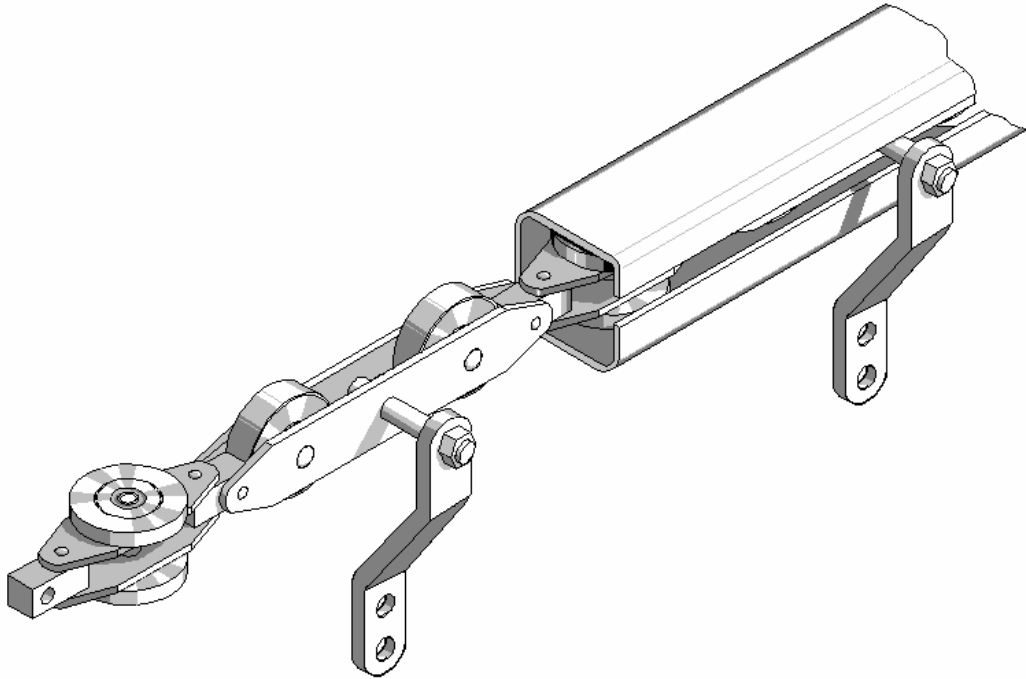


# ST30



Installation & Maintenance Manual

# Introduction

This maintenance manual is a general guide to the installation and maintenance of an overhead chain conveyor system.

Included is a general specification for the components of the system, together with general information to assist the user in the installation and routine maintenance of the conveyor system.

If you have any queries in the future over any technical difficulties, please contact **MCM Conveyors Technical Department**.

Tele. +44 (0) 161 284 2222 Fax. +44 (0) 161 627 0075  
.e mail info@amber-industries.ltd.uk

## **CE Marking**

On supply only equipment a *Certificate of Incorporation* will be issued and no CE marking applied to the drive.

On stand alone systems a *Certificate of Conformity* will be issued together with the drive unit (s) marked with a CE plate. On conveyors interfacing with other equipment the *Certificate of Incorporation* will apply.

## **Method Statements and Risk Assessment**

Method Statements and Risk Assessment data can be supplied on request.

## **Regulations and standards:**

Current Supply of Machinery (safety) Regulations.  
Pr EN 619 Unit load conveyors.

## **Before Maintenance**

Before any work is carried out on the conveyor system, make sure that it is isolated and the fuses are removed. Do not work on the conveyor system whilst it is running unless the work being carried out requires it. In this instance only qualified and authorised personnel fully conversed in safety procedures and the conveyor operation should carry out any necessary work.

## **After Maintenance**

Before restarting the conveyor system, make sure:

- that all tools and maintenance, equipment are removed.
- that all guards are refitted and correctly positioned.
- that all personnel are clear of the conveyor and that all personnel in the area are aware it is being started.
- that only authorised personnel restart the conveyor.

Document Issue ST30 - 1

## **Contents**

1. Function
2. Installation of Overhead Conveyor
3. ST30 Track Section
4. ST30 Chain
5. ST30 Drive Unit
6. ST30 Tension Unit
7. ST30 Linear Expansion Unit
8. ST30 Lubricator Unit
9. Preventative Maintenance Schedules
10. Recommended Lubricants
11. Supplementary sheets – contract specific (if applicable).
12. Sample Method Statement and Risk Assessment.

### **IMPORTANT**

**Please read this manual prior to operating the conveyor system.**

## Function

The choice of an overhead chain conveyor allows greater usage of floor space, transportation through hostile environments, and precise location of product together with easy rotation facilities. The three dimensional flexibility of a chain system enables cost effective avoidance of building and roof obstacles and unlike flat bed conveyors allows simple suspension structures to be used – often made to suit during installation.

Maintenance is essential but relatively simple, aided by automatic lubricators giving minimal running costs.

A typical system comprises of:

**Drive unit** – an inline caterpillar type with a torque limiter shear unit for system protection.

**Chain** – to suit system loading, product pitch and with bearings to suit environment.

**Track sections** – straight track usually in 6m lengths cut to suit on site with intermediate support positions to suit product loading.

**Bends** – horizontal and vertical as required – radius choice dependant upon product size.

**Inspection section** – to check chain condition and provide maintenance access.

**Tension unit** spring loaded to take up normal running fluctuations in the chain up to a chain pitch.

**Lubricator** – critical in oven applications to ensure chain does not dry out and damage bearings which will further damage track causing major system breakdown.

**Linear expansion units** – allows changes in track length due to temperature variations without damaging track and supports.

As a conveyor, products/jigs are attached to pendants – single or double, the load being taken via chain vertical bearings on the supporting track. The loading determines pitch of support steelwork.

In addition, the friction of the bearings, rise, falls and bends determine the actual force required to move the loaded chain around the system. It should be noted that on a fully loaded system the rises will tend to equal the falls but imbalances will affect the forces involved. The system should never exceed the maximum allowable chain pull – positive or negative.

Sidetrack – incorporating a side slot ensures virtual elimination of product contamination from the conveying elements.

## Design of system

Wherever possible – drives should be located at high level or where the highest chain pull is expected and followed as soon as practical by the tension. The tension unit should be situated no higher than the drive unit and if possible at low level. Tensions should never be located before drives. Where dual drives are fitted, location is critical and position and future system changes should be referred to MCM.

Inspection sections and lubricators should be positioned where easily accessible, but there is little advantage of lubricating immediately before an oven.

