
**Earth-moving machinery — Tractor-
dozers — Terminology and commercial
specifications**

*Engins de terrassement — Bouteurs — Terminologie et spécifications
commerciales*



Foreword

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International Standard ISO 6747 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 4, *Commercial nomenclature, classification and rating*.

This third edition cancels and replaces the second edition (ISO 6747:1988), of which it constitutes a technical revision.

Annex A forms an integral part of this International Standard.

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Earth-moving machinery — Tractor-dozers — Terminology and commercial specifications

1 Scope

This International Standard establishes terminology and the content of commercial literature specifications for self-propelled crawler and wheeled tractor-dozers and their equipment. It is applicable to tractors-dozers for earth-moving machinery as defined in ISO 6165.

NOTE — Figures 1, 10, 11, 12, 17, 21, 23, 24, 25, 26, 30 and the figures in annex A do not show the GRP in the correct location according to figure 19.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3450:1996, *Earth-moving machinery — Braking systems of rubber-tyred machines — Systems and performance requirements and test procedures.*

ISO 5010:1992, *Earth-moving machinery — Rubber-tyred machines — Steering requirements.*

ISO 6016:1998, *Earth-moving machinery — Methods of measuring the masses of whole machines, their equipment and components.*

ISO 6165:1997, *Earth-moving machinery — Basic types — Vocabulary.*

ISO 6746-1:1987, *Earth-moving machinery — Definitions of dimensions and symbols — Part 1: Base machine.*

ISO 6746-2:1987, *Earth-moving machinery — Definitions of dimensions and symbols — Part 2: Equipment.*

ISO 7457:1997, *Earth-moving machinery — Measurement of turning dimensions of wheeled machines.*

ISO 7464:1983, *Earth-moving machinery — Method of test for the measurement of drawbar pull.*

ISO 9249:1997, *Earth-moving machinery — Engine test code — Net power.*

ISO 10265:1998, *Earth-moving machinery — Crawler machines — Performance requirements and test procedures for braking systems.*

ISO 10266:1992, *Earth-moving machinery — Determination of slope limits for machine fluid systems operation — Static test method.*

3 Definitions

For the purpose of this International Standard, the following definitions apply.

NOTE — For definitions reproduced or adapted from other International Standards, the definition given in the most recent edition of that International Standard applies.

3.1 General

3.1.1

tractor-dozer

self-propelled crawler or wheeled machine with equipment having either a dozing attachment which cuts, moves and grades material through forward motion of the machine, or a mounted attachment used to exert a push or a pull force [ISO 6165:1997]

NOTE — See figures 1 and 2.

3.1.2

base machine

machine without equipment as described by the manufacturer's specifications

NOTE — The machines should be provided with the necessary mountings to secure equipment as defined in 3.1.6.

3.1.3

equipment

set of components mounted on the base machine to fulfil the primary design function

3.1.4

attachment

assembly of components that can be mounted on the base machine for a specific use

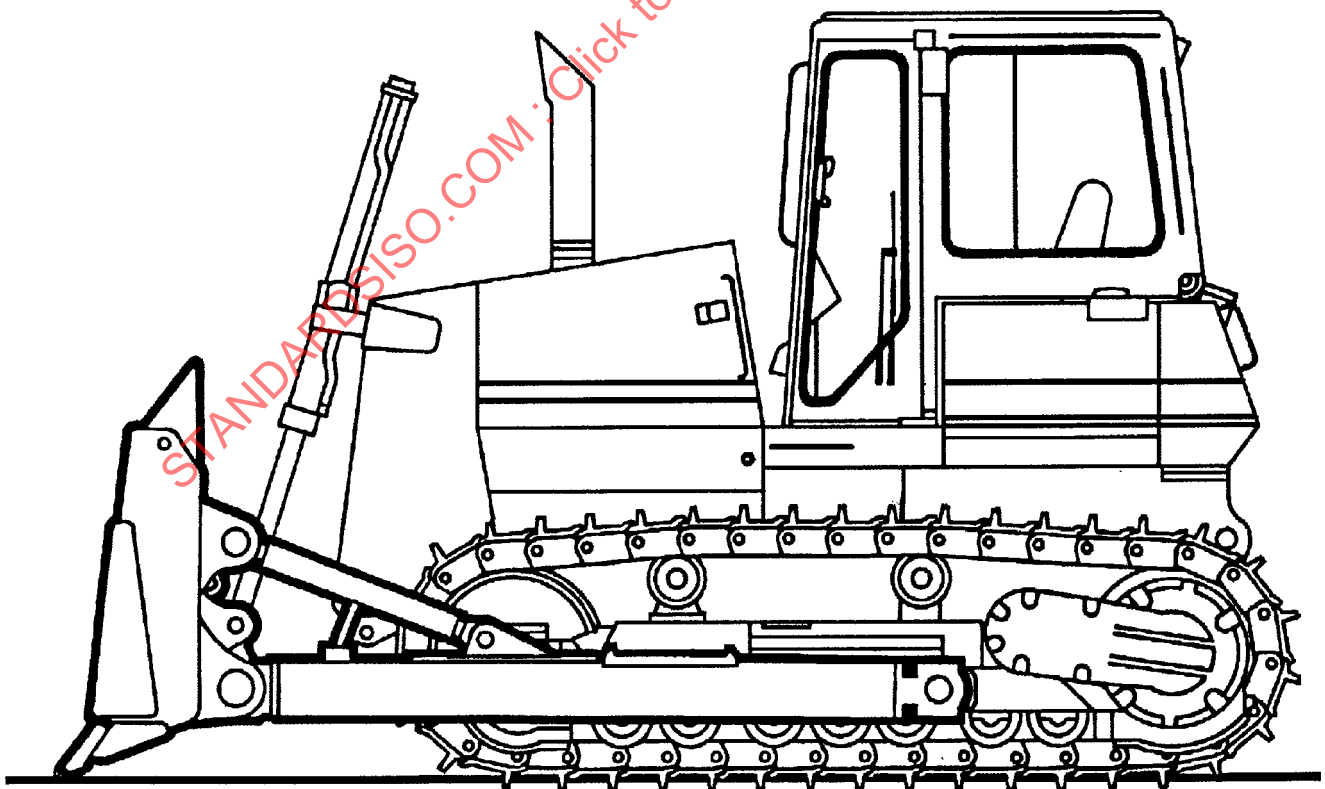


Figure 1 — Crawler-type tractor-dozer

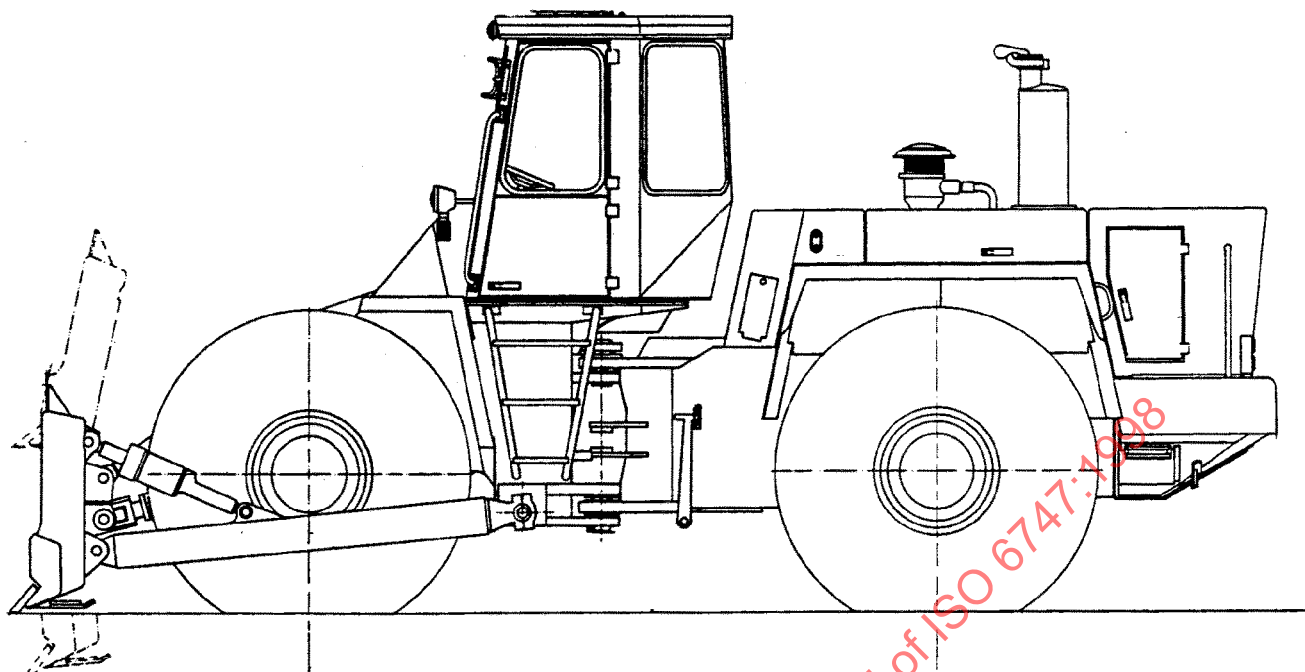


Figure 2 — Wheel-type tractor-dozer

3.1.5

component

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

3.1.6

dozing equipment

front blade and its frame and relevant positioning devices

3.1.6.1

straight dozer

dozer where the blade is maintained in a position where the cutting edge is parallel to an X plane

NOTE — See figure 3.

3.1.6.2

angle dozer

dozer where the blade position may be changed so that the cutting edge is at an angle to an X plane

NOTE — See figure 4.

