

Lifting platforms — Mast climbing work platforms

ICS 53.020.99

National foreword

This British Standard is the UK implementation of EN 1495:1997+A2:2009. It supersedes BS EN 1495:1998, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** **A1**. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment 1 is indicated by **A1** **A1**.

The UK participation in its preparation was entrusted to Technical Committee MHE/12, Lifting platforms.

A list of organizations represented on this committee can be obtained on request to its secretary.

The UK as a member of CEN is obliged to publish EN 1495:1997/A1:2003 as a British Standard. However, attention is drawn to the fact that during the development of A1:2003, the UK voted against its approval.

The reason for this disapproval is that, where The Construction (Health, Safety and Welfare) Regulations 1996 Statutory Instrument 1996 No. 1592 requires the main guardrail, or other similar means of protection, to be at least 910 mm above the edge from which any person is liable to fall, this standard specifies 700 mm high guardrails. Attention is also drawn to The Work at Height Regulations 2005 which also sets the minimum main guardrail height at 910mm.

The textual error set out below was discovered when the English language version of EN 1495:1997/A1:2003 was adopted as a national standard. It has been reported to DIN in a proposal to amend the text of the European Standard.

Table 1.1 — List of hazards (Part 1)

Item 11.9 Essential equipment and accessories for safe adjusting and/or maintaining: **5.4.2.10** should read **5.4.2.9**.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard, having been prepared under the direction of the Engineering Sector Board, was published under the authority of the Standards Board and comes into effect on 15 January 1998

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Amd. No.	Date	Comments
15350	7 October 2004	Implementation of CEN amendment A1:2003
	30 April 2010	Implementation of CEN amendment A2:2009, and alignment of BSI and CEN publication dates

English Version

Lifting platforms - Mast climbing work platforms

Matériels de mise à niveau - Plates-formes de travail se déplaçant le long de mât(s)

Hebebühnen - Mastgeführte Kletterbühnen

This European Standard was approved by CEN on 21 April 1997 and includes Corrigendum 1 issued by CEN on 11 December 1997, Amendment 1 approved by CEN on 1 September 2003 and Amendment 2 approved by CEN on 19 June 2009.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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Foreword

This document (EN 1495:1997+A2:2009) has been prepared by Technical Committee CEN/TC 98 "Lifting platforms", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2010, and conflicting national standards shall be withdrawn at the latest by January 2010.

This European Standard was approved by CEN on 21 April 1997 and includes Corrigendum 1 issued by CEN on 11 December 1997, Amendment 1 approved by CEN on 1 September 2003 and Amendment 2 approved by CEN on 19 June 2009.

This document supersedes EN 1495:1997.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1 and A2 A2.

The modifications of the related CEN Corrigendum have been implemented at the appropriate places in the text and are indicated by the tags AC AC.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

A2 For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. A2

It is a type C- standard related to safety for Mast Climbing Work Platforms.

A2 *deleted text* A2

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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.

Introduction

This standard is one of a series of standards produced by CEN/TC 98 as part of the CEN/CENELEC programme of work to produce machinery safety standards. EN 414 (Safety of machinery – Rules for the drafting and presentation of safety standards) has been used as a guide in the preparation of this standard.

This standard has been prepared to be a harmonized standard to provide one means of conforming with the essential safety requirements of the Machinery Directive.

The extent to which hazards are covered is indicated in the scope of this standard. In addition, lifting equipment shall comply as appropriate with  EN ISO 12100  for hazards which are not covered by this standard.

1 Scope

1.1 This standard specifies the special safety requirements for Mast Climbing Work Platforms (MCWP) which are temporarily installed and are manually or power operated and which are designed to be used by one or more persons from which to carry out work. The vertical moving components (work platform) are also used to move those same persons and their equipment and materials to and from a single boarding point. These restrictions differentiate MCWPs from Builder's hoists.

The standard can also be used for permanently installed MCWP.

1.2 This standard is applicable to work platforms elevated by rack and pinion and guided by and moving along their supporting masts, where the masts may or may not require lateral restraint from separate supporting structures.

1.3 This standard is applicable to any combination of the following alternatives:

- One or more masts;
- Mast tied or untied;
- Mast of fixed or variable length;
- Masts vertical or inclined between 0° and 30° to the vertical;
- Masts which are standing or hanging;
- Movable or static base (chassis, or base frame);
- Manually or power operated elevation;
- Towed or self powered ground travel on site, excluding road traffic regulation requirements;
- Driven using electric, pneumatic or hydraulic motors.

1.4 This standard identifies the hazards arising during the various phases in the life of such equipment and describes methods for the elimination or reduction of these hazards and for the use of safe working practices.

1.5 This standard does not specify the requirements for dealing with the hazards involved in the manoeuvring, erection or dismantling, fixing or removing of any materials or equipment which are not part of the Mast Climbing Work Platform (MCWP). Neither does it deal with the handling of specific hazardous materials.

