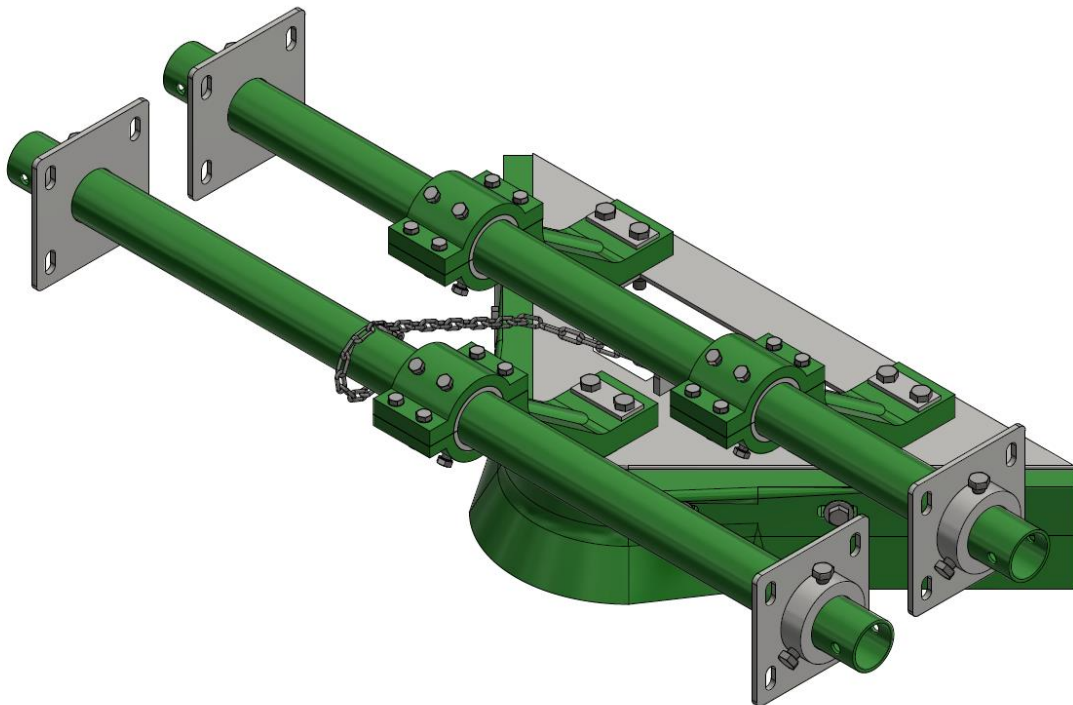


# Installation, Operation and Maintenance Manual



# Heavy Duty Torsion Plough

## Document Control

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## **1 General Information**

### **1.1 Overview**

The Belle Banne Heavy Duty Torsion 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 HD Torsion Plough comprises a pair of poles with mounting brackets, three torsion arms and a frame with bolt-on poly blades. The blade 150mm high and is slightly wider than the nominal belt width.

The poles are torqued up to store a small amount of energy in the torsion arms which allows the HD Torsion Plough to provide a load on the belt that is slightly greater than just its body weight.

HD Torsion Ploughs cannot handle reversing belt applications.

In some applications large materials may be required to be handled by the plough. If so 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.

