



ANSI E1.47 – 2020
Entertainment Technology—Recommended Guidelines for Entertainment
Rigging System Inspections

Approved by the ANSI Board of Standards Review on 18 June 2020

Rig/2014-2003r9

©2020 Entertainment Services and Technology Association (ESTA)
All rights reserved.

NOTICE and DISCLAIMER

ESTA does not approve, inspect, or certify any installations, procedures, equipment or materials for compliance with codes, recommended practices or standards. Compliance with an ESTA standard or an American National Standard developed by ESTA is the sole and exclusive responsibility of the manufacturer or provider and is entirely within their control and discretion. Any markings, identification or other claims of compliance do not constitute certification or approval of any type or nature whatsoever by ESTA.

ESTA neither guarantees nor warrants the accuracy or completeness of any information published herein and disclaims liability for any personal injury, property or other damage or injury of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this document. In issuing and distributing this document.

In issuing this document, ESTA does not either (a) undertake to render professional or other services for or on behalf of any person or entity, or (b) undertake any duty to any person or entity with respect to this document or its contents. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstance.

Published by:

Entertainment Services and Technology Association
ESTA
630 Ninth Avenue, Suite 609
New York, NY 10036
USA
Phone: 1-212-244-1505
Fax: 1-212-244-1502
Email: standards@esta.org

**The Entertainment Services and Technology Association's
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 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.

The Technical Standards Council (TSC) was established to oversee and coordinate the Technical Standards Program. Made up of individuals experienced in standards-making work from throughout our industry, the Council approves all projects undertaken and assigns them to the appropriate working group. The Technical Standards Council employs a Technical Standards Manager to coordinate the work of the Council and its working groups as well as maintain a "Standards Watch" on behalf of members. Working groups include: Control Protocols, Electrical Power, Event Safety, Floors, Fog and Smoke, Followspot Position, Photometrics, Rigging, and Stage Lifts.

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 four hundred people, complete an application which is available from http://tsp.esta.org/tsp/documents/procedural_docs.html. 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 a diversity of interests. ESTA is committed to developing consensus-based standards and recommended practices in an open setting.

Investors in Innovation

The Technical Standard Program (TSP) is financially supported by ESTA and by companies and individuals who make undirected donations to the TSP. Contributing companies and individuals who have helped fund the TSP are recognized as "Investors in Innovation". The Investors in Innovation when this standard was approved by ANSI's Board of Standards Review include these companies and individuals:

VISIONARY LEADERS (\$50,000 & up)

ETC

PLASA

ProSight Specialty Insurance

VISIONARY (\$10,000 & up; >100 employees/members)

Chauvet Professional

Cisco

Columbus McKinnon Entertainment Technology

Robe

Disney Parks Live Entertainment

VISIONARY (\$5,000 & up; 20–100 employees/members)

Altman Lighting, Inc.

German Light Products

JR Clancy

McLaren Engineering Group

Rose Brand

Stage Rigging

Theatre Projects

Theatre Safety Programs

TMB

VISIONARY (\$500 & up; <20 employees/members)

About the Stage

B-Hive Industries, Inc.

Scott Blair

Boston Illumination Group

Candela Controls, Inc.

Clark Reder Engineering

Tracey Cosgrove & Mark McKinney

Doug Fleenor Design

EGI Event Production Services

Entertainment Project Services

Neil Huff

Interactive Technologies

Jules Lauve

Brian Lawlor

Michael Lay

Limelight Productions, Inc.

Link

John T. McGraw

Mike Garl Consulting

Mike Wood Consulting

Reed Rigging

Reliable Design Services

Alan Rowe

Sapsis Rigging Inc.

Dana Taylor

Steve Terry

Vertigo

Steve A. Walker & Associates

WNP Services

INVESTOR (\$3,000–\$9,999; >100 employees/members)

Actors' Equity Association

Barbizon Lighting Company

Golden Sea Professional Lighting Provider

IATSE Local 728

IATSE Local 891

Lex

NAMM

Rosco Laboratories

Texas Scenic Company

INVESTOR (\$1,500–\$4,999; 20–100 employees/members)

American Society of Theatre Consultants

BMI Supply

City Theatrical Inc.

