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Road construction and maintenance equipment — Asphalt pavers — Terminology and commercial specifications

Équipement pour la construction et l'entretien des routes — Asphalteuse — Terminologie et spécifications commerciales

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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ISO 15878 was prepared by Technical Committee ISO/TC 195, *Building construction machinery and equipment*.

Road construction and maintenance equipment — Asphalt pavers — Terminology and commercial specifications

1 Scope

This International Standard deals with asphalt pavers used in road construction and maintenance processes.

It provides terminology for the machine and its components, and also gives operation principles and commercial specifications and establishes parameters for technical characteristics.

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 3046-1:2002, *Reciprocating internal combustion engines — Performance — Part 1: Declarations of power, fuel and lubricating oil consumptions, and test methods — Additional requirements for engines for general use*

ISO 3911:2004, *Wheels and rims for pneumatic tyres — Vocabulary, designation and marking*

3 Terms and definitions

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

3.1
asphalt paver
mobile machine intended for placement and pre-compaction of concrete asphalt mixes using the floating/self levelling screed method

NOTE 1 Equipment normally consists of a tractor unit and a free floating screed.

NOTE 2 See also 2.4.3 of ISO 22242:2005.

3.2
adjustable width strike off
movable blade at the leading edge of a fixed screed for varying screed width

NOTE For an example, see Figure A.5.

3.3
apron
area of the hopper in front of the conveyor

NOTE For an example, see Figure A.9.

3.4
asphalt paver operator
person whose primary functions are to control paver speed, direction and laying of paving material

3.5
asphalt paver operator station
designated location(s) from which the operator controls the functions of the paver

3.6
automatic feeder system control
system for automatic control of the flow of paving material to the screed

3.7
automatic screed control
system for automatic control of the mat profile in relation to an external reference

3.8
bevel edger
attachment for putting a sloped surface on the edge of the mat

3.9
bracing
device for bracing the screed when built up for large working widths

3.10
conveyor tunnel
passageway through which paving material moves from the hopper to the auger/screed

NOTE For an example, see Figure A.4.

3.11
cut-off plate
attachment used in conjunction with the screed end plate to reduce the effective screed width

3.12
conveyor (slat or auger)
device for transferring paving material from the hopper to the spreading auger

NOTE For examples, see Figure A.4 and Figure A.11.

3.13
conveyor flow gate
device for adjustment of the height of paving material being transferred by the conveyor

NOTE For an example, see Figure A.4.

3.14
crown control
device that shapes the screed to form a mat with the desired crown

NOTE For an example, see Figure A.9.

3.15
extendable screed
screed with permanently mounted extensions that can be extended or retracted to change the mat width when the paver is in operation

NOTE For an example, see Figure A.12.

3.16
fixed width screed
screed with a constant width that can only be changed by adding or removing extensions

NOTE For an example, see Figure A.4.

3.17
grade control
system for control of the longitudinal profile of the mat

NOTE For an example, see Figure A.9.

3.18
hopper
component of the paver which receives the paving material from an external source

NOTE For an example, see Figure A.4.

3.19
hopper insert
device to increase hopper capacity

3.20
material feed system
combined conveyor and auger components that transfer paving material from the hopper and distribute it in front of the screed

NOTE For an example, see Figure A.4.

3.21
material feed sensor
device used to detect the quantity of paving material in front of the screed

NOTE For an example, see Figure A.9.

3.22
material retaining plate
material limiting plate
attachment installed in front of a spreading auger extension to prevent the paving material from flowing forwards

3.23
mobile grade reference
towed attachment that provides an independent reference for the automatic grade control

NOTE For an example, see Figure A.9.

3.24
mouldboard
upper part of the front of the screed frame that pushes the surplus paving material being distributed by the spreading auger

3.25
strike off (height-adjustable mouldboard)
attachment at the front of a screed for metering the paving material flowing under the screed

NOTE For an example, see Figure A.6.

3.26
pre-strike off
material management device attached in front of an extendable screed, for managing material build up in front of the screed to allow for easy retraction and material flow to the end gates

NOTE 1 For equal width front mounted extensions, the pre-strike off prevents material from being built up in front of the main screed to allow the extension to retract. For an example, see Figure A.7.

NOTE 2 For rear mounted extensions the pre-strike off prevents material from being built up in front of the extension screed to allow easy retraction. For an example, see Figure A.8.

3.27
push-roller
device that contacts the tyres of the paving material delivery vehicle

NOTE For an example, see Figure A.4.

3.28
screed mounted control
device used to control some of the paving functions of the screed

3.29
screed
device towed behind the tractor to strike off, compact, contour and smooth the paving material

NOTE 1 For an example, see Figure A.12

NOTE 2 Depending on the type of screed, the following paving material compaction systems are identified:

— static compaction: the construction material is compacted by the weight of the screed (see Figure A.13);

— dynamic compaction: in addition to the static compaction, a single additional compaction system, which can consist of vibrators or tamper bars, is fitted (see Figure A.14 and Figure A.15);

— high compaction: in addition to static compaction, at least two compaction systems, which may consist of vibrators, tamper bars or pressure bars, are fitted (see Figure A.16 and Figure A.17).

3.30
screed arm
attachment by which the screed is connected to and towed by the tractor

NOTE For an example, see Figure A.4.

3.31
screed end plate
vertically adjustable plate at the outboard end of the screed, which retains the paving material and forms the edge of the mat

NOTE For an example, see Figure A.4.

3.32
screed extension
fixed or adjustable attachment to the screed for paving at widths greater than the main screed

NOTE For an example, see Figure A.10.

3.33
screed heater
device to heat the screed plate to prevent adhesion of paving material

3.34
screed lift
device used to raise the screed

NOTE For an example, see Figure A.9.

3.35
screed plate
component of the screed that shapes and smoothes the top surface of the mat

NOTE For an example, see Figure A.13.

3.36
screed travel lock
device that secures the screed in the raised position

NOTE For an example, see Figure A.10.

3.37
slope beam
component on which the slope control sensor is mounted

NOTE For an example, see Figure A.9.

3.38
slope control
control that relates to the transverse profile of the mat

NOTE For an example, see Figure A.9.

3.39
spreading auger
screw conveyor used for transverse distribution of paving material ahead of the screed

NOTE For an example, see Figure A.4.

3.40
steering guide
sighting device to enable the operator to follow a predetermined course

NOTE For an example, see Figure A.4.

3.41
tamper
system for pre-compaction, installed at the front of the screed

3.42
tamper bar(s)
reciprocating component(s) on the screed, used to provide additional compaction of the paving material

NOTE For an example, see Figure A.15.

3.43
thickness control
device to manually adjust the mat thickness

NOTE See Figure A.4.

3.44
tow point
pull point
point at which the screed arm is attached to the tractor

NOTE For an example, see Figure A.4.

3.45
tractor
component of a paver which provides propulsion and can also receive, convey and distribute paving material

NOTE For an example, see Figure A.4.

3.46
truck-hitch
device used to hold a paving material delivery vehicle in the proper position relative to the paver when unloading the material into the hopper

3.47
asphalt fume control system
system that collects paving material fumes and exhausts them away from the operator and crew

4 Operating principle

Asphalt pavers place and pre-compact concrete asphalt mixes using the floating/self-levelling screed method. The weight of the screed and its forward motion combined with additional vibrating and tamping elements are used to pre-compact the mixes.

5 Description of an asphalt paver

5.1 General

The design type of an asphalt paver is determined according to the following criteria: undercarriage type, method of mix transfer from hopper to screed and screed type.

5.2 Undercarriage type

The following types of undercarriage are identified:

— wheeled (see Figure A.1);

— steel tracked with replaceable track plates (see Figure A.2);

— rubber tracked (see Figure A.3).

5.3 Method of mix transfer from hopper to the screed

The following methods are typically used:

— by slat conveyor (see Figure A.4);

— by auger (see Figure A.11);

— by gravity.

5.4 Screed type

The following screed types are typically used:

— fixed width (see Figure A.4);

— hydraulically extendable (see Figure A.12);

— extendable by bolt-on extensions.

6 Commercial specifications

6.1 Type of asphalt paver

Specify the type of the asphalt paver, e.g. rubber tyred with fixed width screed, tracked with variable width screed, tracked with fixed width screed and others.

NOTE The examples of specifications for different types of asphalt paver are presented in Figure A.4, Figure A.9 and Figure A.10.

6.2 Basic characteristics of an asphalt paver

Specify the following parameters.

a) Laying performance:

— maximum laying capacity, in tonnes per hour;

— paving width — maximum, in millimetres: the maximum width to which the machine can place paving material with optional screed extensions;

— paving width — minimum, in millimetres;

— paving depth — maximum, in millimetres: the maximum thickness to which the machine can place paving material;

— paving depth — minimum, in millimetres.

b) Turning radius, in millimetres:

The distance from the turning centre to the centre of contact with the ground of the wheel describing the largest circle while the machine is executing the sharpest practical turn. (See Figure A.20, dimension R_2.)

c) Machine clearance circle, in millmetres:

The diameter of the smallest circle which will enclose the outermost point of the vehicle projection with the machine in operating configuration while executing its sharpest practical turn. (See Figure A.20, dimension R_1.)

d) Paving speed(s) — maximum, in metres per minute:

The maximum forward speed over a hard, horizontal surface in the designated paving speed range.

e) Travel speed — maximum, in kilometres per hour:

The maximum forward speed over a hard, horizontal surface in the highest speed range.

f) Crown, as a percentage or in degrees:

The angle between a section of screed and the horizontal. Maximum positive and maximum negative crown shall be specified. Positive crown is defined as the outer end of the screed lower than the inner end. (See Figure A.23.)

g) Screed compaction system:

Specify the type of compaction system used. (See 3.29.)

h) Vibrator frequency, in Hertz.

i) Hopper capacity, in tonnes or cubic metres:

The struck volume of the paver hopper including the volume of the conveyor in front of the rear hopper wall.

j) Engine:

— manufacturer and model;

— power, in kilowatts.

