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A Dynamic Rooftop Renovation Lures a New Type of Workforce

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Commercial office properties have always had to contend for tenants as a part of doing business and, increasingly, existing buildings are facing stiffer competition from new office properties offering integrated amenities packages that go way beyond the lobby coffee shop. As a new generation of employees enters the workforce, employers are challenged to secure leases that provide more than simple office space, instead offering an attractive combination of recreation, retail and relaxation options that feel more akin to a resort than a workplace. In the case of Prudential Plaza, a 41-story structure in Chicago built in 1955, the challenge for the building owners was to offer new value in a building originally designed to respond to a workforce that no longer exists.

Investing more than $85 million into building renovations, Prudential Plaza’s owners envisioned a top-to-bottom rehabilitation, crowned by a 13,000-square-foot amenities deck on the 11th floor. The rooftop transformation is highlighted by a fully wired amphitheater, fire-pit lounge and a small lawn accompanied by a new 12,000-square-foot fitness center and commercial office properties have always had to contend for tenants as a part of doing business and, increasingly, existing buildings are facing stiffer competition from new office properties offering integrated amenities packages that go way beyond the lobby coffee shop. As a new generation of employees enters the workforce, employers are challenged to secure leases that provide more than simple office space, instead offering an attractive combination of recreation, retail and relaxation options that feel more akin to a resort than a workplace. In the case of Prudential Plaza, a 41-story structure in Chicago built in 1955, the challenge for the building owners was to offer new value in a building originally designed to respond to a workforce that no longer exists.
a 7,000-square-foot clubhouse located inside. These amenities are exclusively for building tenants and their employees. Kyle Kamin, a Los Angeles-based CBRE Inc. executive vice president and tenant broker who has clients in Prudential Plaza called the roof deck "a game-changer with an unbeatable view."

**ENGINEERING**
Certainly the idea of a gorgeous tenant recreation and lounge area would appeal to most; however, few outside of the design and construction industry would appreciate the immense challenge of adding this type of space on top of a 60-year-old roof. When Wolff Landscape Architecture, Chicago, was asked to partner with Chicago-based architecture firm Solomon Cordwell Buenz for landscape design, project manager Ishmael Joya quickly understood the complexities of the situation. Joya is a landscape architect with 15 years’ experience, specializing in greenroof construction.

"Prudential Plaza is a classic figure in Chicago’s skyline and the first time we walked the project it was clear that the 4 1/2-inch-thick roof deck was going to present some design and construction challenges," Joya remarks. Although the Wolff Landscape Architecture team has completed many green-roof projects, including renovations, Joya realized that adding what is essentially a mini-park to a very thin structural surface was going to require out-of-the-box thinking. "In any roof-deck renovation, it’s critical to reduce the weight of the building materials because the building is only designed to support a maximum amount of weight and that can’t be compromised," he says.

Joya worked closely with the design team’s structural engineer, Wiss, Janney, Elstner Associates Inc., Chicago, to make sure the appropriate products were specified to support the expected weight of each area of the renovation.

**DEMOLITION AND INTERIM ROOF**
Like many large-scale occupied
ACH Foam Technologies’ EPS 15 was used in areas that would largely be filled with plants. Its EPS 46 was used as a structural fill across the design’s many grade changes and in areas that would bear more weight.

renovation projects, Prudential Plaza’s overall renovation was executed in multiple phases, allowing construction activities to take place while tenants maintained their typical routines. Romeoville, Ill.-based Preservation Services Inc., a commercial roofing company, was responsible for rehabilitating the original 11th-floor roofing structure. The original roof was a modified bitumen membrane that had been applied directly to a layer of lightweight concrete and covered by 2- by 2-foot pavers. Preservation Services carefully removed the pavers, old membrane and thin layer of concrete.

Because the building is located adjacent to a series of vaulted streets, the construction team was unable to use a high-reach crane because the weight of the crane would have required special provisions and necessitated street closures. Consequently, crews carried all removed debris down through the freight elevators during the night while the building was largely empty. At the end of each night, a single-ply EPDM membrane was rolled out, seamed and secured to protect the under structure from possible water penetration the next day.

Once demolition was complete, the EPDM was opened in select areas so repairs to the concrete slab could be made by other trades. When repairs were complete, a single layer of torch-applied modified bitumen membrane was applied to the deck along with additional structural steel required to support the added weight of trees, planters, patios and people. Finally, a white, granular-surfaced modified bitumen roof over tapered isocyanurate foam insulation was installed making the under surface ready for the plaza deck renovation work.

