

## PAKISTAN STANDARD SPECIFICATIONS FOR REAR BLADE

### 1 SCOPE

- 1.1 This standard specifies the material, dimensions, manufacturing and other requirements of major/critical components/sub-assemblies and replacement parts of tractor rear mounted blade to ensure proper quality control measures in the manufacture of these implements.
- 1.2 This standard is related to trade and manufacturing practices prevailing in the country and therefore, permits the purchaser to use his option for selecting the implement to suit his requirements.

### 2 NORMATIVE REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of PS ---/2018. At the time of publication, the edition indicated was valid. All the normative references listed below are subject to revision, and parties to agreement, based on this part of PS ---/2018 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below;

- i) ISO 530-1:1994(E): Agricultural tractors – Rear-mounted three-point linkage – Part 1: Categories 1, 2, 3 and 4.
- ii) PS 1650/1/1984: Specification for Agricultural Wheeled Tractors – Three point linkage – Part 1: categories 1, 2 and 3.
- iii) PS 1808/86: Agricultural wheeled tractors – Three-point linkage – Linchpins.
- iv) PS 877/72: The provision of safety on farm implements.
- v) ASAE S318.9/SAE J208d: Safety for Agricultural equipment.

### 3 DEFINITIONS

For the purpose of this Pakistan Standard, the following definitions shall apply.

- 3.1 **Rear blade:** A tractor rear mounted equipment which is used to scrap and transport soil for the purpose of rough land leveling, removal of un-wanted banks and hedges, and forming of bund or their demolishing. The equipment can also be used for filling in drains and trenches.
- 3.2 **Linkage Categories:** Linkage categories have been standardized through PS 1650/I/1984 and ASAE S318.9/SAE J208d as per tractor drawbar power which helps in selecting matching size of implements with tractor drawbar power. Recommended size of implement to be used with specified tractor drawbar power and associated category of three point linkage system of the tractor is shown below;

Linkage Category	Tractor drawbar power		Recommended size of blade
	kW	HP	
1	15-35	20-45	1829 & 1980 mm(6 & 6.5 ft)
2	30-75	40-100	1980 & 2133 mm (6.5 & 7 ft)
3	60-168	80-225	2133 & 2286 mm (7 & 7.5 ft)

- 3.3 **Three point linkage assembly:** Combination of one upper link and two lower links, each articulated to the tractor and the implement at the opposite ends in order to connect the implement to the tractor.
- 3.4 **Three-point hitch assembly:** Combination of implement mast (providing yoke with hole for insertion of upper hitch attachment) and two lower hitch attachments on the implement, each used to connect tractor links with the implement rigidly.
- 3.5 **Upper hitch attachment:** Pin, usually detachable and forming part of the upper link assembly, by which an upper link is secured.
- 3.6 **Lower hitch attachment:** Pin, or clevis and pin, usually attached to the implement, by which a lower link is secured.
- 3.7 **Hitch point:** Articulated connection between link and implement.
- 3.8 **Mast:** Component of the implement that provides location of the upper hitch point on the implements.
- 3.9 **Linchpin:** Pin, usually fitted with a spring retaining device, by which an articulated connection is retained in position.
- 3.10 **Lower hitch attachment span:** Distance between the shoulders of the lower hitch pins or inner faces of the clevis prongs against which the sides of the lower link socket ball joints abut.
- 3.11 **Mast height:** Vertical distance between the center line of the upper hitch point and the
- 3.12 **Mounted Implement:** An implement which is directly attached with the tractor by connecting three point linkages and three point hitch. During transportation, implement is lifted by the three point linkage with the help of tractor hydraulic system.
- 3.13 **Mild Steel (MS):** Steel with low carbon contents in the range of 0.05%-0.25% carbon. It is commonly used for implement frame, mast and other non-wearing and structural components of the implements.
- 3.14 **Medium Carbon Steel (MCS):** Steel with medium carbon contents in the range of 0.29-0.54 percent. It is commonly used for soil working and wearing components of the implements.
- 3.15 **Angle of Cutting Edge:** The angle included between two faces of the cutting edge.
- 3.16 **Blade:** A hardened steel plate of trapezoidal section fastened to the bowl scraper for cutting of soil.
- 3.17 **Cutting Edge:** The front portion of the blade which penetrates into the soil and makes a horizontal cut below the surface.
- 3.18 **Reversible Blade:** The blade which can be fastened in two positions in such a way that any one of the two cutting edges can be used for cutting the soil.

## 4 DIMENSIONAL, MATERIAL AND MANUFACTURING REQUIREMENTS

*Note: All dimensions are in mm and minimum, except where tolerances are specified.*

### 4.1 Frame and three-point hitch assembly (Figure 1)

Frame and three-point hitch assembly of a typical rear blade is shown in Figure 1(a).

#### 4.1.1 Frame assembly

4.1.1.1 The frame assembly shall consist of main frame structure, mast mounting structure, reinforcement structure, blade mounting structure and bucket plates.

4.1.1.2 Main frame structure shall be made from MS box 80 x 80 x 6 mm.

4.1.1.3 Mast mounting structure shall be made from MS box measuring 65 x 65 x 6 mm which shall be welded to main frame and reinforced with pieces of angle iron.

4.1.1.4 Reinforcement structure shall be made from MS angle measuring 65 x 65 x 6 mm.

4.1.1.5 Blade mounting structure shall consist of lower horizontal member and vertical members. Lower horizontal member shall be made from MS angle 65 x 65 x 6 mm and vertical members shall be made from MS angle 65 x 65 x 6 mm. Horizontal members shall be spaced at  $200 \pm 10$  mm apart and the number of vertical members shall be according to width of the blade. The vertical members shall be welded to main frame at the top and horizontal member at the bottom.

