CEN

WORKSHOP

AGREEMENT

CWA 15902-1

December 2008

ICS 97.200.10

English version

Lifting and Load-bearing Equipment for Stages and other Production Areas within the Entertainment Industry - Part 1: General requirements (excluding aluminium and steel trusses and towers)

This CEN Workshop Agreement has been drafted and approved by a Workshop of representatives of interested parties, the constitution of which is indicated in the foreword of this Workshop Agreement.

The formal process followed by the Workshop in the development of this Workshop Agreement has been endorsed by the National Members of CEN but neither the National Members of CEN nor the CEN Management Centre can be held accountable for the technical content of this CEN Workshop Agreement or possible conflicts with standards or legislation.

This CEN Workshop Agreement can in no way be held as being an official standard developed by CEN and its Members.

This CEN Workshop Agreement is publicly available as a reference document from the CEN Members National Standard Bodies.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

Page

Foreword

The production of this CWA (CEN Workshop Agreement) specifying "Lifting and Load-bearing Equipment for Stages and other Production Areas within the Entertainment Industry" was formally accepted at the CEN Workshop kick-off meeting on 2006-02-08.

The final review/endorsement round for the CWA was successfully closed on 2008-01-23/24. The final text was submitted to CEN for publication on 2008-10-10.

The CWA is published in two parts:
- Part 1: General requirements (excluding aluminium and steel trusses and towers)
- Part 2: Specifications for design, manufacture and for use of aluminium and steel trusses and towers

This document has been developed through the collaboration of a number of contributing partners representing trade associations, manufacturers, installers, consultants, users, public authorities and technical executives engaged within the entertainment industry. The organizations supporting the CWA are:

ABTT, Akumek, Charcoalblue, CISMA, Delstar, DIN/Dthg, Frontline Rigging, Het Muziek Theater, LITEC, Plasa, Prolyte Products the Netherlands B.V., Rhino Rigs, Stage Technolgies Ltd, Stitching Argh, Sttf, Theatreadvies, OperaEurope, TÜV Österreich, Vlaamse Opera, VPT (Dutch OISTAT Centre), Waagner-Biro Austria Stage Systems.

This CEN Workshop Agreement is publicly available as a reference document from the National Members of CEN: AENOR, AFNOR, ASRO, BDS, BSI, CSNI, CYS, DIN, DS, ELOT, EVS, IBN, IPQ, IST, LVS, LST, MSA, MSZT, NEN, NSAI, ON, PKN, SEE, SIS, SIST, SFS, SN, SNV, SUTN and UNI.

Comments or suggestions from the users of the CEN Workshop Agreement are welcome and should be addressed to the CEN Management Centre.

This workshop agreement does not purport to include all the necessary provisions of a contract. Users of this agreement are responsible for their correct application.

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

Introduction

The purpose of the CEN workshop 25 is to produce European specifications for the design, manufacture and installation of lifting and load bearing equipment within the entertainment industry.

It is intended to provide common specifications for national and international (travelling) performances, performers, technicians and manufacturers.

This document covers all machinery used in the entertainment industry including machinery that is excluded from the Machinery Directive (2006/42/EC) specifically Article 1 2j which excludes "*machinery intended to move performers during artistic performances*"

Apart from the Machinery Directive, the Council Directive 89/655/EEC concerning the minimum safety and health requirements for the use of work equipment by workers at work states in annex II:

> *3.1.3. Unless required for the effective operation of the work, measures must be taken to ensure that workers are not present under suspended loads.*
>
> *Loads may not be moved above unprotected workplaces usually occupied by workers.*
>
> *Where that is the case, if work cannot be carried out properly any other way, appropriate procedures must be laid down and applied.*

This workshop considers situations that give rise to danger, such as moving or holding scenery or equipment

a) over persons and/or unprotected areas
b) in areas with low light conditions, limited visibility, while using stage fog and other masking effects.

These additional situations apply not only during performances, but also during rehearsals, technical set up, preparations, installations and other situations

This document covers these hazards and suggests appropriate procedures to maintain safety.

