



PRE ENGINEERED FRAMES FOR INDUSTRIAL STRUCTURES

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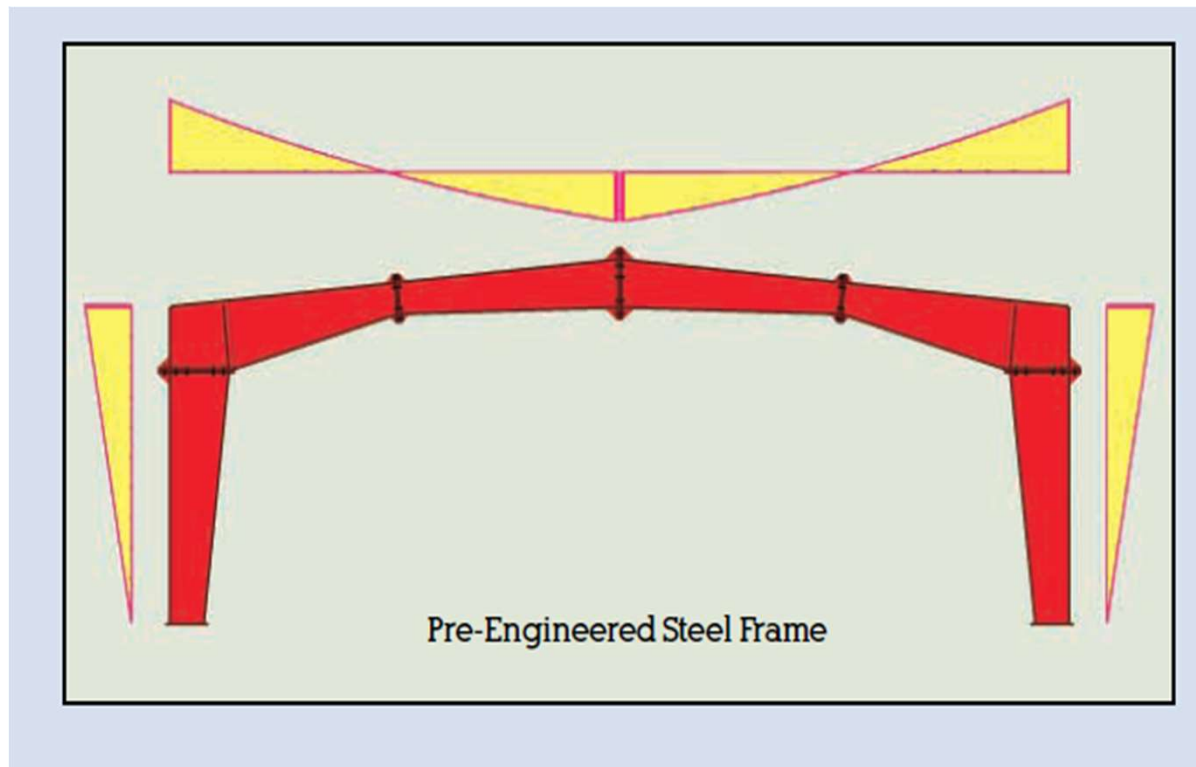


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- Introduction of Pre Engineered buildings(PEB).
- Objectives.
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INTRODUCTION OF PRE ENGINEERED BUILDINGS

- Pre engineered buildings are nothing but steel buildings in which excess steel is avoided by tapering the sections as per the bending moment's requirement.



CONTINUED.....

- Pre-engineered buildings are fully fabricated in the factory after designing, then transported to the site in completely knocked down (CKD) condition and all components are assembled and erected with nut-bolts, thereby reducing the time of completion.
- STAAD Pro software can be used for analyzing and designing of the pre-engineered buildings.

