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Earth-moving machinery — Cable excavators — Terminology and commercial specifications

Engins de terrassement — Pelles à câbles — Terminologie et spécifications commerciales

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 15219 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 4, *Commercial nomenclature, classification and rating*.

Earth-moving machinery — Cable excavators — Terminology and commercial specifications

1 Scope

This International Standard establishes terminology and the content of commercial literature specifications for self-propelled, crawler and wheeled cable excavators and their equipment. Cable excavators are primarily used for dragline, grab and clamshell applications and temporarily for lifting applications. While the base machine is often used as a carrier of equipment in special applications such as drilling and piling, specification of the dimensions of such equipment is outside the scope of this International Standard.

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.

ISO 6016, *Earth-moving machinery — Methods of measuring the masses of whole machines, their equipment and components*

ISO 6746-1:2003, *Earth-moving machinery — Definitions of dimensions and codes — Part 1: Base machine*

ISO 6746-2:2003, *Earth-moving machinery — Definitions of dimensions and codes — Part 2: Equipment and attachments*

3 Terms and definitions

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

3.1
excavator
self-propelled machine on crawlers, wheels or legs, having an upper structure normally capable of a 360° swing with mounted equipment, primarily designed for excavating with a bucket, without moving the undercarriage during the work cycle

[ISO 6165:2001, definition 1.2.4]

NOTE 1 An excavator work cycle normally comprises excavating, elevating, swinging and discharging material.

NOTE 2 An excavator can also be used for object or material handling.

3.2
cable excavator
excavator having a wire rope-operated upper structure primarily designed for excavating with a dragline bucket, a front shovel or grab, used for compacting material with a compaction plate, for demolition work by hook or ball and for material handling with special equipment and attachment

[ISO 6165:2001, definition 1.2.4.3]

3.3
base machine
machine with a cab or canopy and operator-protective structures if required, without equipment or attachments but possessing the necessary mountings for such equipment and attachments

[ISO 6746-1:2003, definition 3.3]

NOTE The base machine has the necessary mountings to secure the equipment and attachments specified in Clause 5.

3.4
equipment
set of components mounted onto the base machine which allows an attachment to perform the primary design function of the machine

[ISO 6746-2:2003, definition 3.4]

3.5
attachment
assembly of components that can be mounted onto the base machine or equipment for specific use

[ISO 6746-2:2003, definition 3.5]

3.6
component
part or an assembly of parts of a base machine, equipment or an attachment

[ISO 6746-2:2003, definition 3.6]

3.7
ground reference plane
GRP
plane on which the machine is placed for measurements: in the case of the base machine, a hard, level surface; in the case of equipment and attachments, either a hard, level surface or compacted earth

NOTE The surface used depends on the intended use of the machine and its equipment and attachments. This needs to be defined when developing specific ISO terminology standards or commercial specifications.

[ISO 6746-1:2003, definition 3.2]

4 Base machine

4.1 Types of cable excavator

4.1.1 Crawler excavator

See Figure 1.

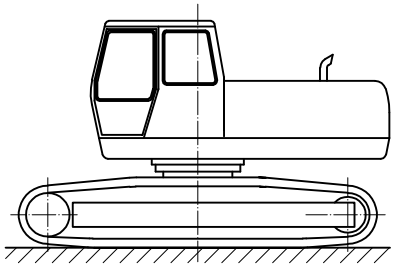


Figure 1 — Crawler excavator

4.1.2 Wheeled excavator

See Figure 2.

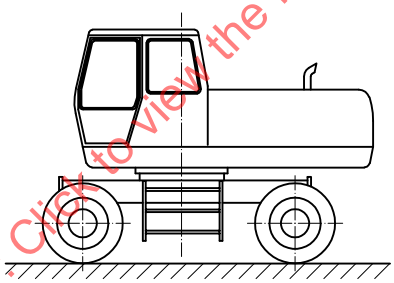
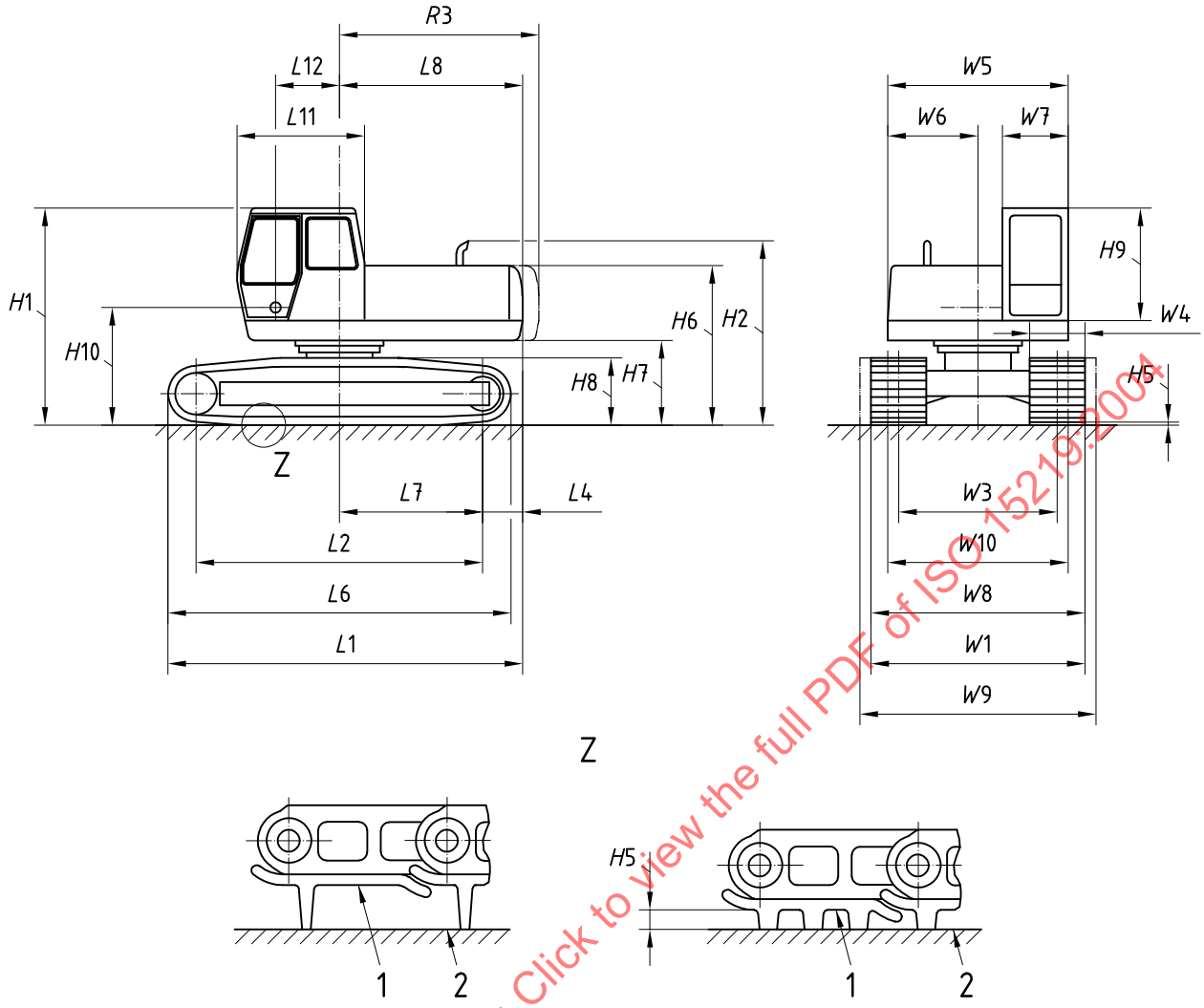


Figure 2 — Wheeled excavator

4.2 Dimensions

The dimensions of the base machine shall be as shown in Figures 3 and 4, in accordance with Annex A (dimensions strictly related to cable excavators) and ISO 6746-1:2003, Annexes A to D (basic dimensions).



