

# A Review on Analysis and Design of transmission tower And Monopole by Using Manual Calculation and Software

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**Abstract:** This research work is focused on comparison of transmission tower and monopole tower for different parameters viz. different height and different loading combinations. The comparative analysis is carried out with respect to axial force deflection maximum sectional property and critical load conditions. The transmission tower and monopole are design by manually by using limit state method based on IS 800, IS 802 IS 875 and gust factor method. Based on steps and formulas involved, a design program will be prepare in MS-EXCEL. The veracity of program will be check by first designing the manually designed transmission tower and monopole using the software and compare results. Wind analysis is carried out using standard codes and software. The behaviour of tower and pole is analysed for different load combination. The maximum displacement values, shear forces and bending moments are obtained. Therefore, transmission tower and monopole should be designed considering both structural and electrical requirements for safe and economical design as per Indian code. It is concluded from past study that transmission tower have lower lateral displacement as compared to monopole. This is because they have higher stiffness. Transmission tower carry heavy electrical transmission conductor at sufficient and safe from the ground than monopole The idea is to reach a definite conclusion regarding the superiority of two structure.

**Keywords –** Transmission tower, monopole, manual design

## I. INTRODUCTION

In last several studies have been performed in the area of analysis and design of metallic towers. The electric transmission is the process by which large amounts of electricity produced at power plants is transported over long distances for use by consumers. Usually steel transmission towers and monopoles are used to transmit the electric power. This is in view of non-availability of adequate land for installation of conventional lattice type tower. To overcome these practical difficulties, a new concept of transmission line is being used world-wide, called monopole. The cost of transmission tower constitutes about quarter to half of the cost of transmission line and hence optimum tower design will bring in substantial savings. The transmission tower are designed and constructed in wide variety of shapes, types, sizes, configuration and material. The supporting structure type used in transmission line generally fall into one of the three categories: lattice, pole guyed. According to IS 800-07, the wind forces are much prominent on the tower, conductors and insulators, besides the self weight. Tower structural calculations include applied loads like wind load, dead load, seismic load and design strength of structural steel member on superstructure including connection and foundation. From safety considerations, along the route of the transmission line clearances above open countries, roads, rivers, railway tracks, tele-communication lines, other power lines, etc. up to conductor needs to be maintained. The basic function of the tower is to isolate the conductors from their surroundings, including other conductors and the tower structure. An alternative to the transmission tower, the monopole tower, is also used in this power corridor. In this case, the monopole supports much lower voltage conductors for distribution to industrial customers and substations. The voltages required for economical transmission of electric power exceeds the voltages appropriate for distribution to customers.



Figure. 1 showing transmission tower



Figure. 2 showing monopole

## II. REVIEW OF LITERATURE :

There are several studies done on the design and analysis of transmission tower and monopole by using software. This literature review reveals the amount of research work done in India.

**Sai Arinank, and Rajasekhar** Analysis and design of transmission tower by using Staad.Pro.v8i, this work is focused in optimising the transmission tower with employing the X and K bracings, and by varying the sections, using static analysis. They concluded that the

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