



## Preventative Maintenance

**We often get asked how long our equipment will last.**

**The answer: it depends.**

We've seen first-hand how proper preventative maintenance procedure impacts the lifespan of the equipment. We sold similar equipment to two separate operations - 20 miles apart from each other.

One operation with a preventative maintenance program got 11 years out of the consumable components. The other walked away when issues needed to be addressed and only got 3 years.

**Preventative maintenance will help you get more out of your equipment.**

The following are tips for properly caring for CDM equipment, including:



Proper chain tension



Sprocket wear and tear/bearings



Return rail and housing wear and tear



Chain replacement

This is not a comprehensive list of all necessary preventative maintenance measures. These are common actions that can help extend your equipment's life. Because CDM equipment is custom-built, each application will be slightly different, so this is general preventative maintenance guidance.



# CHAIN TENSION

## **Proper chain tension is the most important thing to address for maximizing CDM equipment's life cycle.**

When initially installed, the equipment will have a break-in period as the chain polishes / cleans out the bores, and the chain finds the pitch on sprockets. This break-in period will require monitoring chain tension frequently the first several weeks. Intervals between tensioning the chain will gradually increase: You'll check it weekly, then monthly, before it doesn't become an issue for some time.

When you wear through the case hardness, you'll see those intervals happen more frequently: you will tension it every 6 months, to every 3 months, to once a month. Tracking your maintenance along the way helps quantify how long the chain will last and when you need to start planning for replacement.

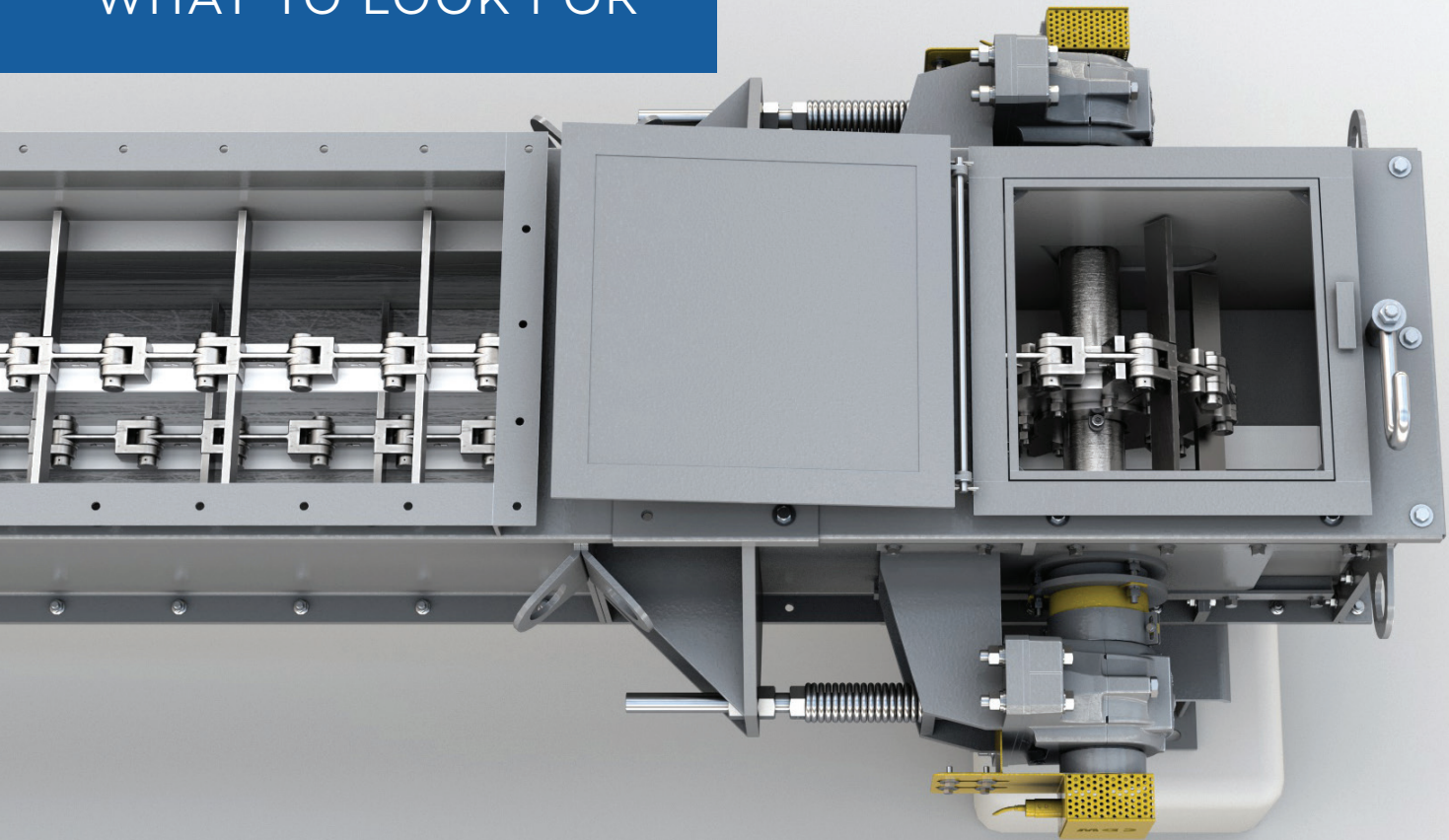
**TIP: When you must tension the chain more frequently, you are wearing through the chain's effective case depth and it's time to plan for an order around the next outage.**

But how do you know if the chain needs to be tensioned?



