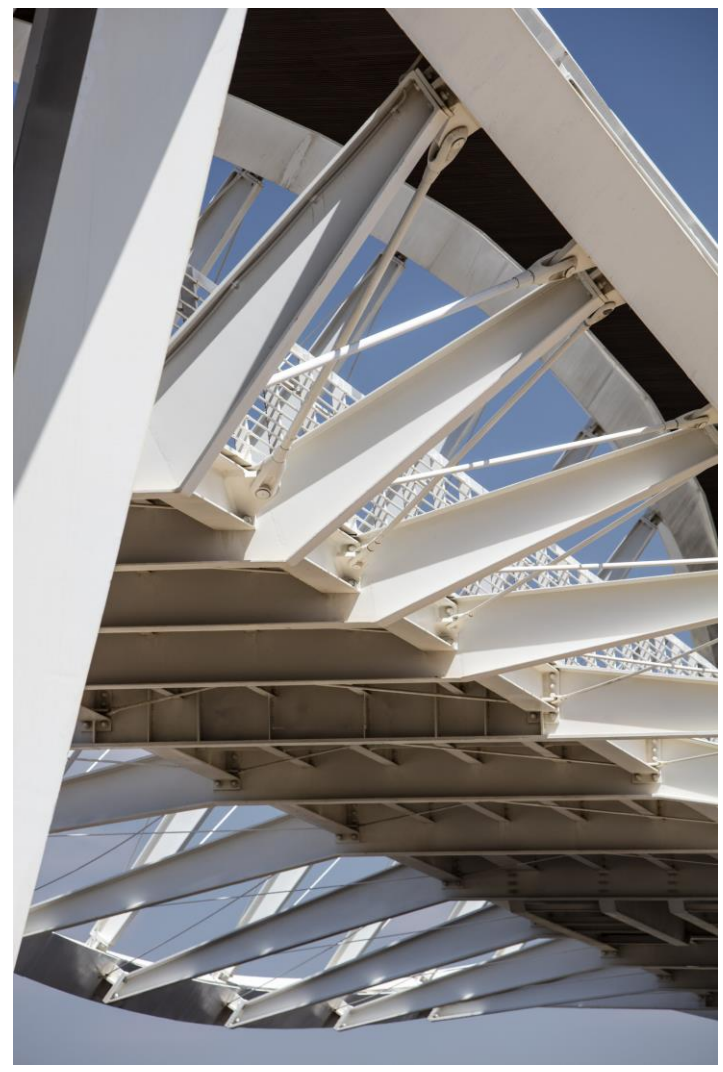
The High –Tech Park Bridge

The new pedestrian bridge in Israel, connecting the high-tech park and the Beer-Sheva University Station, was officially inaugurated and opened during January 2016. At some 210 meters long, the steel bridge is a scenic point of reference as it spans the current and future railway tracks. The bridge's dynamic form is comprised of an abundance of different steel cross-sections, granting it its unique geometry – four steel arches, creating two broad lenses with two clear spans of 100 and 70 meters respectively.

The high-tech park is located within walking distance of the nearby station. Till completion, office workers who had commuted by train, and saw their offices just hundreds of meters away, had to take taxis or busses to bypass the train station and the adjacent neighborhood in order to start their day. This problem was predicted during the park's planning, and to address it, the Municipality of Beer Sheva initiated an architectural competition for the design of the "perfect bridge". The bridge was to provide a solution for the park's access problem for pedestrians and cyclists, as well as symbolize the new park and become a unique point of reference in the new emerging landscape. While several leading firms were invited to submit their proposals for the landmark bridge, the winning design was that of Bar Orian Architects and Rokach Ashkenazi Consulting Engineers.

The goal was to create a functional sculpture as opposed to a technical element connecting two ends – a structure that is an architectural element, generating movement and change. The engineering and design scheme are based on four sets of arches, creating two pairs of “eyes” in the space between them. The arched formation creates a protected space for pedestrians, a uniquely experiential journey, in which each step reveals a surprising view of shapes, materials, and sights. The canopy provides a feeling of protection and shade from the sun and rain. The sides are open to allow the natural flow of air and eye contact with the surrounding environment. This way, the shell serves as a climatic element.

The Beer Sheva Bridge has three simple static schemes in its three primary directions. Vertically the bridge acts as two independent simply supported beams. Each span is supported by its end pier at the bridges extremities and by the central column where they meet.



