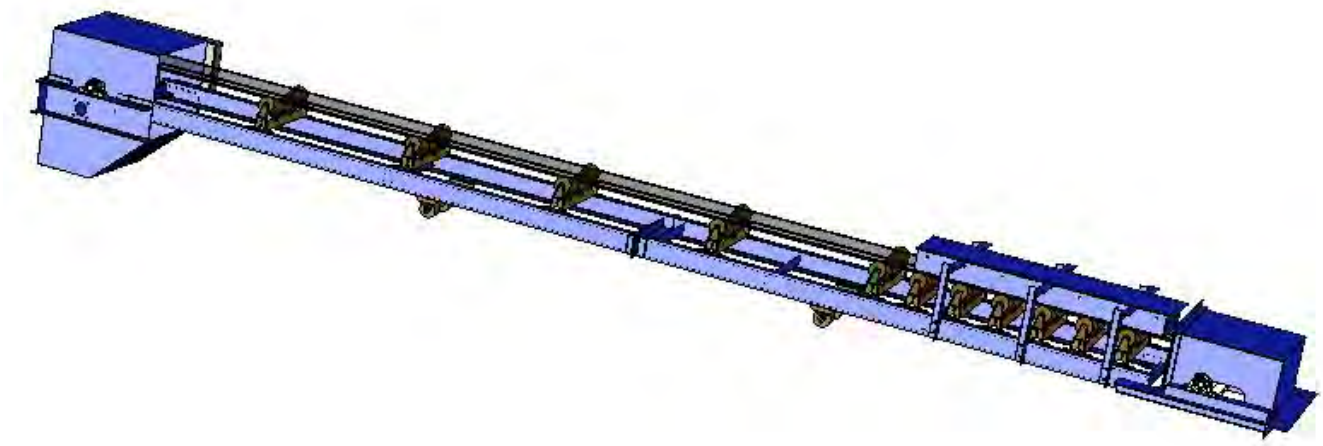
Orthman
CONVEYING SYSTEMS

Belt Conveyor

INSTALLATION, & OPERATIONAL MAINTENANCE MANUAL



PTDA Member

MEMBER CEMA CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION

Phone: (308) 324-7591 ***Fax: (308) 324-7549***

sales@conveyusa.com **TOLL FREE: 1-877-664-2687** www.conveyusa.com

WARNING AND SAFETY REMINDERS FOR SCREW , DRAG , AND BUCKET ELEVATOR CONVEYORS

APPROVED FOR DISTRIBUTION BY THE SCREW CONVEYOR SECTION OF THE CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION (CEMA)

It is the responsibility of the contractor, installer, owner and user to install, maintain and operate the conveyor, components and, conveyor assemblies in such a manner as to comply with the Williams-Steiger Occupational Safety and Health Act and with all state and local laws and ordinances and the American National Standards Institute (ANSI) B20.1 Safety Code.

In order to avoid an unsafe or hazardous condition, the assemblies or parts must be installed and operated in accordance with the following minimum provisions.

1. Conveyors shall not be operated unless all covers and/or guards for the conveyor and drive unit are in place. If the conveyor is to be opened for inspection cleaning, maintenance or observation, the electric power to the motor driving the conveyor must be LOCKED OUT in such a manner that the conveyor cannot be restarted by anyone; however remote from the area, until conveyor cover or guards and drive guards have been properly replaced.

2. If the conveyor must have an open housing as a condition of its use and application, the entire conveyor is then to be guarded by a railing or fence in accordance with ANSI standard B20.1.(Request current edition and addenda)

3. Feed openings for shovel, front loaders or other manual or mechanical equipment shall be constructed in such a way that the conveyor opening is covered by a grating. If the nature of the material is such that a grating cannot be used, then the exposed section of the conveyor is to be guarded by a railing or fence and there shall be a warning sign posted.

4. Do not attempt any maintenance or repairs of the conveyor until power has been LOCKED OUT.

5. Always operate conveyor in accordance with these instructions and those contained on the caution labels affixed to the equipment.

6. Do not place hands, feet, or any part of your body, in the conveyor.

7. Never walk on conveyor covers, grating or guards.

8. Do not use conveyor for any purpose other than that for which it was intended.

9. Do not poke or prod material into the conveyor with a bar or stick inserted through the openings.

10. Keep area around conveyor drive and control station free of debris and obstacles.

11. Eliminate all sources of stored energy (materials or devices that could cause conveyor components to move without power applied) before opening the conveyor

12. Do not attempt to clear a jammed conveyor until power has been LOCKED OUT.

13. Do not attempt field modification of conveyor or components.

14. Conveyors are not normally manufactured or designed to handle materials that are hazardous to personnel. These materials which are hazardous include those that are explosive, flammable, toxic or otherwise dangerous to personnel. Conveyors may be designed to handle these materials. Conveyors are not manufactured or designed to comply with local, state or federal codes for unfired pressure vessels. If hazardous materials are to be conveyed or if the conveyor is to be subjected to internal or external pressure, manufacturer should be consulted prior to any modifications.

