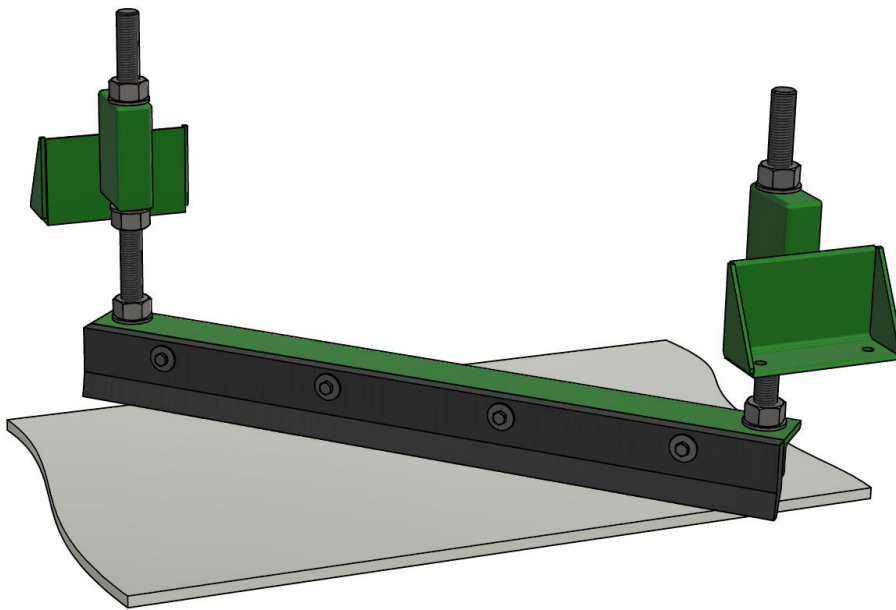


Installation, Operation and Maintenance Manual



Diagonal Plough

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1 General Information

1.1 Overview

The Belle Banne Diagonal Plough is designed to be positioned on a flat, stable section of belt, in close proximity to a tail pulley, upper counterweight bend pulley, or anywhere that spillage on the return side of the belt needs to be removed. It is typically referred to as a return belt cleaner, as it operates on the return side of the belt. The Diagonal Plough comprises a pair mounting brackets with mounting shafts, the plough frame and a bolt-on poly blade. The blade is 100mm high with 50mm of usable blade.

Although Belle Banne Diagonal Ploughs can handle reversing belt applications, they will not work well in a reversing application. (A Belle Banne Reversal Plough can handle reversing belt applications.)

In some applications large materials may be required to be handled by the plough. In such circumstances a Stone Guard can be added to the frame. For complicated applications contact Belle Banne Conveyor Products for more information.

1.2 Advantages

Return belt cleaners significantly reduce the amount of material, that has spilled onto the return belt, from building up on the tail pulley (or other pulleys at similar risk). They also provide protection from foreign objects (e.g. failed rollers) travelling through the pulley and damaging the belt and pulley lagging.

These issues contribute to unwanted plant downtime, resulting in increased costs.

Installation of appropriate return belt cleaners will minimise these issues.

1.3 Safety

During installation and maintenance of all belt cleaners, ensure all energy sources are isolated in accordance with the relevant site's procedures.

Ensure all works are conducted by qualified or competent personnel.

