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## Playground equipment and surfacing

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Part 4: Additional specific safety requirements and test methods for cableways

EUROPEAN STANDARD

**EN 1176-4**

NORME EUROPÉENNE

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Playground equipment and surfacing - Part 4: Additional  
specific safety requirements and test methods for  
cableways

Équipements et sols d'aires de jeux - Partie 4:  
Exigences de sécurité et méthodes d'essai  
complémentaires spécifiques aux téléphériques

Spielplatzgeräte und Spielplatzböden - Teil 4:  
Zusätzliche besondere sicherheitstechnische  
Anforderungen und Prüfverfahren für Seilbahnen

This European Standard was approved by CEN on 2 July 2017.

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## European foreword

This document (EN 1176-4:2017) has been prepared by Technical Committee CEN/TC 136 “Sports, playground and other recreational facilities and equipment”, 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of an identical text or by endorsement, at the latest by April 2018, and conflicting national standards shall be withdrawn at the latest by October 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1176-4:2008.

The principal changes from the previous edition of this part of EN 1176 are as follows:

- a) revised requirements for the different types of grips and seats;
- b) revised requirements for seated and hanging types of equipment;
- c) test methods have been improved in the light of experience.

EN 1176, *Playground equipment and surfacing*, consists of the following parts:

- *Part 1: General safety requirements and test methods*
- *Part 2: Additional specific safety requirements and test methods for swings*
- *Part 3: Additional specific safety requirements and test methods for slides*
- *Part 4: Additional specific safety requirements and test methods for cableways*
- *Part 5: Additional specific safety requirements and test methods for carousels*
- *Part 6: Additional specific safety requirements and test methods for rocking equipment*
- *Part 7: Guidance on installation, inspection, maintenance and operation*
- *Part 10: Additional specific safety requirements and test methods for fully enclosed play equipment*
- *Part 11: Additional specific safety requirements and test methods for spatial network*

This part of EN 1176 should not be used in isolation, but in conjunction with EN 1176-1, EN 1176-7 and EN 1177.

For inflatable play equipment, see EN 14960 *Inflatable play equipment - Safety requirements and test methods*.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## 1 Scope

This European Standard is applicable to cableways whereby children travel on or along a cable by the use of gravity. This standard specifies additional safety requirements for cableways intended for permanent installation for use by children.

## 2 Normative references

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

EN 1176-1:2017, *Playground equipment and surfacing — Part 1: General safety requirements and test methods*

EN 1176-2:2017, *Playground equipment and surfacing — Part 2: Additional specific safety requirements and test methods for swings*

EN 1176-6:2017, *Playground equipment and surfacing — Part 6: Additional specific safety requirements and test methods for rocking equipment*

## 3 Terms and definitions

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

**3.1 cableway**  
item of children's playground equipment whereby children can travel on or along a cable under the force of gravity

Note 1 to entry: See Figure 1.

**3.2 hanging type cableway**  
cableway equipped with a suspension assembly which includes a grip for the user

**3.3 seating type cableway**  
cableway equipped with a suspension assembly which includes a seat

**3.4 starting point**  
area in which the user can reach the grip or seat and set the equipment in motion

**3.5 area of travel**  
area in which the user can travel freely

**3.6 terminus**  
area furthest away from the starting point that the user can reach by travelling across the area of travel

**3.7 traveller**  
moving part that, by influence of gravity, moves the user along the cable

Note 1 to entry: See Figure 1.