# CHAIN TENSION

## WHAT TO LOOK FOR



### **The first signal is most likely going to be a visual cue.**

Monitoring the chain through the drive station inspection door is the most efficient way to see if the chain needs tensioning.

Another signal is most likely going to be an audio cue.

Walk alongside the equipment, listening for clunks or bangs or any other unusual sounds – also checking the lubrication of the bearings. This doesn't require a lot of manhours or a high consumption of resources. It's about getting in the

habit of walking by the equipment and listening for anything atypical.

If something sounds off, make a visual inspection inside the equipment. Don't ignore these cues.

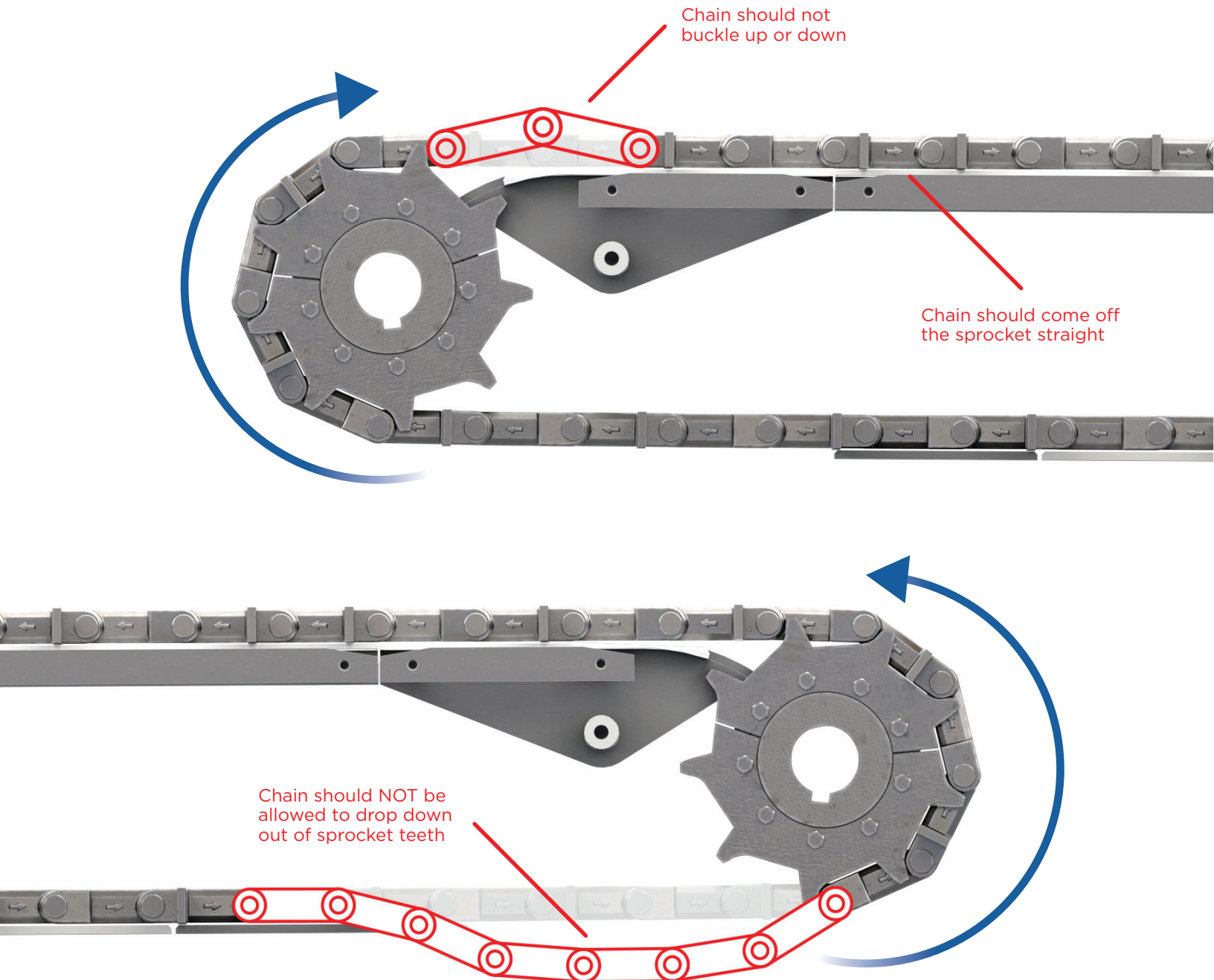
### **Minutes Now Prevents Hours Later**

Preventative maintenance inspections take minutes in most cases and can drastically improve the longevity of the equipment's reliability and maximize the lifecycle of consumable components. Minutes now can prevent hours of unplanned downtime later.

