iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** XII **Month of publication:** December 2018

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue XII, Dec 2018- Available at www.ijraset.com

Analysis of Lattice Tower in Zone IV

Ritu Sharma[1], Dr Parveen Berwal[2]
[1, 2]*Civil Engineering Department, BRCM College MDU Unidersity*

Abstract: ***Transmission tower lines are one of most important life-line structures. Transmission line should be stable and carefully designed so that they do not fail during natural disaster. Transmission towers are necessary for the purpose of supplying electricity to various regions of the nation. The objective of this thesis is analysis of 220kv lattice tower in wind zone IV using STAAD.Pro. Vsi. Transmission towers are necessary for the purpose of supplying electricity to various regions of the nation. Transmission line should be stable and carefully designed so that they do not fail during natural disaster. The height of the tower is 50 m situated at outskirts of Delhi which lies in zone IV.***
Keyword: Four legged, Analysis, Moment, Shear Force, Displacement

I. INTRODUCTION

Transmission tower is a tall structure used to support an overhead power line. transmission tower is used in high voltage AC and DC system. lattice tower is generally design in various design and shapes. Typically, their height ranges between 15 to 55 m. A transmission tower structure set up for the purpose of transmitting and receiving power, radio, telecommunication, electrical and other electromagnetic signals. The aim of every designer is to design the best and optimum system. Most of the big transmission towers may be steel towers, smaller one may be wood, concrete or steel poles The component of transmission tower are peak, cage, cross arm, bracing, tower body.

