10 Ways to Optimize Conveyor Operations and Productivity

A guide to increasing return on your conveyor investment

Cisco-Eagle™

www.cisco-eagle.com/conveyors

Dallas: (800) 441-1162 • Houston: (800) 255-0432 • San Antonio: (210) 403-2902 • Oklahoma City: (800) 522-6532 • Tulsa: (800) 722-4343 • Arkansas: (800) 482-8941

Cisco-Eagle is Employee Owned, Managed, and Operated

Some common sense ways to increase conveyor productivity

Above: know and understand your load factors to avoid a variety of issues. Misunderstanding load factors is perhaps the most common conveyor specification and maintenance error. We can assist you in tracking down the necessary information as you specify conveyor loads.

(1) Keep your ax sharp - maintain your conveyor

There is an old story about a tree-cutting contest that you should know if you're running a conveyor operation. The contest was to cut the most wood in a one day. One lumberjack relentlessly swung his axe, working as fast as he could. The other stopped to sharpen his ax every hour—and despite the downtime, he won. To avoid breakdowns and optimize performance, conveyor needs to be "sharpened," as well. Since conveyor downtime is painfully expensive, you should perform scheduled maintenance, check lubrication, and replace worn-out parts on time.

(2) Know these fixes to common problems

Service is expensive, and you can often avoid it by knowing the fixes to common issues:

The conveyor suddenly shuts down for no apparent reason. Reset the emergency stop buttons, which are located around the conveyor and are used to shut it down in case of an emergency. These buttons are often tripped by personnel or by packages stored too close to the conveyor.

Packages are accumulating in one area of the conveyor. There can be many causes for this, but in most cases the photo eye is dirty, obstructed or offset. Save yourself some money and time: check it before you call service.

The drive runs, but the belt doesn't move. Check your conveyor for an overload. You can eliminate this issue through training and intelligent load redistribution. If redistribution doesn't fix the problem call service.

Load will not accumulate on one or more zones. Check the air lines for kinks. The air bags won't work properly if there is insufficient air. Also, check the air compressor for water since this can cause major problems with the pneumatic system.

(3) Get to know your load

The most common conveyor specification error is lack of detailed information on load data and application objectives. Often, load information is neglected and hardware is selected on an arbitrary basis—a recipe for poor performance and inflexibility. Examine the load in detail. Make a list of all of the units that will be handled on the conveyor.

Consider: (1) Shape or form. The load must be defined for what it is—a pallet, box, drum, wire container, engine block, automatic body, or other item. (2) Dimensions. If the load is a container such as a pallet, box, or tote, know its length, width, and height. If it is a unit item, the dimensions of the interface between product and conveyor—such as the load bearing surface—are critical information. In the case of product on a container, like a pallet of beer cases, the dimensions of both carrier and load must be known to provide for factors like overhang clearance. If the load consists of bulk materials, density and flow rate must be identified.

Other factors include: Orientation. The position of the load on the conveyor must be established. A load length may actually become a height when the item is placed on a conveyor, tow line, or monorail carrier. Footprint. The bottom configuration, or footprint, of a load can have a strong bearing on the design and cost of a conveyor system. The following questions should be asked about footprints of different types of loads: Pallet – are there block feet or runners, and in what direction? Are there broken boards, protruding nail heads, or straps? Drum – are there chines? Does the bottom bulge? Cartons & boxes – Is the bottom soggy? What about

protruding staples? Is the bottom of the box fan-folded or taped? Does it bulge? All of these things could cause the box to act erratically on roller conveyors.

(4) Utilize energy-saving controls and devices

Conveyors are very energy efficient compared to the alternatives for moving product through a facility. Substantial energy and cost savings are possible. How can you convey more for less energy?

Conveyor systems create efficiency and optimize operations. How can you get the most from your system?

Select the right motor for the job. The motor should run at or near top capacity at all times. If load weights vary, use two-speed motors and adjustable-speed drives to enable motors to run near top capacity.

Keep the conveyor lubricated. Proper lubrication is a necessity in any energy efficient system using reducers, chains, and bearings. Besides saving energy, you'll increase the life of your equipment.

Turn your conveyor off when it's not in use. In some operations it may not make sense to continually switch them on and off, but you can efficiently do this in many cases. Intelligent controls can help by turning the conveyor off automatically when it isn't needed.

