Achieving The Lowest Life Cycle Cost

For Your

Wood Processing Conveyor Chains

By Baden Prentice

What are you up against?

• Poor conveyor design or low grade components.
• Insufficient labour to get the job done ie. Shutdown not long enough.
• Shrinking maintenance budget.

What does this mean in today’s mill environment?

• The cheapest purchase price?
• The highest quality product?
• Running the product until repetitive failures demand replacement?

By striving to Achieve The Lowest Life Cycle Cost, we are working towards making your investment last as long as possible in its application, with as little or no associated downtime.
Achieving The Lowest Life Cycle Cost

Specifying
- Avoid the “Buy it on capital, fix it on maintenance” scenario.
- Get involved in the design down to the component level.
- Avoid OEM competition dropping the standard.
- Talk to your suppliers as they see many good & bad installations in their travels.

Procuring
- Good forward planning will ensure the parts are available for the best price.
- Ensure that you have the right quality of components for the application.
- Beware of decaying performance due to increased duty. Upgrade if necessary.

Maintaining
- Correct installment.
- PM checks at regular intervals.
- Plan for replacement of consumable components before failure.

Correctly Matching Components

A conveyor system must be a successful marriage.
(or the divorce could soon follow, sometimes sooner than you would believe!)

Marriage Partners:
1. Chain
2. Attachments
3. Sprockets
4. Wear strip

We suggest the help of a good Guidance Counselor!
Correctly Matching Components

Mill Chain Survey Program

Key Points

- Static survey.
- Valuable reference tool.
- Gives an overall impression of the state of the system.
- Can be used as an aid to planned component replacement.
- Recommendations are based around best practice.
Tensile & Shear Failures

Fatigue Failures
- New chain on old sprockets
- Incorrect sprocket design.
- Incorrect attachment design.
- Catch points
- Endurance limit being exceeded.
Galling is defined as:
Developing a condition on the live bearing surface of a pin, bushing or side bar of a chain where excessive friction between high spots results in localised welding, with subsequent tearing and a further roughening of the contact surfaces.

Chains operated under excessive speed or loading can experience objectionable galling regardless of how much lubrication is applied.

Generally manifests itself between the rivet and barrel or between the side bar and the wear strip. When it occurs between the side bar and the wear strip it is quite commonly misdiagnosed as abrasive wear.

No galling in this abrasive environment.
Common Failure Modes

Plastic Deformation

Corrosion

What about Erosion?

Chain Attachments

Direction of travel

Supply Services Ltd
Sprockets

Materials Available

Mild Steel
• Low hardness, low duty (≤220BHN).

Manganese Steel
• Skin work hardens to 550BHN while retaining a ductile core.

Q&T Steel (Bisalloy or T1-X)
• Moderate hardness (360-440BHN).
• Difficult to machine grades harder than 400BHN.

Induction Hardened C1045
• Very hard, consistent, 6mm deep case (550BHN).
• Not readily available in NZ.

Segmented log deck sprocket allows teeth replacement by one man.
**How does the amount of teeth affect chain life?**

<table>
<thead>
<tr>
<th>No. Of Sprocket Teeth</th>
<th>Joint Articulation (degrees)</th>
<th>% Reduction From 9 Tooth</th>
<th>% Reduction From 6 Tooth</th>
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<tbody>
<tr>
<td>6</td>
<td>60.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>51.4</td>
<td>16.7%</td>
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<td>8</td>
<td>45.0</td>
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<td>9</td>
<td>40.0</td>
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<td>22.2%</td>
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<tr>
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<td>133.3%</td>
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<tr>
<td>15</td>
<td>24.0</td>
<td>66.7%</td>
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</tbody>
</table>

**Sprockets**

Sprockets are the No.1 cause of reduced chain life.

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Wear Strips

Wide End Forward vs Narrow End Forward

Which way should I run my welded steel cranked link mill chains?

Narrow end forward: Barrel rotates on the sprocket tooth.

Wide end forward: Rivet rotates within the barrel.

Run cranked link mill chains WIDE END FORWARD.
Cost Cutting Creates Bad Designs

Avoid using double strands of chain with fixed attachments.

Differential pitch elongation accumulates at the tail sprockets.

For Waste Conveyors use:
- Drag Chain
- Single Strand Refuse Flight Chain
- Long Link Chain

Can-Am WH132IBR Refuse Flight Conveyor
- 75mm x 75mm x 10mm Square hollow section.
- 12.7mm UHMWPE box flights
- High profile sprockets.
You’ve just fitted $45,000 worth of new chain and sprockets. It was a tight time frame but it went in no problems. Or did it?

Drive Sprocket

Middle strand on the outfeed from a drum debarker

- Chain Naming Convention
- Component Hardening
- Welding Procedures
- Mill Chain Selection
- Drag Chain Selection
- Lubrication & Break-In
- Installation Of New Chain
- Reducing Maintenance Costs
The End

Thanks for your time & good luck.