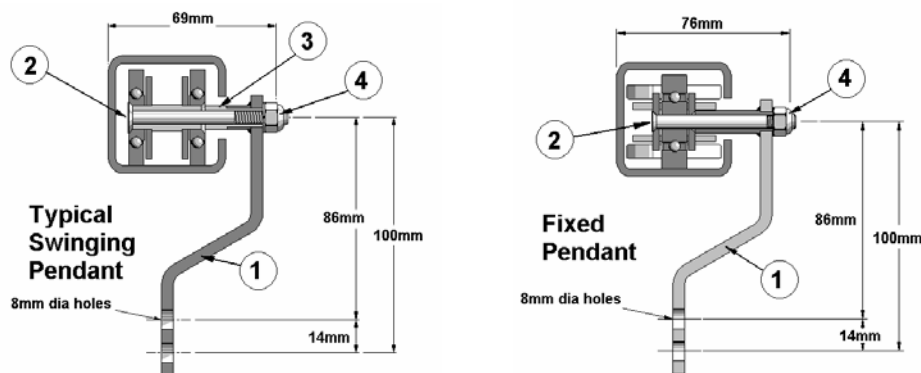
Due to the chording effect of product negotiating bends, it is always recommended that a check is made to ensure product does not collide, or hit adjacent building or structure.

Swinging of loads must also be considered on incline rises and falls.

## Support of loads.

Chain pendants have holes for directly attaching items, or using hooks incorporating a cross bar between pairs of pendants will give additional product rigidity. However, care must be taken when using cross bars and load bars to allow the pendants to articulate on bends. If rotating the product, rigid attachments are recommended. Optimum suspension of loads is at the centre of gravity ensuring minimal position changes around the system.

A number of standard attachments are available on request to suit the application (contact MCM).



### Pendant Detail

1. Pivoting pendant
2. Socket head screw
3. Pivot spacer
4. Lock nut

# Installation of Overhead Conveyors

Assuming a plan layout has been done and datum points shown, it is first necessary to mark the centre-line of the track on the floor, and check visually for unforeseen obstructions.

Wherever possible, it is preferred to start installation with the drive unit, which must be rigidly supported onto the two angle members, either end of the unit.

Immediately after the drive (or as near as possible) the tension unit should be installed – supported from the 4 support points.

If the track is floor supported, check pitch of gallows, goal posts and mark on floor. If suspended fit necessary brackets, clips as required to form temporary down drops. Once a reasonable number of support points are ready, the track can be attached using track hanger clamps. The track should be checked for level in both planes, and floor to track height. Once the track is considered satisfactory the fixings can be made permanent by bolting or welding.

If suspended, consider additional sway braces – particularly on long drops. These should be in the form of diagonal bracings taken outwards particularly in the direction of chain travel to absorb chain pull reactions. Usually fitting these to alternate members in opposite directions is adequate. In either case, work away from the datum.

As installation progresses, check each joint in the track for clearance, and fit inspection sections equally in the system at suitable access points – these may be used for inserting the chain.

In areas difficult to access, sections can be pre assembled on the floor and offered into position.

Once completed, and checked for alignment, it is advisable to tack weld the hanger clamps to the track to prevent movement.

At this point 1) the track should be inspected for cleanliness and 2) a short section of chain should be inserted into the track and pulled around the system –noting any sticking points which need attention – possibly grinding away any lips, burrs to allow free chain travel. Note - the bends have inner or outer slots – depending on the position in the system.

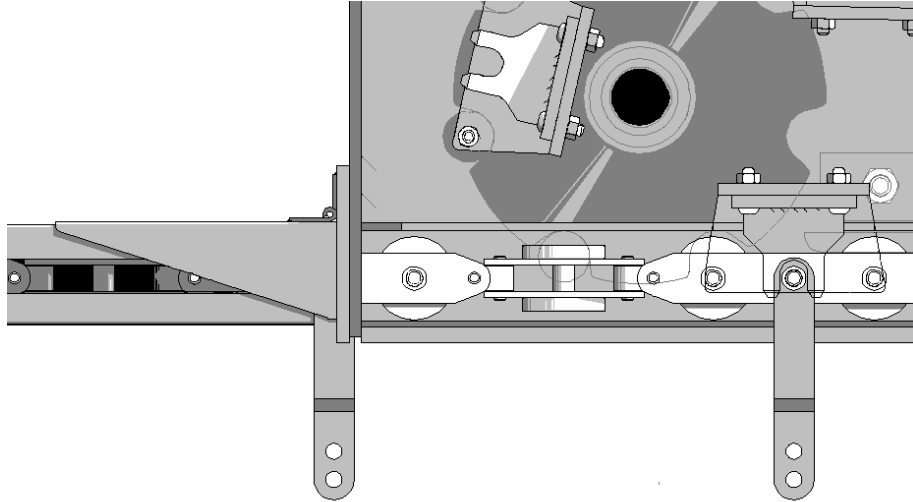
The chain may then be inserted through the inspection sections or in the drive unit by removal of the chain support flats if this is easier. As the chain is pre oiled the floor should be clean, and contamination of the chain should be avoided at all times. The

## Part 2

chain is supplied in bags, each length requiring joining to the next. On some systems feeding the chain may be necessary from several points (inspection sections). The chain should be pulled into the system by hand – securing a rope to the front of the chain.

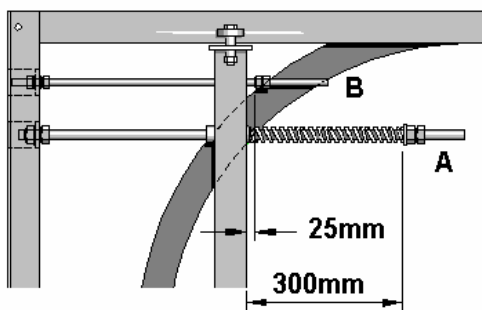
Running the chain through the drive unit can be done either by:

1. Removing the motor cowl and turning the gearbox to manually move the chain via the drive dogs.
2. Disconnecting the shear pin to free the caterpillar chain to allow manual pull through the drive.



When the chain is inserted, it is usually found that one length needs shortening. The tension unit should be fully collapsed and the chain pulled to eliminate slack, and shortened and joined to suit.

### Setting up



Further slack may be taken out of the system using the spring tension unit. The non-sprung rods (**B**) are for anti-collapse protection and the nuts should have 25mm clearance.

The initial trial running of the chain should be carried out at the lowest conveyor speed, and if satisfactory, run for at least one hour. A typical

load should be then hung on the pendants and run around the system checking clearances and any obstructions. A full load test may then be carried out.

After a short period of running, it may be necessary to adjust the tension to compensate for initial chain stretch.

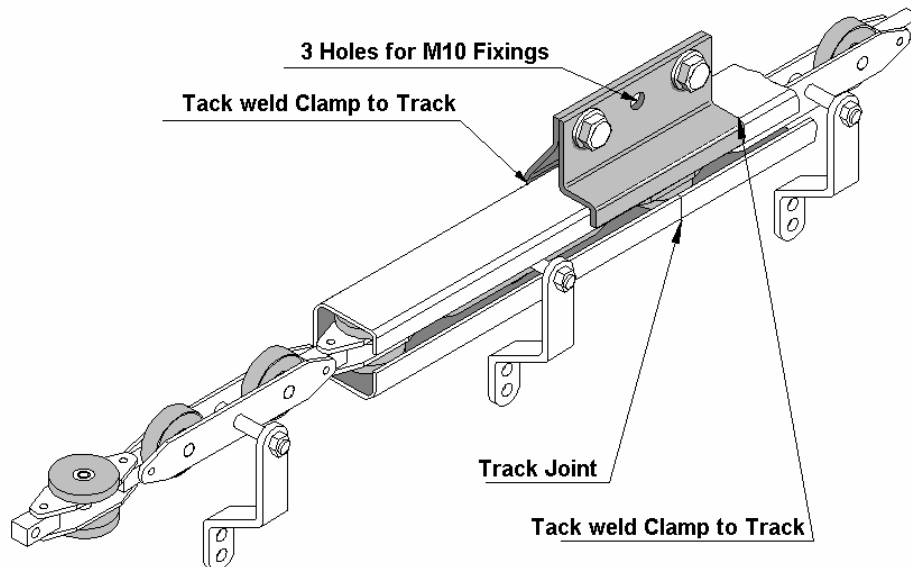
## ST30 Track Section

### Straight Track

The straight track section is formed in standard lengths of 6 metres, with special make up lengths being cut on site to suit individual requirements.