CEMA insists that disconnecting and locking out the power to the motor driving the unit provides the only real protection against injury. Secondary safety devices are available; however, the decision as to their need and the type required must be made by the owner-assembler as we have no information regarding plant wiring, plant environment, the interlocking of the screw conveyor with other equipment, extent of plant automation, etc. Other devices should not be used as a substitute for locking out the power prior to removing guards or covers. We caution that use of the secondary devices may cause employees to develop a false sense of security and fail to lock out power before removing covers or guards. This could result in a serious injury should the secondary device fail or malfunction.

There are many kinds of electrical devices for interlocking of conveyors and conveyor systems such that if one conveyor in a system or process is stopped other equipment feeding it, or following it can also be automatically stopped.

Electrical controls, machinery guards, railings, walkways, arrangement of installation, training of personnel, etc., are necessary ingredients for a safe working place. It is the responsibility of the contractor, installer, owner and user to supplement the materials and services furnished with these necessary items to make the conveyor installation comply with the law and accepted standards.

Conveyor inlet and discharge openings are designed to connect to other equipment or machinery so that the flow of material into and out of the conveyor is completely enclosed.

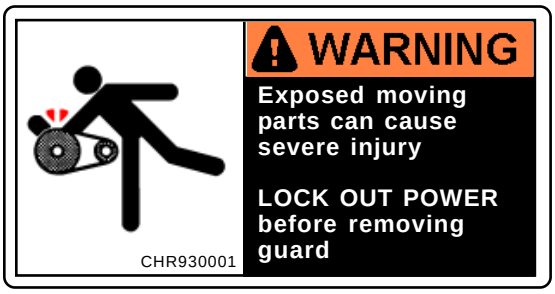
One or more warning labels should be visible on conveyor housings, conveyor covers and elevator housings. If the labels attached to the equipment become illegible, please order replacement warning labels from the OEM or CEMA.

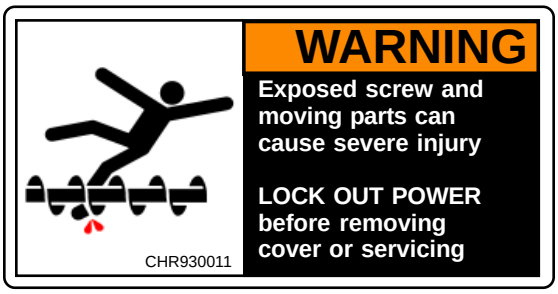
The Conveyor Equipment Manufacturers Association (CEMA) has produced an audio-visual presentation entitled “Safe Operation of Screw Conveyors, Drag Conveyors, and Bucket Elevators.” CEMA encourages acquisition and use of this source of safety information to supplement your safety program.

