Three Categories

- Discharge
  - Down-legging
  - Back-legging
- Premature Bucket Failure
  - Wear
  - Cracking
- Bucket Filling
  - Uneven Fill
  - Incomplete Fill
Discharge Back-legging

• Back-legging describes elevated material falling down the up leg.

– Causes
  • Speed too fast
  • Buckets worn
  • Obstruction in head or throat
  • Pressure vent or internal structure
Typical throw Pattern for High Speed Grain Leg
Shroud in Head
Helps control material flow and reduce discharge problems
Discharge Down-legging

- Down-legging describes elevated material falling down the down leg.
  - Causes
    - Speed too fast/slow
    - Wiper damaged or missing
    - Throat position too high
    - Buckets un-vented
    - Obstruction in Throat
    - High moisture/Sticky Material
    - Air Pressure in Leg
Bucket Discharge

• The point at which material starts to exit the bucket is determined by belt speed, and commodity being conveyed.
• A high speed elevator will begin to discharge at about 30-40 degrees before top dead center.
• Complete discharge should occur at approximately 100 degrees below top dead center.
Discharge Position

• As speeds and capacities have gone up, throat position has gone down
• Most manufacturers have a minimum position of 45° below centerline of head shaft
Bucket Discharge

• In theory, capacity can be gained by increasing belt speed.
• Practical application can be tricky
Speed Increase Effects

- Earlier Discharge
- Higher throw trajectory
- Increased air volume
- Reduction of time window
- Increase in commodity damage
Bucket Fill Problems

- Causes
  - Misguided inlet
  - Buckets un-vented
  - Pulley/inlet position not optimal
  - Speed too fast
  - Vertical spacing
  - Inlet undersized
  - Buckets worn
  - Air Pressure in Leg
  - Obstruction
Upside Feed Optimal Pulley Position
To Vent or Not to Vent

- Conveying meals or soft stock materials
- Sticky or high fat content
- Any light test weight materials
- Powders or flours
- **WHEN IN DOUBT, VENT YOUR BUCKETS!**
Bucket Venting
Aids in fill and discharge of light fluffy, or poor flowing materials. Service provided at a nominal charge.

<table>
<thead>
<tr>
<th>Standard Vent</th>
<th>#2 Vent</th>
<th>#3 Vent</th>
<th>#4 Vent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same holes in body as mounting holes</td>
<td>Twice as many holes in body as mounting holes</td>
<td>Four times as many holes as mounting holes</td>
<td>Same as #3 Plus three holes in each end</td>
</tr>
</tbody>
</table>
PREMATURE BUCKET FAILURE

• Causes
  – Improper hardware selection
  – Over-torqued hardware
  – Incorrect bucket or belt size
  – Misaligned belt
  – Excessive digging
  – Poor inspection practices

• Solutions
  – Must install a locking device
  – Use proper torque settings
  – Ensure buckets and belting are proper widths
  – Install digger buckets
  – Regular inspections to replace damaged buckets
Excessive Bucket Wear

- Misguided or poor feeding
  - Buckets must dig to fill
  - Material overloading one side causing misalignment
- Improper bucket Material
- Application tends to cake or build up in trunking
- Severe downlegging causing heavy digging
Bucket with holes in belly
Urethane buckets in mash leg at Prestage Farms.
Cracked bolt holes
Cracked Bolt Holes - Cause
# BUCKET MATERIALS

<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
<th>Temperature Range</th>
<th>FDA Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime Virgin Polyethylene</td>
<td>For Grain and Food Products</td>
<td>-120F to +180F (210F Intermittent)</td>
<td>FDA Food Grade Material</td>
</tr>
<tr>
<td>Zytel Nylon</td>
<td>Hot, High Impact, Abrasive products</td>
<td>-60F to +300F (350 Intermittent)</td>
<td>Food Grade Available on Request</td>
</tr>
<tr>
<td>Urethane – 55 Durometer</td>
<td>Heavy Abrasion or Sticky Materials</td>
<td>-60F to +180F (210F Intermittent)</td>
<td>FDA Food Grade Material</td>
</tr>
</tbody>
</table>
Polyethylene Vs Urethane

- Turkey feed mash leg
- 354,000 tons throughput
- Poly samples lost +1” off lip
- Capacity loss 50%
- Urethane showed no appreciable wear
The Cost of Bucket Wear

- **10x6 poly bucket**
  - Water level new = 194.04 cubic inches
  - 1” wear on front lip = 164.15 cubic inches
  - **Loss of 15.4% capacity**

- **14x7 poly bucket**
  - Water level new = 356.4 cubic inches
  - 1” wear on front lip = 265.35 cubic inches
  - **Loss of 25.5% capacity**

www.maxilift.com: Your source for buckets & accessories