BELT CONVEYOR

INSTALLATION, OPERATION & MAINTENANCE MANUAL

BELT CONVEYOR GEN - 9/25/26

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FRONT MATTER

Important Safety & Advisory Information

Read this manual and all supplied component/manufacturer instructions before installing, operating, or maintaining the conveyor.

DANGER - LOCKOUT/TAGOUT

Disconnect and lock out/tag out all power and eliminate stored energy before opening the conveyor, removing guards, clearing a jam, or performing inspection, maintenance, or repair.

CEMA Advisory Disclaimer

This manual uses belt-conveyor-specific safety guidance from the Conveyor Equipment Manufacturers Association (CEMA) together with Orthman installation, operation and maintenance practices. CEMA guidance is advisory and is intended to complement - not replace - a comprehensive site safety program, risk assessment, guarding, training and safe work procedures.

The installer, owner and user remain responsible for compliance with applicable laws, codes, standards and project requirements. Project drawings and the instructions supplied by belt, reducer, motor, bearing, coupling, brake, backstop, cleaner and safety-device manufacturers remain part of the required equipment documentation.

References: CEMA Safety Best Practice SBP-002, E-Stop Application Guide for Unit and Bulk Belt Conveyors (2016 revision); CEMA Safety, Operation & Maintenance of Conveyor Pulleys (2018); and current CEMA safety-label and placement guidance for bulk belt conveyors and accessories.

FRONT MATTER

Introduction

This manual provides a common basis for the safe receiving, installation, startup, operation, inspection and maintenance of Orthman bulk-material belt conveyors. It combines established Orthman belt and idler maintenance guidance with practical installation, commissioning, controls and service practices expected in a complete industrial conveyor IOM manual.

Reliability and service life depend on correct receiving and handling, structural alignment, pulley and idler alignment, belt installation and tension, drive lubrication, functional safety devices, controlled startup and disciplined preventive maintenance. Equipment drawings, electrical schematics and component-manufacturer instructions remain part of the required installation and maintenance information.

BEFORE WORK BEGINS

Review the safety section, confirm all guards and protective devices are in place, identify stored-energy hazards, and verify that lockout/tagout procedures are understood before inspection or maintenance.

Scope

- Safety practices, CEMA safety labels, emergency stops and protective devices.
- Receiving, inspection, lifting, storage and general conveyor installation.
- Belt installation, splicing, take-up setup, drive preparation and final installation checks.
- Initial startup, commissioning, normal operation and electrical/control verification.
- Preventive-maintenance scheduling, idler lubrication and approved-lubricant practices.
- Belt training, transitions, loading-point spillage, skirtboards and troubleshooting.
- Daily inspections, shutdown/storage practices and replacement-parts information.

SECTION A

Safety

The contractor, installer, owner and user are responsible for installing, maintaining and operating conveyor equipment in accordance with applicable laws, ordinances and safety standards. The following are minimum provisions from the source manual.

- Operate the conveyor only when all covers and/or guards for the conveyor and drive unit are in place.
- If the conveyor is opened for inspection, cleaning, maintenance or observation, lock out the electric power so it cannot be restarted until guards and covers are replaced.
- Where an open conveyor is required by the application, guard the exposed equipment with a railing or fence in accordance with applicable requirements.
- Protect manual or mechanical feed openings with grating where practical; otherwise guard the exposed section and post warning signs.
- Do not attempt maintenance, repairs or jam clearing until power has been locked out/tagged out.
- Do not place hands, feet or any part of the body in the conveyor, and never walk on covers, grating or guards.
- Do not use the conveyor for any purpose other than its intended service and do not poke or prod material through openings with bars or sticks.
- Keep the area around the conveyor drive and control station free of debris and obstacles.
- Eliminate all sources of stored energy before opening the conveyor.
- Do not attempt field modification of the conveyor or components without appropriate engineering review.
- Conveyors are not normally manufactured or designed to handle materials hazardous to personnel unless specifically engineered for that service. Consult the manufacturer before modifications involving hazardous materials or internal/external pressure.
- Warning labels must remain visible and legible. Replace damaged or illegible labels.

SAFETY DEVICES DO NOT REPLACE LOCKOUT/TAGOUT

Interlocks and other secondary safety devices may supplement a safe system, but they do not replace disconnecting and locking out the power before removing guards or performing maintenance.

SECTION A

CEMA Safety Labels

The CEMA safety labels shown below are reproduced from the source manual. Safety labels should be placed on exposed or hazardous areas as applicable and should remain visible and legible.

