# Conveyor Belting

## Maintenance and Troubleshooting Manual

GRT RUBBER™

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# IMPORTANT NOTICE:

## Read this information before using any information in this catalog!

This catalog is intended as a maintenance guide and troubleshooting manual. It contains cautions, warnings, guidelines and directions for safe and proper use of GRT conveyor belts. You must read all directions carefully and understand them completely before you specify or use belts.

Boxes and boldface type are used to call attention to these instructions. Be sure to read and understand them before proceeding further with this information.

**CAUTION:**
**Indicates a potential hazard which could cause minor injury or property damage.**

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# Conveyor Belt Alignment and Training

A conveyor belt installed and trained correctly will run straight and true. The belt must run centered on all terminal pulleys, snub pulleys, bend pulleys, take-up pulleys, troughing idlers and return idlers throughout the entire belt length. Straight running also requires that the belt contact the horizontal roll of the troughing idlers.

**CAUTION:**

**Incorrect installation alignment and training can result in severe edge damage, material spillage, material leakage through the skirt rubber at the loading point, and excessive power demands. Material spillage causes belt carcass ruptures and pulley cover gouging and stripping, while leakage at the skirt rubber results in excessive conveyor cover wear under the skirts.**

## Conveyor Alignment

All rotating parts - head pulleys, tail pulleys, bend pulleys, snub pulleys, take-up pulleys, troughing idlers, and return idlers - must be a 90° angle to the direction of belt travel, must be level, and the midpoint of each properly centered. Alignment is checked by running a tight wire from the center of the head pulley to the center oif the tail pulley. Center all rotating parts on the wire.

Level all rotating parts. If a part is not level, the belt will run to the side in low-tension areas and to the high side in high tension areas.

Check that all parts are at a 90° angle to the wire. If a part is not at 90° to the center line, the belt will run toward the side that it first contact.

## Belt Training

A belt installed correctly will usually train well both empty and loaded, unless:

1. One or more rotating parts are not in alignment.
2. The belt is too stiff and does not contact center roll of troughing idlers when empty.
3. Belt tensions in some part of system (usually at tail section) are below minimum recommended.
4. Belt is not loaded centrally.
5. Belt doesn't touch center of return roll, if it does not turn over the belt.

When a belt is started initially, it should be jogged around the system to determine if a major runout occurs which could damage belt and belt edges. If runout occurs at some point of the system, the reason is usually an idler or pulley out of alignment about 20 feet before the runout. Alignment should be rechecked before restarting.

After the belt can be run safely without damage, final training should begin with the tail pulley. The belt must enter the tail pulley and loading section in the center without movement from side to side. If the belt is not centered on the tail pulley, the return strand of the belt should be observed for any section which is not centered on return idlers. If belt is not centered at some point, move the idlers starting about 10 times the belt width (i.e. 10 x 36" = 360" or 30') before this point to correct the centering on the idlers. Movement of the idlers in the bracket should be gradual - only 1/16" to 1/8" - since the belt will move in the direction that it first contacts the idler. The same corrective action should be taken on the carrying side to make sure the belt is centered on all idlers and around the head pulley.

After the belt has been trained while empty, you should train it with a load, but only after any necessary corrections have been made. Make sure the belt is loaded in the center, and the take-up has been adjusted to prevent belt slippage and keep tension at all points above the recommended minimum.

If slippage does occur when the belt is operating under load, apply belt tension by adjusting the take-up, but only enough to prevent slip from occuring under the load, and when started up with a load.

**Note: Take-up movement must always be at 90° to the direction of belt travel, or the belt will move out of alignment. Take-up must be level and square with system.**

Minimum belt tension is checked by observing the sag between idlers. The sag must be greater than specified below. To reduce the sag, apply additional tension by adjusting the take-up.

| Idler Spacing | 5′ | 4′ | 3′ | 2′ | 1′ |
|---|---|---|---|---|---|
| Max. Allow. Sag: | 1-1/4″ | 1″ | 3/4″ | 1/2″ | 1/4″ |

After the belt has been in operation approximately two weeks, tighten fastener plates and check belt tension and belt alignments.

**Conveyor Belt Maintenance**

In the last 50 years, a huge quanity of raw material has been transported, processed, reprocessed, circulated, recirculated, and otherwise handled. Material handling constittutes a very large portion of total processing cost.

A conveyor belt moving smoothly has a tendancy to be overlooked until it is damaged or needs replacement. Then it is recognized as a vital link in the materials handling chain; its failure can shut down the plant as effectively as a worn-out screen, or a broken crusher shaft. This relatively small stream of material moving continuously hour after hour, day after day, adds up to tremendous tonnage over a long period of time. Because the conveyor is quiet, relatively simple, and undemanding compared to other equipment, it seldom gets the preventive maintenance that can prolong its life and reduce cost.

