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SIST EN 280:2002

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EUROPEAN STANDARD

DRAFT  
prEN 280

NORME EUROPEENNE

EUROPÄISCHE NORM

November 1994

ICS 91.200

Descriptors : Elevators, platforms, mobile equipment, safety requirements, accident prevention, computation, stability, design, tests, inspection

English version

Mobile elevating work platforms - Design calculations, stability criteria, construction - Safety, examinations and tests

Plates-formes élévatrices mobiles de personnel - Calculs, stabilité, construction - Sécurité, examens et essais

Fahrbare Hubarbeitsbühnen - Berechnung, Standsicherheit, Bau - Sicherheitsanforderungen

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This draft European Standard is submitted to the CEN members for CEN enquiry. It has been drawn up by Technical Committee CEN/TC 98 .

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If this draft becomes a European Standard, 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.

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CEN

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

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<b>Contents list</b>	<b>Page</b>
<b>Foreword</b> .....	3
<b>0 Introduction</b> .....	4
<b>1 Scope</b> .....	5
<b>2 Normative references</b> .....	7
<b>3 Definitions</b> .....	9
<b>4 List of hazards</b> .....	13
<b>5 Safety requirements and/or measures</b> .....	18
5.1 Structural and stability calculations.....	18
5.2 Chassis and stabilizers.....	28
5.3 Extending structure .....	32
5.4 Extending structure drive systems.....	34
5.4.1 General.....	34
5.4.2 Wire rope drive systems.....	35
5.4.3 Chain drive systems.....	37
5.4.4 Leadscrew drive systems .....	39
5.4.5 Rack and pinion drive systems .....	39
5.5 Work platform.....	40
5.6 Controls .....	42
5.7 Electrical equipment.....	44
5.8 Hydraulic drive systems .....	44
5.9 Pneumatic drive systems .....	46
5.10 Hydraulic and pneumatic cylinders.....	47
5.11 Safety devices - General requirements .....	51
<b>6 Verification of the safety requirements and/or measures</b> .....	54
<b>7 Information for use</b> .....	59
7.1 Instruction handbook.....	59
7.2 Marking .....	61
<b>Annex A (informative)</b> Use of MEWPs in wind speeds greater than 12.5 m/s (Beaufort Scale 6) .....	63
<b>Annex B (informative)</b> Dynamic factors in stability and structural calculations.....	64
<b>Annex C (normative)</b> Calculation of wire rope drive systems .....	66
<b>Annex D (informative)</b> Calculation example - wire rope drive systems.....	73
<b>Annex E (informative)</b> Calculation example - dynamic factor "z", obstacle test ...	79

## Foreword

This draft European Standard was prepared by the Technical Committee CEN/TC 98 "Lifting platforms" of which the secretariat is held by DIN.

This document is submitted to Second Enquiry.

This draft 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 EC Directive(s).

As prEN 280: 1991 was not adopted by the Formal Vote, CEN/TC 98 asked its working group WG 1 to amend prEN 280: 1991

- to take into consideration the objections leading to the rejection
- to draft and present this European Standard in accordance with EN 414.

CEN/TC 98 decided (Resolution TC 98/106) to submit the final Draft to CEN/CS for launching the CEN enquiry.

In accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard:

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## 0 Introduction

The object of this European Standard is to define rules for safeguarding persons and objects against the risk of accidents associated with the operation of Mobile Elevating Work Platforms (MEWPs).

**0.1** This European Standard does not repeat all the general technical rules applicable to every electrical, mechanical or structural component. It does not cover stresses caused by travelling but these must be taken into account by manufacturers.

**0.2** The safety requirements of this European Standard have been drawn up on the basis that MEWPs are periodically maintained according to manufacturers' instructions, working conditions, frequency of use and national regulations.

It is also assumed that MEWPs are checked for function daily before start of work and are not put into operation unless all required control- and safety-devices are available and in working order. If a MEWP is seldom used, the checks may be made before start of work.

**0.3** As far as possible this European Standard sets out only the requirements that materials and equipment have to meet in the interest of safety, and it is assumed that persons operating MEWPs are adequately trained.

**0.4** When mention is made of a design for the sake of clarity, this should not be considered to be the only possible design; any other solution may be applied if it is at least equally safe.

**0.5** As no satisfactory explanation could be found for the dynamic factors used for stability calculations in previous national standards, the results of the tests carried out by the former CEN/TC98/WG1 to determine a suitable factor and stability calculation method for MEWPs have been adopted. The test method is described in annex B (informative) as a guide for manufacturers wishing to use higher or lower operating speeds and to take advantage of developments in control systems.