The gross flywheel intermittent power rating as specified by the engine manufacturer and measured in accordance with ISO 3046-1 for the governed speed recommended by the machine manufacturer. The governed rotational speed and the test conditions used shall be stated.

k) Heating system, e.g. electric, hot air, heated by LPG or diesel fuel burners.

l) Overall dimensions in operating mode:

— length, in millimetres: the longitudinal distance between the extreme front and rear points of the machine with the machine in operating configuration (see Figure A.21, dimension L_1);

— width — minimum, in millimetres: the minimum transverse distance between the extreme points of either side of the machine with the machine in operating configuration, but with the hopper wings raised (see Figure A.20, dimension W_2);

— height, in millimetres: the vertical height from the horizontal ground plane (HGP) to the highest point of the machine with the machine in operating configuration (see Figure A.19, dimension H_3).

m) Operating mass, in kilograms:

The mass of the machine in operating configuration with a 75 kg operator. On wheeled machines, the mass of the tyre ballast shall be included if provided or recommended by the machine manufacturer.

6.3 Other characteristics

The following shall be specified (if applicable).

a) Spreading auger diameter, in millimetres. (See Figure A.18, dimension D_1.)

b) Spreading auger ground clearance, in millmetres.

The vertical distance from the HGP to the lowest point of the auger, including reversing paddles. If the auger height can be varied, the total range shall be given. The screed position (up/down) shall be stated. (See Figure A.18, dimension H_1.)

c) Conveyor capacity, in tonnes per hour, derived from the following equation:

Capacity = $D \times A \times S \times E$

where:

D is the paving material bulk density of 1,75 t/m^3;

A is the tunnel area, in square metres, as measured at the tunnel opening — total for all conveyors;

S is the maximum conveyor speed, in metres per minute, in paving mode, multiplied by 60;

E is the coefficient of conveyor efficiency (the conveyor efficiency used in the calculation shall be stated).

d) Tamper frequency, in Hertz.

e) Tamper stroke, in millimetres.

f) Angle of approach, in degrees:

The angle between the HGP and a plane tangent to the forward tyres or tracks of the machine and passing through the lowest point of any structure or component forward of the tyres or tracks which limits the magnitude of the angle. (See Figure A.18, angle α_1.)

g) Angle of departure, in degrees:

The angle between the HGP and a plane tangent to the rear tyres or tracks of the machine and passing through the lowest point of any structure or component behind the tyres or tracks which limits the magnitude of the angle. (See Figure A.18, angle α_2.)

h) Extension slope, as a percentage or in degrees:

The angle between the extension and the adjacent section of the screed. Maximum positive to maximum negative shall be specified. Positive slope is defined as the outer end of the extension lower than the inner end. (See Figure A.24.)

i) Screed heater capacity, in kilowatts:

The total heat input for all screed heaters. The type of heating (e.g. LPG, electricity, etc.), number of heaters, fuel type and fuel pressure shall be stated.

j) Traction drive — rear drive only or rear drive with front wheel assist.

k) Steering system — e.g. front wheel steering.

l) Electrical system:

— supply voltage;

— charging amperage.

m) Ground clearance, in millmetres:

The minimum vertical distance from the HGP to the lowest point of the tractor. (See Figure A.22, dimension H_2.)

n) Gauge — wheel/track, in millimetres. (See Figure A.19, dimension W_1, and Figure A.22, dimension W_1.)

o) Track length on ground, in millimetres:

The longitudinal distance of a track in contact with the HGP. (See Figure A.21, dimension L_3.)

p) Track width, in millimetres:

The transverse width of the track in contact with the HGP. (See Figure A.22, dimension W_4.)

q) Tyre size, in accordance with ISO 3911.

r) Wheel base, in millimetres:

The longitudinal distance from the centre of the rear tyre to the centre of the front tyre. For bogie front suspension, the distance is measured to the bogie pivot. For tandem drive axles, the distance is measured to a point midway between the axles. (See Figure A.18, dimension L_4.)

s) Truck entry clearance height, in millmetres:

The vertical distance from the HGP to the highest non-removable point on the hopper or apron which would restrict the entry of a truck into the hopper, with the machine in operating configuration. Points more than 1,3 m on either side of the longitudinal centre or more than 1,0 m rearward of the front of the push rollers shall be disregarded. (See Figure A.19, dimension H_5, and Figure A.21, dimension H_5.)

t) Truck entry clearance width, in millimetres:

The transverse distance between the innermost points of the hopper sides which would restrict the entry of a truck into the hopper, measured at or above the truck entry clearance height, with the machine in operating configuration. Points more than 1,0 m rearward of the front of the push rollers shall be disregarded. (See Figure A.22, dimension W_5.)

u) Overall shipping dimensions:

— length, in millmetres: the longitudinal distance between the extreme front and rear points of the machine with the machine in shipping configuration (see Figure A.21, dimension L_2);

— width, in millmetres: the transverse distance between the extreme points on the sides of the machine with the machine in shipping configuration (see Figure A.20, dimension W_2);

— height, in millmetres: the vertical distance from the HGP to the highest point of the machine in shipping configuration (see Figure A.22, dimension H_4).

v) Shipping mass, in kilograms:

The mass of the machine as shipped by the manufacturer including those standard components detached and shipped loose with the machine.

7 Measurements

7.1 General

Measurements shall be made with standard equipment or equipped as specified, without paving material, with full fuel, lubrication, cooling and hydraulic systems, and with pneumatic tyres at the machine manufacturer's recommended inflation pressure.

7.2 Operating configuration

Operating configuration shall be with standard equipment provided for normal placement of paving material and with the screed and hopper wings down.

7.3 Shipping configuration

Shipping configuration shall be with those items easily and normally detached for transport and removed, and the machine configured as recommended by the manufacturer.

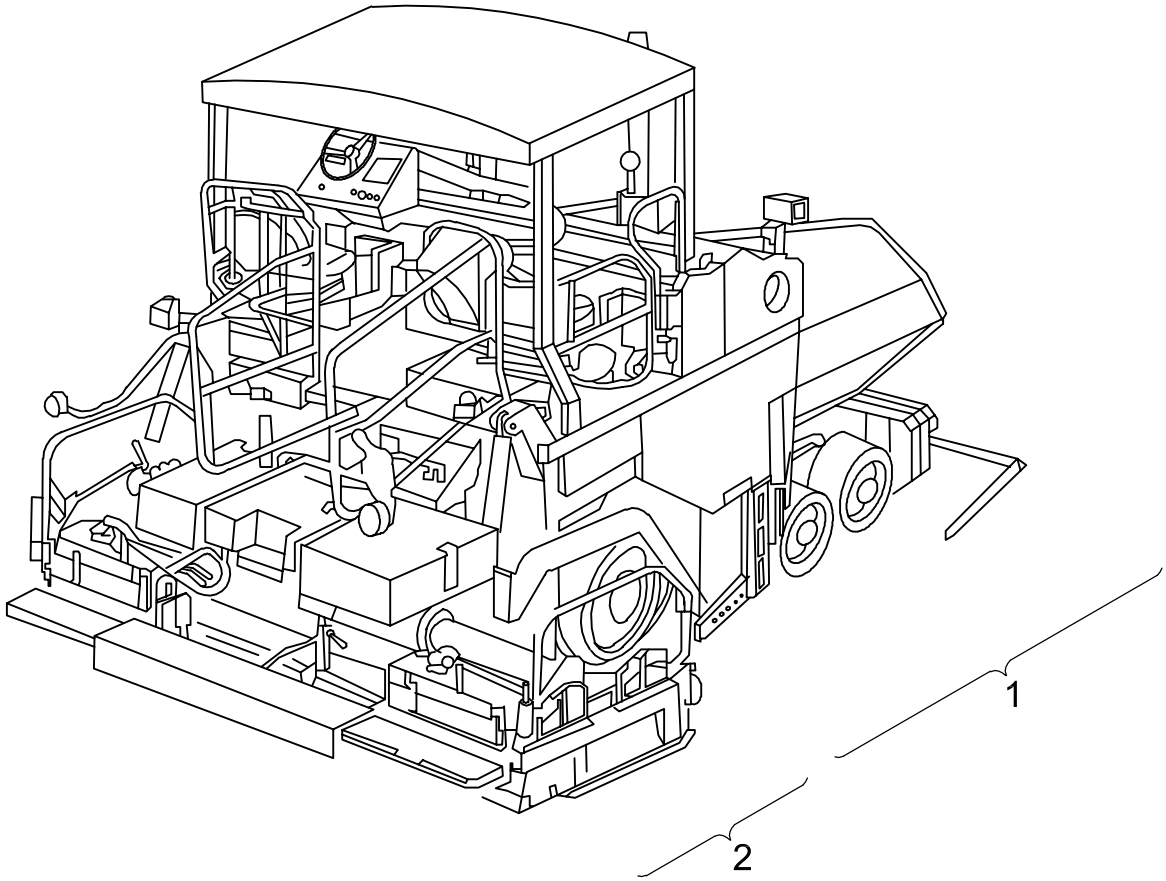
7.4 Material bulk density

Average paving material bulk density shall be assumed to be 1,75 t/m^3.

