SCREW CONVEYOR
SAFETY, INSTALLATION, OPERATION
AND MAINTENANCE MANUAL

Choice Bagging Equipment, LTD
4804 North Main Street
Taylor, Texas 76574
(512) 352-36994
INTRODUCTION

The manufacturer of this screw conveyor equipment has been in business many years and is ISO 9001 certified to provide the highest quality of equipment to all types of customers. They provide cost-effective solutions to the many markets and industries, including aggregate, brewing, cement, chemical, food, gypsum, ice handling, mineral processing, power, pulp & paper and rendering /wastewater treatment systems.

The manufacturer has supplied safety features on each conveyor. Devices may include, but are not limited to; interlocks, limit switches, overflow relief switches, shear pins, emergency stop switches, emergency stop pull cables and point-of-operation switches.

1. SAFETY

Read ALL instructions in this manual and manufacturer’s manuals BEFORE installing, operating and maintaining the equipment.

Screw conveyor safety begins with a plan that considers every possible danger and potential hazard. Operation and maintenance personnel must be thoroughly trained in safe operating procedures, recognition of possible hazards, and maintenance of a safe area around screw conveyors.

CEMA has a comprehensive safety program that includes:
- Warning and Safety Reminder for Screw Conveyors, Drag Conveyors, and Bucket Elevators (CEMA Document SC2004-01)
- CEMA Safety Label Brochure (CEMA Document 201)
- CEMA Safety Label Placement Guidelines:
  - Screw Conveyor (CEMA Document: SC0-2)
  - Vertical Screw Conveyor (CEMA Document: SC-3)
- Screw Conveyor Safety Poster (CEMA Screw Conveyor Safety Poster)
- Screw Conveyor, Drag Conveyor and Bucket Elevator Safety Video (CEMA Document AV6). This video describes key safety practices that personnel must follow when operating and maintaining screw conveyors, drag conveyors and bucket elevators.
Screw conveyor accidents can be avoided by implementation and enforcement of an in-plant safety program. A number of safety precautions are included in this manual. Carefully study and follow the safety precautions. Remember – accidents are usually caused by negligence or carelessness.

CEMA DOCUMENT SCOM-001:

WARNING AND SAFETY REMINDERS FROM THE CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION (CEMA)

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

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

1. Conveyors SHALL NOT be operated unless all covers and/or guards for the conveyor and drive unit are in place. If the conveyor is to be opened for inspection, cleaning, maintenance or observation, the electric power to the motor driving the conveyor and all energy must be LOCKED OUT AND TAGGED OUT in such a manner that the conveyor cannot be restarted by anyone; however remote from the area, until conveyor guards cover and/or guards and drive guards have been properly replaced. Each individual cover must be securely bolted on each end with at least two-tamper resistant safety bolts that require a special tool for removal. It is the responsibility of the owner to supply the tamper-resistant safety bolts and special tools.

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

3. Feed openings for shovel, front loaders or other manual or mechanical equipment shall be constructed in such a way that the conveyor opening is covered by a grating and does not create a safety hazard. If the nature of the material is such that a grating cannot be used, then the exposed section of the conveyor is to be guarded by a railing or fence and there shall be a warning sign posted.
4. DO NOT attempt any maintenance or repairs of the conveyor until power has been LOCKED OUT AND TAGGED OUT.

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

6. DO NOT place hands, feet or any part of your body, in the conveyor.

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

8. DO NOT use conveyor for any other purpose other than that for which it was indented.

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

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

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

12. DO NOT attempt to clear a jammed conveyor until power has been LOCKED OUT AND TAGGED OUT.

13. DO NOT attempt field modification of conveyor or components.

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

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

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

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

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

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

The Conveyor Equipment Manufacturers Association (CEMA) has further safety information on their website or they can be contacted:

CEMA
6724 Lone Oak Blvd.
Naples, FL 34109
1-239-514-3441
www.cemanet.org

(This information is provided as a service to the industry in the interest of promoting safety. Users should consult qualified engineers and other safety professionals for additional guidance and processes. The manufacturer of this equipment makes no representations or warranties, either expressed or implied, and the users of this equipment and document assume full responsibility for the safe design, and operation of this equipment.)
CEMA SAFETY LABELS:

The CEMA safety labels shown below must be used on screw conveyors, drag conveyors and bucket elevators. Safety labels must be placed on inlets, discharges, troughs, covers, inspection door & drive guards. See CEMA Safety Label Placement Guidelines on CEMA Web Site: http://www.cemanet.org/safety/guidelines.html
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 OEM or Manufacturer for Replacement Labels.
SAFETY

REFERENCE – CEMA DOCUMENT SCOM-001

Equipment: Vertical Screw Conveyor

To be placed on removable guards to warn that operation of the machinery with guards removed would expose chains, belts, gears, shafts, pulleys, couplings, etc. which create hazards.

To be placed on inlets and discharges, troughs, covers, and inspection doors of screw conveyors to provide warning against exposed moving parts while in operation.
# Safety, Installation, Operation, and Maintenance

## SAFETY

### Screw Conveyor Safety

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
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<tbody>
<tr>
<td>Do Not Climb, Sit, Stand, or Walk on Conveyor at Any Time.</td>
<td></td>
</tr>
<tr>
<td>Do Not Perform Maintenance on Conveyor Until Electrical, Air, Hydraulic, and Gravity Energy Sources Have Been Locked Out and Blocked</td>
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</tr>
<tr>
<td>Operate Equipment Only With all Approved Covers and Guards in Place.</td>
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</tr>
<tr>
<td>LOCK OUT ALL Power and Block Gravity Loads Before Servicing.</td>
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</tr>
<tr>
<td>Ensure That All Personnel Are Clear Of Equipment Before Starting.</td>
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</tr>
<tr>
<td>Allow Only Authorized And Trained Personnel to Operate Conveyors and Accessories.</td>
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</tr>
<tr>
<td>Keep Clothing, Body Parts, and Hair Away from Conveyors.</td>
<td></td>
</tr>
<tr>
<td>Clean Up Spillage Near Moving Parts ONLY When Power is Locked Out AND Guards Are In Place.</td>
<td></td>
</tr>
<tr>
<td>Do Not Modify Conveyor Or Controls.</td>
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<tr>
<td>Ensure That All Controls are Visible and Accessible.</td>
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<tr>
<td>Operate Equipment Only With All Approved Covers, Guards, and Safety Labels in Place.</td>
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<tr>
<td>Report All Unsafe Conditions.</td>
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**POST IN PROMINENT AREA**
INSTALLATION

Screw Conveyor Components

Note: The above diagram is representative only. Consult contract drawings for specific items on each conveyor.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Screw</td>
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<tr>
<td>2</td>
<td>Screw with Bare Pipe at Discharge</td>
</tr>
<tr>
<td>3</td>
<td>Coupling Bolts</td>
</tr>
<tr>
<td>4</td>
<td>Coupling Shaft</td>
</tr>
<tr>
<td>5</td>
<td>Hanger with Bearing</td>
</tr>
<tr>
<td>6</td>
<td>Tail End Trough End</td>
</tr>
<tr>
<td>7</td>
<td>Trough End for Screw Conveyor Drive</td>
</tr>
<tr>
<td>8</td>
<td>Trough</td>
</tr>
<tr>
<td>9</td>
<td>Trough with Discharge Spout</td>
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<tr>
<td>10</td>
<td>Seal</td>
</tr>
<tr>
<td>11</td>
<td>Bearing</td>
</tr>
<tr>
<td>12</td>
<td>Tail Shaft</td>
</tr>
<tr>
<td>13</td>
<td>Flanged Cover</td>
</tr>
<tr>
<td>14</td>
<td>Flanged Cover with Inlet</td>
</tr>
<tr>
<td>15</td>
<td>Buttstrap</td>
</tr>
<tr>
<td>16</td>
<td>Screw Conveyor Drive Unit with Motor Mount, V-Belt Drive and Guard</td>
</tr>
</tbody>
</table>
2. INSTALLATION

SCREW CONVEYOR COMPONENTS:
RECEIVING:

1. Screw conveyors may be ordered as individual components with all the assembly operations performed in the field, or assembled completely by the manufacturer, with drawings and bill of materials.