Similarly, to avoid the unexplained inconsistencies in coefficients of utilization for wire ropes found in other standards for lifting devices, appropriate extracts of the widely accepted standard DIN 15020 have been taken into 5.4.2 and annex C (normative) with a worked example in annex D (informative).

**0.6** On loading control there was unanimous agreement that, due to the variety and complexity of work platform installations (rotation, power supplies, levelling systems etc.) systems to measure the load on the work platform were impracticable and not state-of-the-art. Avoidance of overloading the structure and overturning must be controlled by stabilizer interlocking systems and automatic control of permissible positions of the extending structure and/or load moment, with appropriate information/indicators on the work platform on the permitted number of persons on the work platform where this is variable.

## 1 Scope

**1.1** This European Standard applies to all types and sizes of MEWP i.e machines as defined in clause 3. This European Standard may be used if the base is fixed and another European Standard does not apply.

**1.2** This European Standard is applicable to the structural design calculations and stability criteria, construction, safety examinations and tests of MEWPs. It identifies the hazards most frequently arising from the use of MEWPs and describes methods for the elimination or reduction of these hazards.

It does not cover the hazards arising from:

- a) operation by radio and other wire-less controls;
- b) use in potentially explosive atmospheres;
- c) electromagnetic incompatibility;
- d) work on live electric systems.

Manufacturers must consider whether hazards shown in clause 4 as Not Applicable (NA) are applicable to MEWPs for special applications and/or with special equipments.

**1.3** This standard does not apply to:

- a) permanently installed personnel lifting appliances serving defined levels
- b) fire-fighting and fire rescue appliances
- c) unguided work cages suspended from lifting appliances
- d) order picking trucks
- e) tail lifts
- f) mast climbing work platforms.
- g) fairground equipment

### 1.4 Classification

MEWPs are divided into two main groups:

- A MEWPs where the vertical projection of the centre of gravity of the load is always inside the tipping lines
- B MEWPs where the vertical projection of the centre of gravity of the load may be outside the tipping lines.

Relating to travelling, MEWPs are divided into three sub-groups:

- 1 Travelling is only allowed with the MEWP in its transport position.
- 2 Travelling with raised work platform is controlled only from a point of control at the chassis.
- 3 Travelling with raised work platform is controlled only from a point of control at the work platform.

The main groups A and B and the sub-groups 1, 2, 3 can be combined.

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## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- EN 292: 1991 Safety of Machinery - Basic concepts, general principles for design  
Part 1: Basic terminology, methodology  
Part 2: Technical principles and specifications  
Part 3: Additional technical principles and specification for mobility and for lifting (in preparation)
- EN 349: 1992 Safety of machinery; Minimum gaps to avoid crushing of parts of the human body
- EN 414: 1992 Safety of machinery - Rules for the drafting and presentation of safety standards
- EN 418: 1992 Emergency Stop Equipment  
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- EN 60204-1: 1993 Electrical Equipment of Industrial Machines Part 1: General Requirements
- ISO 2408: 1985 Steel wire ropes for general purposes; Characteristics
- ISO 4301-2: 1985 Lifting appliances; Classification; Part 2: Mobile cranes
- ISO 4302: 1981 Cranes - Wind Load Assessment
- ISO 4305: 1985 Mobile Cranes - Determination of Stability

ISO 4308-2: 1988 Cranes and lifting appliances; selection of wire ropes;  
Part 2: mobile cranes; coefficient of utilization

ISO 4309: 1981 Wire Rope for Lifting Appliances - Code of Practice for Examination and  
Discard

ISO 8087: 1985 Mobile cranes; Drums and sheave sizes

**NOTE:** Only documents which had reached the status of a Standard at the end of January  
1993 have been considered.

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### 3 Definitions

For the purpose of this European Standard, the following definitions apply:

#### 3.1 Mobile elevating work platform (MEWP)

A mobile elevating work platform consists as a minimum of a work platform, an extending structure and a chassis. In this standard the abbreviation MEWP is used for mobile elevating work platform.

#### 3.2 Work platform (see figure 1)

The work platform is a fenced platform or a cage which can be moved under load to the required working position and from which erection, repair, inspection or similar work can be carried out.

#### 3.3 Extending structure (see figure 1)

The extending structure is the structure which is connected to the chassis and supports the work platform. It allows movement of the work platform to its required position. It may, for example, be a single or a telescoping or an articulating boom or ladder, or a scissor mechanism or any combination of them, and may or may not slew on the base.