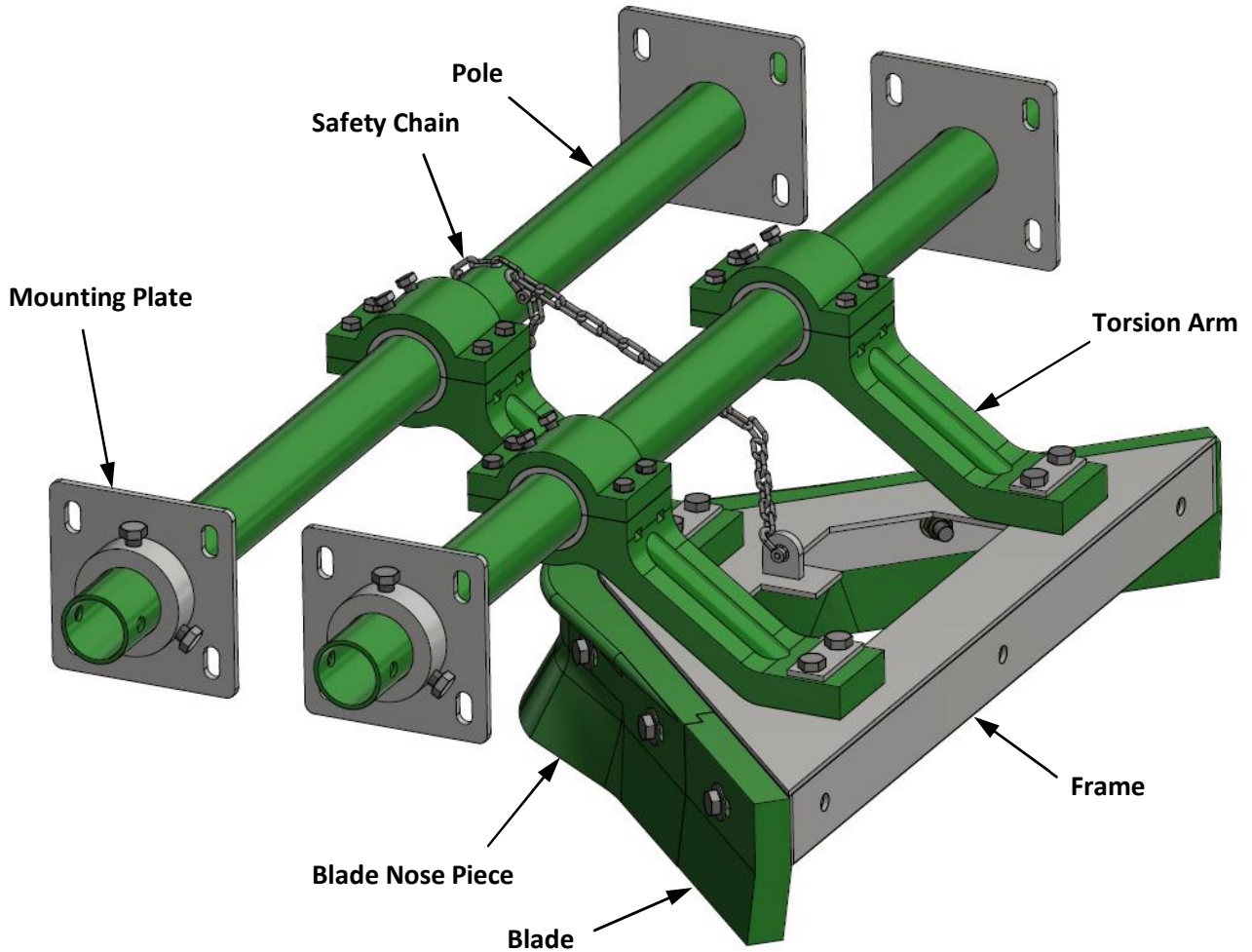
Ensure all works are conducted by qualified or competent personnel.

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 are able to provide support.

## 2 HD Torsion Plough Components



## **3 Tools & Equipment**

### **3.1 Installation**

The tools and equipment required to install a Heavy Duty Torsion Plough are:

- Measuring equipment – for confirming main frame position and mounting plate position.
- Marking pen or chalk.
- Drilling equipment – for drilling holes for the mounting plates (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.
- 19mm spanners (or a socket and a spanner) – for tightening the torsion arm clamp bolts and locking screws.
- 24mm spanners (or a socket and a spanner) – for fastening the torsion arms to the frame and the mounting plates to the poles.
- Large screw driver or podgy bar for torquing up the poles.
- 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 Heavy Duty Torsion Plough has been installed the only maintenance that should be required is blade replacement. The tools and equipment required to do this are.