# CHAIN TENSION VISUAL CUES

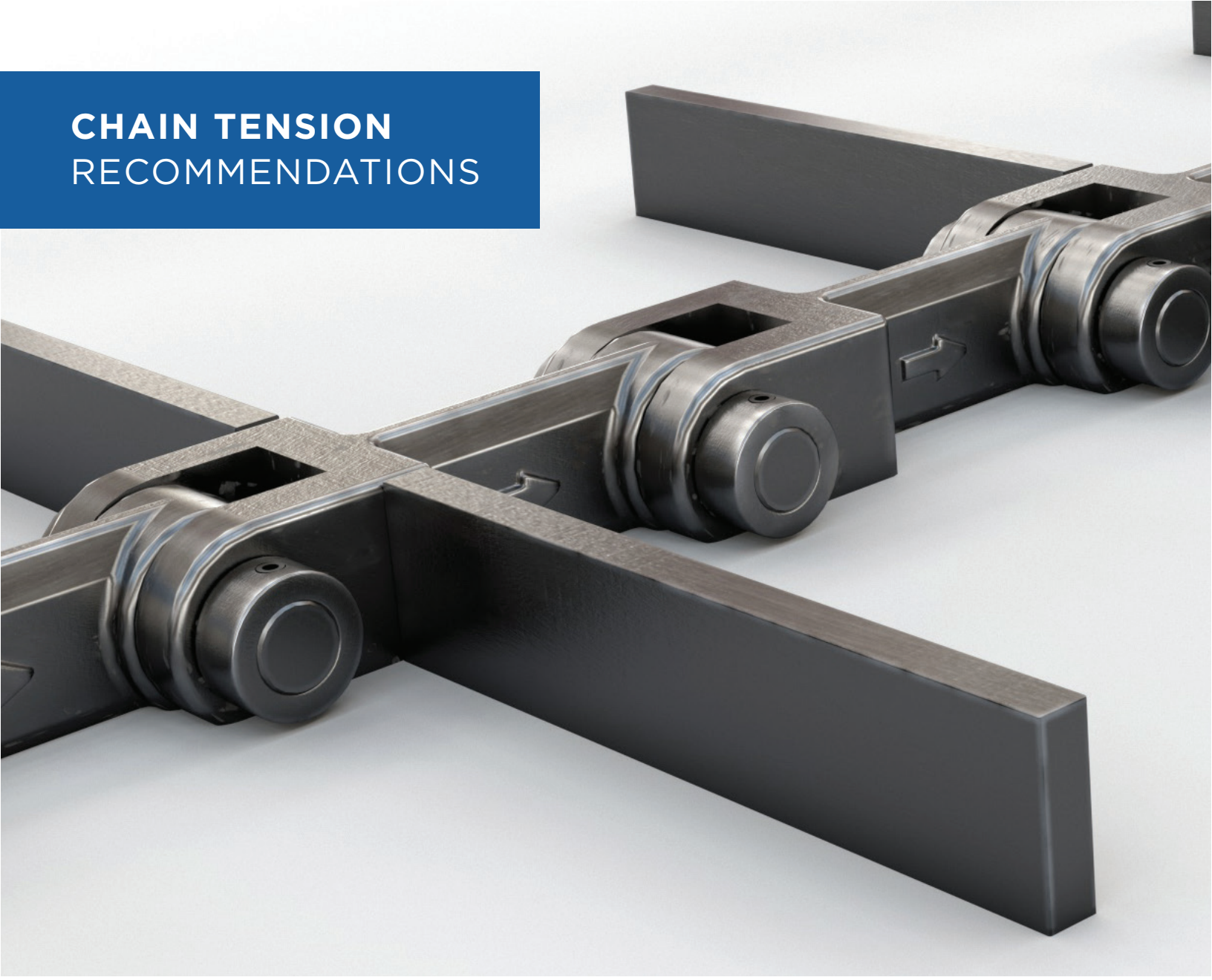
For visual inspection, open the cover on the drive end  
- as the chain comes around the head sprocket, all the  
slack will likely show on the return side of the drive end.

Here are some common visual cues that chain tension should be addressed:





## CHAIN TENSION RECOMMENDATIONS



CDM understands our equipment is a piece in a larger environment. We don't expect you to walk around with tools and address issues immediately. However, it's important to make a note that an action needs to be made when you can set aside 10 minutes to tension the chain.

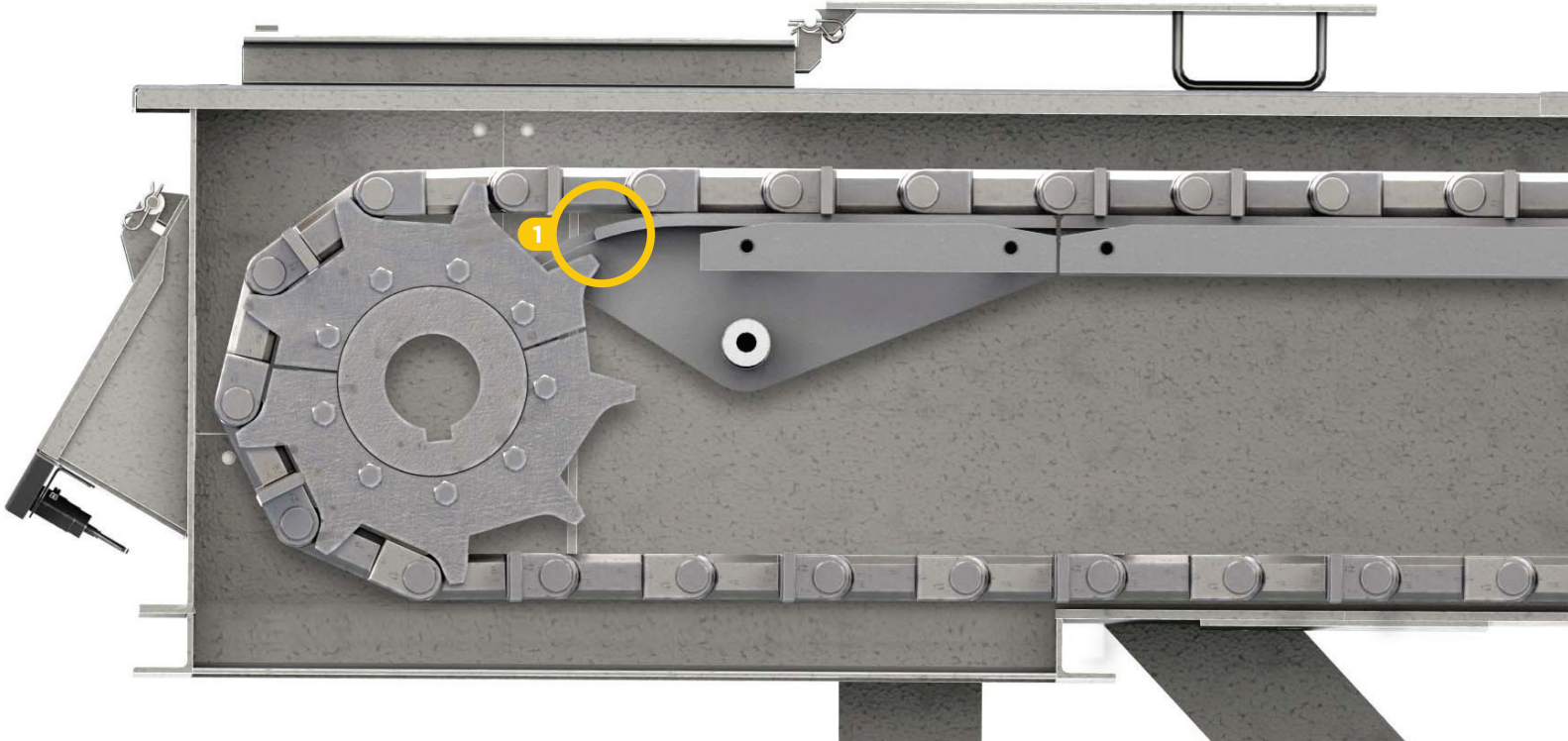
**TIP: There's no formula for the right chain tension. CDM defaults to running at a higher tension, because if you run it looser on the sprocket, it's more subject to shock loading, return rail damages, etc. – which could lead to a catastrophic failure.**