2. Immediately, upon receipt, all items in the shipment should be checked against shipping papers for shortages and inspected for damage.

3. Items to be inspected include troughs, screws, and covers and drive units.

4. DO NOT attempt to install damaged components or assemblies.

LIFTING AND MOVING:

1. Extreme care must be taken to prevent damage when moving assembled conveyors or components.

2. Spreader bars with slings are the recommended support method for lifting.

3. Unsupported span should be no greater than 12 feet.

4. NEVER lift a conveyor with only one support point.

5. Usually heavy items such as drives or gates shall be considered when choosing support points because of load balance and their bending effect.

6. Shop assembled conveyors are typically match marked and shipped in the longest sections for practical shipment.
ASSEMBLY:

1. The mounting surface for supporting the conveyor must be level and true.

2. Screw conveyor troughs must be assembled straight and true with no distortion.

3. Place troughs in proper sequence with discharge spout properly located.

4. Connect the joints loosely. DO NOT TIGHTEN BOLTS.

5. Assemble each trough end to proper end of conveyor.

6. Attach piano wire full length of conveyor at centerline. Make sure piano wire is pulled tight. Refer to Figure 1 at the end of this section.

7. Tighten trough flange bolts keeping the trough assembly true to piano wire. Alignment must be checked in both horizontal and vertical directions. Maximum deviation in either direction at any point along the length of the conveyor is 1/8”. Torque bolts to proper torque rating per Bolt Torque Guide.

8. Anchor trough assembly to mounting surface. Make sure entire length of trough is straight and true. CEMA recommends supporting trough assemblies every 10-12 feet. Saddles and feet may be required.

9. Mount drive or thrust unit on correct trough ends. Drive or thrust units are normally located at discharge end of conveyor. Make sure drive or thrust unit is centered in seal and trough end openings. Torque bolts to proper torque rating per Bolt Torque Guide.

10. Place the first screw section in the trough starting at the drive or thrust end. Install screw so end lugs are opposite carrying side of flight.

11. Insert screw onto drive shaft and install coupling bolts. DO NOT TIGHTEN COUPLING BOLTS.

12. Insert coupling shaft into opposite end of screw and install coupling bolts. DO NOT TIGHTEN COUPLING BOLTS.
13. Pull screw section away from drive or thrust unit to seat thrust connection.


15. Raise hanger and screw section until hanger top bar is flush with top of trough. Make sure correct clearance exist between outside diameter of screw and inside of trough. Match mark and drill troughs to mount hanger assembly. Insert hanger assembly bolts and hand tighten.

16. Assemble screw sections, couplings and hangers until all are installed by repeating steps 10-15. Install screw sections so flighting is 180-degrees from end of frightening of previous screw section.

17. Center hanger bearings between screw sections. Torque hanger assembly bolts to proper torque rating per Bolt Torque Guide.

18. Assemble seal and bearing to opposite trough end. Make sure end shaft is centered in seal and trough end openings. Torque bolts to proper torque rating per Bolt Torque Guide.

19. Insert end shaft through and bearing and into last screw section and install coupling bolts. DO NOT TIGHTEN COUPLING BOLTS.

20. Rotate entire screw assembly to check alignment and adjust hanger assemblies as required.

21. Torque ALL coupling bolts to proper torque rating. Over tightening of coupling bolts could result in failure in tension. CEMA recommends tightening coupling bolts to 75-percent of the values given in the Bolt Torque Guide to eliminate over tightening of coupling bolts.