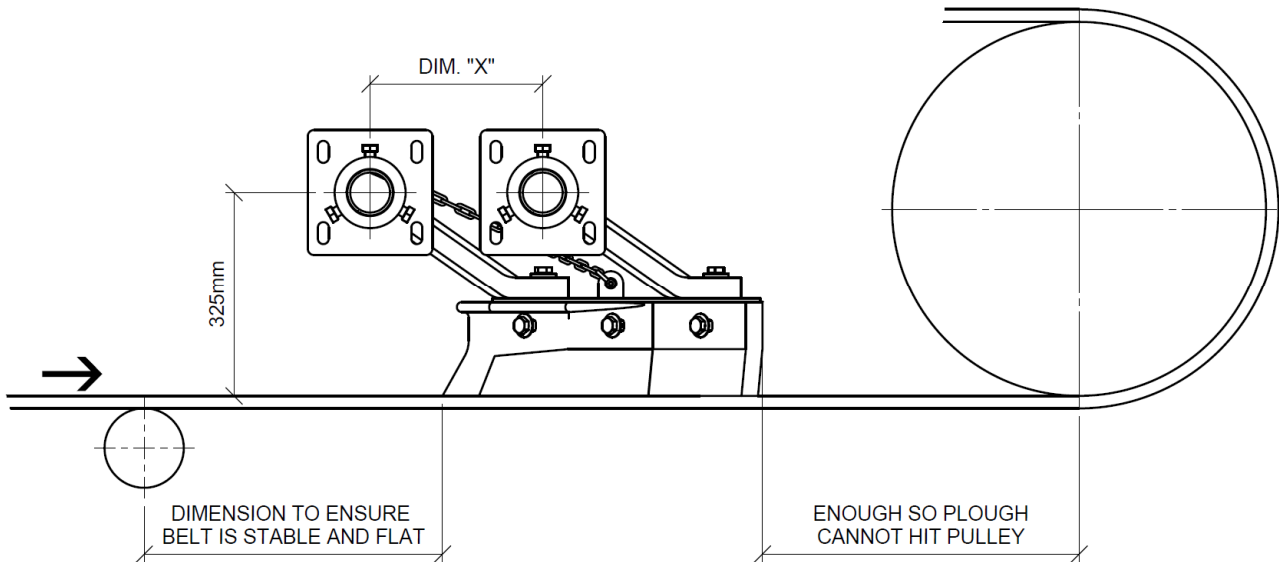
- Paint scraper / wire brush – for cleaning away material build-up.
- 24mm spanners (or a socket and a spanner) – blade mounting bolts and mounting plate pole bolts.
- Large screw driver or podgy for torquing up the poles.

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 Heavy Duty Torsion Plough should be positioned as shown in the diagram below.



Belt Width	900	1050	1200	1350	1500	1600	1800	2000	2200	2400	2500
Dimension "X"	277	352	427	502	577	627	727	827	927	1027	1077

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

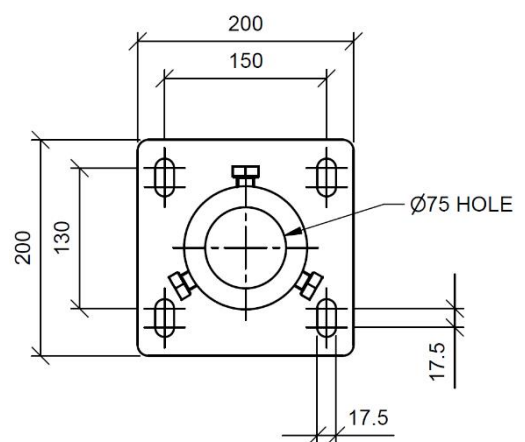
### 4.2 Mounting Plates

The mounting plates can be mounted vertically (as shown above), horizontally, or at any angle required. It is critical that they are spaced "X" apart (see table above). The hole/slot details on the plates are shown in the adjacent diagram.

The mounting slots must be positioned with the large hole 325mm from the belt.

The mounting plates can be mounted to outside or inside of the structure, depending on clearance and mounting options.

Both poles must be parallel to each other and perpendicular to the conveyor centreline.