4.1.1.6 Bucket plates shall be made from MS plate ---(10) mm thick.

#### 4.1.2 Three-point hitch assembly

Three point hitch assembly shall conform to provisions of PS 1650/1/1984 and ISO 530-1:1994(E) and shall consist of a mast yoke to connect upper hitch point and two lower hitch attachments to connect lower hitch points with the implement.

##### **Mast**

4.1.2.1 The mast shall be made from MS flat of 62 x12 mm and shall be reversible.

4.1.2.2 The front and rear mast yokes shall be joined using 02 Nos. mast connecting bars made from of MS flat 50 x13 mm.

4.1.2.3 Width between inner faces of yoke ( $W_1$ ), width between outer faces of yoke ( $W_2$ ) and diameter of yoke hole ( $D_1$ ) shall have dimensions as specified in Table 1.

##### **Lower hitch attachments**

4.1.2.4 Lower hitch attachment may be pin type which shall be mounted on hitch mounting structure of main frame.

4.1.2.5 Lower hitch attachment hole diameter ( $D_2$ ) shall be made at a place to ensure that mast height ( $H_1$ ) and span of lower hitch points ( $S$ ) shall be as specified in Table 1.

*Note: Vital dimensions of three-point hitch assembly are shown in Table 1 and Figure 1 (b).*

4.1.3 **Upper hitch attachment, lower hitch attachment and linchpin (Figure 2)**

4.1.3.1 Upper hitch attachment, lower hitch attachment and Linchpin shall be made from cold drawn MS which shall be zinc coated to make these corrosion resistant.

4.1.3.2 Upper hitch attachment and lower hitch attachment for different categories of three point linkages shall have dimensions as specified in Table 2.

4.1.3.3 Linchpin for different categories of three point linkage systems shall conform to provisions of PS 1808/86 and shall have dimensions as specified in Table 3.

**Table 1: Vital dimensions of three-point hitch**

Dimension	Cat 1		Cat 2		Cat 3	
	Min.	Max.	Min.	Max.	Min.	Max.
<b>Mast</b>						
Width between inner faces of yoke ( $W_1$ )	44.5	-	52.0	-	52.0	-
Width between outer faces of yoke ( $W_2$ )	-	69	-	86	-	95
Diameter of yoke hole ( $D_1$ )	19.30	19.32	25.70	25.72	32.00	32.25
Mast height (H)	460 ± 1.5		610 ± 1.5		685 ± 1.5	
<b>Lower hitch attachments</b>						
Diameter of lower hitch attachment hole ( $D_2$ )	22.40	22.73	28.70	29.03	37.40	37.75
Lower hitch attachments span (S)	683 ± 1.5		825 ± 1.5		965 ± 1.5	

**Table 2 (a): Upper hitch attachment dimensions**

Dimension	Cat 1	Cat 2	Cat 3
Diameter of upper hitch attachment (B)	18.97 - 19.00	25.27 - 25.40	31.50 - 31.75
Linchpin hole distance (A)	76 min	93 min	102 min
Diameter of linchpin hole (C)	12	12	12

**Table 2 (b): Lower hitch attachment dimensions**

Dimension	Cat 1	Cat 2	Cat 3
Diameter of lower hitch attachment (B)	21.79 - 22.00	27.79 - 28.00	36.40 - 36.50
Linchpin hole distance (A)	39 min	49 min	52 min
Diameter of linchpin hole (C)	12	12	17

**Table3: Linchpin dimensions**

Dimension	Cat 1	Cat 2	Cat 3
Linchpin length (A)	32	32	32
Diameter of Linchpin (B)	11	11	16
Diameter of Linchpin wire (C)	3	3	3

## 4.2 **Blade Assembly (Figure 3)**

- 4.2.1 The blade assembly shall consist of blade bucket, blade support and cutting edge as shown in Figure 3 (a).
- 4.2.2 Blade bucket shall be made from formed MS plate 10 mm thick which shall be welded to blade mounting structure and main frame at both ends.
- 4.2.3 Blade support shall be made from MS flat 50 x 12 mm which shall be welded to blade bucket at the rear and bolted to the mast mounting structure at the front.
- 4.2.4 Cutting edge shall be made from forged, hardened and tapered MCS with rear end 6 mm and front end 4 mm thick. Blade shall have hardness of **HRC 45**.
- 4.2.5 Blade bucket and cutting edge shall have dimensions as shown in Figure 3 (b).
- 4.2.5.1 Cutting edge shall be bolted with the blade bucket using M10 counter sunk bolts.

## 5 **OTHER REQUIREMENTS**

- 5.1 All the structural components shall be manufactured by using new materials.
- 5.2 All the market items pipes, nuts and bolts shall be brand new.
- 5.3 Nuts and bolts shall be zinc coated.
- 5.4 Overall size and weight of the rear blade shall be declared by the manufacturer.
- 5.5 All the components/sub-assemblies shall be welded at right angle and parallel members of the frame shall be of equal length and size.
- 5.6 All the nut bolt fastenings shall be tightened at appropriate torque using imported spring washers.
- 5.7 Operation and maintenance (O&M) manual shall be provided in English & Urdu with complete illustrations of assembling of replaceable components.
- 5.8 O&M manual shall also contain relevant safety instructions as provided in PS 877:1972 and ASAE S318.9/SAE J208d.
- 5.9 A set of pins with linchpins and two adjustable wrenches of 250 mm and 300 mm size should also be provided.
- 5.10 The implement shall be painted preferably using baking/stoving paint with primer.

