Analysis of Howe Roof Truss using Different Rise and Span

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Abstract**:**— *Roof trusses are generally used in industrial buildings. There are many types of truss available for the construction of roof truss. 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. It follows the method of design steps of steel truss type structures as per the guidelines of IS: 800-2007 and IS: 875-1987 part 1, 2 and 3 codes and certain amount of decision based on engineering judgments / practices and information from past experiences. In the present study, 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. Four rise criteria such as, L/3, L/4 and L/5 are taken. Angle section and Tube section have been compared for particular span and rise. Analysis was done using STAAD- Pro software and various results had been obtained. The safe and economical steel section was decided on the weight obtained of each truss after the analysis*

Keywords — *Howe truss, Roof truss, Economical, Rise, Span*

I. INTRODUCTION

Steel roof truss is an important element in structural engineering. It is made of individual members with equal tensile and compressive forces, it is designed to behave as a single object which carries/supports a load over whole span. A roof truss is a structural framework designed to connect the space above a room and to provide support for a roof. Trusses usually occur at regular intervals. Roof truss is linked by longitudinal members such as purlins. The space between each truss is known as a bay. Software plays a important role in analysis and design of different types of structures. There are many members used in industrial building .Steel is most widely used material. The primary aim of the present work is to Analysis of roof truss of an industrial building using STAAD.PRO software.

II. PROBLEM STATEMENT

In my study, howe truss is taken of various span and rise. Four different spans such as 7m, 14m, 21m and 28m has been taken into consideration. Three rise criteria such as L/3, L/4 and L/5 are taken.

Table1:-General data taken

Span	7,14,21,28
Height	L/3,L/4,L/5
Number of bays	10
Total dead load (sheeting+purlin+fixing+service)	Varies with geometry
Live load	Varies with geometry
Basic wind speed	44 for surat
Life of structure	50years
Wall opening	0.1

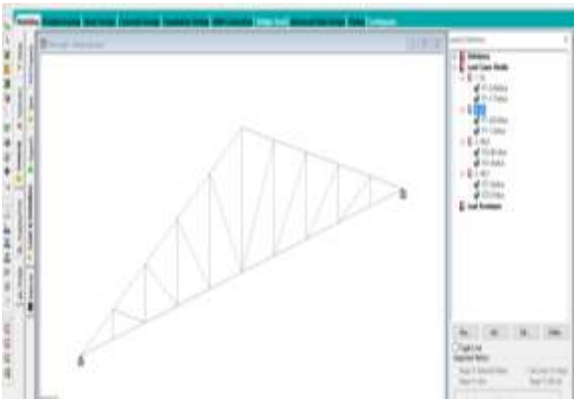

Figure2:-Howe truss

An excel sheet is made for the load values. Loads such as dead load, live load and wind load acting on the truss has been taken into consideration according to varying span and rises in truss. These loads are then applied to the nodes of truss and analysis is done using staadpro software.

III. RESULTS AND DISCUSSION

Table2:-Weight obtained for span/3 rise

Span	Steel Section (mm)	Weight taken(kg)
7m	Angle 45 X 45 X 4 SD	2036
	Tube 60 X 60 X 3.2	2132
14m	Angle80 X 50 X 5 SD	7365
	Tube 72 X 72 X 4.8	7224
21m	Angle 75 X 75 X 6 SD	15253
	Tube 122 X 61 X 5.4	16628
28m	Angle 90 X 90 X 6SD	24353
	Tube 145 X 82 X 5.4	26532

Table3:-Weight obtained for span/3 rise

Span	Steel Section (mm)	Weight taken(kg)
7m	Angle 45 X 45 X 4 SD	2036
	Tube 60 X 60 X 3.2	2132
14m	Angle80 X 50 X 5 SD	7365
	Tube 72 X 72 X 4.8	7224
21m	Angle 75 X 75 X 6 SD	15253
	Tube 122 X 61 X 5.4	16628
28m	Angle 90 X 90 X 6SD	24353
	Tube 145 X 82 X 5.4	26532

Table4:-Weight obtained for span/5 rise

Span	Steel Section (mm)	Weight taken(kg)
7m	Angle 45 X 45 X 4 SD	2036
	Tube 60 X 60 X 3.2	2132
14m	Angle80 X 50 X 5 SD	7365
	Tube 72 X 72 X 4.8	7224
21m	Angle 75 X 75 X 6 SD	15253
	Tube 122 X 61 X 5.4	16628
28m	Angle 90 X 90 X 6SD	24353
	Tube 145 X 82 X 5.4	26532

The above table shows the results obtained by doing analysis in staad pro software. The weight obtained for various steel sections are shown in tables. Weights of angle sections and tube sections are compared and economy of truss is defined according to it.

IV. CONCLUSIONS.

1. For various span(7,14,21,28)m if rise is taken equal to span/3,the results obtained are as under:
   For 7m span-45 X 45 X4sd
   For 14m span-80 X 50 X 5sd
   For 21m span-75 X 75 X 6sd
   For 28m span-90 X 90 X 6
2. For various span(7,14,21,28)m if rise is taken equal to span/3,the results obtained are as under:
   For 7m span-60 X 33 X 3.6
   For 14m span-96 X 48 X 4
   For 21m span-122 X 61 X 4.5
   For 28m span-145 X 82 X 4.8
3. For various span(7,14,21,28)m if rise is taken equal to span/3,the results obtained are as under:
   For 7m span-40 X 40 X 3sd
   For 14m span-65 X 45 X 5sd
   For 21m span-70 X 50 X 6sd
   For 28m span-80 X 80 X 6sd

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