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Review on “Comparative Study with and Without LRB Based PEB Structure for Pushover Analysis Method”

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ABSTRACT: the use of PEB instead of a conventional steel building (CSB) design idea resulted in a number of benefits, since the members were designed according to a bending moment diagram, lowering the amount of material required. This methodology is adaptable not only because of its high-quality pre-design and prefabrication, but also because of its light weight and cost-effectiveness. If we use ordinary steel constructions, the time frame will be longer, and the cost will be higher, making it uneconomical in the long run.

The introduction of a layer with a low lateral stiffness between the superstructure and the foundation; this layer increases the fundamental natural time period of the isolated base structure relative to the fixed base structure. Increases in the fundamental time period may result in a decrease in pseudoacceleration, resulting in the entrance of seismic forces into the structure. This technique has become increasingly popular in the building industry in recent years. The isolation system is introduced utilizing the sliding system's characterization; this system operates by transforming the limiting shear over the isolation interface. Various sliding systems are used in the construction industry; during an earthquake, ground motion produces an inertia force in both directions, which is a result of the building's mass and the earthquake's ground acceleration. As a result, it is critical that the structure has sufficient strength and stiffness to withstand the lateral load induced by the earthquake. As a result, we will examine the pushover analysis approach with and without the LRB-based PEB structure in this project.

KEYWORDS: PEB structure, LRB, pushover analysis method, response spectrum method, portal frames, Conventional Steel building, ETAB

I. INTRODUCTION

PEB is a requirement that meets the expanding construction demands for the region's extensive urbanization. Prefabricated structures assist keep construction costs low and, as a dry construction technology, provide a quick alternative. Prefabrication allows for end-to-end processes that are quick and painless. These are built to set industry standards, as they are made of high-quality materials. These steel constructions are popular because they offer benefits such as low maintenance, heat insulation, and a variety of other features that are ideal for industrial applications. These structures, contrary to popular assumption, are long-lasting. They're easy to set up and constructed to last. One of the most desirable methods for protecting structures from earthquake pressures is base isolation. Separating or decoupling the structure from its foundation is one of the main concepts in earthquake engineering.

These effects reduce inter-story drift and effective displacement in the floors of the base isolated structural system, ensuring the least amount of damage to facilities while simultaneously ensuring the protection of people and property. In the last few decades, the notion of base isolation has been proposed, technologies have been made available, and knowledge of base isolation systems has been used, developed, and thus well established. Because of its ability to change the building's characteristic from rigid to flexible, seismic isolation devices are more successful when applied to high stiffness, low-rise buildings. The primary goal of our research is to examine and compare the behaviour of the PEB structure as it grows. In seismic zones, the base isolation concept is used to reduce storey acceleration, storey drift, and increase the period of oscillation due to earthquake ground excitation. It is applied to the foundation level by installing base isolators lead rubber bearing (LRB) and comparing the performance between the fixed base condition and the base isolated condition using software.

This work presents a stiffness reduction method for the design of laterally restrained with & without LRB steel structures manufactured by welding individual steel plates; Stiffness reduction functions for welded members are devised, completely accounting for the negative impact of the propagation of plasticity and defects on structural resistance. The method entails

- Dividing tapered members into prismatic segments along their lengths,
- Reducing the flexural stiffness of each segment using developed stiffness reduction functions that take into account first-order forces and cross-section properties,
- Performing Geometrically Nonlinear Analysis, and
- Performing cross-section strength checks. Essentially, an integrated process using more sophisticated second-order analysis (with stiffness reduction) but very simple design checks is proposed to replace the current typical approach to structural design of conducting a simple elastic (with nominal stiffness) structural analysis followed by elaborate member checks.
- Because of the provision for flaws, residual stresses, and plasticity through stiffness reduction, as well as the permission for frame and member instability effects through the use of second-order analysis, the distribution of internal forces inside the structure is represented more correctly.
- It's also no longer necessary to calculate effective lengths or perform member buckling inspections. The proposed method is further evaluated against European and North American steel design regulations for tapering steel structures.

