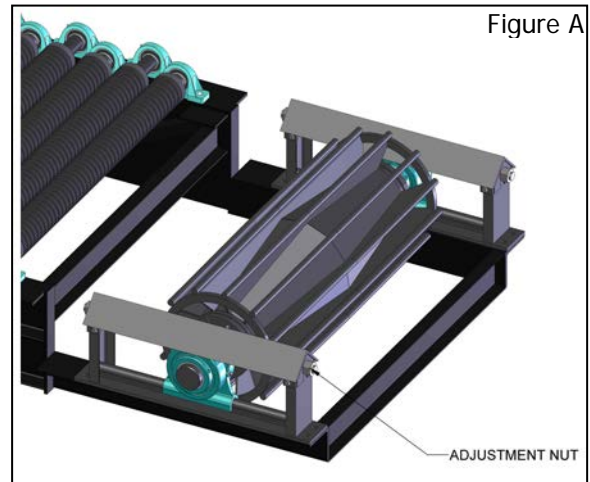




Adjusting Mechanical Take-Ups on Belt Conveyors

Douglas Manufacturing Co., Inc. strongly recommends that any safety program be supplemented by the use of ASME B20.1-2009 that refers to conveyor systems. Never operate, adjust or install equipment on a moving conveyor. Always follow lock out and tag out procedures when working on conveyor systems. Personnel who work on or around conveyor systems must be safety trained and familiar with conveyor systems.

This document provides essential information for adjusting mechanical take up units on bulk material handling belt conveyors under 200 feet long; as well as related belt tracking issues. A mechanical take-up uses threaded rod and nuts to create displacement of the tail pulley assembly. Other styles of take-up frames are available but all use threaded rod to provide adjustment to the tail pulley assembly. As shown in figure A tension applied to the conveyor belt is accomplished by turning the adjustment nut on the take up assembly. There is another identical take up unit located on the opposite side of the take-up pulley. The same procedure must be performed evenly for both take up units. **Before working on the conveyor always follow lock out and tag out**



procedures when working on conveyor systems. Personnel who work on or around conveyor systems must be safety trained and familiar with conveyor systems. Most tail pulleys are enclosed by a mesh guard. Be careful and get help if necessary to remove any guards. Use a wrench and insure that you only apply enough belt tension such that the belt does not slip around the drive pulley. In most conveyor installations, mechanical take-up units are also used to adjust belt tracking.

Some bearings used with take-up frames are self-aligning, many are not. And the ones that are not self-aligning have limits of 1 to 3 degrees of misalignment. Self-aligning bearings can allow up to 7 degrees of misalignment. Therefore both take-up frames should be adjusted at the same time. This means that one would not adjust a take-up more than one turn ahead or behind the other. If one person is adjusting both frames, they will need to turn one screw a turn, then the other, etc. until the proper tensioning is achieved. Of course the belt conveyor power must be switch off, locked out, and tagged as such before making any mentioned adjustments to the take-up units.

Once all tools and equipment are cleared from the site replace all guarding that was removed earlier. The system must be powered on and run until the conveyor belt makes 2 or 3 complete rotations. Carefully observe the effect of your adjustment during this runoff process. If the belt continues tracking off center in the right or left additional adjustments will be required until the belt finally tracks as desired.

If all attempts to center the belt in this manner are ineffective consider adjusting the position of some of the trough and return idlers. For greatest convenience in making idler adjustments the bracket



mounting bolts need to be positioned at the midpoint of the slots. Doing this will allow ample forward and reverse adjustments.

Adjustments for belt alignment on the return side should be made from the head end. Conversely, on the carrying side, adjustments should be made beginning from the tail pulley. Any tendency of the belt to run toward one side must be corrected by adjusting idlers 15 to 20 feet behind the point where the belt appears to run off center. *Remember, the belt will shift toward the side where it first contacts the idler roll.* In extreme cases, training on troughing idlers also can be adjusted by slightly inclining the entire idler frame in the direction of belt travel. This angle adjustment causes concentrating rolls to have a slight wiping effect which tends to confine side movement of the belt.

