COMPENDIUM OF LANDMARK STEEL STRUCTURES IN THE COUNTRY









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INSTITUTE FOR STEEL DEVELOPMENT AND GROWTH

ISPAT PRAGATI BHAWAN
793 ANANDAPUR, KOLKATA 700107

Compendium of Landmark Steel Structures in the Country

An INSDAG Initiative to document Landmark Steel Structures across India, highlighting material choice, sustainability, and stakeholder perspectives

Compiled by

Muneeb Mehraj & Rishav Dutta

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INSTITUTE FOR STEEL DEVELOPMENT AND GROWTH (INSDAG)
"ISPAT PRAGATI BHAWAN"
793 Anandapur, Kolkata 700 107
info@insdag.com / membership@insdag.com

https://www.insdag.com/

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Our Mission Statement

To work in unison with all the stakeholders in the steel industry so as to evolve ways and means for more efficient usage of steel and provide optimum value to the customer.

Technical Report No: INS/TR/164

USE MORE STEEL

THE

PREFERRED

MATERIAL

FOR THE

NEW

MILLENNIUM

Foreword

Dilip Oommen

CEO, AM/NS India, Exec. VP ArcelorMittal
President, Executive Council – INSDAG

India's infrastructure push over the next decade is expected to be significant, with over **USD 1.4 trillion** of investment outlined under the **National Infrastructure Pipeline**. Meeting this demand calls for construction methods that are safer, faster, scalable, and environmentally responsible. Structural steel, with its strength, speed of assembly, and circularity, is increasingly becoming central to large-scale infrastructure planning.

I am pleased that INSDAG has brought out this compendium highlighting the use of steel in a range of noteworthy projects across the country. This compendium captures ten projects that illustrate the growing role of steel in complex and high-impact infrastructure, from long-span bridges and foot overbridges to public buildings and memorials. A common thread across these projects is the use of **indigenously produced steel**, which not only supports local industry but also aligns with the national goal of building self-reliant infrastructure.

From an industry perspective, **AM/NS India** is proud to have contributed to the **Chenab Railway Bridge in Jammu & Kashmir** and the **Atal Tunnel (Rohtang Tunnel) in Himachal Pradesh**. These are both nationally significant projects, and our involvement reflects our commitment to supporting India's infrastructure journey through high-quality, domestically manufactured steel. We hope this publication serves as a useful reference for engineers, designers, and decision-makers working on the next generation of steel-intensive infrastructure.

Dilip Oommen

Preface

Pradip Kumar Mishra

Director General - INSDAG

Steel has long been a cornerstone of modern construction, offering unmatched strength, adaptability, and speed of execution. However, despite its proven advantages, its adoption across diverse building typologies in India has remained uneven. Recognizing the need to highlight successful applications and best practices, this compendium was initiated by INSDAG following a seminar at the School of Planning and Architecture, Bhopal in January 2024. The idea was to develop a structured repository of landmark steel projects that not only showcase technical and architectural excellence but also reflect informed material choices and sustainability integration.

This report features ten iconic projects from across the country—ranging from monumental bridges and statues to public infrastructure and residential buildings. The documentation of each project was supported by site visits and consultations with key stakeholders involved in planning and execution. Each case study captures key parameters such as design rationale, material specifications, execution challenges, and sustainability features. In addition to presenting factual project data, the report also draws structured inferences across projects, including an analysis of decision-makers involved in material selection, the reasons for preferring steel over other materials, architectural inspiration and design adaptability, construction methodologies and site-specific execution details, and the challenges encountered during construction—particularly how the use of steel helped address them. Most importantly, the report consistently reflects on the core question: why steel, bringing out its relevance as a material of choice in today's demanding and diverse construction landscape.