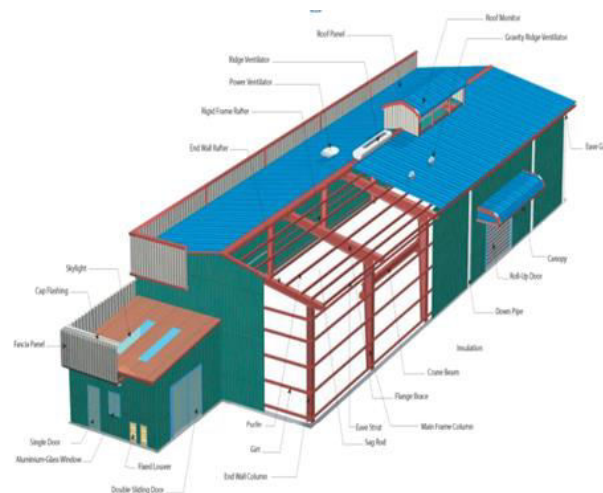


Figure1.1: PEB Structure

Buildings that are prefabricated (PEB)

A pre-engineered building (PEB) is a structure designed by a PEB supplier or manufacturer to be constructed from the highest quality raw materials. For a wide range of structural and visual design requirements, cost-effective manufacturing technologies are available. Pre-Engineered Metal Buildings (PEMB) is also known as Pre-Engineered Steel Buildings (PEMB) or Engineered Metal Buildings, due to the reduction in pre-engineering (EMB). 2D frames are commonly used as primary frames (i.e. may be analyzed using two-dimensional techniques). Advances in computer-aided design, materials, and manufacturing have assisted the development of pre-engineered construction alternatives such as tension fabric structures. Complex (three-dimensional) analysis is required by several building codes. Cold manufacturing is an option for secondary structural components like Z- and C-shaped members. The outside cladding precast concrete, wood, tensioned fabric, and brickwork Block, glass curtain wall, and other materials are used as external cladding.

II. LITERATURE REVIEW

Lovneesh Sharma, Nileshwar Taak, Pankaj Kumar Mishra

(2021), the current study's major goal is to compare pre-engineered steel buildings to ordinary steel buildings in every way. A pre-engineered structure was designed, and then a comparison was made with a conventional structure with the

same configuration. Bentley STAAD PRO was the major programme used for the entire designing and analysis phase, and it was discovered that pre-engineered buildings produce more sustainable results than traditional steel buildings. It was also discovered that using traditional methods for construction would take more time and money in every way, so pre-engineered buildings should be used instead, as the construction and maintenance costs of pre-engineered buildings are significantly lower than those of conventional steel buildings. Another consideration was that the materials used in the construction of the pre-engineered buildings were pre-fabricated and then constructed in such a way that they were both reusable and recyclable in the future. As a result, the entire structural components, as well as the structure, may be moulded and transported to any other location, so achieving the major part of sustainable building.

ZiyanXu and Wenxue Zhou(2021), this study improves big data technology, the traditional accounting process, merges big data technology to develop a computerized accounting system, and uses intelligent big data processing to produce scientific and effective accounting information processing results. The enterprise accounting management system's design purpose is to ensure that the system can efficiently perform the enterprise cost budget accounting work after the design is accomplished, and that the enterprise cost budget accounting work proceeds in a regular and stable manner. The computerized intelligent accounting system based on big data technology created in this article has specific effects, according to the experimental research results.

Tejas Dodiya, JigarZala, Darshan Shah (2021), the study compared pre-engineered buildings (PEB) to conventional steel buildings (CSB). Pre-engineered buildings (PEB) and conventional steel buildings (CSB) were developed according to IS 800:2007 in this study. Using the STAAD Pro V8i software, a comparison between the PEB and CSB systems will be made. For the analysis of material consumption, I used alternative plans and material specifications, as well as varied heights (G+10, G+20) and spans (3880 mm, 4850 mm). Following the findings of the PEB and CSB structures studies, it was discovered that PEB structures consume less material.