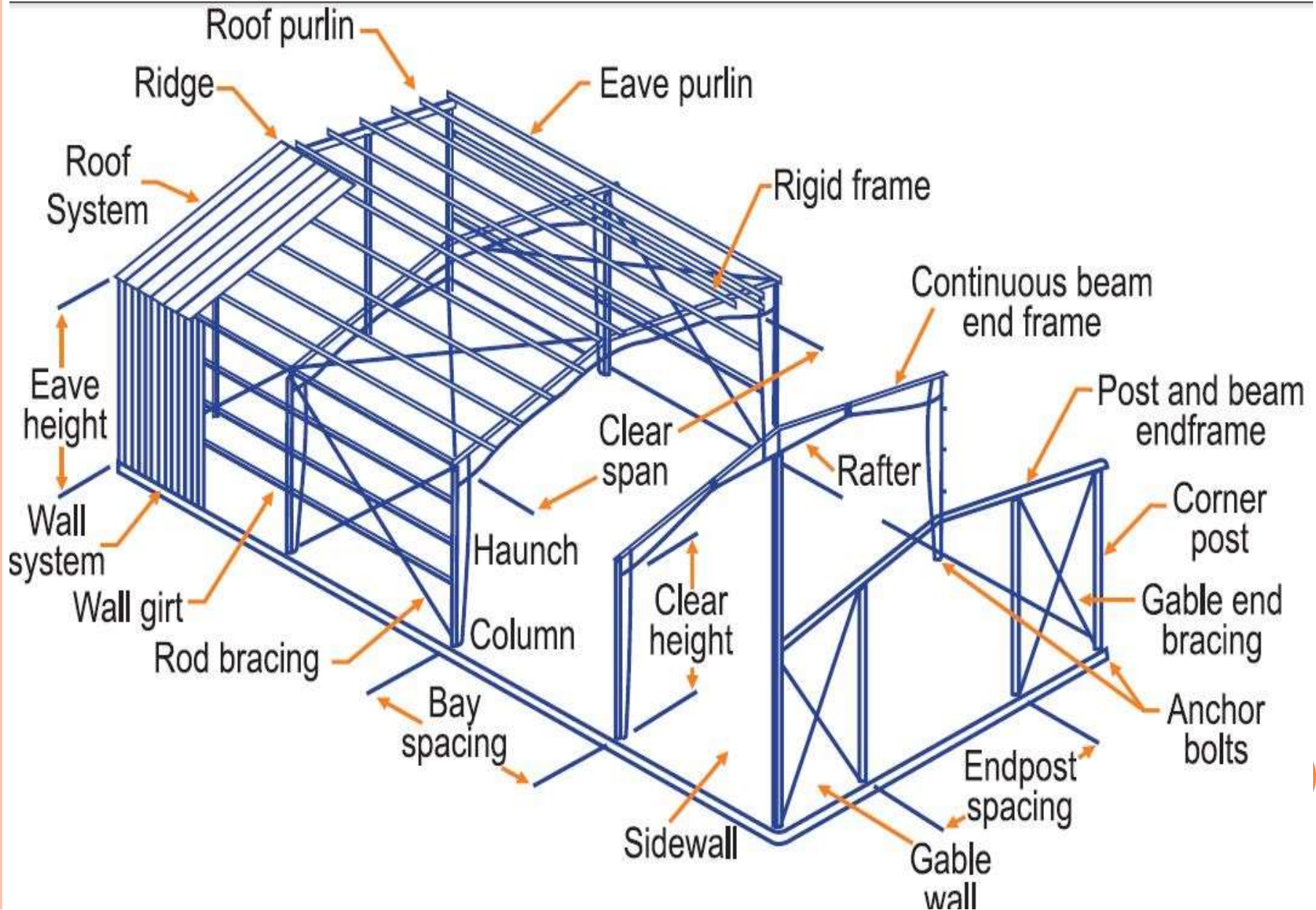
OBJECTIVES

- Study of components of PEB.
- Study of Comparison of PEB and conventional steel buildings
- Study of Advantages of PEB over conventional steel building structures