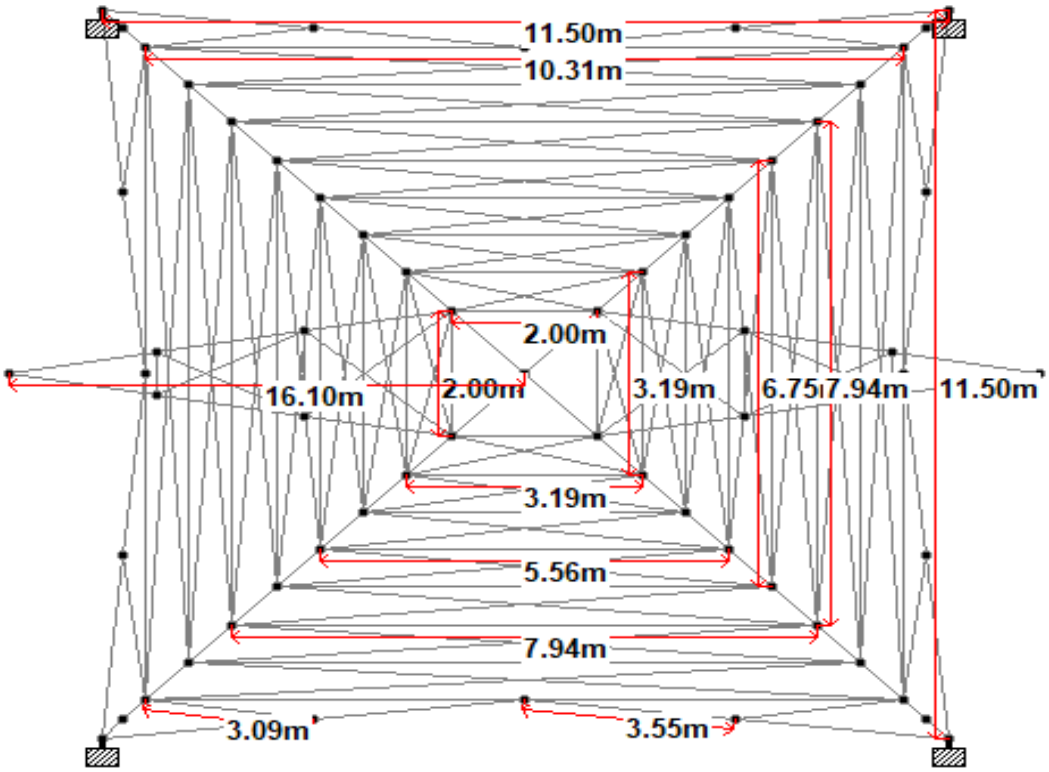
II. STAAD.PRO SOFTWARE MODELLING

The load calculation are performed manually but the analysis and design are done by STAAD.Pro V8i. The software is used modelling.it is user friendly and is also offer a wide feature like dynamic and static analysis etc. **STAAD. Pro** is a structural analysis and design computer program originally developed by Research Engineers International at Yorba Linda, CA in year 1997. In late 2005, Research Engineers International was bought by Bentley Systems.

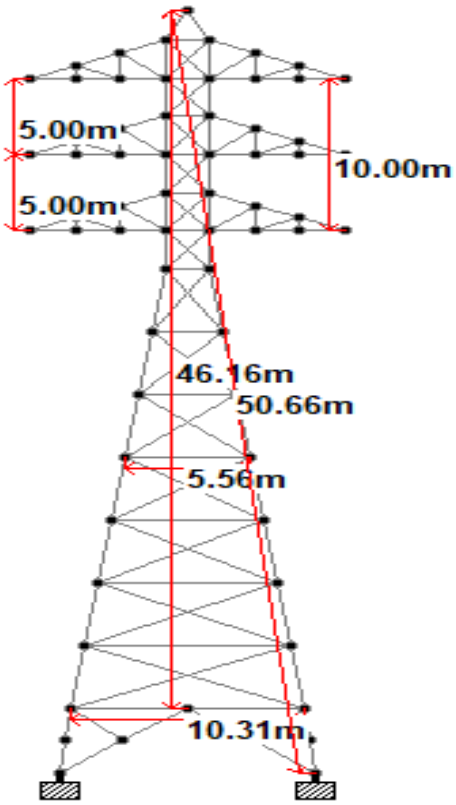
Configuration details of tower

Type of tower	220 KV lattice tower
Height of tower	50m
Base width of tower	11.50 m square base
Length of cross arm	17 m
Type of bracing	Diamond bracing
No of cross arm	3
Conductor material	ACSR
Vertical spacing between conductors	5 m

