BELT CONVEYOR

INSTALLATION, OPERATION MAINTENANCE AND SAFETY MANUAL

CONTINENTAL BELT CONVEYOR SYSTEMS

By

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NOTE – Safety instructions contained within are basic guidelines and should be considered as minimum provisions. Additional information shall be obtained by the purchaser from other sources including the latest editions of American Society of Mechanical Engineers; Standard ANSI B20.1; Standard ANSI B15.1; Standard ANSA A12.1; Standard ANSI MH4.7; Standard ANSI Z244.1-1982.

Suggested Installation, Operation, Maintenance and Safety Procedures applicable to Continental Belt Conveyor Systems Equipment

This is a general guideline for the operation, maintenance and safety procedure for belt conveyors manufactured by Continental Belt Conveyor Systems (CBCS). It is intended to provide general engineering information on belt conveyors and is **not** intended to circumvent or modify any information supplied by the manufacture of any of the purchased components supplied with this equipment.

The information contained herein should be made available to be studied by any of your plant and office personnel who may be expected to operate, inspect, work on - or in any way come in contact with this equipment. This should be done prior to putting the equipment into operation.

INSTALLATION

Prior to receiving the equipment you normally will be furnished with a general arrangement drawing provided by CBCS of your equipment layout, which includes all pertinent elevations and dimensions. This drawing shows the configuration of he conveyor and location of the support points if we are to supply conveyor supports. In the cases where CBCS is to supply supports, there will be an anchor bolt size and setting plan given to accept the base plates of the these supports.

Please review this drawing and if any discrepancies occur in the layout drawing and the actual jobsite condition contact CBCS immediately. Because of varying soil conditions, CBCS does not specify foundation sizes for the equipment. We recommend that you consult a qualified engineer in your area that can determine the exact foundation requirements to handle the individual system components. If required, the loads created by the conveyor we furnish can be shown on the general arrangement drawings. All piers, footings and foundations should comply with local building codes.

When you receive your shipment of equipment it is important that you immediately inspect the shipment against the accompanying shipping list. If any of the goods called for on the freight bill are short or damaged, do not accept or sign the bill until the delivery agent makes proper notation to this effect on your freight bill. This is absolutely necessary as the freight bill is an acknowledgment to the transportation company that the goods were received in good condition. This **must be done**, as the transportation companies will **not** honor any claim for loss or damage equipment.

If the delivery agent will not make the proper notations, then you should file an affidavit stating your notification along with the proper time and date. This will aid in supporting your claim.

Once the equipment is received it is necessary that the proper storage precautions be taken in order to assure against damage due to weather and other unpredictable acts. Keeping in mind the sequence of assembly and easy accessibility. All major components should be placed on blocks to prevent possible damage. If the equipment will not be installed for a lengthy period of time, cover any components that could be damaged by weather elements.

All hardware and small components that are received in crates should be resealed after inspecting the contents for damage. All shipping containers should be blocked-up and covered from the elements until actual erection of the system begins.

Your equipment may have traveled many hundreds of miles by truck and during the trip haul vibration may have caused bolts or setscrews to work loose. During installation and prior to operating the equipment a visual inspect should be done to check and tighten any such fasteners.

Installation of the conveyor should in accordance with the drawings provided by CBCS, these drawings provide the general arrangement of the conveyor and an overall view of the finished conveyor. Proper erecting equipment will be required; this equipment will be dependent on the type of conveyor, frame construction, configuration and length of the conveyor and will be at the discretion of the company or general contractor in charge of installing the conveyor.

Depending on how your equipment was quoted and provided will dictate how you receive it and the amount of assembly work that will be required by field personnel. The following is a list of the major components of a belt conveyor and how they would normally be supplied CBCS to the field.

Tail Section: Assembly with the tail pulley, tail shaft, bearings and take-up assembly if manually adjusted, idlers and return rolls. If the inlet loading area is small enough it may be assembled to the tail section. If the inlet areas to too large it will be shipped loose for field assembly because installing the belt is difficult.