# CHAIN TENSION RETURN RAILS

Our return rails are intended to serve two purposes: The first is to aide in pulling the chain out of the sprocket root because chain, by nature, wants to stay on the sprocket. The rail also acts as the “sprocket cleaner,” (Fig. 1) clearing out any debris that is captured between the tooth plates and hub.

**TIP: Keep a close eye on that piece. It will be the first victim of improper chain tensioning.**

We made that rail part short and replaceable on purpose because a chain isn't tensioned, that's the first place it's going to show. That part becomes sacrificial. We made it relatively small and painless to replace, compared to replacing a 10-foot rail.



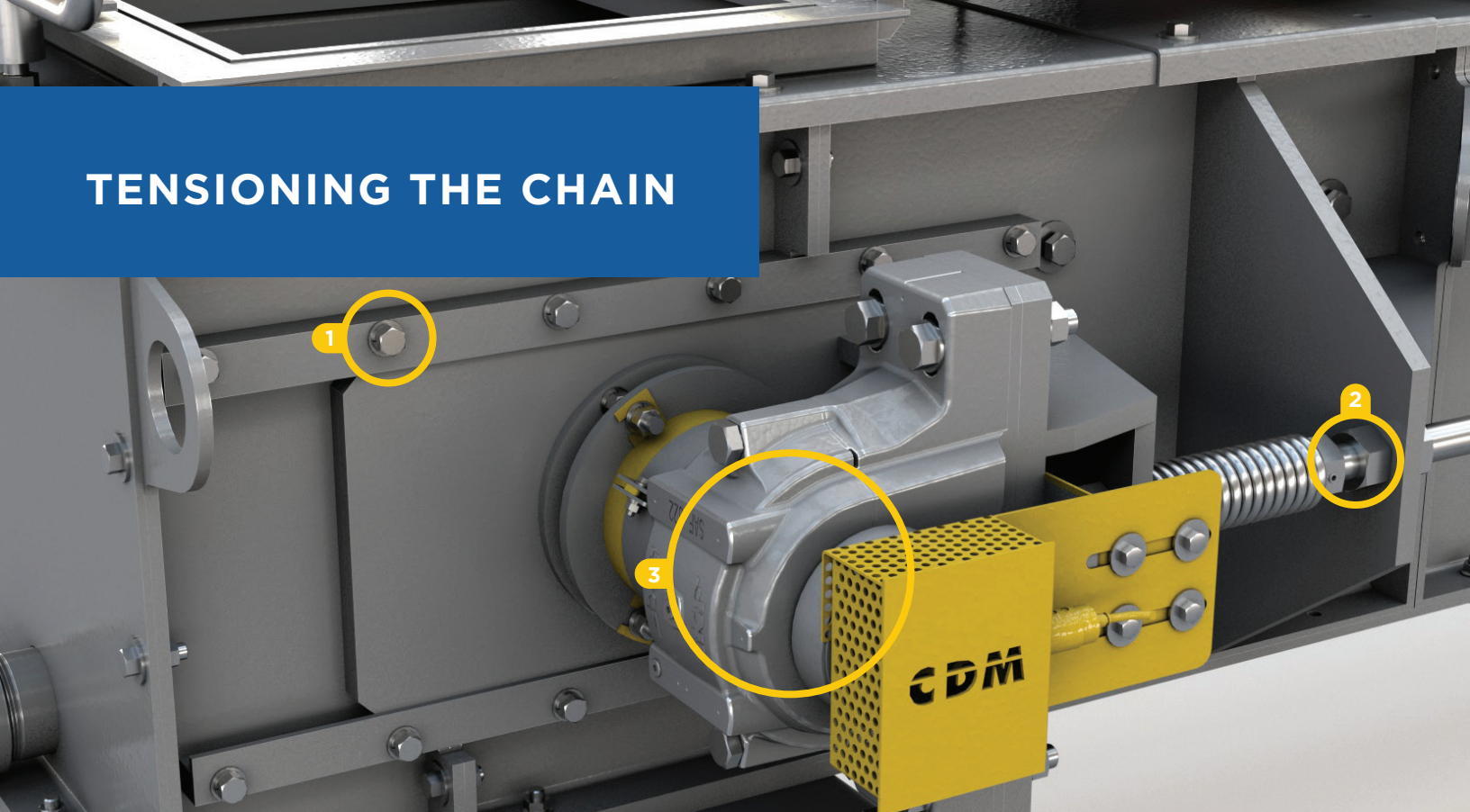
## Checking the Chain's Condition

After the equipment is first installed and the chain is tensioned and you've exhausted the chain take up length, you'll need to remove a link or possibly two. You will do this several times throughout the life of the chain.

When you go to remove a link, that's a great time to check the condition of the chain – the chain pins, the wear around the chain bolts and quantifying any differences.



# TENSIONING THE CHAIN



Chain tensioning can and should be done while the conveyor is operating and under load. It's the most realistic operating environment. You do not have to shut down to tension the chain.

**TIP: You observe on the drive end, but you tension on the opposite end in most cases.**

To tension the chain, loosen the bolts (Fig. 1) on the plate assembly then tighten or loosen the nuts (Fig. 2) to either extend or retract the take-up.

