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# Structural Analysis of Transmission Tower: State of Art

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**Abstract -** *Transmission line structures are frequently made out of metal lattice structures, due to their ease of assembly and because of their mild weight, which ends up in enormously small foundations. Transmission line towers, though designed in step with code provisions, might also fail in the course of mandatory trying out required in many nations. The present Study interacts with the structural analysis of transmission tower structure. Various literature researches study to analyze research work performed on transmission tower structure by using stadd pro analysis.*

*Key Words*: **Structural stability, Transmission Tower, Wind analysis, STAAD Pro.**

## 1. INTRODUCTION

Transmission tower line/ telecommunication tower an important structure which is used to supply and distribution of electricity in the sub staitions. Currently, there is a multi-day increase in power lines and transmission towers in different areas. Infrastructure is the basic way to represent the level of development of a country, among which the major share is shared by the transmission tower which are not possible without a structural designer. As the world is transforming tower are in a great demand which is to be fulfilled without sacrificing any of the three factors, cost, time and safety. The structural stability of these transmission lines are main important issue to prevent any loss of lives due to failure of such structures. Therefore an attempt has beed made to collect the literature related to the stability analysis of a transmission tower considering horizontal force (wind), static and earthquake effects. The available research papers collected from the literature and their outcomes are presented in the following sections.

## 2. LITERATURE REVEIW

Various research works and experiments have been carried out since a long time all over the world to understand or to ascertain the analysis of transmission tower. The concept of modelling and analysis technique used for this purpose has also been getting improved with advancement of engineering and technology as well as with past experience.

**Hadimani and Kulkarni (2017)** - The analysis and modelling of tower is used to FE based completely ANSYS programming program. The model is made in CATIA and a short time later imported to ANSYS workbench. The larger part performing on the apex contemplated are useless weight, live weight and dynamic hundreds (seismic and wind). The tower height is 40m, which include ground clearance, maximum sag of the conductor, vertical separating among conductor rope. Static and dynamic evaluation is done in detail the utilization of FEM based ANSYS programming. Structre for static and wind force is analzed and results are presented.

**Jenifer and Jacob (2017)** - Studied the green member move segment appropriate for the telecommunication tower with the aid of sporting out a comparative evaluation of telecommunication towers with distinctive member pass section for specific heights. The tower is modelling and modal analysis has been done for member cross sections of telecommunication towers for four distinctive heights the use of FEA package ANSYS Workbench. As a result, frequencies are in comparison for different member cross phase for the corresponding mode shapes. The outcomes of this comparative analysis show the performance of a specific members/sections of tower.

**Patel and Ramani (2017) –** In this study, a comparative analysis of towers between two extensively used configurations straight and tapered. An additionally carried out the latest finite element answer capability of general motive software program ANSYS Workbench with incorporated more than one simulation schematic surroundings to carry out static structural evaluation along with modal evaluation and linear buckling evaluation. At the remaining, the benefits of tapered configuration over straight are drawn. It concluded that the tapered round section is more beneficial as compared with straight round phase. For the tapered section there is a much less general deformation as well as lesser quantity of normal stress and Von-misses stress.

**Veg et. al. (2017)** - Discuused a technique for transmission tower 3-D modeling. The task is also a changed into to increase a digital 3D model, similar to the real shape, with the intention to be subjected to structural analysis in ANSYS software.

**Itam et. al. (2016)** -A static examination using STAAD Pro was performed to find maximum stress at the joint (critical) of trnasmition tower with the help of ANSYS software which is Finite Element Method based. Three strategies had been utilized in the product which may be the straight forward plate model, fortified touch without jolts, and shaft detail jolts. Results from the investigation of presentation the

strain esteems expanded with joint subtleties thought. The demonstrates that joints and associations play a situation inside the dispersion of worry inside the transmission tower. As end, the consideration of joint specifying in the examination of transmission tower is successful, and can significantly development the strain delivered on the individuals.

**Krishna and Naidu (2016**) – Studied the static response and comparing strain resultants of transmission tower structure due to twist load at one static immediate time on vertical and transversely position of transmission tower the use of ANSYS. Likewise concentrated free vibration or modular examination qualities of the transmission tower by way of determine the frequencies and mode states of transmission tower the utilization of ANSYS and approving the limited component based outcomes with shut structure arrangement. Finally dubious examine the concise unique examination of transmission tower the utilization of ANSYS with accentuation at the assessment of dynamic reaction of transmission tower because of different breeze load with wind speed like uprooting and hub power.

**Varakavi and Arunakanthi (2016)** - Studied transmission line towers must be designed considering each structural and electrical requirements for a safe and affordable layout. Modeling of transmission tower through the usage of finite detail method. Further determine the static reaction and corresponding pressure resultants of transmission tower shape. It determining the frequencies and mode shapes of transmission tower the usage of ANSYS and validating the finite detail based totally effects with closed shape answer. At last, the brief dynamic evaluation of transmission tower the use of ANSYS with emphasis at the assessment of dynamic response of transmission tower because of time various wind load with various wind velocity.

**Wang et. al. (2016)** - A basic streamlining model for wind turbine towers has been created dependent on a blended parametric FEA (limited component assessment) and GA (hereditary calculation) rendition. The apex distance across, rear and thickness of the pinnacle are taken as structure factors. The enhancement v is a limits the pinnacle mass with six limitation circumstances, for example Twisting, last weight, exhaustion, clasping, vibration and structure variable requirements. After approval, the model has been done to the basic streamlining of a 5MW breeze turbine tower. The outcomes is shown that the proposed an auxiliary streamlining model is prepared to do effectively and solidly achieving an ideal basic format of wind turbine towers, which obviously improves the proficiency of a basic advancement of wind turbine towers. The advanced system is time honored in nature and can be enlisted for an arrangement of related inconveniences, when better numerical models are required than anticipate basic reactions and to streamline the structure.

**Eltaly et. al. (2014)** - Two FE plans have been progressed inside the present day research to watch the nonlinear direct of electrical transmission towers underneath static weight. The apex was shown with the guide of the two node three-dimensional L-organize bar constrained parts and each of the geometrical and surface nonlinearities were considered inside the front line FE reenactments. Model 1 did never again recollect the whimsy of associations for the pinnacle individuals and the joint slippage. In form 2, every one of the unconventionality of associations for the pinnacle people and the joint slippage have been displayed. The FEM reenactments results had been as contrasted and the former distributed impacts of the whole scale test tests and the numerical answers that were accomplished on particular towers.

**Li-Jeng and Yi-Jun (2014) -** Considered unique assessment of self helping power transmission tower utilizing ANSYS. In light of the limited component strategy (FEM), we designate Beam-4 component to develop the numerical model of the pinnacle. At that point run of the mill numerical model is mulled over and the essential driving six central frequencies and terms of the pinnacle crane obtained by utilizing ANSYS are gained and checked by method for utilizing SAP2000. The related mode shapes gained from those two programming's additionally are offered and compared. Furthermore, the time chronicles of transmission tower edge exposed to 1940 El Centro and 1995 Kobe quake are done, separately. Maximal relocations, speeds and increasing speeds are clarified.

## 3. CONCLUDING REMARKS

The transmission line tower is mainly used to distribute the electricity supply and sometime the high rise tower is used for telephone exchange. The structural stability of these towers has main important role to stable against failure to interrupt electricity supply. Therefore in this paper the literature review related to the structural stability of transmission tower.

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