1.6 This standard does not specify the requirements for delivering persons and materials to fixed landing levels. Such equipment is referred to as lifts or hoists and are dealt with by other standards.

1.7 This standard does not include Mobile Elevating Work Platforms (MEWPs) according to  EN 280 , Suspended access equipment according to  EN 1808  or Lifting tables according to  EN 1570 .

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. 

 *deleted text* 

EN 294:1992, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs*

EN 349:1993, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 418:1992, *Safety of machinery — Emergency stop equipment, functional aspects — Principles for design*

EN 614-1:1995, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

EN 953:1997, *Safety of Machinery — General requirements for the design and construction of guards (fixed, movable)*

EN 954-1:1996, *Safety of Machinery — Safety-related parts of control systems — Part 1: General principles for design*

EN 982:1996, *Safety of machinery — Safety requirements for fluid power systems and components — Hydraulics*

EN 60065:1993, *Safety requirements for mains operated electronic and related apparatus for household and similar general use*

EN 60204-1:1992, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

EN 60529:1992, *Degrees of protection provided by enclosures (IP code)*

EN 60947-5-1:1991, *Low-voltage switchgear and controlgear — Part 5: Control circuit devices and switching elements — Section 1: Electromechanical control circuit devices and switching elements*

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

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

ISO 4301-1:1986, *Cranes and lifting appliances — Classification — Part 1: General*

ISO 4302:1989, *Cranes — Wind load assessment*

ISO 6336-1, *Calculation of load capacity of spur and helical gears — Part 1: Basic principles, introduction and general influence factors*

ISO 6336-2, *Calculation of load capacity of spur and helical gears — Part 2: Calculation of surface durability (pitting)*

ISO 6336-3, *Calculation of load capacity of spur and helical gears — Part 3: Calculation of tooth strength*

ISO 6336-5, *Calculation of load capacity of spur and helical gears — Part 5: Strength and quality of materials*

ISO 8686-1:1989, *Cranes — Design principles for loads and load combinations — Part 1: General*

3 Definitions

For the purposes of this standard the following definitions apply:

NOTE The terms which are used in this standard, with reference to the definitions below, are indicated in figures 1 and 2.

3.1

rated load

the loads for which the MCWP has been designed for in normal operation as stated in the load diagram

3.2

load diagram

a notice displayed on the work platform showing the permitted number of persons and the weight and distribution of materials for the particular configuration

3.3

rated speed

the vertical or horizontal speed for which the MCWP has been designed

3.4

transfer

any horizontal movement of the MCWP from one position to another on the same working site

3.5

transfer condition

the configuration of the MCWP in which the MCWP is moved from one position to another on the same working site and any limitation on the weather and the load or persons on the MCWP

3.6

transport

any movement of the MCWP outside the boundaries of the working site

3.7

transport condition

the configuration of the MCWP in which the MCWP is moved outside the boundaries of the working site (for example road transport)

3.8

transfer and transport interlocks

any design features on the MCWP which prevent unsafe transfer or transportation

3.9

base frame

the part of the MCWP which provides support for the mast and elevating assembly

3.10

chassis

the part of the MCWP which provides mobility and support for the mast and elevating assembly

3.11

rail mounted chassis

a chassis designed to transmit horizontal as well as vertical forces to the ground via rails

3.12

outriggers

Supports at the base frame level used to maintain or increase the stability of the MCWP within specified conditions. They may also be used for levelling.

3.13

outrigger beam

that part of an outrigger assembly which moves in a substantially horizontal plane and may be powered or operated manually

3.14

mast

a structure that supports and guides the platform

3.15

mast, fixed length

a mast whose length is fixed and cannot be varied, even by the attachment of further mast sections

3.16

mast, variable length

a mast whose length can be varied by the attachment of successive lengths of prepared sections

3.17

guides

the parts of the mast, which provide guiding for the work platform

3.18

mast tie

the anchorage system used to provide lateral restraint to the mast from the building or other structure

3.19

work platform

The vertical travelling part of the installation upon which the persons, equipment and materials are carried and from which work is carried out. This is as opposed to the MCWP, which refers to the whole of the installation, *inter alia* work platform, mast, mast ties, base and chassis. The work platform includes the main platform and any platform extension.

3.20

available platform area

the area of the work platform measured at the work platform floor level

3.21

main platform

that part of the work platform which is built up using primary structural elements

3.22

platform extensions

those additional parts of the work platform which are built up using secondary structural elements, whose support and location is dependent upon the main platform. They are used to extend the main work platform, usually along its longitudinal working edge. They may form irregular shapes which conform to the work site. They may also extend at a level just above or below the main platform level.