The track section is rolled from a 3mm thick galvanised material to give a 50mm x 50mm square section, with a 16mm slot running along one side.

Conveyor track joints, dependant upon application, are either butt welded or clamped with our standard track joining clamp, however with each method, care must be taken to ensure all track running surfaces are correctly aligned and level. If track-joining clamps are used, a tack weld should be applied at opposite ends on each half of the clamp (as shown below).



If necessary, track-running edges can be lightly 'fettled' at the joint, with the use of a hand grinder (to eliminate any possible "steps").

The track should be supported (subject to loading) at a maximum of 3 metre centres, and care must be taken to ensure that the track is straight and level.

The track joints must be sealed either by use of a sealant, or weld to reduce the possibility of product contamination.



### Inspection Section

The inspection unit is fabricated from the standard track section, and incorporates a hinged cover which allows access to be gained to the conveyor chain. General inspection and routine maintenance operations can be carried out using this section. It is important that the lid is secured via its fixing screw after any maintenance has been completed.

### Horizontal Bend Sections

The horizontal bend sections are manufactured in standard 610mm radius and standard angles of 15, 30, 45, 60, 90 degree segments. Special radii and angle segments are manufactured to suit individual needs. Each bend is supplied with 150mm of lead in straight track at each end. Note slot is either inner or outer.

### Vertical Bend Sections

The vertical bend sections are manufactured in standard 610mm radius and standard angles of 15, 30 and 45 degree segments. Special radii and angle segments are manufactured to suit individual needs. Each bend is supplied with 150mm of straight track at each end.

### Note

When joining horizontal and vertical bends the lead in sections create 300mm of straight track between bend modules. It is desirable to maintain this as a minimum but in tight space limitations, an **ABSOLUTE MINIMUM 200mm** of straight track should be between the two curved sections to prevent twisting of the conveyor chain during normal running.

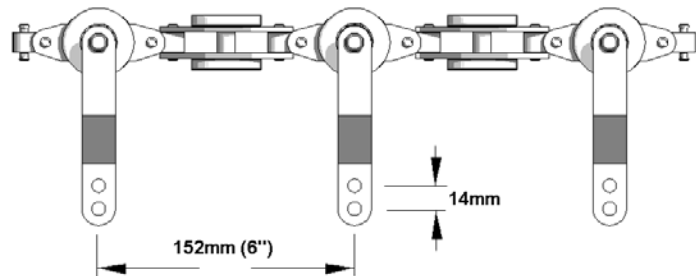
All horizontal and vertical bends are case hardened to ensure prolonged life and a reliable system operation.

## ST30 Chain

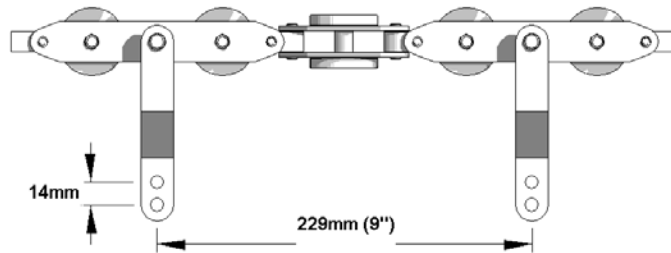
ST60 has a BI-planar chain, which consists of riveted link assemblies, roller bearings and articulating blocks. Standard pendants are combined with the load links giving either a 152 (6") swinging pendant or 229mm (9") pitch – (fixed or swinging pendants).

The chain is supplied in 3048 (203) or 2972mm (229) lengths complete with a connecting link. Care must be taken to install spare chain at the correct pitch.

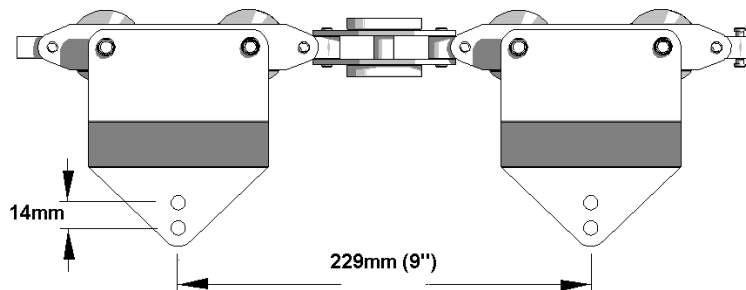
### **Sidetrack 30 - 6" pitch swinging pendant**



### **Sidetrack 30 - 9" pitch swinging pendant**



### **Sidetrack 30 - 9" pitch fixed pendant**



### **Joining the chain**

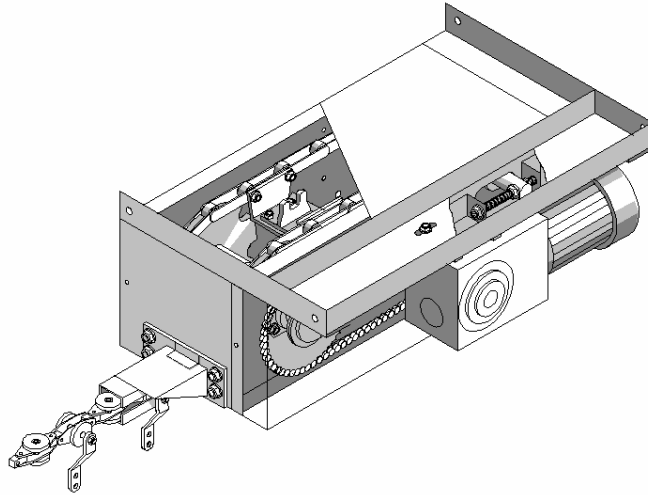
The chain is joined by riveting - the two rivets connecting the links riveted using a ball peen hammer and the central bearing shaft using the punch and anvil to securely swage the hollow shaft.

Note: Oil holes must be facing up.

## ST30 Drive Unit

### Drive Unit

The caterpillar drive unit offers an exceptionally smooth, reliable operation and positional flexibility. The unit is handed by slot position in the direction of travel.