Raviraj S. Gaikwad, Dhananjay S. Patil (2020), this research municipal solid waste landfill mining is a method that combines the concepts of material recycling with long-term waste management. The economic feasibility of a landfill mining scenario was investigated in this study. Initially, a cost-benefit framework was developed, which included seven cost indicators and seven benefit indicators for a landfill mining scenario. The cost-benefit framework was applied to a case study, and a cost-benefit analysis was carried out to determine the economic feasibility of a landfill mining scenario.

Dilip L. Budhlani, Hitesh Jibhkate (2021), Provides structures that is cost-effective, environmentally friendly, and long-lasting; Prior to the implementation of the PEB system in steel structure construction, the conventional steel building (CSB) method was employed, which provided time-consuming and costly design. The CSB is more expensive since it consumes more steel due to the utilization of a consistent cross-section of the hot-rolled section throughout the member length. However, only bolted connections are given at the construction site based on the loading effect built-up section employed in PEB. PEB saves time and provides a lightweight construction, making it preferable to CSB when the span is considerable and column-free area is necessary.

Ms. Shalaka Patil, Dr. M. B. Kumthekar (2021), in this study, an industrial shed (just primary frame components) was constructed utilizing the traditional steel building idea and the PEB concept, and the design outcomes of that structure were compared in detail. The current project entails a comparison of Pre-Engineered Buildings (PEB) with Conventional Steel Buildings (CSB). To address these challenges, the Pre-Engineering idea was developed. Conventional steel buildings are an outdated concept that takes a lot of time, quality, and usual erection factor to adapt. It first appeared on the Indian market. PEB Concept is extremely adaptable, thanks to its high quality, prefabrication, light weight, and cost-effective construction. The study is based on the time and cost performance of pre-engineered buildings in industrial construction.

Suraj kinase, Gajanan Gaikwad (2021), the paper based on time comparison of PEB concrete vs. cast-in-place (i.e. traditional), concrete. How total time of construction by PEB concrete system is less than the time by use of cast-in-place concrete. Time of any construction is directly varied with cost of construction. The time required for steel binding, shuttering, concreting then time required for curing will be minimize

Bhanu Prakash P.M, T A.SriramaRao (2021), This research looks into why composite structures are becoming more popular in developing countries. Because of the increased dead weight, span restriction, low natural frequency, and dangerous formwork, RCC structures are no longer cost-effective for medium and high-rise buildings. Steel and

concrete composite structures are becoming more common in recent years, and they are considered safe over their design life duration. For modern buildings, steel and concrete constructions are the finest option. In this study, we discuss the various building construction findings for RCC, steel, and composite structures based on numerous studies.

D.T. Lamkhade, G.S. Wayal, M. R.Sharma (2020), identified to introduce with & without LRB portal frames to Indian conditions and practices, due to the apparent financial advantages and the unstable supply of hotrolled members locally. This study will bring together various aspects that need to be considered for the design of with & without LRB portal frames and review if this method of construction is safe and worth pursuing as an alternative to conventional building techniques. The present investigation aims at comparison of conventional steel building and building. In this investigation analysis of and design of web tapered portal frames building and conventional steel building will be carried out for spans like 20m using computer software Staad Pro v8i. 11 Web tapered steel portal frames is ideal for construction in remote and hilly areas.

RajnandanVerma, Raghvendra Singh (2020), the cost and time of construction is in more priority for the client with the large working area for various uses. For the economically and minimum loss of material, pre-engineered building system (PEBs) has many advantage, because it gives more column free space at low cost. Pre-engineered metal buildings are more reliable for various uses like complex industrial facilities, warehouses and distribution centers, stock-house, shopping malls, resort, motor court, office, cabin, service complex, aircraft-hanger, athletics and fun stadium, study places, temples, hospitals, and any types of industrial structures. In the pre-engineered metal building system, the rigid frame consists of slab, wall are connected with primary member (beam and column)

Sneha S. Nagrale (2020) this study proposes several approaches for implementing the green building concept with minimal increases in construction costs when compared to conventional buildings. It also covers sustainability and economic research with connections to Indian contexts, as well as a case study of a newly designed and built magnificent residential bungalow in a small town in India. The case study was chosen because it is a residential building that was designed and built in a sustainable and green manner. The major goal of this study is to improve the efficiency of building life cycle costs by using green building materials. After analyzing materials with the use of Revit software, this research study focuses on selecting materials that are less expensive while maintaining the same material attributes. The construction and operational phases of regular and green buildings are compared in this research study. This research will also be useful in determining how much more money is required to create a green building and how much money is saved in energy consumption over the course of the structure's life cycle.

