



PLAZA DECK AT AMERICA'S TOP VENUE RELIES ON A SERIOUS INSULATION SANDWICH

DICKIES ARENA IN FORT WORTH, TEXAS

American poet Carl Sandburg described Texas as a land of “valor and swagger.” The same words could apply to Dickies Arena, a one-of-a-kind arena in Fort Worth that blends valiant cowboy culture with the swagger of high-energy sporting events. Named the number one mid-size venue in North America — and number two in the world — by Billboard Magazine’s Boxscore Chart, Dickies Arena plays host to events that range from rodeos to rock concerts, WWE Monday Night Raw, and the NCAA Gymnastics Championships.

While events, performances, and food trucks on the plaza deck delight visitors, the FOAMULAR® XPS extruded polystyrene insulation that underlies the arena’s high-performing plaza deck delivers behind-the-scenes star performance on a grand scale. How grand? The plaza deck encircles about 140,000 feet of arena space, a testament to Texas’ reputation for going big.

A Three-Tiered Design Strategy

The plaza deck project team was challenged to specify and install an insulation that could deliver several performance attributes. First, the insulation had to offer sufficient compressive strength to withstand the weight load of vehicles, equipment, staging, and thousands of visitors. At the same time, the insulation under the deck was required to minimize the weight load on the overall structure compared to the same thickness of concrete. An especially important challenge was diverting rainfall from the roof to the storm sewer lines. And finally, logistics and project management team members had to ensure that work stayed on track (or ahead of schedule) as deadlines were moved up several times during the course of construction.



Right: From coordinating deliveries to protecting materials on the job site, collaboration and teamwork enabled the plaza deck that encircles about 140,000 square feet of arena space.

Bringing a collaborative mindset to the challenge, Owens Corning worked with Sunbelt LLC, the insulation distributor, to estimate a three-tiered insulating system that relies on a combination of reverse-tapered, flat, and tapered Owens Corning® FOAMULAR® extruded polystyrene (XPS) insulation. An “insulation sandwich” design helps manage the slope of the deck, offers a lighter-weight option for elevating the deck compared to concrete, and helps manage stormwater.

The first tier of insulation was reverse-tapered to gradually bring the slope of the plaza deck back to a level surface. Estimating the amount of reverse tapering may have been the most significant challenge as conventional models were literally turned upside down.

A second tier of insulation consisted of 12 inches of “flat-fill” XPS to raise the deck. The flat-fill insulation provided a much lighter solution to raise the height of the plaza deck than could be achieved with concrete. Professionals evaluating the structure concluded that the weight could be distributed in such a way that a 60-psi insulation installed in the plaza deck could withstand weight loads of 25,000 pounds. The compressive strength of FOAMULAR® XPS was essential to achieving the desired performance.

Lastly, a third tier of insulation was installed to help navigate rainwater from a barely visible drain on the plaza deck through a network of underlying drains leading to the storm sewer system. Whereas plants and grassy areas on vegetative roof assemblies can help absorb rainfall and conceal drains, the hard surfaces on the plaza deck could not leverage vegetation for these purposes. Extensive modeling informed the placement of drains, as well as the specific amount and placement of insulation in different parts of the plaza deck.

While Owens Corning and Sunbelt Building Services, LLC managed installation of the FOAMULAR® XPS insulation, execution of the plaza deck and roof design strategy required collaboration from a team of professionals, including HKS, the architect of record; David M. Schwartz Architects, the design architect; The Beck Group, the general contractor; and Jeff Eubank Roofing Co., Inc., the roof system installer.



Above: Three layers of FOAMULAR® XPS Insulation deliver compressive strength to withstand traffic on the plaza deck covering 140,000 square feet.

Dual Drains Work With Insulation to Manage Stormwater

The design included two sets of drains sloping in different directions to serve specific purposes. As the drain’s design slopes one way to drain water, the insulation rises and meets the bottom of the topping slab, which slopes in a completely different way from the underlying slab. The linear drains serve as an open joint in the pavement, distributing the heavy surface water falling on the plaza. Because concrete is not a water impermeable substrate, a second set of drains collect incidental water infiltrating to the waterproofing level above the structural slab. Together, a system of sleeves and slopes direct incidental water to the storm drain, and trenches channel rainwater to the storm sewer lines.



Above: Linear trench drains serve as an efficient open joint to efficiently distribute heavy surface water to sewer lines without disrupting the smooth aesthetic of the deck.

Logistics, Project Management, and a Collaborative Approach

Job site culture also had a role to play in the success of the plaza deck. Behaviors and best practices that some people might perceive as small things can play an important role in optimizing a project's outcome. For example, a best practice on any construction site is to protect construction materials that are exposed to the elements. Team members ensured that materials on the job site were protected from excessive heat and UV and exposure that can be a concern for polystyrene insulations. Delivery and material staging were coordinated between Owens Corning, Sunbelt, and various contractors on the job site to keep materials clean and pristine for installation. Off-site team members also proved essential to the project's success. Production plants, product managers, and sales managers worked with a dedicated purchase order processor and a team of 20 to manage the plaza deck insulation project through to completion.

Collaboration continued on the job site where tapered pieces were sent "up-slope" and cut into specific rectangular sizes. Because FOAMULAR® XPS can be easily cut by scoring and snapping and is not prone to brittleness, the team didn't have to deal with worksite debris such as board beads littering the work area. Materials on-site were covered or located away from UV rays and wind exposure. During peak construction periods, as many as 700 people were working on-site so a just-in-time approach to getting the right products on the site at the right time was essential.



Above: Materials used in the plaza deck were carefully staged on the job site and protected from the elements. The material was installed in phases. Here, the edge of a completed phase shows the layers of XPS, drainboard, and reinforced concrete topping slab ready for transition to the next phase.

Scale, Structure and Style

Beyond the plaza deck, other aspects of Dickies Arena contribute to its award-winning status. The arena boasts 100,000 square feet of space at the exhibit level, including 40 suites and 14,000 seats. When envisioning the ethos of the arena, designers kept the "neighbors" in mind and sought to complement the nostalgic ethos of the adjacent Will Rogers Memorial Coliseum constructed in 1934. The domed roof is topped with cupolas that complement a time when the U.S. government was investing in Public Works Projects. However, this homage to the past does not mean sacrificing modern lighting technologies that enhance the grandeur of the arena at night.

Whether described as "valor and swagger" or simply "everything is bigger in Texas," Dickies Arena makes a distinctive architectural statement in a city renowned for history, style, and "going big."

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