H&H Specialties, Inc.

InterAmerica Stage, Inc.

Lycian Stage Lighting

Morpheus Lights

Niscon Inc.

INVESTOR (\$200–\$499; <20 employees/members)

Bruce Darden

Guangzhou Color Imagination LED Lighting

Kenney Drapery Associates, Inc.

Indianapolis Stage Sales & Rentals, Inc.

L1 Inc.

Lighting Infusion LLC

Scott Madaski

Mediam Sp. zo.o.

Nanyi Audio & Lighting Enterprise Co., Ltd.

Qdot Lighting Ltd.

Show Light Oy

SUPPORTER (\$50 - \$2,999; >100 employees/members)
Harlequin Floors

SUPPORTER (\$50 - \$1,499; 20–100 employees/members)
ACT Lighting Inc./AC Power Distribution
ARM Automation, Inc.
Ian Foulds, IATSE Local 873
General Lighting Electronic Co. Ltd.
Guangzhou YaFeng Optoelectronic Equipment Co.
Guangzhou Yilaiming Photoelectric Technology Co.,
Ltd.
HAYA Light Equipment Ltd. Co.
High Output
InCord
Intella Systems Co., Ltd.
iWeiss
LA ProPoint, Inc.
Moss LED Inc.

Movecat GmbH
Nanshi Lighting
Oasis Stage Werks
Shenzhen Ifountain Technology
Skjonberg Controls Inc.
Stage Equipment & Lighting
Stagemaker
Stageworks
Syracuse Scenery and Stage Lighting Co., Inc.
Taurus Light Co. Ltd.
Ultratec Special Effects
Vincent Lighting Systems
Zhuhai Shengchang Electronics Co.

SUPPORTER (\$50 - \$199; <20 employees/members)
Capture Visualisation AB
Clik Systems
DMX Pro Sales
Foshan Leiyuan Photoelectric Co. Ltd.
Jack Gallagher
Tony Giovannetti
Pat Grenfell
Beverly and Tom Inglesby
Eddie Kramer
Jason Kyle

LuxBalance Lighting
Tyrone Mellon, Jr.
Orange Pi DMX
Lizz Pittsley
Michael Skinner
Studio T+L
Terrier Marketing
Stephen Vanciel
Arjan van Vught

Planned Giving donor: Ken Vannice

All donations to the Technical Standards Program support the TSP in general, and are not directed to, or for, the benefit of any particular technical standard project, or any Working Group working on any particular standard or project.

Contact Information

Technical Standards Manager

Karl G. Ruling
ESTA
630 Ninth Avenue, Suite 609
New York, NY 10036
USA
+1-212-244-1505
karl.ruling@esta.org

Assistant Technical Standards Manager

Richard J. Nix
ESTA
630 Ninth Avenue, Suite 609
New York, NY 10036
USA
+1-212-244-1505
richard.nix@esta.org

Technical Standards Council Chairpersons

Mike Garl
Mike Garl Consulting LLC
+1-865-389-4371
mike@mikegarlconsulting.com

Mike Wood
Mike Wood Consulting LLC
+1-512-288-4916
mike@mikewoodconsulting.com

Rigging Working Group Co-chairpersons

Bill Sapsis
Sapsis Rigging
+1-215-228-0888 x206
bill@sapsis-rigging.com

Christine Kaiser
Syracuse Scenery & Stage Lighting Co., Inc
+1-315-453-8096
ckaiser@syracusescenery.com

Acknowledgments

The Rigging Working Group members when this document was approved by the working group on 26 February 2020 are shown below.