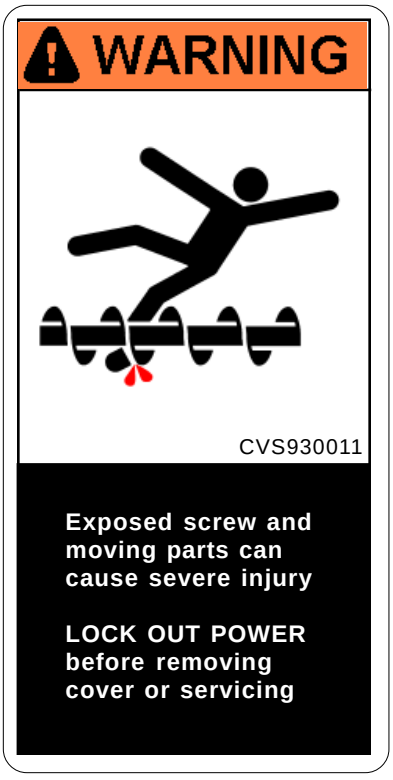
SEE OTHER SIDE FOR SAFETY LABELS

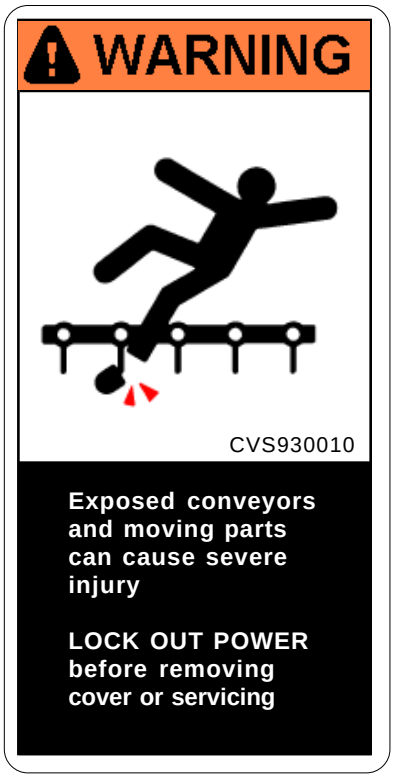
CEMA Safety Labels

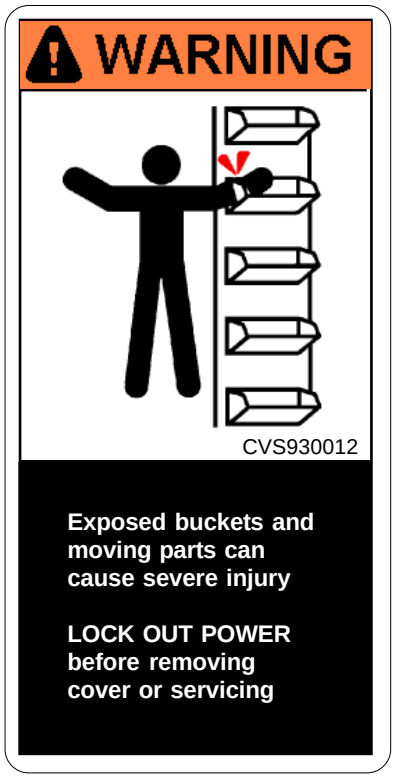
The CEMA safety labels shown below should be used on screw conveyors, drag conveyors, and bucket elevators. Safety labels should be placed on inlets, discharges, troughs, covers, inspection doors & drive guards. See CEMA Safety Label Placement Guidelines on CEMA Web Site: http://www.cemanet.org/safety/guidelines.html











PROMINENTLY DISPLAY THESE SAFETY LABELS ON INSTALLED EQUIPMENT

SEE OTHER SIDE FOR SAFETY REMINDERS

Note: Labels alone do not substitute for a thorough in-plant safety training program centered on the hazards associated with operating your installed equipment.

Contact CEMA or Your Equipment Manufacturer for Replacement Labels

CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION
6724 Lone Oak Blvd., Naples, Florida 34109
239-514-3441

BELT CONVEYOR MAINTENANCE AND TROUBLE SHOOTING

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BELT CONVEYOR MAINTENANCE AND TROUBLE SHOOTING

INTRODUCTION

There are keys to successful preventive maintenance that can be summed up in two words, “Good Housekeeping”. Good belt conveyor and idler maintenance begins with “Good Housekeeping”, the master key to getting the highest return on your conveyor dollar.

We have found the following procedures play a prominent part at almost every installation where high standards of maintenance are achieved. They provide excellent guidelines for any operator.

1. INSPECTION – The key is timing and who does it. It should be done daily and ideally performed by the Maintenance Superintendent or the Foreman.

2. PROMPT REPAIRS – Repairs should be made as soon as possible after reported – daily if possible.

3. CONVEYOR RECORDS – keep a brief outline history of each conveyor noting such things as the original idler and belt specifications, tonnage records and major repairs or changes. This information is invaluable when reordering components. Problem areas can be readily identified and equipment manufacturers can be consulted about desirable changes in specifications when replacements are needed.

In addition to the general tips provided above, we will treat the major areas of conveyor idler maintenance in detail.

IDLER LUBRICATION

Idler seals retain an ample supply of grease at the bearings for long periods of operation, but provision is made in the idlers for relubrication when required. Under ideal operating conditions – little dust and protected from weather – relubrication is generally required only once every 8,000 operating hours or one every two years to insure longest possible life.

Frequency of relubrication must be tempered by food judgment. When severe conditions exist, such as at loading or transfer points or where very dusty materials are present, more frequent lubrication usually becomes necessary, in some cases as often as every two or three months.

Where doubt exists as to the proper interval, disassembly of a few representative idlers and an inspection of the amount of grease remaining in the bearings and the condition of bearings and seal will usually establish whether the lubrication frequency is correct. This procedure can also establish the relubrication cycles considerably longer than 4,000 hours can be obtained.

IMPORTANT – For maximum lubrication effectiveness, as well as for safety reasons, idlers must not be lubricated while the conveyor is running. Power must be locked out to the equipment.

PRESSURE LUBRICATION

Certain high pressure – high volume grease guns and lubrication systems are not suited for idler lubrication. The high pressure and high volume of grease can cause internal damage; therefore, input pressures at the idler of more than 60-70 psi should be avoided.