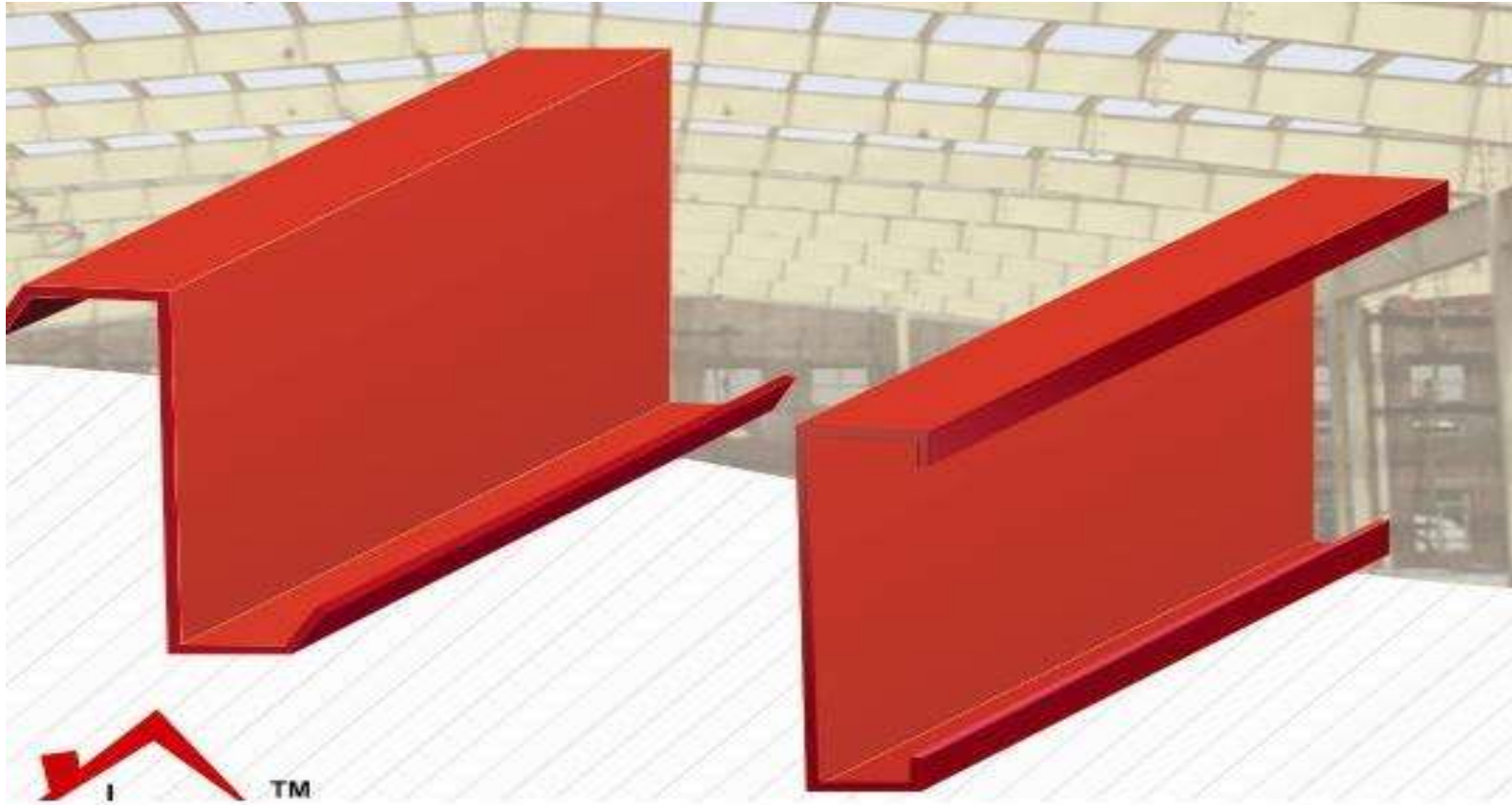
COMPONENTS OF PEB

- Main frame:-
 - a) Primary Members:- Columns and Rafters
 - b) Secondary Members:- Purlins and Girts
- Sheeting:- Roof and Wall
- Accessories:- Ventilators, Sky lights, Misc.