To ensure a well-rounded perspective, the selection of expert contributors for this compendium was carried out with great care. These include a senior structural engineer, a leading bridge engineer, an architect cum academician, and a sustainability expert from GRIHA Council. Importantly, this is the first time we had the privilege of including expert commentary from the GRIHA Council, India's premier green building rating body. Their independent sustainability assessments, placed alongside project team insights, reinforce the growing importance of environmental responsibility in large-scale infrastructure. At INSDAG, we believe this signals a shift in how material choices—especially the use of steel—are now being viewed through a sustainability lens, and we wanted to highlight this evolution clearly in the report

The intent of this report is to inform, inspire, and guide stakeholders across the construction ecosystem—architects, engineers, developers, and policymakers—on the possibilities that steel offers when approached with vision, collaboration, and technical rigour.

Pradip Kumar Mishra

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Expert Committee for the Study

To enrich this compendium with well-rounded, critical evaluations, INSDAG constituted a distinguished Expert Committee comprising senior professionals from the fields of structural engineering, architecture, bridge design, and green building standards. The committee was formed through formal invitations and was entrusted with reviewing the key features of each project, including architectural merit, structural design, execution methodology, and sustainability performance.

These experts reviewed the nominated projects and provided independent assessments, which helped establish credibility, technicality, and contextual relevance in the final report.

Dr. Padmaja Gokaraju
Vice President – Designs, Product and Systems Development,
Kirby Building Systems and Structures India Pvt. Ltd.

Dr. Padmaja Gokaraju holds a PhD in Civil Engineering from Jawaharlal Nehru Technological University (JNTU), Hyderabad, and is a Chartered Engineer and Fellow of The Institution of Engineers (India). With over 39 years of experience in structural engineering, she is an authority on the design and detailing of advanced steel structures.

As a senior leader at Kirby India, a subsidiary of Alghanim Industries Kuwait, Dr. Gokaraju has contributed significantly to the evolution and widespread acceptance of Pre-Engineered Steel Buildings (PEBs) in India. Her efforts span across collaborative design projects with international consultants, application of next-generation steel products, and alignment with global codes and technologies.

She has actively promoted industry–academia collaboration and delivered numerous expert lectures at universities and professional institutions. Dr. Gokaraju is currently a principal member of the committee revising the *National Building Code of India (NBC2016 – CED46 – Section 6A Steel)*. She has been honoured with the **"Outstanding Women Structural Engineer Award 2022"** by IAStructE and the **"Eminent Engineer of the Year 2024"** by ACCE (I).

Shri Alok Bhowmick,

President, Indian Association of Structural Engineers (IAStructE)

Shri Alok Bhowmick is a highly respected bridge and structural engineer with over four decades of professional experience. He is a Fellow of the Indian National Academy of Engineering (INAE) and an International Professional Engineer (India) certified by tshe Institution of Engineers. He is also a FIDIC Certified Consulting Practitioner, involved in numerous high-profile infrastructure projects across the country.

Mr. Bhowmick actively contributes to several national and international code committees, including the **Indian Roads Congress (IRC)**, **Bureau of Indian Standards (BIS)**, and **International Association for Bridge and Structural Engineering (IABSE)**. His leadership has been instrumental in the development of state-of-the-art documents, codes, and manuals for modern bridge design.

A prolific author, he has published over 100 technical papers in national and international journals and received several accolades, including the **24th S.B. Joshi Memorial Award (2018)** for excellence in bridge and structural engineering. He currently serves as President of IAStructE and holds vice-presidential roles in CEAI and IABSE's Indian National Group.

Prof Sanjeev Singh
Professor of Architecture in Department of Architecture, SPA Bhopal

Professor Sanjeev Singh is a *Professor of Architecture in Department of Architecture*, School of Planning and Architecture Bhopal. An Architecture graduate from Government College of Architecture (now Faculty of Architecture, AKTU, U.P), he completed his Master's (Environmental Studies) from Melbourne University and PhD from National University of Singapore. He has been the recipient AUSAID scholarship and Post Graduate Research Scholarship National University of Singapore for his Master's and PhD studies. He has a Teaching and Practice experience of over more than 30 years. His research interests are in the field of *Vernacular Architecture, Cultural Landscapes, and Environmental Studies*. He has been conducting *Vernacular Studio* at SPA Bhopal since past twelve years and has publications at national and international level that refer to his interest areas. Presently he is also holding the position of *Dean (Planning and Development)* at SPA, Bhopal. He has been on various committees of a number of National Institutes in the capacity of expert member.