Intermediate Section: Depending on what type - channel frame or truss frame may have the idlers attached. Shipping of truss sections with idlers may create an over height load.

Gravity Take-up Section: Normally supplied on conveyors in excess of 150’ in length

Conveyor Supports: Normally constructed in one welded assembly in lengths up to 25’, supports longer than this are bolted construction and will require field assembly.

Inlet, Discharge or Diverter Sections: Normally constructed in one welded assembly, only in cases where these assemblies are excessive longer or angular would there be two sections and a bolted jointed to be assembled in the field.

Idlers and Returns: Normally would be shipped attached to the conveyor frame, the exception would be as discussed for the intermediate sections. In the case where idlers and returns were shipped loose acre must be taken to assemble the proper type of idlers and return to the proper location. Transition idlers normally would be at carrying side of the tail and head and training idlers would be spaced approximately 100’ on center, the general arrangement drawing will identify the type and location of these idlers.

Belting: Normally would be shipped as a roll and field installed with a mechanical splice furnished by CBCS (**Note:** Mechanical splice and templet furnished by CBCS tools required by the field installer). The belt furnished by CBCS will have enough additional to allow for a field-vulcanized splice as required. (**Note:** Vulcanizing and materials required by the field installer)

Walkway and Handrail: Walkway and handrail sections along with the walkway support system usually on 5’-0”centers are shipped as loose items and will require field assembly.

Accessories: Safety switches such as emergency stop, safety pull cord, motion sensor, belt misalignment and plugged are all shipped loose for field installation due to possible damage during shipment. Brackets for these items will be supplied and attached to the conveyor frame by CBCS.

Normal conveyor installations begin at the tail sections and proceed towards the head section. Each conveyor and situation is different thus a determination must be made by the company or the contractor in charge of installation as to the best approach for their installation.

The installation of the conveyor should ensure that the frame is level and that a good alignment exists at all of the pulley locations, idlers and returns. Once this alignment is achieved the conveyor frame should be secured to the support and all bolted joints tighten to the proper torque. The alignment of the conveyor frames differs based on their application, the ideal installation would achieve an alignment of plus or minus 1/8" in conveyor frames 50'-0" center-to-center of pulleys length or less. For longer applications 1/4" in 100'-0" with a maximum out of alignment of 1/2" on the length up to 500'-0".

A final inspection of the overall installation should be done to check for potential problems, loose joints, or forgotten pieces prior to the belt being powered up for training. This inspection process could include the plant operates, it will give them a good opportunity to examine and to become familiar with it before there is any material run on the system.

Stop all moving machinery during periods of lubrication, maintenance, or adjustment and provide that the equipment cannot be restarted during such procedures!!!!

OPERATION

The operation of each belt conveyor differs with its application. Once the installation is satisfactorily completed and all of the bearings, idlers, reducers, etc. are proper lubricated and the safety devices are installed the conveyor is ready for operation.

Belt conveyors are designed to conveyor a given amount of particular material, the width of the belt, speed and horsepower have been based on that criteria and any deviation can cause serious effects to the belt conveyor.

The effect of changing any of the determining factors in the design of the belt conveyor will mostly result in excessive costly downtime, spilled material and cleanout, decrease efficiency, annoying motor trip outs and reduce the life of the conveyor and components.

We have provide a trouble shooting chart to help you with commonly experienced problems:

