ASCE STANDARD

ASCE/SEI 48–11

Design of Steel Transmission Pole Structures

This document uses both the International System of Units (SI) and customary units

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STANDARDS

In 2006, the Board of Direction approved the revision to the ASCE Rules for Standards Committees to govern the writing and maintenance of standards developed by the Society. All such standards are developed by a consensus standards process managed by the Society's Codes and Standards Committee (CSC). The consensus process includes balloting by a balanced standards committee made up of Society members and nonmembers, balloting by the membership of the Society as a whole, and balloting by the public. All standards are updated or reaffirmed by the same process at intervals not exceeding five years.

The following standards have been issued:

ANSI/ASCE 1-82 N-725 Guideline for Design and Analysis of Nuclear Safety Related Earth Structures

ASCE/EWRI 2-06 Measurement of Oxygen Transfer in Clean Water

ANSI/ASCE 3-91 Standard for the Structural Design of Composite Slabs and ANSI/ASCE 9-91 Standard Practice for the Construction and Inspection of Composite Slabs

ASCE 4-98 Seismic Analysis of Safety-Related Nuclear Structures

Building Code Requirements for Masonry Structures (ACI 530-02/ASCE 5-02/TMS 402-02) and Specifications for Masonry Structures (ACI 530.1-02/ASCE 6-02/TMS 602-02)

ASCE/SEI 7-10 Minimum Design Loads for Buildings and Other Structures

SEI/ASCE 8-02 Standard Specification for the Design of Cold-Formed Stainless Steel Structural Members

ANSI/ASCE 9-91 listed with ASCE 3-91

ASCE 10-97 Design of Latticed Steel Transmission Structures

SEI/ASCE 11-99 Guideline for Structural Condition Assessment of Existing Buildings

ASCE/EWRI 12-05 Guideline for the Design of Urban Subsurface Drainage

ASCE/EWRI 13-05 Standard Guidelines for Installation of Urban Subsurface Drainage

ASCE/EWRI 14-05 Standard Guidelines for Operation and Maintenance of Urban Subsurface Drainage

ASCE 15-98 Standard Practice for Direct Design of Buried Precast Concrete Pipe Using Standard Installations (SIDD)

ASCE 16-95 Standard for Load Resistance Factor Design (LRFD) of Engineered Wood Construction

ASCE 17-96 Air-Supported Structures

ASCE 18-96 Standard Guidelines for In-Process Oxygen Transfer Testing

ASCE/SEI 19-10 Structural Applications of Steel Cables for Buildings

ASCE 20-96 Standard Guidelines for the Design and Installation of Pile Foundations

ANSI/ASCE/T&DI 21-05 Automated People Mover Standards—Part 1

ANSI/ASCE/T&DI 21.2-08 Automated People Mover Standards—Part 2

ANSI/ASCE/T&DI 21.3-08 Automated People Mover Standards—Part 3

ANSI/ASCE/T&DI 21.4-08 Automated People Mover Standards—Part 4

SEI/ASCE 23-97 Specification for Structural Steel Beams with Web Openings

ASCE/SEI 24-05 Flood Resistant Design and Construction

ASCE/SEI 25-06 Earthquake-Actuated Automatic Gas Shutoff Devices

ASCE 26-97 Standard Practice for Design of Buried Precast Concrete Box Sections

ASCE 27-00 Standard Practice for Direct Design of Precast Concrete Pipe for Jacking in Trenchless Construction

ASCE 28-00 Standard Practice for Direct Design of Precast Concrete Box Sections for Jacking in Trenchless Construction

ASCE/SEI/SFPE 29-05 Standard Calculation Methods for Structural Fire Protection

SEI/ASCE 30-00 Guideline for Condition Assessment of the Building Envelope

SEI/ASCE 31-03 Seismic Evaluation of Existing Buildings

SEI/ASCE 32-01 Design and Construction of Frost-Protected Shallow Foundations

EWRI/ASCE 33-09 Comprehensive Transboundary International Water Quality Management Agreement

EWRI/ASCE 34-01 Standard Guidelines for Artificial Recharge of Ground Water

EWRI/ASCE 35-01 Guidelines for Quality Assurance of Installed Fine-Pore Aeration Equipment

CI/ASCE 36-01 Standard Construction Guidelines for Microtunneling

SEI/ASCE 37-02 Design Loads on Structures during Construction

CI/ASCE 38-02 Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data

EWRI/ASCE 39-03 Standard Practice for the Design and Operation of Hail Suppression Projects