#### 3.4 Chassis (see figure 1)

The chassis is the base of the MEWP. It may be pulled, pushed, self propelled, etc.

#### 3.5 Stabilizers (see figure 1)

Stabilizers are all devices and systems used to stabilize MEWPs by supporting and/or levelling the complete MEWP or the extending structure, e.g. jacks, suspension locking devices, extending axles.

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#### 3.6 Access position<sup>1)</sup>

The access position of the MEWP is the position to provide access to the work platform.

#### 3.7 Transport position<sup>1</sup>

The transport position of the MEWP is the position of the work platform prescribed by the manufacturer in which the MEWP is brought to the place of use.

#### 3.8 Lowering (see figure 2)

Lowering includes all operations to move the work platform to a lower level.

#### 3.9 Raising (see figure 2)

Raising includes all operations to move the work platform to a higher level.

#### 3.10 Rotating (see figure 2)

Rotating is the circular movement of the work platform about a vertical axis.

#### 3.11 Slewing (see figure 2)

Slewing is the circular movement of the extending structure about a vertical axis.

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<sup>1)</sup>Access position and transport position can be identical

**3.12 Travelling (see figure 2)**

Travelling includes all movements of the chassis.

**3.13 Vehicle mounted MEWP**

A vehicle mounted MEWP has the travelling controls located within the cab of the vehicle.

**3.14 Pedestrian controlled MEWP**

A pedestrian controlled MEWP has the controls for powered travelling located so that they are capable of being operated by a person walking close to the MEWP.

**3.15 Self propelled MEWP**

A self propelled MEWP has the travelling controls located at the work platform.

**3.16 Rated load**

The rated load is the load for which the MEWP has been designed for normal operation. The rated load is composed of persons and equipment.

**3.17 Load cycle**

A load cycle is starting from the access position, carrying out work and returning to the access position.

**3.18 Wire rope drive system**

A wire rope drive system comprises the wire ropes running on rope drums and on or over rope pulleys as well as any associated rope drums, rope pulleys and compensating pulleys.

**3.19 Chain drive system**

A chain drive system comprises the chains running on chain sprockets and on or over chain pulleys as well as any associated chain sprockets, chain pulleys and compensating pulleys.

**3.20 Prototype test**

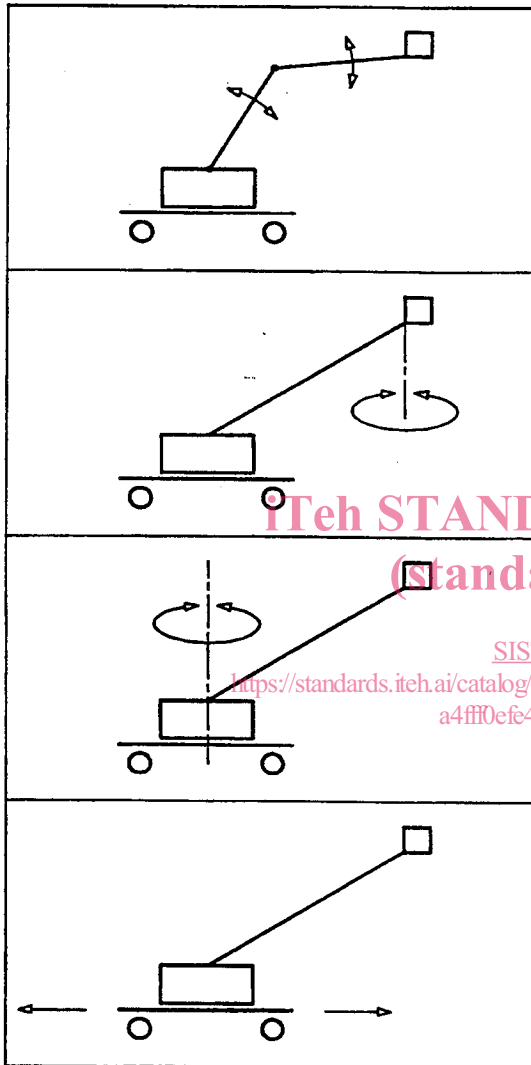
A prototype test is a test on the representative model of a new design or one incorporating significant changes to an existing design, carried out by or on behalf of the manufacturer or his authorized representative.

**3.21 EC-type examination**

EC-type examination is an examination of a representative model of a new design or one incorporating significant changes to an existing design, carried out by a notified body in the sense of EC Directives.