When you put your hand on the bearing (Fig. 3), you should feel the cordial action – the vibrating “peaks and valleys.” When it's properly tensioned, you'll feel it hit the high and low points in the springs.

**IMPORTANT:** When tensioning, limit rotation of the tensioning nuts to 1-3 revolutions per rod before moving to the opposite side and repeating. Keeping the tail shaft square in the housing is critical.

When tensioning of the chain is at the desired point, ensure take-up location is equal on both sides of the conveyor – so the shaft is square – and lock the take-up in position with the jam nut on the back side of the adjustment plate. Operating the conveyor without the shaft being square can lead to significant operational issues, as well as damage to the equipment and components.

The process is the same for loosening the chain, just using the opposite nut.

# CHAIN TENSION

## WHY IT'S IMPORTANT

There are more benefits from proper chain tension than extending the life of the equipment. The consequences of the chain getting so worn that it can't uphold its own strength is the risk of a failure that puts you out for days or weeks – opposed to the 15 minutes of preventative maintenance every few weeks.

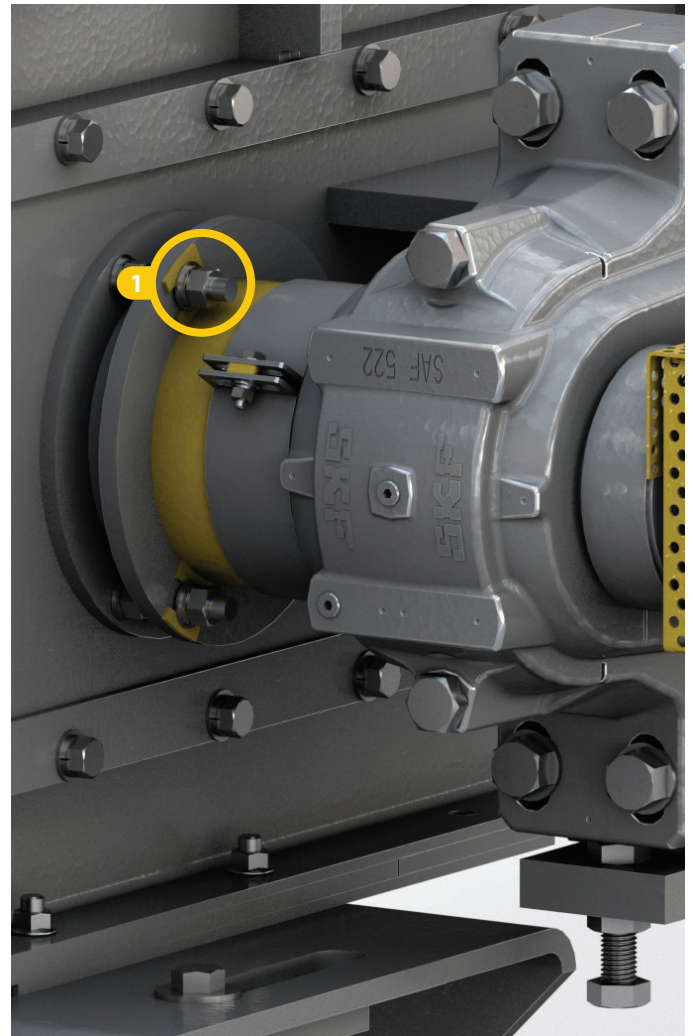


### Do Not Overtighten Packing Glands

While we preach to keep chain tension tight, people tend to overtighten these packing glands (Fig. 1). Tighten the packing enough to seal the shaft – that's it. If you put too much pressure on the packing, it can result in negative operating conditions: stalling the tail shaft and or forcing the chain to ride improperly on the tail sprocket / idler, false zero speed trips and increased sprocket and chain wear. The results are higher horsepower consumption, more load to the chain and an increase in slack.