CEMA Document: SC 2004-01

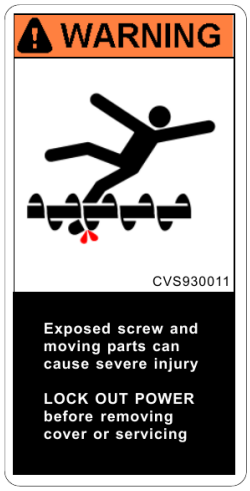
CEMA Safety Labels

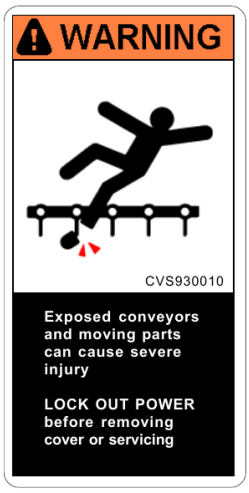
The CEMA safety labels shown below should be used on screw conveyors, drag conveyors, and bucket elevators. Safety labels should be placed on inlets, discharges, troughs, covers, inspection doors & drive guards. See CEMA Safety Label Placement Guidelines on CEMA Web Site: http://www.cemanet.org/safety/guidelines.html

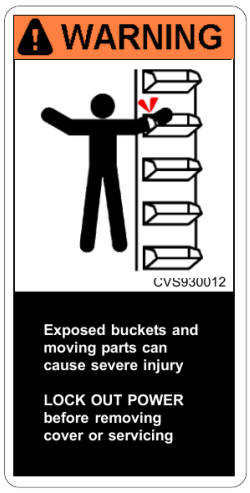












PROMINENTLY DISPLAY THESE SAFETY LABELS ON INSTALLED EQUIPMENT

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

SECTION B

Receiving, Inspection & Storage

Inspect and protect the conveyor before erection. Damage, missing components or incorrect storage can create alignment, startup and service-life problems that are difficult to correct after assembly.

Receiving & Inspection

1. Check the shipment against packing lists, project drawings and shipping documents immediately upon receipt.

2. Inspect structural sections, pulleys, idlers, take-up components, drives, guards, chutes, cleaners, belt and loose hardware for visible damage or shortages.

3. Record shipping damage before unloading is complete and do not install damaged components until disposition is established.

4. Keep match marks, section numbers, tags and equipment identification intact so components can be assembled in the intended location and orientation.

5. Verify that component manuals, electrical drawings and project-specific instructions are available before installation begins.

Handling & Lifting

- Use lifting equipment, slings and spreader arrangements rated for the actual load. Support long conveyor sections at enough points to control bending and twisting.
- Lift pulleys and major components by approved lifting points or shaft-supported slings as applicable; do not lift by guards, bearing housings, conduit, instrumentation or other non-structural attachments.
- Account for concentrated weight from drive units, pulleys, take-up components and chutes when selecting lifting points.

Storage Before Installation

- Store components on firm supports above standing water and protect them from impact, contamination and weather.
- Store conveyor belting in accordance with the belt manufacturer instructions, protected from conditions that can damage covers, carcass or splice materials.
- Follow the reducer, motor, bearing and brake/backstop supplier instructions for short- and long-term storage. Do not assume factory lubrication is suitable for an extended storage period.

PROJECT DOCUMENTS CONTROL INSTALLATION

General guidance in this manual does not replace the project general-arrangement drawings, structural drawings, electrical schematics or component-manufacturer instructions. Where requirements differ, obtain engineering clarification before proceeding.

SECTION C

Installation - Structure, Pulleys & Idlers

Install the conveyor in the arrangement shown on the approved project drawings. Establish the conveyor centerline and elevation before final tightening so the structure, pulleys and idlers form one aligned system.

Before Erection

1. Confirm foundations, support steel and mounting surfaces are complete, stable and at the required elevations.
2. Establish the conveyor centerline and reference elevations using appropriate survey or layout methods.
3. Lay out head, tail, take-up, drive and intermediate sections in the required sequence and direction of material flow.
4. Verify adequate access for installation, guarding, inspection, belt cleaning and future maintenance.
5. Keep structural and equipment fasteners snug but not fully tightened until alignment is verified.

Structure, Head & Tail Sections

- Erect the structure straight, level where required by the design, and free of twist. Shim or adjust supports as necessary before final anchoring.
- Square the head and tail pulley assemblies to the conveyor centerline and verify the pulley shafts are level unless the project design intentionally specifies otherwise.
- Confirm bearing mounting surfaces are flat and aligned. Tighten bearing and structural fasteners in accordance with the applicable manufacturer or project torque requirements.

Pulleys & Idlers

- Install pulleys in the required orientation and verify lagging, bushings, locking devices and bearings are correctly seated.
- Install carrying, impact, transition, return and training idlers in the locations shown on the drawings. Keep idler rolls square to the conveyor centerline unless a controlled training adjustment is intentionally required.
- Verify pulley and idler rotation is free and that no shipping braces, temporary retainers or foreign material remain in the belt path.