Voting members:

Jacob Abbott; PSAV Presentation Services; U
Jesse Adams; Rose Brand Wipers, Inc; DR
Tracie Allen; T6 Truss Designs. LLC; CP
Dana Bartholomew; Silver State Wire Rope and Rigging; DR
Peter W. Batt; Mainstage Theatrical Supply, Inc; DR
Drew Becker; InterAmerica Stage, Inc.; CP
Ian Bevan; Walt Disney Company; DE
Keith Bohn; Area Four Industries; MP
David Bond; Tait Towers Manufacturing LLC; CP
Bennett Brian; Reed Rigging Inc.; DR
Paul Brunner; Thern, Inc.; MP
David Carmack; Columbus McKinnon Corp.; MP
Frederic Caron; Cirque Du Soleil, Inc; U
Joseph Champelli; Entertainment Project Services, LLC; CP
Lee Chuong; Walt Disney Company; DE
Jay Cid; R&M Materials Handling / Stagemaker; MP
Dan Culhane; Wenger Corp.; CP
Bruce Darden; InterAmerica Stage, Inc.; CP
Jonathan Deull; JSD Projects LLC; U
Tony Diemont; Texas Scenic Company; DR
Don Earl; Earl Girls, Inc.; DR
Nick Fleming; Columbus McKinnon Corp.; MP
Joshua "Fritz" Friedensohn; Entertainment Project Services, LLC; CP
Mike Garl; Mike Garl Consulting LLC; DE
Ethan W Gilson; Entertainment Rigging Services, LLC; U
Sanford P. Gilzow; Shur-Rig LLC; G
William B. Gorlin; M.G. McLaren, P.C.; G
Jerry Gorrell; Theatre Safety Programs; G
Pat Grenfell; Hoist Sales & Service; DR
Rod Haney; I.A.T.S.E. Local 891; U
Tim Hansen; Oasis Stage Werks; DR
Robert Haycock; UC Berkeley; U
Jeremy Hodgson; Cirque Du Soleil, Inc.; U
Joseph Jeremy; Show Distribution Group, Inc.; CP
Christine L. Kaiser; Syracuse Scenery & Stage Lighting Co., Inc.; DR
Theresa Kelley; Xtreme Structures and Fabrication; MP
Edwin S. Kramer; I.A.T.S.E. Local 1; U
Ryan Kunkel; Tait Towers Manufacturing LLC; CP
Kyle Kusmer; Steven Schaefer Associates, Inc; DE
Tom Lapp; Cirque Du Soleil, Inc.; U
Kalen Larson; ZFX, Inc.; CP
Ed Leahy; Chicago Flyhouse, Inc; CP
Jon Lenard; Applied Electronics; MP
Michael Lichter; Electronic Theatre Controls, Inc.; MP
Ross Long; I.A.T.S.E. Local 891; U
Daniel H. Louis; Theta Consulting LLC; G
Bill McIntyre; Show Distribution Group, Inc.; CP
Mike Merz; Steven Schaefer Associates, Inc; DE
Sam Michael; Thern, Inc.; MP
Orestes Mihaly; Production Resource Group; DR