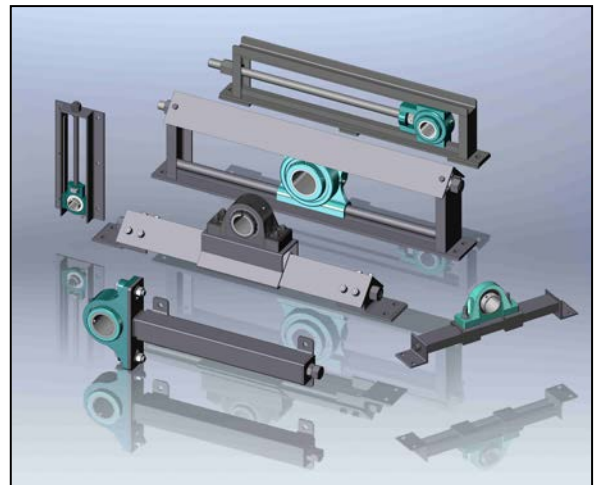
Additional Information

1. For a conveyor belt to run straight, it is essential that idlers, pulleys, and loading conditions are properly adjusted to correct any tendency of the belt to run off center.

2. The empty belt should trough well and contact the horizontal roll of all troughing idlers; for the belt to run true, all pulleys and idlers must be at right angles to the conveyor center line.

3. The empty belt should be run only for as long as necessary to observe alignment and training and to make the proper adjustments for the belt to run true.

4. When the entire belt runs off through a complete section of the conveyor, the problem usually is caused by faulty alignment or leveling of conveyor structures, idlers, or pulleys in that section.



5. If only parts of the belt run off throughout the entire conveyor, the problem usually is caused by the belt itself, in the splices of the belt, or in belt loading.

6. In a new installation, when adjustments have been made for the belt to run well and train true, the belt should be fully loaded and the conveyor operated for several hours. At the end of the day or work-shift the belt should be stopped and allowed to stand idle over night with a full load on it. This will hasten the break-in time for adjusting the belt to flex in a troughed position.

7. Particular care should be taken to make appropriate adjustments on new installations before the conveyor is operated on a full production schedule.

Critical Points to Check

1. Terminal pulleys. When training a new conveyor, the first adjustment should be to make certain that the belt will travel centered on the head and tail pulleys. Adjustment on the head end snub pulley will help train the



belt at the point where it enters the return run; adjustment on the snub pulley at the tail (if so equipped) will affect travel position of the belt over the tail pulley.

2. Return side. Belt edges can be damaged if the belt runs off on the return side. All idlers should be at right angles to the center line to keep the belt running true; however, if the belt does not train properly with idlers at right angles, some of the idlers may be changed slightly from the right angle position.

For greatest convenience in making idler adjustments, mounting bolts on the idler brackets should be positioned at midpoint of the base slots to allow ample fore and aft adjustment. When idlers are first mounted, mounting bolts should be tightened only lightly for the initial belt run; final idler position where mounting bolts are tightened firmly will be determined while the belt is running.

Adjustments for belt alignment on the return side should be made from the head end. Any tendency of the belt to run toward one side must be corrected by adjusting idlers. Idler adjustments usually are made at locations 15 to 20 feet behind the point where the belt appears to run off; the belt will shift toward the side where it first touches the idler roll.

The effects of idler adjustment are not immediate, and the running belt must be observed for 2 or 3 complete revolutions after each idler adjustment before additional changes are made.

Fixed guide rollers or self-aligning idlers should not be installed until the belt has been properly trained.

Edge guides are placed only at points where the belt runs most out of line and should be mounted so that the belt will not touch the guides unless some idlers or framing have shifted. All types of guides cause edge wear if belt is continuously against them. After proper mounting, if the belt rubs against the guide rollers it will serve as a warning signal that idler alignment should be checked and adjusted.

Self-aligning trough idlers should be mounted higher than other idlers so the belt will rest firmly on them and to assure positive actuating.

