



AL JANOUB STADIUM, AL WAKRAH, QATAR

Broadcasting to the world

By Ruth Slavid





Lighting the Al Janoub stadium that will be used for the 2022 international football tournament in Qatar was a demanding technical challenge. Working with lighting designer AECOM, Signify had to provide a solution that worked with the geometry of Zaha Hadid Architects' beautiful and futuristic design. The result is a triumph for lighting, architecture and football.



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The dramatic, pleated form of the Al Janoub Stadium in Qatar reflects its coastal location by referencing a dhow, the traditional boat of the region. One of the eight stadia that are being constructed for the international football tournament in 2022, Al Janoub is a bravura piece of design by Zaha Hadid Architects. Inaugurated on 16 May 2019 for the Amir Cup Final, it has an exciting form that is appropriate both to the game and the climate – and that posed considerable challenges in terms of lighting.

Lighting plays several complementary and equally important roles in stadia that are used for world events. It must light the pitch so that the players can see what they are doing. It must provide the correct lighting, flicker-free Ultra-HD 4k, for the TV cameras to be able to broadcast an accurate representation of the match and capture

the super slow-motion action replays, demanded by broadcasters and viewers alike. The lighting also needs to make the spectators feel comfortable and safe, enabling them to navigate the seating, and possibly provide some entertainment before the match. It can also give the exterior of the building a presence at night to add to the overall stadium experience.

At Al Janoub these requirements were at the highest level, because of the importance of televising such a prestigious tournament. When it comes to hosting and televising international football tournaments, the governing football federations set out stringent criteria. The design team had to satisfy them while working with the limitations of the geometry of the stadium and of the climate, as per the FIFA 2018 guidelines and

the July 2017 Supreme Committee Competition Venues requirements. These guidelines and requirements specify the quality of light in terms of both color rendering and color temperature. Color rendering had to be better than 90 percent to ensure that people will see on their screens a true representation of what is happening on the pitch. There are also strict guidelines concerning the variability of light striking both vertical and horizontal surfaces.

For instance, horizontal surfaces need to have a light level between one and two times the 2000 Lux specified for vertical surfaces. The ratio of minimum to maximum intensity across the surface must be more than 0.7, and of minimum to average more than 0.8. This is slightly



more stringent than for vertical surfaces, because it is the lighting of horizontal surfaces that is most critical for television cameras.

Lee Barker-Field, head of lighting at AECOM and lead consultant on the project, explained, 'Satisfying TV broadcast requirements was a major requirement. Because of the unusual architecture of the stadium, this wasn't as straightforward as on other projects.'

The stadium, which will house 40,000 spectators during the 2022 world football tournament's group and quarter-final matches, will be reduced to 20,000 seats capacity for legacy use. The geometry has been designed to bring spectators, in both modes, as close to the action as possible. It also has an

opening pitch cover, designed by Schlaich Bergermann Partner, to provide protection from the searing summer sun. The result is a stadium that is relatively low, preventing the usual solution of placing lighting as high as possible to keep it out of the primary directions of view.

AECOM worked with the architects to slightly push up the edges of the building envelope. Sections could not give an adequate understanding of the geometry, so it had to be modeled in 3D – a task made more difficult by the fact that the concept architecture was in Rhino, and the structural design in Revit! The conclusion was that a service walkway was needed to follow the line of the building envelope and carry the equipment. This had to be as close to the underside of the roof as possible, but with room for the

LED lighting equipment, which is more space hungry than conventional metal halide lighting.

Vivek Sreekumaran, senior system engineer with Signify, explained the advantages of LED and connected lighting system for this project, the second Qatar tournament stadium for which Signify has supplied Interact Sports software, the system that connects all of the lighting in the stadium. The benefits are additional functionality, the ease of control and the ability to have dynamic lighting, creating a variety of pre-match scenes to deliver best fan experience.

Because of the extremely high ambient temperatures, the 458 Philips ArenaVision Gen 2 floodlights that AECOM specified are not the most powerful available.



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And there was a concern about their positioning – directly under the overhang of the roof, effectively in a hot air pocket. The most sensitive part of the light is the control gear, and therefore AECOM took the decision to position this remotely from the lights themselves.

“Signify were a good supply chain partner,” Barker-Field said. “This was a new emerging technology when we were planning the project three years ago. Some of the equipment was in the early launch phase – technical information was only available on special request, this included information on high ambient temperatures. They listened to the requirements that we had. They were at the head of where the technology was at.”

Installing the lighting was a major undertaking. Signify worked with AECOM to draw up a detailed plan of where every light was supposed to be installed. Then, once they were all in position, it checked the aim of each one.

It also programmed several scenes to be used before matches. The lighting is monitored and controlled using Interact Sports software. This also allowed the stadium to simplify the management of pitch, façade and entertainment lighting, and at the same time deliver the best fan experience with customized light shows.

The lighting of the seating areas was more straightforward, with 109 Philips ClearFlood installed.

AECOM was also involved in the external lighting of the stadium, where it worked to achieve an effect that would complement the architecture, and to position lighting poles in a way that would provide this effect, without being visually intrusive.

In addition to the geometry of the building, the design team is installing solar harvesting to drive a cooling system. The architecture is exciting and appropriate, and the lighting design and execution will ensure that the experience will be great for players, spectators and the many millions around the world watching on television.

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↪ page 14

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Supreme Committee for Delivery & Legacy

Architect

Zaha Hadid Architects

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Structural engineering

AECOM London

Lighting designer

AECOM London

Lee Barker-Field

Installer

Midmac, Porr, Besix

Luminaires

Philips ArenaVision Gen 2 flood

Philips ClearFlood large

Lighting systems

Interact Sports

Websites

www.qfa.qa

www.sc.qa

www.zaha-hadid.com

www.aecom.com

www.lighting.philips.com

www.interact-lighting.com/sports