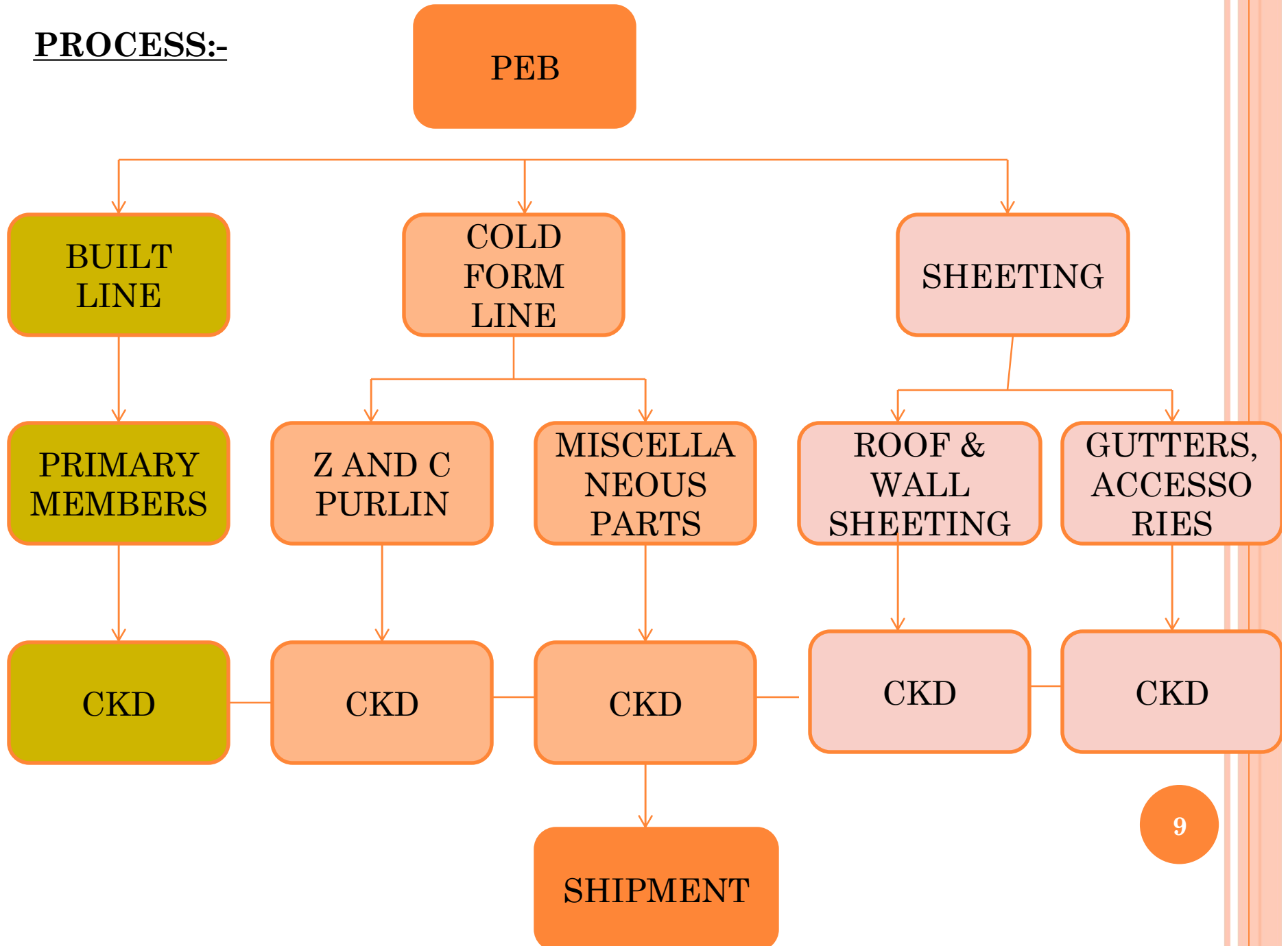
COMPONENTS OF PRE ENGINEERED BUILDING



Z PURLIN AND C PURLIN



PROCESS:-



LITERATURE REVIEW

Paper 1:-Comparative Study of Analysis and Design of Pre-Engineered-Buildings and Conventional Frames.

By Aijaz Ahmad Zende, Prof. A. V. Kulkarni , Aslam Hutagia

In this present work, Staad Pro software has been used in order to analyze and design Pre-engineered building structures and conventional structures. They have considered 3 examples.

- In the first example, a 3D model of a Hostel building has been designed and compared with conventional structure using conventional steel. It is seen that the weight of tapered PEB sections are 369.24kN whereas for conventional building, it is found to be 491.64 kN. Pre Engineered Building weighs 25% less than that of conventional building.