Avoid over-lubrication. The old adage “Too much grease can be as bad as too little” is particularly true in this case. It does not improve operation, but does encourage leakage that may cause contact of grease with costly conveyor belts. If there is excessive grease purging from the idler rolls, chances are they are being relubricated too frequently. The idlers are equipped with a lubrication fitting on one end of the idler and a pressure relief fitting on the other, except in the case of all 100 series, mine- type returns and all return idlers which have a lube fitting on each end.

IMPORTANT – It should be noted that the lubrication fittings are special because they *do not incorporate a ball check and spring*. Therefore, **do not substitute standard fittings for the ones installed.**

SELECTION OF PROPER GREASE

As a result of many tests conducted under controlled conditions, certain greases are approved for idler use. It is not implied that these are the only lubricants available that would be suitable, but that these particular ones are among those, which have been tested and have been found to be satisfactory. It is important, therefore, to use one of the greases approved by ORTHMAN. This information is available from Operating and Installation Manuals, Idler Catalogs or from any ORTHMAN representative.

IDLER GREASE SEEPAGE

Generally, a small percentage of all the idlers we ship will generate some grease seepage or oil separation. The average is probably less than 15 percent.

The degree of purging will also vary from a film of oil or a small collar of grease to a "star burst" of grease continuing to the O.D. of the roll. The "star burst" is usually a very small percentage of the total.

There are multitudes of reasons why new idlers will purge at start up and at each subsequent re-greasing.

1. Displacement of Grease During Start Up – When greased, the pressure relief lubrication system insures that every bearing cavity is adequately lubricated. When the idler starts up, the bearing rolls displace grease that must go somewhere. Sometimes, when a cavity is absolutely full, there is no alternative but that a small portion will purge out through the seals.

2. Internal Pressure – This same pressure relief also retains a small internal pressure, which will only relieve itself fully when the idler rolls rotate freely and the seals break in. This can be affected appreciably by temperature.

3. Oil Separation – In any large container of grease, there will be areas where some oil separation exists. When this grease is put into the idlers, the less viscous lubricant can readily seep through the seals. We do our best to avoid this, but it can happen. It is also important to note that oil separation is not peculiar to idlers. It can occur with any grease in any piece of machinery during storage. Most grease seepage occurs immediately after a new conveyor is installed and the belt is run, the airborne dust always present around a conveyor will solidify this grease and keep any more from getting on the belt.

To minimize the potential damage to belts resulting from the grease seepage at start up, we recommend that the following procedures should be followed:

a. Do not relubricate new idlers prior to or immediately after start up as they are adequately lubricated at the factory. ORTHMAN recommends that the first field re-lubrication should be done 4,000 hours after initial start up.

b. Use only idler lubricants approved by ORTHMAN.

c. Do not lubricate idlers when rotating.

General guidelines for clean up idler lubricant on belts are as follows:

For shorter belts where mechanical clean up is feasible:

Scrape surface deposits of grease from the belt. After all scrapable residue is removed; the belt surface should be wiped clean with a suitable solvent. The cheapest and most commonly available solvent for this purpose is chlorothene. Chlorothene is fast drying, is a good grease solvent and is nonflammable.

For longer belts where manual scraping and wiping are impractical:

Remove all excess grease using a suitable mechanical belt scraper. This operation should be conducted under constant surveillance, to protect against damage to the belt cover. After scraping, the belt surface should be wiped clean as in the manual operation, using a suitable solvent. A rag or felt pad saturated with chlorothene mounted on a scraper carriage can be used for this purpose.

The preceding instructions should be considered general guidelines on the cleaning of belts. We recommend that customers consult with the belt manufacturer for more detailed specific instructions.

Please remember that the majority of idlers run without any grease seepage, but it will happen occasionally.

BELT TRAINING

Conveyor belting represents about 40 – 50 percent of the cost of a new installation, but more important it can involve about 75 percent of the cost of maintenance. Probably the most important single factor in belt life is training.

We could never hope to cover all of the possible causes of detraining but we will discuss the most common ones and the appropriate corrective measures.

If belt detraining is to be reduced to a minimum, the source of the detraining must be identified. Too often, training devices are added to a conveyor to alleviate a specific detraining condition. If the detraining force or cause is one that is detrimental to belt life it still exists – and will still reduce belt life.

Belt training can only be a result of one of two things:

1. Poor initial installation.

2. Shortcomings in operations and/or maintenance or unusual surrounding conditions.

We will cover each separately.