1 Scope

This document applies to machinery and machinery installations used in places of assembly and in staging and production facilities for events and theatrical productions (stage machinery, for short). Such facilities include: theatres, multi-purpose halls, exhibition halls; film, television and radio studios; concert halls, schools, exhibition halls; bars, discotheques, open-air stages and other rooms for shows and events.

The document applies to machinery and machine installations with guided or unguided load bearing and load carrying equipment.

For the purposes of this document, machinery installations are all technical installations and equipment used for operations in stage and production facilities in the entertainment industry. Such installations are used to lift, lower, suspend and carry loads (e.g. scenery, traverse systems, or lighting, film/video and sound equipment). They may also be used to move persons, and persons may stand under such equipment while the loads are at rest or in motion.
This machinery includes Controls, electrical and electronic control systems, electrical and electronic equipment, hydraulic and pneumatic power supplies.

“Stages” include staging facilities and production areas in theatres, multipurpose halls, studios, production facilities for film, television or radio, concert halls, congress centres, schools, exhibition centres, trade-fair centres, museums, discotheques, amusement parks, sports facilities and open-air-theatres.

"Events" are, for example, concerts, shows, congresses, exhibitions, presentations, demonstrations, film or television recordings, etc.

This workshop considers lifting and any movement equipment for stages and production areas within the entertainment industry, and temporary installations using trusses or truss constructions which may include ground support systems or towers at events.

Typical applications include but are not limited to the following:

— acoustic doors;

— auditorium elevators;

— compensating elevators;

— cycloramas;

— fire curtains;

— fly bar systems (manual, motor driven);

— lighting bars;

— movable lighting towers;

— movable stage platforms (stage wagons);

— movable proscenium arches;

— orchestra elevators;

— performer flying;

— point hoists;

— projection screens (manual or motor-driven);

— revolving stages and turntables;

— scenery storage elevators;

— side stage and rear stage shutters;

— stage elevators;

— stage wagons (stage trucks);

— tiltable stage floors;

— trap elevators.

The principles in this document also apply to machinery installations based on new technologies or specially designed installations which are not expressly mentioned here but which nevertheless operate in a similar manner or are meant for similar purposes to the equipment listed above.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

DIN EN 818-4/A1, *Short link chain for lifting purposes - Safety - Part 4: Chain slings - Grade 8.*

EN 294, *Safety of machinery; safety distances to prevent danger zones from being reached by the upper limbs.*

EN 349, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body.*

EN 795, *Protection against falls from a height - Anchor devices - Requirements and testing.*

EN 818-7, *Short link chain for lifting purposes - Safety - Part 7: Fine tolerance hoist chain, Grade T (Types T, DAT and DT).*

EN 1993-1-10, *Eurocode 3: Design of steel structures - Part 1-10: Material toughness and through-thickness properties.*

EN 1999-1-2, *Eurocode 9: Design of aluminium structures - Part 1- 2: Structural fire design.*

EN 10204, *Metallic products - Types of inspection documents.*

EN 12385-1, *Steel wire ropes - Safety - Part 1: General requirements.*

EN 12385-2, *Steel wire ropes - Safety - Part 2: Definitions, designation and classification.*

EN 12385-4, *Steel wire ropes - Safety - Part 4: Stranded ropes for general lifting applications.*

EN 13411-2, *Terminations for steel wire ropes - Safety - Part 2: Splicing of eyes for wire rope slings.*

EN 13411-3, *Terminations for steel wire ropes - Safety - Part 3: Ferrules and ferrule-securing.*

EN 13411-5, *Terminations for steel wire ropes - Safety - Part 5: U- bolt wire rope grips.*

EN 13411-6, *Terminations for steel wire ropes - Safety - Part 6: Asymmetric wedge socket.*

EN 13411-7, *Terminations for steel wire ropes - Safety - Part 7: Symmetric wedge socket.*

EN 13480-3, *Metallic industrial piping - Part 3: Design and calculation.*

EN 14492-2, Cranes - Power driven winches and hoists - Part 2: Power driven hoists.

EN 60034-1, *Rotating electrical machines - Part 1: Rating and performance (IEC 60034-1:2004).*

EN 60204-1, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*

(IEC 60204-1:2005).