©IJRASET: All Rights are Reserved

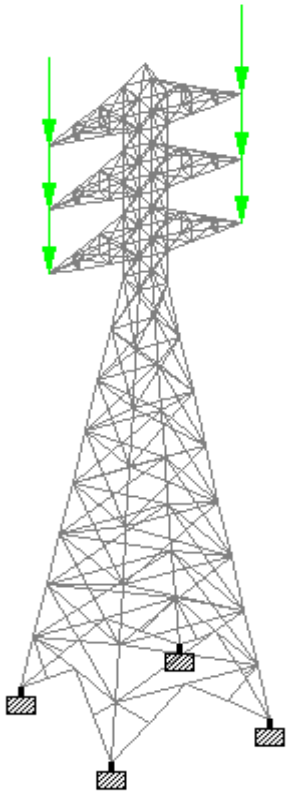


Plan of Tower

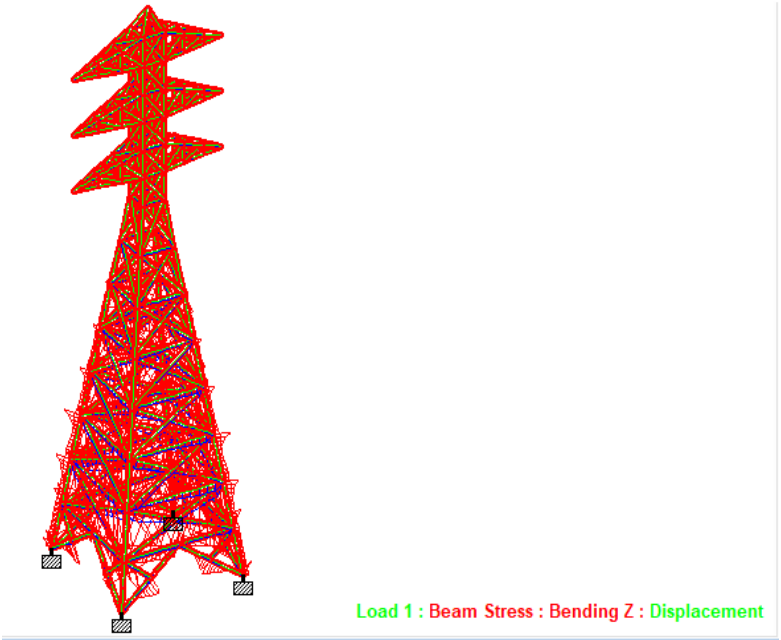


©IJRASET: All Rights are Reserved

Dimension of Tower



WIND LOAD



©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue XII, Dec 2018- Available at www.ijraset.com

III. ANALYSIS DETAILS

After assigning the loading analysis done to evaluate the bending forces, shear force, axial force, displacement and steel take off. Summary of details for the analysis done

Table : 1

S.NO	POINTS	NUMBERS
1	No of nodes	148
2	No of elements	448
3	Highest node	148
4	Highest beam	478
5	No of combination of loads	7
6	Number of supports	4

Table: 2

S.NO	MATERIAL	Quantity
1	Prismatic steel	23119.154
2	Total volume of prismatic steel section	300.95 Cubic meter

Table: 3

S.NO	BEAMS	Moment KN m	Shear FORCE
1	Beam 1	16.34	11.801
2	Beam 2	16.44	11.893
3	Beam 190	-9.238	-3.274
4	Beam 235	-27.912	-8.119
5	Beam 466	6.42	17.459

IV. CONCLUSION

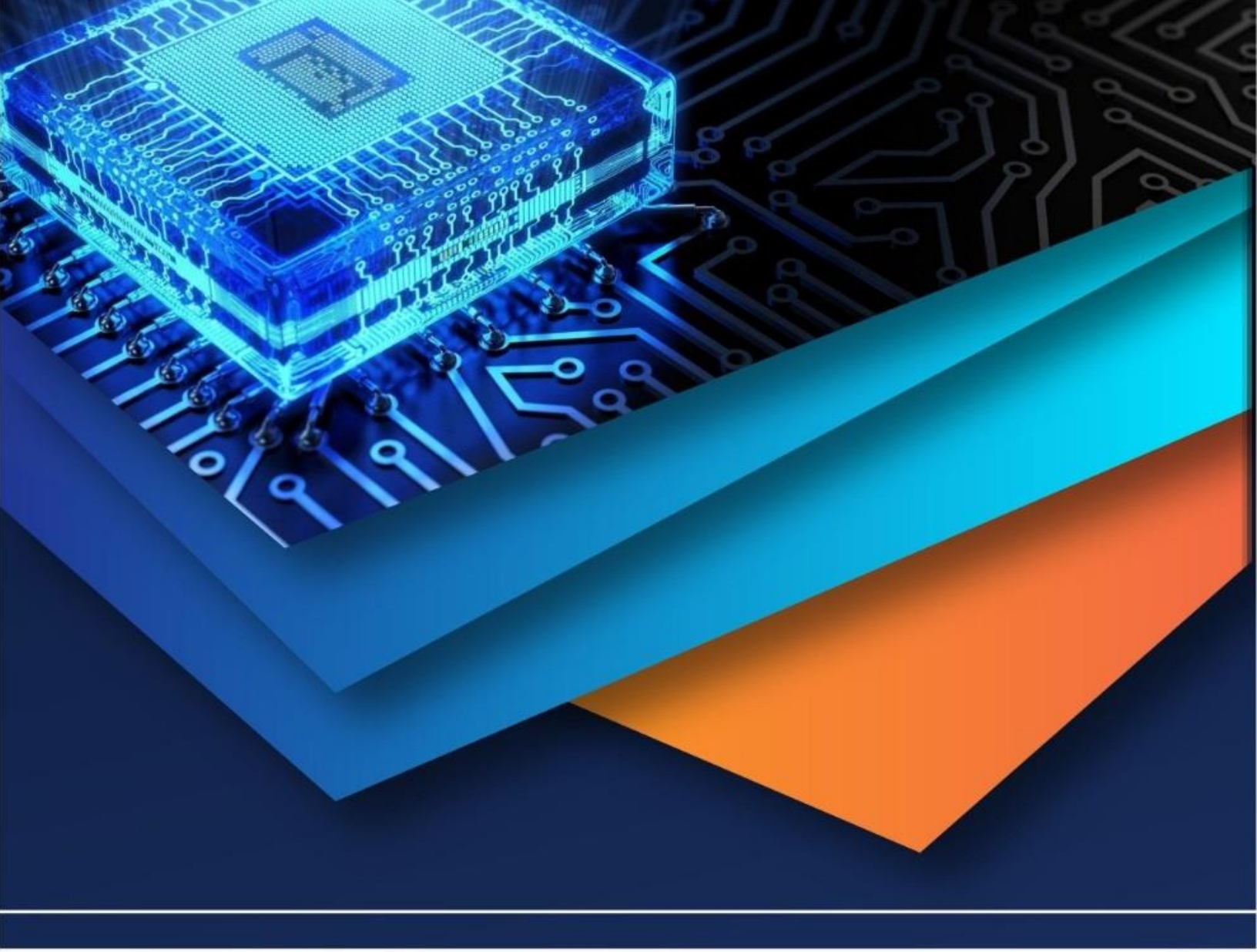
In this paper a transmission tower of 220 KV of 50 m height with diamond bracing is designed and analysis is done by using STAAD.Pro V8i. in wind zone IV at delhi. The vertical members are more leading in loading as compare to diagonal or horizontal members. The overall design of a lattice tower is very closely connected with the user's functional requirements. The vertical members are more leading in loading as compare to diagonal or horizontal members. The tower with angle section and diamond bracing has grater reduction in weight after optimization.