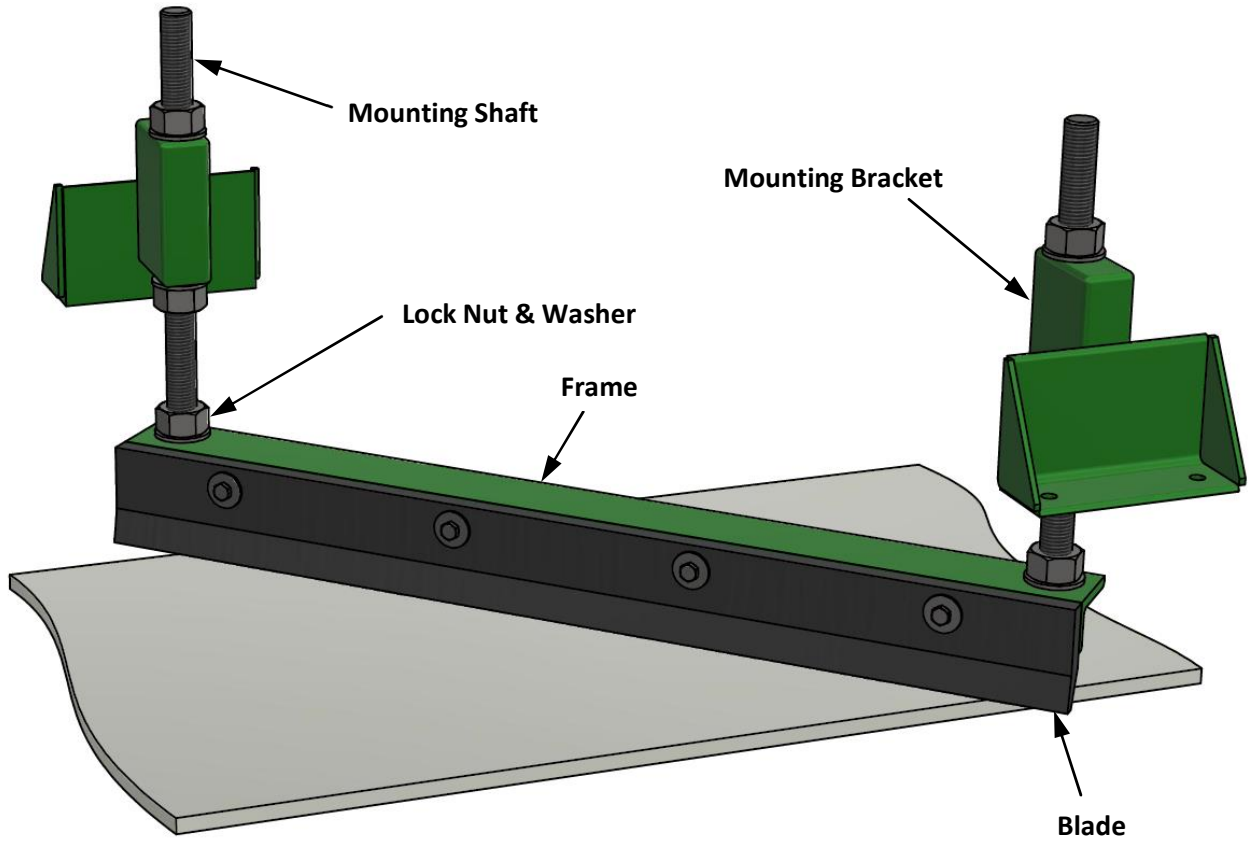
Ensure all personnel utilise appropriate personal protective equipment as required.

1.4 Assistance

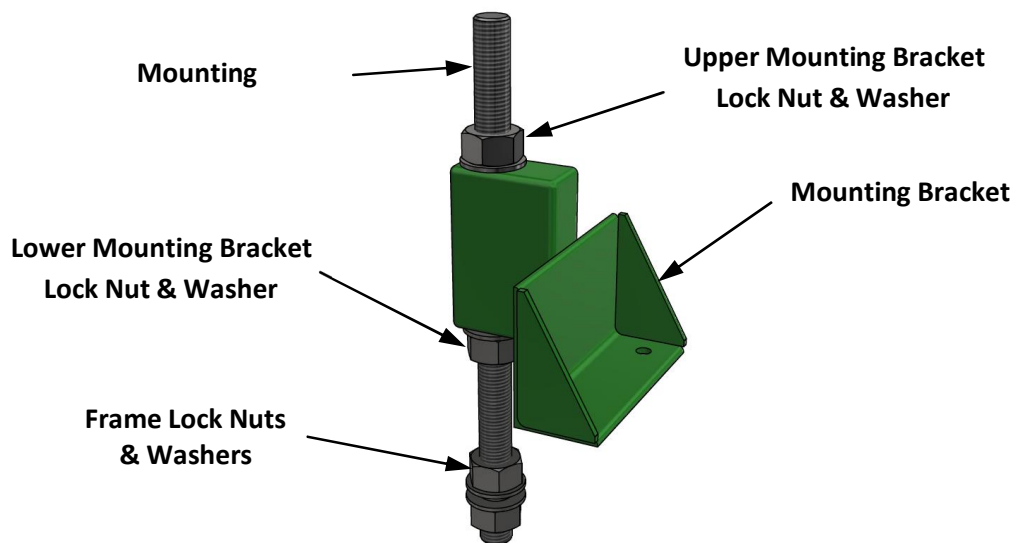
If assistance is required through any stage of the process: belt cleaner selection, design, drafting, installation and/or maintenance, Belle Banne Conveyor Products have personnel that can provide support.