## 6 **FINISH AND WORKMANSHIP**

- 6.1 All components of the rear blade should be free from pits, burrs and other visual defects.
- 6.2 The welding of various parts shall be satisfactory in all respects.

- 6.3 All the weld-ments shall be smoothed by grinding.
- 6.4 All the exposed parts shall have protective coating to prevent surface from rusting and to avoid deterioration in transit and during storage.

## **7 MARKING AND PACKING**

- 7.1 Each rear blade shall be marked with the following particular:
  - 7.1.1 Manufacturer's name, address, contact numbers and trade-mark, if any;
  - 7.1.2 Maximum size and number of tines; and
  - 7.1.3 Batch or code number.
- 7.2 The particulars listed under 7.1.1, 7.1.2 and 7.1.3 shall be stamped embossed or engraved on metallic plate and rigidly fitted on a non-wearing part of the rear blade.
- 7.3 Each rear blade may also carry the PSQCA Certification Mark subject to verification by the competent authority.
- 7.4 The rear blade should be packed to ensure safety of the components in transportation as agreed to between the purchaser and the manufacturer/supplier.

***Note:** Design of a typical Rear Blade is shown in Figure 4. The design can be modified as agreed between the purchaser and the manufacturer subject to compliance of these standard specifications.*

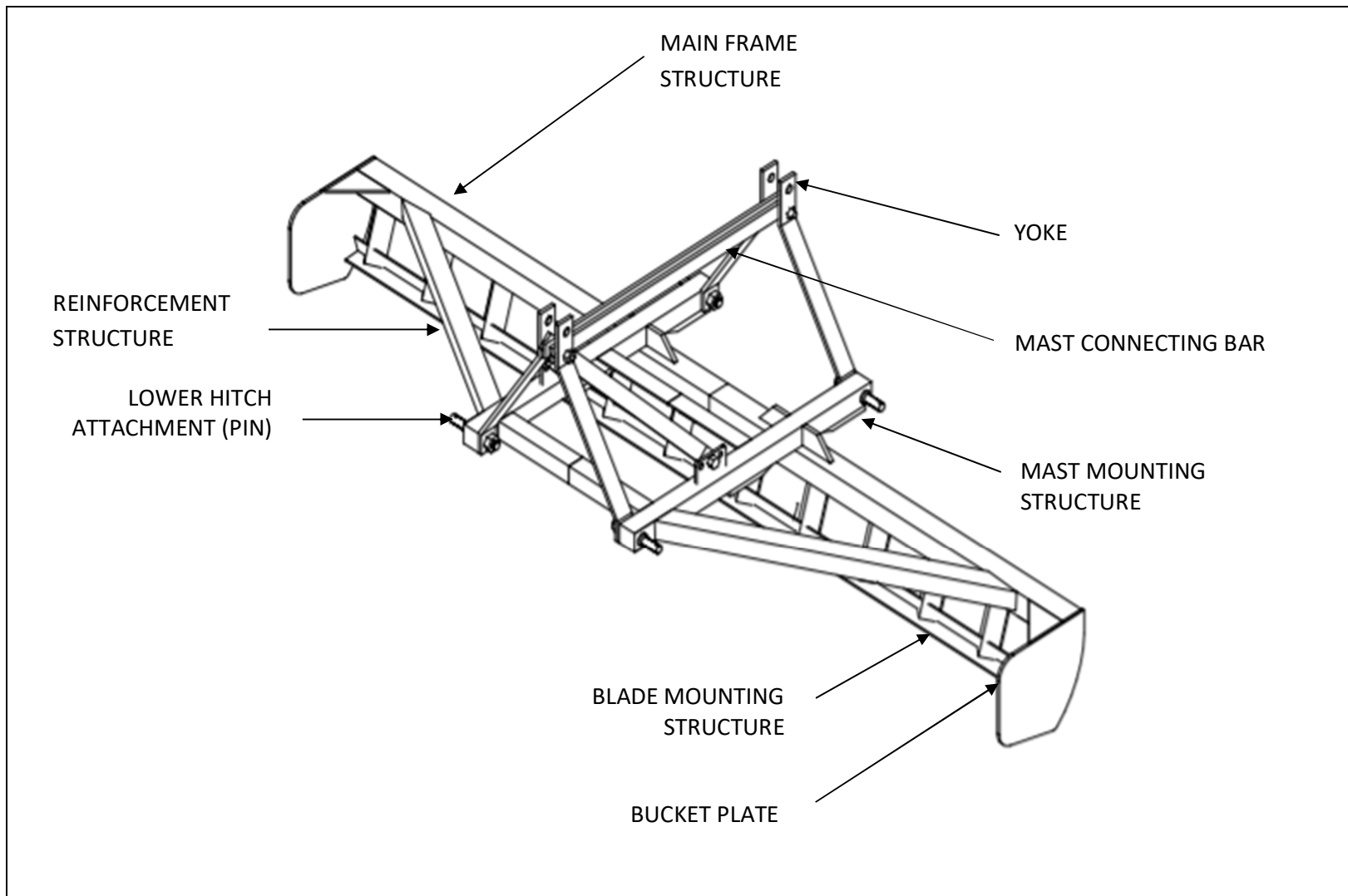