3.23

multilevel work platforms

multilevel work platforms consist of two or more work platforms travelling on the same mast or an additional working level attached to and totally supported by a work platform. (For illustration see annex B)

3.24

counter roller

a roller used to counter – react the gear meshing separation forces between a rack and pinion

3.25

automatic brake

a device to decelerate and stop moving parts in case of interruption of the power supply

3.26

buffer

a resilient stop at the end of the travel, comprising a means of arresting using fluids, springs or similar means

3.27

overspeed

any speed above rated speed

3.28

safety gear

a mechanical device for stopping and maintaining the work platform stationary on the mast in the event of overspeed

3.29

overspeed governor

a device which, when the work platform attains a predetermined speed above rated speed, causes the safety gear to be applied

3.30

competent person

a person having such practical and theoretical knowledge and such experience of that MCWP as is necessary to carry out the function satisfactorily

3.31

user (user organisation)

the person or organisation which has direct control over the MCWP use

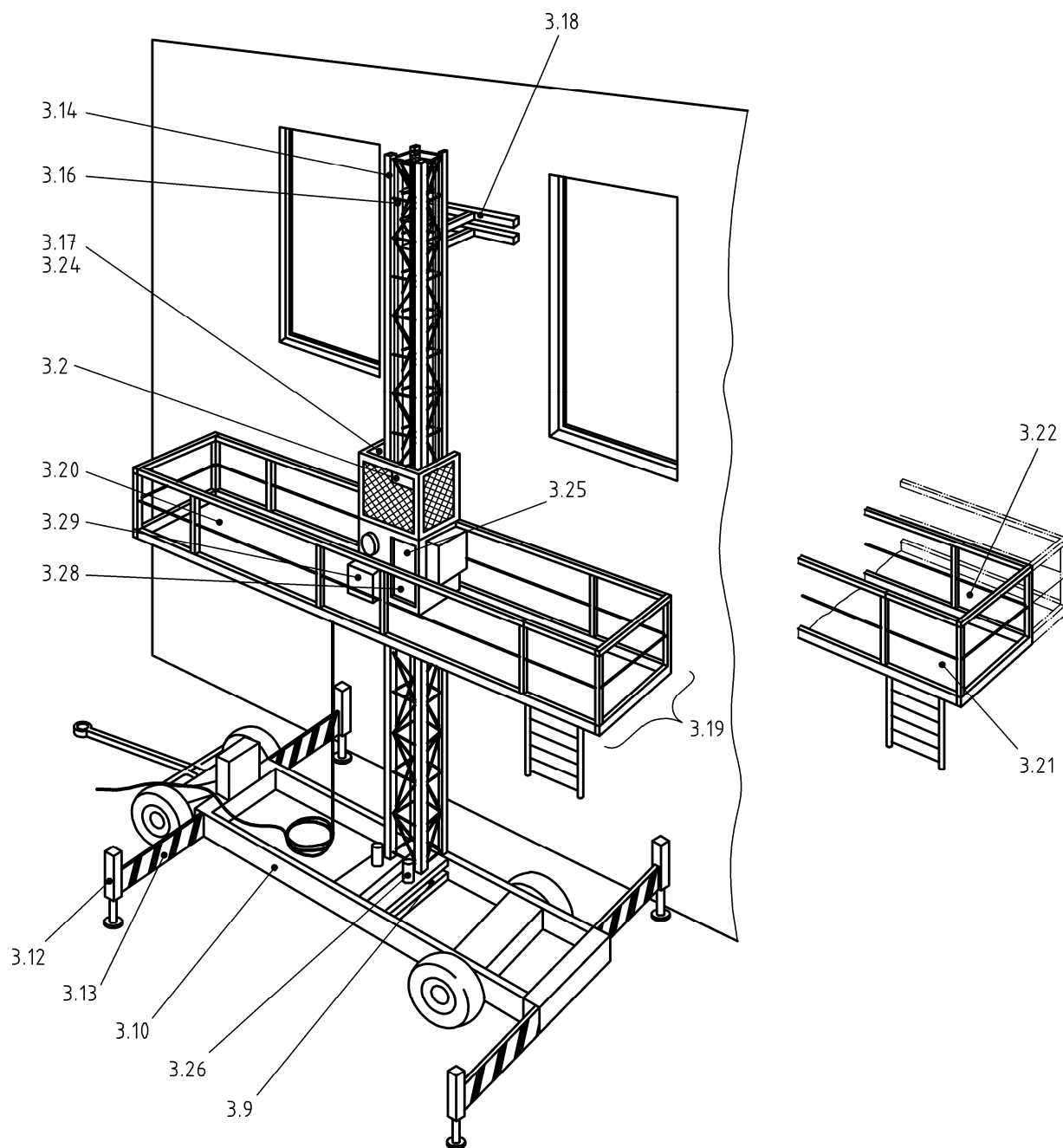


Figure 1 — Typical single mast MCWP

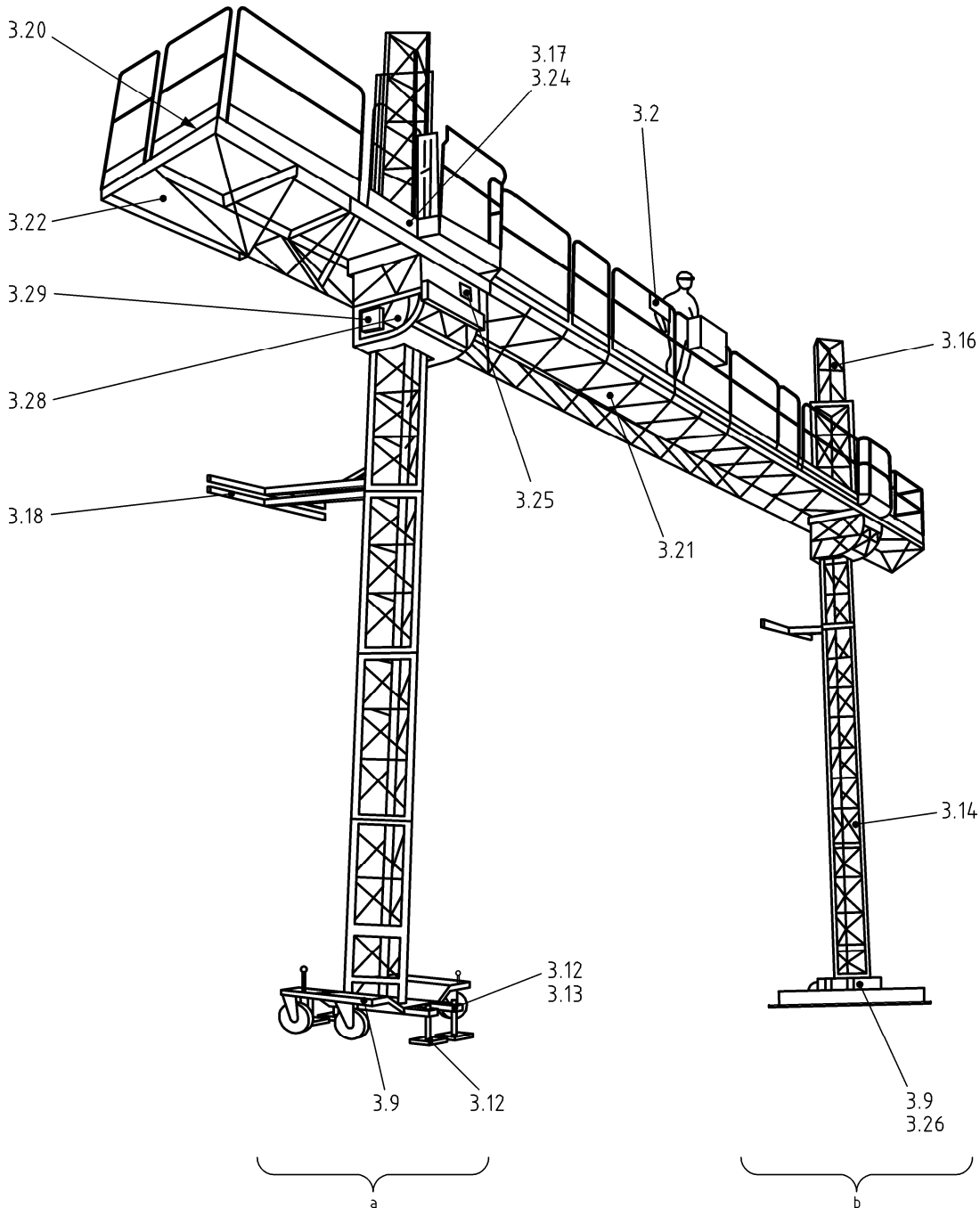


Figure 2 — Typical twin mast MCWP

4 List of hazards

The list of hazards according to the following tables are based on  EN ISO 12100  and Directive 89/392/EEC as amended by 91/368/EEC and 93/44/EEC.

Tables 1.1, 1.2 and 1.3 show the hazards which have been identified and where the corresponding requirements have been formulated in this standard in order to limit the risk or reduce these hazards in each situation.

A hazard which is not applicable or is not significant and for which, therefore, no requirements are formulated, is shown in the relevant clauses column as NA (not applicable).