3.8

**suspension element**

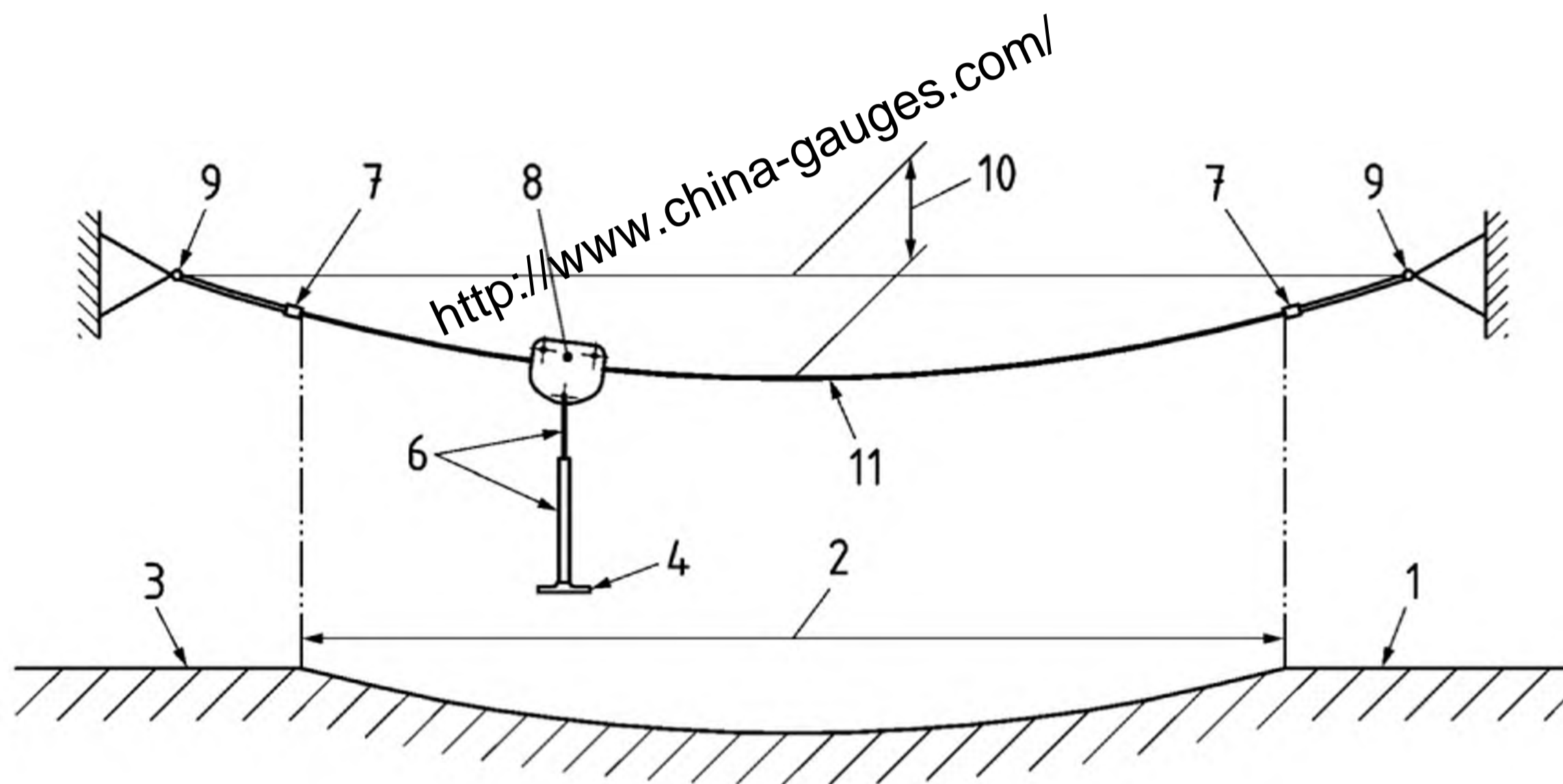
part of the structure between the traveller and the seat or grip

