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Development of Design Tables For A –Frame Trusses As Per Is 800-2007

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Abstract - *Working out the designs from the fundamentals is tedious and time consuming. This cannot be resorted to in the design offices these days, where time plays an important role .Hence this report has been compiled to assist the design engineers involved in steel designs to give a simpler, faster approach for designing of steel trusses. This report manual provides a range of "Ready-to-Use" designs for pitched roof trusses covering spans of 12m,15m,18m.The tables are tabulated in such a way that the designer has it ready reckoned to give the section details and its geometry by viewing the table.*

1. INTRODUCTION

This project was aimed at subverting the disequilibrium by preparation of design tables for trusses which comprise as major shareholder in steel construction in India. The hot rolled angle sections are established all over India as efficient and easily available section owing to the simplicity in manufacturing process, varied and versatile use of these sections.

This report manual provides a range of "ready-to-Use" designs for pitched roof trusses covering spans of 12m,15m,18m each in four different slopes 1:3,1:4,1:5 and 1:6.The designs for the trusses have been done under six different wind loading conditions of 55m/s,50m/s,47m/s,44m/s,39m/s and 33m/s. The table are tabulated in such a way that the designer has it ready reckoned to give the section details and its geometry by viewing the table by all itself.

2. PIN JOINTED PLANE TRUSSES

A structure that is composed of number of line members pin jointed at the ends to form a triangulated frame work is called truss .The arrangement of members in a truss makes it an efficient system for carrying loads . That is ,truss can carry heavy loads compared to its own weight .Most of the truss have a particular name that is associated with its geometric configuration .The key feature of a pin jointed truss that distinguishes it from other structural forms is that it resists loads primarily through axial forces in its members.

With vertically acting gravity loads, compressive forces are usually developed in the top chord members and bottom chord members. In the case of wind loads the top chord will be in tension and bottom chord will be in compression. Hence it is often necessary to design various members of a truss both for tension and compression and select the member size based on the critical force.

Analysis of truss

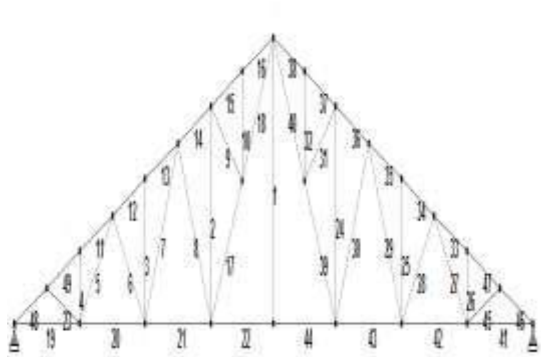


Fig-1: Model showing the beam numbers of truss

Analysis model of 15m span for a wind speed of 55m with a rise of 1:3 under high permeability is demonstrated.

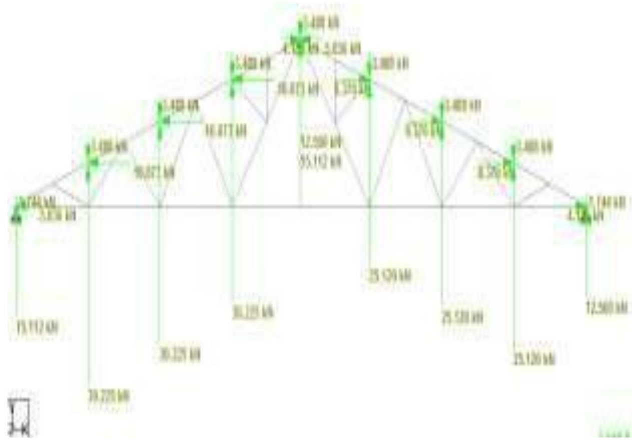


Fig-2: Showing the loads acting on the panel points of the truss for 1.5(DL+LL) combination.