Bhupesh Kumar (2020), Low cost, strength, durability, design flexibility, adaptability, and recyclability are all advantages of pre-engineered steel buildings. Steel is the most common material utilized in the construction of pre-engineered steel buildings. It contradicts regional sources. Steel is the material that reflects the imperatives of sustainable development since it is infinitely recyclable. In this paper, based on the analytical and design results of conventional and pre-engineered steel buildings, it is noted that the Cost Analysis of PEB as consistent with Indian code structure is 45.36 percent, and the Cost Analysis of PEB as consistent with American code structure is 50.78 percent, which is less than the Cost Analysis of CSB structure.

Azharuddin Ahmed (2020), PEB concrete construction has a number of advantages over traditional concrete construction. As a result, numerous types of literature are examined and reviewed, some of which are included in this study. PEB engineering's innovative approach to building adds a new dimension to civil engineering and expands potential in the country's transportation industry. Without a doubt, it is one of the most beneficial construction techniques, and it is hoped that it will become a leader in the development of housing and metropolitan areas in our country. The following research examines many areas of PEB construction engineering, including materials, design, and calculations, as well as economic benefits and limitations.

RohanBhasker, Arun Menon (2020), the purpose of this research is to look at the efficacy and sufficiency of a variety of IMs in anticipating maximum inter-storey drift needs on plan-irregular RC moment frame buildings subjected to bi-directional ground motion. This is done using a cloud-based system that combines nonlinear response history analysis with statistical regression analysis. Furthermore, the ability of scalar bidirectional shaking intensity measures (BSIMs) to predict drift demands is investigated. BSIMs are derived from a vector of intensities corresponding to each horizontal component of ground motion using popular combination schemes such as geometric averaging, arithmetic averaging, SRSS, and use of envelope values. The findings show that IMs based on geometric averaging of spectral ordinates over a range of periods outperform the other descriptors in terms of the aforementioned attributes, and that

geometric averaging the intensities of the two orthogonal components leads to an optimal BSIM that could be used in place of vector IMs. Using a Multiple Stripe Analysis framework, the heteroscedasticity in the maximum interstorey drift response under different degrees of the BSIM is explored further. The ideal BSIM is found to perform relatively well across all desired intensity levels, making it an attractive choice for use as the foundation for fragility and vulnerability functions.

ChetanGurjar, prof. J.N. vyas, (2020), the introduction of Pre-Engineered Building (PEB) design of steel structures in recent years has aided in the optimization of design concepts while lowering the structure's dead load. As the members are designed, the construction of PEB in place of the conventional steel building (CSB) design idea has several advantages. The PEB structure was designed utilizing a bending moment distribution diagram throughout the whole width of the beam and column, decreasing the steel requirement by using tapered IS-sections. In this work, a wind analysis and design of an industrial structure using PEB and conventional steel frames is carried out in accordance with Indian standards, including IS 800-1984, IS 800-2007, and IS 875(part3):2015. The construction of traditional steel buildings and pre-engineered buildings necessitates a high level of speed, as well as good aesthetics and quality. For the construction of industrial and residential buildings, conventional steel buildings and pre-engineered buildings can be employed extensively. The purpose of this paper is to examine several research projects involving the examination of PEB and conventional steel structures.

Sarvapalli S. Ikhar, Dr. Leeladhar S. Pammar(2020), For effective construction management time is most important aspect, so there is necessity of many alternative building materials to minimize the duration of project. Prefab construction and off-site manufacturing have been a part of building construction process for a long time in many countries. This prefab constructed building sets an example of cost effectiveness and rapid construction process to reduce duration of project along with maintaining safety, environmental sustainability and enhance modularity in construction. A literature study was performed in order to gather information and data to study the difference in cast-in-situ constructed buildings with prefab constructed building. During this study it is analyze that, time and cost require for prefab constructed building is comparatively less than cast-in-situ constructed building.