Figure 1(a): Frame and three-point hitch assembly

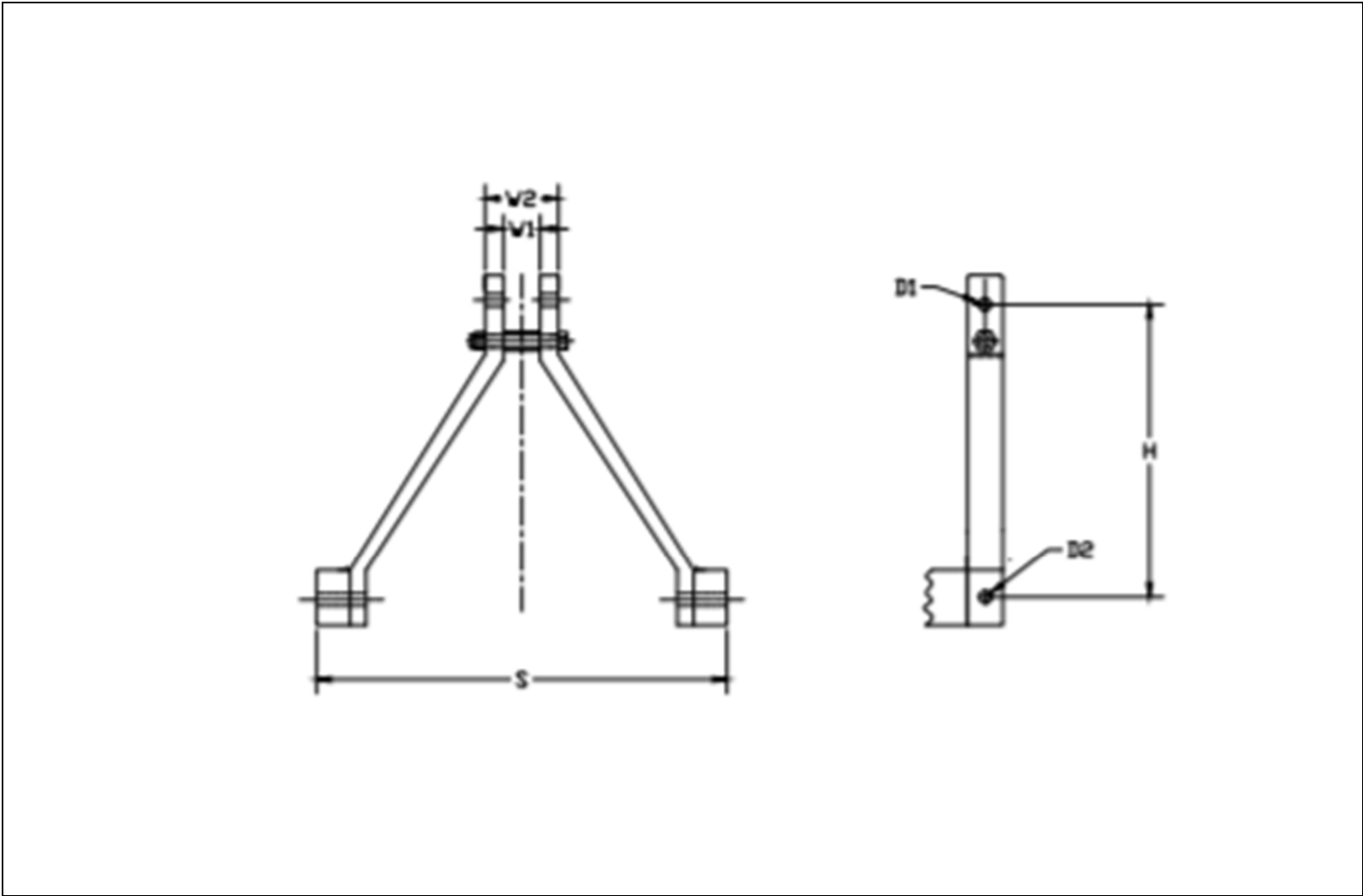


Figure 1(b): Three point hitch dimensions



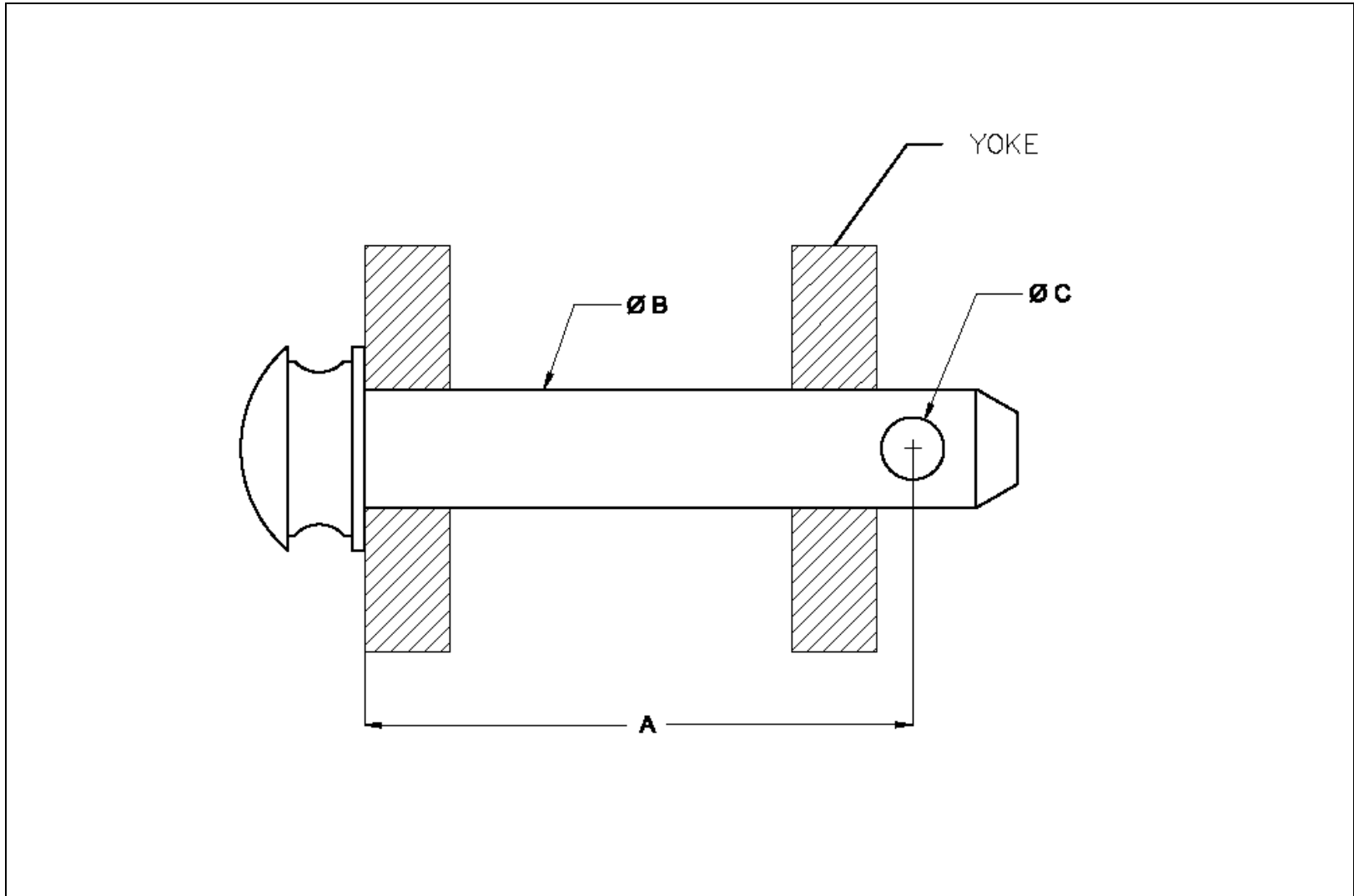


Figure 2(a): Upper hitch attachment dimensions

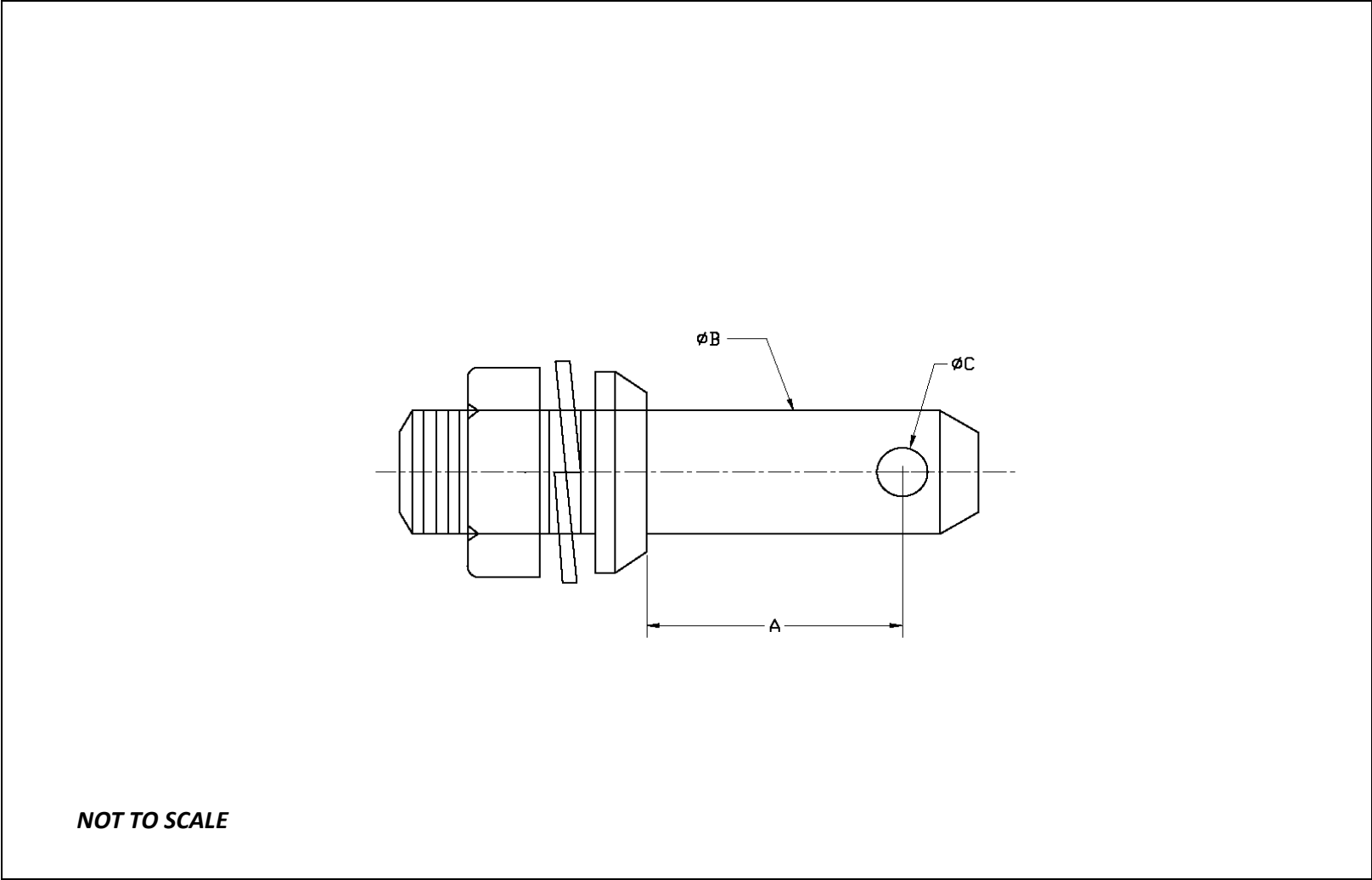


Figure 2 (b): Lower hitch attachment dimensions