Table 1.1 — List of hazards (part 1)

HAZARDS		RELEVANT CLAUSES IN THIS STANDARD
1	Mechanical hazards (caused for example by:	
1.1	Crushing	5.2.1.3; 5.3.2; 5.4.1
1.2	Shearing	5.2.1.3; 5.3.2; 5.4.1
1.3	Cutting or severing	5.3.2; 5.4.1
1.4	Entanglement	5.4.1
1.5	Drawing-in or trapping	5.2.1.3; 5.3.2; 5.4.1
1.6	Impact	5.4.4
1.7	Stabbing or puncture	NA
1.8	Friction or abrasion	NA
1.9	High pressure fluid ejection	5.9.7; 5.9.8; 5.9.9; 5.9.10
1.10	Ejection of parts	5.2.1.4; 5.2.1.5
1.11	Loss of stability	5.1.5; 5.2.2.4; 5.2.2.5
1.12	Slip, trip and fall	5.2.2.1; 5.3.1
2	Electrical hazards	
2.1	Electrical contact	5.8; 7.1.2.7
2.2	Electrostatic phenomena	NA
2.3	Thermal radiation	NA
2.4	External influences	5.7.15 Annex C
3	Thermal hazards	Relevant but not dealt with
4	Hazards generated by noise	Relevant but not dealt with
5	Hazards generated by vibration	5.1.2.3.2
6	Hazards generated by radiation	NA
7	Hazards generated by materials and substances processed, used or exhausted by machinery:	
7.1	Contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	5.9
7.2	Fire or explosion	NA
7.3	Biological and microbiological	NA
8	Hazards generated by neglecting ergonomic principles in machine design:	

(continued)

Table 1.1 — List of hazards (part 1) (concluded)

HAZARDS		RELEVANT CLAUSES IN THIS STANDARD
8.1	Unhealthy postures or excessive efforts	5.2.1.6; 5.2.5.2; 5.6.2; 5.12; 5.12.8
8.2	Inadequate consideration of human hand/arm or foot/leg anatomy	NA
8.4	Inadequate area lighting	7.1.2.6
8.5	Mental overload or underload, stress	NA
8.6	Human error	5.2.2.1; 5.12
9	Hazard combinations	5.1.1.1; 5.1.1.2; 5.1.3
10	Hazards caused by failure of energy supply, breaking down of machinery parts and other functional disorders	5.1
10.1	Failure of energy supply	5.2.2.1; 5.6; 5.8.1.4; 5.12.7
10.2	Unexpected ejection of machine parts or fluids	5.9.7; 5.9.8; 5.9.9; 5.9.10
10.3	Failure or malfunction of control system	5.2.1.5
10.4	Errors of fitting	5.1.5.1.5
10.5	Overturn, unexpected loss of machine stability	5.1.1.2; 5.1.5; 5.7
11	Hazards caused by missing and/or incorrectly positioned safety related measures/means	
8.3	Neglected use of personal protection equipment	5.12.8; 7.1.2.7; 7.1.2.12
11.1	Guards	
11.2	Safety related (protection) devices	5.7
11.3	Starting and stopping devices	5.1.1; 5.3.4.9; 5.12
11.4	Safety signs and signals	5.2.2.7; 7.1.2.9
11.5	Information or warning devices	7.1.2.9
11.6	Energy supply disconnecting devices	5.2.1.2; 5.8.1.2
11.7	Emergency devices	5.5; 5.6
11.8	Feeding/removal means of workpieces	NA
11.9	Essential equipment and accessories for safe adjusting and/or maintaining	5.2.3.1; 5.4.2.10
11.10	Equipment evacuating gases	NA

Table 1.2 — List of hazards (part 2)

	HAZARDS	RELEVANT CLAUSES IN THIS STANDARD
12	Inadequate lighting of moving/working area (continued)	7.1.2.6
13	Hazards due to sudden movement instability etc during handling	5.1.5; 5.2.2.1; 5.2.2.3; 5.2.2.4; 5.4.3
14	Inadequate/non-ergonomic design of operating position	
14.1	Hazards due to dangerous environments (contact with moving parts, exhaust gases etc)	5.2.2
14.2	Inadequate visibility from operators position	5.12.2; 5.12.5
14.3	Inadequate seat/seating	NA
14.4	Inadequate/non-ergonomic design/positioning of controls	5.12
14.5	Starting/moving of self-propelled machinery	5.12
14.6	Road traffic of self-propelled machinery	7.1.2.6; 7.1.2.12
14.7	Movement of pedestrian controlled machinery	7.1.2.6; 7.1.2.12
15	Mechanical hazards	5.1.1.1
15.1	Hazards to exposed persons due to uncontrolled movement	5.2.2.1; 5.2.4; 5.3.1.5, 5.4.1; 7.1.2.7
15.2	Hazards due to break-up and/or ejection of parts	5.2.1.4; 5.2.1.5; 5.2.2.3
15.3	Hazards due to rolling over (ROPS)	5.1.5
15.4	Hazards due to falling objects (FOPS)	7.1.2.7
15.5	Inadequate means of access	5.3.3; 5.3.4
15.6	Hazards due to towing, coupling, connecting, transmission etc	5.2.2.6
15.7	Hazards due to batteries, fire, emissions etc	NA
16	Hazards due to lifting operations	
16.1	Lack of stability	5.1.5; 5.1.1.2; 5.2.2.4; 5.2.2.5; 5.2.5.1
16.2	Derailment of machinery	5.2.2.4; 5.4.1.5; 5.4.2
16.3	Loss of mechanical strength of machinery and lifting accessories	5.1; 5.2.1.7; 5.2.1.8; 5.2.2.2; 5.2.2.3; 5.2.3.2; 5.2.3.3; 5.2.5.2; 5.2.5.3; 5.3.1.4; 5.4.2; 5.4.3
16.4	Hazards caused by uncontrolled movement	5.2.2.5; 5.2.4; 5.4.1; 5.11
17	Inadequate view of trajectories of the moving parts	5.12
18	Hazards caused by lightning	7.1.2
19	Hazards due to loading/overloading	5.7