R.M.Saravana Kumara, S.Sivaranjanian, R.Devananth

(2020), in this study, a 7-story RCC-framed structure in Zone III is evaluated for seismic analysis utilizing the equivalent static analysis method. For the analysis, six models were used, one of which was a bare frame model with no shear wall and the other five were constructions with column support shear walls at varied places. Shear walls were first utilized to counteract wind force in reinforced concrete buildings. In this study, column support shear walls are put at various points in RC frames of a G+6 Storey building and seismic action is investigated, as well as a static pushover analysis. Staad Pro is used for modelling and analysis. The equivalent static analysis approach is used to investigate and evaluate seismic factors such as storey displacement, storey drift, storey shear, and storey stiffness. The goal of this research is to locate the best position for shear walls, which may be established using seismic performance criteria. The torsional impacts of a building can be reduced by strategically placing vertical resisting features and distributing mass. Multi-story RCC buildings with shear walls are becoming increasingly popular as an alternate structural style for earthquake resistance.

UmamaheswaraRaoTallapalem(2019), in present study we consider the three types of Beam-columns connections such as Rigid connection ,semi-Rigid connection and Hinged connections are developed in G+20 High rise building .These High rise building analyzed with help of Time history analysis of High Seismic waves, Moderate Seismic waves and Low seismic waves .It helps to Identify the behaviour of connections and The results of Top Displacements , story Drifts and Inter storey Drifts are compared for the Different connections and Different Seismic waves.

JasimAnamangadan, J. Visuvasam (2019), The various structural behaviors of a multi-story RC Convention Centre building with wide spans of roughly 32 m are discussed in this research. The impact of these enormous spans on the structure is compared to both RC and pre-stressed concrete. Using the software Adapt Builder 2016, the roof slab of the auditorium component of the construction is created with regular RCC and compared to slabs sitting on pre-stressed post-tensioned girders. A comparison of RCC and pre-stressed concrete is also carried out. For seismic design, the structure's diaphragm action is taken into account in order to produce a monolithic action and so offset the torsion impact. The findings of a comparison study with and without the influence of torsion demonstrate that the effect of torsion is prevalent in greater seismic zones, and special attention should be paid to extreme columns and corner columns, which are more sensitive to failure. STAAD is used to analyse the structure's response spectrum. The response graphs for Pro and Storey are obtained.

Muhammad Umair Saleem and Hisham Jahangir Qureshi, (2018), in this article the performance of PEB steel frames in terms of optimum usage of steel sections and its comparison to conventional steel buildings is detailed in this research study. A variety of PEB and LRB steel frames are chosen and tested under varying loads. The frames were studied using a Finite Element Based Analysis programme, and the design was carried out in accordance with the American Institute of Steel Construction design guidelines. The frames were compared based on their weights, lateral displacements (sway), and vertical displacements (deflection). The findings clearly reveal that PEB steel frames are not only the most cost-effective option due to their lighter construction weight, but also function better than CSB frames.

Prajwal T P, Imtiaz A Parvezb, KiranKamatha (2017), in contemporary trends, architectural designs feature many inevitable imperfections in the buildings. Because of these imperfections, the structure is more vulnerable to natural disasters such as earthquakes. The behaviour of irregular buildings during seismic events is investigated in this paper. Nonlinear static analysis is used to evaluate the performance and susceptibility of the irregular building models under consideration. SAP 2000 is used for modelling and analysis. In the case of irregular buildings, the angle of incidence of seismic force is critical. The occurrence of seismic action makes a building structure more vulnerable, even if it is safe when analyzed and designed according to design code provisions. As a result, it is critical to investigate the behaviour of the considered models while accounting for the incidence angle of earthquake forces using parametric tests. By examining different earthquakes, nonlinear dynamic analysis has been carried out along different directions to estimate critical angle of incidence, which is comparable to response spectra of the Indian standard code.