**The Importance of Preventive Maintenance**

Preventive maintenance begins with proper design and installation. A knowledge of belting allows for proper design of component parts so that all parts work together effectively. It does not make sense to install a conveyor belt designed to handle an average load of 300 tons per hour if you know that peak loads will be 400, or 500, or 600 tons per hour at times. The belt should be designed to meet the conditions of the peak surge loads; otherwise, you might find the belt stetching excessively, developing tension breaks, slipping on the drive because of insufficient counterweight, or causing other operating problems.

Belt life depends primarily on four factors:

- Proper loading
- Good belt alignment
- Adequate cleaning or housekeeping
- Good maintenance records

**Proper Loading**

Most conveyor belt wear and tear occurs at the loading point because of the impact of material on the cover. Generally speaking, the faster the cycle, the faster the wear. This is not always true on long-center conveyors where the shifting of the load over the troughing rolls may be a substantial portion of wear, but it is generally true for shorter center applications.

Design of the transfer should take advantage of chutes wherever possible to deposit the material in the line of belt travel. Deposit of material should be as close to the belt speed as possible, centered on the belt, and as near to full capacity as possible. Material being loaded onto the belt should strike between idlers, just forward of, but not directly on tip of an idler.

In addition, if there is heavy impact, then rubber-covered, pneumatic or semi pneumatic impact carriers should be used.

**Note: Material should never be loaded onto the belt in transition area between the tail pulley and the first troughing carrier.**

If the belt is to be loaded at additional points along the conveyor, such loading points should be designed so that there is no interference by chutes or skirts.

Try to maintain a full-capacity load on the belt. If a small amount of material is discharged onto the belt at one point, the wear at this narrow band will be just as much as a full load would produce across the full load area of the belt. Keep surge loading to a minimum and maintain a smooth, even flow of material to get the best tonnage and the least trouble.

Skirts and skirtboards should be long enough to confine the load until it has settled. They should be no longer than that, since they are always a potential wear and trouble spot. The skirtboard should open up in the direction of belt travel from the narrow end at the chute to the wide end of the skirt toward the heat. In addition, the skirtboard should also be raised above the belt in the direction of belt travel, so that if any material is temporarily trapped, it will forced toward a wider opening and released rather than jammed against the belt.

**Caution:**
**Skirt material should never be made from old belting. The fabric in the old belting holds particles of the material and acts as a grinding edges, which wears the conveyor along the skirt line.**

Use all-rubber skirt material, since it will not trap material grit. Do not jam the skirting down against the belt, but allow it to clear the surface of the belt along the length of the skirtboard.

## Good Belt Alignment

Good belt alignment is critical to ensure that the material is loaded in the center of the belt. Off-center loading can cause poor alignment.

A properly aligned conveyor with good loading conditions should not normally require self-training carriers. Self-aligning troughing and return carriers are only designed to take care of momentary or short-term misalignment. Don't depend on them to operate continuously, then something else is wrong in the alignment, loading, or in other conditions of the conveyor.

If an edge is dragged through accumulated material, the edge may wear off, and moisture penetration will cause alignment problems and the continual operation of self-training carriers. In this case preventive maintenance involves determining the cause of the accumulated material, correcting the cause, and eliminating the accumulated material.

Today's belts will train better than old-style belts, but because they train better, they also follow carrier misalignments. Misalignment causes spillage and housekeeping problems which can cause accidents. Some misalignment problems may be caused by crooked mechanical joints or loose bolts in mechanical fasteners. Fastening should be inspected frequently and loose bolts should be tightened. Belts can be torn up because crooked and/or loose plates or crooked splices catch on the structure and rip large sections of the belt.

## Cleaning and Housekeeping

It is important to minimize the frictional drag of a conveyor. Misalignment often causes belt edges to rub against the side of structure, usually on the return side, which is difficult to see. Stuck idler rolls, skirt rubber drag, and the belt dragging in accumulated materials can also increase belt tension and wear on belt cover and edges.

We recommend that you establish wattmeter readings of each conveyor under normal conditions, and refer to these at intervals during the belt life. You will be able to detect any abnormal increase in power consumption, which indicates potential problems before they become acute.

Preventive maintenance is often overlooked at the discharge end. The discharge fills up the surge pile, or a bin, to such a level that the belt runs through the material and the belt is worn or torn off. If this occurs, install a bin-level control or pile-limit switch to prevent further damage.

Terminal pulleys, snub pulleys, and particularly, return rolls should be kept clean. There are various devices for keeping belt and pulleys clean, such as rotating brushes, counterweighted scraper, finger scrapers, water sprayers, etc. Remember, however, to dispose of the material cleaned from the belt or pulleys. If this material is allowed to accumulate, the belt will be damaged when it runs through it.