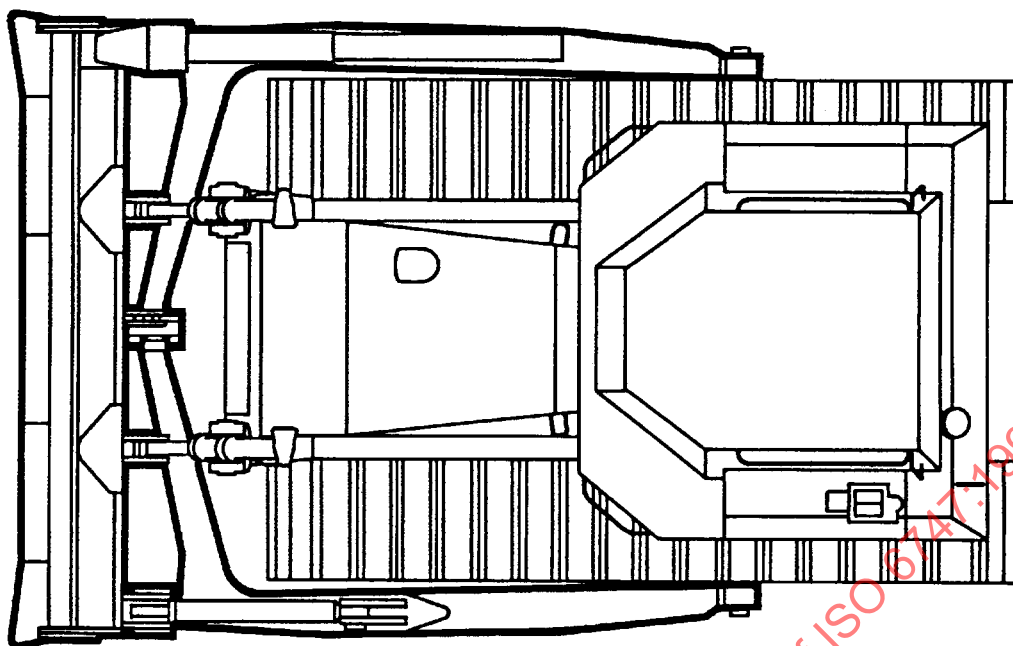


Figure 3 — Crawler tractor with straight dozer

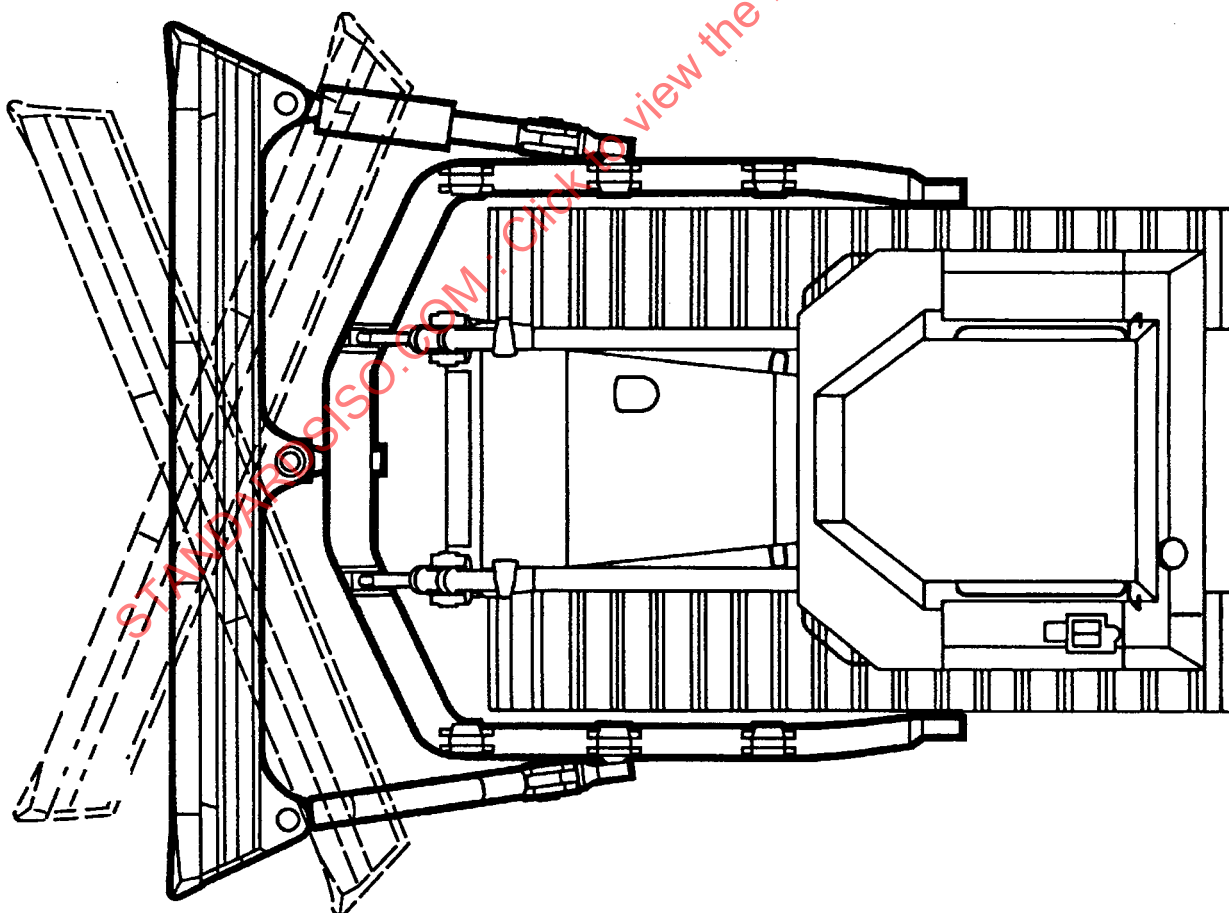


Figure 4 — Crawler tractor with angle dozer

3.1.6.3 tilt and pitch

type of movement of the blade of a straight dozer or angle dozer

NOTE — Blade operation is by hydraulic control where the operation is performed by means of a hydraulic system.

3.1.6.3.1 tilt movement

blade movement in which the position of the blade may be changed so that the cutting edge is at an angle to a Z plane

NOTE — See figure 5.

3.1.6.3.2 pitch movement

blade movement in which the upper portion of the blade may be changed in angle by pivoting it around a line parallel to the cutting edge

NOTE — See figure 6.

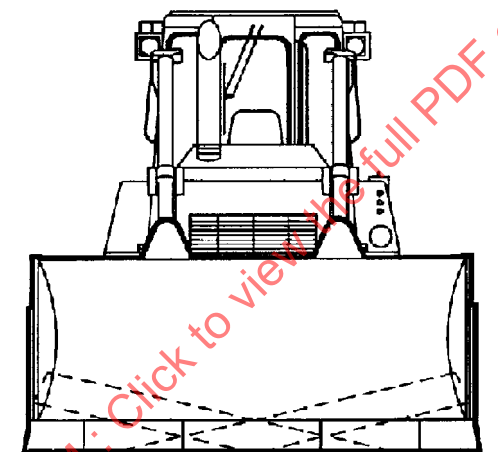


Figure 5 — Tilt movement

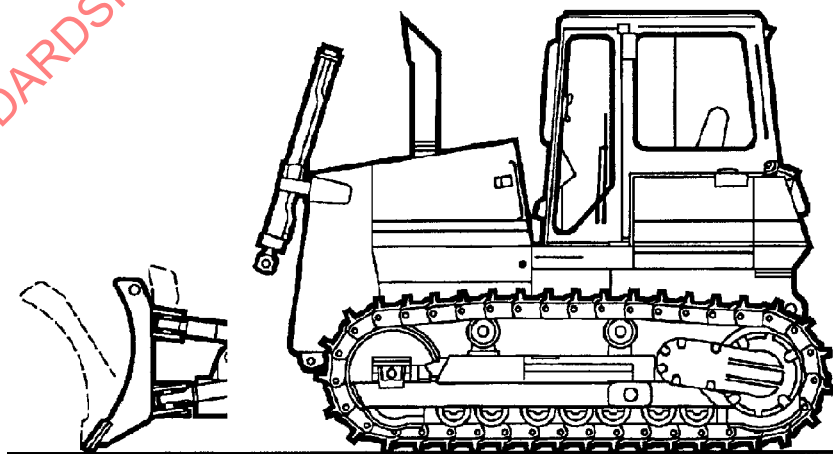


Figure 6 — Pitch movement

3.1.7 ripper

frame which is connected to the rear part of the base machine by means of a mounting bracket, and which is equipped with one or more teeth

NOTES

- 1 See figures 7, 8 and 9. For dimensions, see figure 23.
- 2 There are four types of ripper, as defined in 3.1.7.1 to 3.1.7.4.

3.1.7.1 radial type

type of ripper in which the ripping angle of the tooth tip to the ground varies according to change of the working depth

NOTE — See figure 7.

3.1.7.2 parallelogram type

type of ripper in which the ripping angle of the tooth tip to the ground remains constant regardless of variations in working depth

NOTE — See figure 8.

3.1.7.3 variable type

type of ripper in which the ripping angle of the tooth tip to the ground is variable and can be changed by the operator

NOTE — See figure 9.

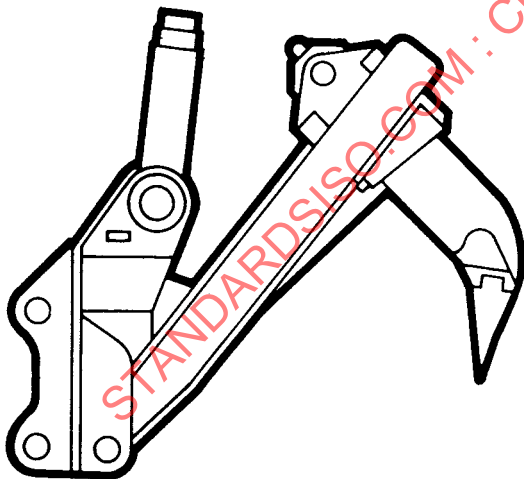


Figure 7 — Ripper — Radial type

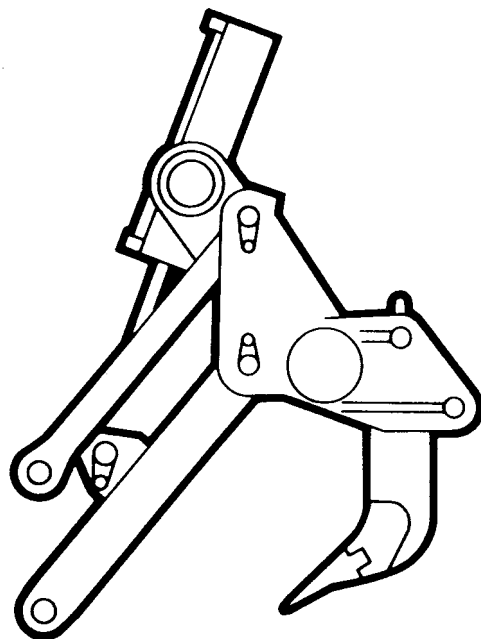


Figure 8 — Ripper — Parallelogram type

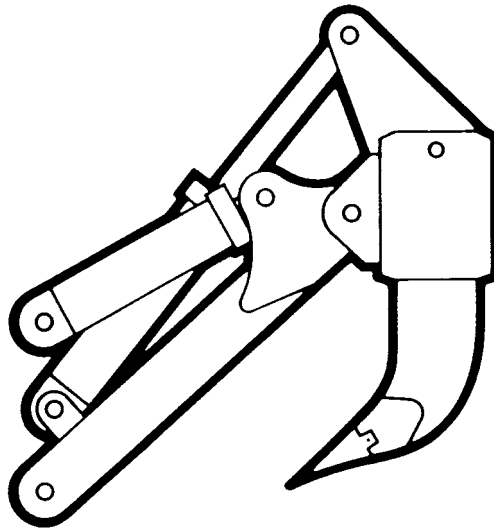


Figure 9 — Ripper — Variable type

3.1.7.4

impact ripper

ripper which exerts an additional impact force by a hydraulic pulsing system

3.1.8

winch

frame equipped with a drum and connected to the rear of the base machine

NOTES

- 1 See figure 10. For dimensions, see figure 24.
- 2 There are two types of winch operation, as defined in 3.1.8.1 and 3.1.8.2.