**TIP: These packing glands should only be tight enough to prevent leakage.**

For example, if the chain isn't properly tensioned and it starts to pull out of the root of the sprocket, the rail takes punishment that could lead to failure. The conveyor also won't run as efficiently if the chain is too loose or too tight.





# SPROCKET WEAR

Keep an eye on the condition of the sprockets and ensure the bearings are properly lubricated.

Sprocket tooth wear will be visible when you open the inspection door – you'll see cupping or wear on the sprocket tooth plates (Fig. 1). We make the sprocket teeth softer than the chain on purpose because it's more economical and easier to replace – since the teeth are segmental, you don't need to pull the shaft to replace the sprockets.

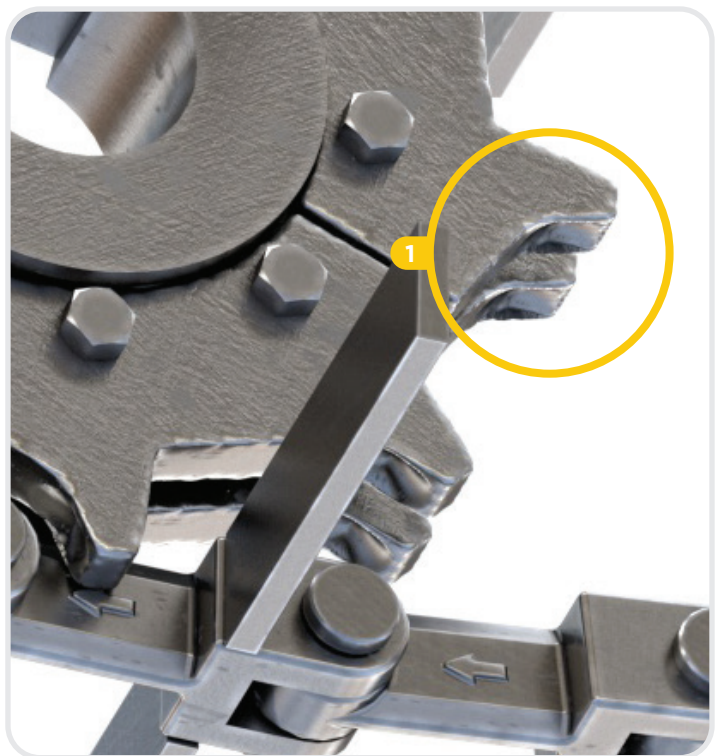
Typically, you'll go through 1-2 sets of sprocket teeth per chain.

**Tip: If you're putting in a new chain, put in new sprockets.**

If the chain is new but the sprockets are worn, the effective pitch between the two will differ. A new chain on old sprockets could lead to issues, so replace the sprockets at the same time as the chain.



No tooth wear



Tooth wear

## RETURN RAIL

### WHAT TO LOOK FOR



Remember to check the return rail, which the chain rides on when functioning properly. CDM builds its conveyors so inspecting the return rail is simple.

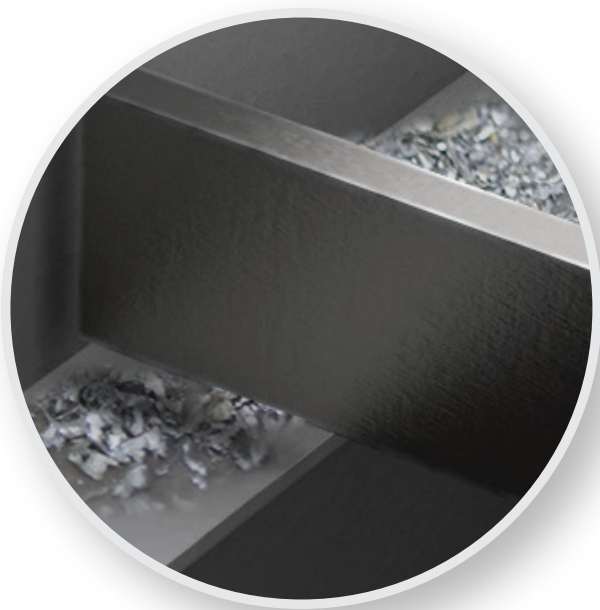
This is what the return rail (Fig. 1) should look like – notice how the clearance in-between the flights allows fines or dust from product to build up along the sides. This is normal.



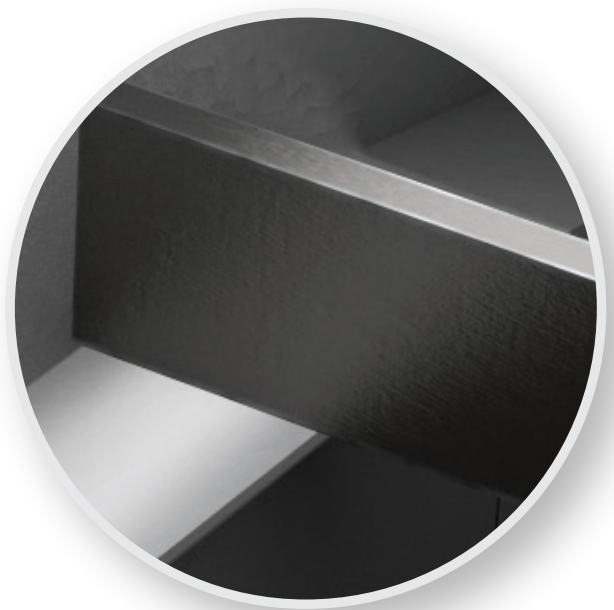
## RETURN RAIL WHAT TO LOOK FOR



Notice in this example, the flights are now dragging on the side rails (Fig. 1) - removing all the product build-up and leaving a more polished look. This is because the return rail is starting to exhaust its effective life, lowering the chain and causing the flights to drag on the side rails.