Rick Montgomery; Motion Laboratories, Inc.; MP
John P. Moore; Vertigo; CP
Chris Moulton; Contract Services Administration Trust Fund; U
Bartholomew J. Mueller; Recreation Engineering Inc.; DE
Reid Neslage; H & H Specialties Inc.; MP
Mark Newlin; Xtreme Structures and Fabrication; MP
Jim Niesel; Theatre Projects Consultants, Inc.; DE
Richard J. Nix; Richard J. Nix; G
Shawn Nolan; Production Resource Group; DR
Tracy Nunnally; Vertigo; CP
Carlos Ortega; PSAV Presentation Services; U
Matt Panther; Reliable Design Services; CP
Miriam Paschetto; Geiger Engineers; DE
Demian Purdy; PSAV Presentation Services; U
Steven Ricks; Electronic Theatre Controls, Inc.; MP
John Ringelman; Freeman Companies; DR
Ryan Riordan; Accurate Staging, Inc.; CP
Ryan Roby; PRG; DR
Eric Rouse; Entertainment Project Services, LLC; CP
Bill Sapsis; Sapsis Rigging, Inc.; U
Chris Schmidt; Freeman Companies; DR
Steven Serafin; The Hartford Group; G
Michael Shaw; Motion Laboratories, Inc.; MP
Harold Ike Shippers; Syracuse Scenery & Stage Lighting Co., Inc.; DR
Mike Skinner; Contract Services Administration Trust Fund; U
Russell Solomon; Texas Scenic Company; DR
Stewart Stephens; Ashford Management Group; DR
Peter V. Svitavsky; Wenger Corp.; CP
Jason Tello; T6 Truss Designs. LLC; CP
Ken Tilson; Columbus McKinnon Corp.; MP
Will Todd; Area Four Industries; MP
Elmer Veith; Reliable Design Services; CP
Steve Walker; Steve A. Walker & Associates; G
Mike Webb; Motion Laboratories, Inc.; MP
Michael Wells; Xtreme Structures and Fabrication; MP
Marty Wesstrom; Mountain Productions Inc.; DR
Jeff Wilkowski; Thern, Inc.; MP
R. Duane Wilson; Amer. Society of Theatre Consultants; DE
Max A. Wilson; Applied Electronics; MP
Allen Winzler; Clark-Reder Engineering, Inc.; DE
Stephan Jon Wood; Tait Towers Manufacturing LLC; CP
Paul Zagajeski; Wenger Corp.; CP

Observer (non-voting) members:

Matthew Antonucci; Contract Services Administration Trust Fund; U
Brent Armstrong; Alpine Rigging & Structural Design; CP
William Ian Auld; Auld Entertainment; U
Robert Barbagallo; Solotech Inc.; DR
William Beautyman; Limelight Productions, Inc.; DR
Justin Bennett; University of the Incarnate Word; U
Roy Bickel; Roy Bickel; G
Tyler Bland; Walt Disney Company; U
William Bradburn; Aerial Arts, Inc.; U
David M. Campbell; Geiger Engineers; G
Daniel J. Clark; Clark-Reder Engineering, Inc.; G
Benjamin Cohen; Chicago Flyhouse Inc.; CP

Brandon Cox; Heavyweight Solutions; CP
David Darland; PSAV Presentation Services; U
Robert Dean; ZFX, Inc.; CP
Jim Digby; Event Safety Alliance; U
Brad Dittmer; Stage Labor of the Ozarks; U
Russ Dusek; I Weiss; MP
Jennifer Ferguson; Kito Group; MP
Tim Franklin; Theta Consulting LLC; G
James M. Garner; Walt Disney Company; G
Michael P. Gosenski; Rigging Systems LLC; U
Phillip R. Hampton; Charcoalblue; DE
Pete Happe; Pete Happe; G
Sean Harding; Port Lighting Systems; G
Chris Higgs; Total Solutions Group; G
Nick Holmberg; PSAV; DR
Donald Hoffend_III; Avista Designs, LLC; G
Cedric Jackson; Screen Actors Guild - American Federation of Television & Radio Artists; G
Ted Jones; Grand Stage; U
Jerald Kraft; JTH Lighting Alliance; CP
Phillip Lewis; Tait Towers Manufacturing LLC; CP
Paul "Luke" Lewkowicz; Paul E Lewkowicz PC; DE
Jacob E. Loretto; Musson Theatrical Inc.; DR
Wendy Manson; Cirque Du Soleil, Inc.; U
Steven Michelman; Entertainment Project Services, LLC; CP
John Neal; Rhino Staging; G
Gregory Orth; WNP Services, Inc.; DR
Kurt Pragman; Pragman Associates, LLC; G
Mark Riddlesperger; LA ProPoint, Inc.; CP
Tim Salamon; PSAV Presentation Services; DR
Peter A. Scheu; Scheu Consulting Services, Inc.; DE
Ford Sellers; Chauvet Lighting; MP
Monica Skjonberg; Skjonberg Controls, Inc.; CP
Knut Skjonberg; Skjonberg Controls, Inc.; CP
John C. Snook; Thermotex Industries Inc.; CP
Lynn M. Snook; Thermotex Industries Inc.; CP
Todd Spencer; PSAV Presentation Services; U
Ross Taylor; Taylor & Taylor Associates; G
Stephen Vanciel; IATSE Local 631; U
Patrick Wallace; PSAV Presentation Services; U
Charlie Weiner; Eurotruss; MP
Drew Wending; PSAV Presentation Services; DR
Mike Weston; PSAV Presentation Services; DR
Greg Williams; PSAV Presentation Services; G
Jeong Sik Yoo; Ghost LX; DE
Andrew Young; Andrew Young; U