3.1.8.1

manually-controlled winch

type of winch which is operated by a manually controlled clutch and brake

3.1.8.2

power-controlled winch

type of winch which is operated hydraulically or by a power clutch and brake

3.1.9

swinging drawbar

frame, equipped with a swing selector bar and a drawbar, connected to the rear of the base machine

NOTE — See figure 11. For dimensions, see figure 25.

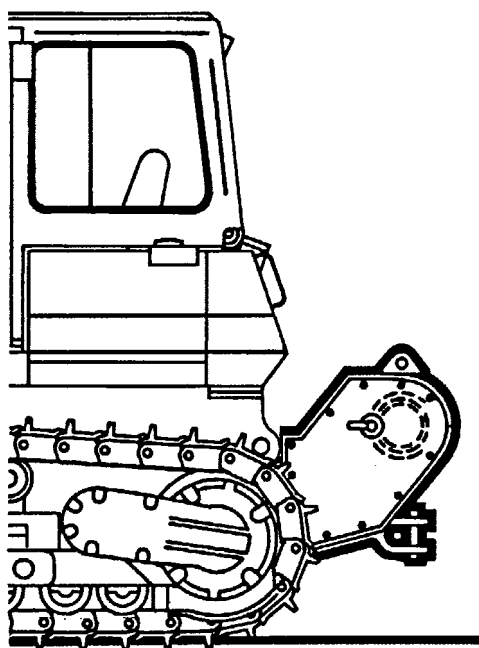


Figure 10 — Winch

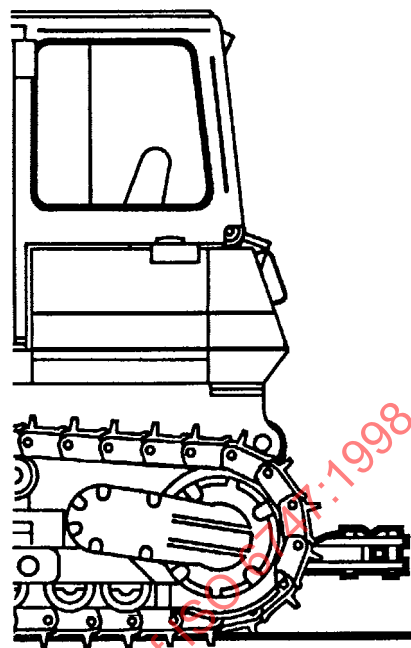


Figure 11 — Swinging drawbar

3.2 Masses

3.2.1 operating mass OM

mass of the base machine with equipment and empty attachment as specified by the manufacturer, with operator (75 kg), and with a full fuel tank and all fluid systems at the levels specified by the manufacturer [ISO 6016:1998]

3.2.2 Axle distribution of masses of wheeled machines

3.2.2.1 axle load

load on each axle at **operating mass** (3.2.1)

3.2.2.2**maximum permissible axle load**

maximum load of each axle specified by the manufacturer

3.2.3**shipping mass****SM**

mass of the base machine without operator, with fuel level at 10 % of tank capacity, with all fluid systems at their levels specified by the manufacturer and with or without equipment, attachment, cab, canopy, ROPS and/or FOPS, wheels and counterweights as stated by the manufacturer [ISO 6016:1998]

3.2.4**cab, canopy, ROPS and/or FOPS mass**

mass of a cab canopy, ROPS or FOPS with all their components, and mountings required to secure these to the base machine [ISO 6016:1998]

3.3 Performance**3.3.1****engine net power**

[according to ISO 9249:1997]

3.3.2**maximum travel load**

maximum speed that can be obtained on a hard level surface in each of the forward and reverse gear ratios available with the machine at its operating mass

3.3.3**drawbar pull**

horizontal towing force exerted at the drawbar/hitch point, expressed in kilonewtons [ISO 7464:1983]

3.3.4**(machine) static slope capacity**

maximum slope, expressed in degrees, that the machine fluid system(s) can operate on without malfunction or damage of any fluid system, at all machine orientations specified in 3.3.4.1 and 3.4.4.2 [ISO 10266:1992]

3.3.4.1**(machine) longitudinal static slope capacity**

maximum slope, expressed in degrees, that the machine can achieve longitudinally (i.e. orientated at 0° and 180°) during the static slope evaluation without exceeding performance parameters [ISO 10266:1992]

3.3.4.2**(machine) lateral static slope capacity**

maximum slope, expressed in degrees, that the machine can achieve laterally (i.e. orientated at 90° and 270°) during the static slope evaluation without exceeding performance parameters [ISO 10266:1992]

3.3.5 Winch performance**3.3.5.1****line pull**

winch pull force measured at engine rated speed with full drum and bare drum

3.3.5.2**line speed**

winch speed measured at engine rated speed with full drum and bare drum

3.3.6**braking system**

(wheeled machines) all the components which combine together to stop and/or hold the machine, consisting of a control, means of brake actuation, the brake(s) and, if the machine is so equipped, the retarder [ISO 3450:1996]

3.3.7 braking system

〈crawler machines〉 all the components which combine together to stop and/or hold the machine, including the controls(s), means of brake actuation, the brake(s) and all parts connecting the brake to the track [ISO 10265:1998]

3.3.8 turning radius of wheeled machines

[according to ISO 7457:1997]

3.4 Dimensions

For definitions of dimensions and the ground reference plane (GRP), see ISO 6746-1 and ISO 6746-2.

For definitions of dimensions strictly related to tractor dozers, see annex A.

4 Classification

4.1 Type of tractor-dozzer

4.1.1 Undercarriage

4.1.1.1 Crawler type tractor-dozzer

See figure 12.

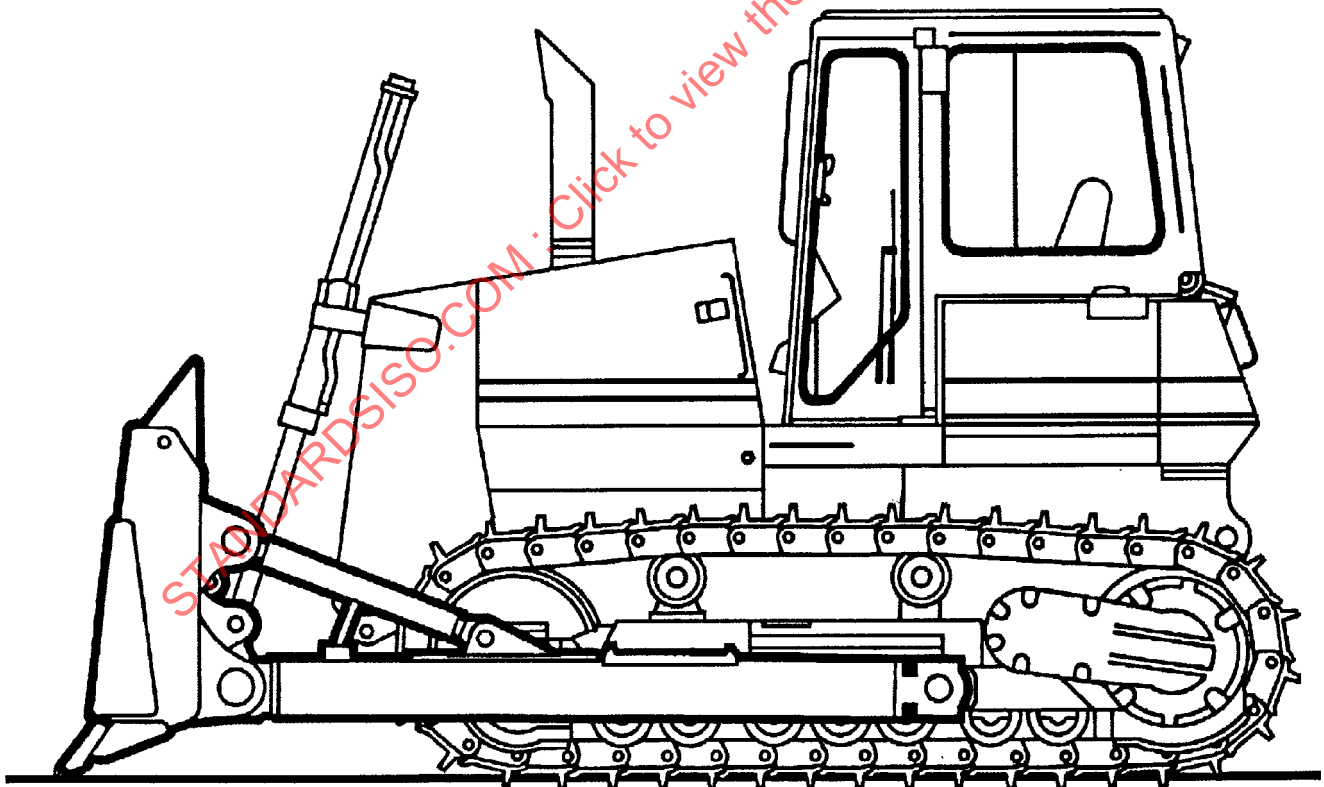


Figure 12 — Crawler type tractor-dozzer

4.1.1.2 Wheel type tractor-dozers

See figure 13.