Annex A
(normative)

Structure and dimension characteristics of asphalt pavers — Examples

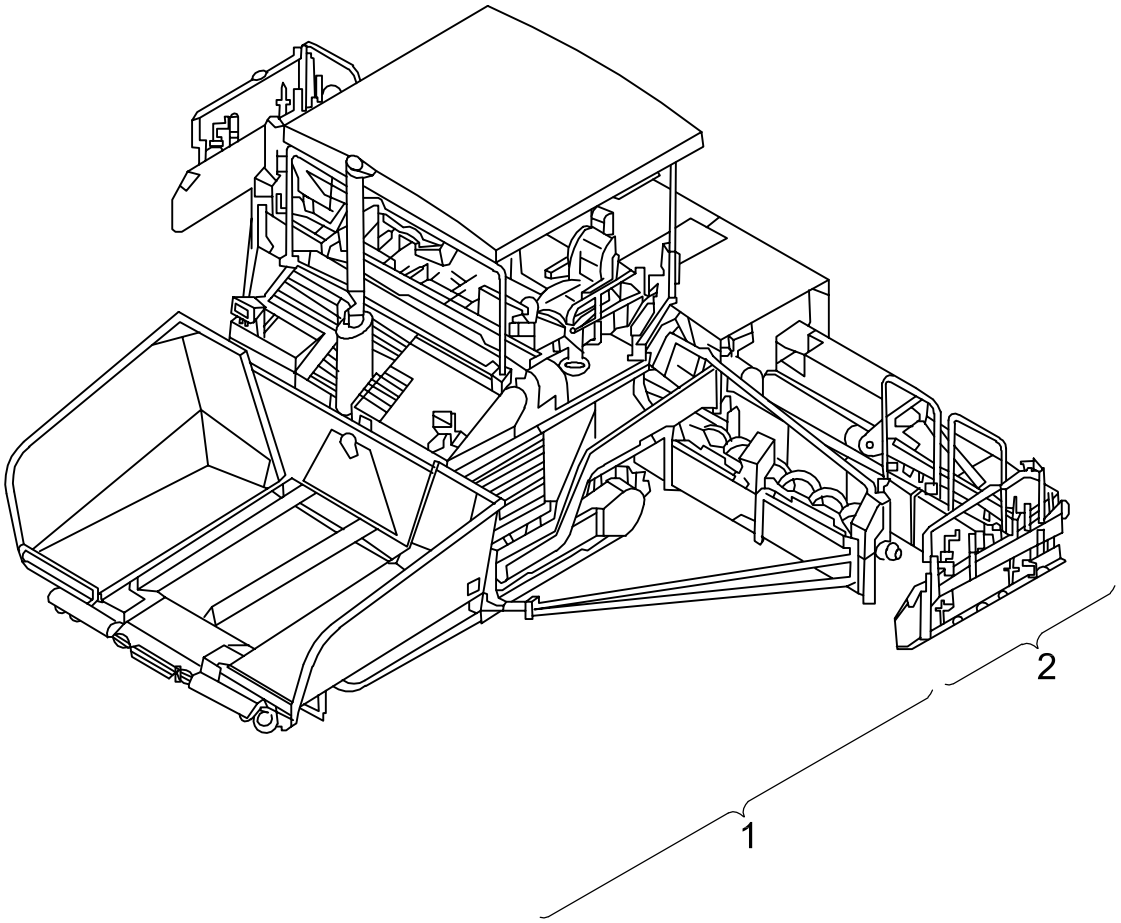
NOTE In Figures A.5, A.6, A.7, A.8 and A.12, the large arrow indicates the direction of travel.



Key

1 tractor and hopper
2 screed

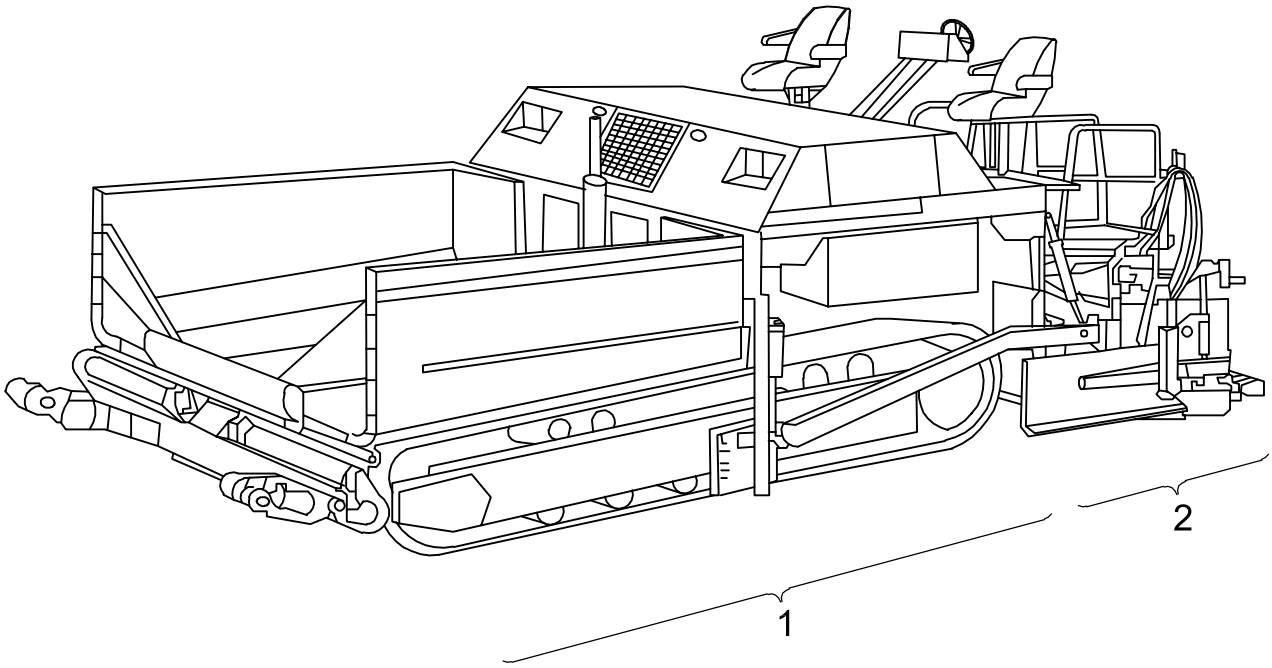
Figure A.1 — Wheeled asphalt paver



Key

1 tractor and hopper
2 screed

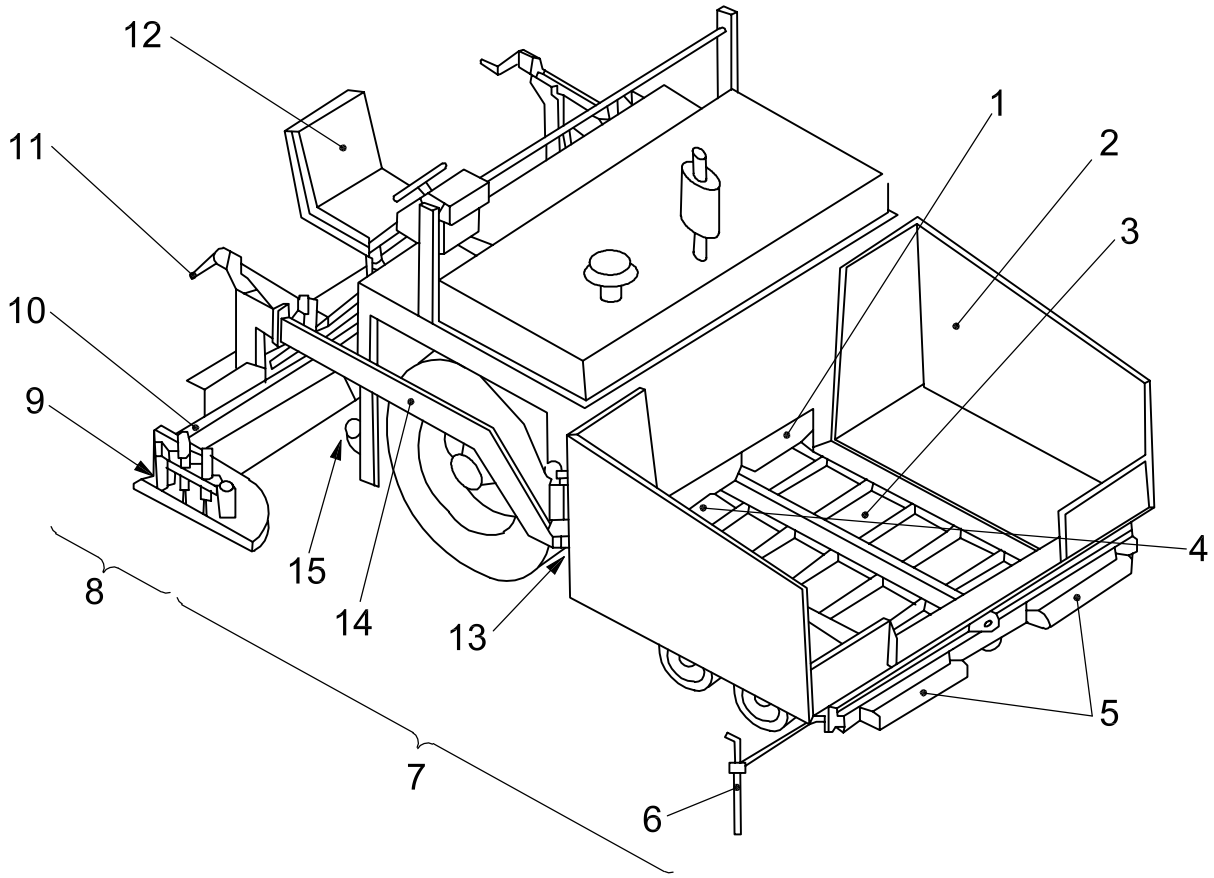
Figure A.2 — Steel tracked asphalt paver