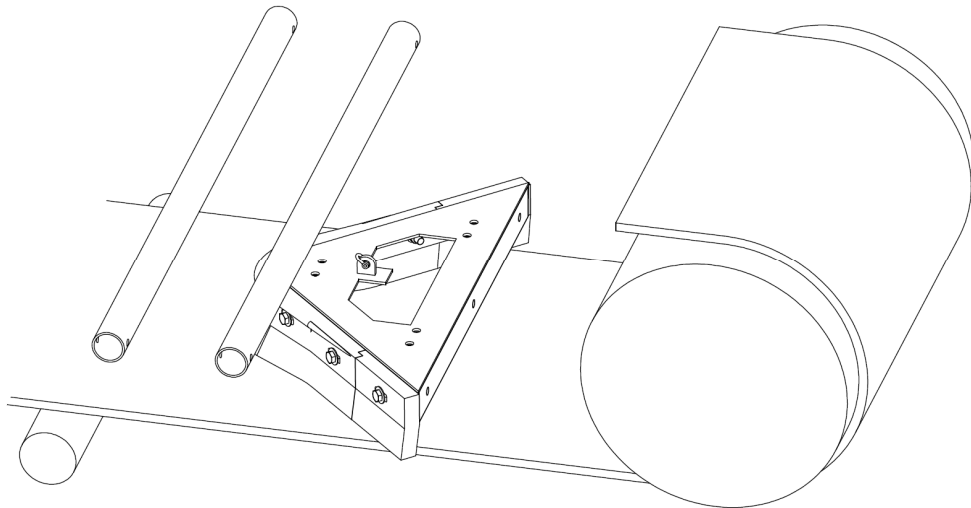


## 5 Installation

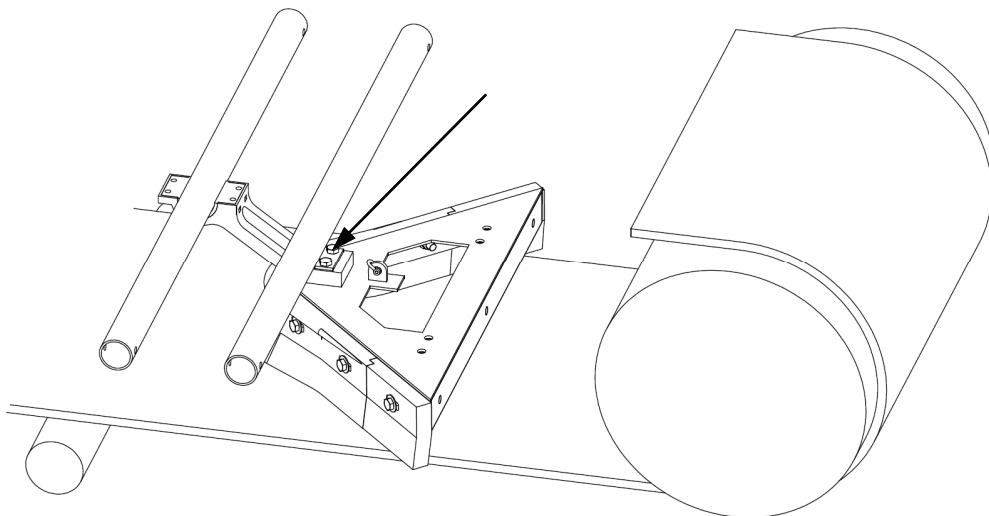
### 5.1 Installing the HD Torsion Plough

The following steps are required to install a HD Torsion Plough. They are based on the mounting plates already being installed.

