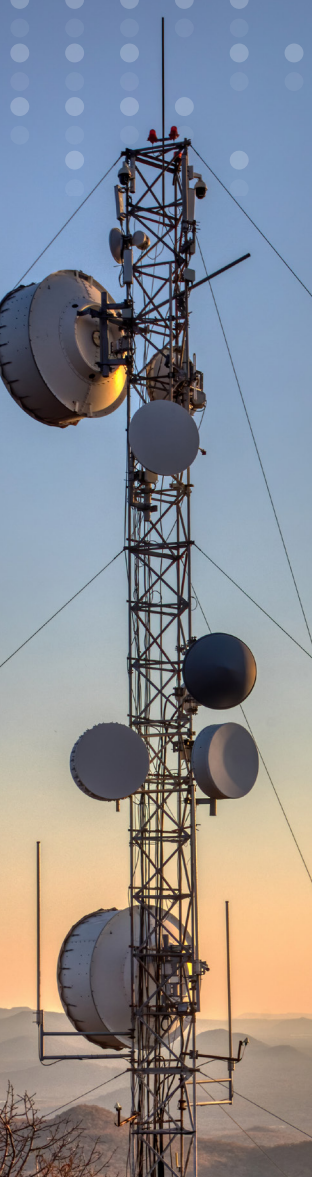

PLANNING ADVISORY NOTICE

ANSI/TIA-222-I Update

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This Planning Advisory Notice (PAN) is pleased to share that the Telecommunication Industry Association (TIA) group, TR-14, published the 9th version of the ANSI/TIA-222 Standard in the second half of 2023, with an effective date of January 1, 2024. It is an incredible achievement when you consider that the TR-14 group consists of hundreds of contributors who oversaw numerous changes required to ensure that telecommunications infrastructure designed and maintained in accordance with this standard provides reliable infrastructure for telecommunications across the United States. In this latest Revision I (Rev. I) you see the standard continuing to provide for the design and manufacture of new structures, while also focusing on maintaining and maximizing the usability of existing telecommunications infrastructure. This latest Rev. I includes several changes from the previous Revision H (Rev. H) as outlined in Figure 1; it is especially important for end-users to familiarize themselves with the changes in Rev. I as it may impact the structures they analyze, modify, own, manage, or co-located on.

Several updates were made to Section 2, Loads, which covers loads applied to structures. Most notably is the addition of Tornado loading for Risk Category III and IV structures located within tornado-prone regions.

These structures will need to be evaluated for tornado loading, including a provision for debris impacting and creating loading on self-support and guyed towers. This change, along with revisions to Exposure and Topographic considerations, was made to bring the standard into alignment with ASCE 7-22 Standard. Additionally, **Section 2.10** has been added to provide an alternative means of calculating drag coefficients for individual appur-

Most Significant Changes Rev. H to Rev. I

Impact	Topic	Impact	Topic
▲▼	Exposure	▲	Grounding
▼	*Topography*	—	*Existing Structures*
—	Tornado	▲▼	*Mounts*
▲▼	*Fatigue*	—	*Maintenance & Condition Assessment*
—	Earthquakes	▲	*Post Modification Inspection*
—	Wind Tunnel & CFD	▲	*Foundations*
▲	Shrouded Structures	▲	U-Bolts

Figure 1 - *Depicts changes from ANSI/TIA-222, Rev. H to Rev. I. Green arrows generally indicate a net benefit to assets, while red arrows generally indicate a net impact to assets. Yellow implies neutral treatment from Rev. H to Rev. I.* ***NOTE: Red arrows are still a benefit to the structure as additional considerations directly impact the reliability of the structure for its intended use.***

