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Design & Analysis of Industrial Building Using STAAD.Pro software

Sudhir Paswan[1], Manas Rathore[2]

[1]Research Scholar, [2]Assistant Professor
[1,2]Department of Civil Engineering
[1,2] Kalinga University, Raipur-492001, Chhattisgarh, India

ABSTRACT-

Structural Steel is a common building material used throughout the construction industry. Its main purpose is to build the skeletal structure of a building, the part of the structure that holds everything up and connected. Metal is one of the most environmentally friendly materials that can be used 100%. The structure of the building has changed, largely due to the demand caused by the earthquake. By using the available ISMB steel parts the required design requirements cannot be met, especially in heavily loaded buildings, as the moment of inertia and cross-sections play a major role. Reinforced concrete sections also carry a heavy load but when the assembly is facing a maximum height of about 50-60 meters it is not advisable to use concreting processes, thus using a built structure it is easy to make a permanent structure. However, like all new things, technology breeds its own set of new problems. So, with the use of STAADPro, seismic analysis is done fairly easily. The multi-story Industrial Building has been selected and carefully analyzed and designed. Selected floor + floor + floor + floor selected. Analysis and design will be done according to standard specifications as far as possible extensions. Structural analysis will be performed using the software package STAAD PRO.V8i. All parts of the building will be designed by hand. Details of the consolidation will be done in AutoCAD 2013. The use of the software provides timely savings. The price is required on the safe side rather than the craft.

Key Words*:* -STAAD PRO, Industrial building, AutoCAD, Codebook

Introduction

Design is not just a calculated analysis; intelligence must be included. Art is a skill that is acquired through knowledge and practice. The design of structures as conceptual studies often involves estimating the size of the members required for a particular building and then analyzing them to consider the resulting pressures and deviations within the limits set in the performance codes. Structural design can be seen as the process of disposing of materials in three dimensions in order to satisfy a specific purpose defined in the most efficient way. STAAD.Pro is currently the leading design software for designers working on large projects that require high precision. Design companies use this software for their project purposes. Comparative analysis of the results obtained from the analysis of the multi-story building when it was analyzed in person using STAAD.Pro software.
STAAD.Pro also offers installation, output and numerical solutions that clearly satisfy the unique design and design features and type of structure, providing a tool that offers a significant amount of time savings and increases accuracy, in addition to standard systems.
As in this project we are dealing with the economic column approach, so in this project we have to design the structure in a cost-effective way by reducing sizes in stages. Reducing the column in the direction of the column in such a way that "long in the long direction will reduce the amount of bending in the structure and as a result the need for steel is reduced.

Objectives

The following are the objectives of the project-
1. The main objective of the research is to analyze and design the G + 3 industrial building using STAAD.Pro.
2. Design of structural components such as foot, base, column, slab, beam by manual.
3. Design and provide details of the reinforcement bar of a building component using Auto CAD.

General load Principles followed in Design

- Loading to take into account the design of different parts of the building including air load will be according to I.S. 875-1987 (Part I to V) and I.S. 1893- 2002 (seismic loads).
- Unless otherwise stated, the weight of the various items will be considered as given below.

1. Brick construction: 19.2 kN / m^2
2. Reinforced cement concrete: 25 kN / m^2

3. Floor finish: 1kN / m^2
4. The live load of the sanitary block will be 2 kN / m^2.
5. The elevator compartment will be designed to accommodate a 10 kN / m^2 live load.
6. Loading due to electrical installation e.g., AC ducting, exhaust fans, etc. will be verified by the Electrical Division Engineer.

- Any other loads that may need to be considered for designs due to the specific type or type of structure should be recorded and included.
- Reduction of dead opening loads should not be considered.
- Analysis will be done on the distribution of dead loads, live loads, temperature, earthquake loads and air loads. Temperature cannot be ignored especially if the buildings are tall. All parts of the building will be designed for the worst combination of the above loads according to IS 875 Part V.
- In the case of tall buildings, if necessary, Model analysis will be performed on horizontal power, according to I.S. 1893 and the U.S. 875 (Part III).
- The R.C.C. the details will generally be as SP 34 and as a ductile code with I.S. 13920.1993.

The initial size of the slab and beam should be as follows:

1. The thickness of the slab should not be less than 100mm and the toilet and stairs should not be less than 150mm.
2. Depth of the beam should not be less than 230mm.
3. The minimum column size is 230mm x 230mm.

