

Title: Technical Audit of the structural design and analysis for the construction of the twin tunnel beneath the railway line between RJPB-GZH

Duration: October 2024 to October 2025

Deliverables: Delivered a technical report titled “Numerical Analysis of Ground Surface Settlement Induced by Twin Tunnel Construction Beneath the RJPB–GZH Railway Corridor with Proposed Instrumentation”

Significant Achievements: Successfully conducted numerical simulation studies to evaluate ground surface settlements due to twin tunnel construction beneath the RJPB-GZH railway line, developing a detailed 3D finite element model using ANSYS Mechanical to assess displacement responses during staged excavation, which indicated a maximum ground surface settlement of approximately 9 mm following completion of twin tunneling. Undertook an initial site investigation to assess prevailing ground conditions and review DMRC's proposed instrumentation and monitoring scheme, critically evaluating its adequacy and site-specific relevance, based on which a revised instrumentation and monitoring scheme was suggested incorporating high-precision instrumentation, defined data acquisition frequencies, thorough calibration protocols, and operational guidelines. Performed staged construction simulations (single and double tunnel phases) to enable assessment of displacement responses, through which the structural integrity and operational continuity of the overlying railway infrastructure were maintained, while preliminary ground investigation insights were leveraged to deliver actionable revisions ensuring reliable, uninterrupted monitoring throughout tunneling operations.

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