

## **How Does The TIA/EIA 222-G Impact Existing Broadcast Towers?**

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Several new provisions of the standard will have a major impact on the existing broadcast towers and their support capacities.

The new standard accounts for the site specific conditions more accurately and in more details. Classification of the importance category of the structure based on its location and its usage, wind exposure categories to reflect surface irregularities, topographic effects, and ice thickness specified by county location; these factors are combined to reflect the particularity of the structure and its location. The categorization of the structure classification, based on certain criteria, will allow the owner of a broadcast tower to have the environmental loading (by adjusting the return period) more closely match the importance of the structure and the associated risk taken by the owner.

This new revision of the standard is based on the limit state loading which will amplify the applied loads and expose any overall stability issues within a tower structure. Some of the slender broadcast towers with long guy spans will have difficulties having their analysis model converge to a solution under the ultimate loading conditions as determined from the new G revision. Some of these overall stability issues may not have always been detected using the older loading provisions.

The new standard provides a county listing of mandatory ice thickness that escalates with height and its corresponding simultaneous wind speed. This is intended to reflect the limit state condition of heavy icing and the related lower simultaneous wind speed when these parameters are combined. Older broadcast towers that were designed with no ice loading consideration will be negatively impacted while some other towers that were designed for higher wind speed combined with an ice thickness may result in an increase in their support capacity.

The appurtenances loading provisions of the new standard allow for reduction of the drag factors when it falls into a supercritical flow condition and allow for a reduction in the effective projected areas based on the location of the appurtenances. For a broadcast tower with large diameter waveguide lines, this will result in a significant reduction of the loading impact from these appurtenances.

Guyed masts are to be analyzed to resist a modified load response under the G revision to account for the dynamic loading that these structures are susceptible to. By redistributing the loading response from a static analysis, this simplified method provides a loading pattern that more closely matches a dynamic analysis results. This provision will impact existing broadcast towers in that some additional capacity may be available in the lower portion of the tower and in the guy wires and anchors, and some reduction in capacity will result in the upper portions of the tower. Also, the minimum shear response requirements will negatively affect towers that were originally designed to closely meet the loading requirement curve.

The new standard also introduces seismic requirements for towers that are in high seismic zones. In general, this provision should not affect broadcast towers unless they have structural irregularities and are located in high seismic zones. Then, either a modal analysis (self-support) or a time history analysis (guyed) would be required to properly account for the seismic loading.

There are other miscellaneous provisions that will affect broadcast towers, such as high-frequency dampers requirements, articulation of guy wires assemblies ...These requirements need to be met when modifying an existing tower.

In summary, the new provisions of the TIA/EIA 222-G standard will allow the owner of a broadcast tower to adopt a loading pattern that more accurately reflect the tower characteristics and usage. It will provide loading requirements that more closely represent the present understanding of the environmental loading the structure is subjected to.