ALIGNMENT FIRST

Do not use belt trainers or excessive belt tension to compensate for a misaligned conveyor structure, pulley or idler. Correct the mechanical alignment first.

SECTION C

Installation - Belt, Take-Up & Final Checks

Belt Installation & Splicing

- Verify the belt specification, width, cover orientation and direction of travel before pulling the belt onto the conveyor.
- Use rated pulling equipment and protect the belt from sharp edges, kinks, contamination and uncontrolled movement during installation.
- Install mechanical or vulcanized splices in accordance with the belt and splice-system manufacturer instructions. Splices must be square to the belt centerline.
- Before tensioning, verify the belt is routed correctly around all pulleys, take-up components and cleaners.

Belt Tension & Take-Up Setup

- Set the take-up so adequate adjustment travel remains for startup, tracking and normal belt stretch. Do not begin operation with the take-up at the end of its usable travel.
- On screw take-ups, adjust both sides evenly so the pulley remains square to the belt and conveyor centerline.
- On gravity take-ups, verify the carriage and counterweight move freely through the intended travel and that guarding prevents personnel access to the moving weight and pinch points.
- Apply only the tension required to transmit drive power and control belt sag for the installed design. Excessive tension can shorten belt, pulley and bearing life.
- Use the belt, drive and project design information to establish final tension; do not substitute an arbitrary counterweight or screw-take-up dimension.

Chutes, Skirtboards, Cleaners & Guards

- Install loading and discharge chutes so material flow is centered and does not impose avoidable side loading on the belt.
- Adjust skirt rubber to contain material without excessive pressure or drag on the belt.
- Install belt cleaners, plows and return-belt protection devices in accordance with their supplier instructions and with adequate maintenance access.
- Install all fixed and removable guards before energizing the conveyor.

Final Installation Checks

- Remove tools, temporary bracing and foreign material from the conveyor.
- Verify mounting and assembly fasteners are secure, bearings and couplings are aligned, the take-up has usable travel, and the belt path is unobstructed.
- Verify safety labels, guards, walkways, crossovers and access barriers required by the installation are in place before power is applied.

SECTION D

Electrical Controls & Safety Devices

Electrical work and safety-device setup must be performed by qualified personnel using the project electrical drawings, applicable codes and the instructions supplied with each device. Conveyor controls must support safe startup, stopping, interlocking and emergency response.

Controls & Interlocks

- Verify motor voltage, rotation, overload protection, disconnecting means and control wiring match the approved electrical design.
- Interlock connected conveyors and process equipment as required so upstream feed cannot continue into a stopped or blocked conveyor.
- Where a startup warning is required by the site or system design, verify the audible/visual warning sequence before routine operation.
- Keep control stations and stopping devices visible, accessible and clearly identified.

Emergency Stops & Pull Cords

- Apply emergency-stop devices and pull-cord systems in accordance with the project risk assessment, applicable requirements and CEMA Safety Best Practice SBP-002 for unit and bulk belt conveyors.
- Verify emergency-stop devices are accessible from the intended work and access areas, mechanically secure and functionally tested before startup.
- Emergency-stop activation must remove the intended motive power and require deliberate reset. Resetting an emergency stop must not by itself command an automatic conveyor restart.
- Inspect and test emergency-stop and pull-cord devices at the site-defined interval and after maintenance that could affect their operation.

Protective Monitoring Devices

- Where supplied, verify belt-misalignment switches, zero-speed or slip detection, chute-plug/blockage switches, rip detection, bearing-temperature monitoring and other protective devices are installed and tested.
- Confirm device trip points, time delays and interlocks match the approved controls documentation. Do not bypass a protective device for normal operation.

E-STOPS DO NOT REPLACE LOCKOUT/TAGOUT

Emergency stops and interlocks are operational safety devices. They are not energy-isolation devices. Disconnect, lock out/tag out and control stored energy before inspection, cleaning, adjustment or maintenance that exposes personnel to hazardous motion.

SECTION E

Initial Startup & Commissioning

Commission the conveyor in a controlled sequence. Correct abnormal conditions at low load before progressing to normal operating capacity.

WARNING: GEAR REDUCER LUBRICATION

Before startup, verify gearbox lubricant type, fill level and mounting-position requirements using the supplied gearbox manufacturer documentation. Depending on gear reducer manufacture, gear reducers do not ship from Orthman Conveying Systems filled with oil. Gear reducers must be positioned, verified and filled to the proper level by the installer or user before startup.

Before Energizing

1. Lock out/tag out power and perform a complete mechanical inspection of the conveyor and surrounding work area.

2. Verify the belt is correctly routed, spliced, centered, tensioned and clear of obstructions; verify the take-up can travel freely.

3. Verify reducer oil, bearing lubrication and drive/coupling setup in accordance with the component manufacturer instructions.