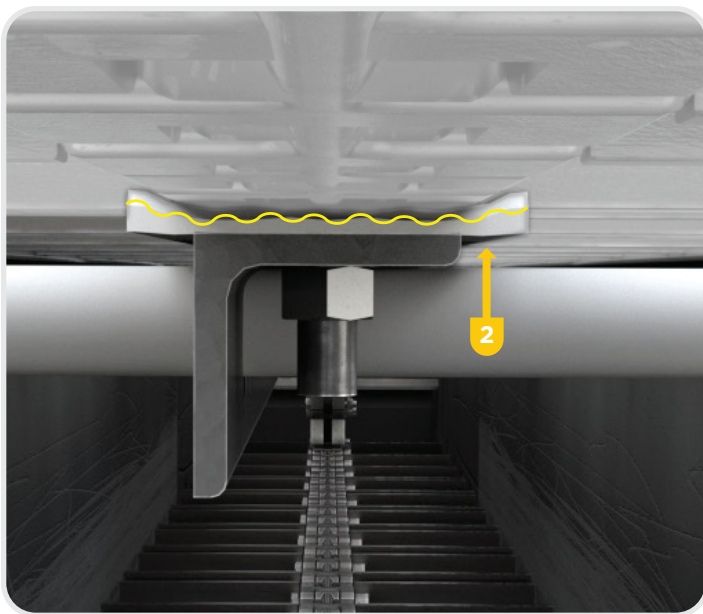


Product build up on side rail



Polished side rail clear of debris.

## CENTER RETURN RAIL WHY IT'S IMPORTANT



Over time, the return rail is going to slowly degrade (Fig. 1 & 2) and if the chain wears through the return rail, it can lead to chain catching or interferences, damage and unplanned downtime.

When that happens, things can go sideways quick. Utilize the convenient inspection doors along the equipment to keep an eye on the side rails.

**TIP: When you see the side rails are polishing, that's a good time to put a replacement order on the next schedule.**



## HOUSING WEAR & TEAR



Housing wear



No housing wear

Sidewall wear typically shows in the lower conveying chamber and is more prevalent between the bottom plate and effective operating product bed depth. This is fairly easy to monitor during a down day or outage when the conveyor is empty and should be checked.

Bottom plates are also relatively easy to monitor during an outage or down day. Wear will be concentrated to the center of the conveyor – where the chain rides. As the link is hardened,

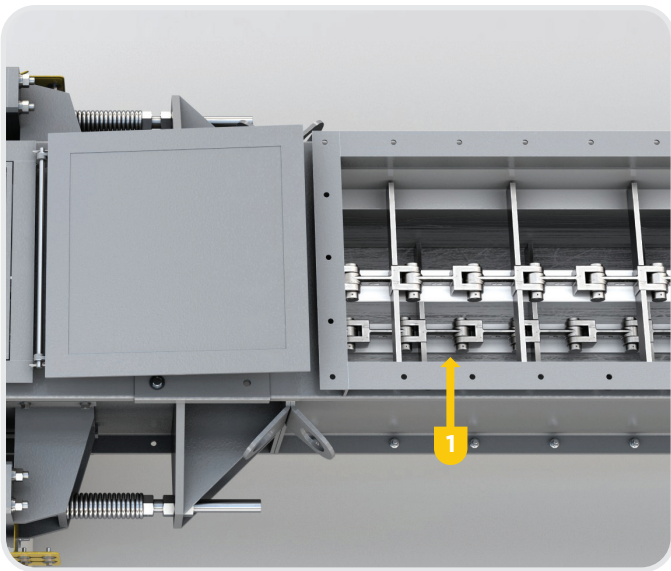
over time the wear on the bottom will show in a similar manner to the wear on the return rail. If the chain is riding full width on the bottom plate (not on an elevated wear rail) the flights will also wear the bottom over time.

Gauging the wear between the flight clearance and the bolted flanged connection on the sidewall and bottom is the best way to inspect bottom plate wear.

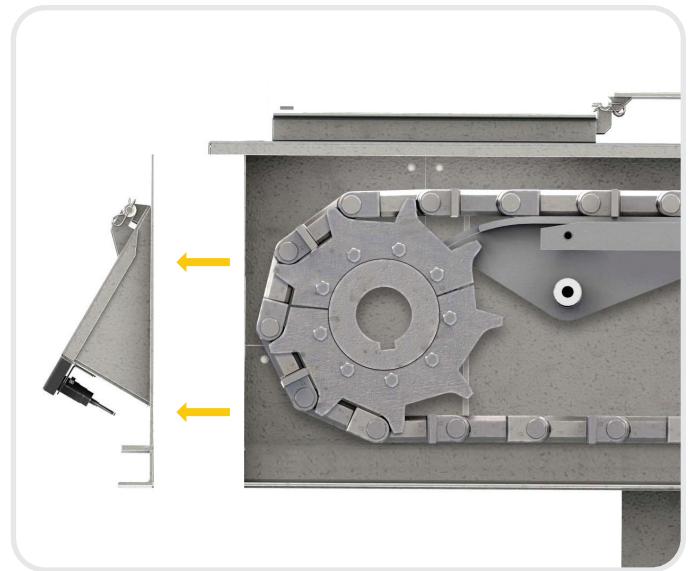
# CHAIN REPLACEMENT

For the most part, chain replacement is relatively painless – depending on your access to the equipment. There are a lot of different ways that an operation could replace the chain, but environmental characteristics specific to your operation play a factor.