Initial Installation

Conveyor Structure Alignment – There is no substitute for proper initial alignment of the conveyor frame. Everything must be installed in accurate lines both longitudinally and laterally and in a fashion to prevent shifting at a later date.

Conveyor Machinery Alignment – Misalignment is probably the most common cause of the problem. It is often treated very lightly, but it can and has created serious problems. As an example, let's take a look at a typical case of pulley alignment. Assume we have a belt conveyor with a 24" diameter pulley running a 500 fpm – an average situation. An insignificant lateral misalignment in the pulley of only 0 – 1' (one minute) will actually cause the belt to run off 2" for every minute of operation.

Another typical case is idler alignment. We know from experience that training idlers generate a positive training effect in a belt with as little as ½ degree of skew. Similarly, a ½ degree misalignment of an idler can cause noticeable detraining.

Belt Splicing – Care must be taken to insure belt spices are square. If it is not, not only does it generate training problems, but also it exerts unequal tension across the belt that can lead to premature failure.

Temperature Gradients – Recently, we have become aware of a case where the sun shining on one side of a long overland belt created severe misalignment through differential in expansion. A similar condition can occur where the prevailing wind can detrain a relatively long belt.

About the only corrective measure is to provide covers or shields. These are some of the more common causes of detraining as a result of improper initial installation.

Operating Problems of Belt Training

Off Center Belt Loading – We have found that this is the most common case of detraining. If the load is put on the belt off center, the only sure cure is to revise the feed chute or loading hopper. Sometimes, with an angular transfer, the load may be centered, but the force of the trajectory is in line with the belt travel. This may be difficult at times due to headroom restrictions, and the only alternative may be to revise the trajectory to a vertical drop, thus, eliminating all lateral of horizontal thrust load. Even this might be detrimental to belt life if belt speeds are over 300 fpm or if the material is coarse and sharp.

Material Build Up – Build up can occur in many places.

On Conveyor Decking – This is generally the result of poor loading conditions, and can cause stoppage of idler rotation, thereby creating excessive wear on idlers and belt, and detraining. Material build up should never be allowed to reach the idler rolls.

Return Idler Build Up – This is very common in applications where fines and moisture exist – which seem to be practically everywhere. The corrections are numerous.

1. Use an effective belt cleaner
2. Use rubber disc idlers, which are probably the most common means for compensating for this.
3. Use a Spiral Cantenary Type Idler – This is probably the most effective means of all of them. Not only does the Spiral tend to remove material through the broken surface and screwing action, but it actually reverse bends the belts to generate a separation of material from the belt. This reverse bend can also help keep the return strand centered.

Pulley Build Up – Can be serious not only for detraining but can also result in a loss of friction for driving the belt. A good lagging, preferably of the grooved herringbone type, will go a long way to alleviating this. Another is the use of a belt plow on the return strand – just ahead of the tail pulley.

Of course, we have all heard the old axiom that if a belt conveyor is installed and operated properly, self-aligning idlers would be necessary. Perhaps true in theory, but it seldom works.

Practically every conveyor requires some trainers, but since they really are nothing more than a necessary evil, their application would be limited to absolute necessity through the proper evaluation of the ideas we have just covered.

Over the last few years, there has been a rapid evolution in conveyor design such as speed up to 1200 fpm, steel cable belts, and long, single flights up to 15,000-foot centers or more. Hewitt-Robins has been pioneering new developments in the area of training these belts.

One is the V-type return idler that is ideally suited for wide, long and fairly high-tension belts. It incorporates two rolls sloped at 10 degrees. If the belt tends to wander, the change in the center of gravity of the belt will tend to return it to the proper location.

While these are more expensive than simple flat return idlers, the overall cost of the system may be a standoff with conventional idlers and trainers in that they can usually be spaced at approximately twice the centers and can eliminate the need for return trainers.

There are, of course, a multitude of other items that could be covered in respect to belt training but the foregoing covers the most common and probably 90 percent of the cases.

TRANSITIONS

Traditionally, conveyor designers have incorporated transition type troughing idlers adjacent to the head and tail pulleys on belts supported on 35 degrees and 45 degrees troughing idlers. Special idlers are available with adjustable end brackets that will permit the slope of the end rolls to be varied in increments of 2 degrees. Some people use one 20 degree idler at each end of a 35 degree conveyor, and 20 degree and 35 degree idlers on each end of a 45 degree conveyor. The object of this approach is to have the rolls sloped to suit the belt contour between the last regular or impact idler and the adjacent pulley.

In recent years, due to the design and development of lighter, thinner and higher tensile belts, all belt manufacturers have experienced premature belt failures from creasing and rupturing at the junction of troughing idler rolls. Although it has occurred on 25 degree, 35 degree, and 45-degree idlers, deep trough idlers have been the chief culprits. We now recognize that changing the slope of the end rolls in the transition area is far from the ideal solution.