22. Adjust seals as required.

23. Remove all debris from conveyor.

24. Install conveyors in proper sequence starting at inlet end and attach with provided fasteners.
25. Lubricate drive and all bearings in accordance with manufacturer’s instructions. DRIVES GENERALLY SHIPPED WITHOUT OIL.

{Manufacturer remarks that a good quality, 90 weight gear oil is required. Do not purchase inexpensive oil but at auto parts store get top quality. ** DO NOT switch between Synthetic oil and back to regular, non-synthetic oil. Whatever type you first put in will need to be used all the time.}

26. MAKE SURE ALL CEME SAFETY LABELS ARE IN PROPER LOCATIONS.
BEFORE INITIAL START-UP:

1. **LOCKOUT/TAG OUT ALL POWER AND ENERGY**

2. Lubricate all bearings in accordance with manufacturer's instructions.

3. Lubricate all gear reducers in accordance with manufacturer's instructions. Gear reducers are normally shipped without lubrication.

4. Check conveyor to ensure all tools and foreign materials have been removed.

5. Turn drive unit by hand to check for alignment and obstructions.

6. Check conveyor to ensure all covers, guards and safety devices are installed and operating properly.

7. Attach gates to inlet and discharge chutes, where applicable.

INITIAL START-UP (WITHOUT MATERIAL):

1. Re-energize power to conveyor.

2. Start conveyor momentarily to check for proper conveyor rotation. If conveyor rotation is NOT correct, quickly shut down and have qualified electrician change wiring.

3. Operate conveyor without material for several hours as a break in period. Observe for excessive bearing temperature, unusual noise or drive misalignment. If these conditions occur refer to Troubleshooting section of this document.

4. Stop the conveyor and **LOCKOUT/TAG OUT ALL POWER AND ENERGY**.

5. Remove covers and check tightness of coupling bolts. Torque bolts to proper torque rating. Over tightening of coupling bolts could result in failure in tension. GEMA recommends tightening coupling bolts to 75-percent of the values given in the Bolt Torque Guide to eliminate over tightening of coupling bolts. Replace covers.
6. Check all assembly and mounting bolts. Torque bolts to proper torque rating.

7. Check conveyor discharge. Discharge must be clear to ensure that material flow out of the conveyor will not be impeded.

**INITIAL STAR-UP (WITH MATERIAL):**

1. Re-energize power to conveyor.

2. Start conveyor and operate without material for several minutes.

3. Feed material gradually until design capacity is reached.

4. **DO NOT EXCEED CONVEYOR SPEED, CAPACITY AND MATERIAL DENSITY.**

5. Start and stop conveyor several times. Operate conveyor for several hours with material.

6. Check motor amperage when conveying at design capacity and compare to full load amperage of motor. Problems may exist if amperage is excessive. Check voltage to ensure that it is within normal operating limits.

7. Stop the conveyor and **LOCKOUT/TAG OUT ALL POWER AND ENERGY.**

8. Remove covers and check tightness of coupling bolts. Torque bolts to proper torque rating. Over tightening of coupling bolts could result in failure in tension. CEMA recommends tightening coupling bolts to 75-percent of the values given in the Bolt Torque Guide to eliminate over tightening of coupling bolts.

9. Check hanger bearings and realign if necessary.

10. Replace covers.

11. Check all assembly and mounting bolts. Torque bolts to proper torque rating per Bolt Torque Guide.
3. MAINTENANCE CHECK LIST

OBJECTIVE:
The purpose of the maintenance checklist is to prolong the life of the equipment by providing the owner or end user a list of common components requiring maintenance on a screw conveyor. Additional component maintenance may be required based on individual equipment designs. Regular inspections are recommended to help prolong equipment life. The owner or end user is responsible for determining the frequency of inspections, and for using a qualified person for performing inspections.