3.9

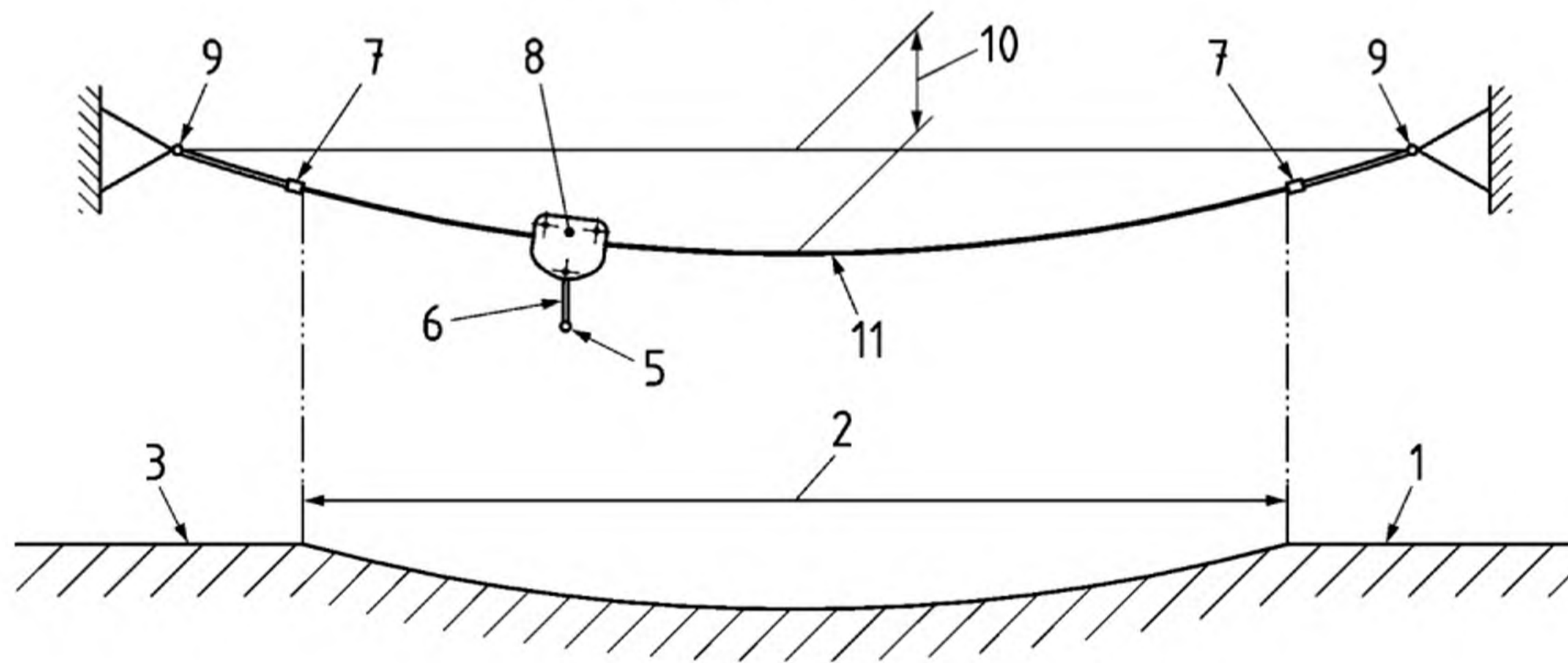
**suspension assembly**

assembly of components hanging beneath the traveller

EXAMPLE Suspension elements, grips and/or seats.



a) Cableway terms (seated)



b) Cableway terms (hanging)

**Key**

- |   |                         |   |                    |    |                     |
|---|-------------------------|---|--------------------|----|---------------------|
| 1 | terminus/starting point | 5 | grip               | 9  | cable fixing points |
| 2 | area of travel          | 6 | suspension element | 10 | sag                 |
| 3 | terminus/starting point | 7 | stop               | 11 | cable               |
| 4 | seat                    | 8 | traveller          |    |                     |

**Figure 1 — Cableway terms**

## 4 Safety requirements

### 4.1 General

Cableways shall conform to EN 1176-1 unless otherwise specified in this part of EN 1176.

### 4.2 Framework and fixing points for the cable

Framework and fixing points for the cable shall be designed to withstand the computed loads (static and dynamic) transmitted by the cable, in accordance with EN 1176-1.

There shall be an adjusting device so that the correct sag can be maintained for the life of the cable.

### 4.3 Calculation of forces acting on the cable of a cableway

The cable shall be designed so that it can withstand the forces acting upon it according to EN 1176-1:2017, Annex A.

### 4.4 Stops

When tested in accordance with Annex A, the stop at the terminus shall progressively slow down the traveller until it stops and the suspension element shall not swing through an angle of more than 45°, as shown in Figure 4.

NOTE This test includes an allowance for starting speed.

### 4.5 Traveller

The traveller shall be constructed so that it cannot slip out of place and the sides are closed to prevent any access by the user to moving parts from the side.

Openings for the cable may allow the 8 mm finger rod (see EN 1176-1:2017, Figure D.10) to pass through but the rod shall not get squeezed between any moving parts when it is inserted by the length of 70 mm.

There shall be only one traveller on the same cable.

The traveller and suspension element shall be designed such that it does not cause damage to the cable during use.

### 4.6 Suspension assembly

For seating type cableways rigid suspension elements shall not be used.

If a flexible suspension element is used it shall be designed to prevent risk of strangulation.

If a pulling device for the traveller is provided it shall be designed to prevent risk of strangulation.

### 4.7 Cableways arranged in parallel

For cableways arranged in parallel, the distance between the cables shall be at least 2 000 mm.

### 4.8 Grips

For hanging type cableways, the grip shall be constructed to ensure that the user can easily release their hold at all times. If the grip is an enclosed loop, it shall not be made from flexible material that could tighten around the user's arm or hand thus preventing the user from releasing their grip quickly. Enclosed loops shall conform to the entrapment requirements in EN 1176-1:2017, 4.2.7.

It shall not be possible to climb on the grip.

If the grip is rigid and does not form a loop, the ends of the grip shall conform to EN 1176-6:2017, Annex E.

NOTE This is to reduce the risk of eye injury from the ends of projecting hand supports.

Suspension type cableways from which users will hang by the hands shall conform to EN 1176-1:2017, 4.2.4.6.

#### 4.9 Seats

Seats shall be designed so that the user can leave the cableway quickly and at all times. Seats which form loops or circular rings shall not be used.

When tested in accordance with EN 1176-2:2017, Annex C, peak values of acceleration shall be not greater than 50 g and the average surface compression shall not exceed 90 N/cm<sup>2</sup>.

#### 4.10 Speed

When tested in accordance with Annex B, the maximum speed of the traveller shall not exceed 7 m/s.