Table 1.3 — List of hazards (part 3)

Hazards according to the second amendment to the Machinery Directive involving the lifting of persons by MCWP.

	HAZARDS	RELEVANT CLAUSES IN THIS STANDARD
20	Overloading or overcrowding of the carrier	5.1.2; 5.7; 5.10 Annex C
21	Unexpected movement of the carrier in response to external controls or other movements of the machine	5.12.7
22	Excess speed	5.4.1; 5.5; 5.6.3
23	Persons falling from the carrier	5.3
24	The carrier falling or overturning	5.2.2.3; 5.4.1; 5.5; 5.10; 5.11
25	Excess acceleration or braking of the carrier	5.2.2.4; 5.4.3.1.2; 5.4.4
26	Due to imprecise markings	5.2.2.7; 7.2

5 Safety requirements and/or measures

5.1 Structural and stability calculations

5.1.1 General

5.1.1.1 All loads and forces which can occur in any allowed configuration during erection, operation, out-of-service, dismantling and transfer shall be considered. This shall also include inclined or hanging masts.

5.1.1.2 The manufacturer shall be responsible for:

- Stability calculations, in order to identify the various configurations of the MCWP and the combinations of loads and deflections, which together create conditions of instability;
- Structural calculations, to evaluate the individual forces and to make allowance for deflections. All combinations of forces shall be considered including those which produce the most unfavourable stresses in the components.

5.1.2 Loads and forces

The following loads and forces shall be taken into account:

5.1.2.1 Structural loads

The masses of the components of the MCWP when they are not moving are considered to be static structural loads.

The masses of the components of the MCWP when they are moving are considered to be dynamic structural loads.

5.1.2.2 Rated load

5.1.2.2.1 The rated load for design purposes is:

$$m = (n \times m_p) + T + (2 \times m_e)$$

where m = rated load (kg)

m_p = 80 kg; mass of each person

m_e = 40 kg; mass of personal equipment (for the first two persons only)

T = mass (kg) of material and equipment on the work platform (excluding personal equipment)

n = number of persons on the work platform

The mass of persons and the mass of equipment and material shall act simultaneously.

The minimum number of persons shall be:

Two (2) for single mast platforms and four (4) for multiple mast platforms.

The mass of the personal equipment (m_e) shall be assumed to act on the point coincident with each of the two persons which give the highest stresses.

5.1.2.2.2 The mass of each person is assumed to act as a point load on the MCWP at a horizontal distance 0,1 m from the upper inside edge of the top guard rail. The distance between the point loads shall be 0,5 m (see figure 3 as an example).

5.1.2.2.3 The mass T shall be evenly distributed over the whole area of the main platform giving a specific load per length t .

The centre of gravity of the mass T shall be assumed to act on a point 0,15 B (where B is the width of the main platform) away from the longitudinal centre line of the main platform, on the side giving the highest stresses. See figure 4.

Calculations must allow for the possibility that a reduced load giving an unbalanced loadcase may result in higher stresses in some parts of the MCWP than a balanced rated load case would give.

For single mast machines the bending moment, M , on masts and platforms shall be calculated according to formula 1, where $L_{\max}$ is the greater of the distances L_1 and L_2 in figure 5.

For multiple mast machines the bending moment M , on masts and platforms shall be calculated according to formulas 2, 3, 4 and figure 6. The factors 1,15 and 1,2 are used in the formulas 1, 2, 3, 4 in order to cover the situations in use where, instead of a uniformly distributed load, a concentration of the same load is placed elsewhere within that individual length.