Key

1 face

2 GRP

Figure 3 — Dimensions of base machine — Crawler excavator

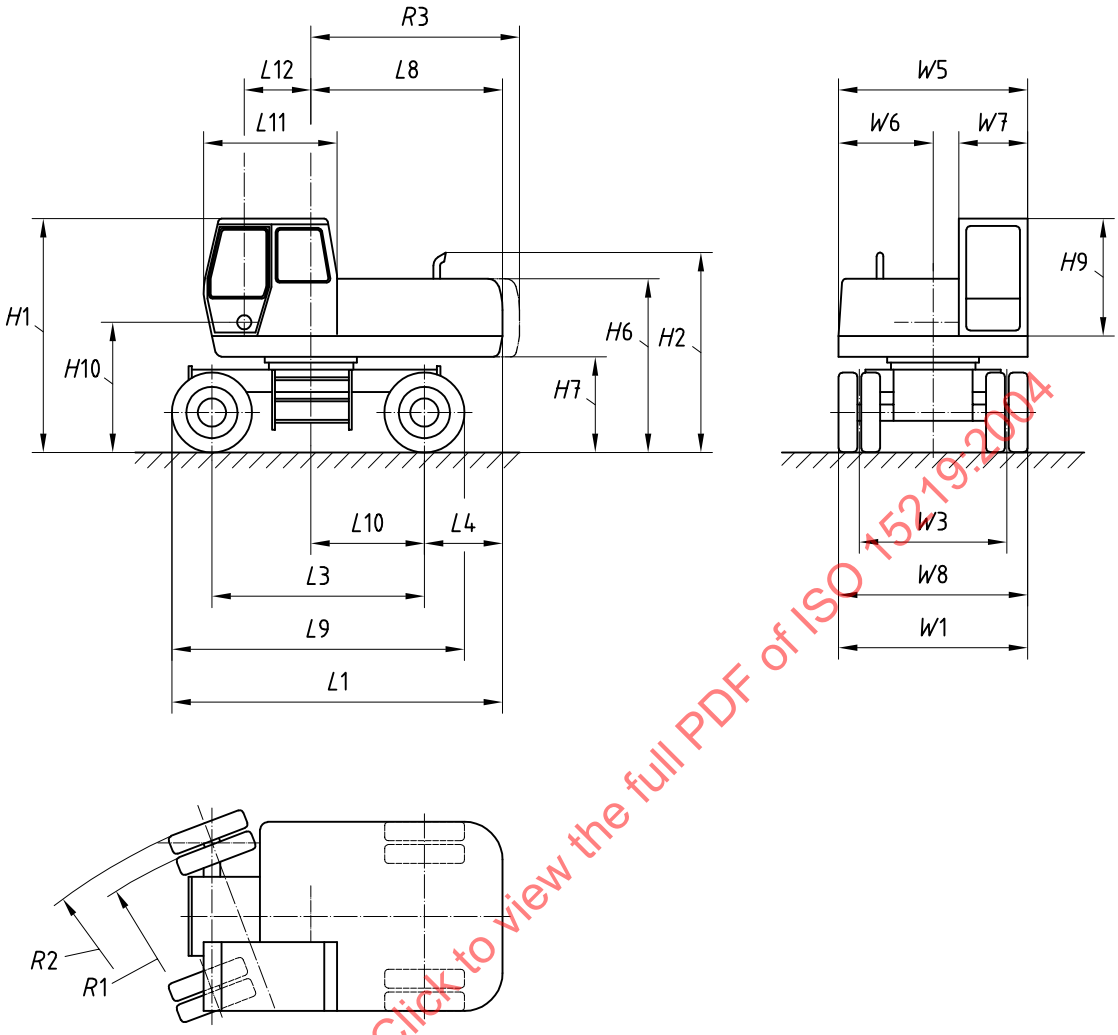


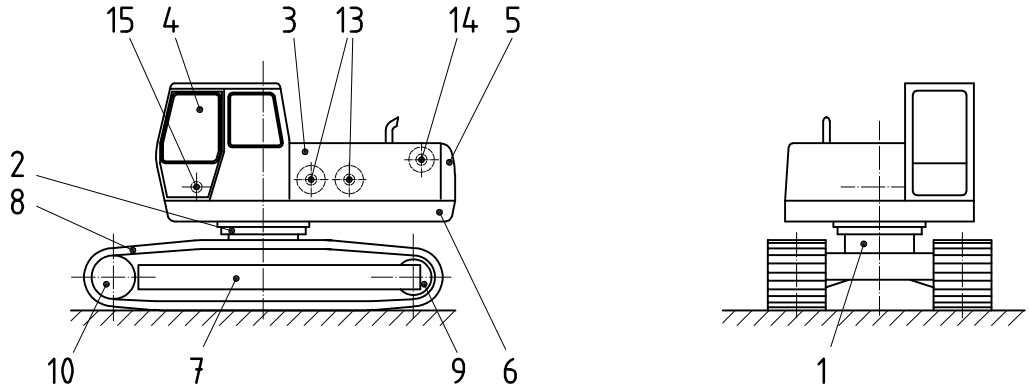
Figure 4 — Dimensions of base machine — Wheeled excavator

4.3 Masses

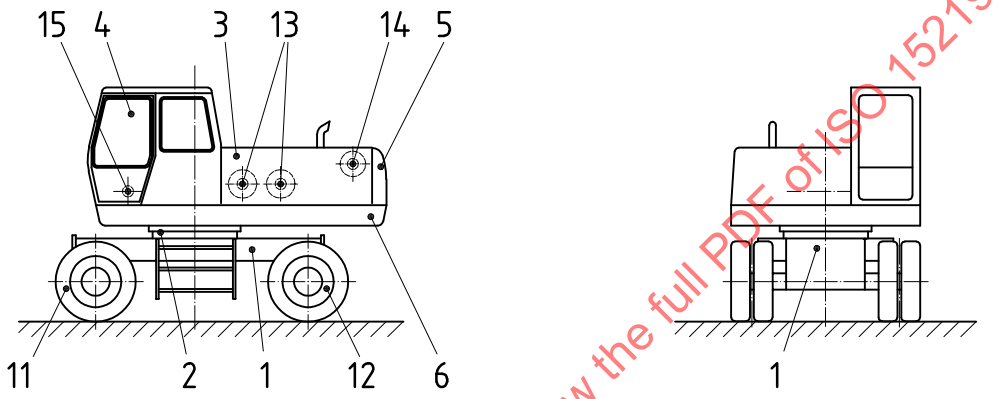
Masses shall be determined in accordance with ISO 6016.

4.4 Nomenclature

See Figure 5.



a) **Crawler excavator**



b) **Wheeled excavator**

Key

1 undercarriage
2 swing bearing
3 upper structure
4 cab
5 counterweight
6 revolving frame
7 track frame
8 track assembly
9 idler
10 sprocket
11 steering axle (front)
12 rigid axle (rear)
13 main winch
14 boom luffing winch
15 boom pivot

Figure 5 — Base machine nomenclature

5 Equipment and attachments

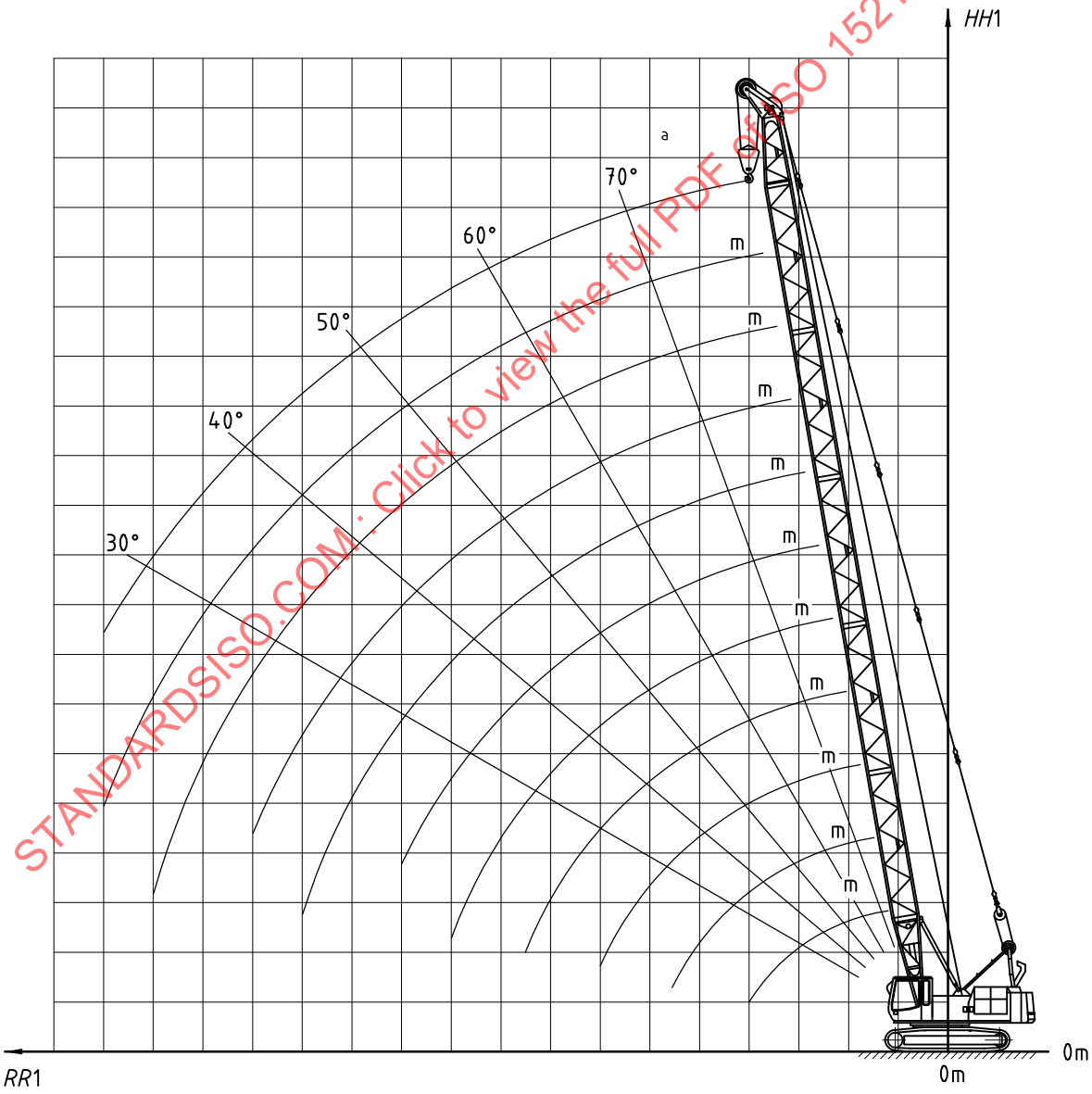
5.1 Dimensions

5.1.1 General

The descriptions of the equipment and attachments whose dimensions are shown in Figures 6 to 8 are based on the main geometrical working area of the most common applications of cable excavators.

