Calli Extradosed Bridge: Fast track project for an extradosed bridge in seismic area

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Abstract
Calli Bridge, in Antalya city center, is the first extradosed bridge in Turkey. This 180m long bridge is composed of an 80m main span and two side spans of 50m. The concrete deck is a twin pi-section of 2.5m in depth and 15m wide, making the bridge 30m wide. The extradosed PT cables are composed of 2 sets of 4 cables 31HDE15 per pi-section that will go through 3 pylons of 7m height, using Freyssinet saddles and cohestrand technology. For the first time worldwide, a 1,960MPa ultimate tensile strength strand is used, which has a direct impact on pylon’s dimensions. As Antalya is located in high seismic hazard zone, a base isolation using LRB has been proposed. Thanks to this innovative concept for Calli Bridge of combining extradosed cables with base isolation and high strength strands, a cost effective solution has been reached. With the control of the overall supply chain of specific equipments, conception and construction were managed in only 7 months.

Keywords: bridge; extradosed; seismic; LRB; post-tension; isolation.

1 Introduction
Extradosed bridges, which combine the prestressed girder bridge concept with the cable-stayed bridge concept, has become an attractive bridge type around the world in recent years. While the external appearance of extradosed bridges resemble the cable-stayed bridge with short pylons, the behavior of the bridge is structurally similar to the prestressed concrete girder bridge with external prestressing tendons. Its shallow pylons and aesthetic view enables the extradosed bridge to be a viable alternative in urban areas.

Since 1990’s, there has been many examples of the extradosed bridge concept built around the world. The Odawara Port Bridge in Japan (1994), is one of the first extradosed prestressed concrete bridges built in the world. Its main span is 122m with a total length of 270m. With its 275m main span, Kiso Gawa Bridge in Japan (2001), has the longest main span in the world.

Despite the many examples of post-tensioned and a few cable-stayed bridges, an extradosed bridge has not been constructed yet in Turkey. Çalli Bridge, in Antalya city center is the first extradosed bridge designed and constructed in Turkey.