Use gravity feeds when possible. You can substitute gravity for power conveyor in the right situation, creating both equipment cost reductions and energy savings. Mixing power and gravity units to conserve energy and reduce costs is usually possible.

Design with energy savings in mind. Use long, straight runs with fewer drives. If possible, power the entire system with one drive. Use high-efficiency speed reducers.

Replace worn-out conveyor. Modern conveyors designed more efficiently, with appropriate controls, deliver significant return-on-investment based on energy savings alone.

(5) Correctly select and integrate vertical and horizontal conveyors

When elevation changes are necessary, choosing the right vertical transport device can make or break system performance. You have to take into account system throughput requirements, product characteristics, elevation change, number of infeed/discharge points, manual or automated infeed/discharge, interface with horizontal transport devices, proximity to workers, safety devices, environment, and future system requirements. Analysis of the above criteria will result in an optimum solution. In the unit handling world of a typical distribution center, examples might include vertical reciprocating conveyors (VRC's), continuous vertical conveyors, incline belt conveyors, spiral conveyors, chutes, and scissor lifts.

(6) Test for performance

You've installed a new conveyor system, and you're ready to get into production. Not so fast. It may be tempting to turn your system loose, but you'll be money ahead if you allow time for adequate testing. If you do a cursory checkout, you miss the opportunity to fine-tune controls and detect hidden mechanical issues. Conveyor systems can have millions of moving parts designed to work in concert. Due to that complexity, a new system may need adjustments to perform. An outline of testing procedures:

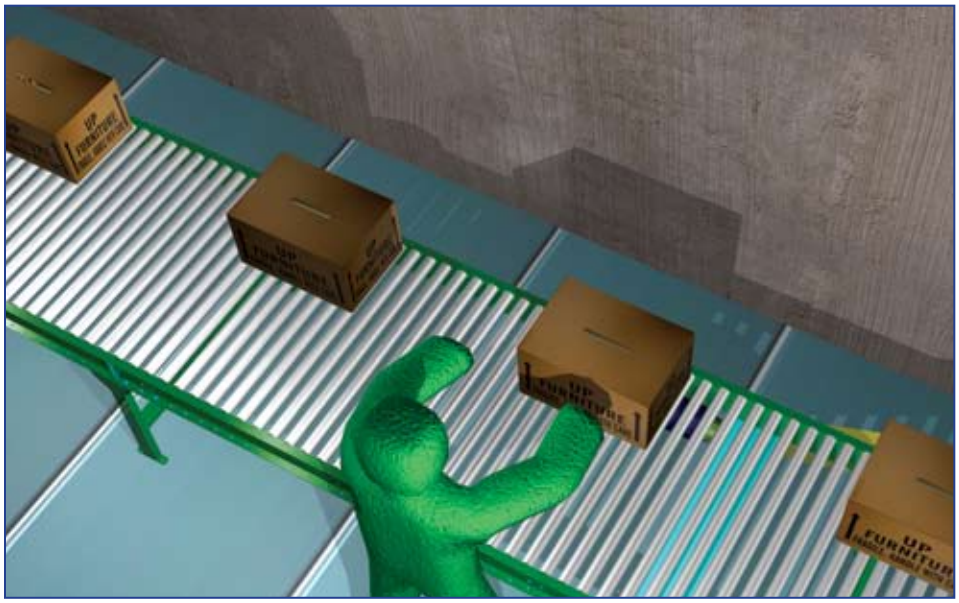
Inspection: Visually inspect the entire system. This is about safety. Are all the guards in place? Are the pull-stops accessible? Are the safety stickers easy to see and read? The mechanical and junction boxes should be closed.

Function testing: Place a small number of items on the conveyor from the various in-feed points. This small amount allows for a controlled evaluation process. Look for obvious flaws; make sure all belts function, diverters and merges work properly. Be sure cartons don't hang up anywhere in the system.

Load testing: It's time to fully load the system to see how it performs at full capacity. Examine how high volume works, whether spacing between cartons is correct, or if any cartons bunch up. Overload areas to check how the system handles massive throughput and detect where any bottlenecks could occur.