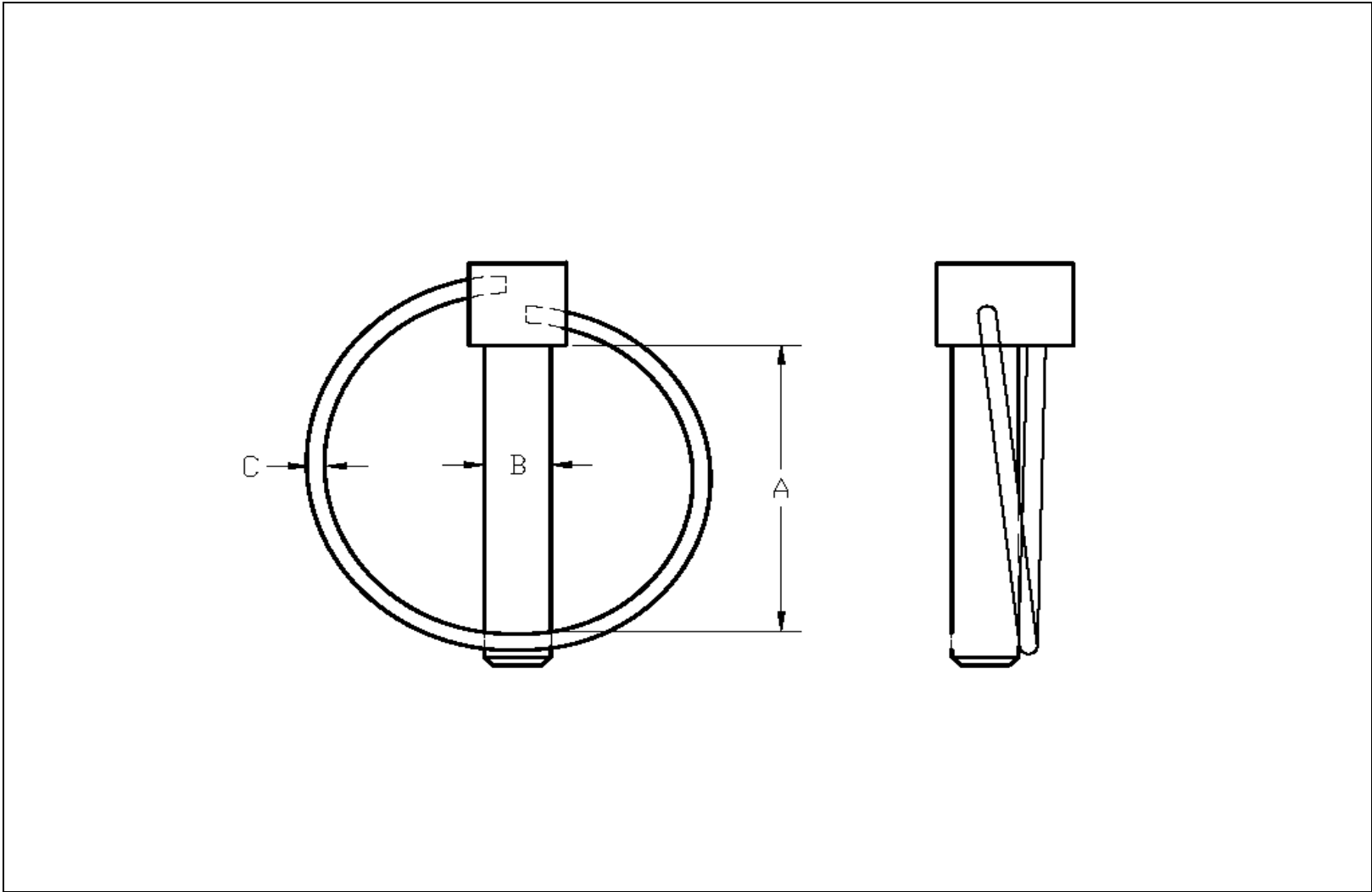


Figure 2 (c): Linchpin dimensions

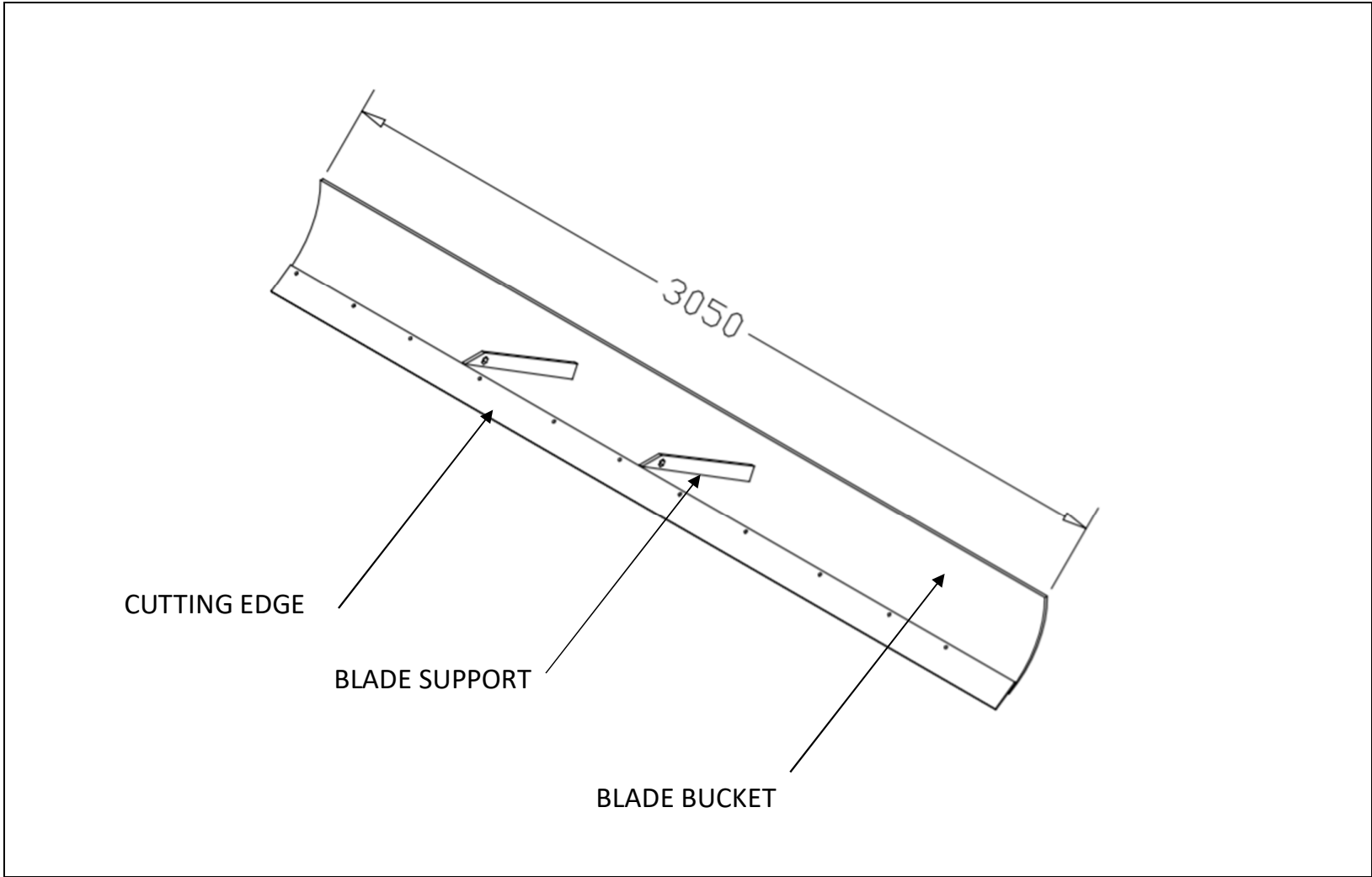


Figure 3 (a): Blade assembly

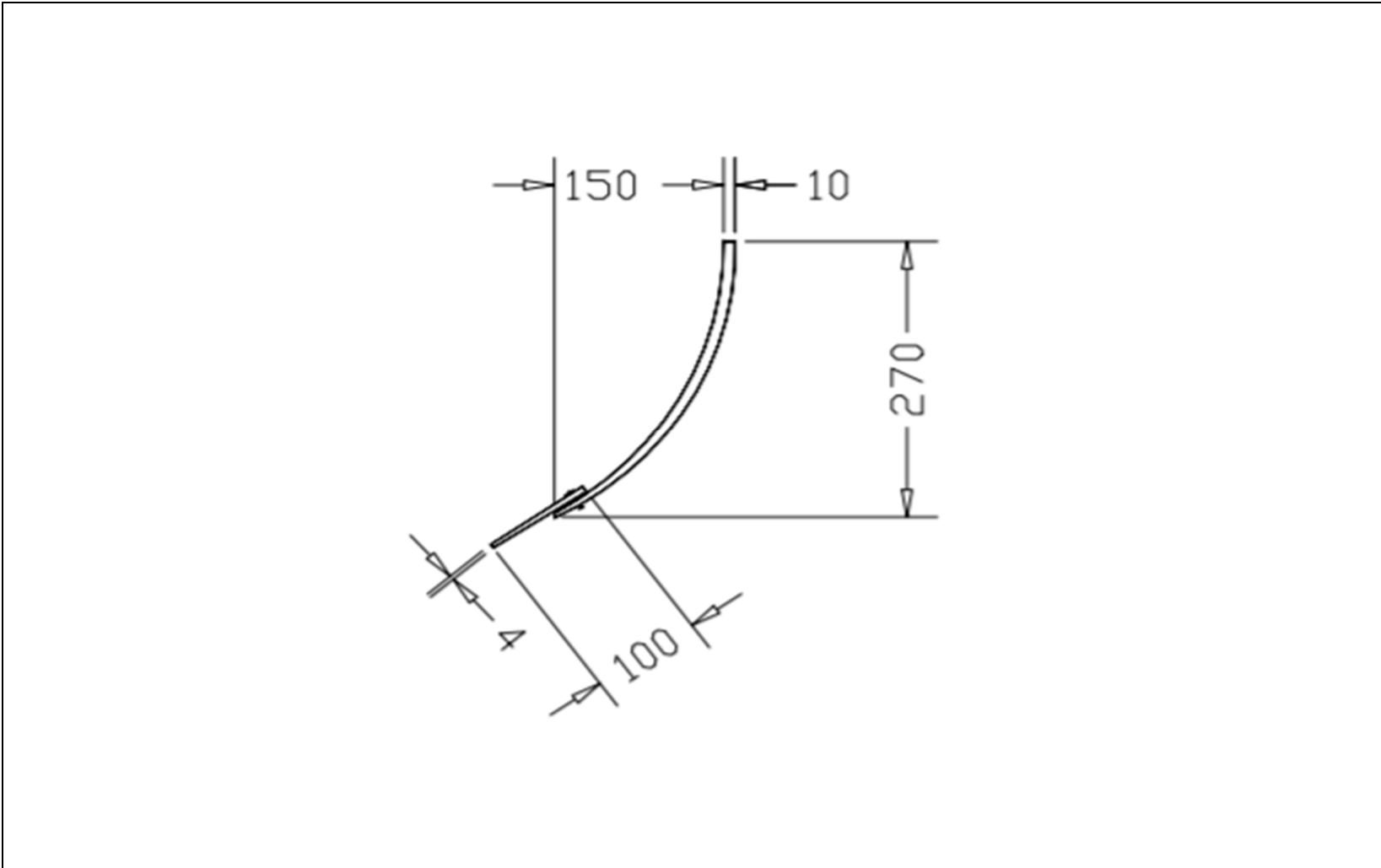


Figure 3 (b): Blade bucket and cutting edge dimensions

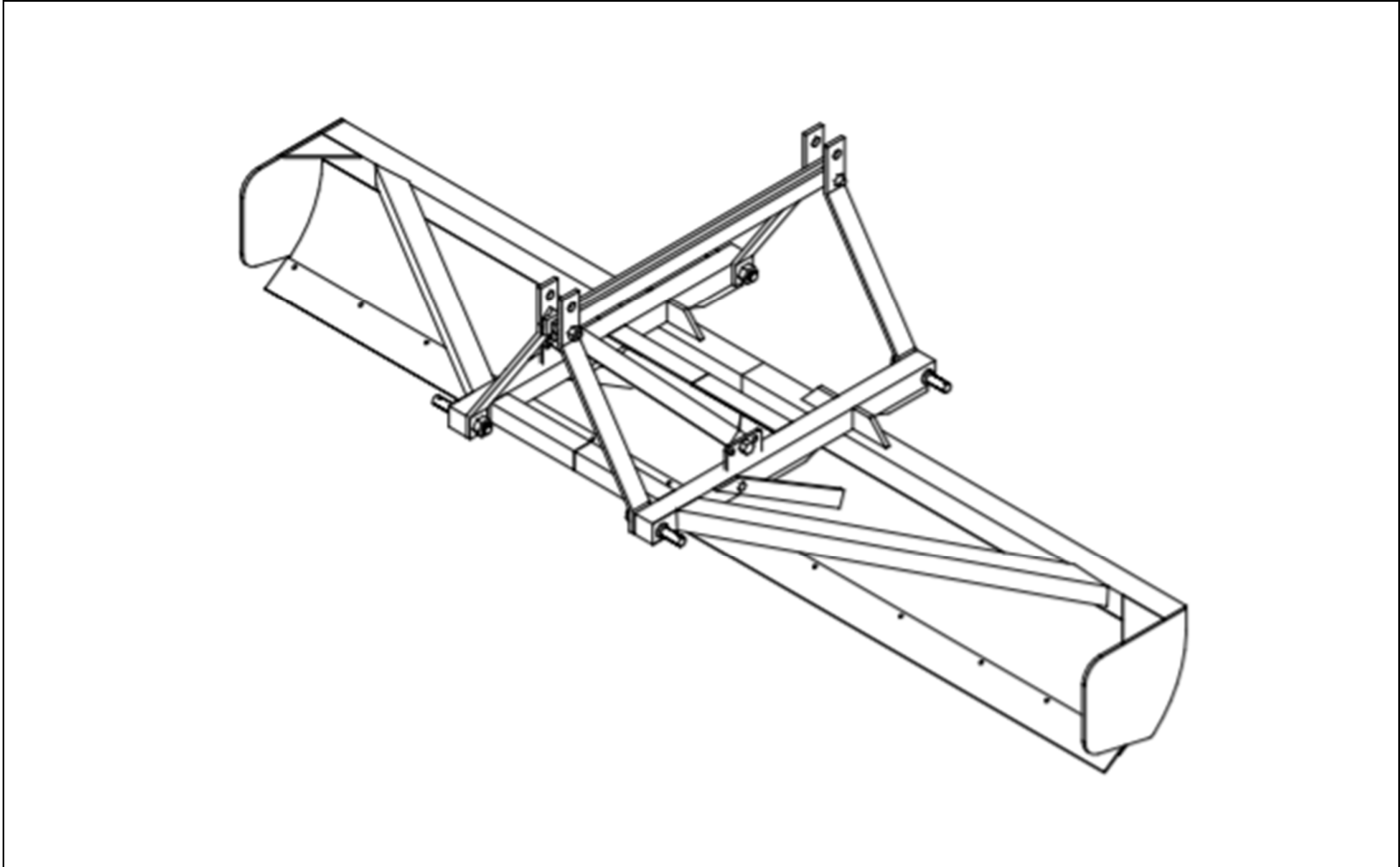


Figure 4: Typical reversible rear blade