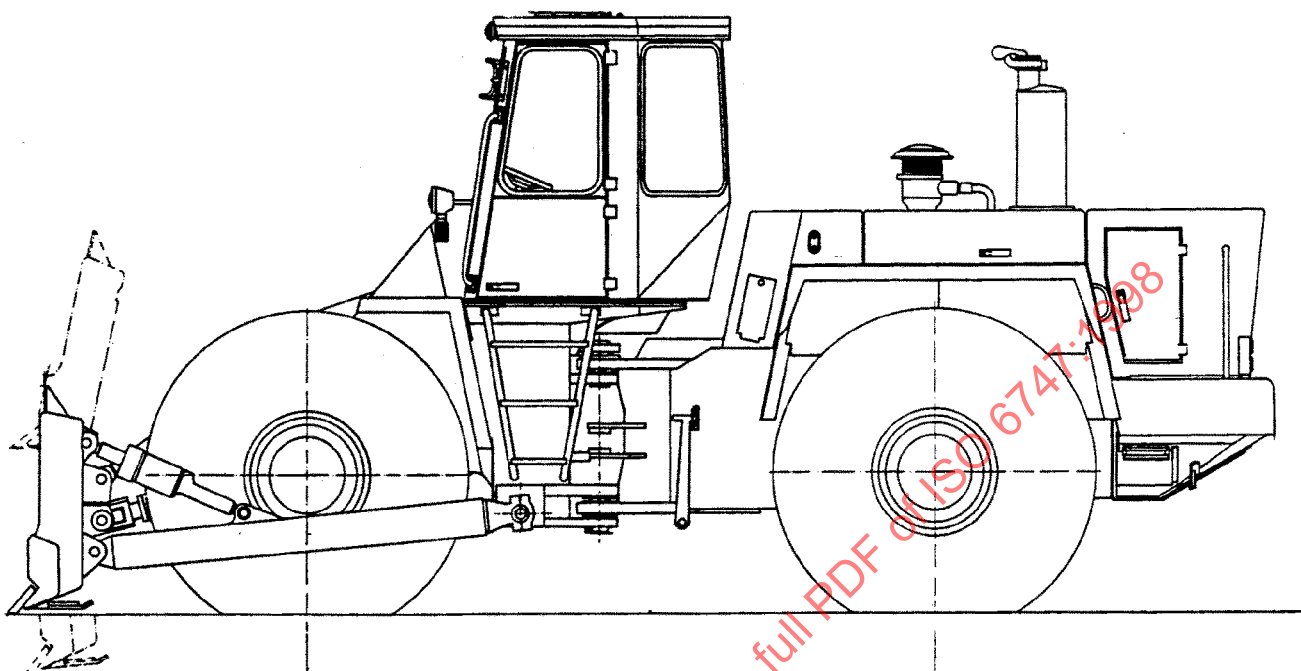
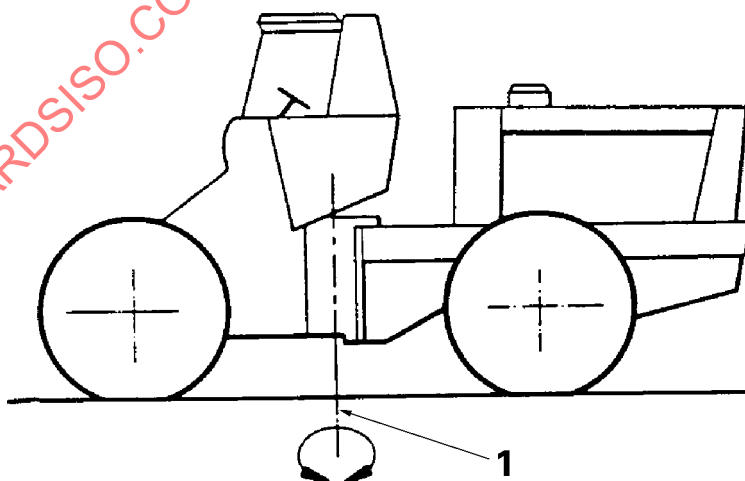


Figure 13 — Wheel type tractor-dozers

4.1.2 Steering system

4.1.2.1 Articulated steering, wheeled machines

See figure 14.



Key

1 Axis of articulation

Figure 14 — Articulated steering

4.1.2.2 Crawler skid steering

See figure 15.

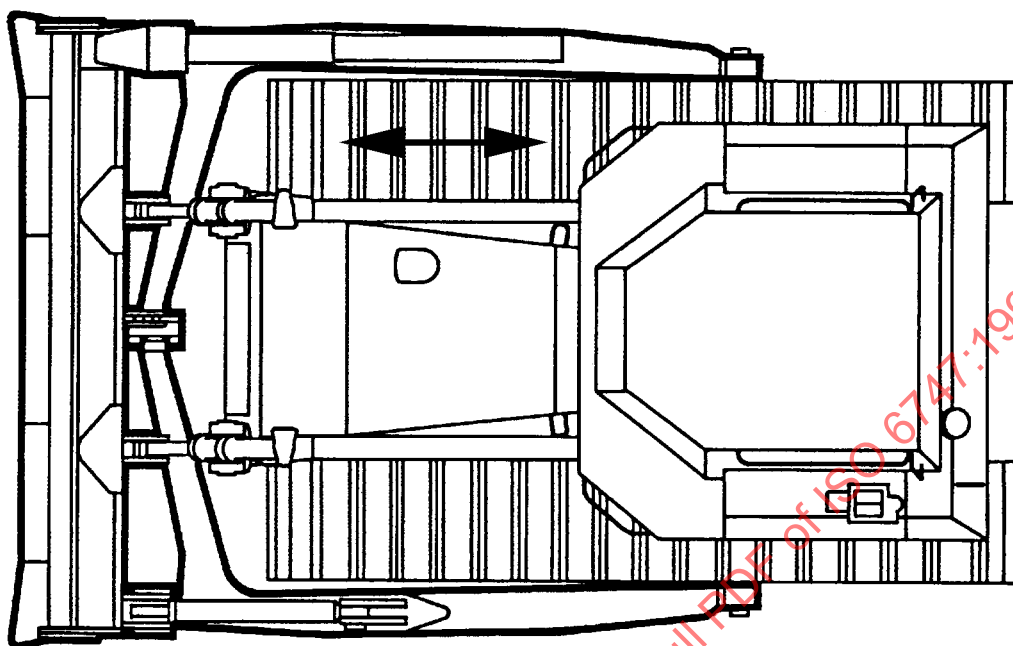


Figure 15 — Crawler skid steering

4.1.2.3 Crawler independent steering

See figure 16.

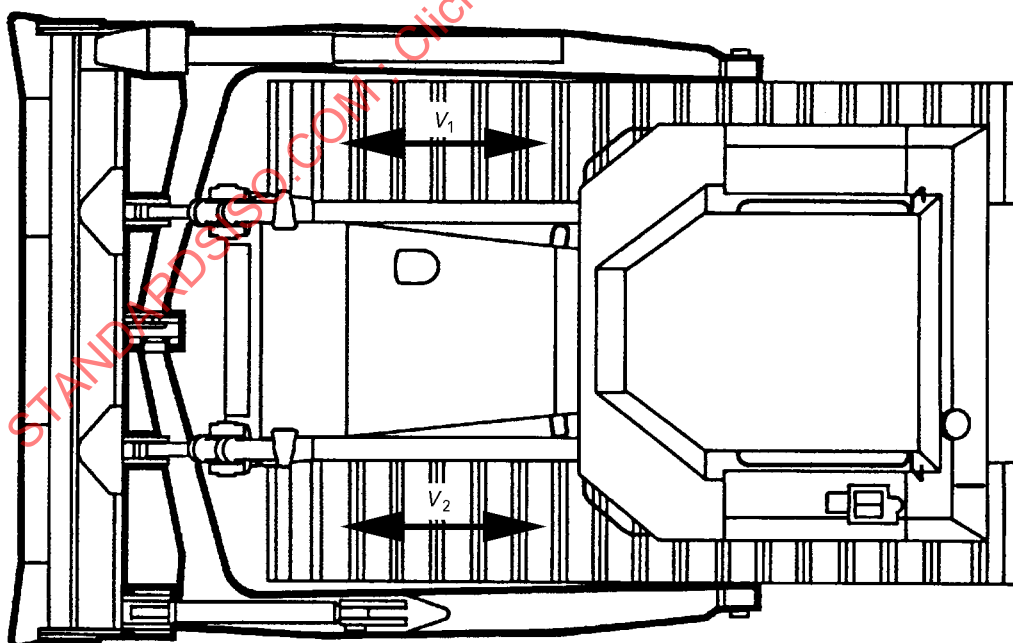


Figure 16 — Crawler independent steering ($V_1 \neq V_2$)

4.1.3 Engine location

4.1.3.1 Front engine

See figure 17.

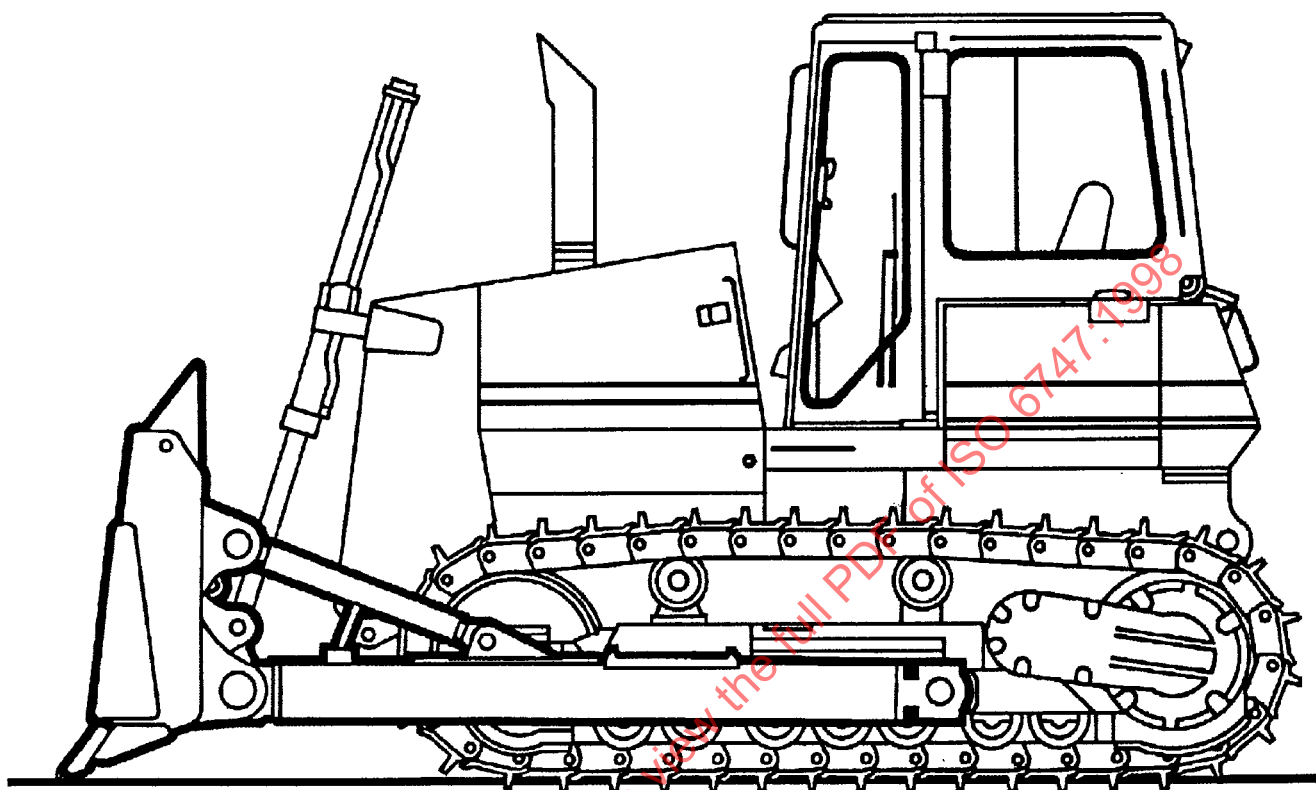


Figure 17 — Front engine

4.1.3.2 Rear engine

See figure 18.