COMPLAINT	CAUSE In order of probable occurrence					
Belt runs off at tail pulley	7	15	14	17	21	--
Entire belt runs off at all points of the line	26	17	15	21	4	16
One belt section runs off at all points of the time	2	11	1	--	--	--
Belt runs off at head pulley	15	22	21	16	--	---
Belt runs to one side throughout entire length at specific idlers	15	16	21	--	--	--
Belt slip	19	7	21	14	22	--
Belt slip on starting	19	7	22	10	--	--
Excessive belt stretch	13	10	21	6	9	8
Belt breaks at or behind fasteners; fasteners tear loose	2	23	13	22	20	10
Vulcanized splice separation	13	23	10	20	2	9
Excessive wear, including rips, gouges, ruptures and tears	12	25	17	21	8	5
Excessive bottom cover wear	21	14	5	19	20	22
Excessive edge wear, broken edges	26	4	17	8	1	21
Cover swells in spots or streaks	8	--	--	--	--	--
Belt hardens or cracks	8	23	2	18	--	--
Covers become checked or brittle	8	18	--	--	--	--
Longitudinal grooving or cracking of top cover	27	14	21	12	--	--
Longitudinal grooving or cracking of bottom cover	14	21	22	--	--	--
Fabric decay, carcass cracks, ruptures, gouges (soft spots)	12	20	5	10	8	24
Ply separation	13	23	11	8	3	--

1. Belt bowed – Avoid telescoping belt rolls or storing them in damp locations. A new belt should straighten out when "broken in" or it must be replaced.

2. Belt improperly spliced or wrong fasteners – Use correct fasteners. Retighten after running for a short while. If improperly spliced, remove belt splice and make new splice. Set up regular inspection schedule.

3. Belt speed too fast – Reduce belt speed.

4. Belt strained on one side – Allow time for new belt to "break in." If belt does not break in properly or is not new, remove strained section and splice in a new piece.

5. Breaker strip missing or inadequate –When service is lost, install belt with proper breaker strip.

6. Counterweight too heavy – Recalculate weight required and adjust counterweight accordingly. Reduce take-up tension to point of slipping, and then tighten slightly.

7. Counterweight too light – Recalculate weight required and adjust counterweight or screw take-up accordingly.

8. Damage by abrasives, acid, chemicals, heat, mildew, and oil – Use belt designed for specific condition. For abrasive materials working into cuts and between plies, make spot repairs with cold patch or with permanent repair patch. Seal metal fasteners or replace with vulcanized step splice. Enclose belt line for protection against rain, snow, or sun. Don't over-lubricate idlers.

9. Differential speed wrong on dual pulleys – Make necessary adjustment.

10. Drive underbelted – Recalculate maximum belt tensions and select correct belt. If line is over-extended, consider using two-flight system with transfer point. If carcass is not rigid enough for load, install belt with proper flexibility when service is lost.

11. Edge worn or broken – Repair belt edge. Remove badly worn or out-of-square section and splice in a new piece.

12. Excessive impact of material on belt or fasteners – Use correctly designed chutes and baffles. Make vulcanized splices. Install impact idlers. Where possible, load fines first. Where material is trapped under skirts, adjust skirt-boards to minimum clearance or install cushioning idlers to hold belt against skirts.

13. Excessive tension – Recalculate and adjust tension. Use vulcanized splice within recommended limits.

14. Frozen idlers – Free idlers, lubricate as required. Improve maintenance. (Don't over-lubricate).

15. Idlers or pulleys out-of-square with centerline of conveyor) - Realign and install limit switches for greater safety.

16. Idlers improperly placed – Relocate idlers or insert additional idlers spaced to support belt.

17. Improper loading, spillage – Feed should be in direction of belt travel and at belt speed, centered on the belt. Control flow with feeders, chutes and skirt-boards.

18. Improper storage or handling – Refer to the manufacturer for storage and handling tips.

19. Insufficient traction between belt and pulley – Increase wrap with snub pulleys. Lag drive pulley. In wet conditions, use grooved lagging. Install correct cleaning devices for safety. See item 7, above.

20. Material between belt and pulley – Use skirt-boards properly. Remove accumulation. Improve maintenance.

21. Material build-up – Remove accumulation. Install cleaning devices, scrapers, and inverted "V" decking. Improve housekeeping.

22. Pulley lagging worn – Replace worn pulley lagging. Use grooved lagging for wet conditions. Tighten loose and protruding bolts.