2 Diagonal Plough Components

2.1 Entire Cleaner



2.2 Mounting Bracket & Shaft



3 Tools & Equipment

3.1 Installation

The tools and equipment required to install a Diagonal Plough are:

- Measuring equipment – for confirming main frame position and mounting bracket positions.
- Marking pen or chalk.
- Drilling equipment – for drilling holes for the mounting brackets (unless they are being welded to the structure).
- Welding equipment – for welding the mounting plates to the structure (unless bolted connections are being used).
- Mechanical lifting aids – for lifting larger (heavier) return belt cleaners into position.
- 2 x 46mm open ended spanners – for tightening the mounting shaft lock nuts.
- Anti-seize – recommended for coating on fasteners prior to installation.
- DENSO tape – recommended for covering exposed thread on the mounting bracket fasteners.

3.2 Maintenance

Once a Diagonal Plough has been installed the only maintenance that should be required is occasional adjustment to maintain adequate blade pressure on the belt, and blade replacement. The tools and equipment required to do this are.

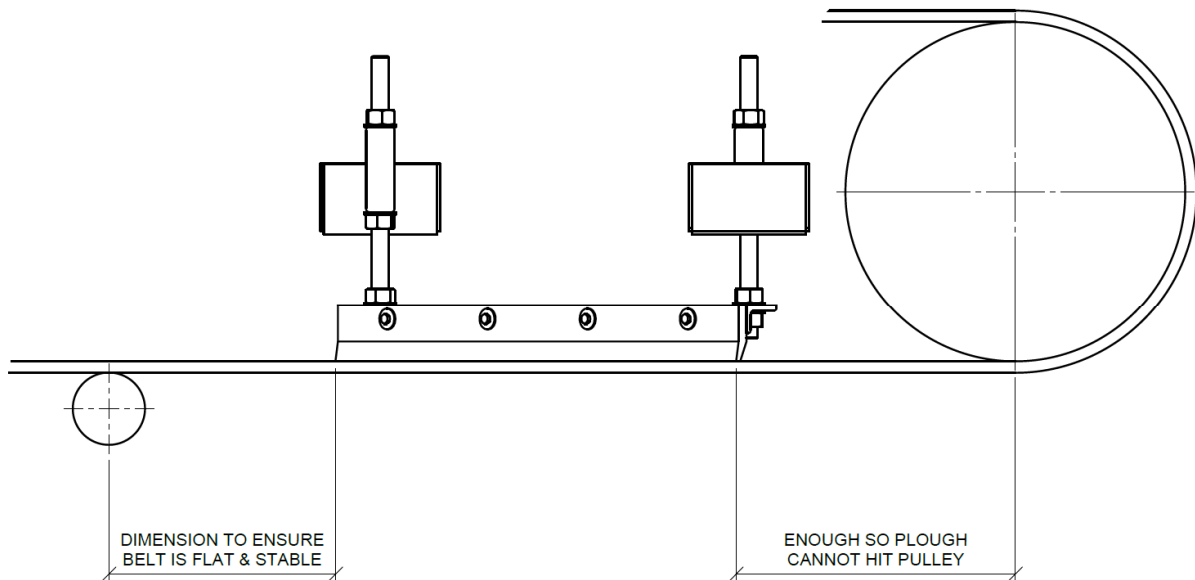
- 2 x 46mm open ended spanners – for loosening/tightening the mounting shaft lock nuts.
- 17mm spanner (or a socket) – for replacing the blade.

