

INNOVATION IN CONSTRUCTION

Afcons Infrastructure Ltd.
Jammu-Udhampur Section Construction
 Udhampur, India



This USD 291 million project involved construction, rehabilitation, and expansion to four lanes of NH-1A from Jammu to Udhampur in India. The section required 67 bridges to be constructed in difficult terrain. Afcons Infrastructure determined that a uniform bridge deck structure was needed and selected 20-meter pretension I-girders. The cost-effective solution involved launching the girders with a launching truss.

Afcons Infrastructure constructed an analysis model in STAAD.Pro to simulate the kinematics of the launching truss by providing the correct loading and boundary conditions. This required testing numerous load cases, a process that took two weeks as opposed to the two months it would have taken using an alternative means of analysis. The STAAD.Pro simulation successfully predicted the actual performance of the structure.

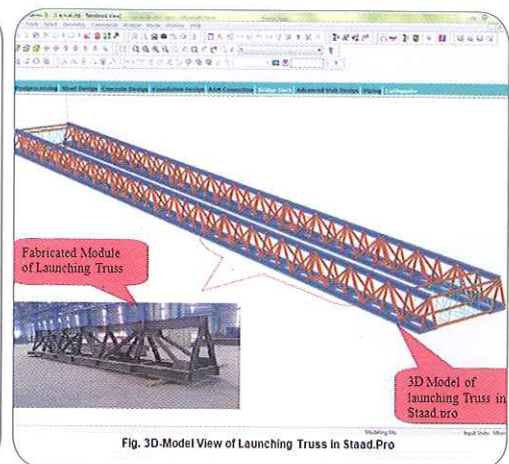


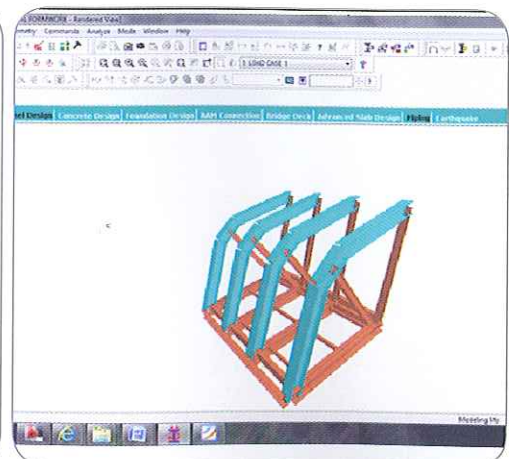
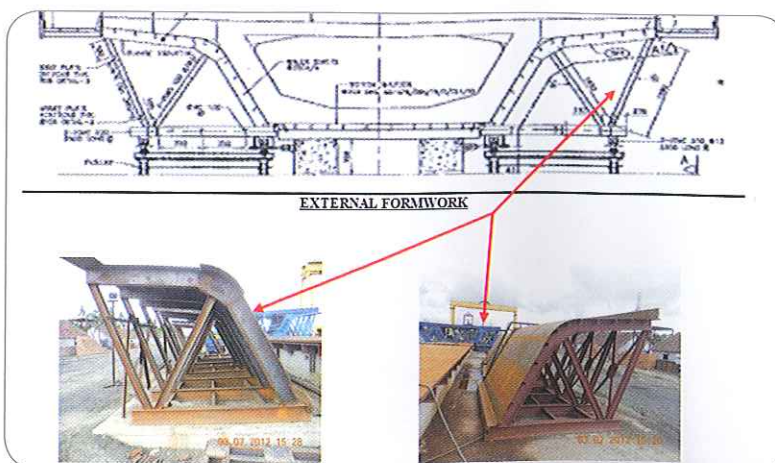
Fig. 3D-Model View of Launching Truss in Staad.Pro

Afcons Infrastructure Ltd.
Metro Rail Viaduct Construction
 Kolkata, India



The 11-kilometer metro rail viaduct under construction for Rail Vikas Nigam Limited in Kolkata, India, is being executed in two stages over a period of 30 months. One critical component is the segment casting and erection. Early design of segment formwork and submission for approval was a primary objective.

Afcons Infrastructure designed and analyzed a model of the formwork in STAAD.Pro. This enabled the design team to perform multiple iterations in much less time than typically required, and the optimized design led to considerable savings in material.



INNOVATION IN STRUCTURAL ENGINEERING

Afcons Infrastructure Ltd.

Underwater Metro Tunnel Project

Kolkata, India

The USD 200 million East West Metro Project in Kolkata, India, includes an underground section from Howrah Maidan Station to Central Station. The section will have three underground stations and 3.7 kilometers of railway tunnels, including a 520 meter segment that will go 20 meters underwater. The tunnels are being constructed using tunnel boring machines.

To advance the tunnel boring machines along the alignment, a reaction frame provides a support strong enough to take a lateral reaction of 2,000 metric tons. Space constraints required the frame's inclined struts to vary in length and stiffness. In addition, uneven lateral forces from 32 hydraulic jacks had to be distributed among the struts. Afcons Infrastructure used STAAD.Pro to model the structure and arrive at optimum member sizes.

