

# Entertainment Services and Technology Association



American National Standard  
E1.21 - 2006

Entertainment Technology  
Temporary Ground-Supported Overhead  
Structures Used to Cover the Stage Areas  
and Support Equipment in the Production  
of Outdoor Entertainment Events

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## American National Standard E1.21 - 2006 Entertainment Technology Temporary Ground-Supported Overhead Structures Used to Cover the Stage Areas and Support Equipment in the Production of Outdoor Entertainment Events Rig/2002-2003r6

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## **The ESTA Technical Standards Program**

**The ESTA Technical Standards Program** was created to serve the ESTA membership and the entertainment industry in technical standards related matters. The goal of the Program is to take a leading role regarding technology within the entertainment industry by creating recommended practices and standards, monitoring standards issues around the world on behalf of our members, and improving communications and safety within the industry. ESTA works closely with the technical standards efforts of other organizations within our industry including USITT, PLASA, and VPLT as well as representing the interests of ESTA members to ANSI, UL, and the NFPA. The Technical Standards Program is accredited by the American National Standards Institute as Accredited Standards Committee E1, Safety and Compatibility of Entertainment Technical Equipment and Practices.

**The Technical Standards Committee (TSC)** was established by ESTA's Board of Directors to oversee and coordinate the Technical Standards Program. Made up of individuals experienced in standards-making work from throughout our industry, the Committee approves all projects undertaken and assigns them to the appropriate working group. The Technical Standards Committee employs a Technical Standards Manager to coordinate the work of the Committee and its working groups as well as maintain a "Standards Watch" on behalf of members. Working groups include: Camera Cranes, Control Protocols, Electrical Power, Floors, Fog and Smoke, Photometrics, and Rigging.

**ESTA** encourages active participation in the Technical Standards Program. There are several ways to become involved. If you would like to become a member of an existing working group, as have over two hundred people, you must complete an application which is available from the ESTA office. Your application is subject to approval by the working group and you will be required to actively participate in the work of the group. This includes responding to letter ballots and attending meetings. Membership in ESTA is not a requirement. You can also become involved by requesting that the TSC develop a standard or a recommended practice in an area of concern to you.

**The Rigging Working Group**, which authored this standard, consists of a cross section of entertainment industry professionals representing manufacturers, consultants, dealers, and end-users. ESTA is committed to developing consensus-based standards and recommended practices in an open setting. Future Rigging Working Group projects will include updating this publication as changes in technology and experience warrant, as well as developing new standards and recommended practices for the benefit of the entertainment industry.

## Contents

Foreword .....	1
1 Scope .....	2
2 Definitions .....	2
3 Design and Engineering .....	3
3.1 Intent .....	4
3.2 Design .....	4
3.3 Analysis .....	5
3.4 Engineering Documentation .....	5
3.5 Loadings .....	6
3.5.1 Seismic Loading .....	6
3.5.2 Wind Loading .....	6
3.5.3 Operations Management Plan .....	7
3.5.4 Load Considerations .....	7
3.5.5 Superimposed Loads .....	7
3.6 Lifting Devices .....	8
3.7 System Erection .....	8
3.8 Ground Conditions and Foundations .....	8
3.8.1 General .....	8
3.8.2 Tower Bases .....	9
3.8.3 Ground Bearing Capacity .....	9
3.9 Lateral Stability .....	9
3.9.1 General .....	9
3.9.2 Guy and Cross-Bracing Cable Assemblies .....	9
3.9.3 Ground Anchors .....	10
3.9.4 Ballast Anchors .....	10
4 Manufacturing .....	10
4.1 Intent .....	10

4.2 Material .....	10
4.3 Fabrication .....	11
4.4 Inspection.....	11
4.5 Identification .....	11
4.6 Documentation .....	11
4.7 Training.....	11
5 Use and Care .....	12
5.1 Intent .....	12
5.2 Pre-use .....	12
5.3 During Use .....	13
5.4 Post-use .....	13
6 User Inspection .....	13
6.1 Intent .....	13
6.2 Inspection Classifications .....	13
6.3 Inspection Intervals .....	13
6.4 Frequent Inspection Procedures .....	14
6.5 Periodic Inspection Procedures .....	14
6.6 Records .....	14
6.7 Repair and Removal from Service .....	14