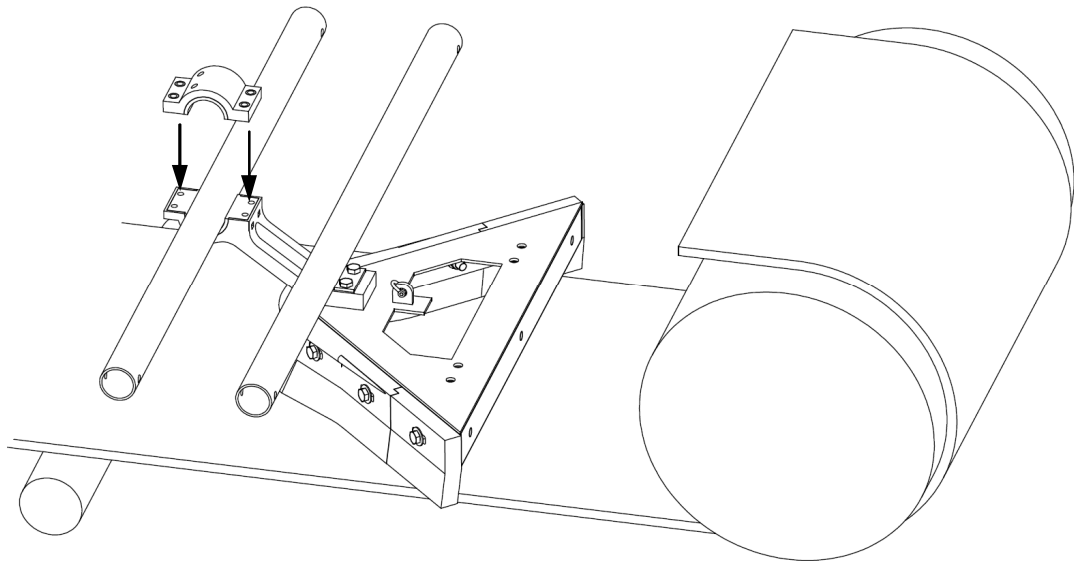
1. Install both poles. If required the pole lengths can be trimmed. If this is done, a hole should be drilled at the end to allow a screw driver or podgy to torque up the pole. If this is not possible the pole can be torqued up using a large pipe wrench.
2. Sit the main frame on the belt, ensuring it is central on the conveyor as shown in the diagram below. Note that the belt may be tracked off the conveyor centreline.



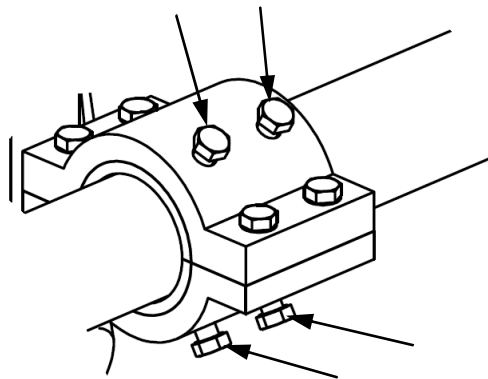
3. Separate the clamp elements of one of the torsion arms and fasten the main part of the arm to the frame using the washer plate and M16 bolts as shown in the following diagram.



4. Position the clamping element of the torsion arm and clamp it in place as shown in the following diagram.



5. Repeat these steps for the remaining two torsion arms.
6. Once all three torsion arms are securely fastened to the frame and the clamp bolts are all tight, check that the frame is central to the conveyor and the poles are central to the conveyor.
7. Lock the torsion arms to the poles by tightening the four lock bolts on each torsion arm, as shown in the diagram below.



8. Using a screw driver or podgy in the hole in the end of the pole, rotate the pole to provide a small amount of downforce on the belt, then lock the pole in place using the three lock bolts on each mounting plate.
9. Repeat this process for the other pole.
10. Secure the safety chain between the frame and the first pole, ensuring the chain cannot get caught in the operating conveyor or plough.
11. The Heavy Duty Torsion Plough is now ready for operation.



## **6 Operation**

Once the Heavy Duty Torsion 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 Heavy Duty Torsion 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. Check that the torsion arms are not overtorqued or damaged.
6. 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 Heavy Duty Torsion 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. Check that the torsion arms are not overtorqued or damaged.
7. Torque up the poles if the blade has worn.
8. 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 75mm before the main 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 Replacing Blades

The process for replacing blades is as simple as:

1. Loosen the pole lock bolts on the mounting plates.
2. Remove the fasteners that are holding the existing blades on.
3. Remove the old blades.
4. Position the new blades, ensuring they are oriented correctly.
5. Reinstall the fasteners to secure the blades in place.
6. Torque up the poles (see section 5).

### 7.4 Replacing Torsion Arms

It is recommended that torsion arms are replaced:

- a) at every second blade change, or
- b) every 2 years, or
- c) if there is visible damage (e.g. cracks or splits in the poly), whichever comes first.

In order to replace the torsion arm, follow Steps 3 – 9 in Section 5.1 in reverse to remove the torsion arms, and follow Steps 3 – 9 in order to install the new arms.