- In the second example, a 2D plane frame of width 44m for both PEB and conventional has been designed and comparison has been made in terms of weight of steel. PEB structure is designed for a clear span of 44m without any column in between, as not in case of conventional frame, where it is not possible to provide a clear span truss and hence an interior column is provided. It is noticed that, even though PEB structures provides clear span, it weighs 10% lesser than that of conventional buildings.
- In the third example, a 2D plane frame of width 80m has been designed with tapered sections for PEB. This frame has been designed for different bay spacing to choose the most economical.

Spacing(m)	No. of frames	Weight / frame(kN)	Total (kN)
8	11	782	8602
8.88	10	805	8050
10	9	948	8537
11.425	8	1046	8374
13.33	7	1218	8528

Paper 2:-

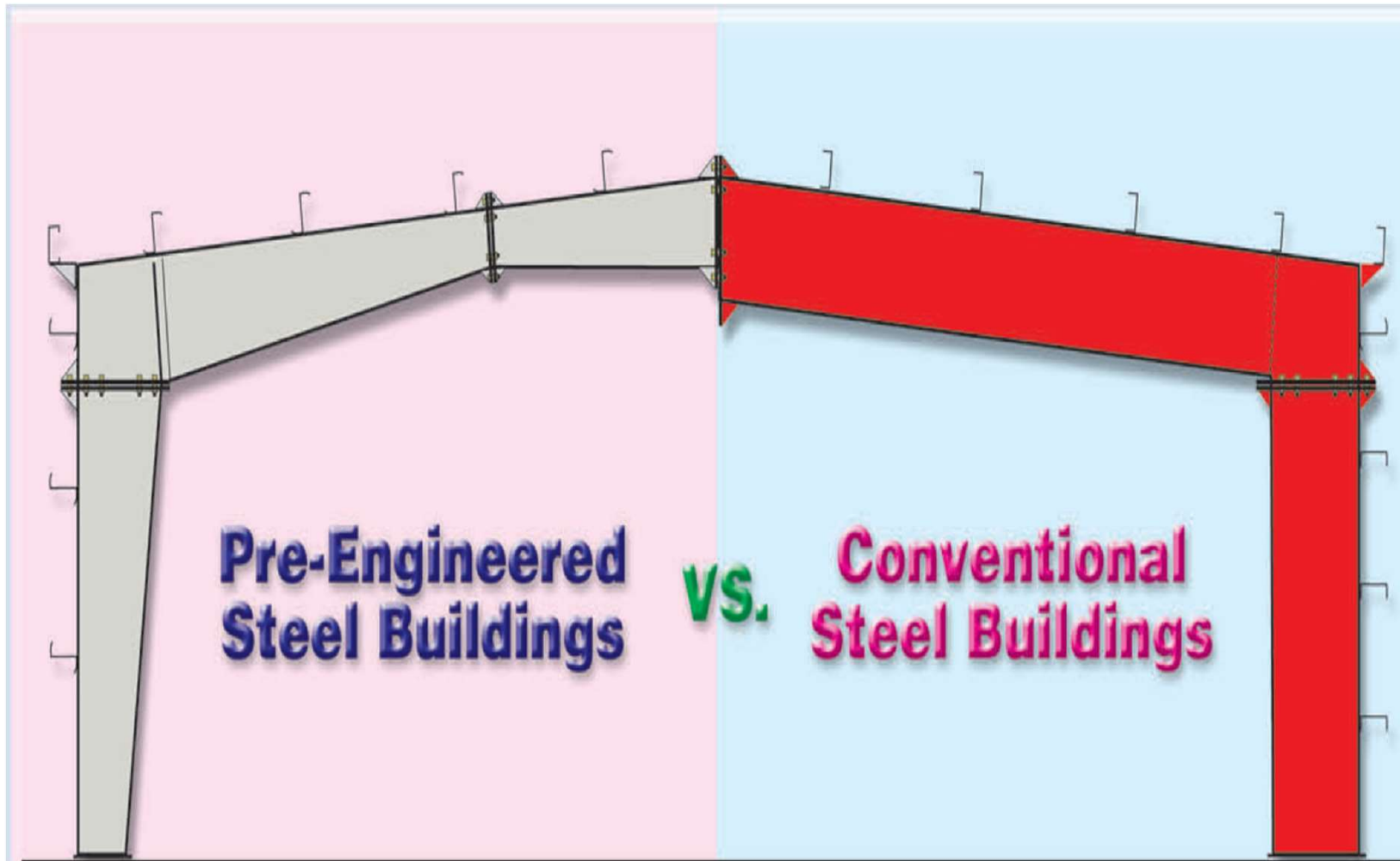
International Journal of Engineering Sciences & Emerging Technologies, June 2013. ISSN: 2231 – 6604
Volume 5, Issue 2, pp: 75-82 ©IJESET