ASCE/EWRI 40-03 Regulated Riparian Model Water Code

ASCE/SEI 41-06 Seismic Rehabilitation of Existing Buildings

ASCE/EWRI 42-04 Standard Practice for the Design and Operation of Precipitation Enhancement Projects

ASCE/SEI 43-05 Seismic Design Criteria for Structures, Systems, and Components in Nuclear Facilities

ASCE/EWRI 44-05 Standard Practice for the Design and Operation of Supercooled Fog Dispersal Projects

ASCE/EWRI 45-05 Standard Guidelines for the Design of Urban Stormwater Systems

ASCE/EWRI 46-05 Standard Guidelines for the Installation of Urban Stormwater Systems

ASCE/EWRI 47-05 Standard Guidelines for the Operation and Maintenance of Urban Stormwater Systems

ASCE/SEI 48-11 Design of Steel Transmission Pole Structures

ASCE/EWRI 50-08 Standard Guideline for Fitting Saturated Hydraulic Conductivity Using Probability Density Functions

ASCE/EWRI 51-08 Standard Guideline for Calculating the Effective Saturated Hydraulic Conductivity

ASCE/SEI 52-10 Design of Fiberglass-Reinforced Plastic (FRP) Stacks

ASCE/G-I 53-10 Compaction Grouting Consensus Guide
ASCE/EWRI 54-10 Standard Guideline for the Geostatistical Estimation and Block-Averaging of Homogeneous and Isotropic Saturated Hydraulic Conductivity
ASCE/SEI 55-10 Tensile Membrane Structures
ANSI/ASCE/EWRI 56-10 Guidelines for the Physical Security of Water Utilities
ANSI/ASCE/EWRI 57-10 Guidelines for the Physical Security of Wastewater/Stormwater Utilities
ASCE/T&DI/ICPI 58-10 Structural Design of Interlocking Concrete Pavement for Municipal Streets and Roadways

FOREWORD

This Standard includes commentary and appendices that are furnished as supplemental information. The commentary and appendices are not mandatory.

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, titled 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 Manual 72 served as the primary resource document for the development of the original version of this Standard, ASCE 48-05. This book is the first revision to this Standard and is intended to replace ASCE 48-05 in its entirety.

This Standard has been prepared in accordance with recognized engineering principles and should not be used without the user's competent knowledge for a given application. The publication of this Standard by ASCE is not intended as a warrant that the information contained herein is suitable for any general or specific use, and the Society takes no position with regard to the validity of patent rights. Users are advised that the determination of patent rights or risk of infringement is entirely their own responsibility.

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Richard F. Aichinger, P.E.
J. Kelly Bledsoe, P.E.
Gary E. Bowles, P.E.
David G. Brinker, P.E., S.E.
Michael D. Brown, P.E.
Jerry G. Crawford, P.E.
Dana R. Crissey, P.E.
Martin L. de la Rosa, P.E.
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Lewis H. Grant, P.E.
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James A Hamraie, P.E.
Henry W. Ho, P.E.
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Leon Kempner, Jr., Ph.D., P.E.
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INTRODUCTION

The Design of Steel Transmission Pole Structures Standard applies to cold-formed single- and multiple-pole tubular steel structures that support overhead electrical transmission lines. Design parameters are applicable to guyed and self-supporting structures using a variety of foundation types, including concrete caissons, steel piling, and direct embedment. The Standard outlines key criteria that must be considered in the structural design, detailing, fabrication, testing, assembly, and erection of these structures. This Standard is a revision of ASCE/SEI 48-05 and provides some revisions to formulas based on other current industry standards. In addition, the Standard includes a detailed commentary and appendices with explanatory and supplementary information designed to provide the user with clarification and reference information.

The information presented has been prepared in accordance with established engineering principles using state-of-the-art information and is intended for general information. Whereas every effort has been made to ensure its accuracy, the information should not be relied upon for any specific application without the consultation of a competent engineer to determine its suitability. Nothing in the Standard shall be construed to alter or subvert the requirements of any existing code or authority having jurisdiction over the facility. Furthermore, alternate methods and materials to those herein indicated may be used, provided that the engineer can demonstrate their suitability to all agencies and authorities.

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CONTENTS

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. Distribution, substation, communication, and railroad electric traction structures are not included within the scope of this 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 titled *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 Manual 72 served as the primary resource document for the development of the original version of this standard, ASCE 48-05. This document is the first revision to this standard and is intended to replace ASCE 48-05 in its entirety.

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