4. Confirm guards, covers, safety labels, emergency stops, pull cords, interlocks and protective monitoring devices are installed and have been functionally tested.

5. Confirm loading and discharge areas are clear and downstream equipment is ready to receive material.

No-Load Startup

1. Momentarily energize the drive to confirm correct belt direction. If rotation is incorrect, stop promptly and have qualified electrical personnel correct the wiring.

2. Run the conveyor without material while observing belt tracking, pulley and idler rotation, take-up action, unusual noise, vibration, rubbing, leakage and abnormal temperature.

3. Make only small, controlled tracking corrections and allow the belt time to respond before making additional adjustments.

4. Stop and lock out/tag out the conveyor before correcting conditions that require access to moving parts, guards, pulleys, idlers or the belt.

Loaded Commissioning

1. Introduce material gradually and confirm loading is centered, discharge is unrestricted and skirtboards/cleaners contain and control material as intended.

2. Increase feed toward design conditions while monitoring motor load, belt tracking, spillage, take-up position, bearing/drive temperature and unusual noise or vibration.

3. After an initial break-in run, stop and lock out/tag out the conveyor. Reinspect the splice, fasteners, guards, take-up, cleaners, reducer oil level and visible alignment before normal service.

LIVE ADJUSTMENT WARNING

Do not place personnel in a nip point or reach through guarding to train a moving belt. Live tracking adjustments are permitted only at adjustment points specifically designed for that purpose and only under an approved site procedure by trained personnel.

SECTION F

Normal Operation

Operate the conveyor only within the material, capacity, speed and duty conditions for which it was designed. Normal operation depends on a clear discharge, centered loading, effective cleaning and prompt correction of developing problems.

Operating Practices

- Unless the conveyor/system was specifically designed for loaded starting, start the conveyor empty and establish normal belt motion before applying feed.
- Where multiple conveyors are interlocked, start downstream receiving equipment before upstream feed equipment and stop feed before allowing the conveyor to clear.
- Keep material centered on the belt and do not exceed the design loading, lump size, speed or material density.
- Maintain adequate housekeeping around pulleys, idlers, take-up areas, cleaners, walkways and control stations.
- Monitor belt tracking, take-up position, spillage, idler rotation, cleaner condition, unusual noise/vibration, motor load, reducer condition and bearing temperature.
- Keep guards and safety devices in service. Do not defeat interlocks or operate with required guarding removed.

Abnormal Operation

- Stop the conveyor when the belt rubs structure, a pulley or idler binds, the drive repeatedly overloads, a safety device trips, or abnormal heat/noise/vibration indicates a developing failure.
- Do not attempt to clear plugged chutes, remove trapped material, clean under guards or make internal adjustments until power and stored energy are locked out/tagged out.
- After an emergency stop or protective-device trip, determine and correct the cause before resetting and restarting the system.

ABNORMAL CONDITION = STOP AND INSPECT

Continuing to operate through repeated mistracking, slippage, seized idlers, excessive heat, abnormal vibration or overload can damage the belt and mechanical components and may create a safety hazard.

SECTION G

Preventive Maintenance Schedule

Use this schedule as a baseline for a general industrial bulk-material belt conveyor. Increase inspection frequency for abrasive, dusty, wet, corrosive, high-temperature, high-speed or high-duty service. Component-manufacturer requirements and site standards take precedence where more restrictive.

Interval	Inspect	Action / Requirement
Each shift / daily	Belt tracking and visible belt/splice condition; spillage/carryback; idler rotation; unusual noise/heat/vibration; chute and discharge condition; guards and visible safety devices.	Correct unsafe or abnormal conditions promptly. Keep the conveyor and surrounding area clean.
Weekly	Cleaners and plows; skirt rubber; pulley buildup; take-up travel; accessible fasteners; damaged idlers; walkways and access areas.	Adjust or replace worn items before they damage the belt or cause loss of containment.
Monthly	Drive belts/chains/couplings where fitted; pulley lagging; bearing seals; reducer and motor leakage; structural looseness/corrosion; belt edges and splice deterioration.	Service in accordance with supplier instructions and record developing trends.
Quarterly	Alignment of structure/pulleys/idlers where problems are observed; belt tension and take-up condition; functional test of emergency stops, pull cords and protective switches per site procedure.	Correct alignment and control issues; document test results and deficiencies.
Semiannual / planned service	Reducer lubricant condition/level as required by the reducer manual; bearing lubrication/service; chute and liner wear; cleaner mounting; guards and barriers.	Follow component-specific intervals; replace worn or damaged components.
Annual / major outage	Detailed belt condition review; pulley, bearing and lagging inspection; take-up and structural inspection; control/protection verification; critical fastener review.	Use outage findings to plan replacements, rebuilds and spare-parts inventory.