Tests have shown that the slope of the edge of the belt remains at the same slope as the troughing idlers all the way from the idler to the flat pulley. What does change is the width of flat (horizontal) and the width of the sloped portion. The horizontal section varies from the full width of the belt at the pulley to the center roll of the idler at the first regular idler. Theoretically, the ideal situation would exist if the transition idlers had end rolls that were at a constant slope of 25 degrees, 35 degrees, or 45 degrees, and were adjustable horizontally to support the edge of the belt, as it contoured itself naturally at the point the idler is installed.

Studies are presently underway to develop hardware consistent with this theory and it is hoped that soon the problems associated with this troublesome area of a conveyor can be eliminated completely.

LOADING POINT SPILLAGE

The initial design of successful loading chutes and skirtboards require considerable care. Much has been written in conveyor design textbooks and manuals about the proper design of skirtboards and their application. Consult ORTHMAN if a particular problem arises on your conveyor. Much of the spillage at loading and transfer points can be attributed to worn or improperly adjusted skirtboards. Other things to consider include hanging a confining curtain (such as an old belt) at the transfer point and incorporating a stone box effect in the chute to reduce material velocity.

There is another solution to a spillage problem in the loading area that is worthy of further investigation. If your basic conveyor utilizes 20 degree troughing idlers, and headroom permits, install 35 degree impact or troughing idlers in the loading area. The additional slope generally eliminated spillage and gives the added bonus of better centering the load on the belt. There is no reason why this cannot be done even after a conveyor is in operation if the loading chute and skirtboard design permit easy modification. The same can be accomplished by using 45 degree idlers on a 35 degree conveyor.

ORTHMAN has developed what we call a “hanging impact idler” that has the effect of eliminating the structure below the idler. The conveyor deck is completely exposed and accessible for simple clean up.

SKIRTBOARDS

Skirtboards, when necessary, are used to confine material to the center of the belt at the loading point. These can be made of wood or steel, but the skirtboards themselves should not come closer than two or three inches to the belt. Fastening skirtboard rubber to the skirtboards and allowing the rubber to extend onto the belt should bridge the remaining gap to the belt. Do not use old conveyor belting for skirtboard rubber, since the carcass provides too much rigidity and will wear grooves in the main belt.

In addition, fines will become trapped in the carcass and act as an abrasive. Instead, skirtboard rubber designed for the purpose should be utilized.

The design of the skirtboards should be such that they taper inward and lift slightly off the belt in the direction of belt travel.

MAINTENANCE HINTS

BELT CONVEYOR – TROUBLES, CAUSES AND CORRECTIONS

TROUBLE	CAUSE	CORRECTION
A. Conveyor belt runs to one side at a particular pint on the conveyor.	One or more idlers not at right angles to longitudinal centerline of belt. Conveyor frame not lined up properly; or idler stand, or stands, not centered on belt. Sticking idlers. Structure not level and belt tends to shift to low side Build up of material on idlers.	Advance the end of idler to which the belt has shifted in the direction of belt travel. Stretch line along edge to determine how much out of line and correct. Replace or free idler Level Structure. Improve maintenance. Install scrapers.
B. One section of belting runs off to one side all along the conveyor.	Splices not square. Crooked belt caused by storage of telescoped rolls or one edge close to damp ground or wall.	Resplice, cutting end square. If bow is in new belt, it may correct itself when belt becomes broken in; otherwise replace it with a new section.
C. Conveyor belt runs to one side for some distance along conveyor line.	Improper loading of belt.	Make changes in loading station and loading conditions so that it is centered properly.

Belt Conveyor – Troubles, Causes, and Corrections (cont.)

TROUBLE	CAUSE	CORRECTION
D. Belt has erratic action, following not particular pattern.	Belt too stiff.	May be due to newness. If so, allow proper break-in time. It will shorten break-in time if belt is left loaded on off shift. Tilt troughing idler forward a maximum of 2 degrees if conveyor is never reversed in direction. Use self-aligning idlers. Use more troughable belt.
E. Belt running off at head pulley.	Head pulley or troughing idlers approaching head pulley out of alignment.	Check alignment of pulley and adjacent troughing idlers.
F. Belt running off at tail pulley.	Build up of material on return idlers.	Remove material; provide better housekeeping.
	Return rollers out of line.	Adjust at right angle to frame.
	Unequal loading.	Adjust loading chute to properly center the load.
G. Excessive wear on bottom side of belt.	Slippage between belt and drive pulley or pulleys.	Increase tension or belt take-up device.

Belt Conveyor – Troubles, Causes, and Corrections (cont.)