23. Pulleys too small – Use larger-diameter pulleys.

24. Radius of convex vertical curve too small - Increase radius by vertical realignment of idlers to prevent excessive edge tension.

25. Relative loading velocity too high or too low – Adjust chutes or correct belt speed. Consider the use of impact idlers.

26. Side loading – Load in direction of belt travel, in center of conveyor.

27. Skirts improperly placed – Install skirt-boards so that they do not rub against belt.

Two of the most important factors in the successful operation of a belt conveyor is proper tension by the take-up assembly and training the belt to run safely within the idlers and returns to avoid costly downtime, damage to belt edge and spilling of material.

The function of the take-up assembly is to maintain a pre-determined amount of tension on the belt during the expected life of the belt at the conveyors critical point, thus allow it to operate as it was designed. Normally this critical point is at the tail pulley, especially for straight or inclined conveyors with a maximum length of 150'to 160'-0" long. In some cases the critical point lies at the base of an incline portion or in the lower part of a vertical curve of the belt in this instance especially with longer conveyors longer than 150'-0" a gravity or counterweighted take-up would be used.

Manual Screw Take-up - Normally mounted at the tail pulley of conveyors less than 150' long this type of take-up must provide enough movement to establish initial tension in the belt and to provide for periodic readjustment as the belt stretches. Under normal circumstances a screw take-up travel of 1 to 1-1/2% of the center distance is sufficient to give reasonable service from the belt. In the event that a screw take-up is moved to its maximum position and the belt does not to be replaced.

Move the take-up back to its original position, cut out the old splice and the excessive belt, manually re-tension the belt and re-splice the belt at its shorter length.

Gravity or Counterweighted Take-up – Normally mounted at the conveyors critical point this take-up must provide sufficient travel to handle any elastic length changes due to load variations, weather changes associated with longer belts. The amount of weight is determined to properly tension the belt to compensate for these changes. Several different types of gravity take-up systems are available to best suit the application of the conveyor. A mid span hanging gravity take-up, a tail section counterweighted take-up, a horizontal counterweighted take-up. The 1-1/2 to 2% of the center distance mount of take-up travel is a good rule for gravity take-ups. As you can see for example - the amount of take-up required for a 500' conveyor would be 7.5' too 10' depending on the application.

Training belt conveyors takes time, especially with long belts, reversing belts and belts with various loading characteristics. The process may have to done several times depending on the belt application, loading situation or weather condition. The process of training the belt begins with adjusting idlers, pulleys and loading conditions in such a manner as to allow the belt to run centered on all these components. This eliminates the tendency for the belt to wander and cause downtime or create potentially problems such as damage to the belt or frame, spilled material, hazardous working conditions.

When all portion of the belt run off through a part of the conveyor the cause is most likely in the belt itself, the belt splice or joint, or in the manner in which the conveyor is being loaded. When the belt is loaded off-center, the center of gravity of material load will seek to find the center of the troughing idlers and lead the lightly loaded side off thus running that edge into potential problems. While this is occurring, the heavily loaded side is moving out from under the skirtboard and belt seal area allowing material to spill - causing dangerous working conditions and downtime.

These are some of the basic rules for correcting a belt that will not train. Any combinations of these items we have listed can produce cases that are difficult to detect and do not appear as clear cut causes. Observing the same pattern of behavior over a sufficient number of belt revolutions will provide you with a better understanding of what correction need to be done.

Head, Tail and Snub Pulleys – Very little steering is obtained from the crown of conveyor pulleys, the crown is most effective when there is a long unsupported span of belting (approximately four times the belt width) approaching the pulley. As this is not possible on the carrying side of the belt crown face on the head pulley is relatively in effective and is not worth the lateral mal-distribution of tension it produces in the belt. Tail pulleys may have some unsupported belt span and the crown can be beneficial in centering the belt going into the load area. Snub or bend pulleys can also be crowned to take care any slight misalignment which occurs in the gravity take-up as it moves position. All pulleys should be level and with their axis at 90 degrees to the belt travel, they should be kept that way and **not** shifted as quick way to train the belt.