5.1.2 Lifting equipment

Lifting equipment consists of a boom, boom-head and pulley-block, and primarily describes the boom working area in relation to the boom configuration. The dimensions shall be as shown in Figure 6 and according to Annex B.

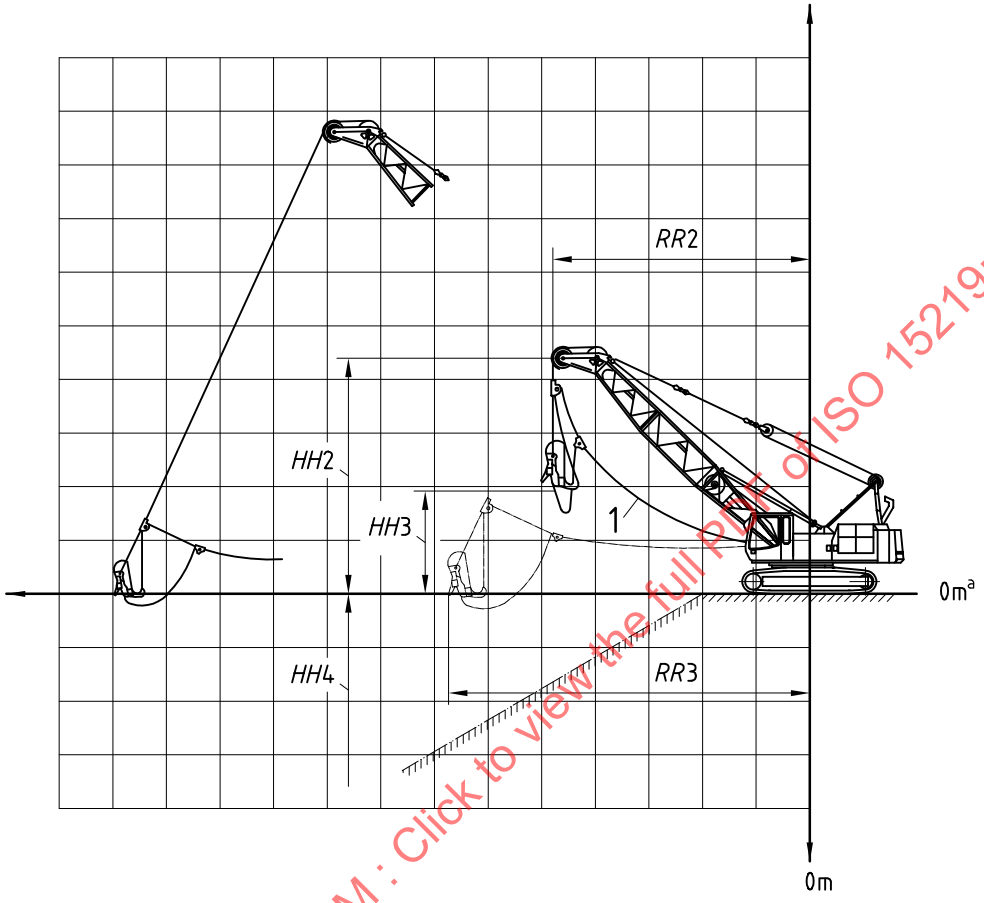


[a] At boom length of ...

Figure 6 — Reach of equipment in lifting application

5.1.3 Dragline equipment

Dragline equipment consists of a boom, bucket, rope and fair lead that cuts material — generally towards the machine — by pulling the bucket by the dragging winch. The dimensions shall be as shown in Figure 7 and according to Annex B.



Key

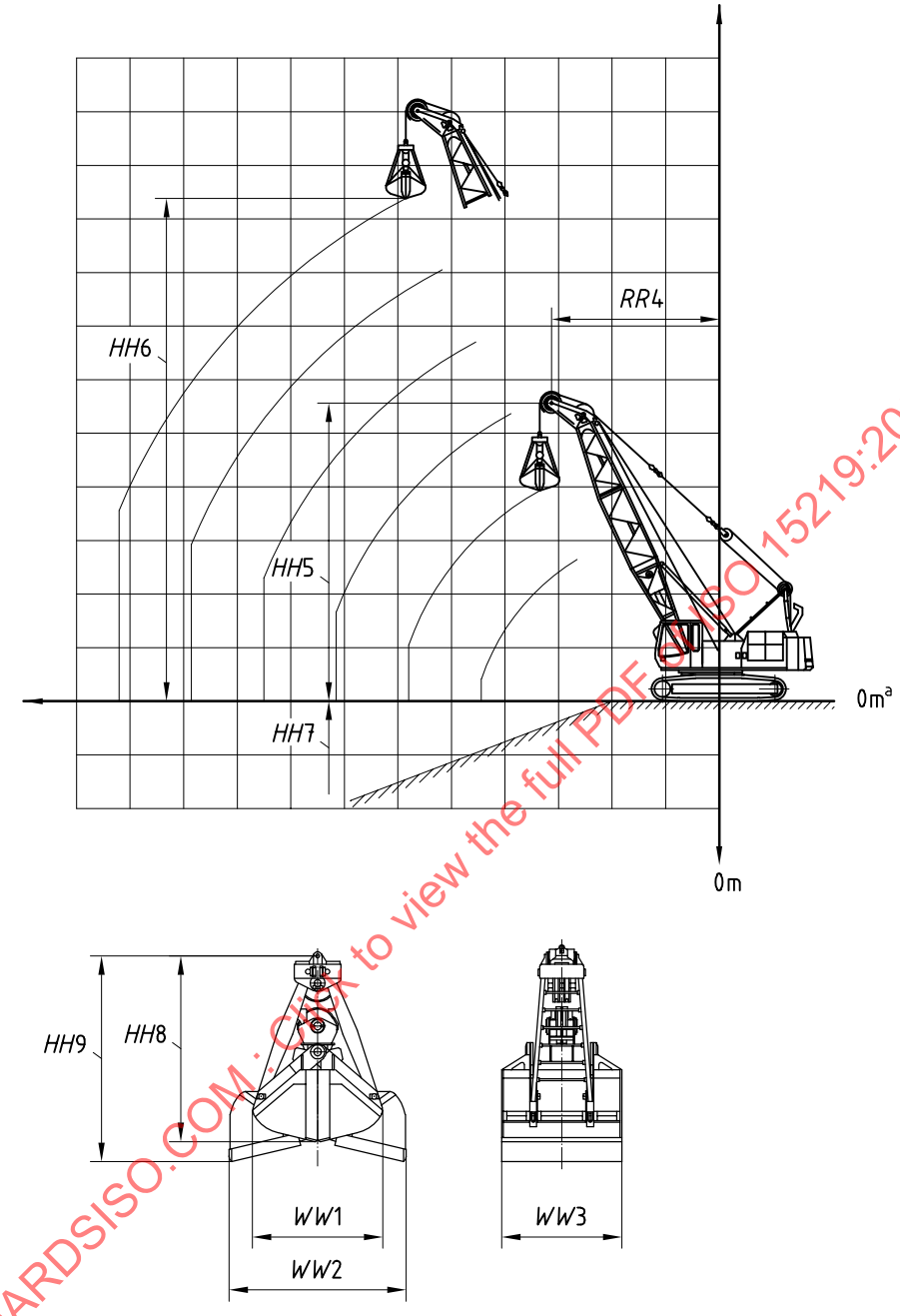
1 dressing rope

[a] GRP.

Figure 7 — Dimensions of dragline equipment

5.1.4 Clamshell equipment

Clamshell equipment consists of a boom, rope and clamshell, with digging and grabbing done generally vertically, discharging below and above GRP. The dimensions shall be as shown in Figure 8 and according to Annex B.

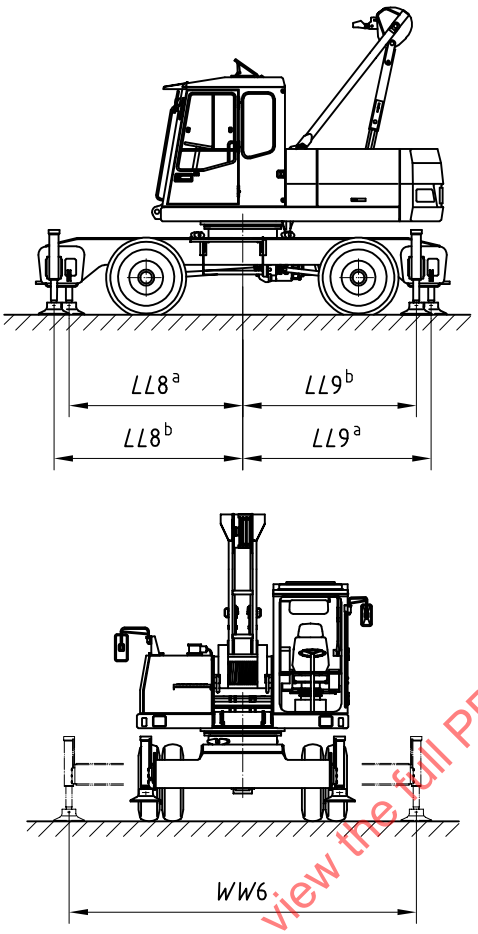


[a] GRP.