Many conveyors deteriorate because lubrication is applied only sporadically. Many people assume that "lifetime lubricated bearings" never need to be checked. But these bearings can wear out, particularly under extremely dusty conditions, and cause the idler rollers to stick.

Note that carriers should not be over-lubricated, since this can blow the seals. When grease drips on the belt, the rubber and skims deteriorate, particularly along the troughing hinge line. Over-lubrication can be just as damaging as under-lubrication.

## Good Maintenance Records

Good maintenance requires keeping service records - to establish service life expectancy, to eliminate trouble spots, and to measure operating maintenance costs. Belts should be inspected each day and any potential problem should be corrected immediately.

If spillage around the loading point has occurred, the cause for the spillage should be determined and corrected immediately before the spillage causes breaks or excessive wear and tear on the covers. If inspection shows bands of wear along the length of the belt, it should be determined whether this is caused by dragging through spilled material, jamming, or other causes, and it should be corrected before the wear exposes the fabric and causes carcass deterioration. If a conveyor belt covers shows no cover gouges one day, but shows several the next day, obviously something is wrong that must be corrected immediately.

Daily inspection and comparison of conveyor conditions make it possible to spot excessive wear or potential trouble at the beginning, before the belt is ruined. An additional year's life on each of ten $5,000 belts will more than pay for the inspector's time. Daily inspections can also prevent costly, unexpected stoppages, and ensure a longer belt life.

# Conveyor Belt Problems and Corrections

Consult the following list of common problems and corrections as soon as trouble appears. Use the diagram on the back of the catalog for clarification of conveyor system components discussed in the following section.

Remember that most problems can be eliminated before belt damage occurs, through proper preventive maintenance.

### PROBLEM 1: Excessive top cover wear, uniform around belt

CAUSE: Dirty, stuck or misaligned return rolls
**CORRECTIONS:**
a. Repair, replace, and realign return rolls.
b. Install cleaning devices.
c. Wash belt.

CAUSE: Belt dragging through spilled material pile.
**CORRECTION:**
Correct causes of spillage and improve housekeeping.

CAUSE: Poor loading conditions or side loading; delivery of material too slow.
**CORRECTION:**
Redesign chute to feed material onto belt in direction of travel and as close to belt speed as possible.

CAUSE: Low cover quality
**CORRECTION:**
Replace with belt with heavier top cover and/or higher quality rubber.

CAUSE: Excessive sag between idlers causing a load shift over idlers
**CORRECTIONS:**
a. Increase belt take-up tension if too low.
b. Reduce idler spacing.

### PROBLEM 2: Top cover grooved, gouged, or stripped

CAUSE: Skirtboard seals too stiff and pressed against belt.
**CORRECTION:**
Use more pliable skirt rubber and adjust to minimum clearance.

CAUSE: Excessive space between belt and skirt seals, allowing material to grind between.
**CORRECTION:**
Adjust skirt seals to minimum clearance.

CAUSE: Skirtboards too close to belt and no opening in belt travel direction to release any trapped material at the end of the loading area.
**CORRECTION:**
Adjust to 1-inch clearance between belt and bottom of skirtboard at loading end and increase gap in belt travel direction.

CAUSE: Skirtboards narrow and confine load in belt travel direction.
**CORRECTION:**
Adjust spacing between skirtboards to widen in belt travel direction to prevent trapping.

CAUSE: Belt deflects under impact at loading point and escaping material gets trapped between belt and skirtboard.
**CORRECTIONS:**
a. Adjust loading so material impacts just ahead of troughing roll but not midway between rolls.
b. Reduce carrier spacing in loading area.
c. Install impact cushion carriers in load area.
d. Install impact beds.

**PROBLEM 3: Cover cut and slashed**

CAUSE: Material hanging under back panel chute.

**CORRECTION:**

Improve loading to prevent spillage behind back panel.

CAUSE: Material jammed in chute.

**CORRECTION:**

Widen chute.

CAUSE: Material jammed against belt at discharge end in full bin or surge pile, etc.

**CORRECTION:**

Install limit switches to prevent excessive pileup of material at discharge end.

CAUSE: Buildup of material on return rolls or pulleys, forcing belt against structural components.

**CORRECTION:**

Install cleaning devices where required.

CAUSE: Excessive impact of sharp material.

**CORRECTIONS**:

a. Redesign chute for better delivery to belt.
b. Install impact cushion idlers.
c. Install impact beds.

CAUSE: Sharp tramp metal.

**CORRECTION**:

Use tramp metal detector or magnet.

**PROBLEM 4: Severe wear on pulley cover**

CAUSE: Sticking carrier rolls.