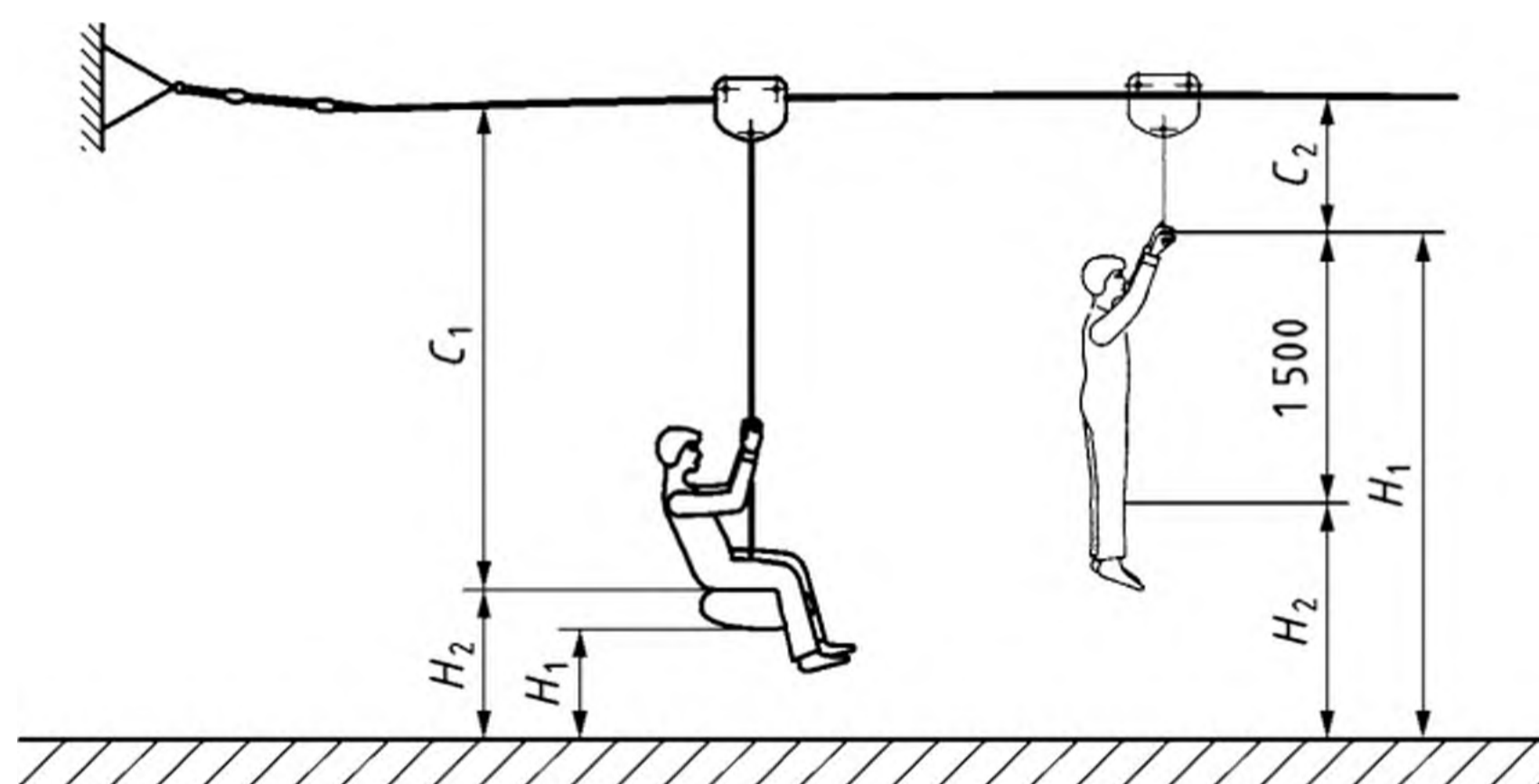
#### 4.11 Free height of fall

The free height of fall, for all cableway types, shall be measured unloaded, and with the seat or hand grip hanging vertically below the cable. In the sitting position the free height of fall,  $H_2$ , shall not exceed 2 000 mm.

In the hanging position the free height of fall shall be measured from the grip position minus 1 500 mm to the surface below, as the user should not be able to access the cable (see Figure 2). In the hanging position, the free height of fall,  $H_2$ , shall not exceed 1 500 mm (see Figure 2).

The sagging of the cable and thus the distance ground/cable, ground/grip and ground/seat are dependent on temperature. The minimum and maximum dimensions specified apply to a reference temperature of 15 °C.

Dimensions in millimetres



#### Key

$C_1$	cable length from the seat	$H_1$	ground clearance
$C_2$	cable length from the grip	$H_2$	free height of fall