Figure 8 — Dimensions of grab/clamshell and its equipment

5.1.5 Stabilizer equipment

Stabilizer equipment consists of a frame to the front and another to the rear, with two single, telescopic, adjustable, outrigger units at front and rear that are fitted with vertical movable outrigger pads. The dimensions shall be as shown in Figure 9 and according to Annex B.



a RH (right-hand side).

b LH (left-hand side).

Figure 9 — Dimensions of stabilizer equipment

5.2 Dimensions for transport, shipping and travelling

5.2.1 Transport and shipping

Dimensions shall be as shown in Figure 10 and according to Annex B.

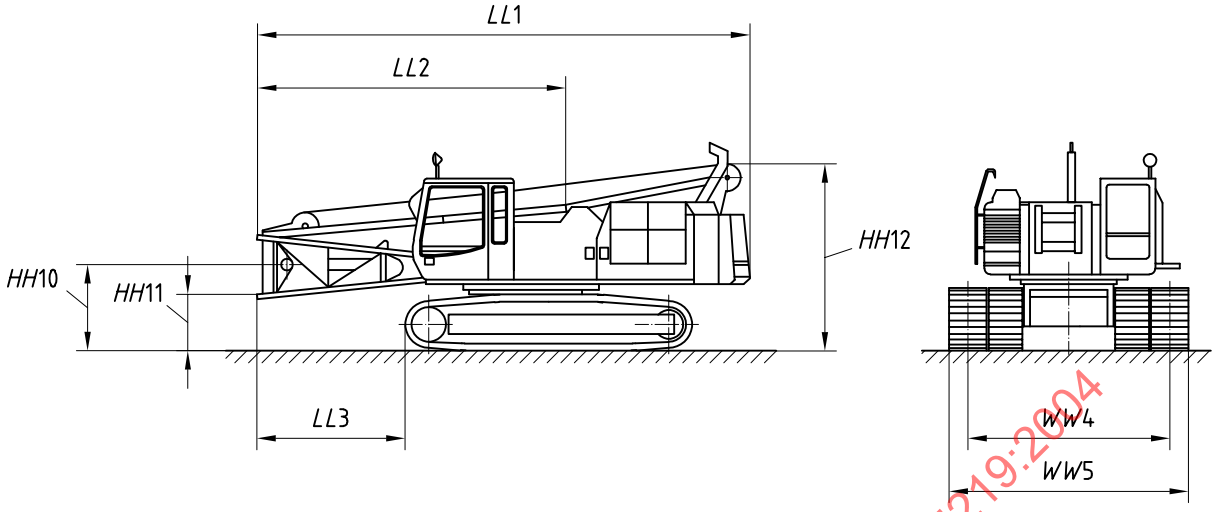
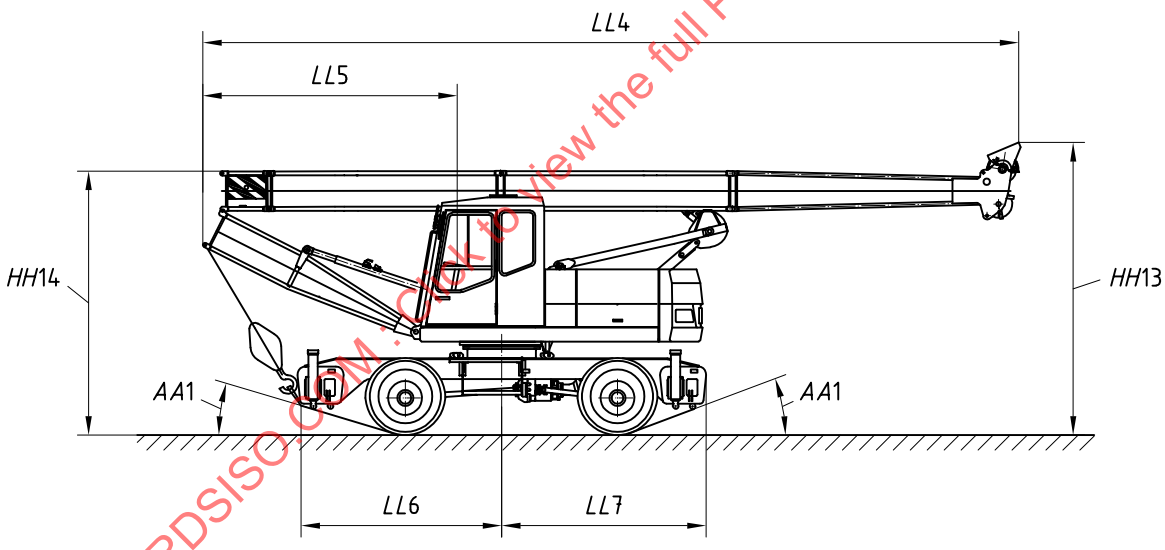


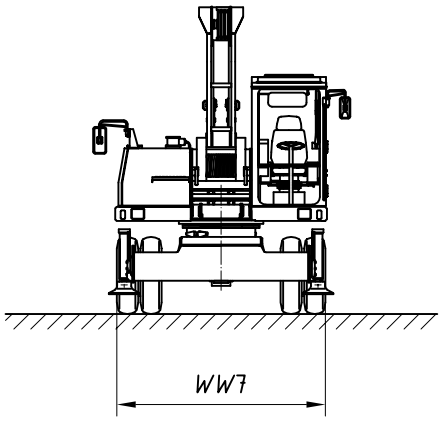
Figure 10 — Transport and shipping dimensions of crawler-type machine with basic equipment

5.2.2 Travelling on public roads

Dimensions shall be as shown in Figure 11 and according to Annex B.



a)



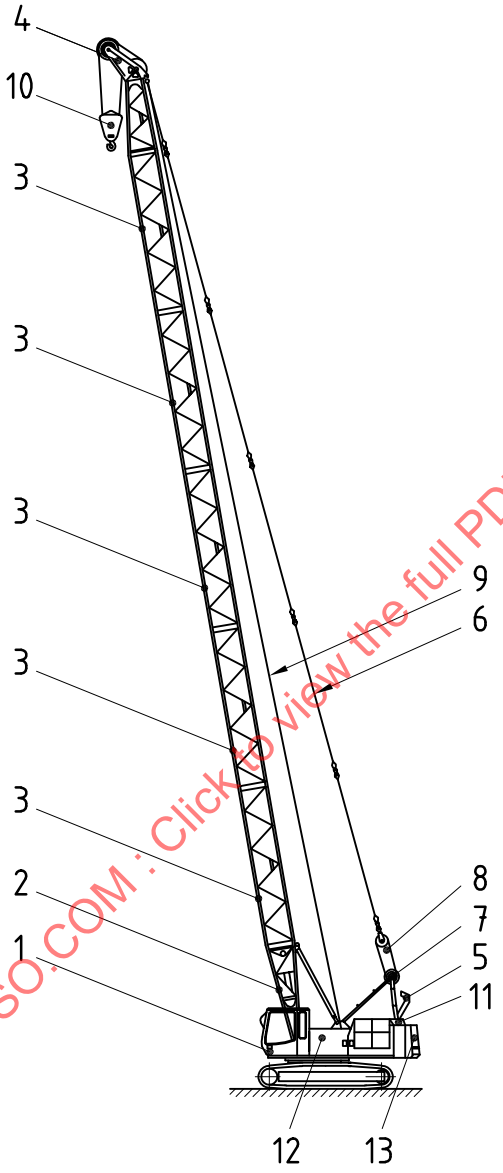
b)

Figure 11 — Dimensions of wheeled cable excavator travelling on public roads

5.3 Nomenclature

5.3.1 Lifting equipment

See Figure 12.



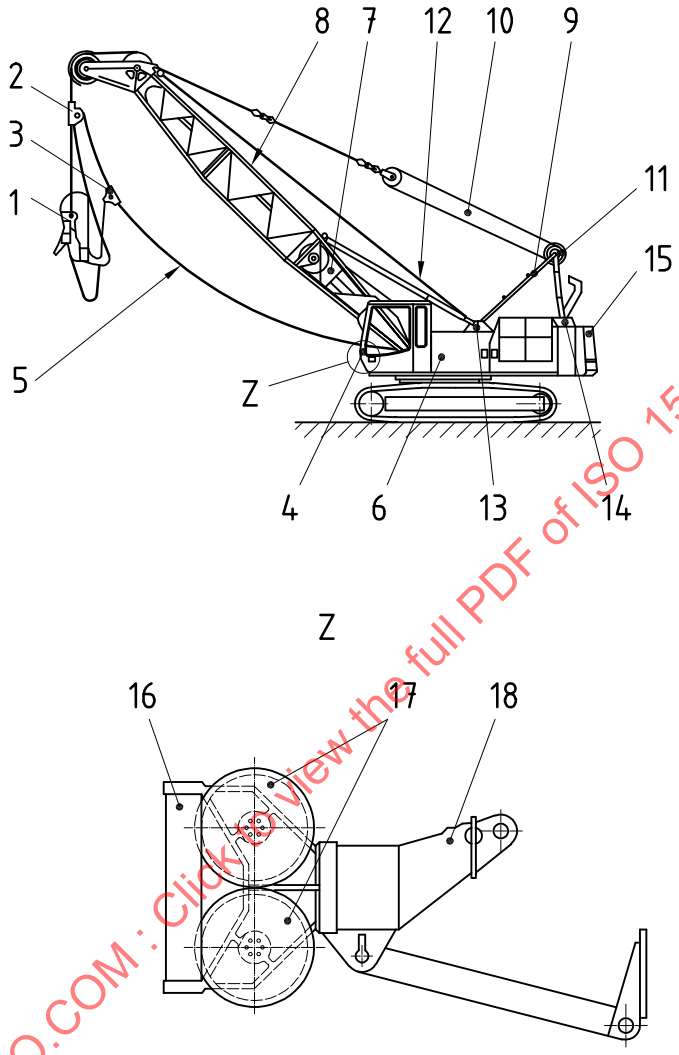
Key

1	boom pivot	8	boom luffing rope
2	lower boom section	9	hoist rope
3	boom intermediate section	10	hook assembly
4	boom head	11	boom luffing winch
5	A-frame	12	hoist winch
6	boom suspension rope	13	counterweight
7	balance luffing device		

Figure 12 — Lifting equipment

5.3.2 Dragline equipment

See Figure 13.