Dimensions in metres

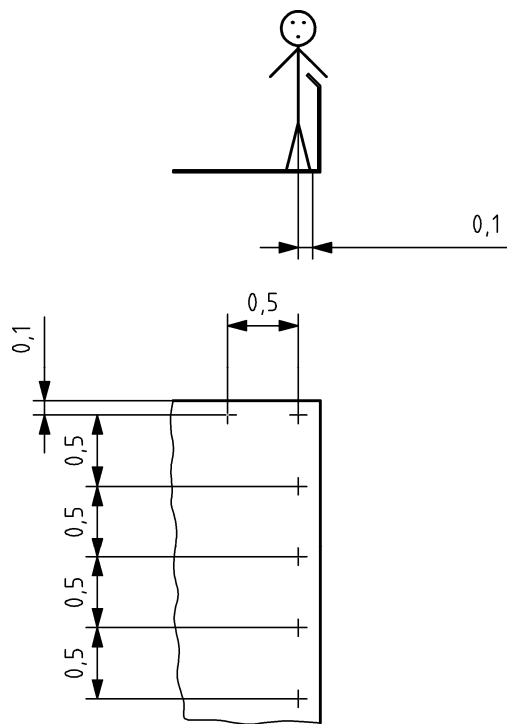


Figure 3 — Example of the distribution of persons on the main platform or platform extensions

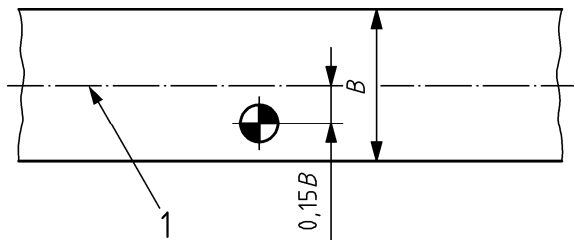
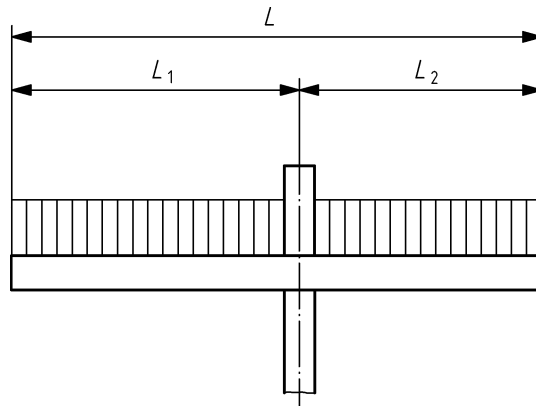


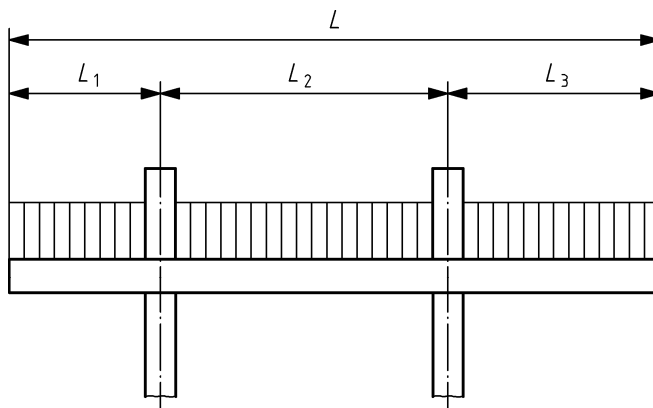
Figure 4 — Eccentric loading normal to the centre line



$$\text{Specific load } t = \frac{T}{L}$$

$$\text{Formula (1): } M_{\max} = \frac{t \times L_{\max}^2 \times 1,15}{2}$$

Figure 5 — Loading in the longitudinal direction. Single mast machines



$$\text{Specific load } t = \frac{T}{L}$$

Formulas:

$$(2) \quad M_1 = \frac{t \times L_1^2 \times 1,15}{2}$$

$$(3) \quad M_2 = \frac{t \times L_2^2 \times 1,2}{8}$$

$$(4) \quad M_3 = \frac{t \times L_3^2 \times 1,15}{2}$$

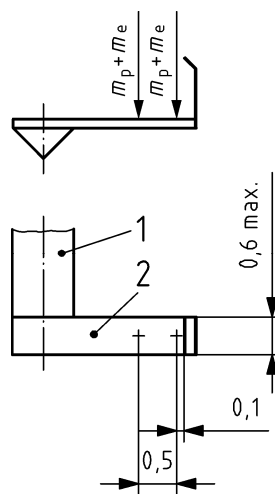
Figure 6 — Loading in the longitudinal direction. Multiple mast machines

5.1.2.2.4 If the area of the main platform, or part of it, is increased by means of extensions, usually to the longitudinal edge of the platform, the mass of the number of persons allowed on the platform, according to 5.1.2.2.1, shall be assumed to act on these longitudinal edges according to 5.1.2.2.2.

5.1.2.2.5 In order to provide long cantilever extensions of restricted width to reach more distant work points an exception to 5.1.2.2.4 may be made, but shall be clearly explained on a sign easily visible on that particular extension to the main platform. In no such case shall the load on the extension be calculated for less than two persons (m_p) carrying their personal equipment (m_e). In order to restrict the available platform extension area, such extensions shall not be more than 0,6 m wide. See Figure 7.