**Figure 2 — Determination of cable length, ground clearance and free height of fall**

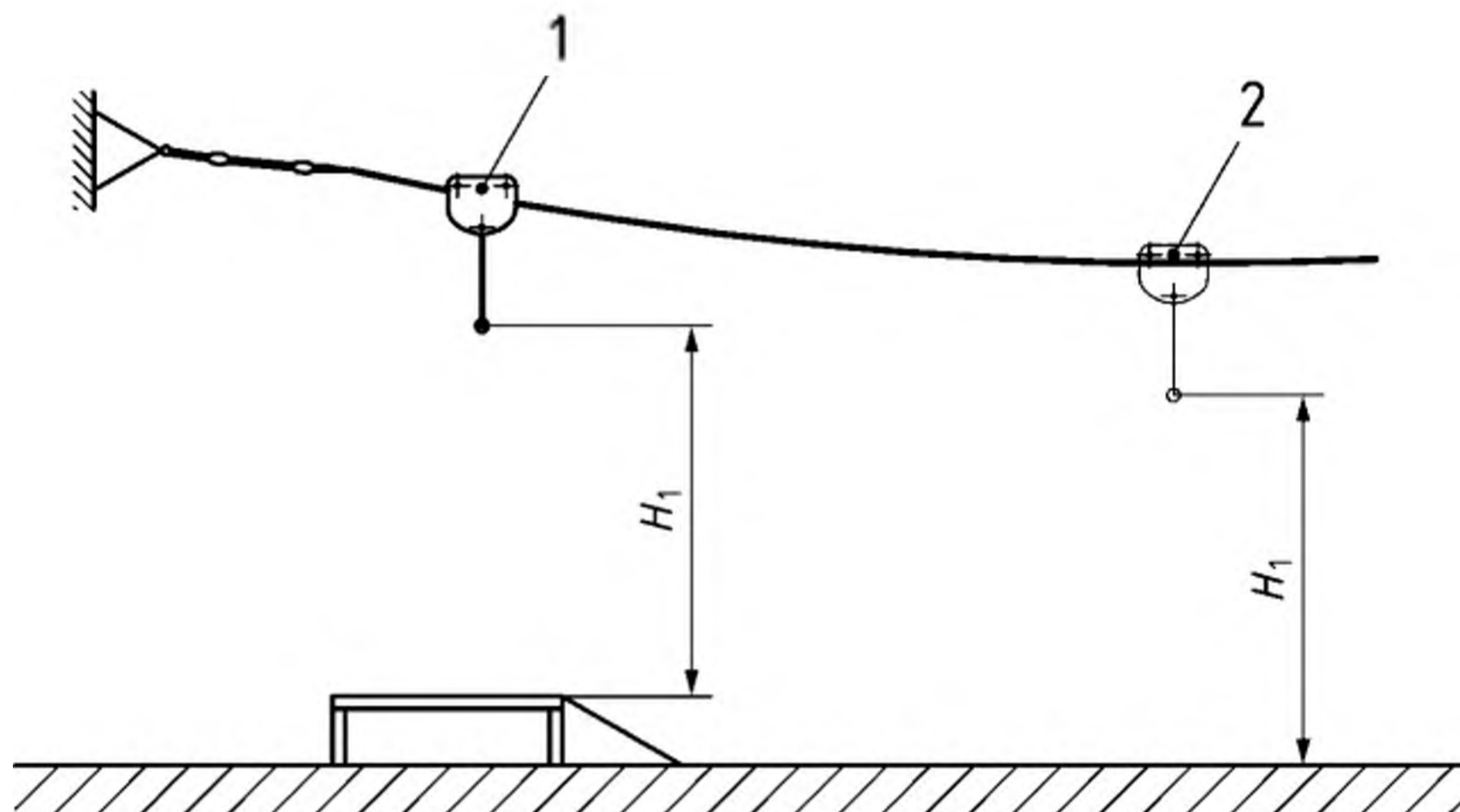


**4.12 Ground clearance**

The ground clearance is the distance between the underside of the seat or the lowest point on the grip and the surface beneath (see Table 1).

**Table 1 — Ground clearance**

Type	Ground clearance
For seating type (see Figure 2)	350 mm minimum — measured loaded with 69,5 kg
For all hanging types, except rigid types (see Figure 3)	1 500 mm minimum at the starting point — measured unloaded 2 000 mm minimum in the running position — measured loaded with 69,5 kg
For rigid hanging types	2 000 mm minimum at the starting point and in the running position — measured loaded with 69,5 kg
NOTE For hanging type cableways where the traveller, suspension element and grip are all rigidly fixed together, a greater ground clearance is necessary to reduce the risk of head injury.	



- Key**
- 1 starting position
  - 2 running position
  - $H_1$  ground clearance

**Figure 3 — Hanging type cableway, determination of ground clearance**

**4.13 Cable length**

The cable length from the seat,  $C_1$ , shall be 2 100 mm minimum, when measured as shown in Figure 2, except that it may be reduced to 1 800 mm minimum if the moving parts of the traveller are enclosed, are not accessible by the user and there is no possibility of finger entrapment.

The cable length from the grip,  $C_2$ , shall be 300 mm minimum, when measured as shown in Figure 2.