EN 60204-11, *Safety of machinery - Electrical equipment of machines - Part 11: Requirements for HV equipment for voltages above 1000 V a.c. or 1500 V d.c and not exceeding 36 kV (IEC 60204-11:2000).*

EN 60204-32, *Safety of machinery - Electrical equipment of machines - Part 32: Requirements for hoisting machines (IEC 60204-32:1998).*

EN 60439-1, *Low-voltage switchgear and controlgear assemblies - Part 1: Type-tested and partially type-tested assemblies (IEC 60439-1:1999).*

EN 60947-4-1, *Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters (IEC 60947-4-1:2000).*

EN 60947-5-1, *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices (IEC 60947-5-1:2003).*

EN 61131-1, *Programmable controllers - Part 1: General Information (IEC 61131-1:2003).*

EN 61131-2, *Programmable controllers - Part 2: Equipment requirements and tests (IEC 65B/582/CDV:2006).*

EN 61346-1, *Industrial systems, installations and equipment and industrial products - Structuring principles and reference designations - Part 1: Basic rules (IEC 61346-1:1996).*

EN 61508-1, *Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements (IEC 61508-1:1998).*

EN 61508-2, *Functional safety of electrical/electronic/programmable electronic safety- related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety- related systems (IEC 61508-2:2000).*

EN 61508-3, *Functional safety of electrical/electronic/programmable electronic safety-related syst*ems - *Part 3: Software requirements (IEC 61508-3:1998).*

EN 61508-4, *Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 4: Definitions and abbreviations (IEC 61508-4:1998).*

EN 61508-5, *Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 5: Examples of methods for the determination of safety integrity levels (IEC 61508-5:1998).*

EN 61508-6, *Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 6: Guidelines on the application of IEC 61508-2 and IEC 61508-3 (IEC 61508-6:2000).*

EN 61508-7, *Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 7: Overview of techniques and measures (IEC 61508-7:2000).*

EN 61000-6-2, *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments (IEC 61000-6-2:2005).*

EN 61000-6-4, *Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments (IEC 61000-6-4:2006).*

EN 62061, *Safety of machinery - Functional safety of safety- related electrical, electronic and programmable electronic control systems (IEC 62061:2005).*

EN 62079, *Preparation of instructions - Structuring, content and presentation (IEC 62079:2001).*

EN ISO 12100-1, *Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology (ISO 12100-1:2003).*

EN ISO 12100-2, *Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles (ISO 12100-2:2003).*

EN ISO 13849-1*, Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 13849–2, *Safety of machinery - Safety-related parts of control systems - Part 2: Validation (ISO 13849-2:2003).*

EN ISO 14121-1, *Safety of machinery - Risk assessment - Part 1: Principles (ISO 14121-1:2007).*

IEC 60050-191, *International Electrotechnical Vocabulary - Chapter 191: Dependability and quality of service.*

IEV 191, *International Electrotechnical Vocabulary - Chapter 191: Dependability and quality of service (Consolidated version included Amendment 1 and Amendment 2); Identical with IEC 60050-191:1990- 12 (Consolidated with IEC 60050-191/A1:1993-03 and IEC 60050-191/A2:2002-01).*

ISO 3834, *Quality requirements for fusion welding of metallic materials - Part 1: Criteria for the selection of the appropriate level of quality requirements (ISO 3834- 1:2005).*

ISO 4301-2, *Lifting appliances - Classification - Part 2: Mobile cranes.*

Council Directive 89/655/EEC

Machinery Directive 2006/42 EC
Minimum safety and health requirements for the use of work equipment by workers at work 95/63/EC.

Pressure Equipment Directive (97/23/EC 1977)

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 General terms

3.1.1
Competent Person
person with sufficient practical and theoretical knowledge and experience to carry out the person's duties, and who is aware of the limits of the person's competency, expertise and knowledge

3.1.2
Drive System
part of a load bearing machine that executes movement and holding of the load; Part of the machine that converts energy into movement

3.1.3
Emergency Stop
device that causes a controlled stop as quickly and as safely as possible and which overrides all other controls

3.1.4
Factor of Safety (FOS) Safety Factor
quotient of the minimum breaking load and the partial tensile force acting at characteristic loading