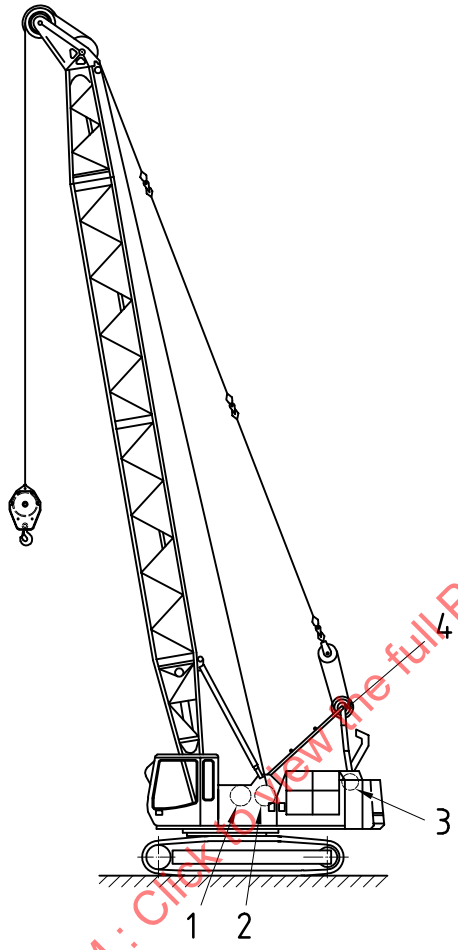
Key

1	bucket	10	boom suspension rope
2	dump block complete	11	balance luffing device
3	three-way drag hitch complete	12	hoist rope
4	fair lead (see detail)	13	hoist winch
5	dragging rope	14	boom luffing winch
6	dragging winch	15	counterweight
7	lower boom section	16	cable guidance
8	boom intermediate section	17	pulley
9	A-frame	18	rotatable bearing

Figure 13 — Dragline equipment

5.3.3 Winch and pulley arrangement

See Figure 14.



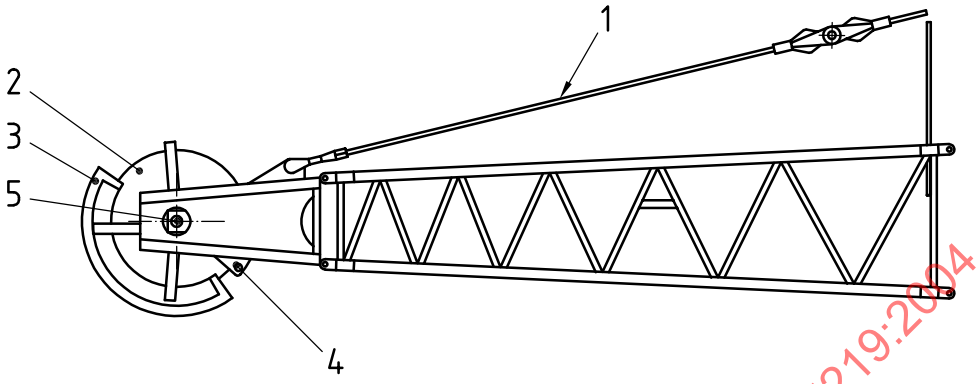
Key

1 main winch 1
2 main winch 2
3 boom luffing winch
4 pulley block at A-frame

Figure 14 — Winch and pulley arrangement

5.3.4 Boom head

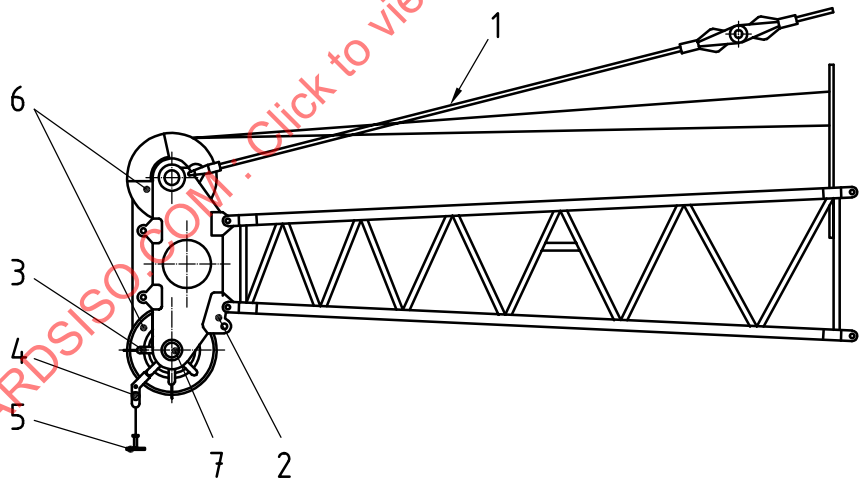
See Figures 15 to 17.



Key

1 boom suspension rope
2 pulley
3 rope protection
4 rope fixing point for multiple reeving
5 end-bit pivot

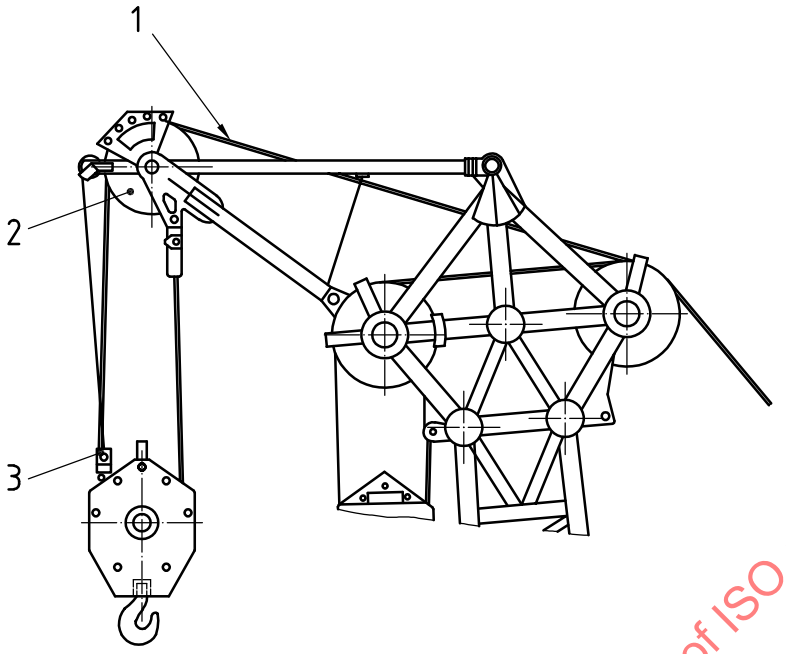
Figure 15 — Excavator boom head



Key

1 boom suspension rope
2 rope fixing point for multiple reeving
3 cable protection
4 top limit switch
5 weight of limit switch
6 sheave
7 end-bit pivot

Figure 16 — Heavy-duty boom head



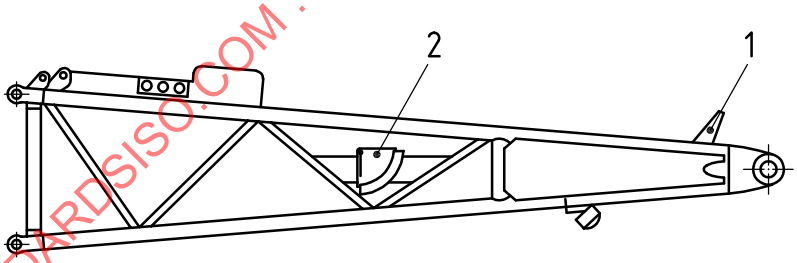
Key

1 frame assembly
2 pulley
3 top limit switch

Figure 17 — Auxiliary jib

5.3.5 Lower boom section/boom sections

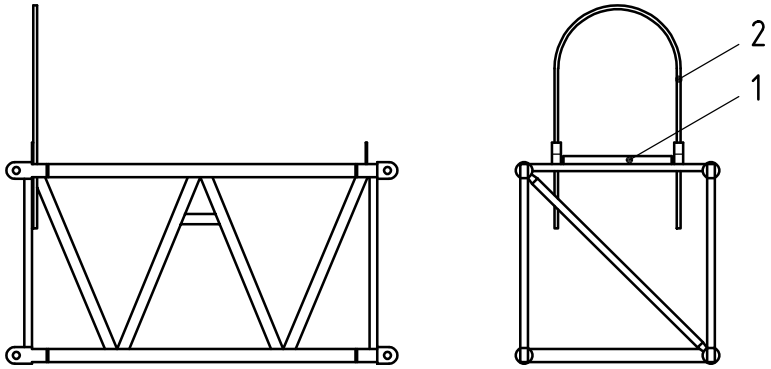
See Figures 18 and 19.