**4.14 Falling space and impact area**

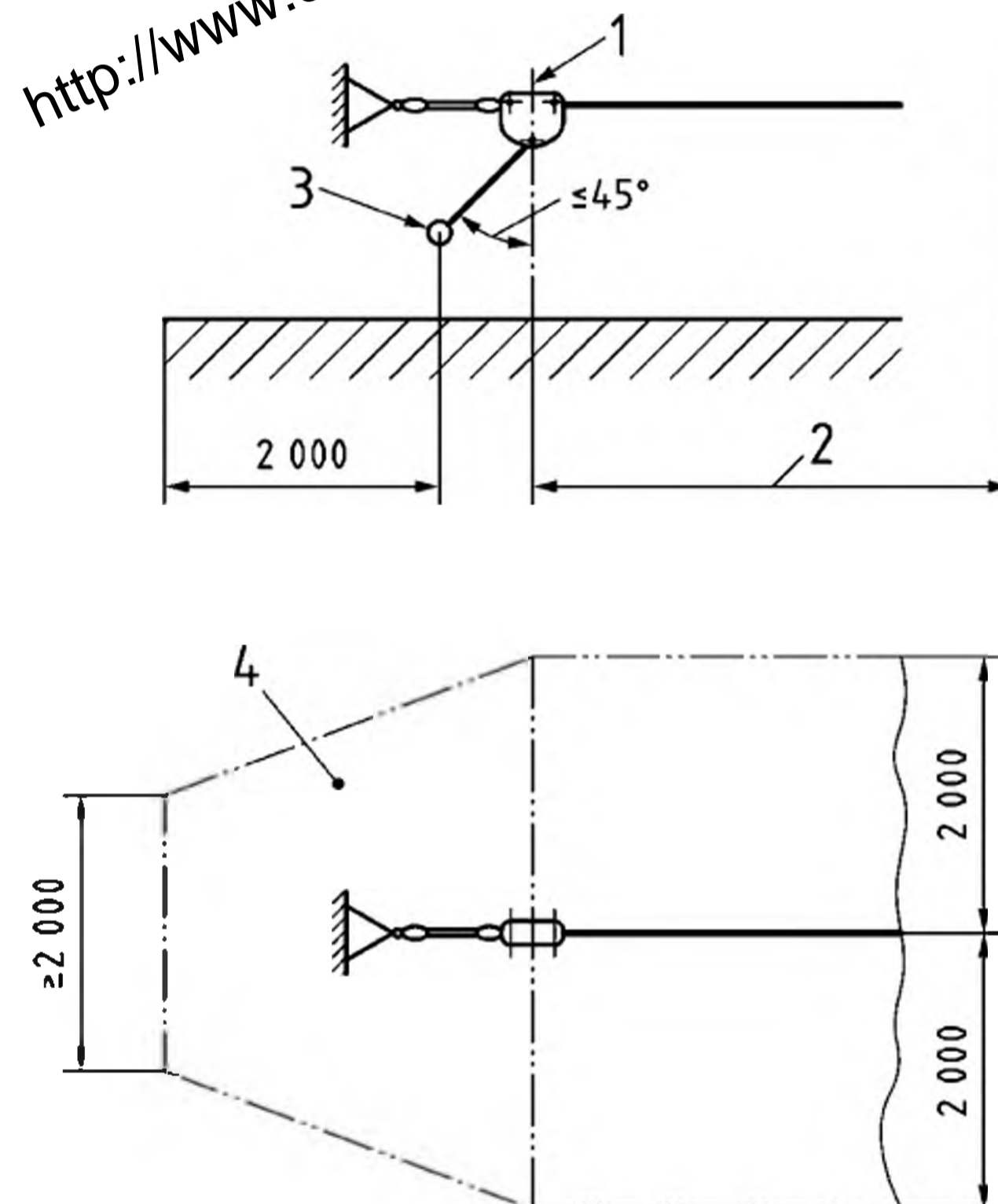
The falling space and impact area shall be free from obstacles that could cause injury and shall be as shown in Figure 4 and Figure 5. In addition to the requirements given in EN 1176-1, the falling space and impact area shall be provided to a distance of at least 2 000 mm to each side, when measured from

the centre of the cable and to a distance of at least 2 000 mm beyond the end of the swinging position, (max 45°, end stop compressed) of the grip or seat. The impact area may reduce in width symmetrically from the end of travel to a minimum overall width of 2 000 mm (see Figure 4). The impact area shall have an adequate level of impact attenuation at least equivalent to a free height of fall of 1 000 mm. For fall heights greater than 1 000 mm, the attenuating properties of the impact area shall be increased proportionately.

NOTE An example of the falling space is given in Figure 6.

Where starting platforms, together with their access ramps, are constructed of materials that yield, including timber and metal, they may be provided without an impact attenuating surface up to a maximum free height of fall of 1 000 mm.