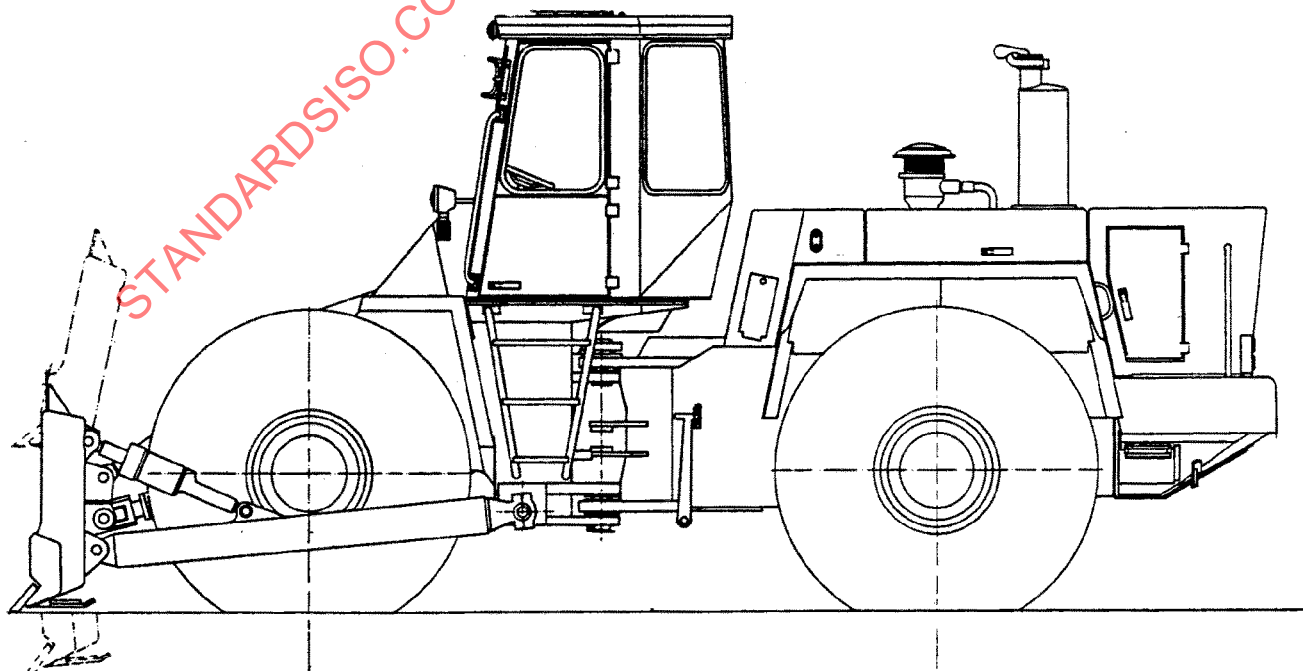


Figure 18 — Rear engine

4.2 Dimensions

4.2.1 Base machine

For definitions of dimensions, see ISO 6746-1.

For definitions of dimensions strictly related to tractor-dozers, see annex A.

4.2.1.1 Crawler machines

See figure 19.

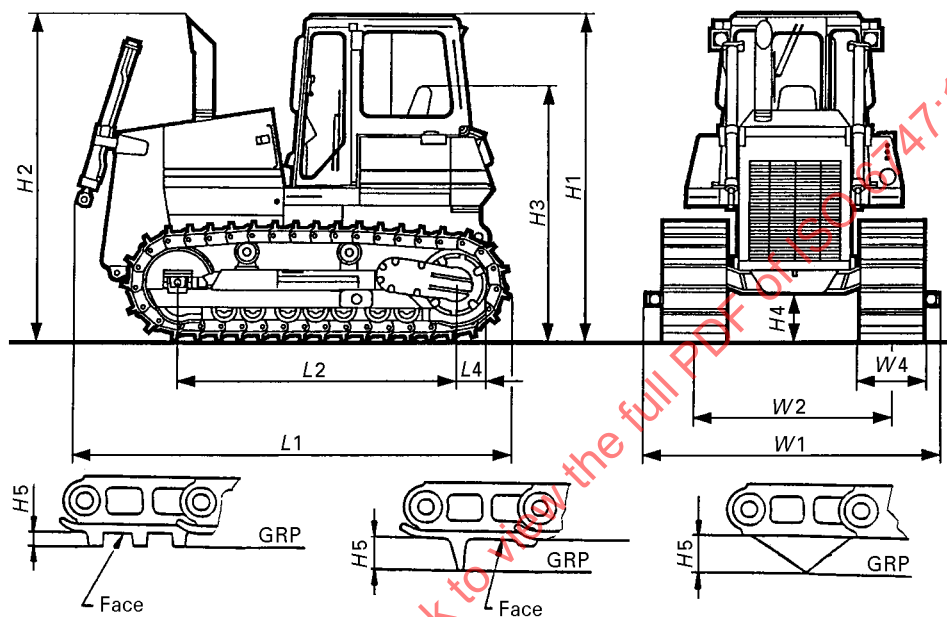


Figure 19 — Dimensions of base machine (crawler tractor-dozer)

4.2.1.2 Wheeled machines

See figure 20.

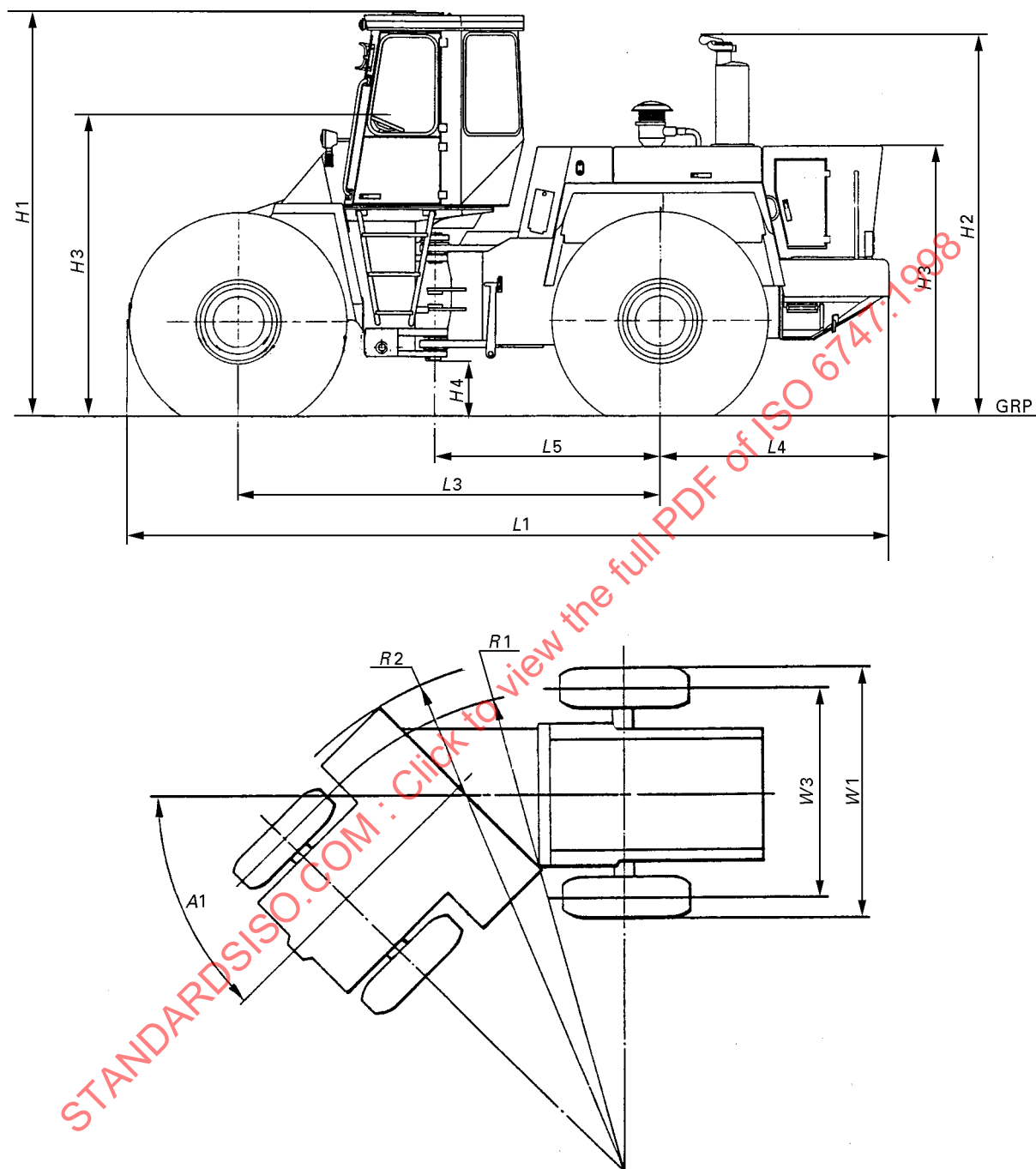


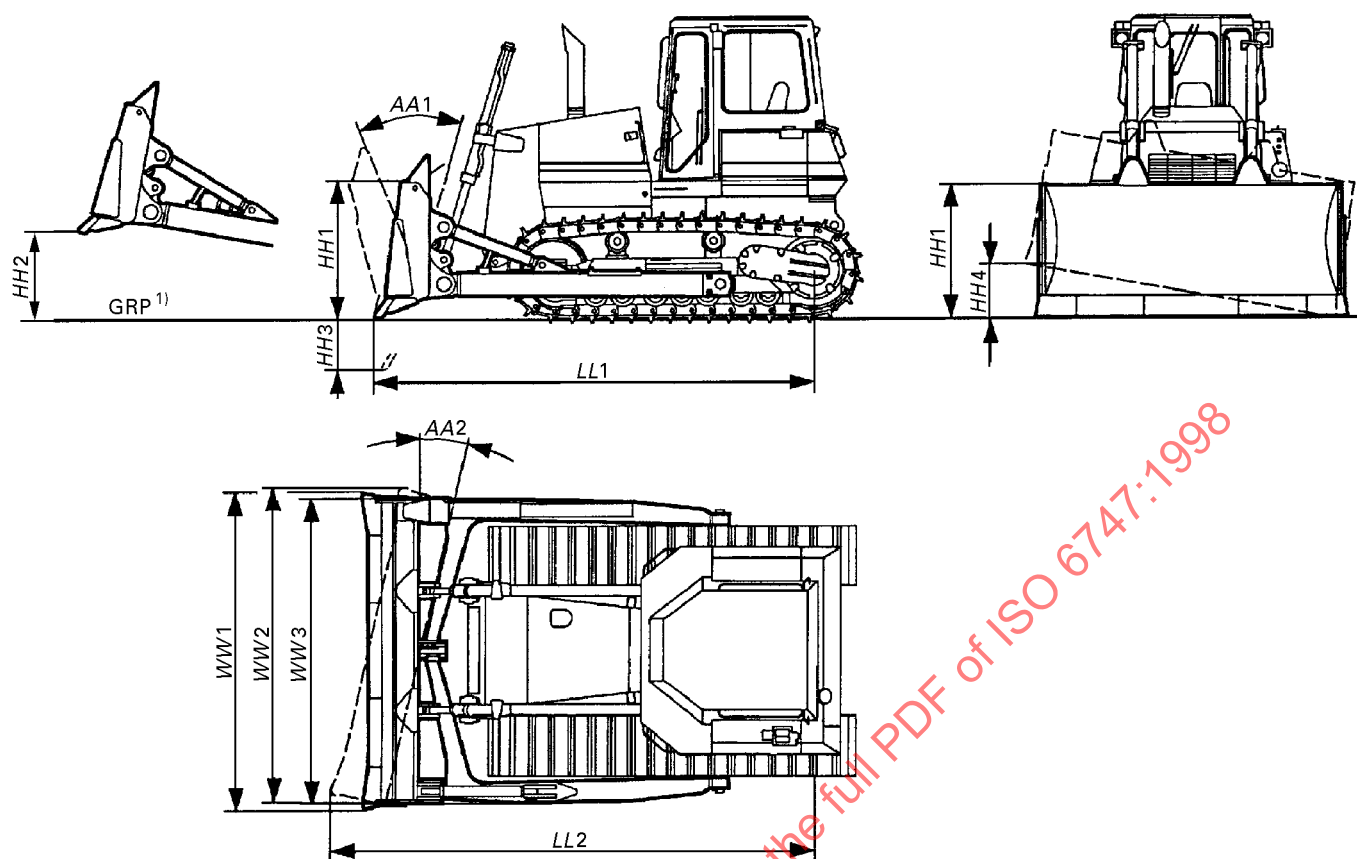
Figure 20 — Dimensions of base machine (wheel tractor-dozer)

4.2.2 Equipment

See figures 21 to 25.

