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Association



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Structural Standard for Antenna
Supporting Structures, Antennas and
Small Wind Turbine Support Structures

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David Brinker, PE, SE

This standard is dedicated in honor of David Brinker, PE, SE. Dave's span of influence and contributions to TR-14 date back to 1987, when he attended his first committee meeting, through 2020 when he retired from the industry. Affectionally known as "The Boss" to those who worked with him on the Steering and Editorial Committees, Dave's contributions to TR-14 are unmatched, with his finger prints found in almost all aspects of TR-14 published Standards. Beyond his contributions to the Standards (including 322 and 505th), Dave has been one of the most consistent voices of reason and direction within an industry that has evolved tremendously during his tenure. Dave has and continues to be a passionate advocate for the industry, tremendously approachable, genuine and incredibly respected. TR-14 is grateful for his continued involvement.

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This revision of the Standard began in 2019 and incorporates information as described in the Standard.

This Standard was prepared through the consensus standards process by balloting in compliance with the procedures of Telecommunications Industry Association (TIA) and American National Standard Institute (ANSI).

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Notes:

1. Normative annexes are integral parts of the Standard which for reasons of convenience are placed after other requirements of the Standard.
2. Informative annexes contain additional information that are not considered part of the Standard.

STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES, ANTENNAS AND SMALL WIND TURBINE SUPPORT STRUCTURES

OBJECTIVE

The objective of this Standard is to provide recognized literature for antenna supporting structures, antennas and small wind turbine support structures pertaining to: (a) minimum load requirements as derived from ASCE 7-2022, "Minimum Design Loads for Buildings and Other Structures", and (b) design criteria as derived from AISC-360-22, "2022 AISC Specification for Structural Steel Buildings" and ACI 318-19, "Building Code Requirements for Structural Concrete". The information contained in this Standard was obtained from available sources and represents, in the judgment of the subcommittee, the accepted industry minimum structural standards for the design of antenna supporting structures, antennas and small wind turbine support structures. While it is believed to be accurate, this information should not be relied upon for a specific application without competent professional examination and verification of its accuracy, suitability, and applicability by a licensed professional engineer. This Standard utilizes loading criteria based on an annual probability and is not intended to cover all environmental conditions which could exist at a particular location.

When this Standard is adapted for international use, it is necessary to determine the appropriate basic wind speeds (3-second gust), wind on ice loads, tornado loads, and earthquake design parameters at the site location based on local data for the mean recurrence interval associated with the risk category of the structure.

Equivalent International System of Units (SI) are given in square brackets [] throughout this Standard. SI conversion factors have been provided in Annex T.

Annex A provides procurement and user guidelines to assist in specifying the requirements for a specific structure. The user is cautioned that site-specific loading requirements, if known, take precedence over the minimum requirements of this Standard. Site-specific data and requirements differing from those contained in this Standard are to be included in the procurement specifications for the structure.

This Standard is intended to cover the requirements for most antenna supporting structures, antennas and small wind turbine support structures but recognizes that structures that are unusual for their height or shape, or for the shape and size of individual members, or located at sites having unusual geological or climatic conditions may require additional considerations. In these cases, a rational design based on theory, analysis, knowledge of local conditions and sound engineering practice, shall be used. The design shall be carried out by a licensed professional engineer qualified in the specific design methods and materials to be used, and shall provide a level of safety and performance equal to or better than that implicit in this Standard.

SCOPE

This Standard provides the requirements for the structural design and fabrication of new and the modification of existing antenna supporting structures, antennas, small wind turbine supporting structures, appurtenance mounting systems, structural components, guy assemblies, insulators and foundations.

This Standard is based on limit states design. It is applicable mainly to steel structures but may also be applied to other materials, when required, so as to provide an equivalent level of reliability.

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The appropriate standards should be referenced for structures that support antennas but that are primarily intended for other applications, such as water storage tanks, electrical transmission and distribution structures, sign support structures, lighting support structures, buildings, bridges, etc. This Standard, however, does apply to the calculation of effective projected areas of appurtenances (antennas, mounts, lines, etc.) and to the serviceability limit states appropriate for structures that support antennas.

Appropriate analysis and design criteria for other structural materials are outlined in Section 6.0 of the Standard.

When a structure with a lower reliability is utilized as part of a communication system, the structure may require modification in order to meet the reliability requirements of this Standard. Alternately, when the primary use of the structure is other than for communications, a lower level of reliability may be acceptable, based on consistency with the original design and use of the structure. Further, when the primary use of the structure is other than for communications, a higher reliability may be required in accordance with the applicable standard governing the primary use of the structure.

Structural requirements during construction and construction means and methods provisions are not within the scope of this Standard. For construction related loading, analysis, and design requirements during construction, installation, alteration, and maintenance, refer to the ANSI/TIA-322-A Standard, "Loading, Analysis, and Design Criteria Related to the Installation, Alteration and Maintenance of Communication Structures". For applicable construction means and methods provisions, refer to the ANSI/ASSP A10.48 Standard, "Criteria for Safety Practices with the Construction, Demolition, Modification and Maintenance of Communication Structures".