Dimensions in millimetres

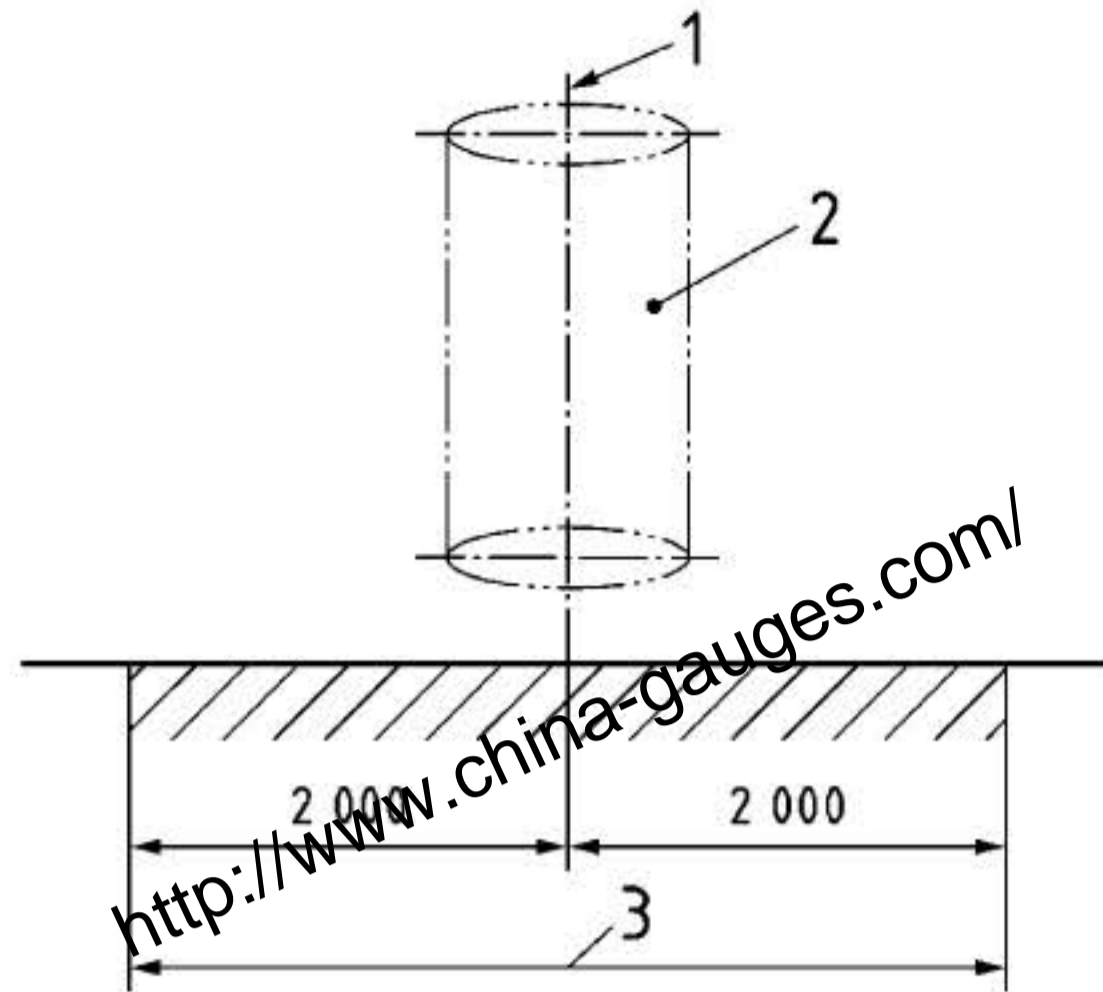


**Key**

- 1 end of travel
- 2 area of travel
- 3 maximum swinging position of seat or grip (see 4.14)
- 4 impact area (see 4.14)