**CORRECTION:**

Replace rolls and improve maintenance and lubrication.

CAUSE: Material spills onto return strand and passes between belt and pulley, or builds up on decking until belt drags through material.

**CORRECTIONS:**

a. Improve loading.
b. Increase belt speed or decrease load feed if belt loaded too full.
c. Install decking between top and return runs.
d. Install plow in front of tail pulley on return run.
e. Prevent leakage of fines through fasteners joints and repair any carcass punctures.
f. Use vulcanized splice.

CAUSE: Belt slips on drive pulley.

**CORRECTIONS:**

a. Increase take-up tension.
b. Use rubber lagging on drive pulley. (It must be grooved if wet)
c. Increase arc of contact on drive pulley with snub pulley.
d. If slime is the cause of persistent slip; use water spray to clean pulley cover side of belt ahead of drive pulley.

CAUSE: Bolt heads protrude above lagging.

**CORRECTIONS**:

a. Tighten bolts.
b. Replace worn lagging.
c. Use vulcanized-on lagging.

CAUSE: Misalignment or excessive tilt of troughing idlers.

**CORRECTION**:

Realign idlers and/or adjust idlers stands to not more than 2° tilt from perpendicular to the belt in direction of belt travel.

**PROBLEM 5: Water or sand blisters on either cover**

CAUSE: Cuts or small punctures in cover allow water and/or fine particles to work under cover and lift away from carcass.

**CORRECTIONS:**

a. Make spot repair with vulcanizer or chemically-cured repair material.
b. For severe and repeating cases, refer all details to belt manufacturing for analysis and possible special belt construction requirements.

**PROBLEM 6: Cover swells in spots or in line of troughing roll junction**

CAUSE: Spilled oil or grease.

**CORRECTIONS**:

a. Better housekeeping.
b. If repeating - locate source and correct it.

CAUSE: Over-lubrication of top run idlers.

**CORRECTION**:

Reduce amount of grease, and check grease seals.

**PROBLEM 7: Belt center raises off top idlers, cupping toward load**

CAUSE: Oil in material.

**CORRECTIONS**:

a. Remove source of oil.
b. Replace with oil-resistant belt for type of oil encountered. Refer all details to belt manufacturer for proper oil-resistant elastomer.
c. Turn belt over to get additional belt life.

**PROBLEM 8: Excessive cupping away from load, top and bottom**

CAUSE: Too much belt tension.

**CORRECTIONS:**

a. Reduce take-up weight if possible without introducing excessive sag or drive slip.
b. Check for drag from stuck idlers, misalignment, tight skirts, edge rubbing, etc., and correct.
c. Reduce loading rate and/or increase belt speed to reduce belt tension.
d. Replace with belt construction adequate for tension requirements.
e. Check for oil or chemical contamination.

CAUSE: High-edge tension from deep-trough carriers and low-stretch belt fabric.

**CORRECTIONS:**

a. Use longer transition at terminals.
b. Use belting with moderate stretch characteristics. Refer to belt manufacturer.

CAUSE: Exceptionally heavy top cover on thin-ply belt.

**CORRECTIONS:**

Refer all details to belt manufacturer for proper belt construction.

**PROBLEM 9: Belt runs to one side at one point on structure**

CAUSE: One or more idlers immediately preceding trouble point are not at right angles to longitudinal axis of conveyor.

**CORRECTION:**

Advance, in direction of belt travel, the end of the idler on the side where the belt has shifted.

CAUSE: Conveyor frame crooked.

**CORRECTION:**

Stretch string along edge to determine extent of misalignment, and correct it.

CAUSE: Structure not level and belt shifts to low side in low-tension area and runs to the high side in high-tension area.

**CORRECTION:**

Level the conveyor structure.

CAUSE: One or more idler stands not centered.

**CORRECTION:**

Stretch string along edge to determine extent of misalignment, and correct it.

CAUSE: Sticking idlers.

**CORRECTION:**

Replace idlers and improve maintenance and lubrication.

CAUSE: Buildup of material on pulleys or idlers.

**CORRECTION:**

a. Improve maintenance.
b. Install scrapers or other cleaning device.

CAUSE: Terminal pulley is misaligned. Terminal pulleys must be square and level with structure of system.

**CORRECTION**:

a. Check and correct alignment of pulley.

b. Check and correct alignment of idlers approaching terminal pulley.

CAUSE: Spilled material forcing belt to one side.

**CORRECTION**:

Improve maintenance and correct cause of spillage.

## PROBLEM 10: A particular section or entire belt runs to one side at all points on structure

CAUSE: Structure misaligned or not level.

**CORRECTIONS:**

a. Stretch string along edge to determine extent of misalignment, and correct it.

b. Level the conveyor structure.

