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# Seismic Evaluation of Pre-Engineering and Conventional Steel Structure-A review

Shrey Jain[1], Dr. J N Vyas[2]
[1]*P.G. student,* [2] *Professor, Department of Civil Engineering, RGPV/Mahakal Institute of Technology And Management, Ujjain, M.P., India*

***Abstract:*** ***In recent years, the introduction of steel pre-engineered building (PEB) designs has helped streamline design concepts and reduce dead loads in structures. PEB construction, replacing the traditional steel structure (CSB) construction concept, has brought many advantages as the element is the design. According to the bending moment distribution diagram over the full span of the beam and column he dimensions the PEB structure and reduces the steel requirements with the help of conical IS profiles. In this study, his PEB frames and conventional steel frames of industrial structures were subjected to Seismic analysis and designed according to Indian Standards IS 800-1984, IS 800-2007 and IS1893:2016. I was. Traditional steel and prefabricated buildings require aesthetic appearance and high quality construction to be built very quickly. Traditional steel structures and prefabricated buildings can be widely used in the construction of industrial and residential buildings. This paper was prepared to study various research work related to the analysis of PEB and conventional steel structures.***
***Keywords: Pre-engineering, structure building, Seismic analysis, construction, residential etc.***

## I. INTRODUCTION

Indian standard design codes are moving towards a design approach for pre-engineered steel structures. This method investigates the response of structures to loads and seismic events by identifying patterns and extent of damage using reduced cross-sections according to the bending moment analysis method. Software analysis is a streamlined process used to investigate the structural framework of systems with one or more degrees of freedom until a collapse mechanism is established. A combination of composite sections, hot-rolled sections and cold-formed members are used in the basic steel structure of prefabricated steel industrial buildings. Single sheet metal or insulated sandwich panels with additional insulation are available for roof and wall cladding. The idea is to provide a complete building envelope system that is airtight, energy efficient, lightest, most cost effective and most importantly perfectly tailored to the user's needs.

## II. LITRATURE REVIEW

A brief review of previous research on the application of PEIB (Pre Engineering Industrial Building) to various structural configurations. This literature review also includes previous studies on various applications of PEIB (pre-engineeredindustrial buildings). This literature searches for recent contributions related to cost analysis of building structures using PEIB.

Sudhir Singh Bhadoria is interested in technological advancements and has made a significant contribution to improving the quality of life through various new products and services over the years. His one such revolution in the field of construction industry is prefabricated buildings. Pre-engineered industrial buildings are custom designed to meet customer requirements. In conventional steel construction, the high consumption of steel and the high cost of construction has always been a problem. This white paper describes how replacing conventional steel structures with his PEIB solves such problems. The concept and appeal of PEIB B. By designing the reinforcing bars according to the bending moment diagram of the steel frame, the structure is economical in terms of steel consumption and cost. This document describes various PEIB models with spans from 10 m to 50 m, i.e. H.Span structures like PEIB. Models of both systems were designed using Staad Pro software and analyzed under dead, live, wind and seismic loads to determine which system is economical.

Swati Wakchaure contributed in his recent research work to the introduction of Pre Engineering Industrial Building (PEIB) design of structures for design optimization. Rather than the traditional steel structure (CSB) design concept, PEIB construction offers many advantages as the elements are designed according to bending moment diagrams, thus reducing the need for steel. In this study, his PEIB frame and his CSB frame of industrial structure were analyzed and designed according to Indian standards IS 800-1984, IS 800-2007. In thisWith a length of 80 m, a width of 60 m, a height of 11.4 m, and an R tilt of 5.71 degrees on PEIB and 18 degrees on CSB, he considers the structure and performs 2D frame analysis and design. Structural economics are discussed in terms of weight comparison between Indian codes (IS800-1984, IS800-2007) and between PEIB and CSB building structures.

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Syed Firoz et al., Prefabricated steel system construction has significant advantages over one-story buildings, which are practical and efficient alternatives. This makes the system represent a central model for several disciplines. Pre-engineered industrial buildings create and manage real-time, multi-dimensional, data-rich views through project support currently implemented through the StaadPro software package for design and engineering. Choosing steel to design a prefabricated steel structure building means choosing a material that offers low cost, strength, durability, design flexibility, adaptability, and recyclability. Steel is the basic material used for materials used in prefabricated steel buildings. It denies from local sources. It is also about choosing reliable industrial products in different shapes and colors. This means quick on-site installation and reduced energy consumption. It means committing to the principles of sustainability. Infinite recyclable steelA material that reflects the requirements of sustainable development.