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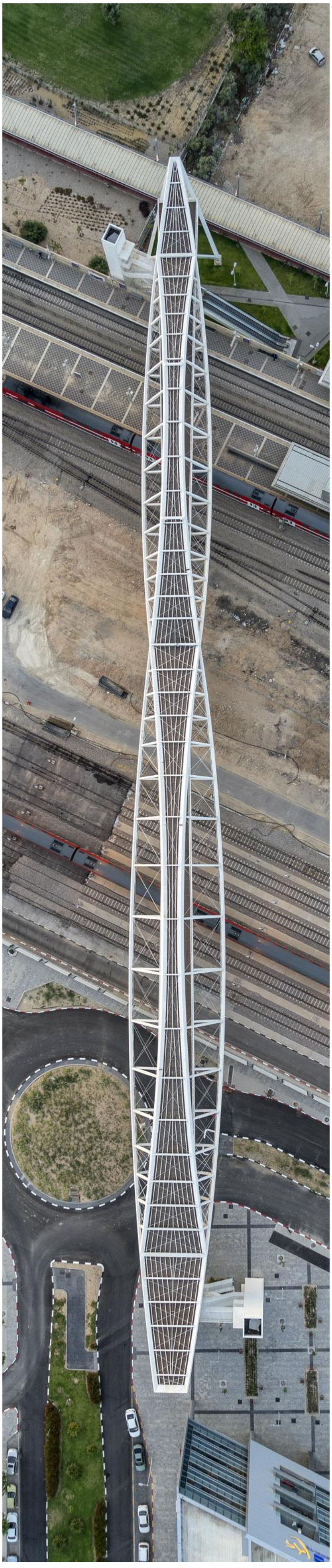
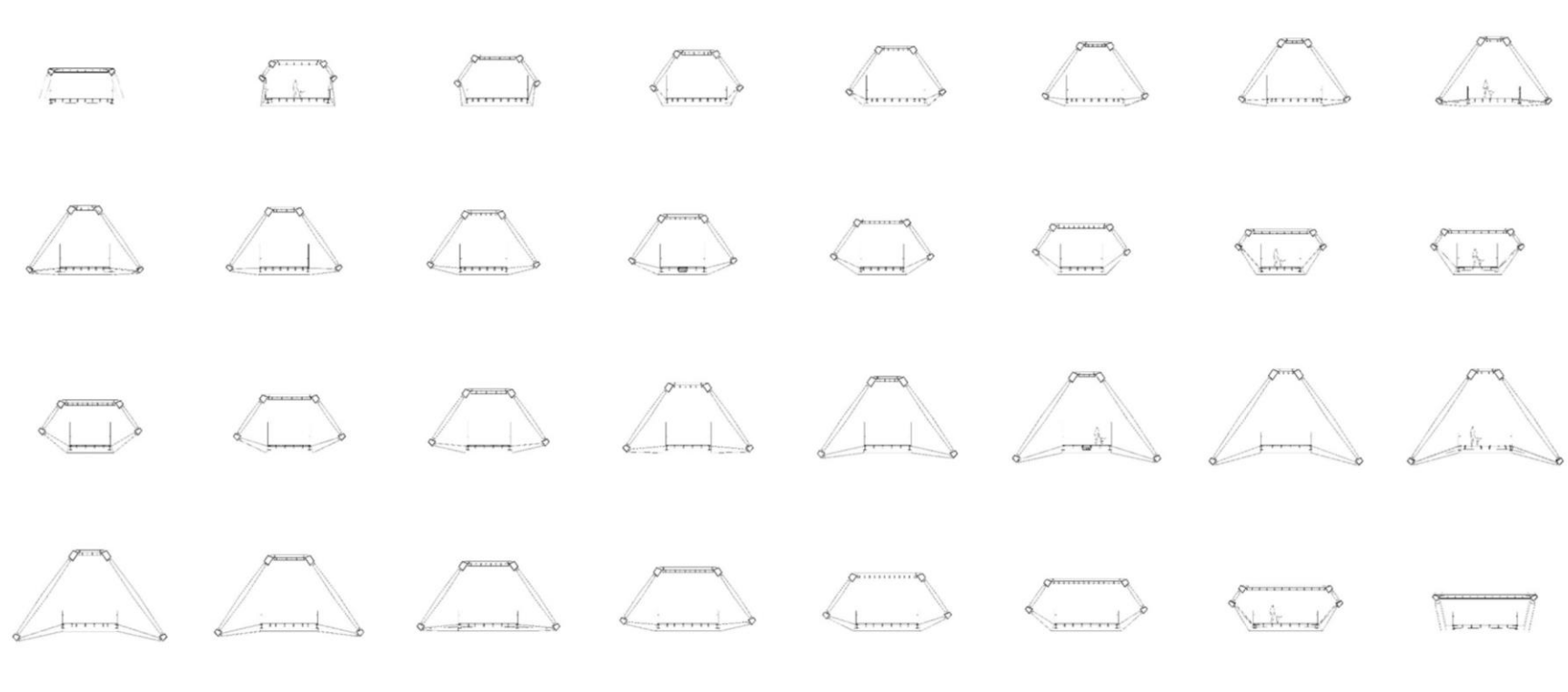
Bar Orian Architects & Rokach Ashkenazi Engineers