A few ways we have seen people replace the chain:



They pull off the top cover (Fig 1.) and connect new strands with the old chain, jog it, put in the next section and then repeat the process. This can be somewhat risky because it's operating open equipment, but it's a way some replace the chain.



They pull off the end plate on the tail end, connect the new strand to the old and pull the new chain in that way. Once it's gone all the way around, they'll make their final connection.

In the end, your best bet is to simply reach out to CDM for some guidance on the most appropriate way to replace your chain. We can analyze your profile and provide our expertise on the best method for your operation when the day finally comes that your chain needs to be replaced.

**Give Us a Call: (763) 428-9700**



# PREVENTIVE MAINTENANCE CHECK SHEET

PM CHECK SHEET		
CORP		
ACTIVITY		
LEGACY PM		
PM DESCRIPTION	MECH. PM FOR DRAG - 30-60-120 DAY	
EQUIPMENT NO:		
TASK DETAILS	RESPONSIBILITY	TRADE
		IND MECH
LOCKOUT		
SPECIAL TOOLS AND REMINDERS		

CHECK SHEET DESCRIPTION	COMMENTS	
DRIVE STATION CHECKLIST		
1. INSPECT AND TIGHTEN BASE BOLTS ON DRIVE, MOTOR BASE, GUARDS, BEARINGS AND TAKE-UP. REPLACE FASTENERS IF NEEDED.		
2. INSPECT HEAD AND TAKE-UP BEARINGS WITH BAR AND INDICATE BEARING WEAR OR DAMAGE AND LUBRICANT CONDITION.	READINGS	
	HEAD-Right	Left
	TAIL-Right	Right
3. INSPECT REDUCERS FOR THE FOLLOWING: <ul style="list-style-type: none"> <li>Oil level – top up as required</li> <li>Oil leaks – report location</li> <li>Air vent – clear any obstruction</li> <li>Unusual vibration, noise or overheating</li> <li>Input and output shaft axial clearance</li> </ul>		
4. INSPECT SHEAVES FOR ALIGNMENT AND GROOVE WEAR. <ul style="list-style-type: none"> <li>Inspect belts for tension cracks, wear</li> <li>If burnt or missing, adjust or replace</li> </ul>		

CHECK SHEET DESCRIPTION	COMMENTS
<b>DRIVE STATION CHECKLIST</b>	
5. INSPECT DRIVE SPROCKET FOR WEAR AND PROPER CHAIN ENGAGEMENT.	
6. CHECK CHAIN TENSION WHILE OPERATING THROUGH DRIVE INSPECTION DOOR. ENSURE CHAIN IS NOT IMPACTING SPROCKET CLEANER.	
<b>TAIL SECTION</b>	
7. INSPECT CHAIN TAKE-UP / TENSIONING TO ENSURE THAT TAKE-UP CAN TRAVEL FREELY (NOT SEIZED OR RUSTED INTO POSITION). INSPECT TAKE-UP SPRINGS (BELLEVILLE OR RUBBER) TO ENSURE SPRINGS ARE NOT FLAT, SPENT OR DAMAGED. ENSURE RUBBER SPRINGS ARE NOT CRACKED, CUT OR DAMAGED. REPLACE AS REQUIRED - BUT ENSURE THAT NEW SPRINGS ARE INSTALLED ON BOTH SIDES OF TAKE-UP.	
8. INSPECT TAKE-UP SPROCKET FOR WEAR AND PROPER CHAIN ENGAGEMENT.	
<b>TROUGH / OPERATING INSPECTION</b>	
9. RUNNING INSPECTION FOR LOOSE OR MISSING FLIGHTS, BOLTS, BENT OR BROKEN ATTACHMENTS AND FLIGHTS, CRACKED CHAIN LINK AND CHAIN TENSION. REPAIR AS REQUIRED. IF FLIGHT IS CAUSING INTERFERENCE COLD FORM BACK TO AS CLOSE TO STRAIGHT AS POSSIBLE OR REMOVE ENTIRELY. DO NOT USE HEAT TO FORM/REPAIR FLIGHTS.	DRIVE =  MIDDLE =  TAIL =
10. INSPECT HEAD AND TAIL CHAIN SPROCKETS FOR WEAR AND ALIGNMENT.	
11. INSPECT DRIVE CHAIN FOR LOOSENESS, WEAR, ALIGNMENT. REPAIR/ TENSION AS REQUIRED. BEST TENSIONED DURING OPERATION. CHAIN SHOULD EXIT DRIVE SPROCKET HORIZONTALLY. CHAIN SHOULD NOT IMPACT SPROCKET CLEANER RADIUS. SHOULD BE SLIDING FREELY	
12. CLEAN AROUND HEAD SHAFT AND TAIL SHAFT SPROCKETS, BEARINGS AND PEDESTALS.	
13. INSPECT CHAIN GUIDES AND RECORD THICKNESS MEASUREMENT.  Visually inspect the conveyor sidewalls at inspection doors to see if there is excessive wear. Wear will show if the chain flight is sliding against the conveyor sidewall. As long as there is no significant wear, it is not a problem. If wear is occurring, check that sprockets are centered at drive and tail end. Check conveyor alignment, and shim as required. If shimming does not correct, flights may need to be trimmed.	
14. INSPECT FEED AND DISCHARGE CHUTES, INSPECTION DOORS AND BOTTOM WEAR PLATES. REPORT WEAR OR OTHER DAMAGE.	