Key

1 boom luffing limiting device
2 boom angle indication

Figure 18 — Lower boom section



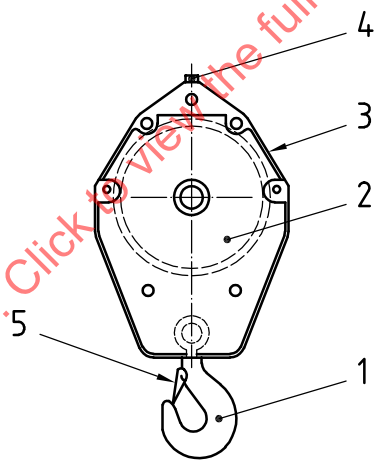
Key

1 cable protection
2 cable basket

Figure 19 — Boom sections

5.3.6 Hook assembly

See Figure 20.



Key

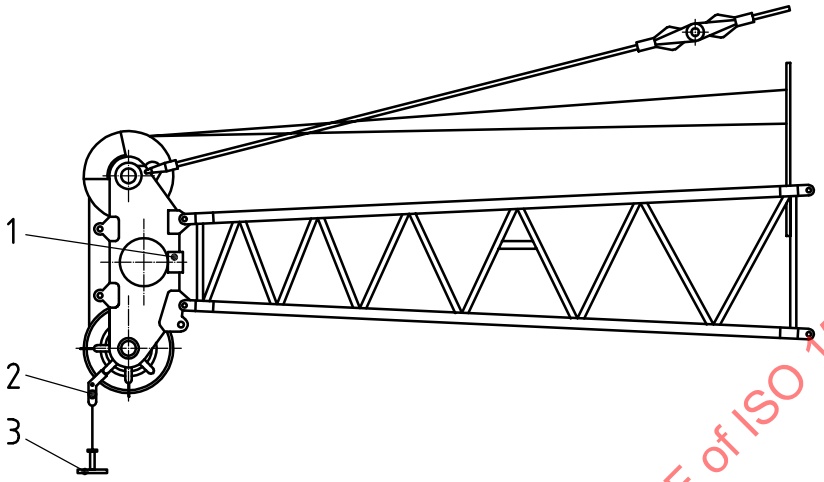
1 hook
2 pulley
3 frame assembly
4 cable fixing
5 safety latch

Figure 20 — Hook assembly

5.3.7 Safety device

5.3.7.1 Hoist rope lift limiting device

See Figure 21.



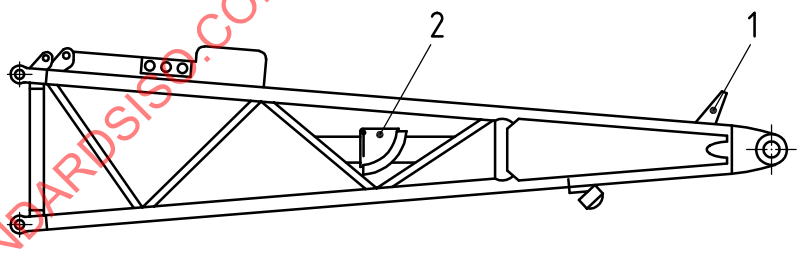
Key

1 plug for hoist rope lift limiting device at the boom head
2 top limit switch
3 hinge with limiting switch lever

Figure 21 — Hoist lift limiting device

5.3.7.2 Angle indicator and limiting device

See Figure 22.



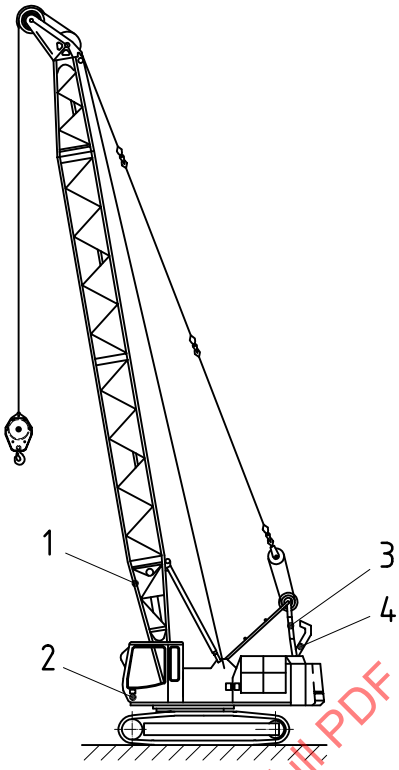
Key

1 boom luffing limiting device
2 angle indicator

Figure 22 — Angle indicator and lift movement limiting device

5.3.7.3 Load moment limiting (LML) device

See Figure 23.



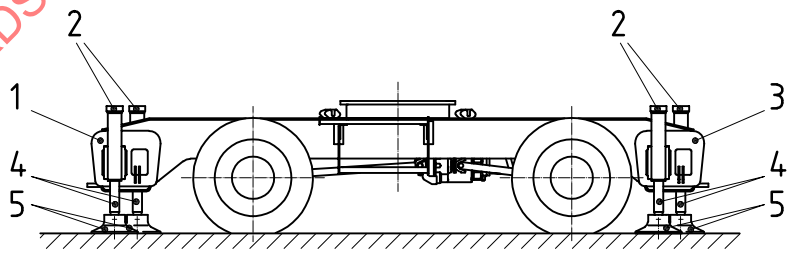
Key

1 electronic angle indicator
2 indication of boom angle and percentage of load moment
3 electronic LML system
4 force measuring device

Figure 23 — Load moment limiting (LML) device

5.3.7.4 Undercarriage, outrigger equipment

See Figure 24.



Key

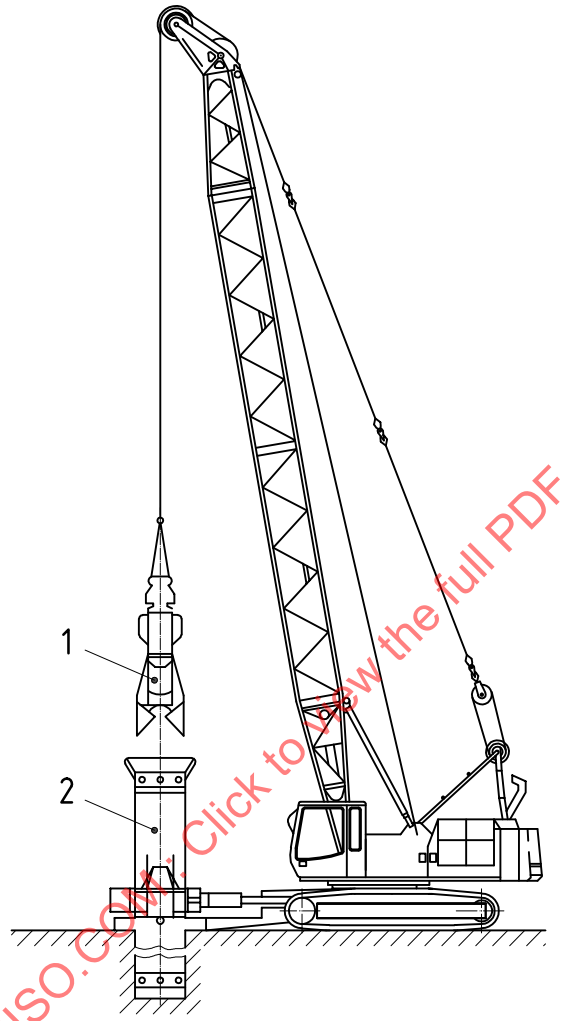
1 front outrigger frame
2 telescopic adjustable unit
3 rear outrigger frame
4 outrigger cylinder
5 outrigger pad

Figure 24 — Stabilizer equipment

5.3.8 Special applications where base machine is used as carrier

5.3.8.1 Drilling equipment

See Figures 25 and 26.

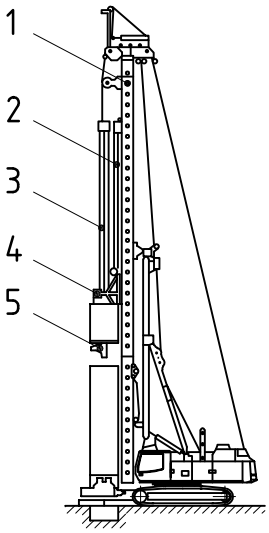


Key

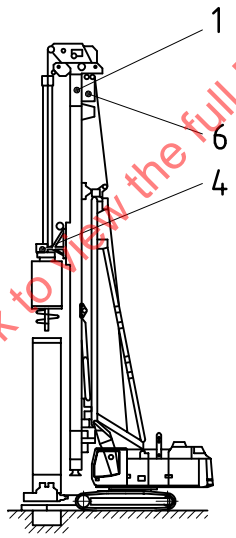
1 one- or two-rope grab

2 casing oscillator

Figure 25 — Casing oscillator



a)



b)

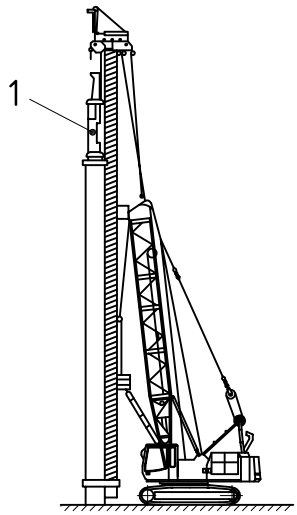
Key

1 leader
2 feed device (cylinder or winch)
3 kelly bar
4 drilling gear
5 auger
6 pull down device with winch

Figure 26 — Drilling equipment

5.3.8.2 Piling equipment

See Figure 27.