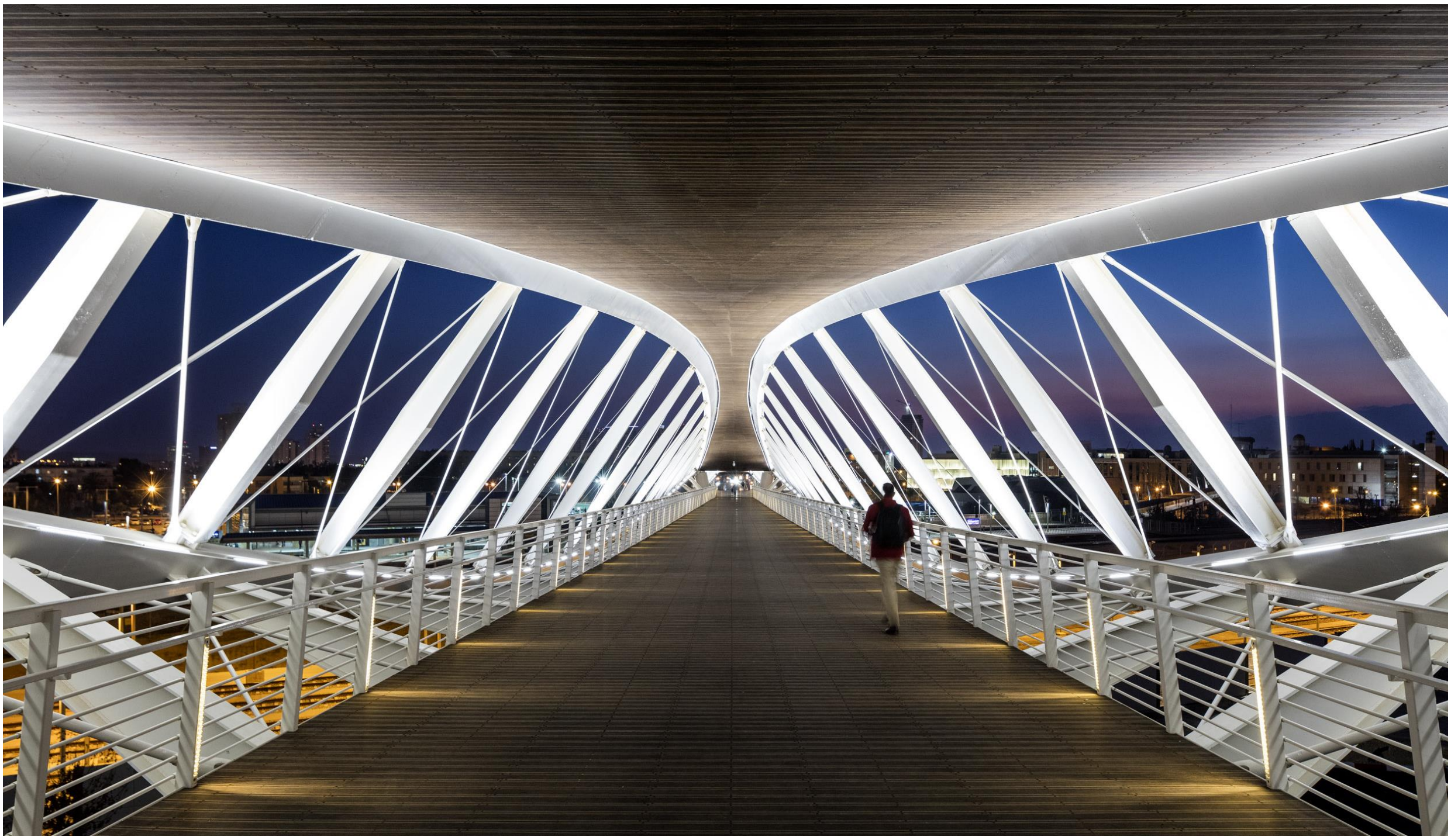


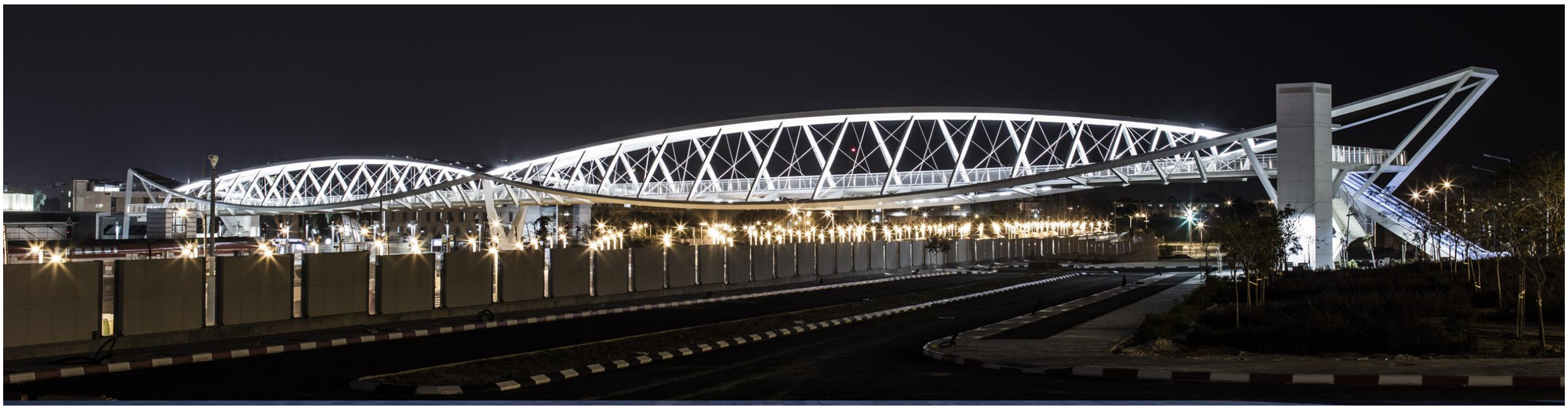


Despite the connections' physical continuity, each span works and behaves as would a single span with pinned end restraints (not bearing bending moment stresses). This approximation is made possible because of the flexibility of the cross section at the point of connection compared to the high rigidity of the span itself (due to the truss height), in addition to a sliding detail connecting the walkway to the central column but not allowing any coupling forces to develop between the walkway and the truss itself.

The bridge's axial static scheme is that of a cantilever, the bridges full rigidity stems from the central column and its resistance to bending as a cantilever. The truss ends' flexibility, the end piers' slenderness, and a hinged detail designed at the foundation, allow the piers to function (approximately) as a compression strut would and do not resist loads in the bridge's axial direction, allowing an approximately isostatic system. Axial forces are resisted solely by the central column as a cantilever.

Transversely, the bridge acts as a continuous beam across its entire length. In this direction it functions as a continuous beam supported by three supports. The end piers are able to restrain transverse movement due to their geometry and act as truss structures resisting movement. The central column again works as a cantilever.





The lighting design for the bridge was very much derived from the architecture; there was no intention of telling different stories from day to night. There was a process of deciding what to show at night – what to light. The result is that the bridge almost appears to be hovering at night as if it was lifted off the ground allowing the trains to pass underneath. All light fittings are integrated in the structure. The light creates a rhythm that enhances the flow of the structure at night. There is a strong sense of safety and security at night since the focus of the lighting is the structure and not the path, there is still a very relaxed and intimate atmosphere on the bridge.

On the eve of the 18th of June, all railway traffic was stopped and during a nightlong operation the 230 ton southern span was lifted into place and welded to its supports. The 430 ton northern span was lifted during a second operation. Throughout the entire construction, traffic was interrupted for less than 24 hours. The bridge was officially opened with a festive ceremony on the 12th of January 2016.