Note: the above tools & equipment are the recommended minimum. Additional tools (adjustable wrench, screw driver, etc.) may also be required.

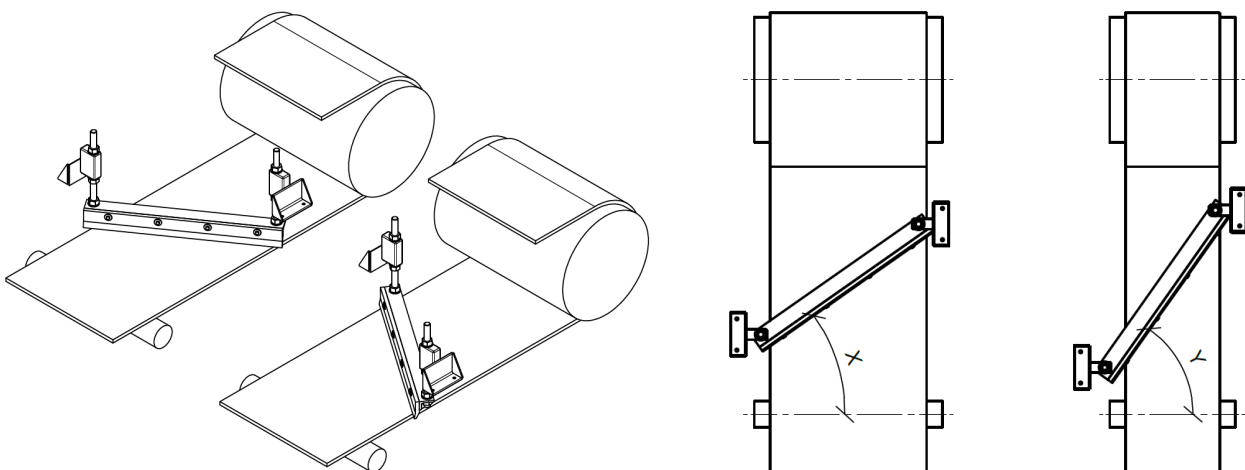
4 Mounting Location

4.1 Plough Position

The Diagonal Plough should be positioned in relation to flat support idlers and the tail (or other) pulley as shown in the diagram below.



The plough can be positioned with the angle of the blade in either direction, as shown in the LH diagram below.

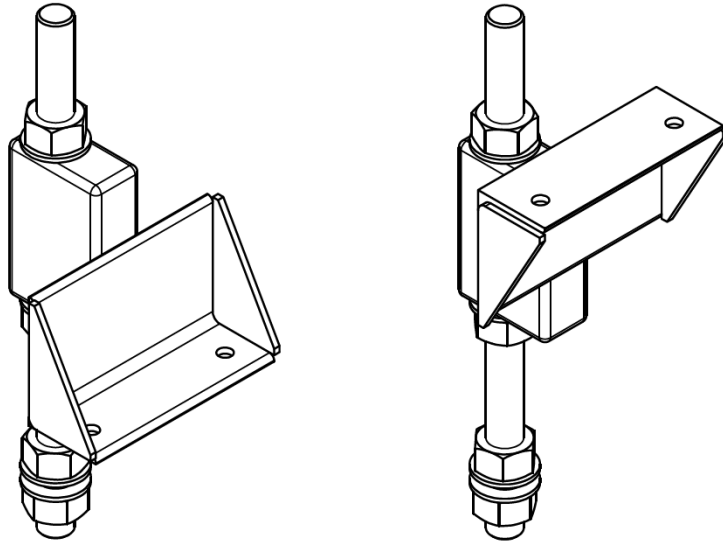


The angle of the blade in relation to the conveyor varies with belt width and mounting bracket position, as shown in the above RH diagram.