Carrying Idlers – Training the belt with the troughed idlers is accomplished by two methods. Shifting the axis of the idler with respect to the path of the belt, commonly known as "knocking he idlers" and "tilting the idler" by shimming the frame to make the idler tilt for ward or toward the belt travel. Knocking the idlers is effective when an entire belt runs to one side along some portion of the conveyor frame. The belt can be centered by "knocking" ahead (in the direction of travel) the end of the idler frame to which the belt runs. Shifting idlers in this way should be done prior to and

in the are where the correction is to take place over, obviously such idler adjustments is only effective belt operation in one direction as reversing belt this type of correction would be a determent in its reverse operation. Tilting the troughing idlers toward the belt travel (not over 2 degrees) produces a good self-aligning effect and is accomplished by shimming the back side (tail end) of the idler frame thus tilting it forward toward the belt travel. This method has an advantage over knocking idlers in that it will helps correct movement of the belt to either side of the idler making it useful for training erratic belts. Reversing belt should have all idlers squared and left that way and the self-aligning idlers used for belt movement correction.

Return Rolls – Being flat provide no self-aligning influence as in the case of troughing idlers. However, by sifting their axis, with respect to the path of the belt the return rolls can be used to provide a constant corrective effect in one direction. The same fix is true for return rolls as idlers; the roll should be adjusted toward (in the direction of return belt travel) the side of the belt that is off center.

Automatic Self Aligning Devices – Self aligning idlers and returns with center pivoting frames and external roller mechanisms that are activated by the edge of the belt can be used in groups of two or three or can be spaced throughout the length of a long conveyor. The external roller mechanisms activated by force from the edge of the belt pivots the idler or return frame to correct the belt movement. In most cases extra belt pressure is desired on the self-aligning assemblies, one way to accomplish this to raise the self-aligning frame above the adjacent idlers or returns.

Belting – Belts with extreme lateral stiffness relative to their width will be more difficult to train due to its lack of contact with the center roll of the carrying idler. Being aware of this enables you to take necessary precautions such as partially load to compensate and improve its steerablity. Some new belts may tend to run off to one side in a certain spot of location along the conveyor frame, this may be caused by a temporary lateral mal-distribution of tension. Operating the conveyor with the proper tension corrects this condition in practically all cases.

Stop all moving machinery during periods of lubrication, maintenance, or adjustment and provide that the equipment cannot be restarted during such procedures!!!!

MAINTENANCE

The maintenance of a belt conveyor is basically the same as any equipment with moving parts and no matter how well the conveyor is designed and constructed it will require scheduled maintenance and periodic service maintenance.

The section deals with general maintenance practices and is **not** intended to be a guide for the actual maintenance of specific parts on the conveyor. This particular information is available from the manufacture's manuals; please consult it for maintenance schedule and lubrication requirements.

Maintaining equipment is good medicine - for example we have a 36" x 500' conveyor with one sized idler this may not appear important but under the right circumstances – as the shell of the idler roller wears through and forms a sharp edge we have the potential for severely damaging a very expensive belt. The damaged belt causes the conveyor to go down and now you are faced with an

unscheduled outage. The unscheduled delay and all its expensive associated cost can be traced back to that one idler that "froze up" and maintenance did not catch it.

A strict maintenance schedule and well-trained maintenance crew can save companies a large amount of money over the course of equipments life. The maintenance function in any operation is in charge of keeping the equipment operating at maximum productivity or capacity. Scheduled maintenance reduces downtime and ensures the efficient and safe operation of the system.
A quality maintenance program begins with management and their insistence on strict routine maintenance schedule and periodic outages specifically for the overall review of the equipment.

Equally as important to the maintenance schedule of belt conveyors, is that service being performed by well-trained, competent personnel provided with proper test equipment and tools. The maintenance crew should be skilled employees empowered to shut down the conveyor to make repairs necessary repairs.