SeenaSomasekharan, Vasugi K (2017), the truss chord members for different sections such as ISLC/ISA, UB/UC, and SHS are designed in this study utilizing SAP 2000-18. For the design of the industrial building, the most cost-effective truss chord sections are used, and the industrial buildings are therefore built to carry out wind analysis with various bracings such as X-bracing, diagonal bracing, and k-bracing.

As a result, given the same parameters, the most optimized structured is compared to PEB structure.

Peter Fajfar, (2018), when seismic regulations embraced static analysis with lateral loads of around 10% of the structure's weight. Seismic loads of this size were included in the majority of seismic codes around the world for a long time. More complex analysis approaches, taking into account the dynamics and nonlinear behaviour of structures, were adopted throughout time. Methods including explicit probabilistic considerations may be used in the future. The evolution of seismic provisions as they pertain to analysis is outlined in this study, and the current state is discussed, as well as prospective future changes.

Adrian Fredrick C. Dyaa, Andres Winston C. Oretaa (2017), In the study, it is assumed that the properties and number of structural members for each story is constant. Thus, soft stories may be defined by simply determining the height of the stories. The study is also limited to a single soft story at the first story. The severity of the soft story is varied by increasing the height of the soft story. A static pushover analysis is utilized to determine the performance of the building under different irregularity conditions. The output of the study may be used to improve existing level 1 seismic risk assessments. Due to the limitations of a static pushover analysis, the study only covers low-rise buildings as permitted by the NSCP. Though it is recognized that a dynamic time history is more suitable, a pushover analysis is sufficient due to the preliminary assessment nature of the objective. The study has found that one of the primary concerns in vertical irregularities is the localization of seismic demand. For soft story buildings, the concentration of seismic demand is where the soft story is located. Data from the pushover analysis is translated into score modifiers for the varying soft story severity which may be used for preliminary risk assessment tools.

Sudhir Singh Bhadoria(2017)

This research focuses on using PEBs to replace typical steel constructions. PEB members are designed to lower the structure's steel consumption and cost by following the bending moment diagram of the steel frame. As a result, this article compares numerous models of PEB spans ranging from 10 metres to 50 metres, i.e. 10 metres to 30 metres, 40 metres, and 50 metres, to standard steel spans of the same length. The most cost-effective solution is determined by designing and analyzing models of both systems using Staad Pro Software.

Hari Prasad M, 2017, the PEB construction system provides the designer with a wide range of benefits and advantages in order to suit all of the client's needs. The increasing popularity of PEB systems necessitates the enhancement of their structural behaviour when subjected to dynamic stress. This project is about the analysis and design of a PEB Substation building with a Crane (5 tonnes capacity) subjected to Earthquake Dynamic Loads. The cast in-situ structure is also examined and compared to the PEB structure in order to validate its structural behaviour.

Research Methodology

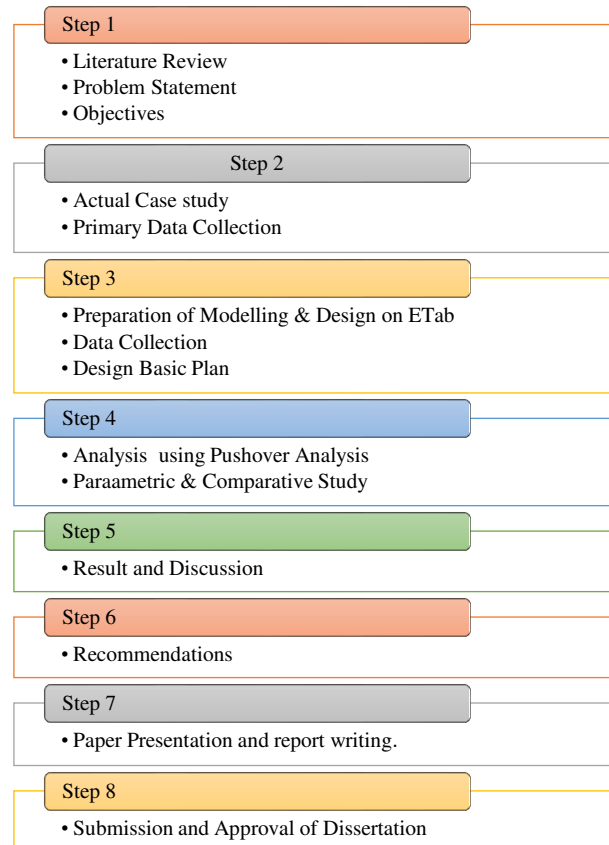


Figure1.2: Methodology Flow

Aim

Aim of the project is to perform and present a development of theoretical and analytical aspect of the behaviour of base isolated PEB structure for pushover analysis.