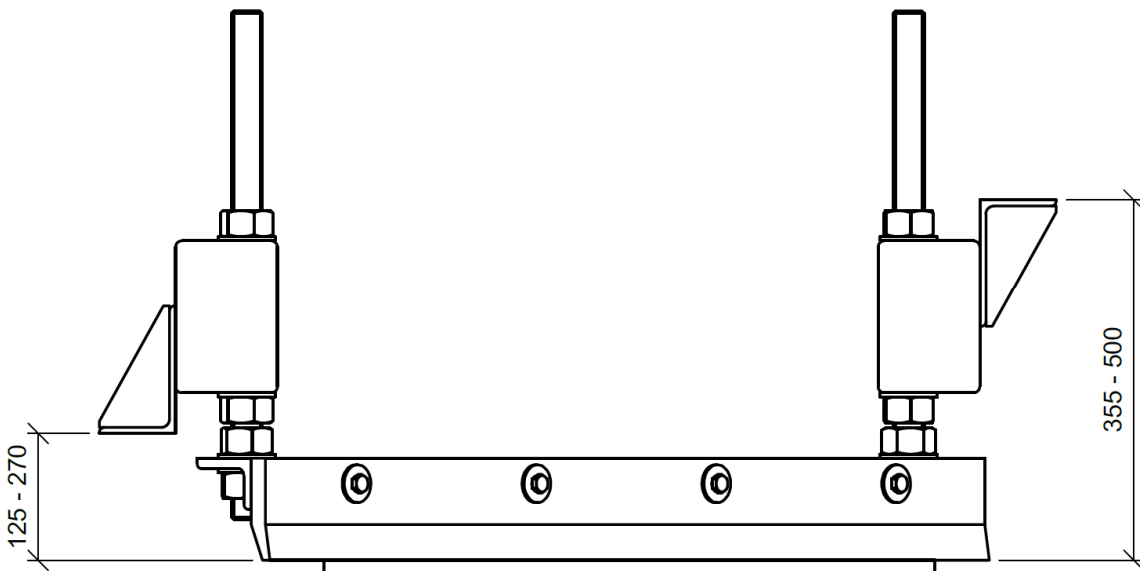
If the plough is being positioned in a location away from a pulley, flat return rollers should be positioned before and after the plough, to ensure the belt is flat and stable.

4.2 Mounting Brackets

The mounting brackets are designed to be mounted on top of existing structure (LH diagram below) or mounted to the underside of existing structure (RH diagram below).



The height of the mounting bracket in relation to the belt is shown in the diagram below. Mounting the bracket in the dimension range shown for either mounting bracket configuration will allow 50mm of downward adjustment as the blade wears.

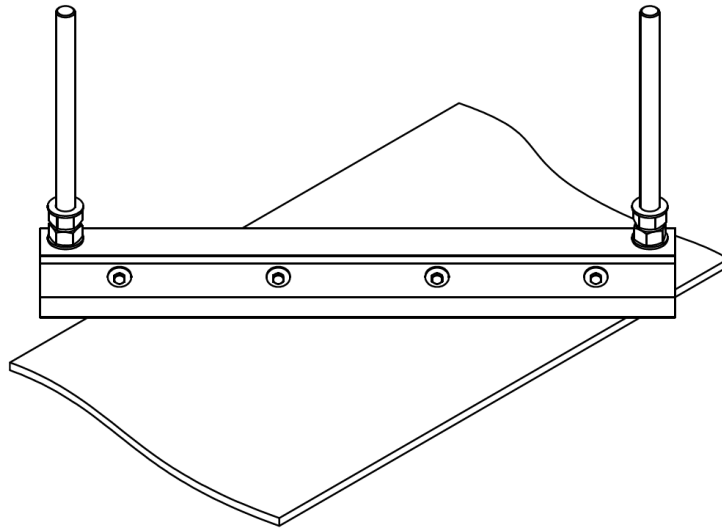


5 Installation

5.1 Installing the Diagonal Plough

The following steps are required to install a Diagonal Plough.

1. Decide which side of the conveyor the material is to be discharged.
2. Remove the upper mounting bracket lock nuts and washers and remove the mounting brackets.
3. Run the lower mounting bracket nuts down as low as they can go as shown in the following diagram.