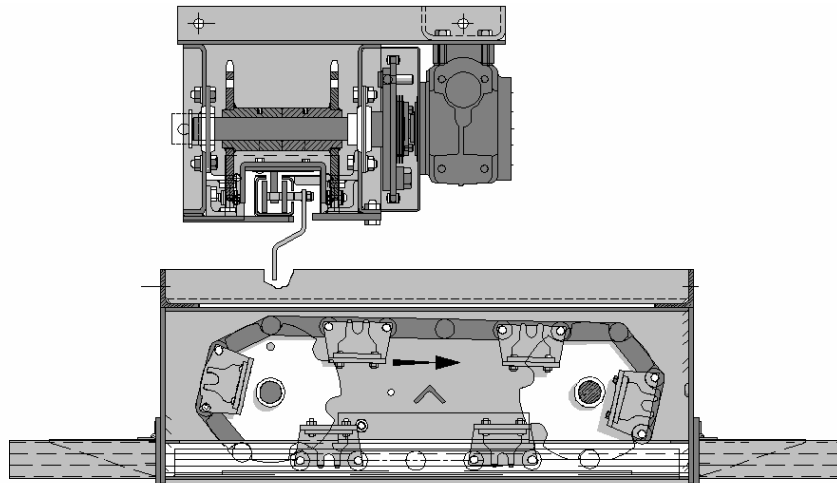
The drive unit consists of a fabricated folded plate body onto which is mounted a motor gearbox and a series of sprockets, chains and driving dogs.

The driving dogs are fixed between two transmission chains and are allowed to 'straddle' and engage the conveyor chain.

This feature enables

the driving dogs centre line to match the conveyor chain so reducing the reactional loading into the drive unit.

All sprockets & chains will be fully guarded to conform to current Health + Safety and CE mandatory requirements. With identification labels fitted to the drive unit confirming manufacturing and customer details, allowing future information retrieval for maintenance and service work to be more efficient.



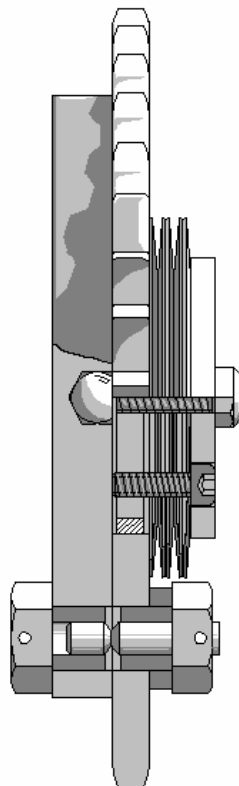
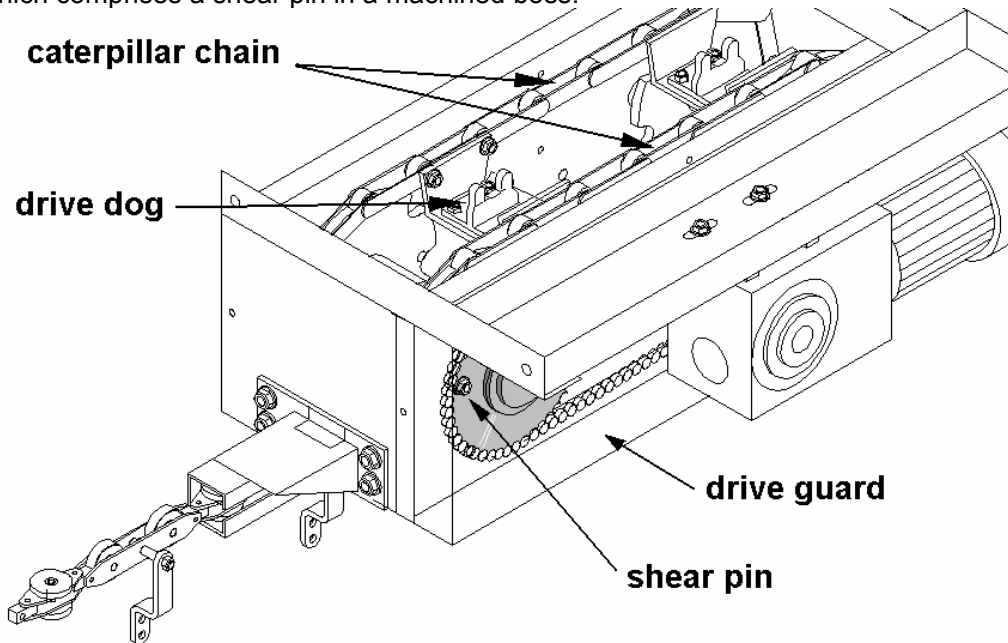
A wide range of standard speeds are available, with an electrically operated variable speed facility being an optional extra if required, via an inverter unit.

For heavily loaded systems a multi drive solution can be incorporated utilising TASC load sharing controllers.

Top support angles allow facilities to mount the unit from the floor or roof.

**Drive Unit cont.**

An overload protection device is utilised in case of a conveyor chain jam, which comprises a shear pin in a machined boss.



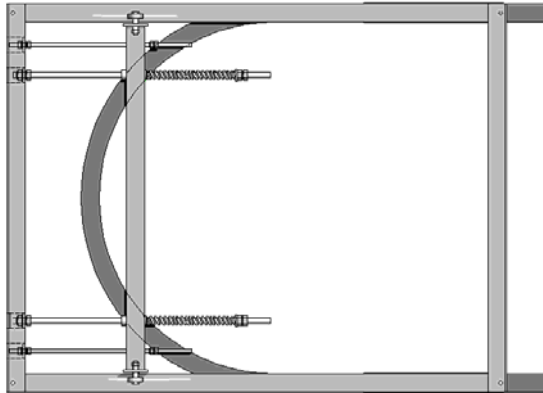
**Shear pin replacement**

1. Isolate system as detailed previously.
2. Remove drive guard.
3. Turn gearbox (key facilities at end of motor) manually to align unit. If auto stop limit switch facility is fitted – locate and recess balls prior to assembly in shear assembly.
4. Replace with new pin ensuring groove position is correct.
5. Refit and test.

See Overload Protection – page 21

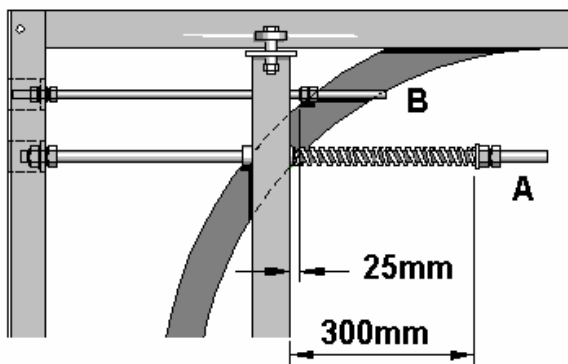
## ST30 Tension unit

The standard tension unit comprises of two linear expansion units which consist of a section of track which slide within a surrounding sleeve section. These are fitted to a 180-degree horizontal compound bend and supported from a sliding frame.



Tension is applied to the chain by adjusting the two springs, which are carried on screwed rods, pushing the 180-degree compound bend outwards thus increasing the track length, whilst maintaining the chain length.

Tension units are supplied with either 457 or 610 radius bends subject to product size, straights being available to extend chain centres to suit the application.