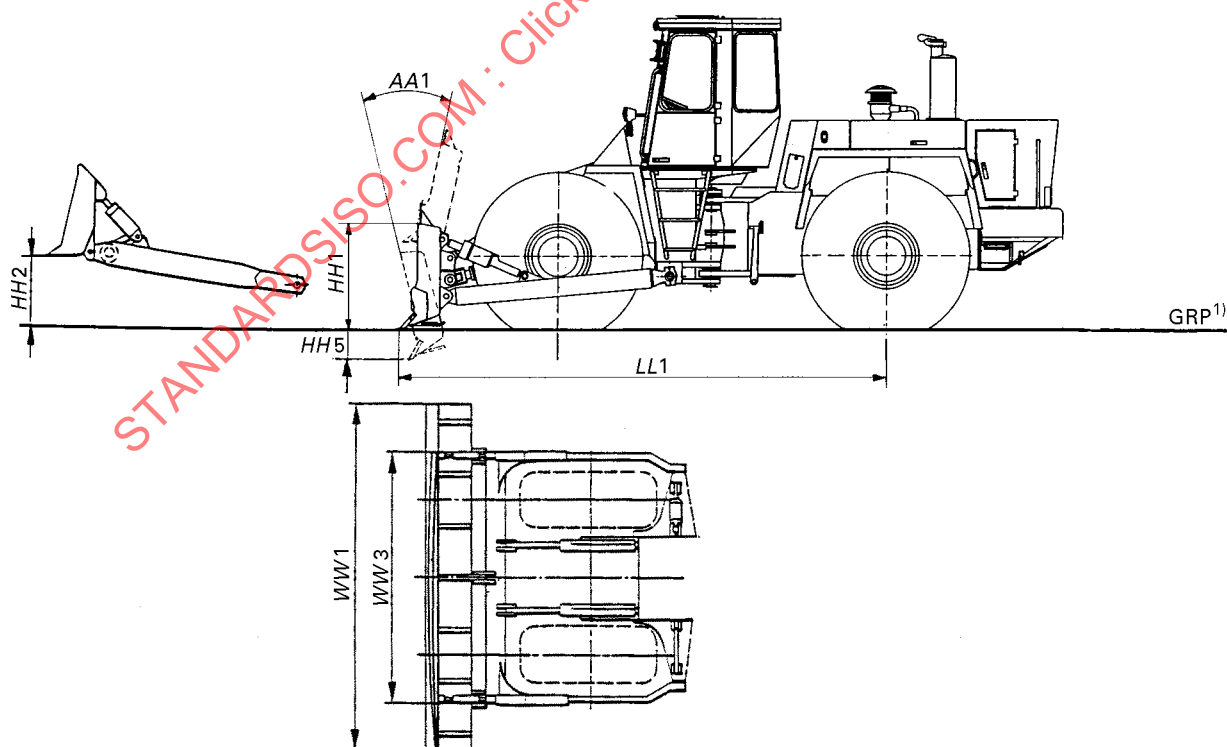
For definitions of dimensions, see ISO 6746-2.

For definitions of dimensions strictly related to tractor-dozers, see annex A.



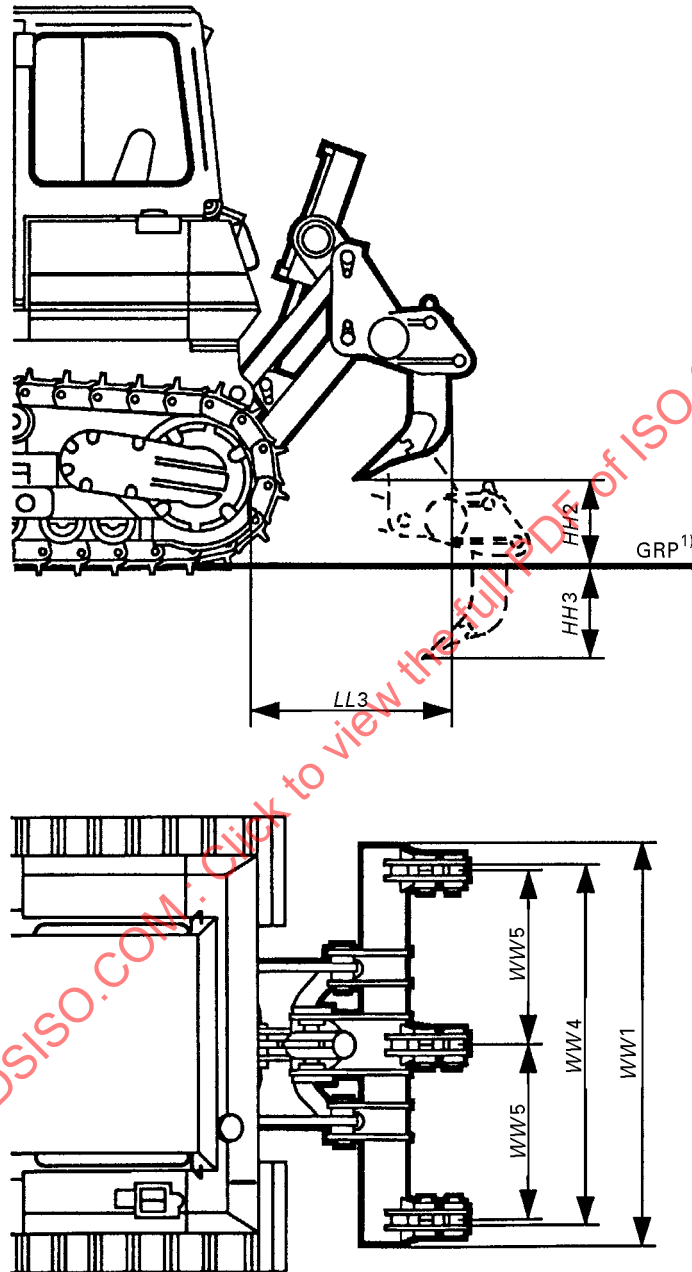
1) For detail, see figure 19.

Figure 21 — Dimensions of dozer (crawler type)



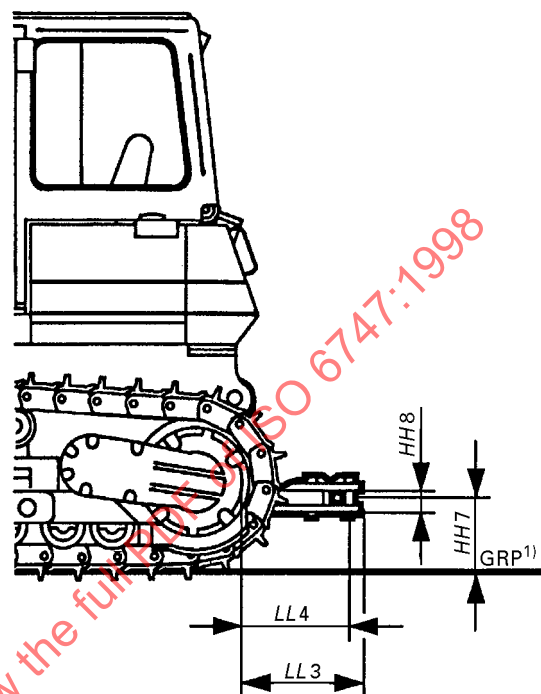
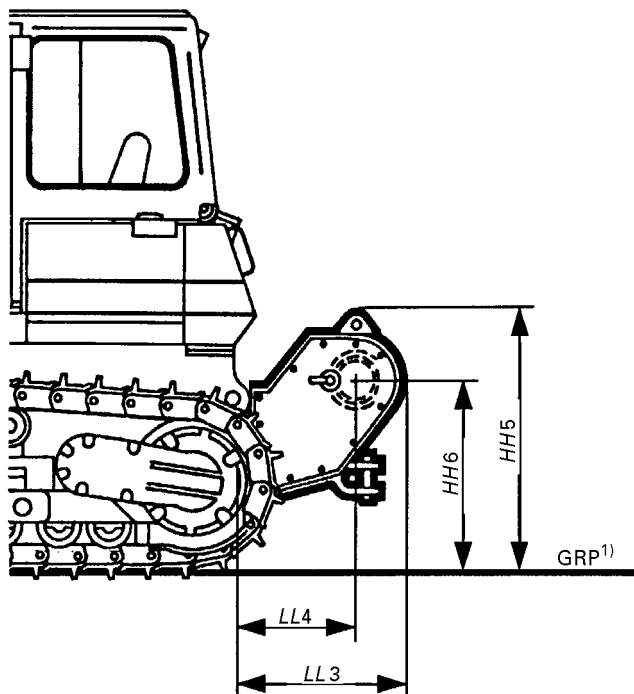
1) For detail, see figure 19.

Figure 22 — Dimensions of dozer (wheel type)



1) For detail, see figure 19.

Figure 23 — Dimensions of ripper



1) For detail, see figure 19.

