



**Kappa Kalıp ve İnşaat Taahhüt A.Ş.**

Istanbul, Turkey

PT and MSS technology for viaduct construction

# PT and MSS reduce CO<sub>2</sub> in viaduct construction

The Sular Valley Viaduct project is improving Istanbul's expanding ring road's connectivity, using construction technologies that led to a measurable reduction in CO<sub>2</sub>.

Using post-tensioning (PT) and movable scaffolding systems (MSS) for deck construction, Kappa Kalıp ve İnşaat Taahhüt A.Ş., in collaboration with Rönesans Holding, is constructing a 90m-span of viaduct while maintaining access to Sular Vadisi Park below.

Progress on the Sular Valley Viaduct continues, with preparations underway for the first segment casting and the first spans completed by June 2025. The viaduct is being built using MSS technology provided by the Portuguese company, BERD. This enables the construction of large, reinforced concrete spans with minimal disruption to the public park below.

By using PT and MSS combined, Kappa Kalıp ve İnşaat Taahhüt A.Ş. can keep construction elevated and allow the deck to be lifted off the ground and moved into place incrementally. This reduces the need for heavy scaffolding and other temporary structures and enables continued access to the park. To complete the full deck width, a cantilever machine will follow behind the MSS, installing the deck's wings and struts. This auxiliary system extends the structure for construction of wider decks.







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### Saving 21,300t of CO<sub>2</sub>

Sustainability is at the heart of this project, where the use of PT and MSS technology has led to a 46% reduction in concrete compared to the original design, a 51% reduction in rebar, 31% reduction in strands and saved 21,300t of CO<sub>2</sub>. Less materials means fewer transport trips, which reduces the carbon footprint further.

With these innovations, the Sular Valley Viaduct sets a new benchmark for sustainable infrastructure development in Istanbul. Kappa Kalıp ve İnşaat Taahhüt A.Ş.'s ongoing work in this project highlights its leadership in decarbonizing construction.

### Achieving high structural integrity with PT

The Sular Valley Viaduct's structural integrity is critical. To achieve this, Kappa Kalıp ve İnşaat Taahhüt A.Ş. is incorporating BBR VT CONA CMI and BBR VT CONA CMF PT tendons into the design. This provides the strength necessary to support the viaduct's long span while optimizing materials to meet sustainability goals.

The BBR VT CONA CMI tendons, featuring 31 strands of 15.7mm diameter, 1,860 MPa

steel, offer exceptional load-bearing capacity, which is essential for the 90m span. Additionally, BBR VT CMF 306 anchor sets will be deployed to reinforce the deck's wings, with transverse strands strategically placed for added stability. Their compact design minimizes borehole sizes, streamlining installation while reducing costs and materials.

### A benchmark for sustainable infrastructure

The Sular Valley Viaduct is a symbol of Istanbul's commitment to sustainable infrastructure development. By integrating PT and MSS technologies, Kappa Kalıp ve İnşaat Taahhüt A.Ş. is demonstrating that large-scale engineering projects can balance urban development with environmental responsibility.

This project is setting a new standard for how cities can grow while preserving their natural surroundings and addressing climate change. Once completed, the Sular Valley Viaduct will improve connectivity in Istanbul and stand as a testament to the potential for construction technologies to shape a more sustainable future.

- 1 On this project, the main challenge is to construct a viaduct while maintaining access to a public park below it.
- 2 PT and MSS technologies allowed the deck to be lifted off the ground and moved into place, limiting heavy scaffolding and allowing the public park below to remain open.
- 3 The use of MSS and PT technologies on the Sular Valley Viaduct has reduced materials and CO<sub>2</sub>, which supports the city's commitment to sustainable development.

### TEAM & TECHNOLOGY

**Owner/developer** – Republic of Turkey Ministry of Transport and Infrastructure

**Main contractor** – Nakkaş Otayol Yatırım ve İşletme A.Ş.

**Technology** – BBR VT CONA CMI, BBR VT CONA CMF, MSS90

**BBR Network Member** – Kappa Kalıp ve İnşaat Taahhüt A.Ş.

Material	Initial BCM design (by client)	Optimized MSS design (by Kappa)	Reduction (%)	CO <sub>2</sub> Savings (tons)
Concrete C60 (m <sup>3</sup> )	58,345m <sup>3</sup>	31,381m <sup>3</sup>	46%	10,786t
Steel rebars B500-C (tons)	12,371t	6,074t	51%	10,075t
Strands (tons)	1,031t	708t	31%	436t
<b>Total CO<sub>2</sub> Savings</b>				<b>21,297t</b>