LOCKOUT/ TAG OUT ALL POWER BEFORE INSPECTION OF EQUIPMENT

- Bearings: Check for proper lubrication. Lubricate all bearings in accordance with manufacturer’s instructions. Check hanger bearings for proper alignment and excessive wear. Replace hanger bearings when wear exceeds 1/8 inch. For more information please contact OEM for further information from manufacturer.

- Gear Reducers: Check for proper lubrication. Lubricate all gear reducers in accordance with manufacturer’s instructions. For more information please contact OEM for further information from manufacturer.

- Drive: Check for wear on belts and proper tension. Check for lubrication on chains and proper tension. Replace belts or chains as necessary. For more information please contact OEM for further information from manufacturer.

- Screws: Check for damage, excessive wear and material buildup. Replace screw section as necessary.

- Troughs: Check for damage, excessive wear and material buildup. Check trough alignment using piano wire as described in Assembly section of this document. Replace trough sections as necessary.

- Liners: Check for excessive wear. Replace liners when wear exceeds 1/8 inch. For more information please contact OEM for further information from manufacturer.

- Shafts: Check for bolt hole elongation of wear. Check for run-out. Replace shafts when wear exceeds 1/8 inch.
Seals: Check for leakage. Adjust seal or replace packing as necessary. For more information please contact OEM for further information from manufacturer.

Coupling Bolts: Check for wear. Replace worn coupling bolts as necessary. It is recommended to replace coupling bolts and lock nuts when replacing screw sections. Torque ALL coupling bolts to proper torque rating. Over tightening of coupling bolts could result in failure in tension. CEMA recommends tightening coupling bolts to 75-percent of the values given in the Bolt Torque Guide to eliminate over tightening of coupling bolts.

Assembly Bolts: Check for tightness. Torque ALL assembly bolts to proper torque rating per Bolt Torque Guide.

Guards: Check for clearance and bolt tightness. Check oil level on oil-tight guards.

REPLACING SCREW CONVEYOR COMPONENTS:

1. LOCKOUT / TAG OUT ALL POWER AND ENERGY.

2. Removal of a screw section must proceed from the end opposite the drive or thrust unit.

3. Remove trough end, screw sections, coupling shafts and hangers until the damaged screw section is reached and replaced.

4. Re-assemble conveyor components in accordance with the Assembly Section of this document.

NOTE: QUICK DISCONNECT SCREWS CAN BE REMOVED AT INTERMEDIATE LOCATIONS WITHOUT FIRST REMOVING ADJACENT SECTIONS.
EMERGENCY SHUTDOWN:

An emergency shutdown may be necessary to clear obstructions or to replace damaged or worn components.

1. **LOCKOUT/ TAG OUT ALL POWER AND ENERGY**
2. Remove all covers.
3. Remove all obstructions and product from conveyor.
4. Inspect all obstructions for damage or wear. Check conveyor components in accordance with the Maintenance Section of this document.
5. Replace all damaged or worn components. Replace conveyor components in accordance with the Assembly Section of this document.
6. Turn drive unit by hand to check for alignment and obstructions.
7. Replace all covers and guards.
8. Replace conveyor in accordance with the Operation Section of this document.

EXTENDED SHUTDOWN:

1. An extended shutdown may be necessary if the conveyor is not in operation for a long period of time.
2. **LOCKOUT / TAG OUT ALL POWER AND ENERGY.**
3. Remove all covers.
4. Remove all obstructions and product from the conveyor.
5. Inspect all components for damage or wear. Check conveyor components in accordance with the Maintenance Section of this document.
6. Replace all damaged or worn components. Replace conveyor components in accordance with the Assembly Section of this document.