CAUSE: Belt not joined squarely.

**CORRECTION**:

Refasten belt, cutting ends square.

CAUSE: New belt is bowed.

**CORRECTIONS**:

a. Wait for belt to straighten out as soon as it has operated under full load tension and is "broken in."

b. Avoid poor storage conditions such as telescoped rolls, or one edge close to damp ground or wall.

c. Consult manufacturing.

CAUSE: Belt bowed from moisture penetration of worn edge.

**CORRECTION**:

Same corrections as for problem 9. Improve maintenance.

CAUSE: Belt bowed from off-center loading.

**CORRECTIONS**:

a. Correct loading and improve maintenance.

b. Adjust so belt comes over tail pulley correctly.

## PROBLEM 11: Belt is erratic (no pattern of performance)

CAUSE: Tilted idlers installed backwards.

**CORRECTION**:

Reinstall idler correctly.

CAUSE: Belt too stiff to train.

**CORRECTION**:

Use more troughable belt. Refer to belt manufacturing.

CAUSE: Combination of Problem 9 and 10, with off-centered loading.

**CORRECTION**:

Correct loading first, then other problems can be identified, and corrections made.

## PROBLEM 12: Excessive belt stretch

CAUSE: Tension too high.

**CORRECTIONS**:

a. Increase speed while holding same loading rate.

b. Reduce tonnage at same speed.

c. Decrease tension requirements by increasing drive pulley arc of contact and lagging pulley.

d. Use gravity take-up with minimum take-up weight.

e. Check for stuck or worn out idlers, dragging from misalignment, skirt drag, and drag through spilled material, and correct. Use better maintenance.

CAUSE: Belt construction too light for existing conditions.

**CORRECTIONS**:

a. Check tonnages presently handled versus tonnage conditions for which belt designed. Correct as above if possible.

b. Replace with belt material with correct tension rating and stretch characteristics for existing conditions.

**PROBLEM 13: Belt shrinks**

CAUSE: Moisture absorption.

**CORRECTIONS:**

a. Install extra piece of belt with same construction, with take-up halfway down.
b. Replace with moisture-proof synthetic carcass belt. Refer to manufacturer.
c. Eliminate bareback constructions.

**PROBLEM 14: Short breaks in carcass - longitudinal, transverse, or star configurations.**

CAUSE: Impact of lumps on belt.

**CORRECTIONS**:

a. Install plows on return run ahead of tail pulley.
b. Put deflector over gravity take-up pulley.
c. Improve housekeeping.

**PROBLEM 15: Transverse breaks at belt edge**

CAUSE: Belt edges folding up on structure at or near pulley.

**CORRECTIONS**:

a. See problem 9-11 for suggestions.
b. Install limit switches to stop belt in case of extreme shifting.
c. Provide more lateral clearance.

CAUSE: Material jamming under skirtboards.

**CORRECTIONS**:

a. Use more pliable skirt rubber and adjust to minimum clearance.
b. Adjust skirt seals to minimum clearance.
c. Adjust to 1-inch clearance between belt and bottom of skirtboard at loading end and increase gap in belt travel direction.
d. Adjust spacing between skirtboards to widen in belt travel direction to prevent trapping material.

CAUSE: Final idler before head pulley is located too close or too high with respect to head pulley.

**CORRECTIONS**:

a. Use longer transition length and adjust troughing carrier position so that line tangent to top of head of pulley and parallel to conveyor line is midway between top of center roll of idler and top of troughed belt edge.
b. Adjust curve radius and support in curve to reduce edge tension.
c. Terminal pulleys too low; on convex curve use 10° idlers frame to frame.

**PROBLEM 16: Lengthwise rips partially or entirely through belt.**

CAUSE: Skirtboard seals too stiff and pressed against belt.

**CORRECTION**:

Use more pliable skirt rubber adjust to minimum clearance.

CAUSE: Excessive space between belt and skirt seals, allowing material to grind between.

**CORRECTION**:

Adjust skirt seals to minimum clearance.

CAUSE: Skirtboards too close to belt and no opening in belt travel direction to release any trapped material at the end of the loading area.

**CORRECTION**:

Adjust to 1-inch clearance between belt and bottom of skirtboard at loading end and increase gap in belt travel direction.

CAUSE: Skirtboards narrow and confine load in belt travel direction.

**CORRECTION**:

Adjust spacing between skirtboards to widen in belt travel direction to prevent trapping material.

CAUSE: Belt deflects under impact at loading point and escaping material gets trapped between belt and skirtboard.

**CORRECTIONS**:

a. Adjust loading so material impacts just ahead of troughing roll but not midway between rolls.
b. Reduce carrier spacing in loading area.
c. Install impact cushion carrier in load area.
d. Install impact beds.