Maintenance Records & Trending

- Record belt and splice condition, idler failures, cleaner/skirt wear, take-up position, motor load, reducer/bearing observations and recurring mistracking or spillage locations.
- Use repeated failures as an indication to investigate the root cause rather than only replacing the failed component.
- Keep belt specifications, pulley/idler information, component model/serial data and major repair history with the conveyor records.

COMPONENT INSTRUCTIONS GOVERN SERVICE

Lubrication products, oil quantities, relubrication intervals, bearing settings, coupling alignment and device testing requirements vary by supplied component. Use the instructions furnished with the actual equipment.

SECTION H

Idler Lubrication

Idler seals retain an ample supply of grease at the bearings for long periods of operation, but provision is made for relubrication when required. Under ideal operating conditions - little dust and protection from weather - relubrication is generally required only once every 8,000 operating hours or once every two years to support long service life.

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

Where doubt exists, disassembly and inspection of a few representative idlers can help establish whether the relubrication interval is correct and whether longer cycles are practical.

IMPORTANT

For maximum lubrication effectiveness and for safety, idlers must not be lubricated while the conveyor is running. Lock out/tag out power before lubrication.

Pressure Lubrication

Certain high-pressure, high-volume grease guns and lubrication systems are not suited for idler lubrication. Excessive pressure or volume can cause internal damage; input pressures above approximately 60-70 psi at the idler should be avoided.

Avoid over-lubrication. Excess grease does not improve operation and can encourage leakage that may contact the belt. The source manual notes special lubrication fittings without a ball check and spring; do not substitute standard fittings for the installed fittings.

SECTION I

Selection of Proper Grease

As a result of tests conducted under controlled conditions, certain greases are approved for idler use. This does not imply that they are the only lubricants that may be suitable, but that they are among those tested and found satisfactory.

Use a grease approved by Orthman for the specific idler application. Approved-lubricant information may be obtained from operating and installation manuals, idler catalogs or an Orthman representative.

LUBRICANT SELECTION

Use only lubricants approved for the installed idlers. If the correct product is uncertain, verify the idler model and operating conditions before relubrication.

SECTION J

Idler Grease Seepage

A small percentage of idlers may generate grease seepage or oil separation. The degree of purging can vary from a film of oil or a small collar of grease to a limited "star burst" of grease extending toward the roll O.D.

Common Reasons for Purging

1. Displacement of grease during start-up. When a bearing cavity is completely full, initial rotation can displace a small amount of grease through the seals.
2. Internal pressure. Pressure retained in the lubrication system may not fully relieve until the idler rotates freely and the seals break in; temperature can affect this condition.
3. Oil separation. Grease can exhibit local oil separation during storage. The less-viscous lubricant may seep through seals, particularly at initial start-up.

Recommended Start-Up Practices

- Do not relubricate new idlers before or immediately after start-up; they are lubricated at the factory. The source manual recommends first field relubrication at approximately 4,000 hours after initial start-up.
- Use only idler lubricants approved by Orthman.
- Do not lubricate idlers while they are rotating.

SECTION J

Cleaning Idler Lubricant from Belts

The source manual provides the following general guidelines for cleaning idler lubricant from conveyor belts. Consult the belt manufacturer for detailed, belt-specific cleaning instructions.

Shorter Belts - Manual Cleanup

- Scrape surface deposits of grease from the belt.
- After removable residue has been scraped away, wipe the belt surface with a suitable solvent that is compatible with the belt.

Longer Belts - Mechanical Cleanup

- Remove excess grease using a suitable mechanical belt scraper under constant surveillance to protect the belt cover.
- After scraping, wipe the belt surface using a suitable belt-compatible solvent and an appropriate rag or felt-pad arrangement.

BELT-COMPATIBILITY CHECK

Before using any cleaning solvent or method, verify compatibility with the installed belt and follow the belt manufacturer's current recommendations.

SECTION K

Belt Training - Initial Installation

Conveyor belting represents a major portion of conveyor cost and maintenance expense. Proper training is therefore one of the most important factors in belt life. Detraining generally results from either poor initial installation or operating/maintenance conditions.

Conveyor Structure Alignment

Install the conveyor frame in accurate longitudinal and lateral alignment and in a manner that prevents later shifting. Proper initial alignment is the foundation of belt training.

Conveyor Machinery Alignment

Misalignment is a common cause of detraining. Pulley and idler alignment should be treated carefully; small angular errors can create noticeable belt movement.

Belt Splicing

Ensure belt splices are square. An out-of-square splice can create training problems and unequal tension across the belt, which can contribute to premature failure.

Temperature Gradients / Environmental Effects

Differential heating from sun exposure or prevailing wind can contribute to misalignment on long belts. Covers or shields may be required where these environmental effects are significant.

