

Title: Proof checking the design of the 4 lane ROB Parallel to Existing 4 Lane ROB Rly Km 537/27-32 between stations Rajendra Nagar- Gulzarbagh and at road Ch 1+677 from Patna to Hajipur of NH-19 (SSP 417)

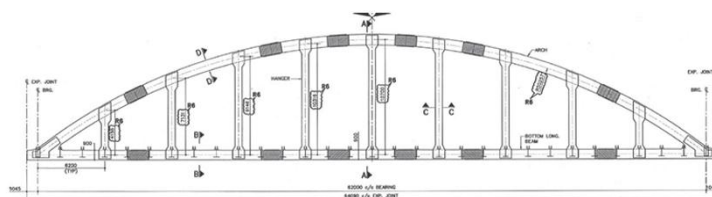
Client : SP Singla Constructions

CSIR-SERC was entrusted by SP Singla Constructions Pvt. Ltd. to proof-check the design of a non-standard 62 m span bow string steel railway overbridge (ROB). The bridge, located between Rajendra Nagar and Gulzarbagh on the Patna–Hajipur NH-19 corridor, featured an unconventional geometry that required verification before approval by the concerned authorities. The scope included detailed review of design calculations, development of a three-dimensional numerical model, simulation under IRC loading conditions, structural adequacy assessment, and preparation of technical recommendations. A comprehensive finite element model was developed, incorporating realistic boundary conditions, steel and concrete components, and all relevant dead, live, wind, and seismic loads. Detailed evaluations were performed for critical structural members such as arches, bottom chords, hangers, and cross beams to verify safety and serviceability requirements.

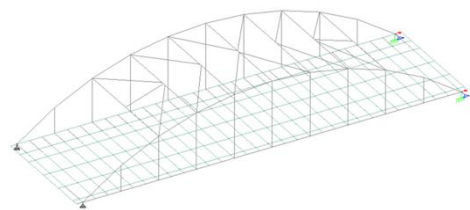
The primary challenge was the non-standard structural configuration of the bow string bridge, which required rigorous verification beyond routine design checks. Since the bridge geometry differed from conventional highway bridges, special attention was needed to evaluate global stability, member forces, buckling behaviour, fatigue resistance, and connection adequacy.

Benefits to Client:

Through detailed proof checking and numerical analysis, CSIR-SERC identified critical issues requiring attention and provided recommendations for improving structural reliability. These included revisions to connection design calculations, clarification of pre-camber requirements, verification of fatigue-related provisions, and refinement of sectional modulus calculations used in welded connections.



Bowstring bridge girder-Longitudinal elevation



3D numerical model of the bridge