CAUSE: Belt Running off and snagging on structure.

**CORRECTION**:

See Problems 9-11

CAUSE: Tramp iron at chute

**CORRECTION**:

Use metal detector or magnetic remover.

CAUSE: Fastener failure.

**CORRECTION**:

a. See problems 9-11
b. Plate catching on structure.

CAUSE: Joining of many impact breaks, cuts and fatigue of cover over carcass breaks.

**CORRECTIONS**:

a. Reduce impact.
b. Use cushion idlers.
c. Do not load in transition area.
d. Install impact bed.

## PROBLEM 17: Carcass ruptured lengthwise; top cover and all or part of bottom cover intact.

CAUSE: Belt running off against structure and folding back on itself.

**CORRECTIONS**:

a. See Problems 9-11
b. Install limit switches
c. Provide more lateral clearance.

CAUSE: Joining of many impact breaks.

**CORRECTIONS**:

a. Reduce impact.
b. Use cushion idlers.
c. Do not load in transition area.
d. Install impact bed.

CAUSE: Material jamming under skirtboards.

**CORRECTIONS**:

a. Use more pliable skirt rubber and adjust to minimum clearance.
b. Adjust skirt seals to minimum clearance.
c. Adjust to 1-inch clearance between belt and bottom of skirtboard at loading end and increase gap in belt travel direction.
d. Adjust spacing between skirtboards to widen in belt travel direction to prevent trapping material.

CAUSE: Final idler before head pulley is located too close or too high with respect to head pulley.

**CORRECTIONS**:

a. Use longer transition length and adjust troughing carrier position so that line tangent to top of head of pulley and parallel to conveyor line is midway between top of center roll of idler and top of troughed belt edge.
b. Adjust curve radius and support in curve to reduce edge tensions.
c. Terminal pulleys too low; on convex curve use 10° idlers frame to frame.

**PROBLEM 18: Fasteners pulling out**

CAUSE: Wrong type or size of fasteners, or loose fasteners.

**CORRECTIONS**:

a. Refasten with proper fasteners.
b. Regularly inspect joints. Re-tighten new fasteners after a few hours' run.

CAUSE: Pulley sizes too small for mechanical fasteners

**CORRECTIONS:**

a. Use vulcanized splice.
b. Use larger pulleys.
c. Check with fastener manufacturer for correct size.

CAUSE: Belt tension too high.

**CORRECTION**:

Check tension in belt.

CAUSE: Belt running off against structure and folding back on itself.

**CORRECTIONS**:

a. See Problem 9-11.
b. Install limit switches.
c. Provide more lateral clearance,

CAUSE: Material jamming under skirtboards.

**CORRECTIONS**:

a. Use more pliable skirt rubber and adjust to minimum clearance.
b. Adjust skirt seals to minimum clearance.
c. Adjust to 1-inch clearance between belt and bottom of skirtboard at loading end increase gap in travel direction.
d. Adjust spacing between skirtboards to widen in belt travel direction to prevent trapping material.

CAUSE: Heat

**CORRECTIONS**:

a. Use vulcanized splice.
b. Recess fasteners, and cover with self-curing rubber.
c. Cool material more before discharging to belt.

CAUSE: Misalignment causing joint to catch on structure.

**CORRECTION:**

See Problems 9-11.

CAUSE: Two belts with excessive guage difference are joined.

**CORRECTION**:

Recess fastener plates in cover of thicker belt to give uniform plate pressure on both belt ends.

**PROBLEM 19: Transverse breaks in belt immediately behind fasteners**

CAUSE: Fastener plates too long for pulley sizes.

**CORRECTIONS:**

a. Change to smaller, shorter fasteners.
b. Use larger pulleys:
c. Check condition of wing pulley.
d. Refer to fastener manufacturer for correct fastener based on belt tension, minimum pulley diameters, opening conditions, and belt thickness.

**PROBLEM 20: Hardening and cracking of covers and carcass, loss of carcass strength**

CAUSE: Heat

**CORRECTION**:

Refer all details to GRT for a heat-resistant belt recommendations.