SECTION K

Belt Training - Operating Problems

Off-Center Belt Loading

Off-center loading is a common cause of detraining. The primary corrective action is to revise the feed chute or loading hopper so material is centered. With angular transfers, the material trajectory should not impart lateral thrust to the belt.

Material Build-Up

- On conveyor decking: prevent accumulation from reaching idler rolls; correct poor loading conditions and maintain housekeeping.
- Return idlers: use effective belt cleaning and suitable return-idler designs where fines and moisture cause buildup.
- Pulley buildup: maintain effective lagging and use appropriate plows or cleaning devices ahead of the tail pulley where required.

TRAIN THE CAUSE, NOT THE SYMPTOM

Training devices may reduce visible wandering, but the underlying detraining force should still be identified and corrected to protect belt life.

SECTION K

Belt Training - Trainers & Special Conditions

In practice, many conveyors require some training devices even when the structure and machinery are correctly installed. Their use should be limited to what is necessary after the basic causes of detraining have been evaluated and corrected.

The source manual describes V-type return idlers for wide, long and relatively high-tension belts. Two rolls are sloped so that a wandering belt changes its center of gravity and tends to move back toward the proper location.

Conveyor designs may involve higher speeds, steel-cable belts and long single flights. Training devices must therefore be selected with the belt construction, operating tension and application in mind.

SECTION L

Transitions

Transition areas between flat pulleys and troughing idlers require careful design. Historically, transition-type troughing idlers with adjustable end rolls have been used adjacent to head and tail pulleys on deep-trough conveyors.

The source manual notes that lighter, thinner and higher-tensile belts can be sensitive to creasing and rupture at the junction of troughing-idler rolls. Tests cited in the manual indicate that the edge of the belt tends to remain at the troughing-idler slope while the width of the flat and sloped portions changes through the transition.

The ideal transition arrangement therefore supports the belt edge as it changes contour naturally between the flat pulley and the first regular troughing idler. Consult current belt-manufacturer and engineering guidance when establishing transition geometry for the installed belt.

SECTION M

Loading Point Spillage

Successful loading chutes and skirtboards require careful initial design. Spillage at loading and transfer points is often associated with worn or improperly adjusted skirtboards.

- Consider a confining curtain at the transfer point where appropriate.
- A stone-box effect in the chute can help reduce material velocity.
- Where headroom permits, deeper troughing in the loading area may help contain material and improve centering, provided the belt and conveyor design are suitable.
- Keep the loading point accessible for cleanup and inspection.

APPLICATION-SPECIFIC DESIGN

Loading-point changes can affect belt life, trajectory and capacity. Evaluate chute, skirtboard and idler changes as a system before modification.

SECTION M

Skirtboards

Skirtboards are used where necessary to confine material near the center of the belt at the loading point. The skirtboard structure should not contact the belt directly; suitable skirt rubber bridges the remaining gap.

- Do not use old conveyor belting as skirtboard rubber where the carcass can be too rigid and wear grooves in the main belt.
- Use skirtboard rubber designed for the purpose.
- Design skirtboards so they taper inward and lift slightly off the belt in the direction of belt travel.
- Inspect skirt rubber regularly for wear, trapped fines and adjustment.

SECTION N

Maintenance Hints / Troubleshooting

Use the following troubleshooting guide only after the conveyor has been safely shut down and locked out/tagged out. Correct the underlying cause rather than relying only on training devices or repeated adjustment.

Trouble	Possible Cause	Corrective Action
A. Belt runs to one side at a particular point	Idlers not square to belt centerline; conveyor frame or idler stands out of line; sticking idlers; structure not level; material buildup on idlers.	Square/align idlers and structure; free or replace sticking idlers; level the structure; improve housekeeping and install scrapers as required.
B. One section of belting runs off to one side along the conveyor	Splices not square; crooked belt from storage or exposure.	Resplice square. If a new belt is bowed, allow break-in time; otherwise replace the affected section.
C. Belt runs to one side for some distance along the conveyor line	Improper loading of the belt.	Revise the loading station and loading conditions so material is centered properly.

SECTION N

Troubleshooting - Continued

Trouble	Possible Cause	Corrective Action
D. Belt has erratic action with no particular pattern	Belt too stiff; training/alignment condition.	Allow proper break-in time if due to newness. Where appropriate and only on non-reversing conveyors, slight idler skew may be used; use self-aligning idlers or a more troughable belt as required.
E. Belt running off at head pulley	Head pulley or troughing idlers approaching the head pulley out of alignment.	Check and correct alignment of the pulley and adjacent troughing idlers.
F. Belt running off at tail pulley	Material buildup on return idlers; return rollers out of line; unequal loading.	Remove buildup and improve housekeeping; align return rollers square to the frame; adjust the loading chute to center the load.
G. Excessive wear on bottom side of belt	Slippage between belt and drive pulley(s).	Increase tension or correct the belt take-up as required; renew worn lagging and improve drive traction.