Figure 24 — Dimensions of winch

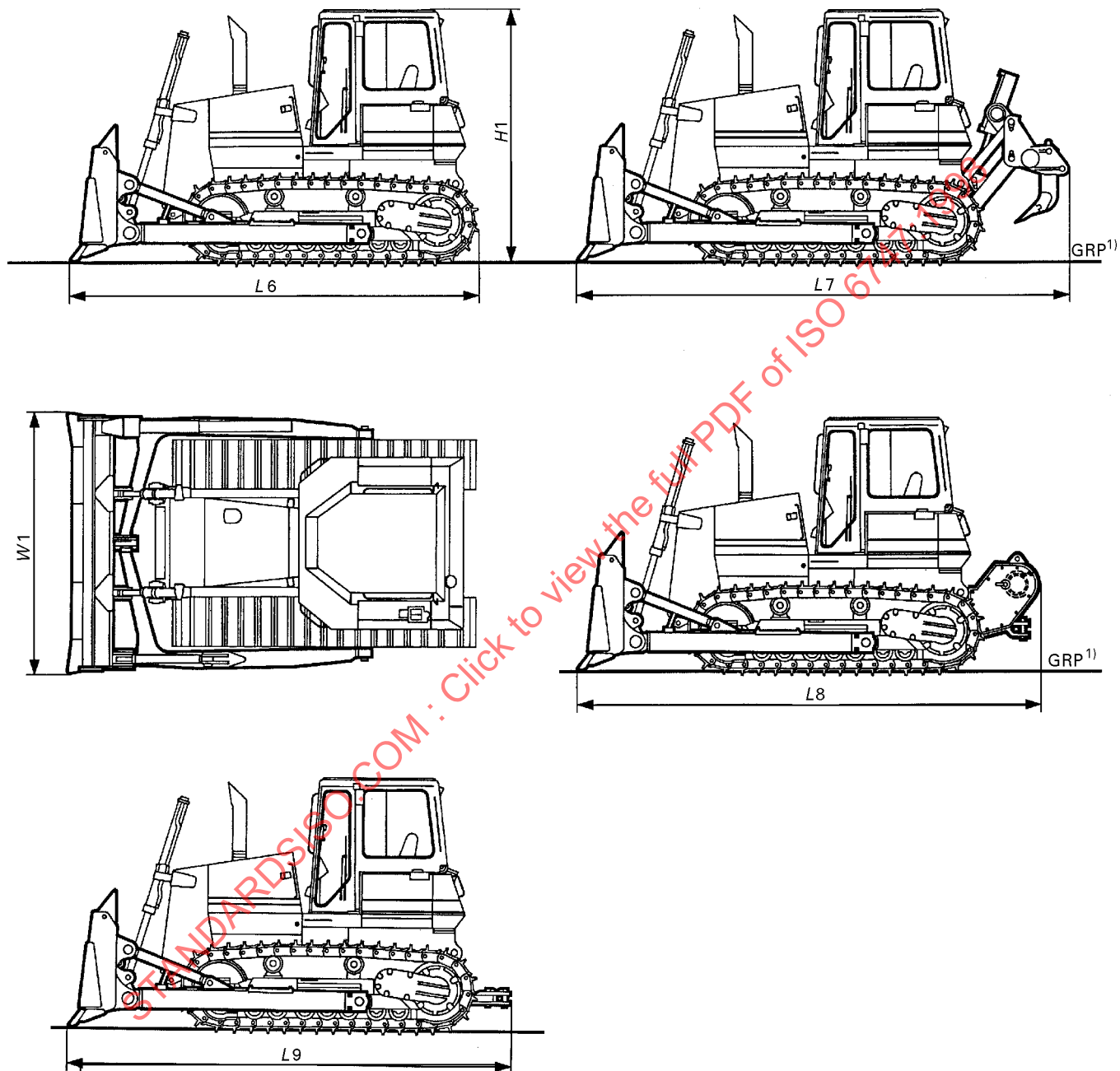
1) For detail, see figure 19.

Figure 25 — Dimensions of swinging drawbar

4.2.3 Overall dimensions

See figure 26.

For definitions of dimensions, see annex A.



1) For detail, see figure 19

L6: with dozer blade

L7: with dozer blade and ripper

L8: with dozer blade and winch

L9: with dozer blade and swinging crawler

Figure 26 — Overall dimension crawler tractor-dozer

4.3 Nomenclature (see diagram numbers)

4.3.1 Definitions

The following definitions are presented for a better understanding of terms included in dozer nomenclature.

4.3.1.1

jack

mechanically adjustable member for pitching or tilting the blade

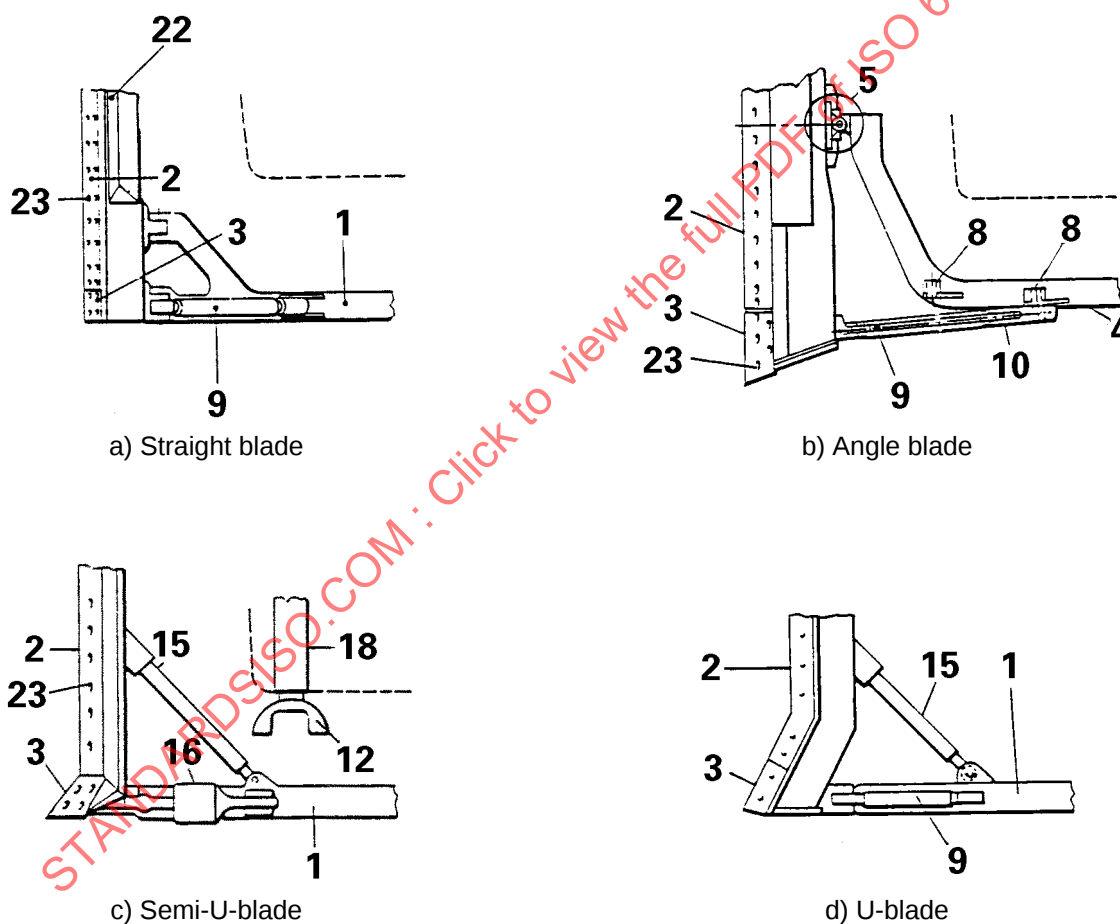
4.3.1.2

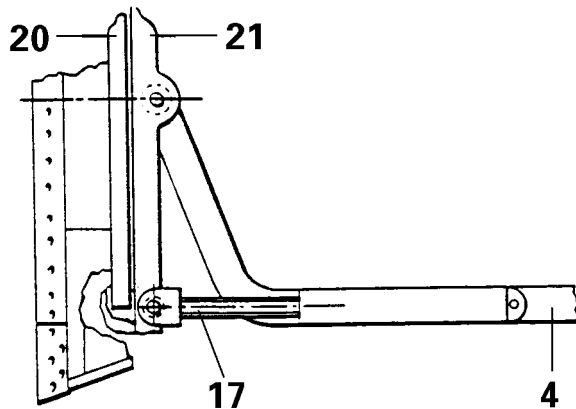
strut

member which is fixed in length after assembly

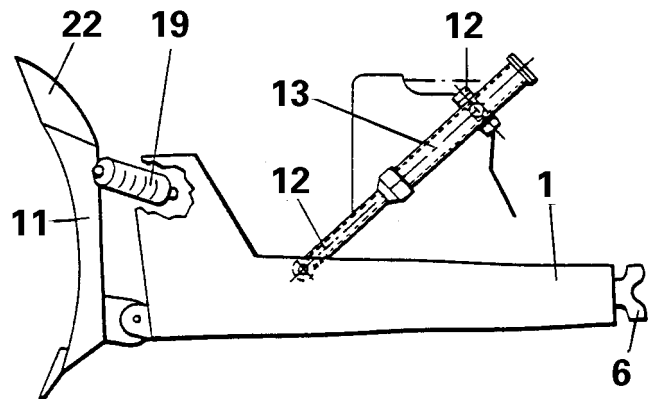
4.3.2 Dozing equipment

See 3.1.6 and figure 27.

