

STUDY OF VARIOUS TYPES OF ROOF TRUSSES FOR SAME SPAN

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Abstract - This paper review is related to study the different industrial roof truss with the same span and rise to determine one of the economical trusses. And the design of truss is by limit state method using STAAD. Pro Vi8.2015 analysis and design software by applying Indian Standards. It follows the method of design of steel truss as per IS: 800-2007 and IS:875-1987 part 1, 2 and 3 codes. And the section properties are taken from steel table and certain decision based on practices and past engineering experience. In the present study, Fink truss, Parallel chord truss, Arch truss, P.E.B truss and Pratt truss this types truss has been taken using same span 25m and rise 4m is considered an industrial area of Nagpur. The safe and economical truss has been decided by a comparison of results of the various type of trusses for same span and rise.

Key Words: Steel roof truss, STAAD Pro., Comparison, IS 800, Economical.

1. INTRODUCTION

Steel roof truss is an important element of the industrial structure. Steel is a widely used material in industrial structures which economical than concrete. Truss is triangular frameworks, to provide support to the roof and the truss connected with longitudinal member purlins and truss having spacing at regular interval. Especially in an industrial building, the large span truss is used. Roof truss design for dead load, live load, wind load, and their combinations as per IS:875-1987 part 1 for dead load calculations and IS: 875-1987 part 2 for live load calculations and IS 875-1987 part 3 wind load calculations. Truss is axially loaded member which more effective to resists external load. The loading of truss changes with span length, spacing, location and roofing type of trusses. The selection of steel sections for truss members is depending on the forces employed on a truss. Usually conventional (Angle, Channel etc.) and hollow steel section use for truss members. The Present work includes designing various Roof trusses for an industrial building using conventional steel sections and selecting the most suitable section for safe and economical roof truss for the same span.

2. LITTRATURE REVIEW

[2.1]Dinesh Kumar,Gupta Mirza and Aamir Baigh have studied the design of an industrial steel shed by limit state method based on IS 800-2007 (LSM) . 48m x 16m

of truss building having a bay spacing 4m with a column height of 11m. The area of design was considered in the East Delhi. 16m Span taken for fink type trusses. The structure was modeled in STAAD Pro. This project was all about analysis of loads & forces acting on the members of the above structure & their design

[2.2] Manoj Nallanathe, Ramesh Bhaskar,and Kishore have studied the steel roof truss is designed to have 18m and 30 m span had been analyzed with the design of tubular sections of truss members. In this truss he has to design in two ways one was conventional and prefabricated. The truss was drawn by using STAAD Pro v8i 2007. Actually conventional is better than the prefabricated and utility, safety, economic and must be fulfilled. This paper presents a study on the efficiency and economy of roof trusses and purlins by comparison method.

[2.3] Tejas D. Parekh, Disha Parmar, Yati tank, have analysis and design an economical and stable 2D truss for the usage in industrial purpose like storage rooms, workshops, warehouses etc., using STAAD. Pro.Vi8. He follows the method of design steps of steel truss type structures as per the guidelines of IS: 800-2007. and Howe type of truss has been taken using various span and rise. Four different spans such as 7m, 14m, 21m, and 28m have been taken into consideration. Three types of the riser are taken such as L/3, L/4, and L/5.The Tube section and Angle section are compared for span and riser. Safe and Economical section decided on weight obtain after Design and analysis

[2.4] Anush limbage, have studied that, the comparative study was carried out on four different spans of A-Type truss. Handbook for typified design for structures with steel roof trusses. A detailed comparative study was carried out on a 9m span truss by using IS 875(part 3);1987. In IS 875 (part 3); the span of truss taken 9m, 18m, 24m and 30m.the spacing and roof slope taken constant 6m and 1 in 3 respectively.

[2.5]Yash Patel Yashveersinh Chhasatia Shreepalsinh Gohil Het Parmar have investigated tubular steel is the best possible alternatives to the convention with their comparatively better specifications. This is all about the economy , load caring capacity, and safety of the trusses. Comparison of Conventional and Tubular section is for economical purpose. Up to 15% to 25% saving is

accomplished by using a tubular section. Analysis the shed using software STAAD Pro V8i.

[2.6]A.S.Gawande, S. A. Chauhan have studied that, to compare the limit state method IS 800-2007 and working stress method IS 800-1987 for sections of truss and conclude that the limit state method is lot economical than working stress method by using STAAD Pro. They use industrial shed 48m x 16m having a spacing of bay 4m and column height 11m with industrial area id east Delhi. Design the truss for Dead load, Live load, crane load wind load and seismic load using IS 875-1987(part 1), IS 875-1987(part 2), IS 875-1987(part 3). The main aim of this project was to conclude the economic and supply additional loading capacity.

[2.7]Anisha Goswami, Dr. Tushar Shende have studied the Pre-Engineering building concept for the single-story industrial shed. The work involved the comparative study and design of Pre-Engineering building and Conventional steel Building (CSB). And conclude the PEB is more economical than CSB. The PEB building is 27% lighter than CSB steel building. They design the industrial warehouse shed with using both concepts the structural analysis and software STAAD Pro.

3. METHODOLOGY

Firstly we study on the most commonly used trusses like Pratt Truss, Fink Truss, Arch Truss, P.E.B Truss, and Parallel Chord truss for span 25m and rise 4m. Design all trusses for Dead load, Live load, Wind load and Load combinations.

Draw basic Auto CAD plans, Design, and Analysis of trusses using STAAD. Pro Software Design Trusses for Limit State Method

Estimate and compare all trusses

4. CONCLUSION

From the literature reviews, we have concluded that the comparison of the five types of industrial trusses with the same span and same raiser help to find out the safest and economical industrial truss using STAAD. Pro and from the above reviews we able to observe that the truss designed using limit state method are a lot economical than the truss that is designed by working stress method. Also, the truss designed by limit state method has more load carrying capacity than the working stress method.

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