Key

1 tractor and hopper
2 screed

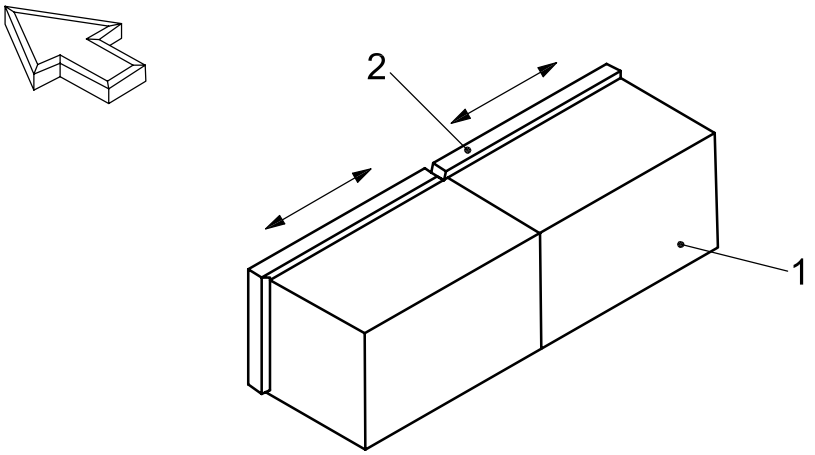
Figure A.3 — Rubber tracked asphalt paver



Key

1 conveyor flow gate
2 hopper
3 slat conveyor
4 conveyor tunnel
5 push rollers
6 steering guide
7 tractor
8 fixed width screed
9 screed end plate
10 adjustable width strike off
11 thickness control
12 operator station
13 tow point
14 screed arm
15 spreading auger

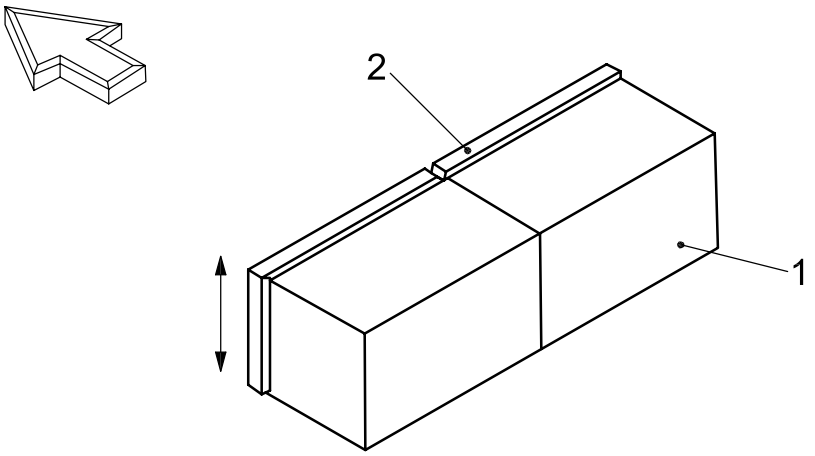
Figure A.4 — Wheeled asphalt paver with fixed width screed



Key

1 fixed screed
2 adjustable width strike off

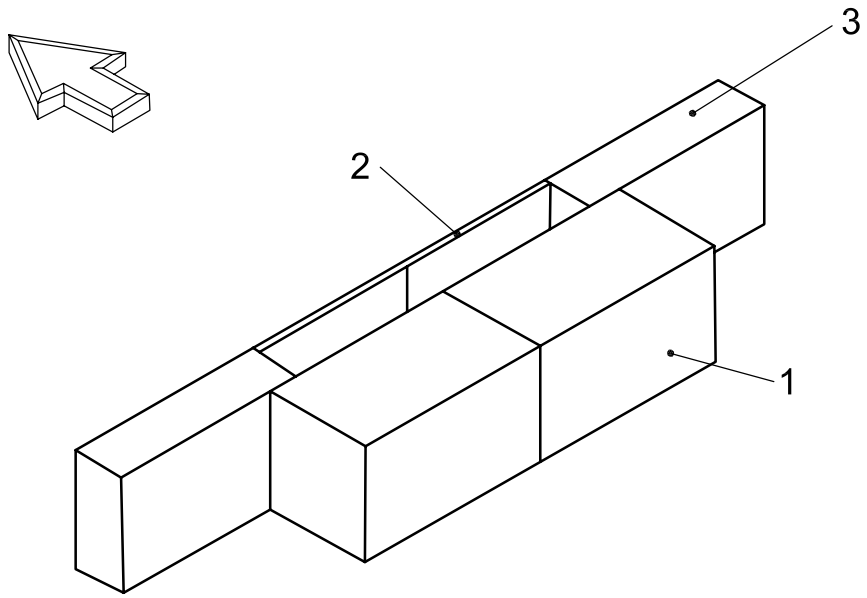
Figure A.5 — Adjustable width strike off



Key

1 screed
2 strike off (height-adjustable mouldboard)

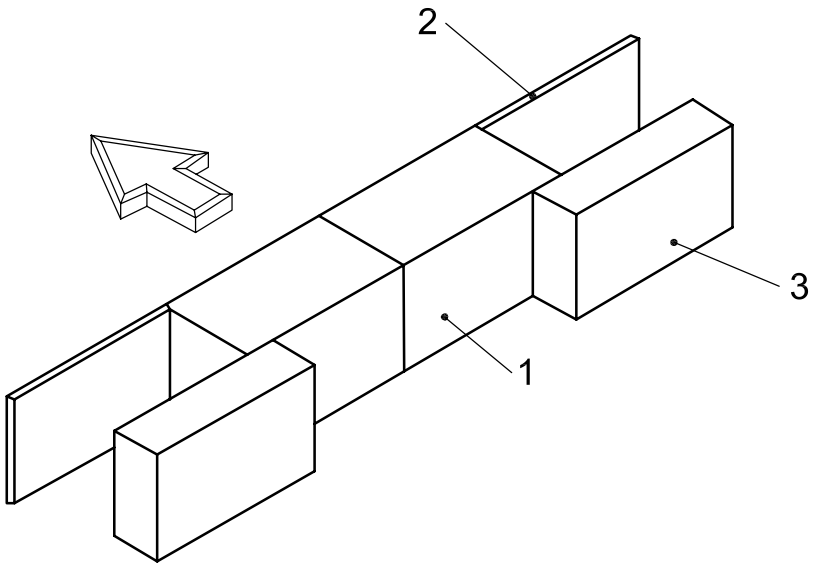
Figure A.6 — Strike off (height-adjustable mouldboard)



Key

1 screed
2 pre-strike off
3 front mounted extension

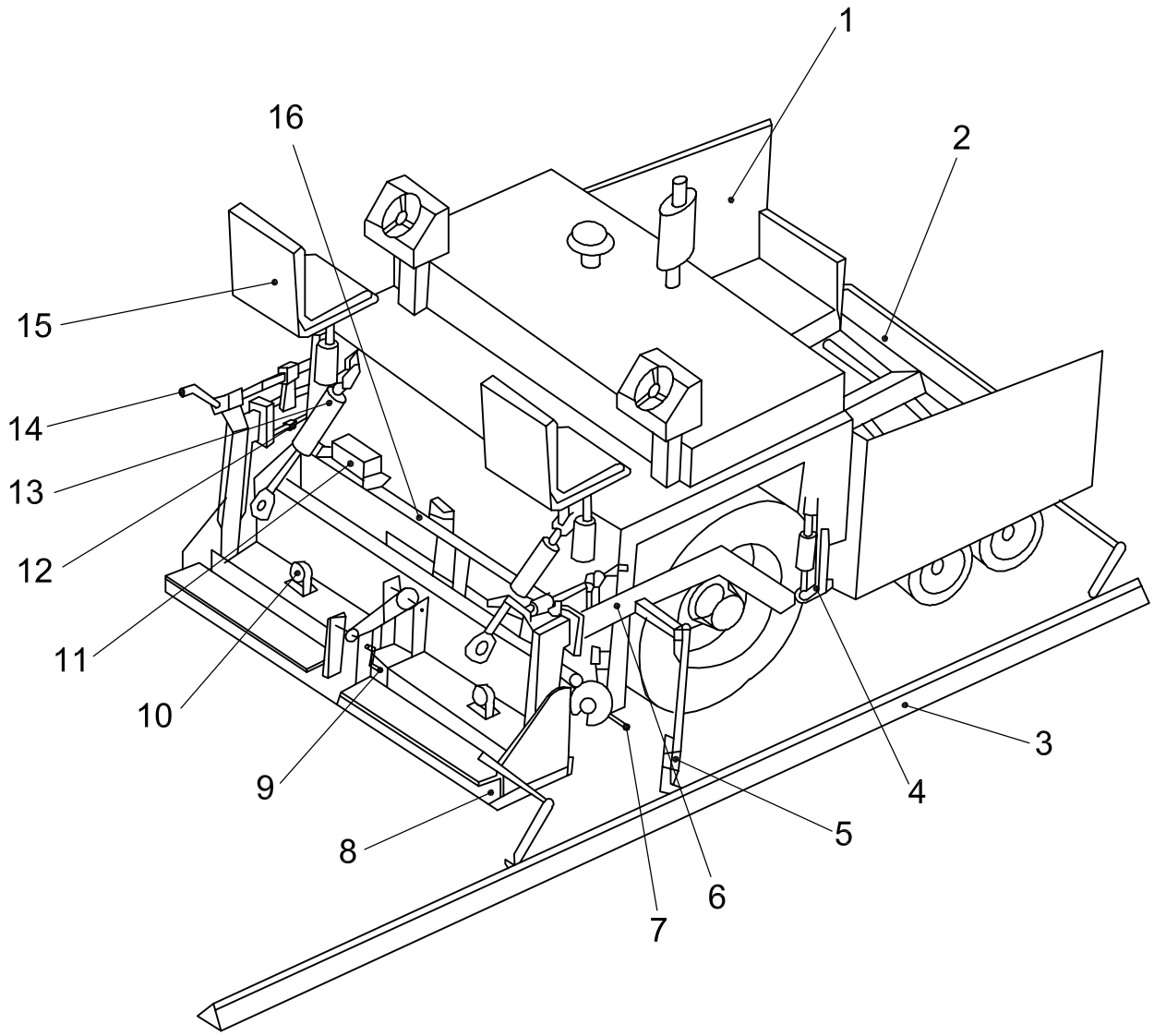
Figure A.7 — Pre-strike off on front mounted extensions



