**CASE STUDY**

**LUBRICATION ON WORK ROLL BEARINGS FOR THE HOT STRIP MILL**

**QUAKERTEK™ CS 4015-EP**

**THE SOLUTION**

Quaker suggested the mill run a trial on the work roll bearings. The work roll bearings represented the best place for the trial due to the ability to:

- Inspect the bearings prior to the trial
- Remove used grease
- Avoid mixing with the current grease
- Disconnect from centralized lubrication system and use a separate pump to quantify the amount of grease used

- The mill was currently using a competitor's Lithium based grease, and Quaker suggested converting to QUAKERTEK™ CS 4015-EP, a Calcium Sulfonate Complex grease for the trial
- The initial fill of the QUAKERTEK™ CS 4015-EP was reduced 15% compared to the lithium based grease. After 1 week (3 campaigns) the mill grease was seen coming out of the bearings, but was still consistent and showed good lubricity
- It was evident that the initial fill needed to be reduced by another 50% of the original lithium based grease
- After 10 more campaigns the status of the lubrication of the bearing was checked. There was still plenty of grease inside the bearing, so that the re-lubrication interval was further expanded
- Current status of relubrication is once a month – on average 20 campaigns

- The trial on the roughing mill has produced the following results:
  - 70% reduction in grease consumption lowering lubricant costs
  - Reduced maintenance time and costs – required only once a month vs. after each campaign
  - Reduced cooling water pollution
  - Cleaner machinery

Analysis of the competitive Lithium based grease and QUAKERTEK™ CS 4015-EP Calcium Sulfonate Complex grease showed the difference in how both products perform in the presence of water. This is illustrated in the following tables.

<table>
<thead>
<tr>
<th>COMPETITOR’S LITHIUM BASED GREASE</th>
<th>QUAKERTEK™ CS 4015-EP</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Lithium based grease softens so much, that it is easily washed out of the bearing, and can be seen on the outside of the chock.</td>
<td>The Calcium Sulfonate Complex grease hardens slightly and improves the sealing of the bearing, reducing washout dramatically.</td>
</tr>
</tbody>
</table>
LUBRICATION ON WORK ROLL BEARINGS FOR THE HOT STRIP MILL
QUAKERTEK™ CS 4015-EP

THE PRODUCT
QUAKERTEK™ CS 4015-EP is a high performance Calcium Sulfonate Complex grease based on mineral oil. It is designed for applications that operate under severe conditions with regard to medium to low speeds, high loads and corrosion problems, such as roller and plain bearings in all kind of industries, and delivers the following benefits:

» High oxidation resistance
» Excellent resistance to water washout
» Excellent load carrying capacity
» High temperature stability
» Excellent corrosion protection
» High lubricating film strength
» Very good shear stability
» Well suited for centralized lubrication systems

PROPERTIES

<table>
<thead>
<tr>
<th>TYPICAL PROPERTIES</th>
<th>TYPICAL VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Smooth, greenish brown</td>
</tr>
<tr>
<td>Soap Type</td>
<td>Calcium Sulfonate Complex</td>
</tr>
<tr>
<td>Base Oil viscosity at 40°C</td>
<td>400 mm²/s</td>
</tr>
<tr>
<td>NLGI Grade</td>
<td>1-2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>COMPETITOR’S LITHIUM BASED GREASE</th>
<th>QUAKERTEK™ CS 4015-EP CALCIUM BASED GREASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh</td>
<td>Used</td>
<td>Fresh</td>
</tr>
<tr>
<td>Penetration at 25°C [mm⁻¹]</td>
<td>313</td>
<td>410</td>
</tr>
<tr>
<td>Water content [%]</td>
<td>0</td>
<td>28</td>
</tr>
</tbody>
</table>