To set the tension unit nuts marked 'A' should be tightened and locked with the 2<sup>nd</sup> nut until springs are compressed to 300mm long. This will pretension the conveyor chain to the correct setting.

When 'A' is set – back off anti-collapse nuts 'B' and lock off

25mm clear from frame. This allows the system to 'breathe'.

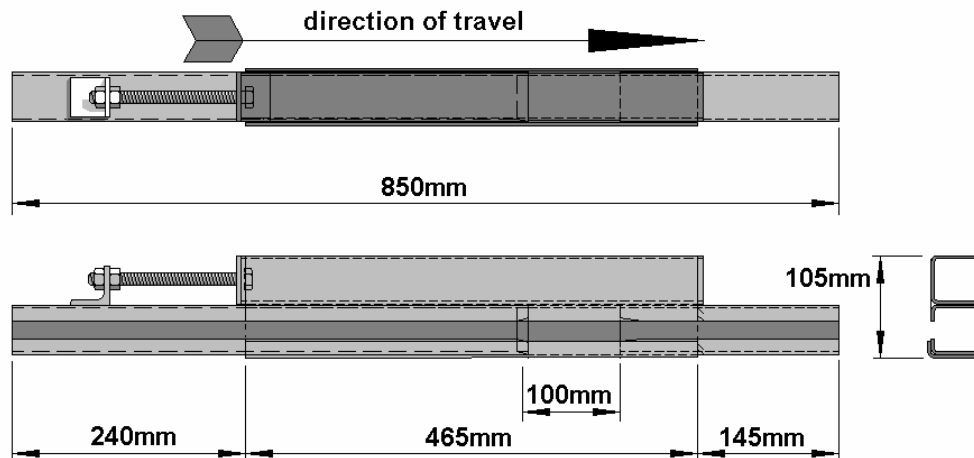
Care should be taken not to exert too much tension, as this may result in premature wear on the bends and chain stretch.

It should be noted that although called a "Tension Unit" the purpose of this unit is to eliminate slack chain from the system, but not put the conveyor chain under tension.

## ST30 Linear Expansion Unit

The linear expansion units consist of a section of track, which slide within a surrounding sleeve section.

The expansion sections should be set at site, to allow a 100mm gap between the sliding conveyor track and the fixed end on the expansion section.

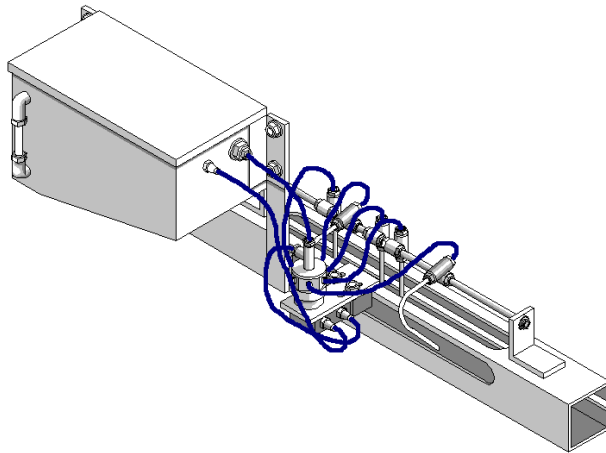


The linear expansion units are used primarily on applications where a conveyor is routed through high temperature ovens to compensate for linear expansion of the track due to temperature. It should be noted that the oven supports should be designed such as to allow for the linear expansion of the track.

Note. Direction of travel is important and sliding track ends should be bevelled on site to effect a smooth transfer.

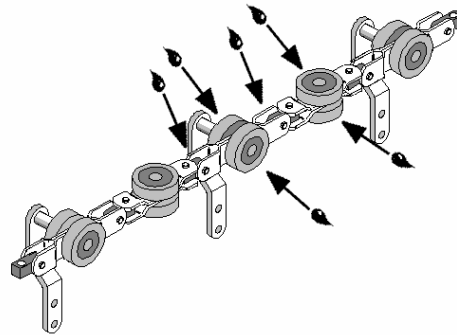
## ST30 Lubricator Unit

The purpose of a lubricator is to allow the effective application of lubricant to the conveyor chain to enhance the life expectancy and reliability of the appropriate parts of the conveyor system.



An accurately measured quantity of lubricant is “shot” onto the chain components via nozzles, which should be checked for alignment during the system commissioning trials and periodically during the system life.

Each lubricator is fitted with 6 nozzles fed from a common distribution block. Two nozzles are directed at the pairs of load carrying rollers, Two nozzles are directed at each pair of guide rollers and two nozzles are directed at the articulating blocks. (See Diagram) This method ensures very accurate application of lubricant to the conveyor chain, thus considerably reducing the possibility of product contamination and associated reject components.



Each conveyor system requires its own lubrication frequency, which is dependent upon certain, variable design parameters. i.e.

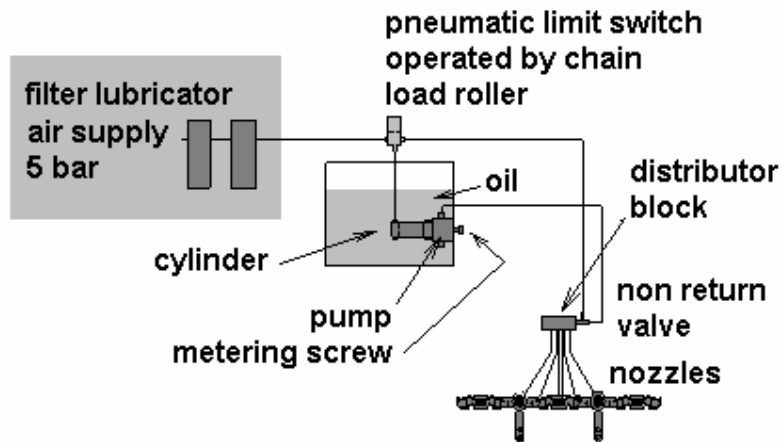
- Conveyor Speed
- Operating Period
- Working Environment (heat etc)
- Carrying Capacities

Due to the variation in the above working parameters of each conveyor system, it is difficult to determine a set lubrication frequency. Therefore, we suggest that the chain is monitored during the initial running stages with the frequency being increased or decreased dependant upon the condition of the conveyor chain.

### **Chain Lubricant**

We recommend the use of MCM ‘TP1773’, which has been formulated to give the most effective protection to the chain components whilst working in temperatures from ambient up to 250°C.

## Lubricator Operating Principle



Mains compressed air at 5 bar is supplied to the air line filter-lubricator (not part of supply). It passes through the pneumatic limit switch to the single acting pneumatic cylinder, causing its piston rod to move forward and enter the chamber of the oil pump until checked by the setting of the metering screw.

This displaces a predetermined volume of oil, which is transferred by way of the non-return valve, to the distributor block.

This volume of oil is regulated via the metering screw, anti-clockwise to increase, clockwise to decrease the volume of the shot.