Aijaz Ahmad Zende et al., Long Span, Column-free structures are paramount in any type of industrial structure and Pre Engineering Industrial Buildings (PEIB) meet this requirement along with time and cost savings. compared to traditional construction. Current work consists of comparative static and dynamic analysis studies and pre-technology industrial building (PEIB) and conventional steel frame designs. The design of the structure is done in Staad Pro software and compared with the conventional type in terms of weight, thus reducing costs. Three examples were used in the study. Two examples compare a pre-engineered industrial building (PEIB) with a conventional steel frame, and a third example uses a long-span pre-engineered industrial building structure for the study. Current work focuses on Pre Engineering Industrial Building (PEIB) and traditionalSteel structures are designed to withstand dynamic forces, including wind and seismic forces. Wind analysis was performed manually according to IS 875 (Part III).– 1987 and seismic analyzes were performed according to IS 1893 (2002). Prefabricated steel construction offers low cost and strength.

VrushaliBahadure and R.V.R.K. Prasad, Paper includes a comparison of different configurations of industrial halls. There are various types of industrial halls. But here we compare different configurations of industrial halls such as.

Vaibhav B. Chavan et al., This study aims to assess the economic importance of hollow sections (HSS) compared to open sections. This study To understand the importance of cost efficiency, a study was conducted to determine the savings achieved in Hollow Section (HSS). Techniques used to achieve this objective included comparing different profiles for different combinations of height and material cross-section at given span and load conditions. The analysis and design phase of the project was performed using STAAD PRO V8i. Sample results from STAAD analysis are validated against results from manual analysis.

SubhrakantMohakul et al., in this submitted project work, carried out the design of an industrial steel reservoir and considered the forces acting through the other bars when one of the bars failed due to joint failure is proposed. The theme of this work was decided in consideration of the accident that happened at R.I.N.L. Visakhapatnam, November 2013. Heavy rain caused the slag his dump to collapse. This project is a study of the forces acting on adjacent members when one of the members fails and the calculation of the excess stresses and ratios induced in these connected members. It also finds and describes the moments and thinness of generation. We propose to design this structure according to IS:800 - 2007 and perform dead load, live load and wind load analysis according to IS:875 - 1987 (Part-I, Part-II, Part III). Much of the analysis is performed on the Bentley Staad.Pro V8i.

According to Kavita K. Ghogare and Dr. S.K. Deshmukh, the current work describes the stability analysis of wind-loaded industrial halls. In the current work an equivalent static verification of his single-storey steel structure with a Zone II gable roof is performed. It is nothing but an industrial structure. Industrial structures must be designed and constructed to withstand wind action in accordance with the requirements and provisions of IS:875 (Part 3):1987. This standard describes procedures for wind protection of such structures. Computer Aided Design dh (STAAD PRO) software is used to perform a stability analysis of a single-story steel building with a pitched roof. The main parameters considered in this document to compare the wind performance of buildings are bending moment, shear force, deflection and axial force. This document focuses on industrial halls only. H. Sloping roof truss. Buildings must adequately fulfill many functions. These features include usability and stability of the building for its intended use and use.

G. Durga Rama Naidu et al., Long Span, Column-free structures are paramount in any type of industrial structure and Pre Engineering Industrial Buildings (PEIB) meet this requirement along with time and cost savings .Compared to traditional construction. Current work includes pre-engineered industrial buildings (PEIB) and conventional comparative studies and designs. Steel frame. Structural designs are created in Staad Pro software and then compared to conventional types that affect weight reduce costs.