Objectives

- Study of types of base isolators, their constituent elements
- The present work is focused on the impact of different base isolated systems like Lead rubber bearing and friction pendulum bearing on the seismic performance of the symmetrical and unsymmetrical structure.
- The comparative study between bases isolated structure and fixed base structure.
- The parametric study was carried out to study the linear dynamic characteristics considering different isolated systems used in the structure using Response spectrum method.
- To design and study the effectiveness of lead rubber-bearing

Problem Statement

To analyze PEB building structure with various techniques using ETABS software analysis to get optimum results. Study of various parameters governing the structure such as:

- a) Earthquake zone
- b) Geographical Location of a proposed Site
- c) Geological Parameters that includes: Type of soil, bearing capacity of soil

In this effort, ETab 2018 software was utilized to assess and create pre-engineered and conventional building structures. In the first case, a 2D plane frame of 92 m length, 40 m width, and 7 m bay spacing was developed for PEB Structure. This frame allows you to pick the most affordable bay spacing.

III. DESIGN & MODELLING

A PEB structure used for analysis; a small plan of the structure is used. Following figure shows the plan of the PEB Structure.

Material Grade Fe345

Material Properties (All Dimensions in Mm)

Items	Total Depth	Top Flange	Flange Thickness	Web Thickness	Bottom Flange Width	Flange Thickness
COL 300 DEPTH	300	200	16	8	200	16
COL 800 DEPTH	800	300	20	8	300	20
COL 700 DEPTH	700	300	20	12	300	20
COL 900 DEPTH	900	350	25	12	350	25
PIPE FOR BRACING	100 X 100		8	8		

Details of parameters for seismic analysis

Analysis is carried out as per IS 1893:2002 following parameters are considered:

1. Zone factor as zone III
2. Soil type is taken as medium soil
3. Importance Factor 1
4. Reduction factor is taken as 3
5. Damping is taken as 5%

By Using Response Spectrum Analysis

- Seismic Zone III
- Soil Type II
- Response Reduction Factor 3
- Importance Factor 1
- Damping Ratio 5%

Elevation details of the structures

Height of structure height of 4.5 m

- The depth of foundation below plinth level is 2m
- The total height of each structure above ground level is 4.5m

Loading

This section discusses the different loads that could act upon a tall building; moreover it discusses the importance of those loadings. The forces which can act and considered to be acting on the structures are dead weight of the structure, live load on the structure, earthquake forces as this project deals with the seismic behavior of the structures under consideration.

Loading calculations:

There were three types of loading consideration taken into account while analyzing the structure that is PEB structure.

- Dead Load
- Live Load
- Co-lateral Load
- Wind Load 1
- Wind Load 2
- Wind Load 3
- Wind Load 4
- Seismic Load X Direction
- Seismic Load Y Direction