When the passing of the chain load bearings operates the pneumatic limit switch, it allows the pneumatic cylinder to exhaust. The pulse of air is fed into the distributor block and expels the stored charge of oil into equal parts, which are directed to the bearings and articulating blocks of the chain by the lubricator nozzles.



## **Maintenance**

**Before undertaking any work on the conveyor whatsoever the conveyor drive(s) must be isolated and locked off, and an appropriate sign displayed. All work must be carried out in a safe manner, in accordance with current health and safety legislation.**

### **Track section**

The straight track section requires little attention,

- 1 Depending on operating conditions the track may need to be cleaned periodically.
- 2 The track running surfaces should be checked for wear.
- 3 The general condition of the track should be checked for signs of external damage, Supports should be checked for security and all bolts checked for tightness.
- 4 Track joints should be checked for alignment and bolted joints checked for tightness.

### **Horizontal bends**

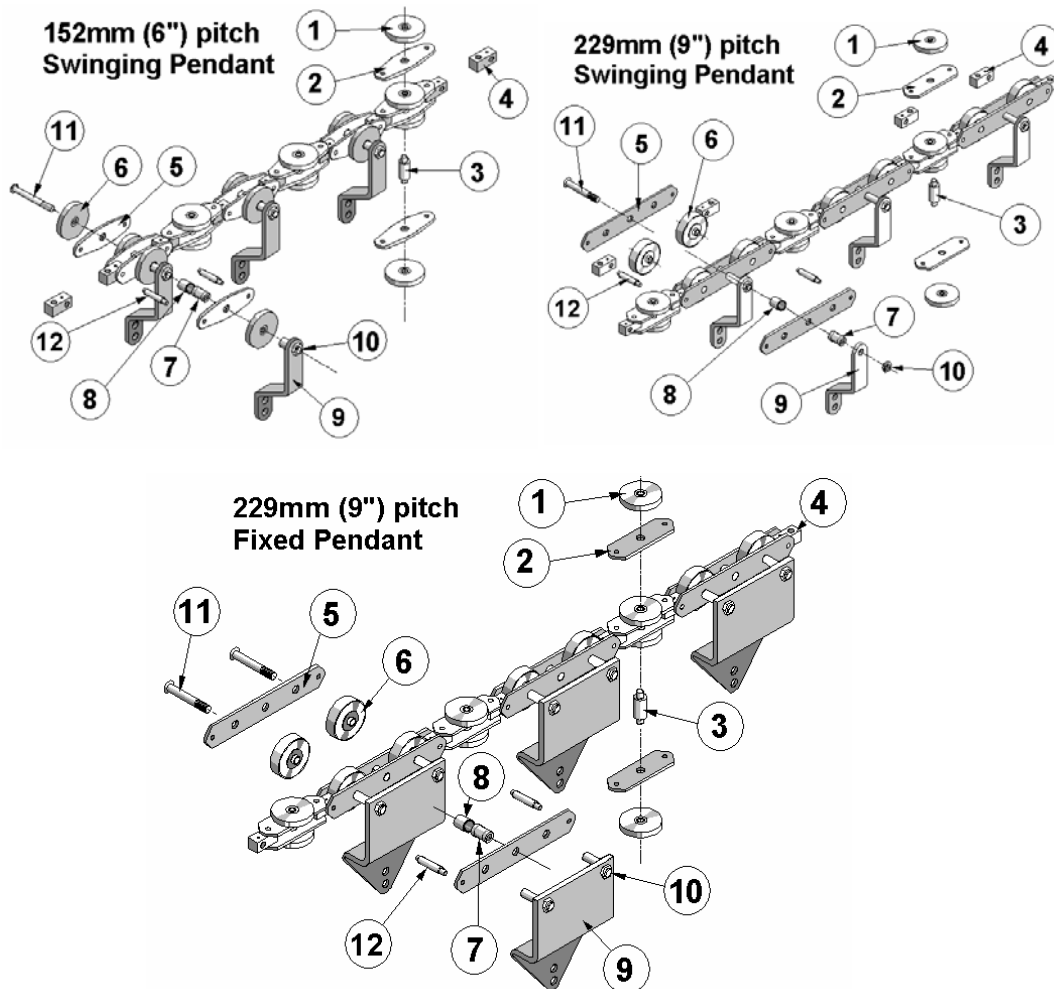
- 1 The bends should be checked for wear on the running surfaces, paying particular attention to the inside guide surfaces.
- 2 The general condition of the bends should be checked for signs of external damage, supports should be checked for security and all bolts checked for tightness.
- 3 Track joints should be checked for alignment and bolted joints checked for tightness.

### **Vertical bends**

- 1 The bends should be checked for wear on the running surfaces, paying particular attention to bottom running surface on fall bends, and top running surfaces on rise bends.
- 2 The general condition of the bends should be checked for signs of external damage, supports should be checked for security and all bolts checked for tightness.
- 3 Track joints should be checked for alignment and bolted joints checked for tightness

## ST30 Chain

- 1 The chain should be frequently checked for correct lubrication. The chain should not be over lubricated as this will result in possible product contamination. Under lubrication or incorrect nozzle alignment will decrease the life of the chain.
- 2 The chain bearings should rotate freely with little sideways motion; excessive sideways motion is a result of wear on the bearings and should be changed immediately.
- 3 The chain articulating blocks should rotate freely in both the vertical and horizontal planes. Failure to do so is a result of poor lubrication. And a symptom of seized or partially seized articulating blocks on rivets. This will result in excessive chain pull where high loads will be exerted into the bends, causing early failure and possible chain breakage.
- 4 The chain should be checked for damaged links, especially after a jam situation.
- 5 Damaged links should be removed from the system to prevent driving problems and further damage due to miss-engagement of the driving pusher dogs.



## Part 9

Item No.	1	-	Guide roller
	2	-	Side Link (guide)
	3	-	Spacer bush (guide)
	4	-	Articulating block
	5	-	Side Link (load)
	6	-	Load roller
	7	-	Hollow rivet
	8	-	Driving bush
	9	-	Pendant
	10	-	Pendant fixing nut
	11	-	Pendant fixing bolt
	12	-	Rivet

- 6 A damaged link can be changed at an inspection section. When changing damaged links the tension unit should be collapsed to introduce slack chain into the system. **With systems that have rise and falls it is of paramount important that the chain be secured at either side of the position where the chain is to be split to prevent the ends running away.**
- 7 The chain can be split, by first selecting the link to be removed and positioning it centrally within the inspection unit. A small hand grinder (goggles should always be worn) or hacksaw should then be used to remove the peined ends of the two articulating block rivets on each end of the side link.
- 8 With the use of two levers inserted between the side links, the link assembly can be 'split' and removed from the articulating blocks.
- 9 Once removed, a new connecting link assembly can be inserted, ready for riveting using a hammer and small steel block. The steel block should be positioned underneath the chain link whilst peining the Articulating Block and Load/Guide Roller rivets. Care should be taken when peining the Articulating Block and Load/Guide Roller rivets.
- Note: when changing a load link assembly two joining link assembly's are required either side of the load link. Note the position of the small oil hole on blocks. Ensure that rivet has seated securely in bearing recess and is tight.
- 10 Upon completion, the inspection cover should be replaced and the system re-tensioned. All tools etc. should be removed before attempting to re-start the system. Check chain pitch and check running through drive unit.