Error recovery: These tests primarily check system controls. Errors are induced to confirm recovery procedures. Examples of errors might include barcode or RFID misreads, or products improperly inducted or removed from the system mid-stream. Additional "operator error" scenarios should be tested. Testers start and stop sections of the system to see how it handles these forces. Also check into "what if" scenarios to see how the conveyor will react to unplanned events. For instance, what would happen if an operator pushes two buttons at once or pushes one by mistake and then quickly pushes the correct button. It's important to see as many possible events as you can, so the system can recover as quickly as possible from operator errors. For large systems, it's advisable to keep both mechanical and electrical personnel on site for at least 14 days to ensure good system operation. Overlap this time with training time if possible.

Proper testing assures that a system works today—and in the future. A system designed to handle 80 units a minute might need to convey half that many in its first year. Don't wait to discover that it chokes at 65; test and find out. A system operating at a 20% capacity can look flawless, but might bog down at 80%. It's easier to make modifications during the testing than later on after the system is up and running.



(7) Safety is essential

Conveyors are a safe way to transport materials through your facility—in fact one of the safest ways—but they require training, process and vigilance to stay that way. Here's what you can do: Awareness: Part of the issue, unlike with many other kinds of industrial machinery, is that workers—and often managers—don't recognize the potential conveyor hazards. It moves slow relative to other machinery, and doesn't appear "threatening." Conveyor might be seen more like a part of the warehouse than a machine that is powerful and can be dangerous if used inappropriately. Train new employees on how to use the conveyor, its on/off switches, emergency stops, and how to behave around it. And retrain your veteran workers to drive home the point. Nearly 42% of injuries around conveyors occur while performing maintenance, lubrication, or other mechanical processes.

(8) Design conveyor workstations with ergonomics in mind

Using conveyor in combination with workstations is an excellent way to boost productivity and increase safety. Musculoskeletal disorders can develop when workers lean, stoop, twist, or reach. These postures are also symptomatic of a less productive operation. A well-designed conveyor workstation eliminates risks and optimizes productivity. The two biggest factors are work surface height and reach distance.

Work surface height is the height at which hands are normally held to perform work on conveyed objects. Heavier tasks performed on larger objects require a lower work surface height than light, higher-precision tasks. Since people are different heights, one fixed height can't serve for everyone—and you can't alter the height of the conveyor itself. The thing to do is design the height appropriate to the load. If you want to vary it, design it for the taller workers and utilize step platforms for shorter workers. For standing workers doing belt picking or light assembly, the rule of thumb is about 42 inches. For seated workers, it's 30 inches.

Reach distance: Zones of repetitive reaching on a conveyor should be within 18 inches of the front of the operator's body. This increases productivity and helps avoid repetitive musculoskeletal injuries by limiting repeated forwards reaching. This is affected by load. If numerous items are being picked from the belt, the zone of repetitive reaching encompasses the entire belt. If you're consistently moving larger items that take up most of the belt, the zone might not extend to the far edge of the belt since objects might be grasped at mid-depth, within the 18" zone. If you're using a wider belt with pickers on each side, the ergonomic sweet spot is still 18 inches to the center of the belt.

(9) Choose the right belting

A powered conveyor belt is the only component in contact with both the drive pulley and the product. Despite this, it's a frequently overlooked component. It can greatly enhance conveyor performance if properly selected and installed, or cause headaches if it isn't. There are thousands of conveyor belt styles, materials, thicknesses, surfaces, and colors to consider. Because belt is costly and sometimes difficult to install correctly, getting it right the first time is important. Things to consider include the kind of load, the need for increased oil resistance, and applications where the load & conveyor may make belt tracking more difficult. Specialized conveying applications like food handling have entirely different belting requirements. Others require a belt that assists the conveyor when items are diverted. Your application, load and requirements will determine the right belt type. Know those in detail and you're more than halfway to selecting the right belt.

(10) Make conveyor technology upgrades

Today's conveyors and sortation systems offer advantages unavailable just a few years ago. Distribution systems now perform at levels well beyond their predecessors. One of the more significant examples occurs within accumulation systems. Known as Dynamic Zone Allocation, the system automatically adjusts the conveyor's zone length to accommodate the length of the carton being conveyed. The result is that product density is increased as required, and system throughput increased dramatically. More importantly, if larger cartons are introduced after the installation, the system is not obsolete. This technology creates flexibility for today and the future.

An additional feature of newer technology is "loading zone" functionality—the ability of the system to tell the difference between a load in transport and one that is inserted, and only delay inserted loads is one example. It is all about system performance to meet the growing needs of today's distribution center.