TROUBLE	CAUSE	CORRECTION
G. Excessive wear on bottom side of belt.	Slippage between belt and drive pulley or pulleys. (Cont.)	Lag drive pulleys, renew worn-out lagging.
		Increase arc of contact drive pulley with snub pulley or use tandem drive.
	Sticking troughing idlers.	Replace or free.
	Material ground between pulley and belt.	Install scrapers in front of tail pulley or return belt.
H. Excessive wear on carrying side of belt.	Dirt, frozen or misaligned return idlers.	Install belt-cleaning plows at head end and tail end.
		Clean, repair and align return idlers.
	Excessive sag between troughing idlers causing load to move and shift on belt as it passes over idlers.	Increase belt tension if too low.
		Reduce idler spacing.
	Abrasive skirtboards.	Use rubber skirt material. Avoid use of old belting.
	Poor loading.	Feed load on belt in same direction at same speed.

Belt Conveyor – Troubles, Causes, and Corrections (cont.)

TROUBLE	CAUSE	CORRECTION
I. Belt requires too much tension resulting in excessive stretch in belt.	Improper maintenance of troughing and return idlers.	Reduce friction by placing frozen or worn-out idlers. Provide better maintenance. Decrease tension by improving drive. 1. Lagging on drive pulleys. 2. Increase arc of contact of drive pulley; provide tandem drive. Increase speed, if possible, keeping shift tonnage the same. Reduce tonnage at slower speed. Tighten screw take-up just enough to keep belt from slipping. On a gravity take-up reduce counterweight to minimum amount sufficient to keep belt from slipping.

Belt Conveyor – Troubles, Causes, and Corrections (cont.)

TROUBLE	CAUSE	CORRECTION
J. Fasteners pull out of belt.	Tension too high.	See Paragraph 1.
	Mildew.	Use mildew inhibitor on belt.
	Wrong type of fasteners or fasteners not tight.	Replace belt with proper fasteners that have the required strength.
		Use vulcanized splices if feasible.
	Improper starting.	Use more acceleration steps in starting.
K. Short breaks in carcass of belt parallel to edge and star breaks in carcass.	Impact of lumps falling on belt at loading station.	Use impact idlers.
	Material trapped between belt and pulley.	Install plows or scrapers ahead of pulley.
L. Excessive noise or squealing in tandem drive.	Unequal diameters of drive pulley.	Difference of ¼ inch diameters will cause noise.
M. Thumping noise in tandem drive.	One or both pulleys loose on shaft.	Tighten pulleys.
	Gear out of mesh, improperly machined or worn out.	Change gears.

BELT CONVEYOR DAILY MAINTENANCE CHECK LIST

Belts:

1. Watch out for spillage of material onto the return strand, where it can get between the belt and pulleys.

2. See that the belt is properly trained and does not contact steel structure.
   This is especially important on the return strand that is generally not as easy to see.

3. Mark breaks, damaged and worn spots and report them for early repair.

4. Keep large lumps of material off belts. If they do get on, remove them carefully.

Idlers and Pulleys:

1. Note and mark “frozen” or damaged idlers for repair or replacement.

2. Check troughing and return training idlers for proper operation.

3. Check scrapers and plows for proper operation.

4. Watch for material to build up on decking or floor under idlers or pulleys. This is especially important at training idlers.

5. Watch for and eliminate material built up on idlers and pulleys.

Chutes and Hoppers:

1. Note and correct clogged or “bridged” material.

2. Prevent large lumps from dropping onto unprotected belt.

3. Check to see that the material is centered on the belt and that the belt is not overloaded.

CEMA IDLER STANDARDS

CEMA CLASS	TYPE BEARINGS	ROLL DIAMETER	SHAFT DIAMETER	LOAD CAPACITY	H-R SERIES
B4	BALL	4" – 5"	$^{5}/_{8}$"		1000
B5	BALL	4" – 5"	¾"		
C4, C5	ROLLER	4" – 5"	¾"	900	2000
C6	ROLLER	6"	¾"	900	2000
	ROLLER	6"	1"	1500	3000
D6	ROLLER	6"	1 $^{3}/_{16}$" *OR* 1 ¼"	1800	4600
D7	ROLLER	7"	1 $^{3}/_{16}$" *OR* 1 ¼"	1800	4700

IDLERS – BASIC DESIGN FEATURES

Everyone is aware of the fact that conveyor idlers are designed to support and to train the conveyor belt. We also realize that they are to offer a minimum of resistance to the belt passage regardless of speed, and they must be designed and spaced to support a load of material as well as to support the belt. Impact damage from heavy lumps must be resisted. Frequently, idlers must be specially designed to resist severe abrasion, corrosion, oxidation or material build up on rolls.