The tension unit is designed in such a manner that when fully extended, the unit can be retracted and a full pitch of chain removed from the system in instances of excessive chain wear causing stretch. Stretch is to be expected, and gradually the drive dogs will wear to suit. When the meshing of dogs and chain cause problems, the chain should be considered as due for replacement. More often the obvious signs of chain wear relate to the chain bearings, which, if seized or fragmented will also wear the track. It is normally recommended that the caterpillar chain is replaced when the conveyor chain is replaced due to the stretched chain causing wear of the dogs.

## Part 9

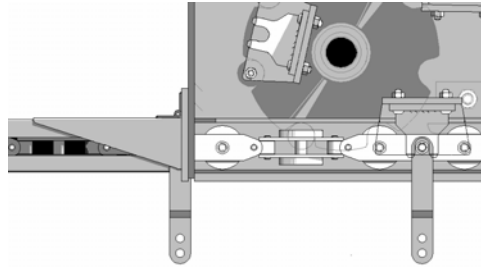
### Chain Accessories

Numerous chain attachments can be utilised depending upon the system function, but the common types with appropriate maintenance are as follows:

- 1) Loadbar complete with S hooks. - Periodic cleaning. Check hooks for damage.
- 2) Fixed loadbar complete with clevis units. – Check fixings are secure. Grease moving parts.
- 3) Spinner attachments. – Lubricate regularly dependant upon application. Check operation.
- 4) Indexing units. – Check fixings are secure. Lubricate cams regularly.

### Inline Caterpillar Drive Unit.

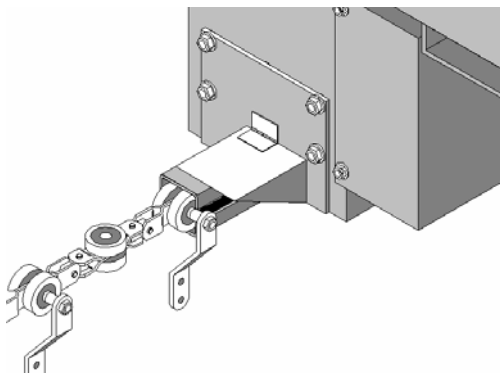
1. The drive dogs should be checked for correct meshing with the conveyor chain - they should straddle the chain links, with the two dog profiles engaging on drive bush, as detailed in the 'Chain Section'.
2. Check the tension of the twin transmission chains for signs of any wear. Note: - These chains should not be over tensioned.



Due to the chording offset of the chain on the drive sprocket assembly (a tight/slack tight / slack operation is created), care must be taken to ensure the correct tension is applied.

To adjust the chain tension, wind the motor by key until the chain is at the tightest position on the sprockets. The chains should then be tensioned, as a general guide, approximately 25mm of up/down movement of the chains at the central point between the drive and tail sprocket should be achieved.

3. The drive power tube (special chain track through the drive unit) should be checked for wear and damage.
4. The drive dog profile should be checked for wear and damage.
5. All fixings on the drive profile plate, drive body and the transmission chains should be checked for tightness.
6. Ensure the twin transmission chains are correctly lubricated.
7. The idler shaft should be checked for wear.
8. The drive shaft bearings should be checked for wear and greased.
9. The gearbox should be checked for the correct oil level. This should be done whilst the unit is stationary.
10. The drive motor bearings should be checked for wear and the cooling fins and fan should be cleaned.



11. Check the drive bottom plates for wear and remove any debris.
12. Check the lead-in and lead-out safety flaps are free to move (see illustration)

### Safety flap on drive unit

### **Inline Caterpillar Drive Unit cont.**

13. Check the ½” pitch primary transmission chain for wear and lubricate as necessary.
14. Tension the ½” pitch transmission chain. This is done by loosening the 4 off motor gearbox bolts and sliding the unit in the slotted holes accordingly.
15. Check the tooth condition for wear on the sprocket attached to the output of the gearbox and the plate wheel on the shear boss assembly.
16. Check that the shear pin is fitted correctly and that a non-standard unit has not been fitted. If a non-standard unit is fitted this must be replaced immediately with the correct type. Failure to do so could result in excessive wear to the conveyor chain, drive unit and track sections.

### **Overload Protection**

Overload Protection is in the form of a shear boss unit.

The Torque limiter should require little attention if the system is installed correctly. If the system is over loaded and jams the torque limiter will slip, the conveyor should then be turned off and the reason must be found and corrected before restarting the conveyor.

Refer to drive unit section for shear pin instructions.

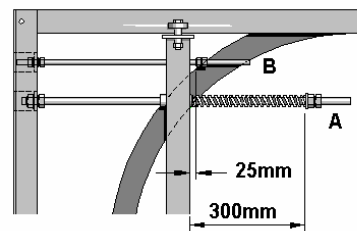
## Tension Unit

Under normal running conditions there should not be any slack chain in the system, chain tension should be checked during full load conditions.

Assessing the correct adjustment is generally done through experience, however the following is a general guide.

- 1 Select a position at low level where slack chain could gather.
- 2 It should not be possible to move the conveyor chain longitudinally in the conveyor track, if it is possible to manually push the chain back and forth, then there is excessive slack chain in the system and this can be removed by adjusting the tension unit.
- 3 After adjustment of the chain tension it should be possible to pull the chain bearings away from the 180-degree bend of the tension unit by pushing against the chain pendant.

- 4 The tension unit is easily adjusted by screwing the nuts against the springs on the tension screwed rods (**A**), thus moving the 180-degree bend outwards. This has the effect of extending the track length whilst keeping the chain length constant. After adjustment the tension unit nuts should be locked off (**A&B**).



- 5 Once the tension unit has reached its full extent, it then becomes necessary to remove a pitch of chain. This can be done as previously described for the changing of a damaged link.
- 6 Should the system be of a type where the pendants need to be kept at “a perfect pitch” then instead of removing a chain pitch it becomes necessary to add straight track either side of the tension unit to maintain integrity and close up the tension unit.

### Operating instructions.

1. Fill the reservoir with clean lubricant.
2. Slacken the locknut on the metering screw and turn the screw clockwise as far as it will go without forcing: the ram of the oil pump is now fully retracted and held in that position by the metering screw. Now turn the screw anti-clockwise five full turns (each turn represents 35 cu. mm of oil delivery).
3. Supply air at a preferred 5 bar to port 1 of the actuating valve.
4. The ram of the oil pump moves forward as the valve opens and back as it closes: at each actuation a slight 'knock' will be heard and felt at the reservoir as the ram contacts the end of the metering screw.
5. After a few strokes oil should be observed in the translucent pipe leading from the top of the pump block to the base of the distributor turret: this column of oil should move forward about 1 cm each time the valve operates until it enters the base of the turret.
6. Continue to operate the valve until oil is seen to be ejected from the nozzles onto the conveyor chain.
7. Once the conveyor is in service the amount of oil applied should be progressively reduced until the chain is running with its components just moist with oil but not dripping. Nozzle positions are factory set but should be checked for correct alignment. Individual adjustment is available if necessary.
8. Conveyor systems operating in high temperature environments may require increased application of TP1773, while those working in less arduous conditions may be lubricated intermittently.



