Roll Bite Lubrication.

OVERVIEW Roll bite lubrication is used in over 80% of Flat Hot Strip Mills around the world. This process has been of interest for many years, and since the introduction of new developments in the hot mill environment and the increasing focus on cost savings and quality improvement, the advantages of hot mill lubrication have been underestimated.

APPLICATION Roll Bite lubrication is the application of a dispersion, which is a mechanical mixture of oil (<0.5%) and water (>99.5%) in the hot rolling process. The typical application involves 0.02 to 0.06 gallons per minute at 5 psi per mill stand, about a third of an 8 oz. coffee cup per bar. Oil is injected into the water stream and mixed by a static tube mixer to form dispersion that is sprayed onto the work roll. The goal is to form a strong non-washable protective film on the roll surface. There are four main ways to lubricate the roll bite of the stand, by applying a dispersion of oil and water to the following:

» Work rolls after the wiper
» Back-up rolls
» Work rolls and back-up rolls
» Work rolls before the wiper

IT'S WHAT'S INSIDE OUR PRODUCTS

BENEFITS OF LUBRICATION

- Energy savings on power consumption
- Productivity increase through extended campaign length
- Ability to roll harder grades with restricted power loads
- Prevention of work-roll cost
- Improvements to strip quality
- Reduction in roll wear
- Elimination of edge seam/scale defects
- Decreased maintenance costs
- Savings in tinning mill operations

Certain benefits listed above apply to some, not all, of the products in Quaker’s Hot Rolling Oils Product Line.

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**Mobile Industrial Dispersion Application System (MIDAS)** The Quaker MIDAS System is an extremely accurate, positive displacement pump system which can stand alone or be tied into level two control systems. The system helps mills to achieve all the benefits from Quaker lubricants.

Quaker has designed MIDAS systems for finishing and roughing mills, edger rolls, tube and pipe stretcher mills and double cold reduced (DCR) mills. Additionally, static mixers, part of the MIDAS system, are fabricated and sold by Quaker. The static mixers can be used for many other applications other than the MIDAS system. Worldwide, Quaker supplies MIDAS systems to over 25 mills and has served several universities with the lubrication system.

**Example of Trial Results**

- Severe wear and heavy rolled in scale were eliminated
- Downstream pickle line speeds increased by 150 feet per minute

The results illustrate the reductions achieved by using Quaker's MIDAS system for both total ton force and total amps over a period of several months.

<table>
<thead>
<tr>
<th>METHOD OF LUBRICATION</th>
<th>TOTAL TONS FORCE 6 STANDS</th>
<th>TOTAL AMPS 6 STANDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quaker MIDAS System</td>
<td>7,864.1</td>
<td>32,796.05</td>
</tr>
<tr>
<td>Competitive System</td>
<td>8,246.4</td>
<td>36,566.42</td>
</tr>
<tr>
<td>Water</td>
<td>8,344.5</td>
<td>38,072.52</td>
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<tr>
<td>Quaker vs. Leading Competitor</td>
<td>-382.3</td>
<td>3,770.37</td>
</tr>
<tr>
<td>Quaker vs. Water</td>
<td>-480.4</td>
<td>-5,276.47</td>
</tr>
</tbody>
</table>

Due to system modeling, finishing mill totals were used in the evaluation. Only two of the six stands were lubricated for the trial.