**3.22 Diverse redundancy (diversity)**

Redundancy which is reached by using different principles of operation or different types of devices.



lowering/raising (3.8/3.9)

rotating (3.10)

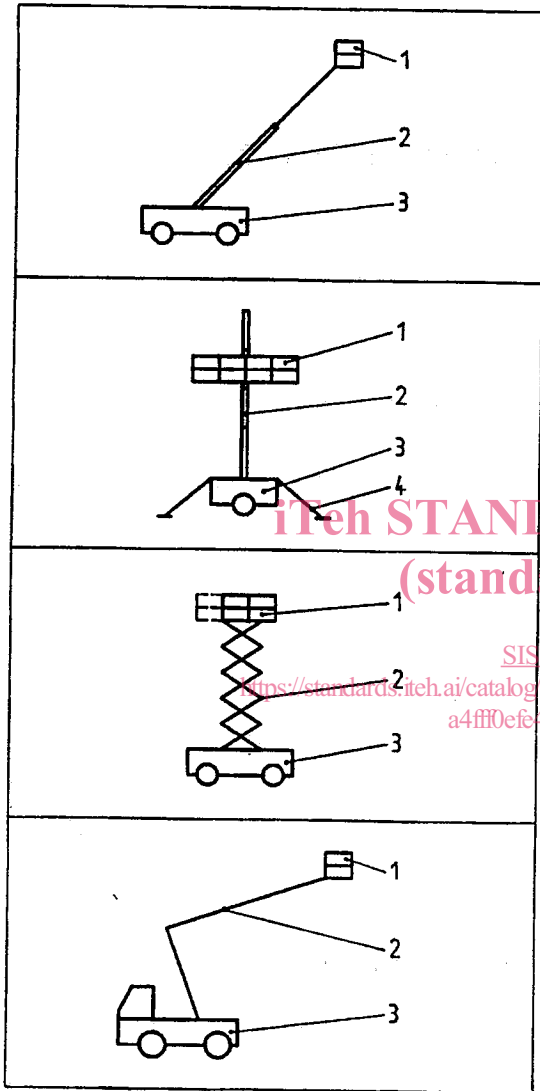
slewing (3.11)

travelling (3.12)

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Figure 1: Illustration of some definitions (1)



1 Work Platform (3.2)

2 Extending Structure (3.3)

3 Chassis (3.4)

4 Outriggers (3.5)

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Figure 2: Illustration of some definitions (2)

#### 4 List of hazards

The hazards have been identified by the risk assessment procedure and the corresponding requirements formulated.

Table 1.1 details these requirements against the applicable hazards listed in EN 414, annex A.

Table 1.2 and 1.3 detail these requirements against the applicable hazards taken from clauses 3 to 6 of annex 1 of the Machinery Directive, first and second amendments.

When EN 414 is extended to include the first and second amendments of the Machinery Directive, tables 1.2 and 1.3 will be incorporated into table 1.1 (then new table 1).

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

**Table 1.1: List of hazards (part 1)**

Hazards		relevant clauses in this standard
<b>1</b>	<b>Mechanical hazards</b>	-
1.1	crushing hazard	5.2.23, 5.3.5, 5.5.9, 5.6.1, 5.6.11, 7.2.14
1.2	shearing hazard	5.3.5, 5.6.1, 7.2.14
1.3	cutting or severing hazard	NA
1.4	entanglement hazard	5.2.20, 7.2.14
1.5	drawing-in or trapping hazard	5.2.20, 7.2.14
1.6	impact hazard	NA
1.7	stabbing or puncture hazard	NA
1.8	friction or/abrasion hazard	7.1.1.4e)
1.9	high pressure fluid injection hazard	5.8.1, 5.8.2, 5.8.3, 5.8.4, 5.9.1, 5.9.2, 5.9.3, 5.9.4
1.10	ejection of parts	NA
1.11	loss of stability (of machinery and machine parts)	5.1, 5.2.2, 5.2.6, 5.2.7, 5.2.9, 5.2.10, 7.2.21)
1.12	slip, trip and fall hazards	5.5.2, 5.5.3, 5.5.4, 5.5.5, 5.5.6, 5.5.7, 7.2.14
<b>2</b>	<b>Electrical hazards, caused for example by:</b>	-
2.1	electrical contact (direct or indirect)	5.7, 7.1.1.1g)
2.2	electrostatic phenomena	NA
2.3	thermal radiation	NA
2.4	external influences on electrical equipment	5.7.1
<b>3</b>	<b>Thermal hazards for example resulting in:</b>	-
3.1	burns and scalds by a possible contact of persons by flames or explosions and also by the radiation of heat sources	5.2.20

(continued)