Khan Shatyr Entertainment Centre cable net supply, engineering and installation

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ABSTRACT

The Khan Shatyr Entertainment Centre is an iconic multi-purpose retail and leisure facility located in Astana, Kazakhstan. One of the largest tensile structures in the world, the building provides the city with a focal point for people to congregate for civic, cultural and social events. The structure is designed by Foster and Partners in line with local traditions as a giant transparent tent that evokes the traditional nomadic building form. A 150-meter high mast with a tubular-steel tripod supports a complex net of cables with a 200 x 195-metre elliptical base. This paper addresses the technical aspects of this 100.000 square meters structure, focusing mainly on all features related to steel cable net and cladding. The contribution of Redaelli and Montage service to this giant structure embraced all challenges relating to the cable net, from the production of the cables to the final on site installation. Redaelli supplied the sets of radial and hoop cables, which make up the cable net and Montage Service studied the engineering of cable installation as well as performed related site activities and supervised the membrane installation. All cables were manufactured using helically wound hot-dip galvanized high strength steel round wires, spun in opposite directions around a central core. Cables are fitted with sockets made using high strength steel castings or machined high strength alloy steel. The cable net is clad with a three-layer envelope, which allows sunlight through and at the same time maintains an ambient microclimate all year round in a location that experiences extreme temperature variations (-35^{o}C to +35^{o}C). The cable supported fabric roof material is Ethylene Tetrafluoroethylene (ETFE), a fluorine-based plastic transluscent film with high corrosion resistance and strength over a wide temperature range, excellent chemical, electrical and high-energy radiation resistance properties.