Recommended components of a belt conveyor requiring routine maintenance and service:

Electrical:	Motors - lubricate internal bearings as recommended by the manufacture. Safety switches check electrical connection and any signs broken parts.
Reducers:	Lubricate internal bearings and fill oil level as recommended by the manufacture.
V-Belts:	Check for proper tension and worn or cracked areas.
Chain drives:	Check for proper tension and worn roller and sidebars.
Screw Take-ups:	Check for proper belt tension and remove any built up material.
Idlers:	Check for free rotation and excessive worn areas, if greaseable type lubricate as recommended by the manufacture. Remove any built up material.
Training Idlers:	Check for proper alignment to belt and free rotation or excessive worn areas, if greaseable type lubricate as recommended by the manufacture. Remove any built up material.
Pulleys:	Check pulley alignment and surface of lagging if lagged. Pulley assemblies should rotate freely. Remove any built up material.
Bearings:	Check for proper alignment to frame and lubricate as recommended by the manufacture. Remove any built up material.
Belting:	Check for proper tension excessive wear areas, torn, or ripped areas. If a mechanical splice check fasteners.
Belt Cleaners:	Check for proper tension and wear on the cleaner blade and replace if needed to keep cleaner from rolling under.

In addition to scheduled maintenance service there is a number of devices that can be installed on belt conveyors to ensure its safe and efficient operation. These devices continuously monitor critical parts and operation of the conveyor. In some cases providing immediate electronic warnings of failed parts or dangerous situations.

We have provided a list of the most common devices and their functions, these components may not be part of the system you have purchased.

1. Belt Misalignment Switch: Monitors belt side movement along the path of motion; these switches are normally installed at the maximum limit of safe travel on each side of the belt. As the edge of the belt moves to contact the switch and applies enough force the switch is activated and the relay shutdown the conveyor. Normally belt misalignment switches are installed on both sides of the conveyor near the head and tail locations.

2. Damaged Belt Switch: Monitors belt damage such as impending failures, rips, punctures, splice failure, or sharp objects protruding through the belt surface. Two switches are connected by a vinyl coated steel cable, when this cable is activated by one of these problems the switch relay is tripped and the conveyor is shutdown. Normally mounted in pairs at the mid span of the belt.

3. Belt Speed Monitor: A belt running too slow or too fast can be a signal that something is not right with the conveyor and could cause permanent damage to the belt or the conveyor components. Speed monitors can sound alarms or shut down the system when a belt deviates too far from a preset range. They can be used to monitor belt slippage, overloading of the belt and runaway belt as in a down grade application. They may also be used to monitor multiple conveyor application and power outages.

4. Backstops: Internal (mounted inside the reducer transmitting the power) or external (mounted directly on the head shaft of the conveyor) provides a mechanical means of stopping a loaded inclined conveyor from rolling backwards. In a case of loss power, the backstop activates when the head shaft attempts to rotate opposite to its normal. The belt is held in place thus eliminating the load of material on the belt from discharging itself at the tail end of the conveyor and causing a dangerous situation not to mention a huge cleanout problem.

5. Tramp Metal Detection: Stray metal objects ranging from metal strapping, bucket loading teeth, pieces of chute lining can cause severe damage to the belt and to equipment down stream of the belt conveyor. Tramp metal detection can be done by a variety of methods such as magnetic head pulleys, hanging permanent magnets, self-cleaning magnetic systems.

6. Electrical Interlock: All conveyor systems should have the electrical safety devices interlocked to the equipment feeding material to it and taking it away to prevent overloading and damage to that equipment.

All operators should familiarize themselves with the details of the equipment involved and take necessary precautions. If the operator of the equipment is aware of a potential hazard it should be brought to the owners attention for immediate correction. If there are any questions as to the safe manner in which this equipment should be operated please call this office.

Stop all moving machinery during periods of lubrication, maintenance, or adjustment and provide that the equipment cannot be restarted during such procedures!!!!!

