Conveyors vs Load & Haul

Improve Process, Lower Costs and Share Knowledge
Purpose

• Provide simple, but tangible ideas to improve productivity or costs of your processing plant.
• Review case studies
• Features to look for on Conveyors
Why Conveyors

- Cost
- Safety
- Labor Availability
- Topographic Challenges
  - Incline and Slope of Terrain
  - Right of way Restrictions
  - Utility Ways
  - Wet Land Restrictions
  - Municipal Restricting
Price of Aggregate Stays Relatively Consistent with Steady Predictable Increases

Producer Price Indices (PPI)
Load & Haul – Influenced by Price Fuel as noted in Red Line

Producer Price Indices (PPI)
US Diesel Fuel Prices

Average 2017 – 2018 $3.08/gallon
$.52/gallon increase over the past 12 months
Load & Haul – Cost

What is an O&O?

- Est. Ownership and Operating Costs

  “Fixed”

  - **Ownership** = Cost of capital or asset...

  “Variable”

  - **Operating** = Cost of operating the asset...

Estimated O&O costs

- Operator 15 – 25%
- Depreciation 20 – 25%
- Insurance Registration 12 – 15%
- Fuel 20 – 28%
- Tires/Tracks 10 – 14%
- Repair & Maintenance 10 – 12%
# Load & Haul

**Estimated O&O Cost**

**Where’s the Money ??**

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Rate</th>
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</thead>
<tbody>
<tr>
<td>40 ton Articulated Hauler</td>
<td>$110 - $145/hr</td>
</tr>
<tr>
<td>50 – 100 ton Rigid Truck</td>
<td>$103 - $135/hr</td>
</tr>
<tr>
<td>Face Loader</td>
<td>$87 - $120/hr</td>
</tr>
<tr>
<td>Excavator</td>
<td>$90 - $120/hr</td>
</tr>
<tr>
<td>Stockpile Wheel Loader</td>
<td>$87 - 130/hr</td>
</tr>
</tbody>
</table>

**Assumptions**
- $18 - $24/hr operator wage
- $3.00/gas diesel
Case 1
8” Sand & Gravel

Customer Pick & Carry with Front End Loader

- When Carry was Greater than 300 – 400’
- Capacity Decreased
- Increase wear and tear on Loader
**Case 2 – Traprock**

- Original Primary 300 TPH
- Upgrade Primary Station 600 TPH
- Relocated -100’ Elevation
- 950’ Horizontal
- Added Surge Pile with 4200 Live Pile-Plant Flexibility

Capital Cost of Conveyor and Primary Station

= Cost of Capital for upgraded Rolling Stock
Case 3

Conveyor Span
Road & Waterway

New Primary Location
Case 3

Conveyor

• Municipal Approval
• Continuation of Mine
• Safety
• Lower Operating Cost
Case 4 – Sand & Gravel

Lower Operating Cost
Case 4 – Sand & Gravel

Over 1800’ Horizontal including 193’ Span
Raw Material Stockpile 180,000 Ton
Case 4 – Sand & Gravel

- Site Limitations
- Added Flexibility with Higher Conveyor Capacity than Plant
Case 5

Stock Pile Management of Material

Conveyor Handling
120-145 TPH
of Base Material

Eliminated
25¢/Ton Loader
And
4-5 Hours/day
Road Truck

Less than 15 Month Pay Off
Case 6
Limestone
Case 6
Limestone

Shot Rock Gradation

<table>
<thead>
<tr>
<th>Size</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>-30</td>
<td>100%</td>
</tr>
<tr>
<td>-24</td>
<td>95%</td>
</tr>
<tr>
<td>-16”</td>
<td>90%</td>
</tr>
<tr>
<td>-12”</td>
<td>75%</td>
</tr>
<tr>
<td>-8</td>
<td>60%</td>
</tr>
<tr>
<td>-3</td>
<td>50%</td>
</tr>
<tr>
<td>-1 ½</td>
<td>38%</td>
</tr>
</tbody>
</table>
Case 6
Limestone

42” X 590’
150’ Lift
600 TPH
-14” Shot Rock
Case 6
Limestone

+16” Stockpile
Case 6
Limestone

Eliminated 75% of Trucks from Hauling from the Bottom of the Mine to the Top of the Primary
Case 7
Overland Conveyors

- Totaling over 4000 Feet to Transport 850 TPH
- Conveyor System Designed to Span Roads, Railroad Tracks and Accommodate Utility Rights
- Lower Operating Cost
- Safety
Belting is the Most Expensive Consumable on Conveyor

Things to look for

- Transfers
- Wind Hoops
- Tail Pulley
- Take-up - Proper Tension
- Head Pulley Lagging
- Trainer Idlers
- Conveyor Cover

Improve Process, Lower Costs and Share Knowledge
Self Cleaning Pulley Design
Wing Pulleys
Round Bar Better By Design

- Full 3/4” Thick Minimum Round Contact Bar Can Last 3X Longer
- Helps Prevent Wing Folding
- Round Bar Protects Belt Bottom Cover from Cuts and Tears
- Round Bar Increases Belt Fastener Life
- Optional Wing Reinforcing Rings Available
Take-Up - Proper Tension
Head Pulley Lagging
Trainer Idlers
Other things to look for from a Supplier

- Guarding
- Structural Engineering Review
- Foundation/Infrastructure Requirements
- Service and Maintenance Contracts
Guarding
Structural Engineering Review
Foundation/Infrastructure Requirements
Service and Maintenance Contracts
Your Powerful Partner for
Material Handling Equipment Solutions

Innovation
Our ideas produce results
Working on the basis there is no “one right answer” we collaborate with each other and our customers to provide creative solutions for any application. Whether it’s replacing a part, servicing a breakdown or designing and installing an entire plant, we create a tailor-made plan of action for every customer.

Safety
Safety first, always
We share your commitment to safety in every aspect of your operation. Our top-down safety culture empowers employees to work safely, guided by our state certified safety committee and MSHA Part 46 and 48 training and certification.

Knowledge
Put us to work for you
Our team is our most important asset. We leverage our decades of experience in material handling, sharing our industry expertise to get quality results. Kemper educates our customers and employee through hands-on maintenance seminars, product training and equipment demonstrations.

Commitment
Count on Kemper
With over 30 years as a family business, Kemper is committed to creating trusted partnerships with our employees, customers and leading industry manufacturers. For Kemper employees, it means a positive work environment with clear communications and a can-do team approach where each individual is a valued asset. For Kemper customers, it means we care. Our team is personally committed to your project and success by taking ownership of our roles, quickly responding to your needs and providing superior customer service.