WEIGHT CONSIDERATIONS
Joya recommended a lightweight expanded polystyrene (EPS) material with high compressive strength that is used to reduce axial loading on structures. He has found the product very easy to work with, which saves time and money, ultimately allowing designers to put more of the client’s investment into tangible value users will see and feel rather than subsurface building materials.

On the Prudential Plaza roof-deck renovation, two types of EPS were used. EPS 15 was used in areas that

TEAM
ARCHITECTS: Wolff Landscape Architecture, Chicago, Wolfflandscape.com, and Solomon Cordwell Buenz, Chicago, SCB.com
GREEN-ROOF INSTALLER: Christy Webber Landscapes, Chicago, ChristyWebber.com
ROOFING CONTRACTOR: Preservation Services Inc., Romeoville, Ill., PreservationServices.com
ENGINEER: Wiss, Janney, Elstner Associates Inc., Chicago, WJE.com
GENERAL CONTRACTOR: Bear Construction Co., Chicago, BearCC.com

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—Nick Kinsella, project manager, Christy Webber Landscapes

would largely be filled with plants and wouldn’t bear much foot traffic. EPS 46, chosen for its high compressive strength, was used as a structural fill across the design’s many grade changes and in areas that would bear more weight of roof-deck occupants. For Joya, another advantage of using the EPS is being able to see the shape of the assembled product and make any required changes before the concrete is poured and work becomes significantly more complicated.

Installing the EPS was the responsibility of Chicago-based Christy Webber Landscapes, a subcontractor to general contractor Bear Construction, Chicago, which managed the overall building renovation. Although, like the Wolff Landscape Architecture team, Christy Webber Landscapes has extensive experience with green-roof construction, Project Manager Nick Kinsella remarks the roof deck on Prudential Plaza was one of the most challenging projects on which he has worked.

“The design for this project was really quite complex with lots of different design elements and a wide range of building materials in play,” Kinsella notes. For most construction projects, especially renovation work, understanding and resolving construction logistics is a challenge that generally presents case-by-case complexities for builders like the Christy Webber Landscapes team. In the case of the Prudential Plaza roof-deck renovation, one of the biggest challenges for Christy Webber Landscapes’ eight-man project crew was simply getting the required building materials to the 11th-floor roof. Like the demolition and interim roofing crew, Christy Webber Landscapes’ team brought all construction materials up through the freight elevator.

“We were able to work with the EPS foam manufacturer to have all the pieces of foam cut to a specific length, allowing laborers to transport the foam to the 11th floor on the elevator and then walk it through a series of corridors out to the roof,” Kinsella recalls.

Once the EPS was on the roof, the building team assembled the pre-marked pieces, allowing the space to take shape. As each area of blocks was assembled, the construction team was able to survey the progress and fine tune according to the designed curves and contours. Pieces that needed to be further shaped were cut by hand with a reciprocating saw by general laborers.

**GREEN ROOF**

Prudential Plaza features an “intensive green roof” in which the entire surface is more like an actual park with deep growing medium. Structural loading remained a primary concern for the designers, so they specified a specialized soil mixture that is lightweight and drains rapidly to avoid water-weight accumulation during heavy precipitation.

Vegetation was hand-selected to survive the roof deck’s harsh winter environment. Planted material includes a wide range of ornamental grasses, perennials and several varieties of sedum ground covers. To give the deck a truly park-like feel, surface vegetation was complemented by 6-inch-caliper trees, including five triumph elms and an autumn blaze maple, which can grow up to 25 feet in height.

Today, with construction at Prudential Plaza complete, building tenants are enjoying a premium green-roof experience that boasts fantastic skyline views and overlooks Chicago’s famed Millennium Park. Interestingly, 10 years earlier, Millennium Park was also built on top of the same EPS material for many of the same reasons.

“The transformation of the 11th-floor roof deck really couldn’t be more dynamic,” Kinsella explains with pride. “The space went from a flat, barren roof to a vibrant, inviting private park that will be a delightful spot for midday lunch or after-work drinks.”

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**ROOF MATERIALS**

**MEMBRANE:** White, granular-surfaced modified bitumen from GAF, GAF.com
**EPS:** Foam-Control EPS Geofoam from ACH Foam Technologies, ACHFoam.com
**PAVERS:** Umbriano Pavers from Unilock, Unilock.com
**GROWING MEDIUM:** TerraViva, TerraViva.ag