Interest category codes:

CP = custom-market producer	DE = designer
DR = dealer rental company	G = general interest
MP = mass-market producer	U = user

Table of contents

NOTICE and DISCLAIMER.....	i
Investors in Innovation.....	iii
Contact Information.....	iv
Acknowledgments.....	v
Table of contents.....	vi
1 Introduction.....	1
2 Scope of this document.....	1
2.1 General.....	1
2.2 Exclusions.....	1
3 Definitions.....	1
4 Reference information.....	2
5 Qualifications of the inspector.....	2
5.1 Work experience and certifications.....	2
5.2 Physical qualifications.....	2
6 Ethics and responsibilities.....	3
7 Frequency and scope of inspections.....	3
7.1 General.....	3
7.2 Frequency of inspections.....	3
7.3 Scope of inspections.....	4
7.4 Inspection service variations.....	7
8 Arrangements prior to the inspection.....	7
8.1 General arrangements.....	7
8.2 Considerations for level two access.....	8
9 Site conditions during inspection.....	8
10 Rigging inspection report.....	8

1 Introduction

Entertainment rigging systems are systems used to move, lift or support scenery, luminaires, and other equipment in entertainment venues, such as theatres, video/film studios, amphitheatres, and arenas used for live performances or special events.

Routine inspection of entertainment rigging systems is required in order to provide a safe working environment and to comply with ANSI rigging standards. This document offers guidance to inform owners, users and inspectors about the process of inspecting entertainment rigging systems. ESTA has written this recommended practice to promote proper inspection of entertainment rigging systems, to enhance safety of system users and audiences, to enhance the longevity and performance of systems and identification of potential equipment problems, to assist in regulatory compliance, and to reduce liability associated with the operation of entertainment rigging systems.

The purpose of an entertainment rigging inspection is to provide information about the condition of the systems and components at the time of the inspection. Nothing should be inferred regarding the future performance of the system as a result of this inspection.

2 Scope of this document

This document covers the inspection of entertainment rigging systems. Rigging systems may be statically suspended (stationary) (dead hung) equipment, manually operated counterweight sets, manually operated hoist sets, rope and sandbag (hemp) sets, and electric hoist sets (including winding drum hoists, packaged hoists, powered counterweight sets). The document includes inspection of fire safety curtain systems, rigging only. Rigging systems frequently include combinations and variations of rigging types.

2.1 General

These guidelines include recommended inspector qualifications and responsibilities, scope and frequency of inspections, content of the rigging inspection report, and related information concerning the inspection process.

2.2 Exclusions

These guidelines do not pertain to the process of inspecting:

2.2.1 Performer flying rigging systems.

2.2.2 The building structure.

2.2.3 The building electrical infrastructure.

3 Definitions

Definitions contained in this section apply to this guideline. Where terms are not defined in this section, they should be defined using their ordinarily accepted dictionary meanings within the specific context of their use.

3.1 Inspector: The person engaging in the examination of entertainment rigging systems.

3.2 Lifting media: The load carrying element that is attached to the counterweight carriage or is driven by the hoist to move the load (e.g. wire rope, roller chain).

3.3 Limits of use: The parameters under which the system is designed to operate (e.g. working load limit, speed of movement, duty cycle, environmental conditions, user skill level, availability of maintenance).

3.4 Owner: The legal entity which exercises control over management and recordkeeping functions relating to a building and/or facility in which activities covered by this document take place.

3.5 Qualified person: A person who, by possession of a recognized degree or certificate of professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.