Key

1 screed
2 pre-strike off
3 rear mounted extension

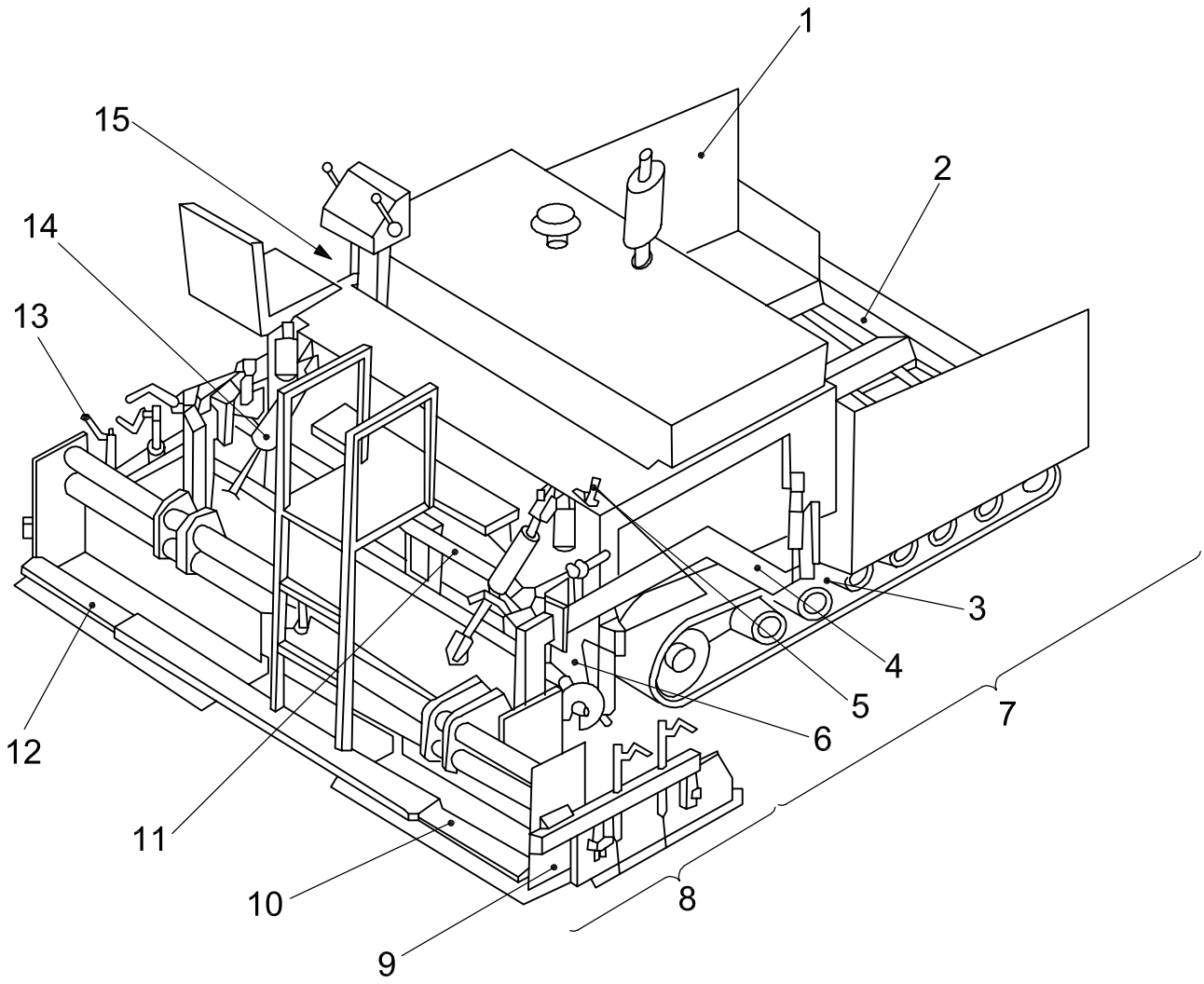
Figure A.8 — Pre-strike off on rear mounted extensions



Key

1	hopper	9	crown control
2	apron	10	screed heater
3	mobile grade reference	11	slope control
4	tow point	12	screed travel lock
5	grade control	13	screed lift
6	screed arm	14	thickness control
7	material feed sensor	15	operator station
8	screed plate	16	slope beam

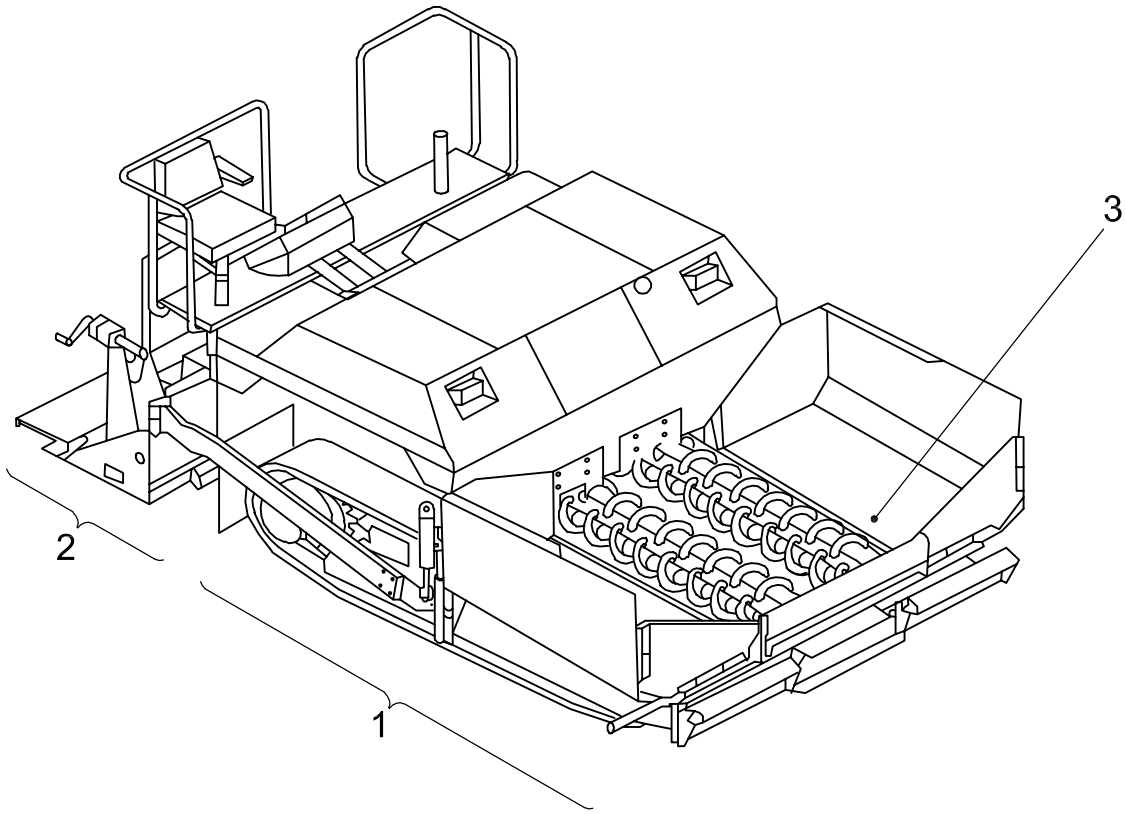
Figure A.9 — Wheeled asphalt paver with fixed width screed



Key

1	hopper	9	screed end plate
2	apron	10	screed extension
3	tow point	11	slope beam
4	screed arm	12	screed plate
5	screed travel lock	13	thickness control
6	material feed sensor	14	screed lift
7	tractor	15	operator station
8	screed		