D V Swathi's long-span column-free construction is of paramount importance in any type of industrial construction and Pre Engineering Industrial Building (PEIB) reduces this requirement while reducing time and costs compared to traditional construction meet. This work includes pre-engineering analysis and design.Industrial Building (PEIB). An example was taken for research. Wind

analysis was performed manually according to IS 875 (Part III) - 1987. In conclusion, "The construction of prefabricated buildings brings a lot to the end user.A better and more economical solution for large span structures requiring large unsupported areas. ”

Yash Patel et al., Many steel buildings are made from orthodox steel sections that are designed and built using conventional approaches. This leads to heavy or expensive construction. Steel pipe is the best. Analysis of hut elements was performed using Staad Pro V8i computer software with manual application of Indian criteria. Multiple Excel sheets for various architectural elements such as purlins, roof trusses, compression bars, tension bars. Executed in Microsoft Office Excel. Finally, a cost estimate sheet is produced for each section of the conventional truss and the section of the pepper truss. A total savings of 18% was achieved during this project work. From the current research and results, it can be concluded that longer span structures can be designed with tubular sections, benefiting the overall economy. Smaller spans require the construction of trusses with minimal cross-sections for both conventional and tubular steel sections, which increases the initial cost, compromising overall economics. will be Although the cost of tubular profiles is higher than traditional profiles, their relatively low dead weight has proven more economical for industrial roof trusses and other steel structures.

Salem, R.S. Ghdoura and Vikas Srivastava, Due to limitations on maximum allowable deflection. High strength properties of construction steel are not always givencan be used optimally. As a result, several new processes were designed to increase the stiffness of steel elements without adding weight need steel. Steel construction is a structural technique for supporting structures composed of rectangular lattices, using a skeletal frame of vertical steel columns and horizontal I-beams.Building floors, roofs and walls are all attached to frames. The development of this technology made it possible to build skyscrapers ofFor this study, a steel structure was selected and analyzed for various loading and support conditions using STAAD Pro and robotics software. The deflection pattern at the bar center distance is investigated under various loading conditions. The main purpose of this project is the analysis and design of steel structures using architectural design software. Design includes load calculations and full structure analysis with STAAD Pro and Robot software.

Note that in the context of working with structures, steel is the easiest material to model because it is isotropic. Also, robots andSTAAD Pro was originally developed for steel construction. This also applies to links to applications. So it should come as no surprise that the bestSimple steel construction delivers results. Iterative optimization is inherent in all design processes. This is especially important during the concept design stage, when engineers consider different design options in terms of geometry, construction scheme, and size of individual elements before arriving at a practical solution. This process continues to the detailed design stage where more precise element sizes and connection specifications are detailed. For most projects, the iterative design process is manual and based on trial and error.

SagarWankade and Dr. P. S. Pajgade, The Pre Engineering Industrial Building (PEIB) concept is a new concept for single storey industrial buildings. This methodology is versatile, not only because of the high quality pre-planning and pre-fabrication, but also because of its lightweight and economical construction. This concept has many advantages over the conventional steel structure (CSB) concept for buildings with roof trusses. This paper is a comparative study of PEIB and CSB concepts. This paper effectively conveys that the PEIB structure can be easily designed with simple design methods according to national standards. In the light of this study, it can be concluded that the PEIB structure has cost efficiency, speed of construction quality control and more advantages compared to the CSB structure.

Simplicity of erection. This paper also provides a simple and economical idea for the initial design concept of PEIB. The concepts presented will help you understand the design process of the PEIB concept.

According to Monika Nakum et al., PEIB systems are widely used in industry and many other constructions around the world and are a relatively new concept in India.

This concept includes techniques to provide the best possible section according to optimal requirements and cost effectiveness. In the current work, a survey of her PEIB using CSB was performed. Observations made based on this research are very useful for the practicing structural engineer.

This document compares CSB (conventional steel building) and her PEIB (pre-technical industrial building) after being analyzed by STAAD-pro&design using IS:800:2007.

