

Investigation of Existing Guidelines for Four-Legged Angular Telecommunication Tower

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Abstract : Lattice towers are light weight structures which are primarily governed by the effects of wind loading. Ensuring a precise assessment of wind loads on the tower structure, antennas, and associated equipment is vital for the safety and efficiency of tower design. Earlier, the Indian standards are not available for design of telecom towers. Instead, the industry conventionally relied on the general building wind loading standard for calculating loads on tower components and the transmission line tower design standard for designing the angular members of the towers. Subsequently, the Bureau of Indian Standards (BIS) revised these standards and angular member design standard. While the transmission line towers are designed using the above standard, a full-scale model test will be done to prove the design. Telecom angular towers are also designed using the same with overload factor/factor of safety without full scale tower model testing. General construction in steel design code is available with limit state design approach and is applicable to the design of general structures involving angles and tubes but not used for angle member design of towers. Recently, in response to the evolving industry needs, the Bureau of Indian Standards (BIS) introduced a new standard titled "Isolated Towers, Masts, and Poles using structural steel -Code of practice" for the design of telecom towers. This study focuses on a 40m four legged angular tower to compare loading calculations and member designs between old and new standards. Additionally, a comparative analysis aligning with the new code provisions with international loading and design standards with a specific focus on American standards has been carried out. This paper elaborates code-based provisions used for load and member design calculations, including the influence of "ka" area averaging factor introduced in new wind load case.

Keywords : telecom, angular tower, PLS tower, GSM antenna, microwave antenna, IS 875(Part-3):2015, IS 802(Part-1/sec-2):2016, IS 800:2007, IS 17740:2022, ANSI/TIA-222G, ANSI/TIA-222H.

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