



ALLIANZ FIELD LIGHTS UP MINNESOTA

Design and Innovation Drive Iconic MLS Stadium

Multiple iterations of professional soccer have existed in Minnesota since the 1970s, however, the state never boasted a dedicated soccer stadium. That changed in April 2019 with the opening of Allianz Field in St. Paul, the new home of Minnesota United FC. At long last, in redeveloping a contaminated, brownfield site, professional soccer finally has a permanent home in Minnesota. The owner desired a home that would compete against the best international venues in the world serving as an iconic piece of art and architecture for the team and state. Creating a world-class stadium showcased the multiple ways structural engineering can influence a project.

For the venue's most recognizable element—the dynamic, signature façade—the owner desired a material that was weathertight yet transparent; strong yet flexible; and would provide a variety of colors and textures. No material available on the market met those competing requirements. Walter P Moore collaborated with material manufacturers to develop a clear polytetrafluoroethylene (PTFE) laminate with a fiberglass yarn weave. The result was a façade that changes based on how sunlight reflects off of the material during the day and how variable LED backlighting shines through the skin creating a glowing lantern effect in a myriad of colors and effects at night.

Integrating the structural frame and fabric membrane analysis allowed for the optimization of the entire structural system resulting in an extremely cost-effective design without compromising the owner and architect's ambitious design vision.

PROJECT HIGHLIGHTS

INNOVATIVE CLADDING MATERIAL

Walter P Moore partnered with global membrane specialist Saint-Gobain to develop a material that extends the capabilities of traditional open weave fiberglass membranes by laminating the fiberglass yarn weave with a clear polytetrafluoroethylene (PTFE). The resulting material is weathertight and as strong as traditional PTFE coated fiberglass membranes while transmitting twice the natural light. At night, the solid yarns and clear PTFE are the perfect projection screen for the variable LED backlighting mounted to the driver pipes.

FANS IN MIND

Behind the south goal, the 2,800-capacity supporters section rises at approximately 35°, creating a true “wall of sound.” Also, the trapezoidal shape of this seating area frames perfectly into the 22-foot x 116-foot main videoboard above. Three integral steel-framed catwalks with steel grating allow convenient access to the display panels for maintenance. The steel bowl structure was designed per the latest Institute of Structural Engineers (UK) standard for fan participation loads to not induce any objectionable vibration from fans jumping throughout the match.

“Walter P Moore brought an elite level of ingenuity to Allianz Field. They re-defined industry standard practices to solve our unique design constraints and their team integrated so seamlessly into our process that their expertise felt like a direct extension of our internal design team.”

— Phil Kolbo, Populous Lead Designer



STADIUM SUSTAINABILITY

Only 400 parking spots were included in the stadium design encouraging fans to either take advantage of alternative transportation options to reach the stadium or patronize nearby facilities before or after games. The pedestrian-oriented masterplan included outdoor gathering spaces and took advantage of the site's proximity to the adjacent mass transit rail line. Over 6,000 fans per game (30%) arrive via light-rail. Using the previous large-scale public investments of the rail line, Allianz Field has accelerated further development along the corridor.



DIGITAL WORKFLOW

Walter P Moore developed a nimble digital workflow and documentation of the 360-degree roof canopy that could respond to changes, creating a workflow that pulled data from the architectural rhino model, and then pushed into structural analysis and documentation models. This advanced workflow process not only provided rapid structural analysis but also enabled the team to determine accurate material quantities to feed into cost estimates for the various canopy configurations.



RESULTS

The client, Populous, expected strong collaboration during the design process. Walter P Moore blended our knowledge with the Populous' team to create a shared digital platform enabling a seamless transfer of information and a deeper level of collaboration. The use of a common platform and rapid iteration allowed for a near real-time loop of design-analysis-responsive design, which led to a truly iconic design.

Fans, media, and the team have raved about Allianz Field since it opened. Every game in its inaugural season was sold-out and the stadium hosted both the United States Women's and Men's National Soccer Teams in its first season. By collaborating with both architect and material manufacturer, structural engineer Walter P Moore created a world-class stadium perfectly suited for the St. Paul environment and redefined the leadership role of the modern structural engineer.

Allianz Field exhibits the influence a structural engineer can have on a project by combining structural knowledge of building design, materials, and enclosure systems resulting in an iconic design comparable to the finest sporting facilities around the world. Collaborating with industry partners, Walter P Moore was able to develop a new cladding material that solved the issue of many competing interests; taking an extremely complex, sinuous shape and rationalizing it to a series of single radius elements with a high-fidelity model to minimize the risk of construction or fabrication errors. Developing a common platform for data-sharing and adjusting allowed deeper collaboration than previously possible, cementing the structural engineer as an integral part of the architectural design process.



PROJECT TEAM

Owner – Minnesota United FC
Owner's Representative – TEGRA
Construction Manager – Mortenson Construction
Architect – Populous
Structural and Enclosure Engineer – Walter P Moore

STEEL TEAM

Steel Fabricator – Merrill Steel
Steel Erector – Danny's Construction
Fabric Installer – Fabritec