Dimensions in metres



Key

- 1 main platform
- 2 platform-extension

Figure 7 — Long cantilever extensions

5.1.2.2.6 Where the manufacturer includes in his design, provision for the use of a handling crane then the mass of the crane and the crane's rated load shall together be treated as part of the rated load of the MCWP. The location of the force resulting from the use of the crane shall be dictated by the manufacturer's chosen mounting positions for the crane supports.

5.1.2.3 Horizontal forces

5.1.2.3.1 Manual forces

The minimum value for the manual force is assumed to be 200 N for each of the first two persons on the platform and 100 N for each additional person permitted to be on the work platform.

It is assumed that the force is applied at a height of 1,1 m above the floor of the work platform and acts in a horizontal direction.

5.1.2.3.2 Forces from the use of power tools

Where the manufacturer of the MCWP permits the use of power tools which impose horizontal reaction forces on the work platform which are in excess of those given in 5.1.2.3.1 then the manufacturer shall specify the maximum force permitted. It is to be assumed that the force is applied at a minimum height of 1,1 m above the floor of the work platform.

Such forces may be caused by the use of, for example:

- Water jetting equipment;
- Sand or grit blasting equipment;
- Mechanically assisted drilling machine;
- Hammer assisted drill;
- Electrically driven hammer/breaker.

5.1.2.3.3 Forces from the use of weather protection screens on the Work Platform

If the Work Platform is designed to permit the use of weather protection, in the form of a roof over part of, or the whole of a work platform, then the resulting wind forces shall be considered to act on walls which reach the full height from the work platform floor to the top of the roof. Wind forces shall be calculated according to 5.1.2.5 and 5.1.2.8. For platform regions protected by such weather screens, the wind forces on persons, equipment and material coming under the protection of these weatherscreens may be neglected.

The mass of the weather protection screens shall be treated as part of the rated load.

5.1.2.4 Dynamic forces

Dynamic forces shall be taken into account by multiplying all moving masses by a dynamic factor of 1,15.

Moving, includes the raising and lowering of the work platform and also transfer of the MCWP in its transfer condition.

5.1.2.5 In service wind loads

5.1.2.5.1 All MCWP used out-of-doors or otherwise exposed to wind, whilst in service, shall be regarded as being affected by a minimum wind pressure in accordance with table 2.

Table 2 — Minimum design wind data, in service

Installation	Wind velocity [m/s]	Wind pressure [N/m²]
Freestanding or MCWP during erection and dismantling	12,7	100
Tied MCWP	15,5	150

5.1.2.5.2 Wind forces are assumed to act horizontally at the centre of the wind area of the exposed structural parts of the MCWP.

5.1.2.5.3 The windforce coefficients applied to areas exposed to the wind shall be in accordance with ISO 4302. The windforce coefficient for persons exposed to the wind is 1,0.

5.1.2.5.4 The full area of one person is $0,7 \text{ m}^2$ ($0,4 \text{ m}$ average width $\times$ $1,75 \text{ m}$ height) with the centre of area $1,0 \text{ m}$ above the work platform floor.

5.1.2.5.5 The exposed area of one person standing on a work platform behind an imperforate section of fencing $1,1 \text{ m}$ high is $0,35 \text{ m}^2$ with the centre of area $1,45 \text{ m}$ above the work platform floor.

5.1.2.5.6 The number of persons directly exposed to the wind is calculated as:

- a) The length of the side of the work platform exposed to the wind, rounded to the nearest $0,5 \text{ m}$ and divided by $0,5 \text{ m}$, or
- b) The number of persons allowed on the work platform if less than the number calculated in a).

5.1.2.5.7 If the number of persons permitted on the work platform is greater than in 5.1.2.5.6 a), a reducing coefficient of 0,6 may be applied to the extra number of persons.

5.1.2.5.8 The wind force on exposed equipment and material on the work platform is calculated as 3 % of the mass (T), acting horizontally at a height of $1,0 \text{ m}$ above the work platform floor.

5.1.2.6 Loads and forces occurring during transfer conditions

Inertia forces plus any load permitted by the manufacturer on the work platform shall be taken into account when the MCWP is subject to transfer conditions.

5.1.2.7 Erection and dismantling loads

The load for which the MCWP has been designed during erection and dismantling. Erection load may be higher than rated load.

If the handling crane, as carried in 5.1.2.2.6, is used during erection and dismantling of the MCWP, then the crane's mass and the rated load shall together be treated as part of the erection load.

5.1.2.8 Out of service wind loads

Whilst out of service, with the work platform in a safe position, the wind pressure for the calculations shall be in accordance with table 3.

The limiting wind pressure shall be considered in the most unfavourable direction.