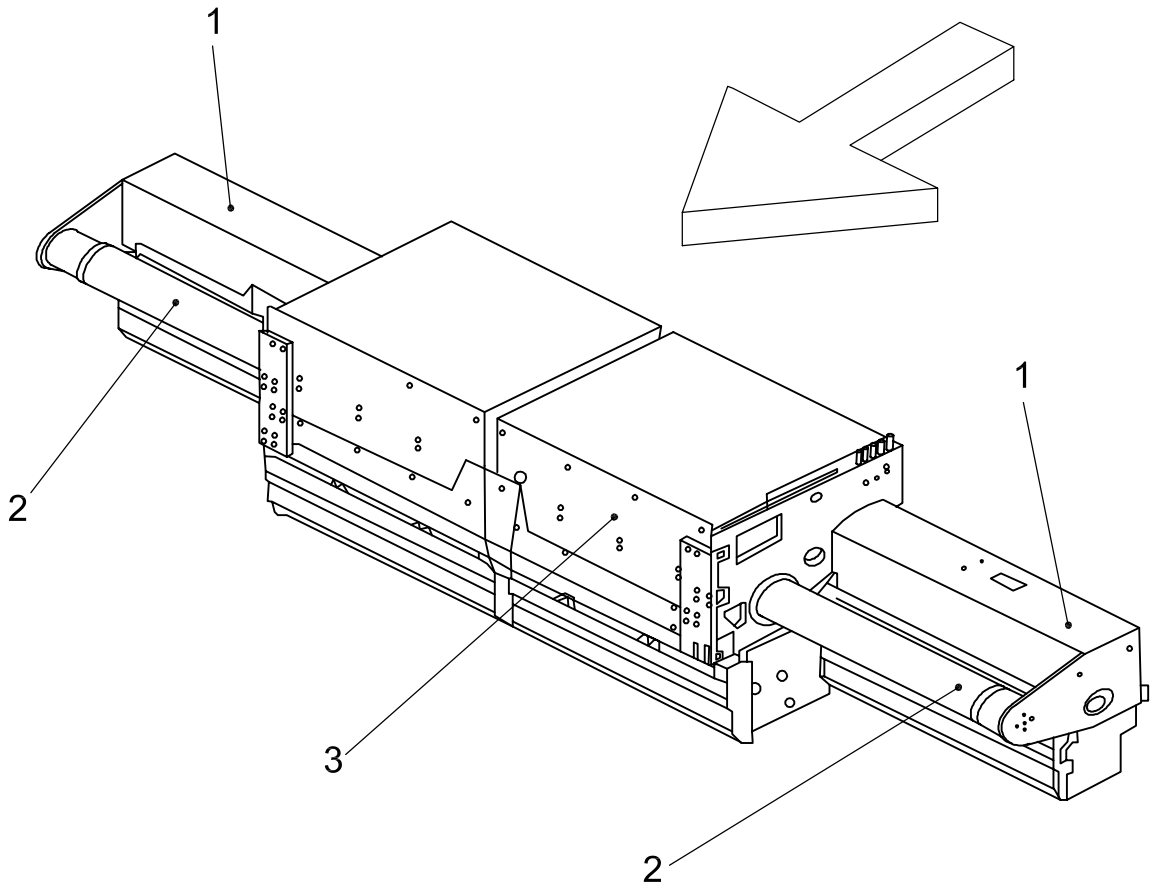
Figure A.10 — Tracked asphalt paver with variable width screed



Key

1 tractor and hopper
2 screed
3 delivery auger conveyor

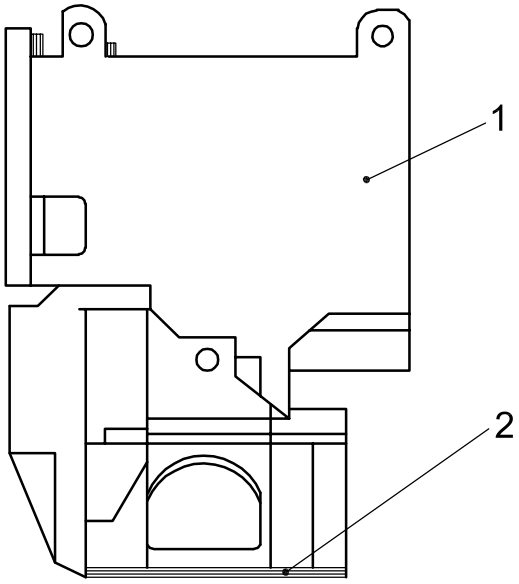
Figure A.11 — Tracked asphalt paver with delivery auger conveyors



Key

1 rear mounted extension
2 hydraulic cylinder for extension
3 screed body

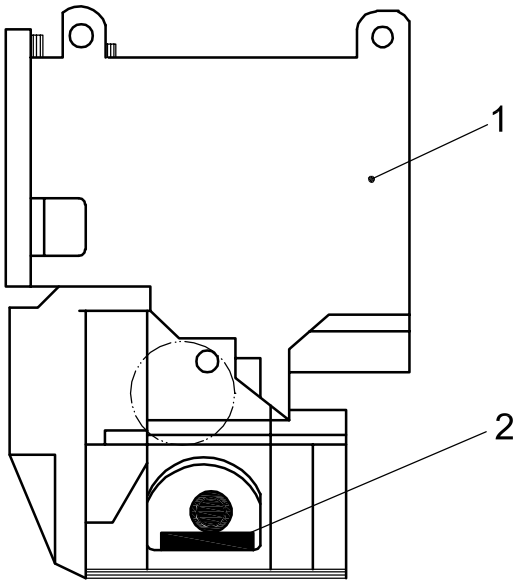
Figure A.12 — Hydraulically extendable screed



Key

1 screed body
2 screed plate

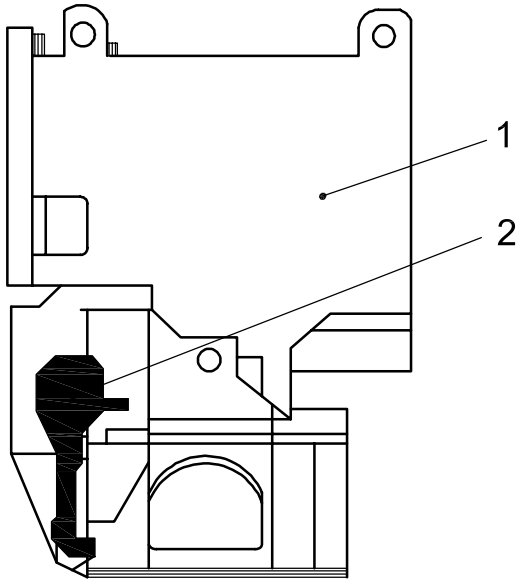
Figure A.13 — Static compaction screed



Key

1 screed body
2 vibrator

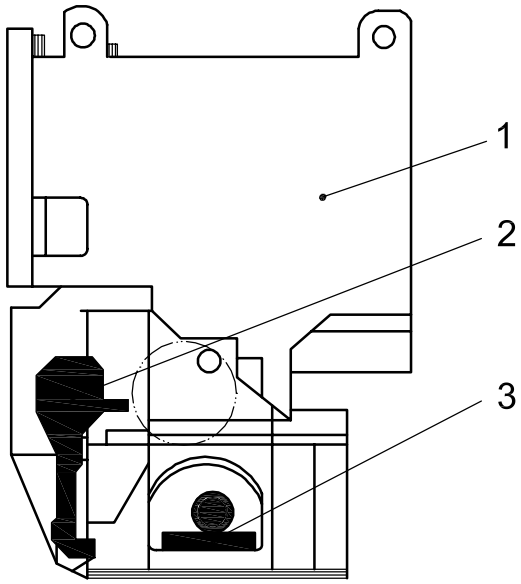
Figure A.14 — Dynamic compaction screed with vibration



Key

1 screed body
2 tamper bar

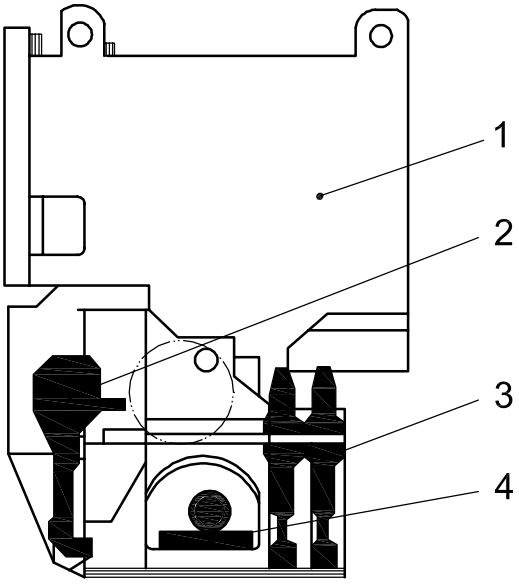
Figure A.15 — Dynamic compaction screed with tamper bar