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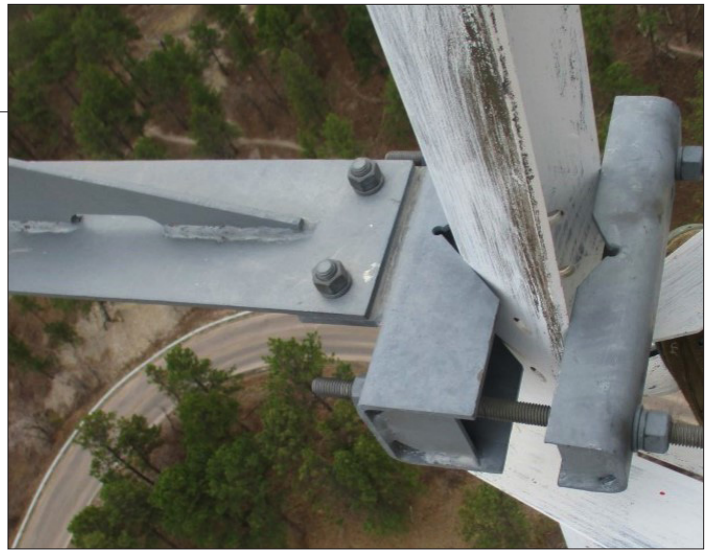
tenances via **Computational Fluid Dynamics (CFD)** information. The section provides guidance on what constitutes a valid study and how values should be implemented. Utilizing this new section for individual appurtenances could allow the user to achieve reduced drag factors with aerodynamically shaped appurtenances. It also reduces the overall wind loads applied to the analyzed structure in a way that more accurately represents the true Effective Projected Area (EPA) from the appurtenance.

Section 9, Foundations and Anchorages was updated with a new provision for **single caisson foundations** which limits analysis methods based on the depth-to-diameter ratio of the foundation. Ratios over 6.0 require additional analysis methods to account for the flexibility of the caisson in relation to the soil. Additionally, changes were made to analysis methods for existing guyed tower base foundations that increase the capacity of the foundation in bearing by up to 25% based on soil consolidation that occurs after initial construction.

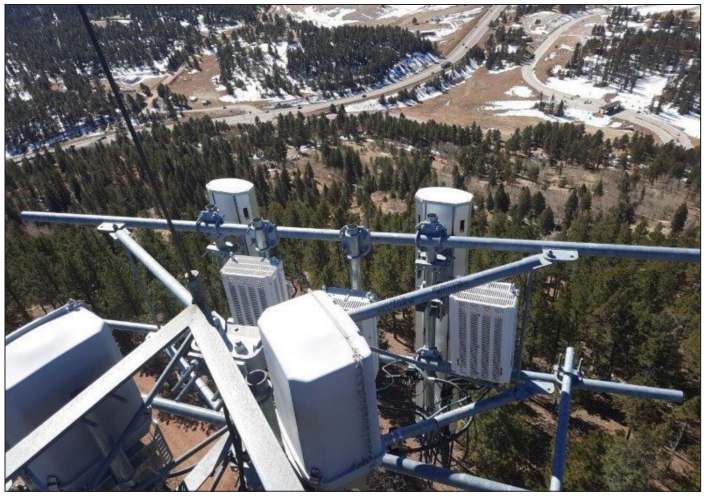
Section 10, Protective Grounding, includes updates to the minimum requirements for **Protective Grounding** to align better with TIA-607 and the National Electric Code (NEC). The maximum measured ground resistance of the grounding system has been raised from 10 ohms to 25 ohms, and more specific information has been provided for ground rods and ground wire radials per structure type. A ground wire ring is now also required for all structures taller than 40 feet. It is important to note that this clarity on the intended use of Section 10 was necessary to protect the tower structure and foundations. Additional equipment installed on a site may require site-specific grounding assessment for the equipment needs.

Section 14, Maintenance & Condition Assessment includes changes to the maximum deviation for design initial tensions for guy wires. The requirement is now +/- 20% for guy wires up to and including 1" diameter and +/- 10% for guy wires greater than 1" diameter. This additional tolerance increases the range allowed for condition assessments and is further elaborated on in **ANSI/TIA-222-I Annex J: Maintenance and Condition Assessment (Normative)**. The modifications to Section 14 is a great example of collaboration among structure owners sharing real world data that allowed the proper alignment of the ANSI/TIA-222 Standard to what is occurring with the installation and maintenance of the structures.