# APPENDIX: Approximate Weights of Materials and Maximum Allowable Angle for Inclined Conveyors.

| Materials | Weight (Lbs. / Cu Ft) | Maximum Incline Angle (Degrees °) | |
|---|---|---|---|
| | | Fines | Mixed |
| Aggregate | 100 | 18 | 20 |
| Alumina | 60 | 12 | - |
| Asbestos (crude) | 50 | 18 | 20 |
| Ashes (soft coal) | 45 | 22 | - |
| Barley | 38 | 16 | - |
| Barytes Ore | 125 | 18 | 20 |
| Bauxite | 80 | 18 | 20 |
| Beets | 45 | - | - |
| Buckwheat | 45 | 16 | - |
| Cement rock | 100 | - | 20 |
| Cement (clinker) | 85 | 20 | - |
| Cement (dry) | 90 | 20 | - |
| Cinders | 40 | 15 | 20 |
| Coal (anthracite R.O.M.) | 55 | - | 18 |
| Coal (anthracite fines) | 55 | 20 | - |
| Coal (bituminous R.O.M.) | 50 | - | 18 |
| Coal (bituminous fines) | 50 | 20 | - |
| Coke (breeze) | 30 | 20 | - |
| Coke (run of oven) | 30 | - | 18 |
| Concrete mix (wet) | 120 | 12 | - |
| Copper Ore | 110 | 18 | 20 |
| Corn | 45 | 16 | - |
| Cottonseed | 25 | 16 | - |
| Dolomite (crushed) | 100 | 20 | - |
| Earth (loam) | 80 | - | 20 |
| Earth (loam, wet) | 100 | - | 18 |
| Feldspar | 70 | 18 | - |
| Flaxseed | 40 | 16 | - |
| Flour, wheat | 40 | 20 | - |
| Fullers earth | 40 | 20 | - |
| Glass (cullet) | 120 | 18 | - |
| Granite | 95 | 18 | 20 |
| Gravel, dry | 100 | 15 | - |
| Gravel, wet | 120 | 18 | - |
| Gneiss | 95 | 18 | 20 |
| Gypsum | 90 | 20 | 22 |
| Iron Ore | 150 | 22 | 25 |
| Lead Ore | 200 | 16 | 18 |
| Limestone | 100 | 18 | 20 |
| Marble | 100 | 18 | 20 |
| Metal Scrap | 125 | - | 18 |
| Oats | 26 | 16 | - |
| Peanuts | 18 | 8 | - |

| Materials | Weight (Lbs./Cu Ft.) | Maximum Incline Angle (degrees °) | |
|---|---|---|---|
| | | Fines | Mixed |
| Phosphate, fertilizer | 60 | 13 | - |
| Phosphate, pebble | 90 | 15 | - |
| Phosphate, rock | 80 | 16 | 18 |
| Phosphate, triple sugar | 50 | 30 | - |
| Potash | 80 | - | - |
| Quartz | 100 | 18 | 20 |
| Rice | 45 | 16 | - |
| Rye | 45 | 16 | - |
| Salt | 75 | 20 | - |
| Sand | 100 | 20 | - |
| Sand (foundry) | 100 | 24 | - |
| Sand and gravel (dry) | 100 | 18 | - |
| Sand and gravel (wet) | 120 | 20 | - |
| Sandstone | 90 | 18 | 20 |
| Sawdust | 13 | 20 | - |
| Shale | 95 | 18 | 20 |
| Sinter | 125 | 18 | 20 |
| Shells (oyster) | 50 | 16 | - |
| Slag | 90 | 15 | 18 |
| Slag (crushed) | 80 | 20 | 22 |
| Slate | 90 | 18 | 20 |
| Soda ash | 65 | 15 | - |
| Soybeans | 48 | 8 | - |
| Stone | 100 | 18 | 20 |
| Sugar | 55 | 20 | - |
| Sulphur | 70 | 18 | - |
| Taconite pellets | 140 | 15 | - |
| Trap rock | 100 | 18 | 20 |
| Wheat | 50 | 16 | - |
| Wood chips (dry) | 25 | 25 | - |
| Zinc ore | 150 | - | 22 |

**Conveyor Belt Data Form**

*Sketch conveyor configuration, locating drive, take-up, curves, and tripper limits.*

Sheet no.: _____ Date: _____ Salesman: _____

Customer: _____

☐ Distributor ☐ Engineering company ☐ Equipment manufacturer

Conveyor no. or description: _____

## Conveyor Belt Operating Data and Recommendations

### Material Data

Material: _____

Max. Lump size: _____ inches

Average size: _____ inches

*Max. Capacity: _____ ton/hour

Average capacity: _____ ton/hour

Oil: ☐ None ☐ Some ☐ Alot

### Operating Data

*Belt Width: _____ in. *Belt speed: _____ ft/min.

Temperature: _____ °F ☐ Wet ☐ Dry

**Length**

*Conveyor center: _____ Ft.

Installed belt length: _____ Ft.

**Elevation**

*Vertical lift: _____ Ft.

### Drive Data

Location: ☐ Head ☐ Tail ☐ Between

Type: ☐ Single ☐ Tandem ☐ Dual

Motor horsepower: _____ *Lagged: ☐ Yes ☐ No

### Take-up

Type: ☐ Gravity ☐ Screw ☐ Auto

Travel: _____ ft. _____ in.