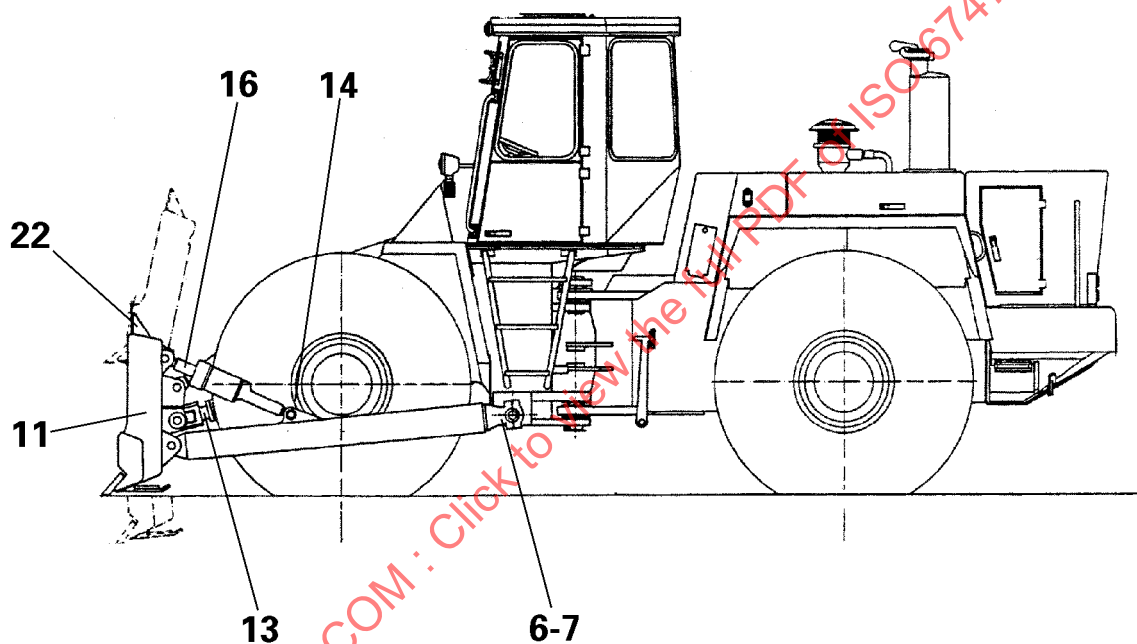




e) Power (angle and tilt) blade



f) Cushion blade



g) Dozer attachment

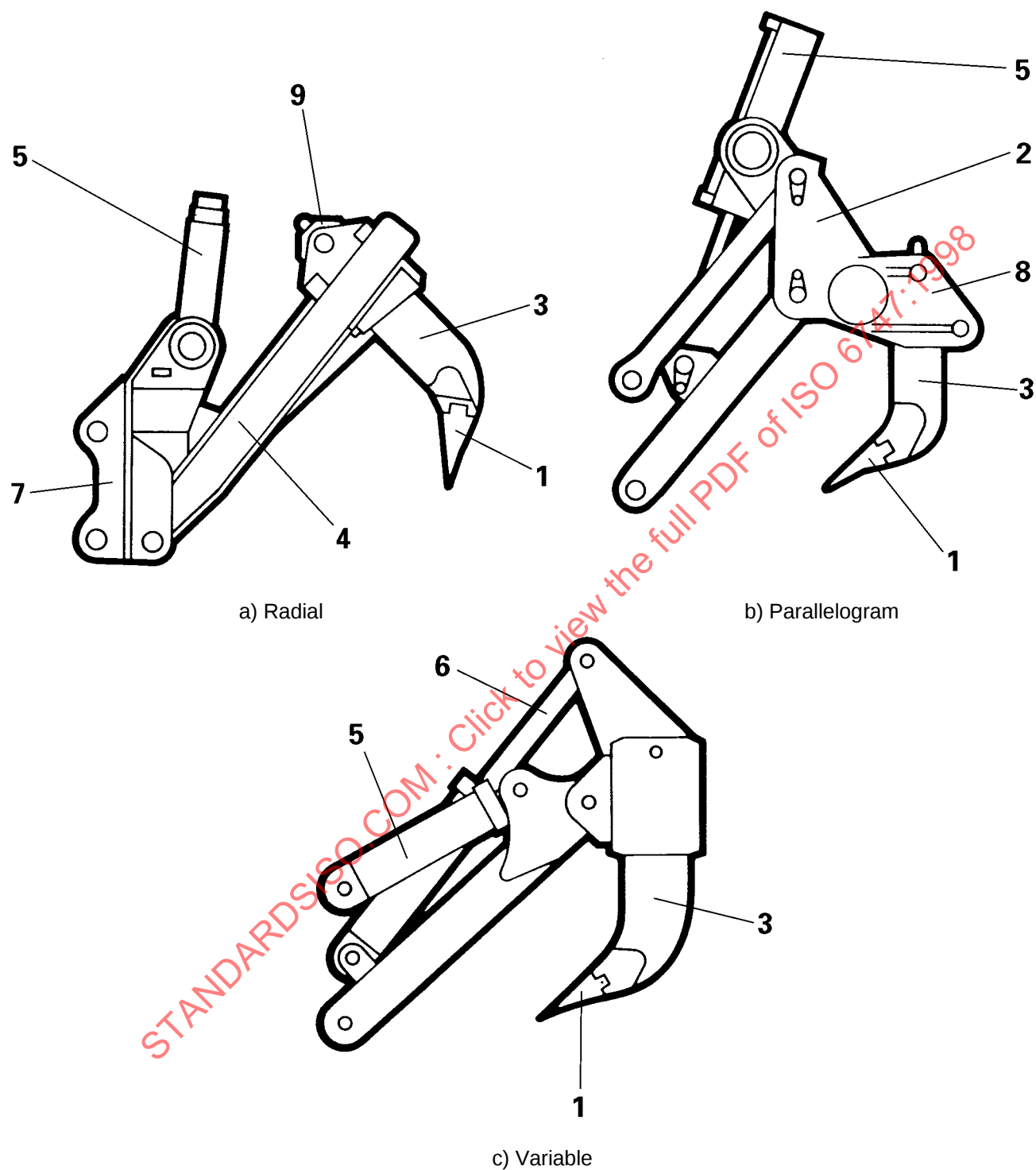
Key

- | | |
|--------------------------|-----------------------------------|
| 1 Beam, push | 13 Cylinder, lift |
| 2 Cutting edge | 14 Trunnion, cylinder |
| 3 Bit, end | 15 Strut, horizontal blade |
| 4 C-frame | 16 Cylinder, tilt |
| 5 Swivel, blade | 17 Cylinder, angling |
| 6 Trunnion | 18 Tube, yoke or trunnion support |
| 7 Bearing, trunnion | 19 Member, cushion |
| 8 Bracket, angling strut | 20 Frame, tilt |
| 9 Jack, adjusting | 21 Frame, angling |
| 10 Strut, angling | 22 Spill guard |
| 11 Blade | 23 Plough bolts |
| 12 Yoke, cylinder | |

Figure 27 — Dozing equipment

4.3.3 Ripper

See figure 28.



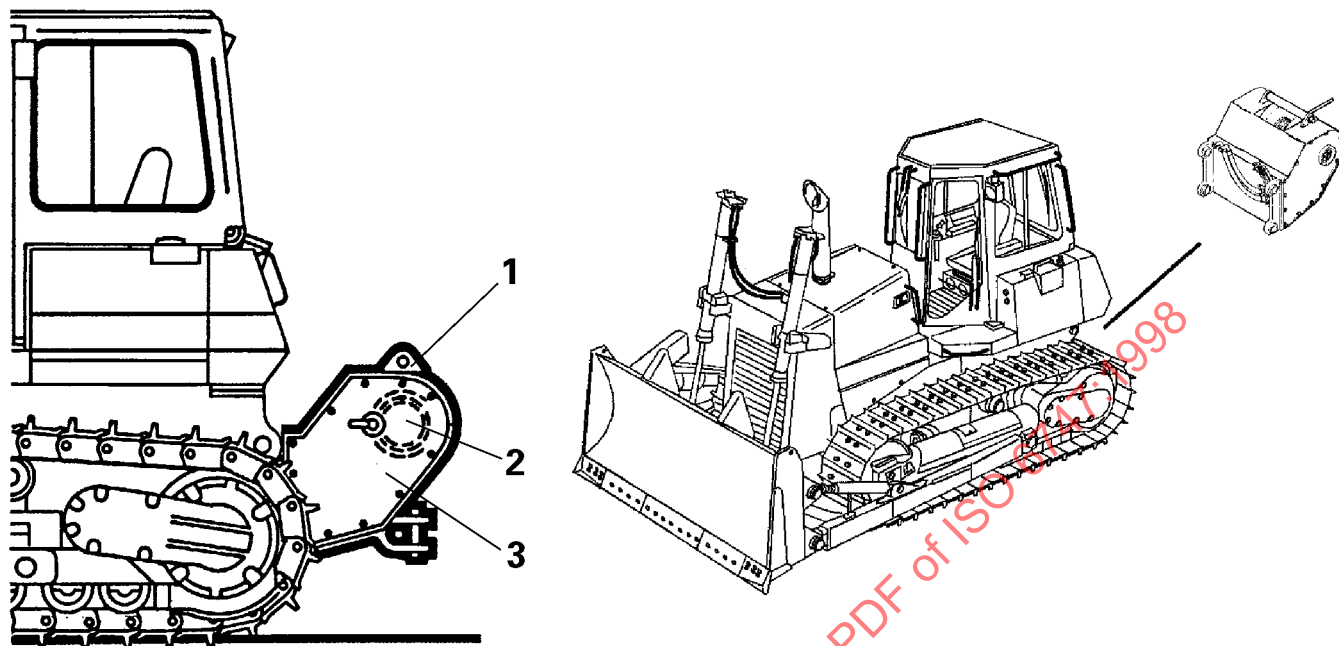
Key

- | | |
|------------------|------------------------|
| 1 Point | 6 Cylinder, shank tilt |
| 2 Clevis | 7 Bracket, mounting |
| 3 Shank | 8 Block, bush |
| 4 Bar, tool | 9 Pin, shank |
| 5 Cylinder, lift | |

Figure 28 — Ripper

4.3.4 Winch

See figure 29.



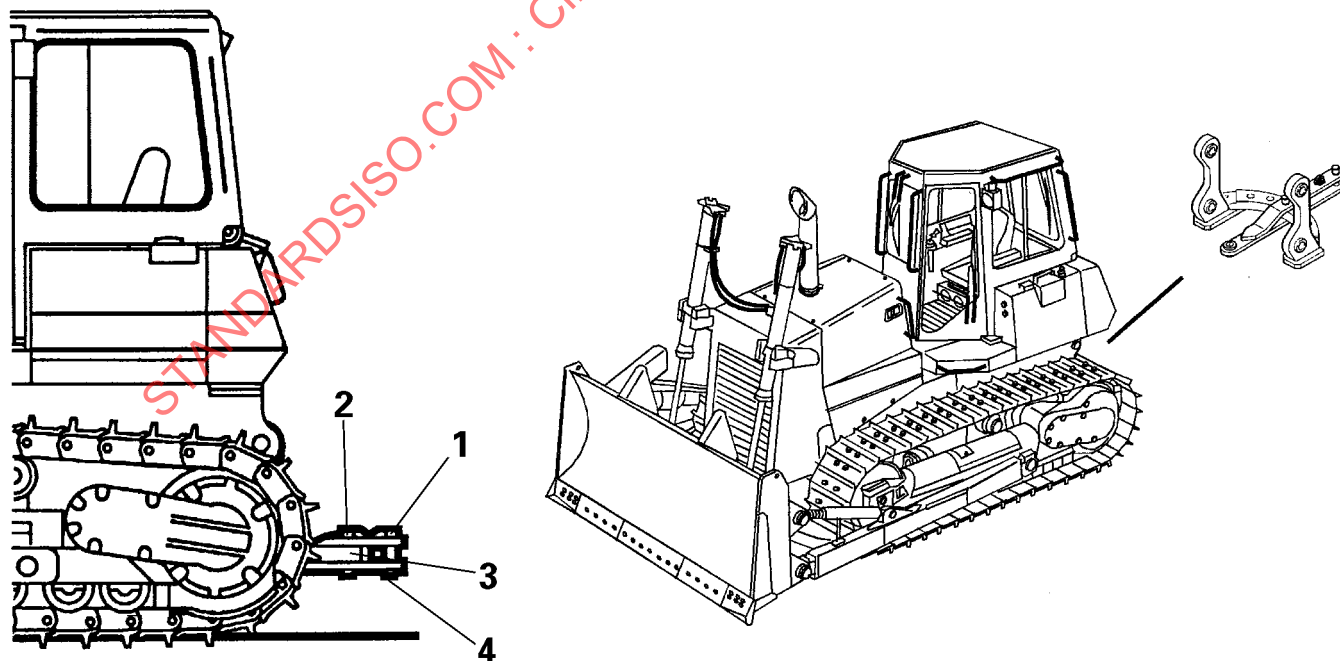
Key

- | | |
|----------------|------------------|
| 1 Guard, cable | 3 Housing, winch |
| 2 Drum, cable | |

Figure 29 — Winch

4.3.5 Swinging drawbar

See figure 30.



Key

- | | |
|-------------|----------------------|
| 1 Pin | 3 Swing selector bar |
| 2 Pin, stop | 4 Drawbar |

Figure 30 — Swinging drawbar