**Appendix A, Commentary** (This appendix is informative and contains no mandatory requirements)

A.1 Scope .....	15
A.2 Definitions .....	15
A.3.2 .....	15
A.3.5.1 Seismic Loading .....	15
A.3.5.2 Wind Loading .....	15
A.3.5.3 Load Considerations .....	16
A.3.5.4 Superimposed Loads Such as Rain, Snow, Ice, etc. ....	17
A.3.7 System Erection .....	17
A.3.8 Ground Conditions and Foundations .....	17
A.3.9 Lateral Stability .....	18
A.5.2 Pre-use .....	19
A.5.3 During Use .....	21
A.6 User Inspection .....	22

## Foreword

*(This foreword contains no mandatory requirements and is not part of E1.21)*

There has been no specific American National Standards that cover temporary stage roofs in the entertainment industry. It should be noted that other ANSI Standards may be relevant, depending on the application and intended use. In an attempt to improve safety and standards in the industry, the Entertainment Services and Technology Association (ESTA) convened a series of meetings to prepare a draft standard.

It has been assumed in the drafting of this standard that the execution of its design provisions are entrusted to appropriately qualified and experienced people, and that the fabrication and use is carried out by qualified and suitably experienced people and organizations.

This standard presents a coordinated set of rules that may serve as a guide to government and other regulatory bodies and municipal authorities responsible for the guarding and inspection of the equipment falling within its scope. The suggestions leading to accident prevention are given both as mandatory and advisory provisions; compliance with both types may be required by employers of their employees.

Safety codes and standards are intended to enhance public safety. Revisions result from committee consideration of factors such as technology advances, new data, and changing environmental and industry needs. Revisions do not imply that previous editions were inadequate.

Compliance with this Standard does not of itself confer immunity from legal obligations.

This document uses annex notes to provide additional reference information about certain specific section requirements, concepts, or intent. Subject matter with a corresponding annex note reference is identified by the asterisk (\*) symbol, and the associated reference text is found in Appendix A, Commentary, identified with the referring text section number – e.g. an annex note to section 3.2 will be identified in Appendix A, Commentary as A.3.2. The annex notes are informational only, and do not add or subtract from the mandatory requirements of this standard.



## **1\* Scope**

This document establishes a minimum level of design and performance parameters for the design, manufacturing, use and maintenance of temporary ground-supported overhead structures used to cover the stage areas and support equipment in the production of outdoor entertainment events.

The structures within the scope of this standard are ones in which the structural elements are rigid towers, trusses, and space frames. Membrane structures and other structures in which the majority of the structural elements under tension are made of flexible elements such as cable are not included in the scope of this standard. This document offers guidance to ensure the strength and structural reliability of these structures and does not address fire safety and safe egress issues.

## **2\* Definitions**

**2.1 ASCE:** American Society of Civil Engineers.

**2.2 Allowable load:** Maximum static equivalent load imposed on the structure in addition to the self-weight (i.e. lighting, sound, audio visual equipment, props, scenery, etc.).

**2.3 AWS:** American Welding Society.

**2.4 Base plate:** The component or part of the structure that spreads axial load to the on-site supporting material

**2.5 Blockage:** Any object, whether a part of the structure or part of the payload, that impedes or changes the airflow in and around the structure.

**2.6 Buckling:** Permanent lateral displacement of a compression member from the original centerline under axial load, usually sudden.

**2.7 Competent person:** A person who is capable of identifying existing and predictable hazards in the workplace and who is authorized to take prompt corrective measures to eliminate them.

**2.8 Components:** Parts of a whole.

**2.9 Consumable:** Supplies that are depleted in the course of their intended use (e.g. welding rod).

**2.10 Damage:** Condition that adversely affects the intended use of structural component (usually load carrying capacity).

**2.11 Dead load:** The self-weight of the structure as a whole and all of the necessary components and covering.

**2.12 Designer:** A person who creates the plans for the structure.

**2.13 Diagonal:** Elements of the truss or tower module that are at an angle to the main chords.

**2.14 Effective wind area:** The surface area exposed to wind.

**2.15 Incident:** Occurrence where damage to one or more structural elements is or may be sustained.