**Figure 4 — Impact area when the traveller comes to a halt against a stop**

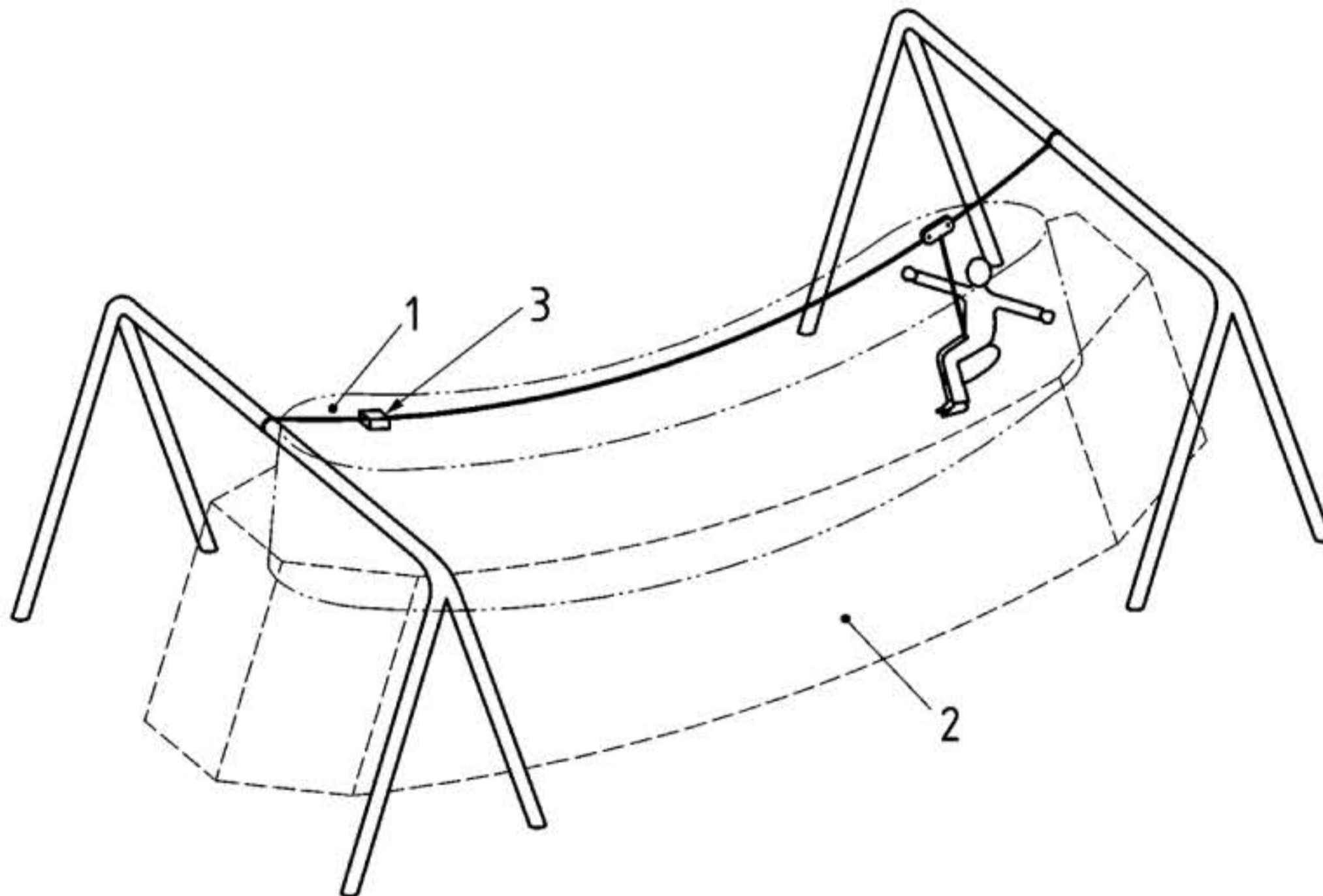
Dimensions in millimetres



**Key**

- 1 centreline of suspension element
- 2 free space (see EN 1176-1:2017, 4.2.8.2.3)
- 3 impact area width (see 4.14)

**Figure 5 — Free space and impact area viewed along direction of the cable**



**Key**

- 1 free space
- 2 falling space
- 3 end of travel

**Figure 6 — Example of the free space and falling space of a cableway**

## 5 Test report

In addition to the requirements in EN 1176-1:2017, Clause 5, the test report shall include at least the following:

- a) test report regarding compliance with EN 1176-4;
- b) certification of conformity with the relevant requirements of EN 1176-1 and EN 1176-4;
- c) the number and date of this European Standard, i.e. EN 1176-4:2017.

## 6 Information to be provided by the supplier/manufacturer

In addition to the requirements in EN 1176-1:2017, Clause 6, the manufacturer shall provide at least the following information with each cableway:

- a) special tools required to adjust the cable sag;
- b) instructions on how to install the equipment correctly and on base construction;
- c) values of the required gradients;
- d) values of the minimum and maximum cable sag;
- e) instructions on setting and adjusting the cable (depending on the temperature, see 4.11);
- f) instructions on fitting the cable correctly (deflection radii);
- g) instructions on maintaining and looking after the structural components, including critical gradients;
- h) intervals at which the entire structure should be inspected.

## 7 Marking

Cableways shall be marked in accordance with EN 1176-1:2017, Clause 7.

Marking shall be positioned on the cableway in a location that will be visible when erected on site.

## Annex A (normative)

### Method for the determination of performance of stops

#### A.1 Principle

When using cableways, different speeds have an effect at the end of the travelling distance, i.e. the stop at the terminus. High speeds cause the user to swing forwards at the terminus, as illustrated in Figure 4. To test the effectiveness of the impact attenuation and the outward swing, the seat or grip is loaded with a mass of 69,5 kg (see EN 1176-1:2017, Annex A) and set in motion from the starting point to the terminus. The seat or grip is monitored to ascertain whether the traveller stops in an impact attenuating manner and the angle of swing is recorded.

#### A.2 Apparatus

Mass of 69,5 kg.

#### A.3 Procedure

Load the seat or grip with the mass (A.2). Start the traveller in motion at the starting point by pulling the suspension element to an angle of 30° against the direction of travel and releasing.

Visually assess whether the traveller is progressively slowed down and stopped and measure and record the angle of swing.

## Annex B (normative)

### Method for the determination of the maximum speed of the traveller

#### B.1 Principle

The seat or grip is loaded with a mass of 69,5 kg (see EN 1176-1:2017, Annex A) and set in motion at the starting point. The speed of the traveller is measured.

#### B.2 Apparatus

Mass of 69,5 kg.

#### B.3 Procedure

Load the seat or grip with the mass (B.2). Start the traveller in motion by pulling the suspension cable to an angle of 30° against the direction of travel and releasing.

Calculate the speed of the traveller in metres per second.

**Annex C**  
(informative)

**A-deviations**

**A-deviation:** National deviation due to regulations, the alteration of which is for the time being outside the competence of the CEN-CENELEC national member.

This European Standard does not fall under any Directive of the EU.

In the relevant CEN-CENELEC countries these A-deviations are valid instead of the provisions of the European Standard until they have been removed.

Country	National Regulation
France Subclause 4.14 The exemption of impact-attenuating surfacing for the starting platform (and their access ramps) up to 1 000 mm free height of fall, permitted by the last sentence of subclause 4.14, cannot be applicable in France.	Decree no. 96-1136 of 18 December 1996 specifying the safety requirements for community playgrounds Annex II, 3, a) This part of the decree indicates that “The surfaces onto which children are liable to fall when using the equipment must be covered in suitable impact-absorbing materials”.

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