the structural deck where the concrete was cracked and spalled. The low-shrinkage, high-early-strength material allowed for a fast turnaround time.

Once the concrete was repaired, a hot fluid rubberized waterproofing was installed (Fig. 1 and 2). This product started as chunks of asphalt, which were heated in a kettle at 425 to 450°F (218 to 232°C). The melted asphalt was placed into steel buckets, poured onto the substrate, and leveled with squeegees to provide a 90 mil (0.09 in.) layer. A geotextile reinforcing fabric was installed followed by another 125 mil (0.125 in.) layer of hot fluid waterproofing. The quick cure time for this material made it possible to install a multi-composite drainage and protection board the next day.

With the new waterproofing system in place, reinforcing steel was installed and the new topping slab poured. Then, a two-component, 100 percent solids, moisture-tolerant epoxy resin binder with an aggregate broadcast was applied to the topping slab (Fig. 3 and 4). The low-modulus coating system allows for movement of the substrate, such as the loading dock's expansion and contraction based on the ambient temperature. Finally, control joints were sealed, new dock bumpers installed, and the loading dock was striped. The same waterproofing scope detailed previously was also performed on the 10,000 ft^2 (929 m^2) A/B Hall exterior terrace (Fig. 5).

Fig. 4: An aggregate broadcast was applied into the epoxy coating for slip resistance

Fig. 5: The completed loading dock

THE BLACK ACADEMY OF ARTS AND LETTERS BUILDING

A 40 ft (12 m) deep excavation kicked off the 5000 ft^2 (465 m^2) below-grade remedial waterproofing process for The Black Academy of Arts and Letters Building. The excavation was completed in very tight spaces due to retaining walls and the landscaping. Protective systems were engineered to allow

Fig. 6: Trench boxes were placed in the narrow excavation at The Black Academy of Arts Building to allow for safe completion of the repairs in the limited areas where shoring or benching was not a possibility

Fig. 7: Trench box in the narrow excavation site

Fig. 8: The crew worked safely in the trench box to apply the below-grade waterproofing to the basement of The Black Academy of Arts Building

Fig. 9: The area of Ceremonial Drive under which the convention center's storm drain system resides

Exterior Waterproofing and Storm Drain Repairs

SITE
Kay Bailey Hutchison Convention Center
Dallas, TX

OWNER
City of Dallas
Dallas, TX

CONTRACTOR
Chamberlin Roofing & Waterproofing
Dallas, TX

ENGINEER
Datum Structural Engineers
Dallas, TX

MATERIAL SUPPLIER
All Tex Supply and SSI
Dallas, TX

for safe completion of the repairs in limited areas where shoring or benching was not a possibility.

In one narrow area measuring approximately 1400 ft^2 (130 m^2), trench boxes were used as a cave-in protective system (Fig. 6, 7, and 8). For safety purposes, the excavated soil was transported and stored off site until it could be placed back in the ground. Another remedial measure incorporated a sheet pile system. I-beams were inserted into drilled pier holes and shored with rock. Then, metal panels were placed between each I-beam to safely secure the soil.

Once the excavated area was safely secured, a self-adhered sheet waterproofing was applied to the basement of the building. To remedy persistent leaks caused by the old waterproofing system stopping short, just beyond the wall's cold joint, the new waterproofing extends 30 ft (9 m) below grade.

THE STORM DRAIN SYSTEM

An additional drain pipe was added to the convention center's existing storm drain system to expand its capacity, and the new pipe was tied in with existing utilities. The storm drain system resides under Ceremonial Drive, a main road leading to the convention center (Fig. 9), making this utility work especially challenging to complete. To allow use of the road for each event, construction had to be halted and the excavation filled in. To create a driving surface, concrete was poured where possible and road base filled the rest. When the event was over, the road was re-excavated and construction continued.

QUALITY CONTROL

Quality control was a team effort on this job. Throughout the duration of the project, quality inspections were completed by the owner, architect, engineering firm, material representatives, and prime contractor.

CONCLUSIONS

The entire project team was extremely pleased with the finished product. Through excellent field labor productivity and efficient material use, with virtually no waste, this high-quality project was completed under budget at just over $1.7 million.

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