His research interests focus on environmental studies, sustainable architecture, vernacular practices, and cultural landscapes. He is a recipient of prestigious scholarships including the AISAID Scholarship (1994) and Postgraduate Research Scholarships from the National University of Singapore (1998).

Professor Singh has authored numerous research publications, particularly in the areas of corporate environmental responsibility and traditional architecture. His work has been featured in international journals and books by reputed publishers including the United Nations and Zed Books.

In addition to his academic and research contributions, he has held significant administrative roles at SPA Bhopal such as Dean (Planning and Development), Dean (Academics), Head of multiple departments (Architecture, Landscape, and Design), Registrar, and Associate Dean (Campus Administration and Student Welfare).

Shri Akash Deep
Deputy General Manager & Treasurer, GRIHA Council

Shri Akash Deep is an architect with a B.Arch (Hons.) and a Master's in Sustainable Urban Design and Creative Urban Practices from the University of Glasgow. He has been a part of the GRIHA Council since 2011, leading the implementation of India's indigenous green building rating system.

He has overseen the sustainability evaluation of **over 1000 building projects** across the country and has trained more than 50,000 students and professionals through workshops, seminars, and international conferences. His leadership helped gain global recognition for GRIHA, including its presentation at the **UNFCCC Conference in Bonn, Germany**, where it was acknowledged as India's own green building rating system.

An active contributor to sustainability literature, Mr. Deep has authored several publications on sustainable practices in water, waste, and mobility. He also serves on technical committees of the BIS, State Pollution Control Boards, and other regulatory bodies, and brings practical architectural experience in urban, interior, and landscape design.

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Executive Summary

This compendium brings together ten remarkable projects from across India that showcase how **steel has played a transformative role in modern construction**. From the towering **Chenab Bridge** in Jammu & Kashmir to the vibrant **Sabarmati Foot Over Bridge** in Ahmedabad, each project highlights the versatility, strength, and beauty of building with steel. The analysis presented is informed by project-specific data obtained through on-site visits and engagement with project stakeholders.

These examples make it clear why steel was the ideal choice—whether it was for **spanning long distances**, **working in difficult terrains**, or **speeding up construction** in busy or sensitive locations. Steel's unique qualities—like being lightweight yet strong, flexible in design, and easy to assemble—made it possible to achieve things that would have been much harder with traditional materials.

Importantly, this report also looks at **how these projects addressed sustainability**. With support from expert from the **GRIHA Council**, comment are available for each of these projects on environmental considerations—looking at aspects like **reduced embodied carbon, durability, and recyclability**. In many cases, the use of **locally sourced and certified steel** also helped lower the overall environmental footprint. Projects like the Marjing Polo Statue showcased the use of **EPD-certified hollow steel sections**, offering quantifiable reductions in embodied emissions.

To ensure multi-disciplinary insights, the report was enriched by independent expert reviews by a senior structural engineer, a leading bridge engineer, an architect cum academician, and a sustainability expert from GRIHA Council. The **structured data gathered from project stakeholders**—including cost, material grades, quantities, structural systems, and rationale for steel selection—provides a comprehensive foundation.

The **major inferences section** of this study brings together key observations from across all projects and is structured around several parameters. These include the **types of structures and use-cases**, **timeframes for completion**, **cost breakdowns**, and **quantities and grades of steel used**. It also explores **why steel was chosen**, the **role of stakeholders in decision-making**, and covers detailed insights into **architectural features, structural systems, construction methods, challenges faced, and sustainability benefits**. Together, these insights offer a practical lens through which future steel-based projects can be planned and executed more effectively.

In short, this compendium celebrates not just structures made of steel—but the people, ideas, and innovations that made them possible.