Location from head: _____ ft. From tail: _____ ft.

Counterweight: _____ lbs.

### Pulley Diameters

Drive pulley dia.: _____ In.

Head pulley dia.: _____ In.

Tail pulley dia.: _____ In.

Take-up pulley dia.: _____ In.

Snub pulley dia.: _____ In.

Snub pulley dia.: _____ In.

Bend pulley dia.: _____ In.

Wing tail: ☐ Yes ☐ No

### Loading Data

Direction in-line: ☐ Side ☐ Vertical

Type loader: _____

*Drop to belt: _____ Ft. Chute angle: _____ °

Loading idlers: ☐ Impact ☐ Plain

Space at loading: _____

Impact station length: _____

Splice: ☐ Mech. ☐ Vulc. Idler spacing: _____ in. Trough angle: _____ °

*Tripper: ☐ Yes ☐ No Lift: _____ ft. Fixed: _____

Transition distance: Head: _____ in. Tail: _____ in.

Previous or current belt specification: _____

Belt recommendation: _____

## Belt Selection Data

### Horsepower Data

HPX: _____

HPY: _____

HPZ: _____

Tripper horsepower: _____

Total horsepower: _____

### Tension Data

Effective belt tension: _____ lbs.

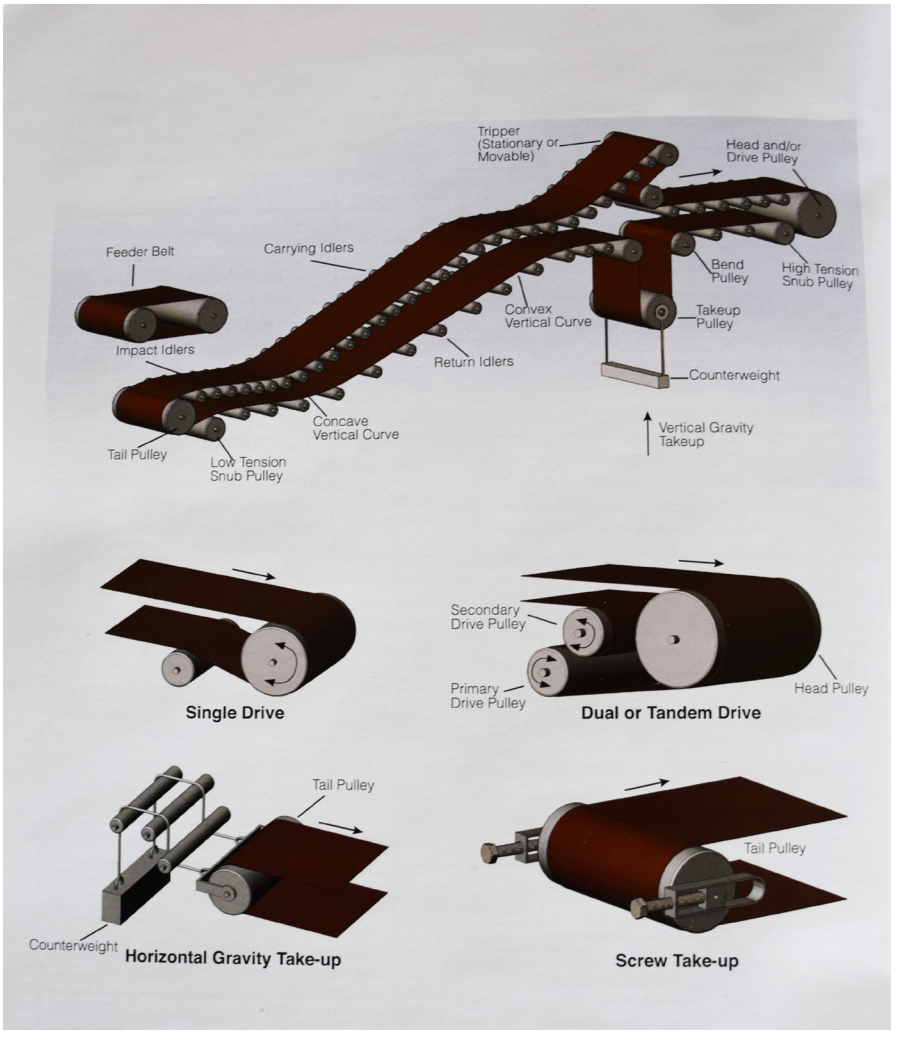
Slack side tension T (2): _____ lbs.

Maximum belt tension: _____ lbs.

Tension per inch of belt: _____ lbs.

**** MUST be completed.***

## Conveyor System Components

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Performance data published in this brochure has been developed from field testing, customer field reports and/or in-house testing. While the utmost care has been used in compiling
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