Stable Staging Platform for Bridge with Tensar Multiaxial Geogrid

Six Laned Extradosed Cable Bridge over River Ganga

Bihar, India

A Tensar Mechanically Stabilised Layer (MSL) was proposed as a value engineered solution over conventional removal and replacement for settlement control. FEA analysis verified the design reduces settlement from staging and concrete pour loads.

CLIENT'S CHALLENGE

A 150m Cable Stay bridge across Ganga River required in-situ casting of girders. Staging and concrete pouring exerted pressures up to 58 kPa. The subsoil at piers MP-22 to MP-25 exceeded the 25mm settlement limit. Conventional treatment methods proved costly and time-consuming due to deep excavation and borrowed fill requirement.

TENSAR SOLUTION

A Tensar mechanically stabilised layer (MSL) with multiple layers of geogrids was designed to maintain ground settlements within permissible limits during temporary staging platform construction. The Tensar Stabilised Soil (TSS) Model was used to predict settlement performance through PLAXIS software analysis using staged construction modelling. Site observations confirmed that the proposed MSL scheme supported all associated staging loads without apparent settlement issues, indicating successful achievement of the primary settlement control objective.

B E N E F I T S

- **Cost-effective solution**
  by using locally available fill materials
- **Reduced excavation depth**
  compared to conventional removal and replacement
- **Simple and rapid installation**
  requiring no special machinery or skilled labour
- **Settlement control**
  maintaining movement within permissible limits

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PROJECT DETAILS

Constructed in
2022

Client
Bihar State Road Development Corporation Ltd

Contractor
Daewoo - L&T JV

Consultant
CH2M Consulting India Pvt. Ltd.

Multiaxial geogrid used in the MSL for the bridge staging platform

Roads, Pavements & Trafficked Area | No. 531

PROJECT BACKGROUND

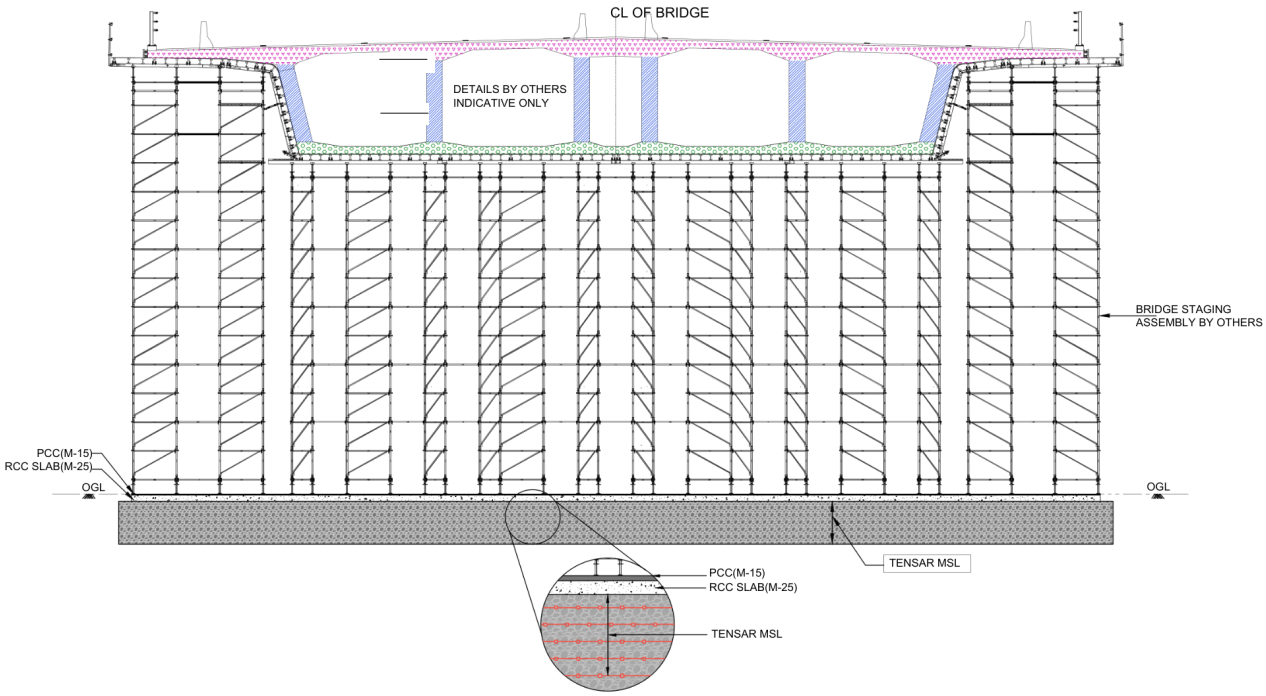
BSRDC (Bihar State Road Development Corporation) appointed Daewoo - L & T JV as EPC contractor to construct a Green Field Six Lane Extradosed Cable Bridge over River Ganga near Kacchi Dargah, Patna. This new bridge connects NH 30 to NH 333, providing a crucial roadway link between northern and southern Bihar.

The 150m single-span Cable Stayed Bridge, constructed using in-situ staging, faced challenges at pier locations MP-22 to MP-25. The subsoil conditions failed to meet settlement requirements for the bridge staging assembly. With scarce quality granular soil in the vicinity, conventional ground improvement methods proved uneconomical.

To address these challenges, Tensar proposed a ground improvement solution using Tensar MSL, incorporating multiple layers of multiaxial geogrid beneath the staging assembly to control settlement and enhance bearing capacity.

The completed staging assembly of the bridge

CROSS-SECTION



TYPICAL CROSS SECTION 'X-X' OF GROUND IMPROVEMENT USING TENSAR MECHANICALLY STABILISED LAYER (MSL) FOR STAGING ASSEMBLY (PIER MP 21 TO MP 22, & MP 24 TO MP26)

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