3. Carrying side. Mounting bolts on the troughing idler brackets should be positioned at midpoint of the base slots to allow ample fore and aft adjustment. If a belt troughs well when empty and carrying idlers are on center line, there will not be much trouble experienced with belt training.



Adjustments for belt alignment on the carrying side should begin at the tail pulley. If necessary, the angle of idler with center line can be changed slightly. As on the return side, the belt will shift toward the side where it first touches the idler rolls.

Training on troughing idlers also can be adjusted by inclining the entire idler frame in the direction of belt travel. This angle adjustment causes concentrating rolls to have a slight wiping effect which tends to confine side movement of the belt because the axis of rotation is no longer at right angles to belt center line. Idler angle adjustment can be made by placing washers under one



side of each bracket so that the idler tilts in the direction of belt travel. Too much tilt can cause excessive cover wear on bottom side of the belt.

Forward tilt measurement of the carrier rolls can be done by using a carpenter's square to form a right angle with the decking. At the outside height of the center line of the outside idler roll shaft, measure 1/8 in to 3/16 in forward; then under each side of the idler brackets place a washer with the correct thickness. On some types of idlers, the forward tilt is included in the casting; no additional washers should be used with such idlers.

Side edge guides or self-aligning idlers should not be placed along the carrying side unless absolutely necessary. Self-aligning idlers should be mounted 1/2 in. to 3/4 in. higher than the regular idlers.

When fixed edge roll guides are used, they should be placed at right angles to belt edge troughing angle and positioned so that belt will be restricted within the limits of the outside dimensions of troughing or return idlers. With the belt riding on center, there will be about 1 1/2 in. clearance at each edge of the troughing side and approximately 2 in. clearance at each edge of the return side. Riding against edge guide rolls causes belt edge wear and corrective measures should be taken whenever belt consistently exerts pressure against the roll.

If the belt has a tendency to run off center behind the loading point and there is a long slack side behind the loading point, additional troughing idlers will be a training aid.

If loading is off center, a portion of the carrying side will tend to run out of line. Such a condition is most easily remedied by improving the loading. Self-aligning idlers also can be used to get the belt back in line.

Other Training Issues and Corrective Measures

- 1.** If the same part of the belt always tends to run off regardless where it is on the conveyor, the belt is either crooked or a crooked splice has been made. The problem can be corrected only by resplicing or refastening the belt.
- 2.** If the belt has run well for some time and develops a tendency to run crooked, one edge of the belt may be worn thin and stretching, or water may be getting into the belt fabric and causing the exposed edge to shrink. The problem can be overcome only by a new belt or a new length spliced in.
- 3.** Tendency of the belt to climb sideways on the same idlers indicates that the idlers are out of line or the entire conveyor framing could be out of alignment. Misalignment does not cause a belt to run crooked at the point where the source of trouble actually is located, and adjusting idlers or framing does not affect the belt at the point of adjustment but rather 10 or 15 ft. beyond in direction of belt travel. Conveyors in pits or on poor foundations or where frames are made of green lumber will get out of alignment easily. Conveyors supported on trestles with material piling around the trestle from a tripper discharge are subject to misalignment due to unequal stresses on trestle framework. Conveyors on steel supports may change in alignment during a day due to unequal expansion of metals caused by heat from the sun. In any of these cases, misalignment variations should be studied and alignment adjustments established midway between the two extremes of change.
- 4.** A belt which has run for some time on an installation and trains well probably will not train well on a new or different installation no matter how well the new one is aligned. Correct training may be achieved through use of mechanical guides, and after careful running-in the belt could run properly on the new installation.



5. Belt can be forced out of alignment when return idlers develop build up from sticky materials. Accessory equipment should be utilized to eliminate carrying material to return side of the belt and prevent build up on return rollers.

6. If all corrective measures have been taken to achieve belt alignment and the belt still does not pass over the center of the head or tail pulleys, alignment could be achieved by adding two self-aligning idlers in the belt strand approaching the problem pulley. For best results, one idler should be located 20 ft. to 50 ft. from the pulley, depending on belt width, and the other placed the same distance ahead of the first.