©IJRASET: All Rights are Reserved

REFRENCES

[1] IS 1893:2000 Part 1
[2] Design of steel structure by Subramanian, Oxford university press
[3] Limit state design of steel structure by S.K. Duggal, Tata McGraw Hill.
[4] Design of steel structures by S. Ramamurtham, Dhanpat Rai Publishing company.
[5] Design of steel structure by K.S. Saurian, Pearson Education
[6] Steel structure by Robert Englekrik. Hohn Wiley& sons Inc.
[7] Structural steel design by Lambert tall (Ronald Press Comp. New York).
[8] Design of steel structure by William T Segui. CENGAGE Learning
[9] Structural steel design by D MacLaughlin, CENGAGE Learning
[10] N.PrasadRao, G.M.SamuelKnight, S.J.Mohan, N. Lakshmanan "Studies on failure of transmission line towers in testing"
[11] F. Albermani, M. Mahendran and S. Kitipornchai "Upgrading of Transmission Towers Using a Diaphragm Bracing System" International Journal Of Civil And Structural Engineering Volume2, No2, 2008
[12] Indian Standards,"Galvanised stay strand (second revision)"IS 2141:1779, Bureau of Indian Standards New Delhi.
[13] Indian Standards,"Aluminium conductors for overhead transmission purposes"IS 398(part II):1976, Bureau of Indian Standards , New Delhi.
[14] Indian Standards,"General construction in steel"IS 800:2007, Bureau of Indian Standards , New Delhi
[15] Indian Standards,"Use of structural steel in overhead transmission line tower",IS 802(part 1):1967, Bureau of Indian Standards , New Delhi.
[16] STAAD PRO, Bentley corporation
[17] IS 802 Part 1 sec 1 1995 Code of practice for use of structural steel in overhead transmission line towers, part 1

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)