4. Slide a mounting bracket onto each mounting shaft in the desired configuration.
5. Clamp the mounting brackets into place.
6. Apply anti-seize on the mounting shaft.
7. If the brackets are to be bolted in place, drill/cut holes in the structure to suit the 14mm dia. mounting bracket holes and bolt them in place using M12 fasteners.
8. If the brackets are to be welded in place weld the brackets to the structure.
9. At this point the diagonal plough should be sitting on the belt and able to float up and down.
10. Secure the plough in its operating position by tightening the lower mounting bracket lock nuts which will push the plough down onto the belt – ensure the plough is level. The amount of downward load will depend on a number of factors including belt tension, belt width, belt stability, etc. Contact Belle Banne Conveyor Products for assistance if required.
11. Once the desired downward pressure has been achieved install and tighten the upper mounting bracket lock nuts and washers.
12. Cover the exposed mounting shaft threads with DENSO tape.
13. Check all plough blade fasteners are tight.
14. The Diagonal Plough is now ready for operation.
15. Monitor the plough during initial operation to determine whether blade pressure needs to be adjusted.

6 Operation

Once the Diagonal Plough has been installed and set up correctly, the only operational activities required are regular inspections. The frequency of inspections will depend upon a number of factors including the conveyor duty cycle and the material type. During conveyor operation only a Visual Inspection (looking) can be done. When the conveyor is isolated a Physical Inspection (touching) can be done – refer to Section 7.

6.1 Visual Inspections

Visual Inspections can be done while the conveyor is operating. The following steps are recommended to perform a Visual Inspection on a Diagonal Plough.

1. Wash away any material build-up on the plough.
2. Check for correct installation (see Section 5).
3. Check blade condition and estimate wear.
4. Check that fasteners are all tight.
5. Record all observations and estimates (eg. blade wear).

7 Maintenance

7.1 Physical Inspections

Physical Inspections can only be done when the conveyor is isolated. The following steps are recommended to perform a physical inspection on a Diagonal Plough.

1. Follow all plant isolation procedures.
2. Wash away any material build-up on the plough.
3. Confirm correct installation (see Section 5).
4. Measure blade wear. Replace the blade if required.
5. Check all fasteners are tight.
6. Record all observations and measurements (eg. blade wear).

7.2 Evaluating Blade Condition & Wear

If the plough is well balanced the poly blades should wear evenly. The blade can wear 50mm before the frame will start rubbing on the belt. The blade should be replaced well before this.

It is not uncommon for the outside ends of the blades to not wear and create a step in the blade which can cause side loading on the plough if the belt tracks off. This step should be trimmed to keep the edges of the blade level with the rest of the blade.

7.3 Adjusting Blade Pressure

As the blade wears blade pressure will reduce. In order to increase blade pressure:

1. Remove DENSO tape from the mounting shaft.
2. Loosen the upper mounting bracket lock nuts.
3. Tighten the lower mounting bracket lock nuts against the mounting bracket, which will lower the plough and increase blade pressure.
4. Once the desired blade pressure is achieved tighten the upper mounting bracket lock nuts.
5. Reinstall DENSO tape on the mounting shaft.

7.4 Replacing Blades

The process for replacing blades is as simple as:

1. Remove DENSO tape from the mounting shaft.
2. Loosen the upper mounting bracket lock nuts.
3. Loosen the lower mounting bracket lock nuts by 50mm.
4. Tighten the upper mounting bracket lock nuts so they are holding the frame/blade assembly clear of the belt.
5. Loosen the screws that are holding the blade to the frame.
6. Replace the blade and reinstall the fasteners.

7. Tighten the lower mounting bracket lock nuts which will push the plough down onto the belt – ensure the plough is level.
8. Once the desired downward pressure has been achieved install and tighten the upper mounting bracket lock nuts and washers.
9. Cover the exposed mounting shaft threads with DENSO tape.
10. Check all plough blade fasteners are tight.
11. The Diagonal Plough is now ready for operation.
12. Monitor the plough during initial operation to determine whether blade pressure needs to be adjusted.