Key

1 screed body
2 tamper bar
3 vibrator

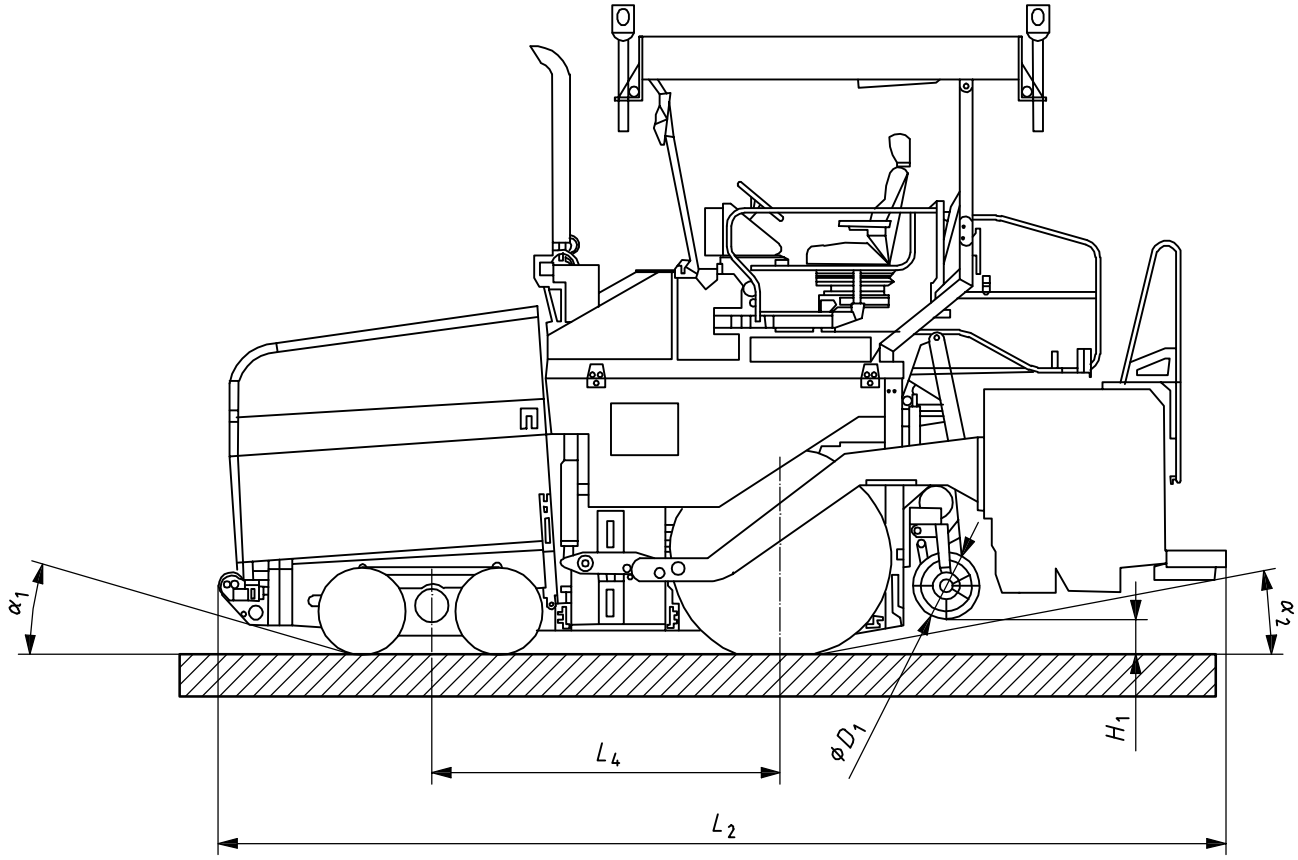
Figure A.16 — High-compaction screed with tamper bar and vibration



Key

1 screed body
2 tamper bar
3 pressure bar
4 vibrator

Figure A.17 — High compaction screed with tamper bar, vibration and two pressure bars



Key

D_1 spreading auger diameter

α_1 angle of approach

α_2 angle of departure

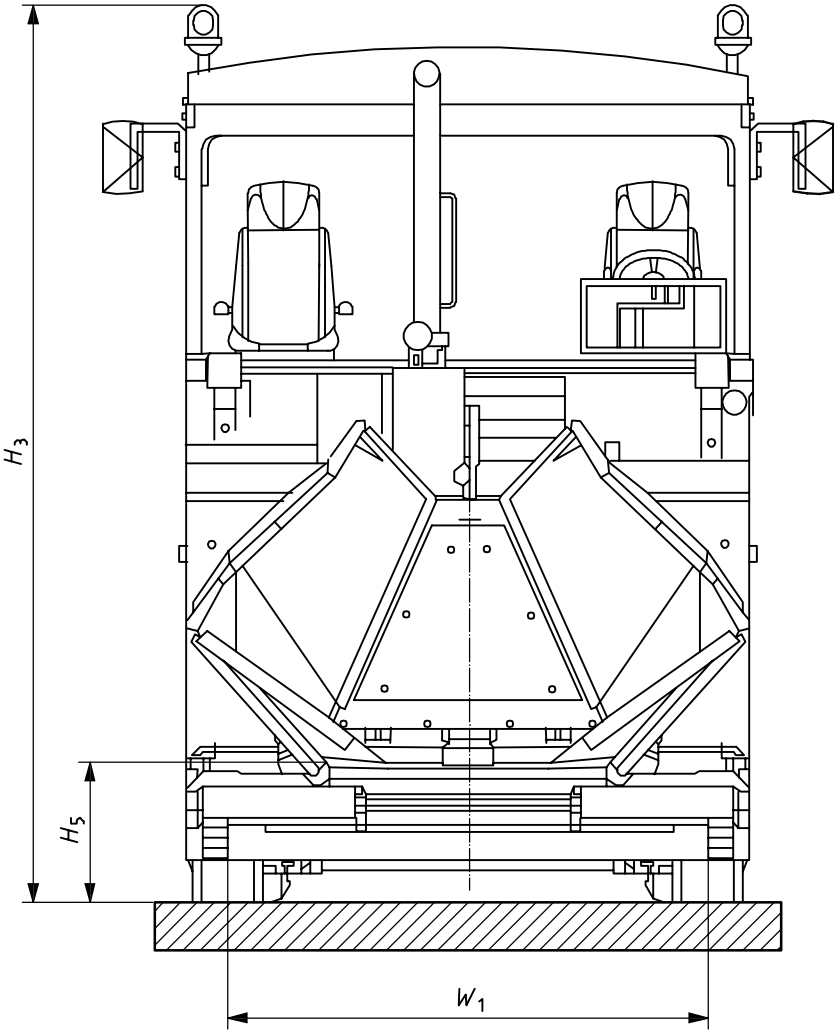
H_1 auger ground clearance

L_4 wheel base

L_2 shipping length

NOTE Dimensions presented are only for illustration of parameters given in 6.3 and do not show the full dimensional characteristics of the paver.

Figure A.18 — Dimensions of a wheeled asphalt paver



Key

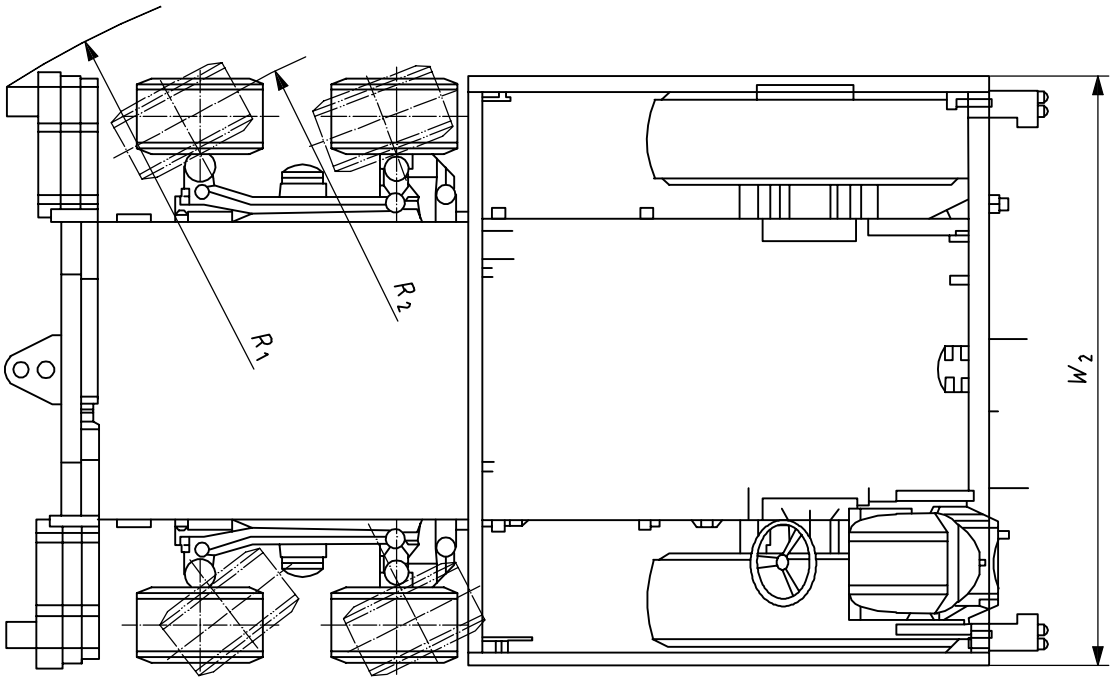
H_3 operating height

H_5 truck entry clearance height

W_1 gauge — wheel

NOTE Dimensions presented are only for illustration of parameters given in 6.2 and 6.3 and do not show the full dimensional characteristics of the paver.