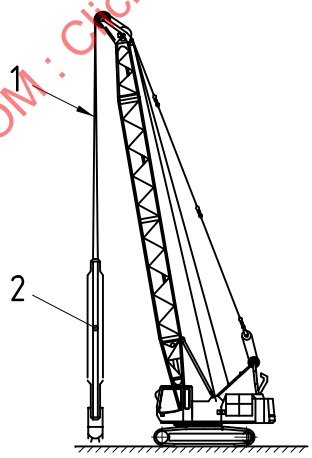
Key

1 hydraulic or diesel hammer

Figure 27 — Piling equipment

5.3.8.3 Wall cutter equipment

See Figures 28 to 30.

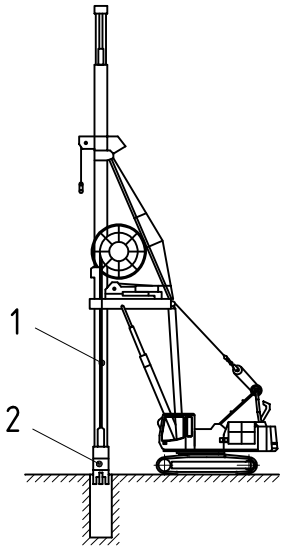


Key

1 two hoisting ropes

2 diaphragm wall grab

Figure 28 — Diaphragm wall cutter

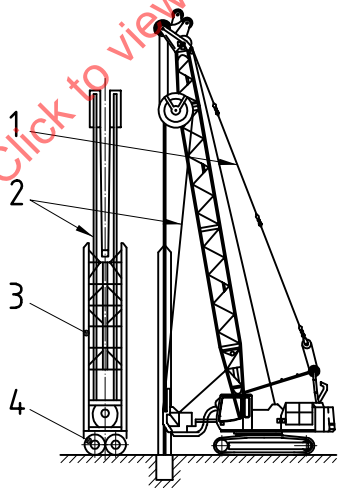


Key

1 Kelly bar

2 diaphragm wall grab

Figure 29 — Kelly-type diaphragm wall grab



Key

1 pulleys for hydraulic and suspension hoses

2 feed cylinder

3 guide frame

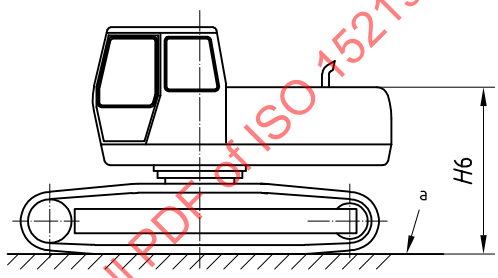
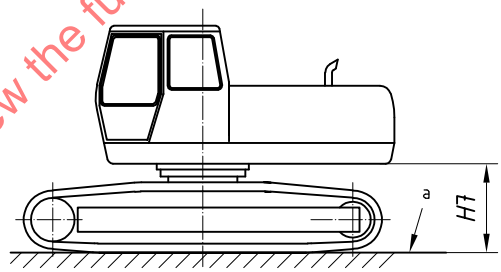
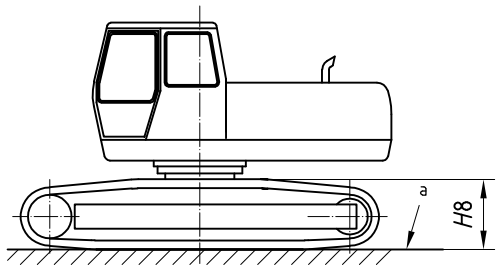
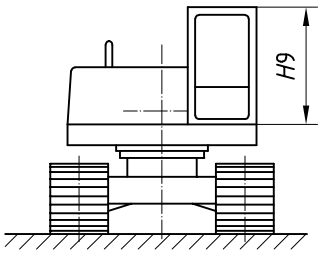
4 cutter wheel

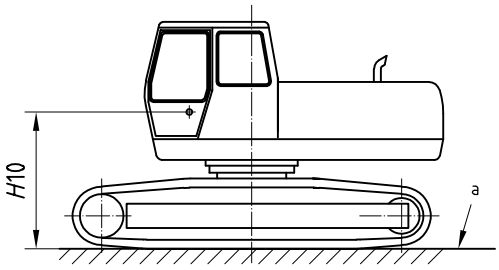
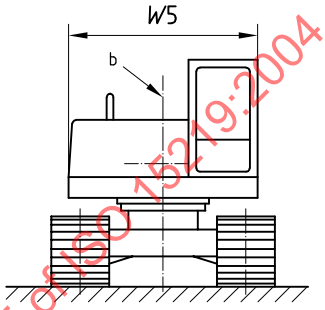
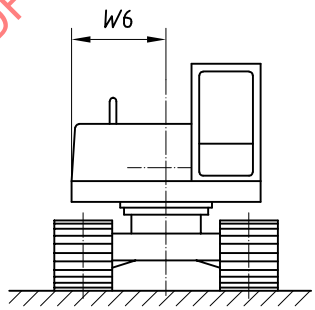
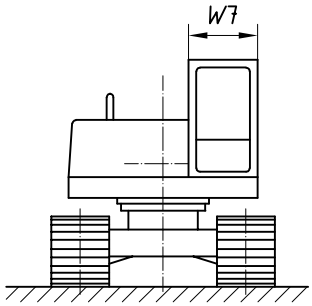
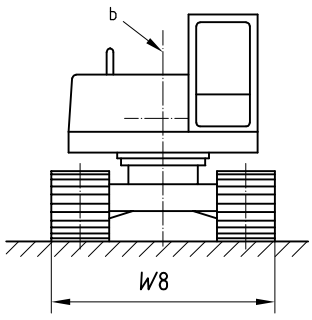
Figure 30 — Diaphragm wall cutter

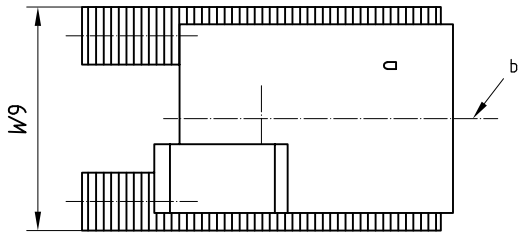
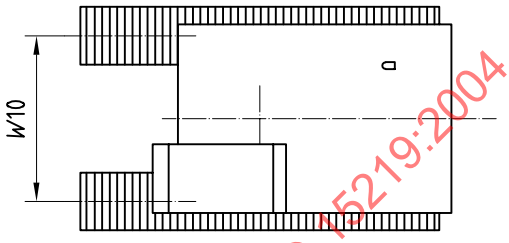
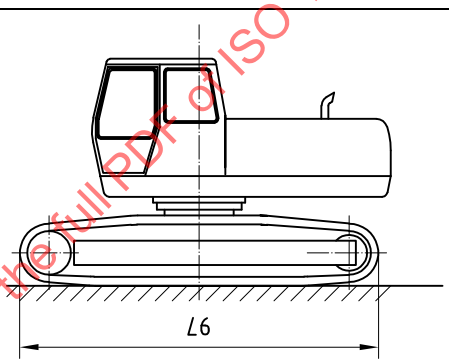
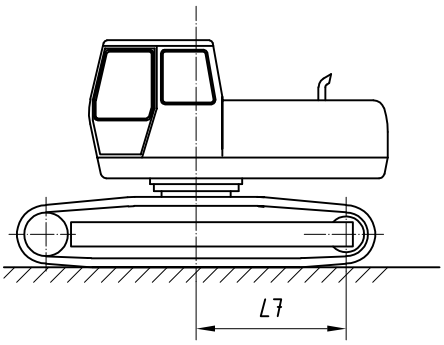
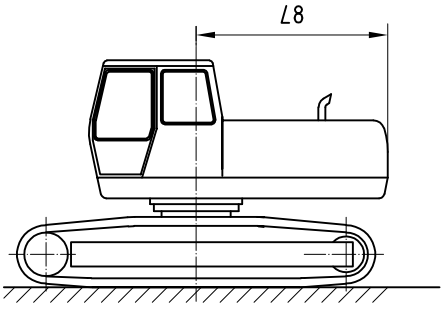
Annex A
(normative)