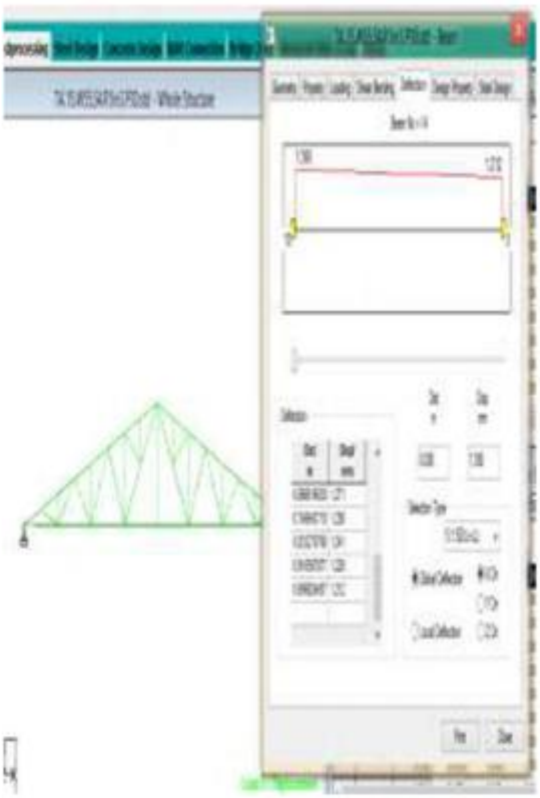
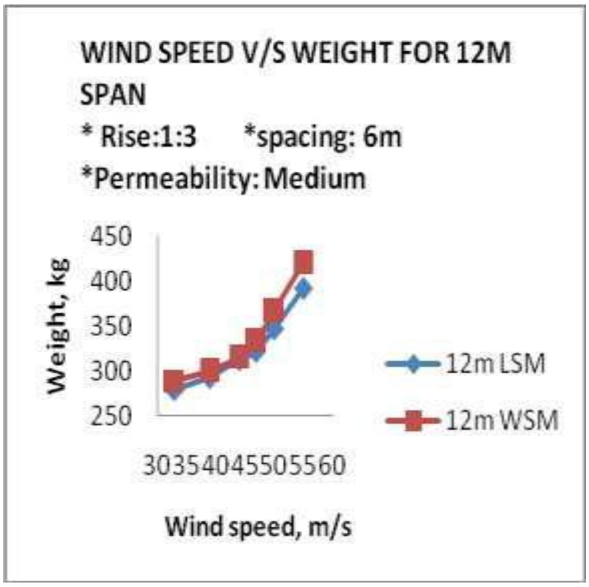
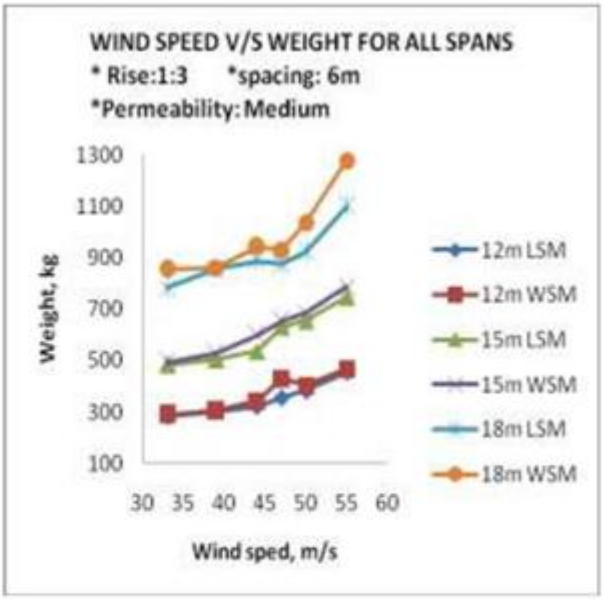


Fig- 3: showing the Deflection profile of the truss for the top chord member Comparison between LSM AND WSM in terms of Weight.



Graph -1: Showing the weight in Kg for 12 m span under different wind speeds in LSM and WSM for medium permeability



Graph -2: Showing the weight in Kg for 12m, 15 m and 18m spans under different wind speeds in LSM and WSM for High permeability

3. CONCLUSIONS

The above data analysis and interpretation from all the graphs envisages that,

Limit state method for higher spans of the trusses (say

> 15m) with different wind speeds, it is possible to save 10-12% of steel in comparison with the working stress method. Limit state method also, for the lower spans (say<12m), it is possible to save 5-6% of steel on an average as compared with the working stress method. Significant amount of material can be saved under different wind speeds in higher spans thereby achieving a good economy. Thus, this book can be used as a ready reckoned for practice engineers in the field of steel construction and design.

4. REFERENCES

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