Figure A.19 — Wheeled asphalt paver — Front view



Key

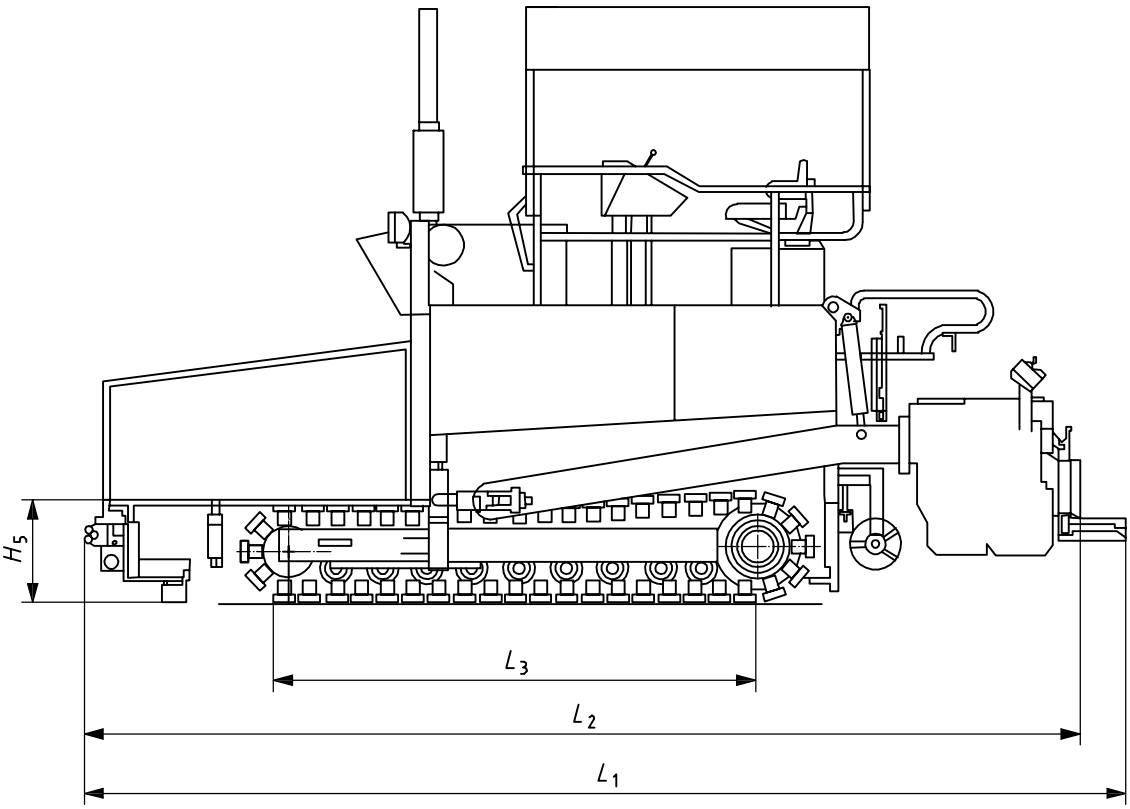
W_2 operating width — maximum

R_1 machine clearance circle

R_2 turning radius

NOTE Dimensions presented are only for illustration of parameters given in 6.2 and 6.3 and do not show the full dimensional characteristics of the paver.

Figure A.20 — Wheeled asphalt paver — Top view



Key

L_1 operating length

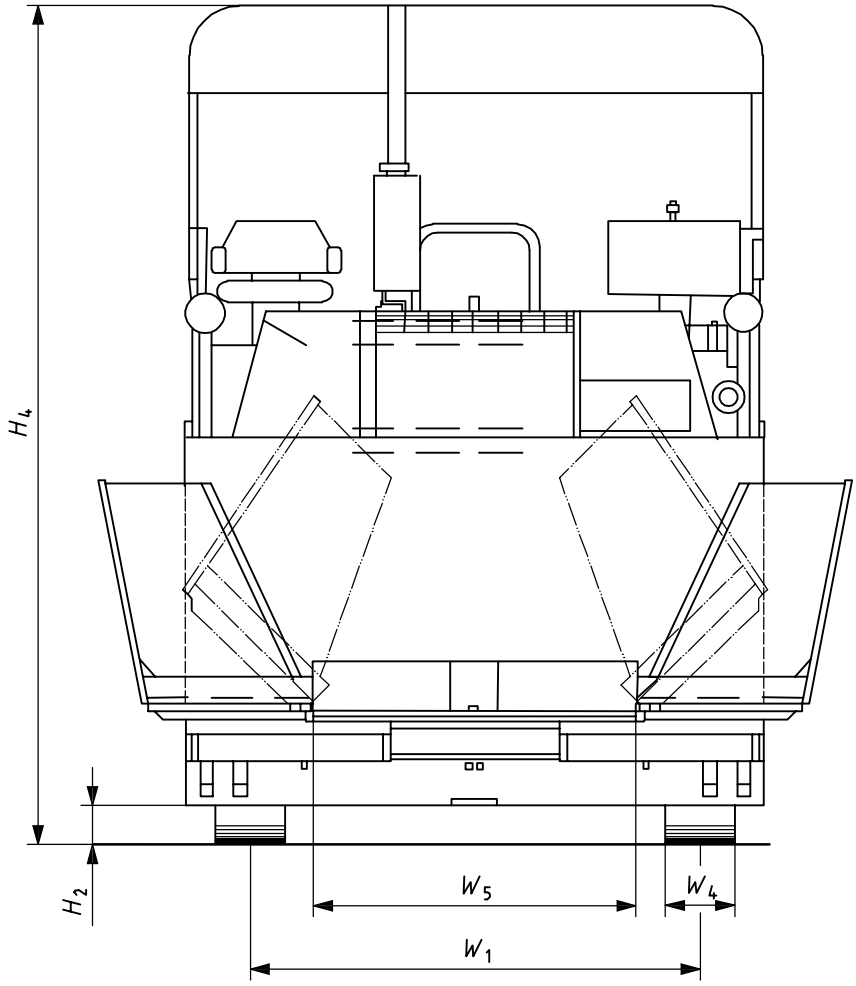
L_2 shipping length

L_3 track length on ground

H_5 truck entry clearance height

NOTE Dimensions presented are only for illustration of parameters given in 6.2 and 6.3 and do not show the full dimensional characteristics of the paver.

Figure A.21 — Dimensions of a tracked asphalt paver



Key

H_2 ground clearance

H_4 shipping height

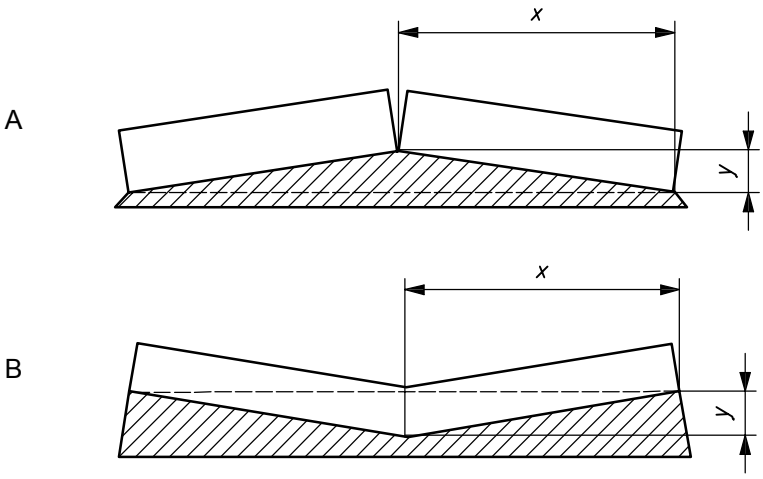
W_1 gauge — track

W_4 track width

W_5 truck entry clearance width

NOTE Dimensions presented are only for illustration of parameters given in 6.3 and do not show the full dimensional characteristics of the paver.

Figure A.22 — Tracked asphalt paver — Front view



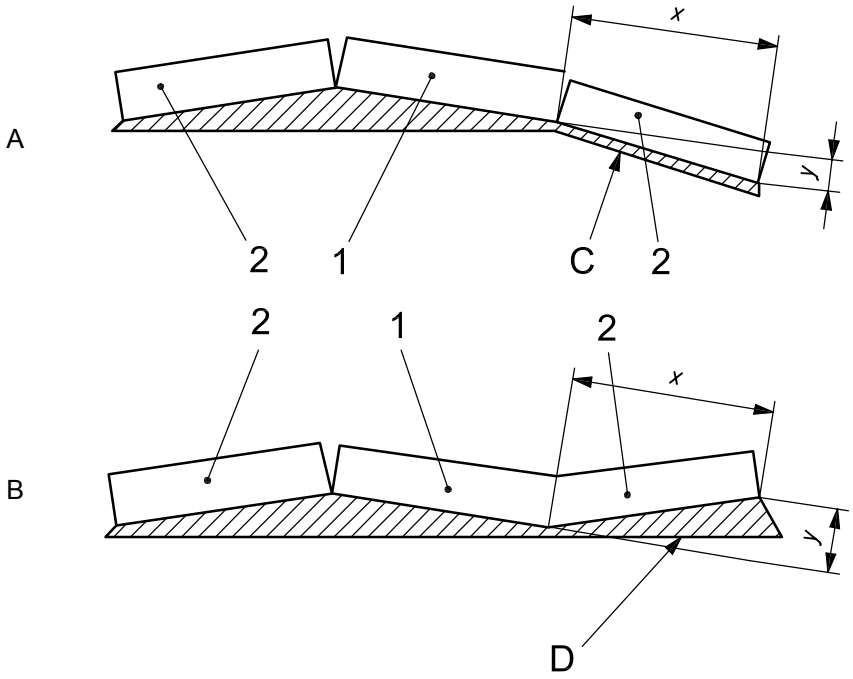
Key

A positive crown

B negative crown

NOTE Crown value is calculated from the formula $(y/x) \times 100$ %.

Figure A.23 — Crown



Key

1 main screed

2 extension screed

A extension — positive slope

B extension — negative slope

C, D slopes

NOTE Slope values C and D are calculated from the formula $(y/x) \times 100$ %.

Figure A.24 — Extension slope

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