Customer case study

Stronger and faster construction for Europe's biggest tunnel cross sections, Riva Tunnel

The Riva tunnel is a 562 m (1844 ft) long four-lane motorway tunnel located northeast of Istanbul, Turkey. The tunnel's excavation span is 22 m (72 ft), while the final lining diameter is 18 m (59 ft). This makes it one of Europe's biggest tunnel cross sections.
The tunnel, consisting of two twin tubes, is part of the North Marmara Motorway, which connects Asia and Europe. The new motorway is expected to cut chronic congestion in Istanbul and contribute to new and developing industrial investments in the Marmara Region.

The challenge

There were two main challenges in creating the final lining for the Riva tunnels. First, the size of the cross sections was exceptionally large. Secondly, there was limited time to complete the construction works. Working with traditional reinforcement in a tunnel this wide would not only have been time-consuming, but also very risky.

The solution

To ensure optimal reinforcement, contractor IC İçtaş & Astaldi JV used C30/37 concrete reinforced with 20 kg/m³ of Dramix® 5D 65/60 BG steel fibers. By replacing the traditional steel cages with steel fiber reinforced concrete, the contractor was able to finish the project a lot faster and easier.

Over the course of two and a half months, 15,750 m³ of concrete was cast over 540 m (1772 ft) of tunnel sections. Fibers were automatically added to the concrete by the dosing equipment in the batching plant. Dramix® 5D 65/60 BG steel fibers resisted the calculated load and increased durability.

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Project specifications

Project type: Road tunnels
Application: Cast-in-place – final lining

Partners:

Owner: Ministry of Transport and Infrastructure
Contractor: IC İçtaş & Astaldi JV