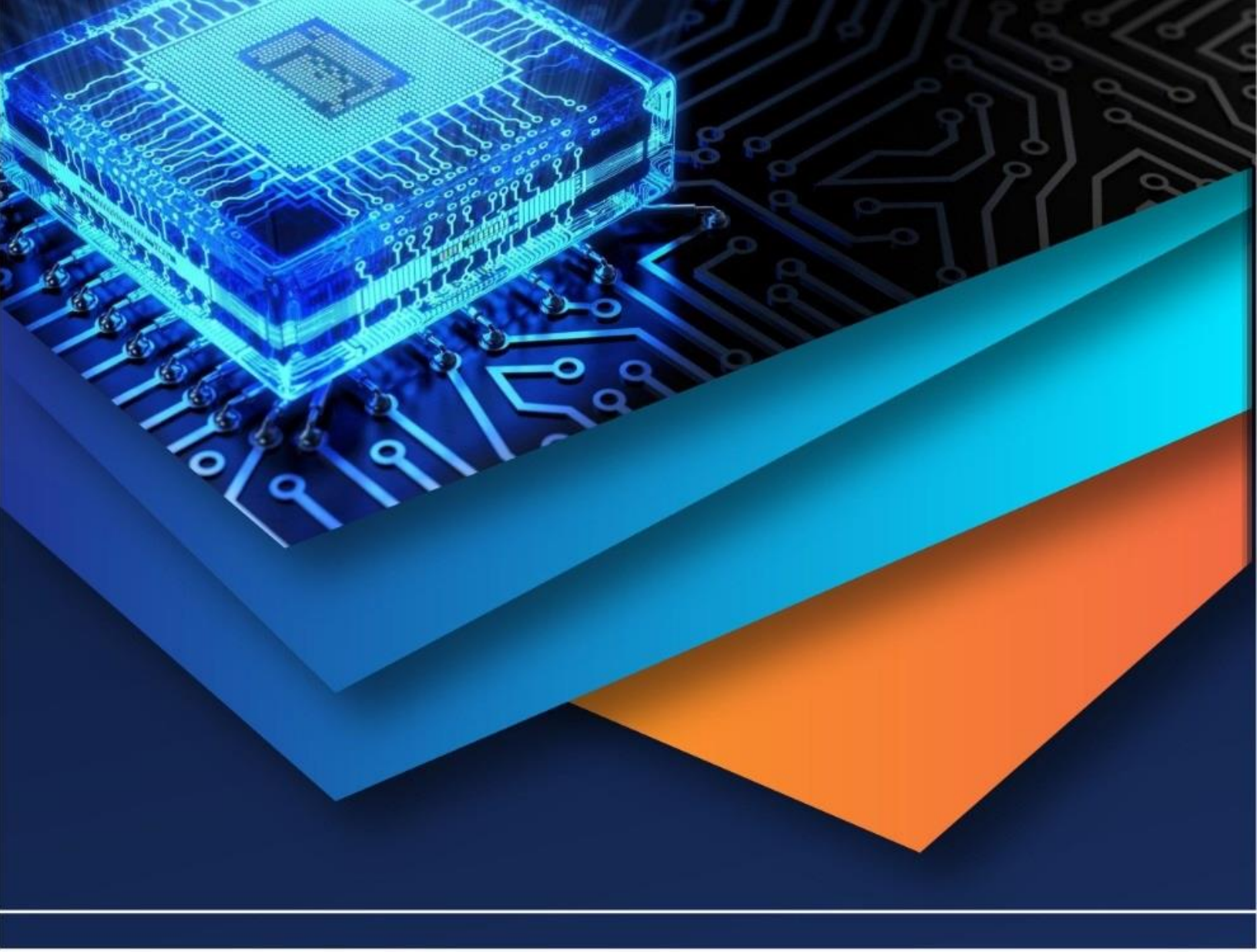
Syed Firoz and S. Kanakambara RaoSteel structures (I-section) offer significant advantages in residential buildings, improving practical and material efficiency, energy efficiency, consumption, impact on natural resources, and CO2 emissions from recycled building materials. Increase some system areas. Steel Buildings creates and manages real-time, multidimensional, rich data views through project support currently implemented by Tekla software packages for sustainable steel design, modeling, and detailing.

## III. CONCLUSIONS

From the above literature review, it is seen that the research is in interest of usage of different types of PEB and steel structure so I further study The performed Seismic analysis for the present work clearly shows that there is an important difference in the dead load of the PEB and conventional steel structure with different configuration of span. Research studied various parameters like enhancement of stiffness, displacement and also observe perfect design of PEB building. Few researches were carried out for the comparative analyses of PEB and conventional steel structure as a residential building and there is much scope of study in this field of engineering.

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