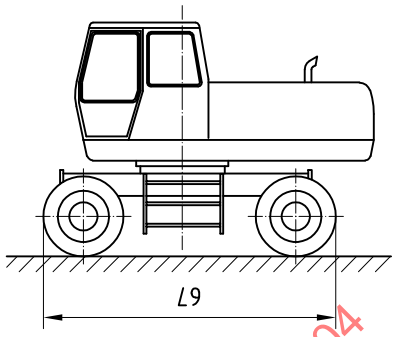
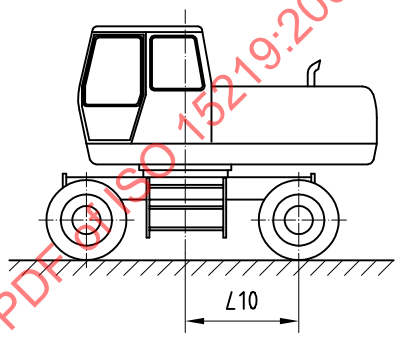
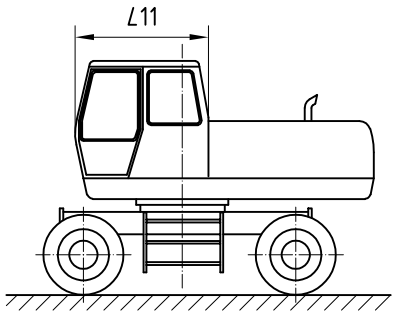
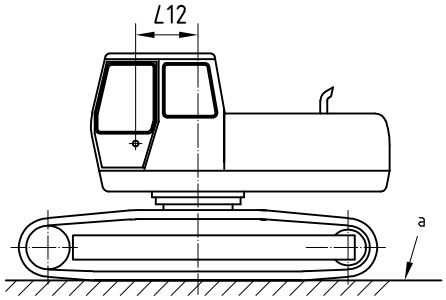
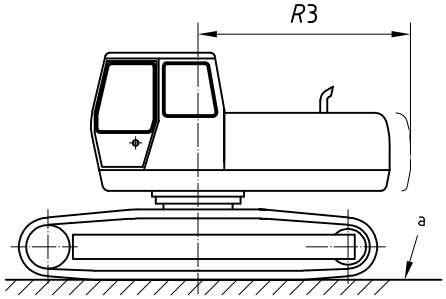
Dimensions — Base machine

This annex defines base-machine dimensions strictly related to cable excavators and specifies their codes. For the basic dimensions common to all earth-moving machinery and an explanation of the three-dimensional reference system used to define, and the coding system used to identify, base-machine dimensions, see ISO 6746-1.

Code	Term and definition	Illustration
*H*6	**turntable height** distance on Z coordinate between GRP and the highest point of the turntable	
*H*7	**clearance height under upper structure** distance on Z coordinate between the GRP and the lowest point of the upper structure	
*H*8	**crawler tracks height** distance on Z coordinate between the GRP and the highest point of the crawler tracks	
*H*9	**cab height** distance on Z coordinate between platform of upper structure and highest point of the cab	

Code	Term and definition	Illustration
*H*10	**height boom-pivot point** distance on Z coordinate between GRP and the pivot point for boom assembly	
*W*5	**upper structure overall width** distance on Y coordinate between two Y planes passing through the furthest points on the sides of the upper structure	
*W*6	**right/left side upper structure distance from axis of rotation** distance on Y coordinate between two Y planes passing respectively through the axis of rotation and the furthest right/left side of the upper structure	
*W*7	**cab overall width** distance on Y coordinate between two Y planes passing through the furthest points on the sides of the cab	
*W*8	**undercarriage overall width** distance on Y coordinate between two Y planes passing through the furthest points on the sides of the undercarriage	

Code	Term and definition	Illustration
*W*9	**maximum width with track extended or retracted** distance on Y coordinate between two Y planes passing through the furthest points of the machine on both sides of the zero Y plane	
*W*10	**track gauge with track extended or retracted** distance on Y coordinate between two Y planes passing through the mid-width of the sprocket teeth	
*L*6	**crawler overall length** distance on X coordinate between two X planes passing through the furthest points on the front and rear of the crawler	
*L*7	**sprocket axis to axis of rotation** distance on X coordinate between two X planes passing respectively through the sprocket axis and the axis of rotation	
*L*8	**upper structure rearmost distance from axis of rotation** distance on X coordinate between two X planes passing respectively through the furthest point on the rear of upper structure and the axis of rotation	

Code	Term and definition	Illustration
$L9$	**undercarriage overall length** distance on X coordinate between two X planes passing respectively through the furthest points on the front and rear of the undercarriage	
$L10$	**rear axle to axis of rotation** distance on X coordinate between two X planes passing respectively through the centre of the rear axle and the axis of rotation	
$L11$	**cab overall length** distance on X coordinate between two X planes passing through the furthest points on the front and rear of the cab	
$L12$	**distance from axis of rotation to boom pivot point** distance on X coordinate between two X planes passing respectively through the boom pivot point and the axis of rotation	
$R3$	**swing (rear-end) radius** distance on X coordinate (Z plane) between the axis of rotation and the furthest point of the upper structure	

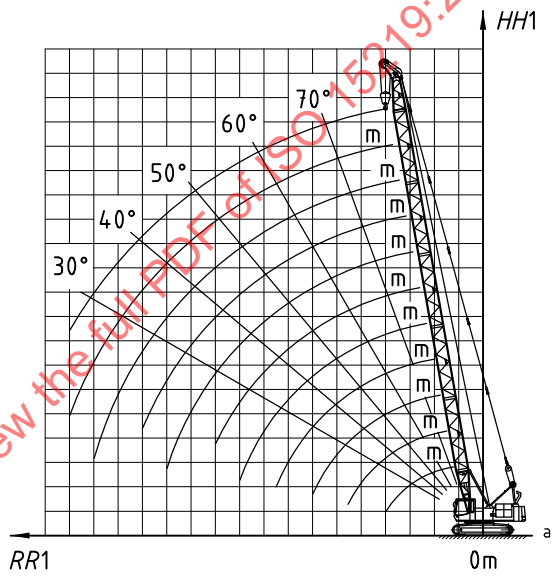
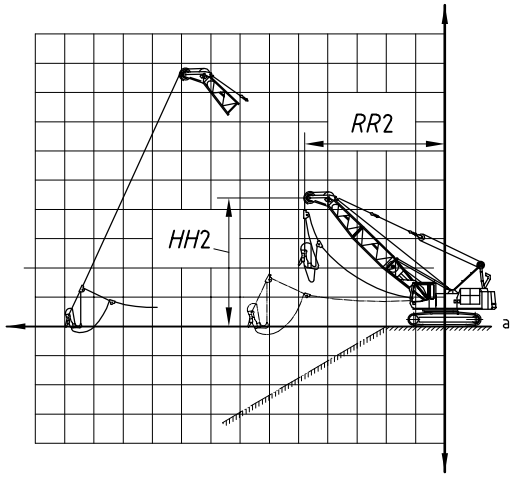
[a] GRP.

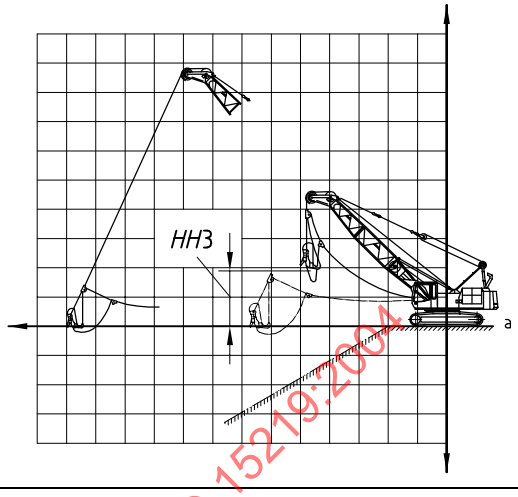
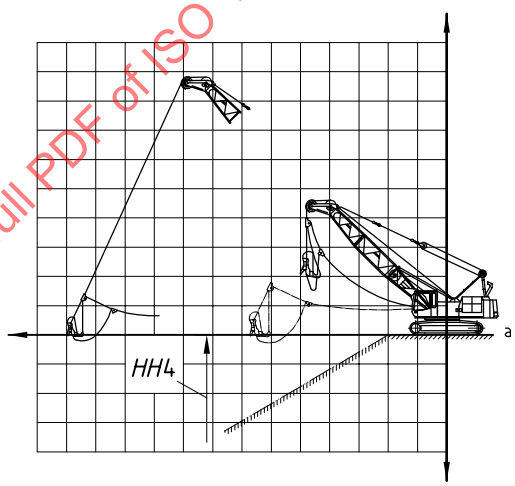
[b] Zero Y plane (see ISO 6746-1).

Annex B
(normative)

Dimensions — Equipment/attachments

This annex defines equipment and attachment dimensions strictly related to cable excavators and specifies their codes. For an explanation of the three-dimensional reference system used to define, and the coding system used to identify, equipment and attachment dimensions, see ISO 6746-2.

Code	Term and definition	Illustration
*HH*1	**lifting height of lifting equipment application** distance on Z coordinate between GRP and the centreline of the pulley hook in relation to the reach *RR*1 and the boom configuration NOTE Lifting curves are added in relation to the boom angle and boom length as illustrated.	
*HH*2	**boom height of dragline equipment application** distance on Z coordinate between GRP and the end-bit pivot in relation to the reach *RR*2 and the boom configuration	

Code	Term and definition	Illustration
*HH*3	**maximum dumping height of dragline equipment** distance on Z coordinate between GRP and the lowest point of the dragline when the bucket is in the highest dumping position in relation to the boom configuration	
*HH*4	**maximum digging depth of dragline equipment** distance on Z coordinate between GRP and the deepest point which can be reached in dragline operation in relation to the boom configuration	
*HH*5	**boom height of grab application** distance on Z coordinate between GRP and the end-bit pivot in relation to the reach *RR*4 and the boom configuration NOTE Lifting curves of the grab in closed position are be added in relation to the boom configuration.