SECTION N

Troubleshooting - Continued

Trouble	Possible Cause	Corrective Action
G. Excessive wear on bottom side of belt	Slippage; sticking troughing idlers; material ground between pulley and belt.	Renew worn lagging; increase arc of contact where appropriate; free or replace idlers; install suitable scrapers ahead of the tail pulley or return belt.
H. Excessive wear on carrying side of belt	Dirty, frozen or misaligned return idlers; excessive sag; abrasive skirtboards; poor loading.	Install cleaning plows; clean, repair and align return idlers; increase belt tension if too low; reduce idler spacing where required; use proper skirt material; improve loading direction and speed matching.

SECTION N

Troubleshooting - Continued

Trouble	Possible Cause	Corrective Action
I. Belt requires too much tension, resulting in excessive stretch	Improper maintenance of troughing and return idlers; excessive friction; insufficient drive traction.	Replace frozen or worn idlers and improve maintenance. Improve drive traction with suitable lagging or increased wrap/tandem drive as appropriate. Operate at suitable speed/tonnage and adjust take-up only enough to prevent slipping.

TAKE-UP ADJUSTMENT

On gravity take-up systems, use only the counterweight required to prevent slipping. On screw take-up systems, tighten only enough to maintain required belt traction.

SECTION N

Troubleshooting - Continued

Trouble	Possible Cause	Corrective Action
J. Fasteners pull out of belt	Tension too high; mildew; wrong or loose fasteners; improper starting.	Correct excessive tension; address belt condition; install fasteners of required strength and tighten properly; use vulcanized splices where feasible; improve acceleration/start sequence.
K. Short or star breaks in belt carcass	Impact of lumps at loading station; material trapped between belt and pulley.	Use suitable impact idlers; install plows or scrapers ahead of pulleys.
L. Excessive noise or squealing in tandem drive	Unequal drive-pulley diameters.	Correct pulley diameter mismatch; the source manual notes that even a small diameter difference can generate noise.
M. Thumping noise in tandem drive	One or both pulleys loose on shaft; gear out of mesh, improperly machined or worn.	Tighten pulleys and correct or replace affected gearing.

SECTION O

Belt Conveyor Daily Maintenance Check List

Belts

1. Watch for spillage onto the return strand where material can get between the belt and pulleys.
2. Verify the belt is properly trained and does not contact steel structure, especially on the return strand.
3. Mark breaks, damaged areas and worn spots and report them for early repair.
4. Keep large lumps of material off the belt; 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 buildup on decking or the floor under idlers or pulleys, especially at training idlers.
5. Eliminate material buildup on idlers and pulleys.

Chutes and Hoppers

1. Correct clogged or bridged material.
2. Prevent large lumps from dropping onto an unprotected belt.
3. Verify material is centered on the belt and the belt is not overloaded.

Safety & Controls

1. Confirm emergency-stop and pull-cord devices are unobstructed and visibly intact.

2. Check belt-misalignment, zero-speed/slip, blockage and other protective devices for visible damage where equipped.

3. Report any bypassed, damaged or repeatedly tripping safety device immediately; do not normalize operation with a protective device defeated.

SECTION P

CEMA Idler Standards

CEMA Class	Type Bearings	Roll Diameter	Shaft Diameter	Load Capacity	H-R Series
B4	Ball	4-5 in.	5/8 in.		1000
B5	Ball	4-5 in.	3/4 in.		
C4, C5	Roller	4-5 in.	3/4 in.	900	2000
C6	Roller	6 in.	3/4 in.	900	2000
	Roller	6 in.	1 in.	1500	3000
D6	Roller	6 in.	1 3/16 in. or 1 1/4 in.	1800	4600
D7	Roller	7 in.	1 3/16 in. or 1 1/4 in.	1800	4700

SECTION Q

Idlers - Basic Design Features

Conveyor idlers support and train the belt while offering low resistance to belt travel. They must support the conveyed load and the belt, resist impact and, where required, withstand abrasion, corrosion, oxidation or material buildup.

The source manual describes idlers equipped with anti-friction bearings and provisions for relubrication. Roll ends are welded to the idler rolls, gaps between rolls are minimized to reduce belt pinching, and slotted mounting holes are used to permit alignment for training purposes.

A one-shot lubrication arrangement may allow grease to be applied from one side through a single grease passage. A pressure-relief feature helps equalize internal grease pressure and provides visual indication when lubrication is complete.

Drop-in roll construction uses simple steel keepers so rolls can be changed without special tools. The source manual also notes rounded roll ends and slotted mounting holes intended to simplify installation and belt alignment.

