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48-19

Design of Steel Transmission Pole Structures

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PREFACE

This standard includes informative commentaries and appendixes that are not a mandatory part of the standard. The commentary is numbered to correspond to the sections of the standard to which they refer. The appendixes provide additional information that is not necessarily related to specific sections of the standard.

Before the initial publication of this standard in 2005, most electric transmission design professionals used ASCE's Engineering Manual and Report on Engineering Practice No. 72, *Design of Steel Transmission Pole Structures*, as their primary reference for providing a uniform basis for designing, fabricating, testing, assembling, and erecting steel transmission pole structures. The second edition of MOP 72 served as the primary resource document for the development of the original version of Standard ASCE/SEI 48-05. The first revision was Standard ASCE/SEI 48-11. This document is the second revision to this standard and is intended to replace ASCE 48-11 in its entirety.

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CHAPTER 1
SCOPE

Design of Steel Transmission Pole Structures specifies requirements for the design, fabrication, testing, assembly, and erection of cold-formed tubular members and connections for steel electrical transmission pole structures. Structure components (members, connections, guys) are selected to resist factored design loads at stresses approaching yielding, buckling, fracture, or any other limiting condition specified in this standard. Communication and railroad electric traction structures are not included within the scope of this standard.

Overhead line structures, including steel transmission poles, are inherently different from buildings and most other structures. Overhead lines are a complex structural system composed of foundations, structures, conductors, and cables. A significant portion of the load on the structure is imposed by the conductors and other cables strung between the structures and is concentrated at specific points on the structure. The conductors and cables are subjected to extremes of temperature, wind, ice, and other phenomena not typical to other structures such as buildings and bridges. The tensions in these conductors and cables change with temperature, wind, and ice loads, and the temperatures of the conductors can be significantly higher than ambient temperature. Another significant difference between overhead line structures and other types of structures is that they are designed for a different life cycle than buildings, bridges, and other occupied structures. The structure designer shall clearly understand these differences and the unique behavior of overhead lines.

One advantage of this cable system is the combination of its ability to absorb dynamic energy and the very low relative mass of the steel pole structures. As a result, the design of overhead lines, including steel transmission poles, is not normally controlled by seismic loads. In general, large structure deflections are acceptable provided such deflections are accounted for in the analysis of the structures and their effects on the positions of the connected conductors and cables are considered.

Units of measurement herein are expressed first in US customary units followed by the Système International (SI) units in parentheses. Formulas are based on US customary units, and thus, some formulas require a conversion factor to use SI units. The appropriate conversion factor is given after each formula.