International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue IV Apr 2022- Available at www.ijraset.com

A Review on Comparative Study between the Pre-Engineered Building and Conventional Steel Building

Nikita D Radake[1], R V R K Prasad[2]
[1]Post Graduate Student, KDK College of Engineering & Technology, Nagpur, Maharashtra
[2]Associate Professor, KDK College of Engineering & Technology, Nagpur, Maharashtra, Department of Civil Engineering, K.D.K. College of Engineering, Nagpur-440009, India

Abstract: ***In steel structure design the Pre-engineering building (PEB) system is a modern technology that provides economical, eco-friendly, and sustainable structures. The pre-Engineered Building (PEB) concept is a new conception of single-story industrial building construction. This methodology is versatile not only due to its quality pre-designing and prefabrication but also due to its lightweight and economical construction. This concept has many advantages over the Conventional Steel Building (CSB) concept of buildings with roof trusses. This paper mainly focuses on the PEB concept and CSB concept. The study is achieved by designing a Warehouse building as PEB and as CSB with the help of Staad Pro. The CSB is designed and analyzed by IS 800:2007 (LSM) and PEB is designed and analyzed by AISC 360:10.***

Keywords: Pre-Engineered Building (PEB), Conventional steel building (CSB), Structure analysis and Design, STAAD PRO V8i

I. INTRODUCTION

PEB is modern technology introduced in steel structures. The steel industry is growing rapidly in almost all parts of the world. The use of steel structures is not only economical but also eco-friendly at a time when there is a threat of global warming. Here, the "economical" word is stated considering time and cost. Time is the most important aspect, steel structures (Pre-fabricated) are built in a very short period and one such example is Pre Engineered Buildings. If we go for regular steel structures, the time frame will be more, and also cost will be more, and both together i.e. time and cost, make it uneconomical. Steel concrete composite construction technique offers several advantages like increased load carrying capacity and stiffness, saving in weight of steel, reduction in the cost of the foundation, and most importantly a large saving in construction time. Thus in pre-engineered buildings, the total design is done in the factory, and as per the design, members are pre-fabricated and then transported to the site where they are erected in a time less than 6 to 8 weeks.

A. Concept Of Conventional Steel Building

Nowadays, steel is used worldwide due to its ductility and flexibility properties. Steel bend when it's subjected to heavy loading rather than crushing. Conventional steel buildings (CSB) are small rise steel buildings with roofing structures of truss with roof coverings. Steel roof trusses are normally used for industrial buildings, workshop buildings, warehouses, and even residential buildings. The selection criterion of roof truss also includes the slope of the roof, fabrication and transportation methods, aesthetics, climatic conditions, etc.

B. Concept Of Pre-Engineered Building

Pre-Engineering Building is a combination of the tapered built-up section, hot roll section, and cold-formed section material. Pre-Engineered steel structures are fabricated or created necessity in the plant itself. The production of structural members is done on customer requirements. A pre-engineered building (PEB) is designed by the producer to be fabricated using a pre-determined inventory of raw materials and production techniques that may efficiently satisfy a wide variety of a structural and aesthetic views of design requirements within a few geographic manufacturing sectors these buildings are also called as Pre-Engineered Steel Buildings. These members are made up of a cold-formed section. The section's sizes depend on the bending moment diagram. PEB provides lightweight, less time-consuming, and it is advantageous over CSB when the span is large and column-free space is required. The design and manufacturing of structure members are done at the plant and later it's transported to the construction site and the erection process will take place.