K. PRABIN KUMAR , D. SUNNYPRAKASH, Analysis of Design and Design of an Industrial Building Using STAAD PRO In this project work, the hangar was designed using PEB components to achieve a ductile and highly reinforced hangar. This is achieved by using bracing on the hangar from time to time. The hangar has seven ports. The first and last harbors have a space of 7.5 meters. Another 5 bays have 7.0 m spaces. the length of the hangar is 50m and the width is 15m. The length of the hangar is 10m. A 10deg slope is provided on the roof. The calculation of the various loads operating in the building was performed using codal provisions. Thereafter, load combinations are developed in the construction of the foundation is made based on the loads that operate the foundation of the structure. Hagarwasthe design and structural analysis are done using Staad pro software. The result shows similarities in hangar construction. Deviation values for both methods were found to be below the allowable deviation calculated. Thus, the structure is safe against deviations.

Ms. Aayillia. K. Jayasidhan, Mr. Abhilash Joy, Analysis and Design of an Industrial Building This paper focuses on the analysis made by comparing the results we obtained from the analysis of the multi-story building using the manual method and the use of ETABS. software. Building analysis refers to the design of the structure and all the general dimensions of a particular building in order to perform the required function for which it was created and to safely withstand the environmental and operational impacts that will apply to it throughout its useful life. In their analysis, they have done by analyzing all the necessary details of earthquake zones and their behavior is assessed by looking at the type of ground type II. At their construction site they considered the system under zone –IV. Seismic Intensity is out for Severe and Zone Factor is 0.24

M. Suneetha, Gillela. Naresh Kumar Reddy In this Dissertation, a numerical survey was completed. By adding additional power such as seismic analysis, air load in various areas of zone I, zone II, zone III. The Framework for the Various Structures of the Steel Structure and the Pre-Engineering Engineering Structure (PEB) has been developed and the conclusions reached have been reached: - considered to be unchanged compared to the Steel Truss Building which uses part of the edge. The percentage of savings on the results is shown at the bottom of the table.

Harun Mugo Thande This thesis was about the structural analysis of the identified parts of the warehouse building. The components analyzed include roof truss, columns and structure members. Selected building components were considered the most important especially when considering loading conditions. The three main loads operating on the building included: snow load, air load and building weight. The main purpose of the analysis was to identify parts of the structure that were experiencing severe stress. Analysis covers most of the thesis and is a very important part. There have been a number of dependent steps involved in the analysis. Ninety percent of the building did not have high pressure. Redesign was important to support the analysis.

C.V.S. Lavanya, Emily. Pailey, Md. Mansha Sabreen, their project deals with the economical design of the column so that they can design the structure more economically by reducing the size of the section. Since the load is much lower compared to the upper floors, it is less likely to give a larger size at the top. The column layout needs to be well maintained by arranging its shape in such a way that the length of the column will result in a reduction in the amount of bending and as a result the need for metal is reduced. it may be different i.e., it may be higher in the upper column to minimize structural failure

Dinesh Kumar, Mirza Aamir Baig: In this project work the author proposes to design an industrial waste disposal storage system in the form of a standardized system based on IS 800-2007 (LSM) and to compare similar results obtained with operational pressure. method based on IS 800- 1984, of the same size and loading structure. 48m x 16.0m industrial steel shed with 4.0m bay spaces with 11m column length. is considered the East Delhi Industrial Area. Fink roof trusses are 16 meters long. The plot is modeled on STAAD Pro, analysis and design software. A full 3D model is being produced. This project is about analyzing the loads and strengths that apply to the members of the upper structure and their structure. Building loads are gravity loads (dead and alive), Crane Loads, air loads, and earthquake loads calculated using the Indian Standard code IS 875-1987 (part I), IS 875-1987 (part II), IS 875-1987 (part III) and model phase structures are obtained using a metal table. In this building the loading of ice is not considered as Delhi does not experience any snowfall at all. The main objective of this project is to provide a cost-effective approach and to provide additional capacity and maximum flexibility.

Sayyed A. Ahad, Hashmi S Afzal, Pathan Tabrej, Shaikh Ammar, Shaikh Vikhar, Shivaji Bidve, Design and analysis of the existing residential building (G + 10) issues. The analysis was performed using the ETABS version Version 15.2 which proved to be good enough for the construction and construction analysis of all the phases. All structural elements such as concrete wall, which retain the weight of the soil are provided.

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