

Rajpath Infracon

The 360 of Structuring a
Greenfield Project for
achieving **4 Guinness
World Records**

Achieved Four Guinness World Records in just 149 hours

*On a greenfield highway with no pre-existing right-of-way, Rajpath Infracon transformed compressed schedules into world-record efficiency. Overcoming geotechnical uncertainties and logistical constraints on NH544G's 157.233 lane kilometres, the team executed critical structural works to achieve **four Guinness World Records in just 149 hours**—redefining infrastructure execution*

87
Structures
Built

87
Engineering
Excellence

157+
Lane Kms

149
Hours

4
Guinness
World
Records



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India's accelerated infrastructure push has resulted in a marked increase in greenfield highway developments - corridors executed on virgin alignments with no pre-existing right-of-way. Spearheaded aggressively by NHAI, these projects are typically delivered under compressed schedules to address escalating mobility demands and enable macro-economic growth. Within the overall project lifecycle, structural works constitute a critical path activity, governing alignment continuity, load transfer mechanisms, and operational safety across varying geotechnical and topographical conditions. However, execution within stringent timelines introduces significant technical, logistical, and resource optimization challenges -

particularly during excavation operations, which are highly sensitive to subsurface variability, groundwater conditions, and constructability constraints. We at Rajpath Infracon faced and successfully cleared all such trials and tests as we tackled and raised the concrete structures in the greenfield six lane, access-controlled NH544G- Package 2 and 3 project, under the Bengaluru Vijayawada Economic Corridor as we readied the site to make 4 Guinness World Records (GWRs) in January 2026, on this stretch of 157.233 lane kilometres in a mere 149 hours!

The Significance of Structural Work

Structural works constitute the primary load-bearing framework of greenfield highway projects, encompassing bridges, culverts, flyovers, grade separators/interchanges, underpasses, and retaining systems. These assets facilitate uninterrupted alignment across rivers, valleys, rail corridors, and existing utilities, while ensuring compliance with prescribed design speeds, geometric standards, and safety criteria.

From a systems perspective, each structure is delineated into three principal components: foundation, substructure, and superstructure. The foundation system ensures safe load transfer to competent strata, the substructure (piers, abutments, and associated elements) provides vertical

and lateral support, and the superstructure accommodates vehicular loads and traffic-induced stresses. The structural integrity, serviceability, and long-term performance of the highway are contingent upon the effective design integration and execution of these components.

Critical consideration and preparatory planning

Most Greenfield highways projects are often executed under Engineering, Procurement, and Construction (EPC) or Hybrid Annuity Model (HAM) contracts, which impose strict completion deadlines. Delays not only increase project costs but also lead to contractual penalties and deferred public benefits. The road stretch of 150 kilometres identified from Package 2 and 3 for our GWRs attempt had a total of 87 structures, demanding specific attention owing to their geotechnical requirements.

To ensure that this stretch was ready in all respects, construction activities, especially for the structures, was meticulously planned. Our tactic was to get the structures standing first before the base layers got the alignment ready. To support this project policy, timelines considered all the aspects – from receiving approvals from the authorities to excavation plans, laying of foundations to curing periods, planning the manpower, material and machine requirement to its deployment.

The monsoon patterns were also considered as 2025 particularly demonstrated erratic rainfall patterns. Activities were executed in parallel across multiple chainage locations with efficient resource allocation, continuous monitoring for progress and quality, and the adoption of advanced construction technologies, to ensure all the fronts are sequentially ready on this road stretch. Contingency planning sitting in our hind pocket as a fail-safe mechanism, came to good use as surety to prevents delays in the overall structural completion plan.

Excavation- Challenges at the foundation level

Excavation is the first and one of the most critical steps in structure construction. It sets the stage for foundation work and directly influences the stability and safety of the entire structure. We could just not forget, the GWRs road stretch was a time-bound project, even for a moment. The hardness of rock, with unexpected geological variations in strata with mixed soil profiles, continuous water ingress into excavation pits, challenged the excavation activities at site. Blasting in rocky areas or excavation near environmentally sensitive zones required approvals, many a times the primary blasting did nothing impactful to the granite mountains and multiple secondary rounds were employed to obtain manageable boulder sizes. Then efficient disposal and reuse of enormous volumes of soil and rock within limited timeframes presented a logistical challenge. Deep excavations for bridge foundations posed risks of cave-ins and we also faced slope instability issues, and flooding of foundation pits with heavy and untimely rainfall.

To counter this, we armoured our systems with

- Scientific smart changes in construction methodology were effectively adopted with technical support from our Consultants and the Department of Civil Engineering, IIT Bombay.
- Precast and prefabrication techniques were employed to reduce on-site construction time. Efficient dewatering systems managed the groundwater.
- Digital Project Management Tools tracked and monitored progress real-time
- Improved planning, contingency and risk management helped with predictive analysis and prescriptive solutions
- Safety measures for all our workmen and staff were implemented and fostering daily

awareness with Tool Box Talks (TBTs) made a big contribution in keeping the site devoid of any incident or damage till the very end.

Quality shall reign supreme

Ensuring the quality of concrete structures like minor bridges, vehicular under and over passes, and culverts in this NHAI project for the GWRs involved not just abiding to the stringent quality assurance (QA) and quality control (QC) norms of the NHAI across all phases, but also keeping the Quality Assurance Plan (QAP) and documentation in an immaculate system, for the qualification with the GWR office in the UK, in the first place! The quality was routinely checked at the site and even in our laboratories, by the officials for slump tests, cube tests, with a sanction of their approvals. Standards like IRC:112, MORTH, ACI were adhered to, and the consequence of this serious commitment was the desired specified superior quality of the pre-construction (materials), during construction (execution), and post-construction (testing) deliverables.

Conclusion

Structural works are integral to the successful delivery of greenfield highway projects in India, forming a critical path component within overall project execution. Although accelerated timelines of this project imposed significant constraints, these challenges were successfully mitigated through robust planning, deployment of advanced construction technologies, and integrated project management practices. This may sound like a safe cliché, none-the-less the success of readying our road stretch for the Guinness World Records attempt, with all the structures was owing to agile adaptation of these basics.

Today, the achievement of four Guinness World Records in a single infrastructure project, in a single attempt, by a single Indian infra company on the greenfield national

highway is a shining example of how smart civil engineering, with clear intent and rigorous execution, can transform virgin terrains into benchmarks of technical excellence. As the national highway network continues to expand, enhancing execution efficiency in structural works will be pivotal to achieving quality benchmarks within stipulated schedules, thereby strengthening infrastructure reliability, improving connectivity, and supporting sustained economic growth. And true to the spirit of our motto - *Building the Nation, beaming with pride*, Rajpath Infracon is very much on that road to Viksit Bharat.