The belt idlers manufactured today are equipped with anti-friction bearings and they provide for relubrication from one side to minimize relubrication time. Roll ends are welded to the idler rolls eliminating reduced tube thickness at the roll ends, thus preventing the necessity of early idler replacement due to holes abraded through the idler roll ends. For the protection against belt pinching, gaps between idler rolls are kept at a minimum. Slotted holes are used for bolt connections to supporting steel so that idlers may be aligned for training purposes.

One-shot lubrication system provides a means of greasing all six bearings of the idlers by the application of a grease gun to one grease fitting, which can be located on either end of the idler. A single axial grease passage services all bearings. No need to reach dangerously beneath the belt to lubricate through other grease fittings. Plus, only one walkway required for servicing.

An important feature of this one-shot lubrication system is the use of an open-grease fitting and pressure relief valve that equalizes internal grease pressure. This permits a build up of pressure sufficient to force fresh grease to enter bearing chambers through drilled holes behind each bearing. This grease flowing through the bearing forces the air ahead of it until it all escapes around the cork seal elements. When the grease contacts the cork rings, they act as check valves, closing the exit, and prevent further travel of grease in the bearing chamber. All other grease chambers are successively filled with fresh grease in the same manner. Grease coming through the pressure relief valve visually alerts maintenance men that the lubrication is complete. Grease escapes at a point where it cannot come in contact with the belt.

Drop-In Roll construction used on all new series utilizes very simple steel keepers to hold the rolls in place. No special tools are required. A special feature of this arrangement is that all steel rolls and impact rolls of the same series fit into the same frame. Distributors can now modify stock idlers by simply changing rolls to enable them to offer more styles from stock with less investment. Although we lose the extra load carrying capacity available in the previous rigid Truss Designs, these new lines meet or exceed all CEMA standards.

Additional belt protection is assured by rounding off all roll ends.

Fast Belt Alignment is accomplished by utilizing slotted belt holes on one and two-bolt connections on each side. For one-bolt connection, located at each end of the baseboard, installation time is cut by 50%.

SPECIAL AND ACCESSORY IDLERS

Training Idlers – are useful when used within the guidelines given in our idler selection procedure. They are of limited or no value on steel cable belts and high-tension fabric belts where the training force that can be obtained is far less than the forces in the belt causing detraining. In such cases, v-return idlers and trainers should be considered. We know that a "skewed" idler exerts a force on the belt that causes it to tend to move laterally. It is this force on the belt that causes it to tend to move laterally. It is this force that we take advantage of when we use a training idler. On troughing training idlers, there is a guide roll located on the outside of the end rolls. When a belt detrains and contacts this roll, it is pushed out, rotating around a pivot. At the opposite end of the guide roll bracket (under the end roll) there is a brake pad. When the guide roll is pushed far enough, the brake pad comes in contact with the end roll causing it to stop rotating. This causes a drag between the belt and the roll, which, in turn, causes the frame holding the three rolls to pivot around a center pivot. The idler is thus skewed and a force is applied to the belt to move it back to the center. Other designs, such as our current reversible return trainer, use a skid bar in place of a guide roll. The drag occurs from the belt skidding over the stationary skid surface.

Impact Idlers – are currently being made in 3000 and 4000 Series only. Since there is very little cost difference between a 2000 and 3000 Series trainer, it was decided to make 3000 Series only to facilitate inventory. Dimensionally, they are the same. Impacts should be applied as described in the idler selection procedure. There are many applications we have encountered where no conventional impact will do the job. In these cases, we usually recommend 5 roll impacts. We have also used spirals successfully where conventional impacts have failed. The trick here is the swivel bracket where the roll is held in the heavy steel cable and the "hammock" effect where the energy of the impact is partially dissipated through idler movement and deformation.

Troughing and Return Idlers – are available with different types of rolls to suit severe operating conditions, such as highly abrasive coke, sinter, etc. Cast iron rolls are available on 2000 and 3000 Series and are generally used in highly abrasive applications, such as coke and sinter. Coated rolls are also an excellent solution to the abrasion problem. We can also supply idlers with 6" diameter rolls and ¼" thick roll sheets. When material tends to stick to the rolls, Spiral Cantenary Idlers are excellent choices.

Rubber Disc Returns – are used when material handled is damp, sticky or corrosive, or when material tends to freeze in the belt.

Feeder and Picking and Feeder and Picking Impact – idlers are used primarily on belt feeders as they spread the load in a wide, thin layer for picking, sorting and inspection. They are made in 3000 (except impact) and 4000 Series only.

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75765 Road 435 • PO Box B • Lexington, NE 68850