### Lubricator Fault Finding and Diagnosis

The lubricators have only two moving parts – the actuating valve and the piston rod of the pump cylinder.

If these are not working check: -

1. That air is supplied to the valve at the correct pressure and that it is reaching the cylinder.
2. That the cylinder is working: remove the metering screw and insert a thin rod to contact the end of the pump ram. Actuate the valve and forward movement of the ram should be felt – if not, either valve or the cylinder is defective.  
If the latter, do not attempt to dismantle it from the pump block, but return either the pump unit alone or complete reservoir and pump assembly to the manufacturers, who will replace it at a nominal cost. (Free within the 12 months warranty period).
3. If the valve and pump units are working but no oil is being ejected the non-return valve or the delivery pipe is probably obstructed by dirt or, if graphite or moly-sulphide dispersions are being used, by settled out residues of solid lubricant.

#### Procedure

- Flush out with fresh oil and replace nozzles/tube if necessary.
- Clear blocked nozzles and check for any damage.
- Check nozzle alignment.
- Check for correct oil volume

## Preventative Maintenance Schedules

### **Weekly**

- 1 Visually observe the general running of the conveyor during normal production conditions, note any unusual occurrences and investigate further.
- 2 Listen for any unusual noises coming from the conveyor, note anything unusual and investigate further.
- 3 Check chain appearance with respect to lubrication and contamination, alter the frequency of lubrication as necessary.
- 4 Check the function of the lubricator, and ensure reservoir is full.
- 5 Check the function of all Emergency stops, and any other safety devices.
- 6 Check the system conveyor chain tension, and adjust as required. This should be carried out on a weekly basis for the first three months of operation, whilst the chain “beds in”.
- 7 Check all guards are fitted securely.

### **Monthly**

- 1 Check the conveyor chain tension, and adjust as required.
- 2 Visually inspect the chain at random points and react accordingly.
- 3 Check the lubricator nozzles are working and are aligned correctly.
- 4 Check the drive unit for any unusual noises, and act accordingly
- 5 Visually inspect the conveyor track for external damage.
- 6 Check caterpillar drive chain tension.

### **Three Monthly**

#### Drive unit

- 1 The drive unit should be checked for correct meshing with the conveyor chain. The drive dogs should straddle the chain links, and drive the rounded part of the articulating block.
- 2 The drive lead-in and lead-out should be checked for wear and damage.
- 3 The teeth on the drive dogs should be checked for wear and damage, the fixings connecting the twin transmission chains should be checked for tightness.
- 4 The idler shaft should be checked for wear.
- 5 The tail shaft bearings should be checked for wear and greased.

## Part 9

- 6 The drive shaft bearing should be checked for wear, lightly greased and the fixings checked for tightness.
- 7 The gearbox should be checked for oil using the specified lubricant.
- 8 The drive motor bearings should be checked for wear and the cooling fins and fan should be cleaned.
- 9 The security of all bolts and fixings should be checked.
- 10 Check driving and driven power chain sprockets are secure.

### Lubricator

- 1 Clean out lubricator reservoir and re-fill with clean oil.
- 2 Check all solenoids are working correctly and are secure.
- 3 Check all nozzles are clear and correctly aligned.
- 4 Check security of all bolts and fixings.

### Tension Unit

- 1 Lightly grease tension unit sliding frame.
- 2 Check tension unit bolts, and supports fixings.

### Conveyor Track

- 1 Check the conveyor straight track sections for signs of wear, and external damage, especially in plant such as pre-treatments or ovens.
- 2 The horizontal bends should be checked for wear on the running surfaces, paying particular attention to the inside guide surfaces.
- 3 The vertical bends should be checked for wear on the running surfaces, paying particular attention to bottom running surface on fall bends, and top running surfaces on rise bends.
- 4 The bend running surfaces should be lightly greased.
- 5 Track joints should be checked for alignment and bolted joints checked for tightness.

### **Annually**

- 1 Change gearbox oil.
- 2 Remove chain from track, and thoroughly clean, fully inspect the chain replacing any worn or damaged components.
- 3 Thoroughly clean out the inside of the track, inspecting for any damage or worn sections.
- 4 Inspect all conveyor joints and supports for tightness.

## **Recommended Lubricants**

### **Conveyor chain.**

Ambient - 250 degrees Celsius.

MCM TP1773.

### **Drive Gearbox.**

SEW "S" Range - Mobil 636

SEW "R" Range / David Brown "M" Range - Mobil 630

David Brown "C" Range - Mobil Glygoyle HE320

### **Drive unit bearings.**

B.P. Oils Ltd EnergreaseLS3. Shell Oils Alvania R3

### **Tension Unit slides.**

B.P. Oils Ltd EnergreaseLS3. Shell Oils Alvania R3

### **Oven Expansion Units.**

P.B.C. Grease.

MCM

**Method Statement****Date :** 11<sup>th</sup> July 2001**Site:** A N Application,  
Somewhere Road, Plain Industrial Estate,  
Anywhere, AW32 7AB**Installation Period :** 21<sup>st</sup> July 2001 - 4<sup>th</sup> August 2001**Scope of works:**

Provide all necessary tools and labour required to install the overhead conveyor system with the supply of supporting steelwork where required to suit the conveyor configuration.

**Manning levels :** 2 men**METHOD STATEMENT**

- ◆ All areas within the area where installation is being undertaken will be cordoned off using hazard warning tape and safety signs.
- ◆ Low level and supporting steelwork sections would then be bolted to the floor.
- ◆ All high level trimmer beams would be raised into position by means of mobile platforms and would be secured into position by the use of girder clamp assemblies.
- ◆ With all conveyor supports low level and high level in position the overhead conveyor track would be offered up to the supporting drop suspension assemblies and bolted into position by the use of hand tools.
- ◆ All tubular suspension assemblies would be cut and welded on site to suit the appropriate length.
- ◆ All underside guarding would be installed and modified to suit, the guarding would be supported from the top of the conveyor by means of cross members. These cross members would be bolted into the conveyor track flanges, half flanges shall be welded into position where required.
- ◆ Underside guarding drop arms shall be fitted to the cross members and the guarding side frames.
- ◆ A section of conveyor chain would be fed through the system to check that there were no jamming spots in the system, once satisfied that the system would run freely, the main conveyor chain would then be installed into the circuit.
- ◆ All safety equipment, harnesses, hard hats, personal protection equipment will be provided by MCM Conveyors.
- ◆ A N Application shall issue hot work permits on the days required to the relevant site personnel.
- ◆ The site would be cleared of all debris after each shift.
- ◆ We would expect a designated internal storage area for the storage of new equipment and equipment that has been removed by A.N. Application.
- ◆ A.N. Application shall provide electrical control and pneumatic power of the system.
- ◆ The use of a fork lift truck by A.N. Application shall be made available to us for the duration of the contract period.