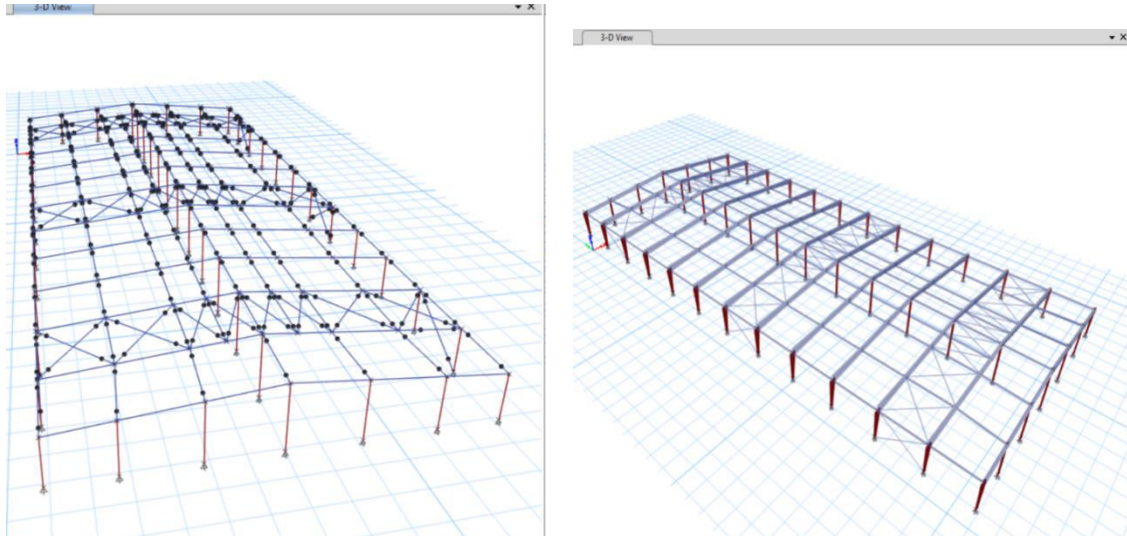


Figure1.3: TopView

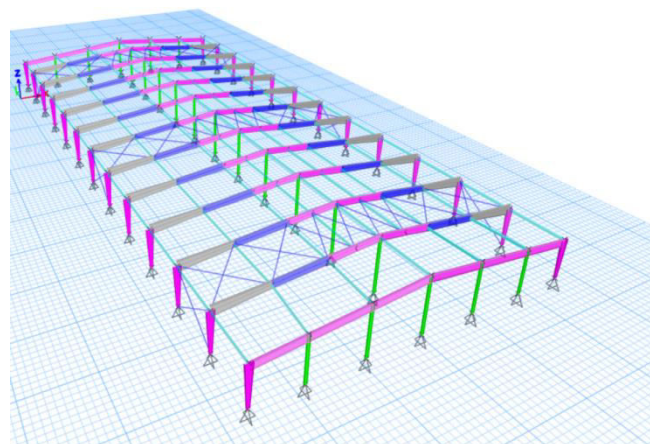


Figure1.4: Model with Shown Section

Loadings as per IS 1893:

India is basis on the earthquake prone area and intensity and magnitude of past earthquake is divided into four seismic zones. Zone II, Zone III, Zone IV, Zone V.

The earthquake horizontal acceleration A_h is the multiplication of 4 factors numbered as 1,2,3,4.

1. Z =Zone factor, it depends on the location of the building of or the structure under consideration. When the maximum earthquake is to be taken into account the zone factor is taken as it is. For design purpose it is divided by 2

2. I/R where, I= importance factor, depends on the importance of the building. The building which is more important has a greater important factor. And R=Response reducing factor of the structure which depends on how the building is featured to resist the forces,
3. S_a/g = average response acceleration coefficient, it depends on the different soil type of the structure on which the building is founded.

Design Lateral Force (lateral shear at the base of the structure) V_B .

IV. ACKNOWLEDGMENT

We express our sincere thanks to PG coordinator **Prof. Vijay Kumar Prakash Bhusare** for his continuous support. I also thankful to our Head of the department **Dr. Navnath Khadke**, also supporting staff, teaching & Non-teaching Staff

V. CONCLUSION

Because the members were constructed according to a bending moment diagram, the quantity of material required was reduced when PEB was used instead of a conventional steel building (CSB) design idea. Because of its high-quality pre-design and prefabrication, as well as its light weight and cost-effectiveness, this methodology is flexible. If we employ standard steel structures, the project will take longer and cost more, making it uneconomical in the long term.

This study will examine a variety of concerns that must be considered when developing with & without LRB portal frames, as well as whether this method of construction is safe and worth pursuing as an alternative to existing construction methods. The goal of this research is to compare traditional steel structures to new steel structures. This study examined and built web tapered portal frames and conventional steel buildings using computer tools. Steel portal frames with web tapered webs are ideal for construction in remote and hilly areas.

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