SAFETY

Continental Belt Conveyor Systems equipment offers many safety features, some of which are standard, while others are optional and specified by the user based on conditions under which the equipment will be operating. Good common sense is the key when working on any equipment and must be used while observing or servicing equipment.

Employees and operators must be protected from moving belts, pulleys, shafts, chains, gears etc. CBCS offers belt guards, chain guards, nip guards, skid resistant catwalk with toe boards, safety railing, emergency stop switch with safety pull cord, belt covers, and many other safety items some of which may be optional and were not purchased nor included as a part of your equipment. In the absence of any such safety apparatus having been specified by you on your order, it is up to you to provide whatever such devices are deemed necessary to comply with your current and existing requirements

Employees, maintenance personnel and operators must be made aware of the type of equipment and how it operates and of the power required to operate this equipment. Basic conveyor safety begins with the design of the equipment that avoids foreseeable hazards. Company management must provide training in the proper operation and maintaining of the equipment. Management must insist on good housekeeping and safety procedures.

The establishment and maintenance of safe practices in design, construction, operation and maintaining the equipment will greatly aid in the safe and overall success of the equipment. CEMA Conveyor Equipment Manufacture Association in their Safety Standards has developed guidelines for safety in conveyor design and operation for Conveyors and Related Equipment as adopted by the American National Standards Institute in ANSI B20.1-1976.

<u>These are some of General Safety Guidelines</u>

1. Lockout/tag out all energy sources to the belt conveyor, conveyor accessories, and associated process equipment before beginning **any** work – whether it is construction, installation, maintenance, or inspection that is directly associated with the equipment you are involved with. The use of lockout device with one key for each piece of equipment should be used. The person actually doing the work should be the only person with the key to the lockout device.

2. Operating and maintenance personnel should become familiar with the material being handled in the system along with the location and purpose of the safety devices before being allowed to operate or work on the equipment.

3. A belt conveyor safety training session should be a portion of a comprehensive safety program provided by the company to all employees that will be required to operate or maintain the equipment.

4. All safety devices should be in good working condition, properly maintained and easily accessible. Emergency stop switch with safety pull cords should be mounted at the proper height.

5. The equipment should be operated at its design capacity and speed. Overloading belt conveyors results in spilled material and hazardous working conditions and premature failure of components.

6. During and after maintenance on the equipment a safety "walk around" is recommended as a precaution for leaving tools or work material prior to staring the equipment.

7. A formal maintenance and inspection schedule should be developed and followed for the equipment and associated safety devices.

8. Required personnel safety equipment such as hard hats, safety glasses, steel toe shoes should be worn when in the area of the equipment to provide any type service or work.

Manual inspection, maintenance or repairs **must be** done at a time the can be taken out of service, properly lockout and tagged. In **NO** case should belt conveyors or any operating equipment be serviced while in operation. Only visual inspection can be done during operation and care must be taken to be at a safe distance and not be wearing loose clothing. Inching drives provide an excellent method of visually inspecting the belting.

Stop all moving machinery during periods of lubrication, maintenance, or adjustment and provide that the equipment cannot be restarted during such procedures!!!!

Companies must constantly observe the working conditions, and if doubt exists, as to whether you deem your equipment safe enough for your employees welfare, call in a qualified safety engineer to advise you as to whether or not your equipment satisfies current safety regulations and requirements of any federal, state, municipal or other duly constituted regulatory agency to whom you might be responsible.

It is also the responsibility of your company to properly train your personnel in the correct use of this equipment. Should there be any question as to the safe manner of its operation you should first contact Continental Belt Conveyor Systems. Keep in mind that what might be considered an open and obvious danger to the most experienced plant operator could be completely ignored and overlooked by an inexperienced or less perceptive employee.

The information contained in this manual is be used as a guideline **only**, any company policies, local or state regulation should be adhered to. The recommendation on service and maintenance are general in nature and any technical information from the manufacture on particular parts should be used.