

INSDAG YEARBOOK 2021-2022



INSTITUTE FOR STEEL DEVELOPMENT & GROWTH (INSDAG)

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INSDAG

Steel is the backbone of all industries and the basic ingredient for growth and development of a country. Traditionally, the fortunes of the steel industry have been linked to the economic cycle of the country. Per capita consumption of steel speaks volumes about the relative position of the country on the development frontier. In India the per capita consumption of steel stands low compared to developed and developing countries. Moreover, steel is completely recyclable and environment friendly. Hence, a large potential exists in furthering the usage of steel in various segments of industry. Institute of Steel Development & Growth (INSDAG), a non-profit making, member based organization established by Ministry of Steel and the major steel producers of the country. The Institute primarily works towards the development of advanced design methodologies & technical marketing by expanding applications of steel in different segments of industry, upgrading skills & know-how, creating awareness amongst potential users and communicating the benefits of steel. Our founding members are SAIL, Tata Steel Ltd., RINL, JSW Steel Ltd., and Arcelor Mittal Nippon Steel India Limited (AM / NS) apart from Ministry of Steel. INSDAG has got very good networking among the member organisations/professionals for exchange of ideas. The Institute is registered as a "Society" under Societies Registration Act of West Bengal.

Director General looks after the daily affairs of the Institute and Executive Council provides guidance and direction. Two other functional committees namely the Working Group and Project Review Committee provide administrative and technical guidance respectively. The Institute has defined its mission, role, and functions and has evolved its short, medium and long term Activity Plans. The Institute primarily works towards the development of technology in steel usage and the market for the steel fraternity. Some of its roles are:

- Ø Creating awareness amongst potential users on affordability of steel.
- Ø Bringing out technical publication on steel applications.
- Ø Providing technical advisory services on materials, construction practices etc.
- Ø Upgrading the skills of work force by refresher courses / training programmers.
- Ø Communicating the benefits of steel through life cycle cost studies.
- Ø Providing requisite thrust to increase steel consumption in rural areas.
- Ø Assisting in the development of ancillary industries for creating new market.

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2021-2022

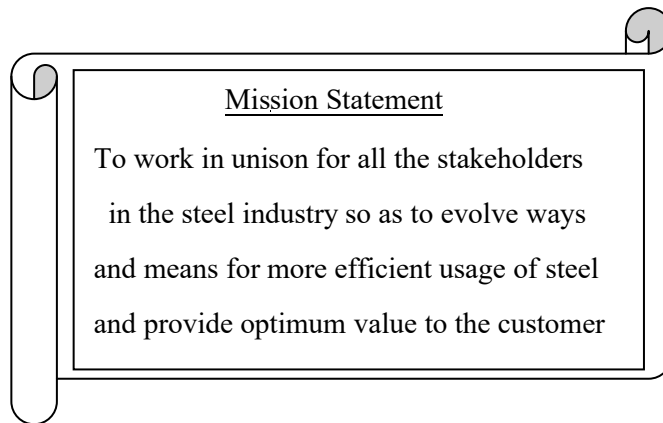
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PREFACE

INSDAG Yearbook 2021-2022 contains the technical articles from experts in steel industry.

The document contains article like Comparative Analysis and Optimization of Steel In Pre-Engineered Building by Prof. A.J. Shah, Associate Professor, Structural Engineering, and Kalpesh Jeengar, PG Scholar, Structural Engineering, DoCE, SVNIT, Surat; Efficiency of Steel Diagrid Buildings With Buckling-Restrained-Braces under Earthquake Load by Dr. Soumya Bhattacharjya, Associate Professor, Department of Civil Engineering, and Debtanu Karmakar, Master's student, Department of Civil Engineering, Indian Institute of Engineering Science and Technology, Shibpur; Buildings in Severe Earthquake Zones Made of Structural Steel Hollow And Plate Members By Arup Saha Chaudhuri Associate Professor, Civil Engineering Department, Techno Main Salt Lake, Kolkata and Avijit Ghosh M.Tech (Structure), Civil Engineering Department, Techno Main Salt Lake, Kolkata; Bolts- Comparing Capacities By Manas Mohon Ghosh, Consultant INSDAG; Durability Aspects of The Cold-Formed Steel Structures by V. Marimuthu, P. Prabha, M. Saravanan and M. Surendran, SERC,Chennai.

We believe that the range and scope covered by the technical papers in the yearbook covering the high strength steels, new steel materials like welded wire mesh, parallel flange sections, composite construction, corrosion protection of steel structures and innovative use of steel hollow sections will definitely create interest in steel fraternity and increased use of steel intensive structures.

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COMPARATIVE ANALYSIS AND OPTIMIZATION OF STEEL IN PRE-ENGINEERED BUILDING

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ABSTRACT

Pre-Engineered Building systems are the buildings predesigned as per the requirement and prefabricated off the site as per the specifications and then transported to the site for the erection process. The current building strategies and requirements necessitate the best architectural appearance, high quality and Speed of construction, cost-effectiveness, and creative touch. For such requirements, some alternative construction technologies, such as pre-engineered steel structures, must be considered. The use of a Pre Engineered Building (P.E.B.) is a new idea that involves employing a steel framework and maximizing the Design while preserving economic integrity. Compared to other developed construction strategies, Pre Engineered Buildings are more sustainable and take first place. If we use ordinary steel structures, the time required from design to erection will be longer, and the cost will be more than if we use Pre Engineering Building. The materials employed in this idea are reusable, recyclable, and environmentally beneficial. The present study's major goal is to compare pre-engineered steel structures with ordinary steel buildings in every way. A model of Pre Engineered Building was created, and a comparative analysis with a conventional steel building of the same dimensions and specifications was performed.

Keywords: P.E.B.(Pre-Engineered Building), C.S.B. (Conventional Steel Building), Pre-fabricated, Utilization Ratio.

1. INTRODUCTION

Steel construction use has expanded dramatically in the last two to three decades. As the earthquake forces significantly depends on the weight of building, steel buildings being lighter in weight than concrete buildings, steel buildings are more earthquake-resistant than concrete