7. Lubricate drive and all bearings in accordance with manufacturer’s instructions.

8. Coat all exposed metal surfaces with rust preventative.

9. Rotate screws by hand every week. Screws may sag and permanently deform if not rotated.

---

**NOTE:** WHEN OPERATION IS TO RESUME, RESTART CONVEYOR IN ACCORDANCE WITH THE OPERATION SECTION OF THIS DOCUMENT.

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**STORAGE:**

1. Protect conveyor from weather, moisture and extreme temperatures. DO NOT use coverings that promote condensation.

2. Coat all exposed metal surfaces with rust preventative.

3. Rotate screws by hand every week. Screws may sag and permanently deform if not rotated.

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**NOTE:** WHEN OPERATION IS TO RESUME, RESTART CONVEYOR IN ACCORDANCE WITH THE OPERATION SECTION OF THIS DOCUMENT.
# Troubleshooting Guide

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RPM too high or Trough Loading too High</td>
<td>Reduce Speed. Consult CEMA Document to Determine Recommended Speed and Trough Loading.</td>
</tr>
<tr>
<td>2. Hanger Bearing Failure</td>
<td>Incorrect Alignment</td>
<td>Realign Trough Assembly and Hangers in Accordance with Assembly Section of this Document</td>
</tr>
<tr>
<td></td>
<td>Improper Speed and Trough Loading</td>
<td>Consult CEMA Document to Determine Recommended Speed and Trough Loading.</td>
</tr>
<tr>
<td></td>
<td>Improper Hanger Bearing Material</td>
<td>Consult CEMA Document to Determine Recommended Bearing Material.</td>
</tr>
<tr>
<td></td>
<td>Excessive Bearing Wear</td>
<td>Replace Hanger Bearing.</td>
</tr>
<tr>
<td></td>
<td>Screw Deflection</td>
<td>Consult CEMA Document to Determine Proper Pipe Size and Screw Length.</td>
</tr>
<tr>
<td></td>
<td>Bent Screw</td>
<td>Straighten or Replace Screw.</td>
</tr>
</tbody>
</table>
## Troubleshooting Guide

### Page 2

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Shaft Hole Elongation</td>
<td>Insufficient Number of Coupling Bolts</td>
<td>Increase number of Coupling Bolts</td>
</tr>
<tr>
<td></td>
<td>Conveyor Subject to Frequent Stop/Start</td>
<td>Cease Frequent Stop/Start. Increase Bearing Capacity of Shaft and/or Increase Number of Coupling Bolts.</td>
</tr>
<tr>
<td></td>
<td>Frequent Overloads</td>
<td></td>
</tr>
<tr>
<td>5. Drive Shaft Breakage</td>
<td>Excessive Torque</td>
<td>Consult CEMA Document Proper Torque Rating</td>
</tr>
<tr>
<td>6. Motor Overload</td>
<td>Motor Undersized</td>
<td>Consult CEMA Document to Determine Proper Horsepower Requirements</td>
</tr>
<tr>
<td></td>
<td>Upset Loading Condition</td>
<td>Empty Trough, Control Feed and Operate Under Design Specifications.</td>
</tr>
<tr>
<td>7. Trough End Bearing Failure</td>
<td>Bearing Contamination</td>
<td>Upgrade or Replace Seal. Change to Outboard Bearing.</td>
</tr>
<tr>
<td></td>
<td>Insufficient Lubrication</td>
<td>Lubricate in Accordance with Maintenance Section of this Document.</td>
</tr>
<tr>
<td></td>
<td>Improper Shaft Runout</td>
<td>Check Screw Straightness and Replace as Necessary</td>
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</tbody>
</table>
**TOUBLESHOOTING GUIDE**

**Page 3**

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>CAUSE</th>
<th>REMEDY</th>
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<td>Breakage</td>
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<td>Realign Trough Assembly and Hangers in Accordance with Assembly Section of this Document</td>
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<tr>
<td></td>
<td>Alignment</td>
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<tr>
<td></td>
<td>Excessive Shaft Wear</td>
<td>Replace Coupling Shaft</td>
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**BOLT TORQUE GUIDE – GENERAL BOLT TIGHTENING TORQUE (Ft. Lbs.)**

<table>
<thead>
<tr>
<th>Bolt Dia. Inches</th>
<th>Threads/Inch (UNC)</th>
<th>SAE 2</th>
<th>SAE 5</th>
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