Challenges
An aluminum rolling mill with a conventional three mill hot line, which includes a breakdown reversing mill, an intermediate reversing mill, and multi-stand tandem mill, was using rolling oil that required frequent additions to maintain rolling performance during the life of the emulsion. Additionally, it required periodic additions of biocide (50 gallons per month) to control microbiological problems. Compounding this microbiological problem was the fact that coolant emulsion was used as a lubricant for the table rolls of the hot line on both sides of the intermediate mill. As the emulsion was sprayed, cooled, and eventually flowed back into the sump area, a constant re-inoculation of the emulsion with microbiological contamination occurred.

The 4-hi intermediate hot reversing mill produces over 3,000,000 pounds of aluminum per day. A wide variety of products are run, including can body and end stock, trailer roof, and building products. Alloys rolled are mostly 1XXX, 3XXX, and 5XXX aluminum alloys. The coolant system is approximately 60,000 gallons and is using municipal tap water for makeup and maintaining system volume during operation.

The aluminum producer decided to convert to ALUSHIELD™ IHM-2000. From the conversion, they were looking to improve the lubricity performance on harder alloys, reducing the requirement for biocide additions, and ceasing the need for additive additions to maintain good emulsion performance on a daily basis. Further, it was expected to be able to run all normal practices and products with acceptable levels of quality on the first day the coolant emulsion was placed into service.

Providing Solutions
ALUSHIELD™ IHM-2000 has an excellent lubrication additive package which allow for a full, one grade improvement on anodized quality on both the key can body and can end stock alloys. An unanticipated benefit was an extension in work roll life from 1 week to 2 1/2 weeks before re-grinding was necessary, resulting in a cost savings of approximately $60,000 per year.

No biocide additions have been necessary, no odor has been observed around the mill, and mill cleaning frequency has gone from every 3 weeks to every 5 weeks. The operator commented that the ALUSHIELD™ IHM-2000 is much easier to maintain than the previous product used. Additionally, no tank-side additions have been necessary. Dynamic Equilibrium has facilitated consistent performance on a day-to-day basis.

Product Description
ALUSHIELD™ IHM-2000 represents the next generation of rolling oils for the aluminum industries' hot reversing mills. This formulation couples outstanding emulsification boundary and hydrodynamic lubricity with a low propensity for soap formation and excellent bio-resistance properties. This chemistry represents the first developed using our Nash Laboratory Rolling Mill. Coupled with dynamic equilibrium, balancing system inputs and outputs, this chemistry affords the lowest total cost system in our industry. ALUSHIELD™ IHM-2000 offers the following benefits:

- Outstanding boundary and hydrodynamic lubricity performance
- Superior emulsification performance for stability and consistency of emulsion
- Low metallic soap formation tendency
- Excellent corrosion inhibition performance
- Demonstrated bio-resistance under field conditions
- Low oil consumption rates

Process & Equipment

<table>
<thead>
<tr>
<th>Operation:</th>
<th>4-hi intermediate hot reversing mill</th>
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<tr>
<td>Capacity:</td>
<td>1+ billion pounds per year</td>
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Product and Process Expertise
Rolling lubricants represent a very minor part of the costs of aluminum rolling operations, typically considerably less than 1%. This case illustrates the importance of using the leverage of advanced lubricant technology to achieve substantial productivity increases while at the same time reducing total applied cost. That is why Quaker focuses on developing products with the highest performance without compromise, products that sharpen your competitive edge.