C. M. Meera (M.E. Structural Engineering,)

This paper is a comparative study of PEB concept and CSB concept. The study is achieved by designing a typical frame of a proposed Industrial Warehouse building using both the concepts and analyzing the designed frames using the structural analysis and design software Staad.Pro.

Sl. no	Description	PEB	CSB
1	Support reaction(KN)	355.47	375.58
2	Max deflection(mm)	1.86	8.61
3	Max shear force(KN)	340.94	453.98
4	Max moment(KN)	888.97	908.57

COMPARISON OF PEB AND CONVENTIONAL STEEL BUILDING SYSTEM



Property	Pre Engineered Buildings	Conventional Steel Buildings
STRUCTURE WEIGHT	Lighter (30 % than conventional steel)	Heavier
DESIGN	Quick and efficient	Slow and tedious
	Specialized computer analysis and design programs optimize material required..	Substantial engineering and detailing work is required.
SAFETY AND RESPONSIBILITY	Single source of responsibility is there because all the job is being done by one supplier.	Multiple responsibilities can result in question of who is responsible when the components do not fit in properly, insufficient material is supplied or parts fail to perform particularly at the supplier/contractor interface.

Property	Pre Engineered Buildings	Conventional Steel Buildings
DELIEVERY	Delivered in Short Period (6 to 8 weeks)	Require Longer Period (20 to 26 weeks)
FOUNDATION	Simple design, easy to construct and light weight.	Extensive, heavy foundation required.
ERECTION SIMPLICITY	Since the connection of components is standard, erection is faster.	The connections are normally complicated and differ from project to project.
	Erection is provided at the site by the manufacturer.	There has to be separate allocation of labour for the purpose of erection.

Property	Pre Engineered Buildings	Conventional Steel Buildings
ERECTION COST & TIME	Cost effective , faster and less number of equipments are required for erection.	Costlier (20 % than PEB) , time consuming and heavy equipments are required for erection.
OVERALL PRICE	Price per square meter may be as low as by 30 % than the conventional building.	Higher price per square meter.
ARCHITECTURE	Outstanding architectural design can be achieved at low cost using standard architectural details and interfaces.	Special architectural design and features must be developed for each project which often require research and thus resulting in higher cost.

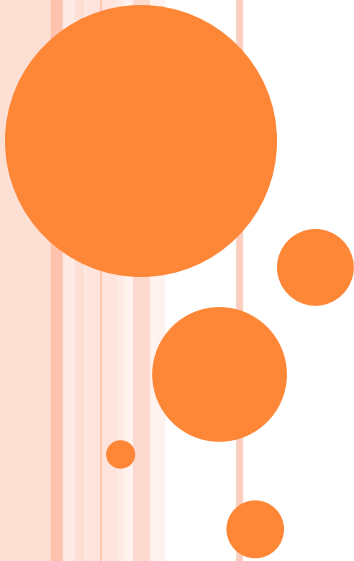
ADVANTAGE OF PEB SYSTEM OVER CONVENTIONAL STEEL BUILDING SYSTEM

- PEB System is zero maintenance & superior in strength.
- It is having an attractive appearance.
- PEB System has protection against non uniform weathering.
- Excellent resistant in transit to corrosion & storage strain.
- This system reduces energy loads on buildings due to long term bright surface that helps to retain heat reflectivity.
- It is a higher level technology & innovation & better product over conventional material.

APPLICATIONS

- Pre-Engineered Building concept have wide applications including warehouses, factories, offices, workshops, gas stations, showrooms, vehicle parking sheds, metro stations, schools, recreational buildings, indoor stadium roofs, outdoor stadium canopies, railway platform shelters, bridges, auditoriums, etc.

THANKU



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