Many of the changes within Rev. I are intended to be applied to new designs. As such, **Section 15, Existing Structures** includes clarification on exemptions for structures designed under older iterations of the ANSI/



Mount-to-Tower Angle Leg



Topo Mount

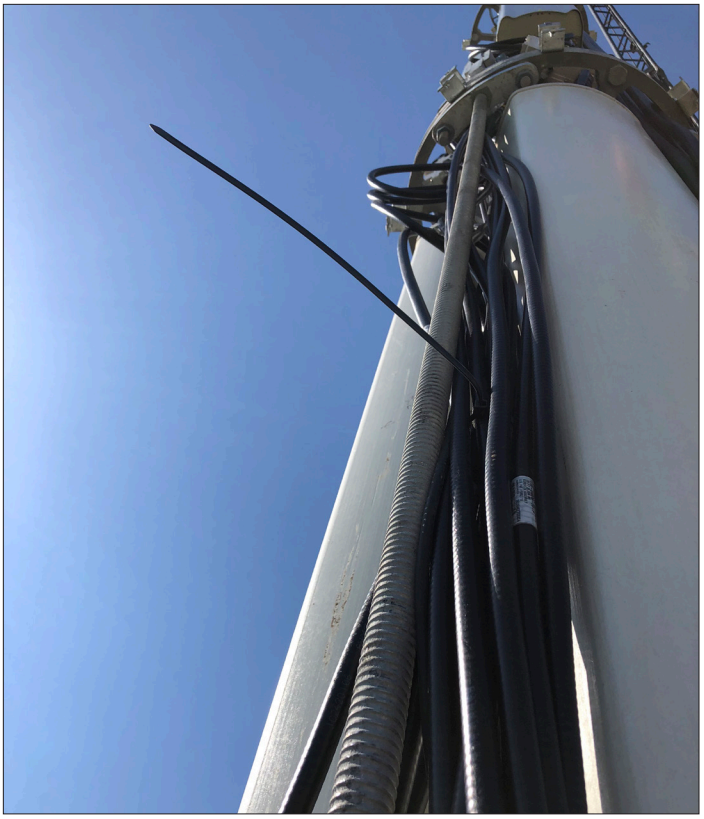
Weather Mount

TIA-222 Standard. It also includes additional clarification on **Changed Conditions** that would trigger an existing structure to be evaluated to the current ANSI/TIA-222-I Standard. If sufficient documentation is available regarding the existing condition of the structure through original design documents, ANSI/TIA-222 compliant modification designs, or passing structural analyses compliant with Rev. G or Rev. H of the ANSI/TIA-222 Standard, an existing structure may not require an ANSI/TIA-222-I analysis if the loading changes do not constitute a 'significant changed condition' based on the overall stress ratios in the structure.

Changes to **Section 16, Appurtenance Mounting Systems** include the addition of requirements surrounding application of forces to structural models, or more commonly phrased, mount to tower interaction. Specific equations are added to analyze the connections between tension friction collars to monopole shafts as well as appurtenances mounted to lattice tower legs. One item to watch out for are large loads on open-section tower legs and thin-walled monopoles. It is important that manufacturers and engineering companies analyzing mounts relay this data so the engineer analyzing the tower structure can check for the impact of localized loads. Other changes include clarity on how to consider roof-mounted structures, including non-penetrating ballast mounts and penetrating mounting frames, which are also now included in ANSI/TIA-222-I **Annex O: Existing Structures Modification Inspection**.

There are also new additions to the ANSI/TIA-222-I Standard which consider vibrations and fatigue loading assessment for various types of structures including tubular poles, tubular spines, and shrouded and Vierendeel-type structures. Assessments include considering different types of vibration patterns such as along-wind vibrations and two types of cross wind vibrations: vortex shedding and galloping of triangular shaped shrouds.

Lastly, the TIA TR-14 group is actively working on a commentary that will accompany Rev. I, providing clarity and further insight into many of the topics addressed throughout the standard. The release date has not officially been announced as of this writing; however, it is expected to be released sometime in 2024. The Commentary will bring forth additional discussion on various topics within the ANSI/TIA-222 Standard and there is a belief that it will become an instrumental part of the ANSI/TIA-222 Standard from Rev. I and forward into the future.



Spine Saver

In conclusion, the authors encourage the review of these changes and others not mentioned in this PAN. This is an exciting update and does help as our industry's infrastructure matures and is used in new and innovative ways. The updates in Rev. I allow for better understanding and supports the infrastructure in continuing to perform and support the telecommunications equipment that we all use in our day-to-day lives.

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