SECTION R

Special & Accessory Idlers

Training Idlers

Training idlers are useful when applied within the limits of the belt and conveyor design. A skewed idler exerts a lateral force on the belt; some training-idler designs use guide rolls or other mechanisms to create corrective skew when the belt wanders.

Impact Idlers

Impact idlers are used where material impact at loading points is severe. The source manual notes conventional, multi-roll and spiral arrangements for applications where standard designs are insufficient.

Troughing and Return Idlers

Different roll materials and constructions can be selected for severe abrasion, buildup, damp, sticky, corrosive or freezing conditions. Spiral and rubber-disc return designs may be used where material tends to cling to the return belt or rolls.

Feeder / Picking Idlers

Feeder and picking idlers are used primarily on belt feeders to spread material in a wide, thin layer for picking, sorting and inspection.

SECTION S

Shutdown & Extended Storage

Planned / Emergency Shutdown

1. Stop material feed and allow the conveyor to clear when conditions permit, then shut down and lock out/tag out all power.

2. For an emergency shutdown, establish a zero-energy state before removing guards, clearing material or inspecting the conveyor.

3. Inspect the belt, splice, pulleys, idlers, take-up, drive, guards and the condition that caused the shutdown before returning the conveyor to service.

4. Remove accumulated material that could harden, corrode components, retain moisture or interfere with restart.

Extended Storage / Out-of-Service Period

- Clean the conveyor and protect exposed machined surfaces and vulnerable electrical components from the storage environment.
- Maintain reducer, motor, bearings, brakes/backstops and couplings in accordance with their supplier storage instructions.
- Protect the belt from sunlight, chemicals, standing water, sharp bending and other conditions prohibited by the belt manufacturer.
- Keep gravity take-up and moving counterweight areas secured. Do not leave stored gravitational or mechanical energy uncontrolled where personnel could be exposed.
- Periodically inspect stored equipment for corrosion, water intrusion, pest damage, loss of protective coatings and other deterioration.

Return to Service

- Perform the receiving/installation condition checks applicable to the stored equipment, verify lubrication and safety devices, and complete the Initial Startup & Commissioning procedure before normal operation.
- Replace deteriorated belt, splice materials, seals, lubricants or electrical components that are no longer serviceable.

RESTART AFTER STORAGE

Do not assume equipment that was operating correctly before storage is ready to restart. Storage conditions can affect lubrication, seals, belt condition, electrical devices and corrosion protection.

SECTION T

Replacement Parts & Recommended Spares

Information to Provide When Ordering Parts

- Orthman job or conveyor identification, project name and equipment location.
- Component description, quantity and observed condition or reason for replacement.
- Manufacturer, model, serial number and part number from the supplied component when available.
- For belt-related items: belt width, construction/strength designation, cover grade/thickness and splice type.
- For pulleys/idlers: pulley diameter and face width, lagging/bushing/bearing details, or idler series, roll diameter, trough angle and mounting arrangement.
- For drive items: motor and reducer nameplate information, ratio, mounting position, coupling/drive details and relevant electrical data.

Recommended Spare Categories

Category	Typical Considerations
Idlers / rolls	Carry a practical quantity of the most failure-prone carrying, impact and return rolls used on the installation.
Belt repair / splice items	Maintain compatible repair materials or splice components based on the installed belt and site repair strategy.
Cleaners & skirt rubber	Stock wear blades, tips, tensioner service parts and skirt rubber used at critical loading/cleaning points.
Bearings, seals & locking devices	Consider spares for critical pulley and take-up positions where outage duration justifies on-site inventory.
Drive components	For critical service, evaluate spare belts/chains, couplings, backstop/brake parts, motor or reducer components based on lead time and plant redundancy.
Sensors / safety devices	Maintain approved replacement switches, pull-cord components and monitoring devices where downtime or lead time warrants.

Replacement Component Controls

- Use components that meet the original application requirements for load, speed, environment, guarding and safety function.
- Do not change pulley diameter, belt specification, take-up arrangement, idler geometry, reducer ratio or protective-device function without appropriate engineering review.
- After replacement work, reinstall guards and complete the applicable startup/commissioning checks before returning the conveyor to service.

SAFETY-CRITICAL SUBSTITUTIONS REQUIRE REVIEW

Do not substitute a different emergency-stop device, backstop/brake, guarding arrangement, pulley/bearing configuration or other safety-critical component solely because it fits physically. Confirm functional suitability before installation.

COMPANY INFORMATION

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PARTS, SERVICE & TECHNICAL SUPPORT

When requesting support, provide the conveyor/job identification, component description, observed condition, belt/pulley/idler details as applicable, and relevant motor/drive nameplate information so Orthman Conveying Systems can assist efficiently.