

LIGHTNIN Extraction News

The Newsletter for Solvent Extraction Engineers

February 1999

Customer Corner Plant Retrofit Provides Financial and Processing Benefits

By Mike Gosko LIGHTNIN



We recently spoke with Héctor Denogéan, Superintendente of the Hydrometallurgy Operations at Mexicana Del Cobre, about the impact of an equipment retrofit on plant operations.

M.G. Please describe your plant operation.

H.D. We are operating three trains. Two trains have extraction and settling stages, and the third one has extraction, settling and washing stages. Total flow is 27,000 liters per minute. Our annual production is 22,000 tons

M.G. Why did you decide to retrofit your operation, and how did you go about it?

H.D. We were looking for ways to operate the trains more efficiently with respect to extraction, entrainment and energy consumption. In order to prevent unnecessary downtime, we replaced the equipment during the pre-established crud-cleaning period. Ing. José Luis López (Plant Manager), Tec. Rogelio López B. (Operations Manager), Ing. Ruperto Andrade (Maintenance Manager) and Ing. Sergio Gámiz F. (Quality Manager) were instrumental in the project implementation.

M.G. What effect has the retrofit had on stage efficiency?

H.D. The two trains with two settling stages reached 90%. The train with one settling stage and one washing stage reached 82%. We did not observe a notable difference with the introduction of LIGHTNIN agitators.

M.G. Has the retrofit had any effect on entrainment levels?

H.D. We have observed a significant reduction in the entrainment levels. For O/A and A/O, this reduction has been approximately 40%. The average A/O is 300 ppm and O/A is 40 ppm.



M.G. Have you observed any changes in the auxiliary mixer?

H.D. The agitation is more uniform and the energy consumption has been reduced. But the most important point is that the LIGHTNIN system starts up in organic continuous at normal flow. With the previous system, we needed to shut down the aqueous flow in order to define the organic continuity. Afterwards we would re-establish the aqueous flow.

M.G. What about energy consumption?

H.D. Energy consumption has been reduced 30% for the pumps and 50% for the auxiliary mixers.

M.G. Were you happy with the service LIGHTNIN provided to you?

H.D. Yes, the service and support have been excellent.

M.G. Thank you very much for your comments.

H.D. It is my pleasure.

Technology for Today & Tomorrow

Flow Patterns in the Settler...

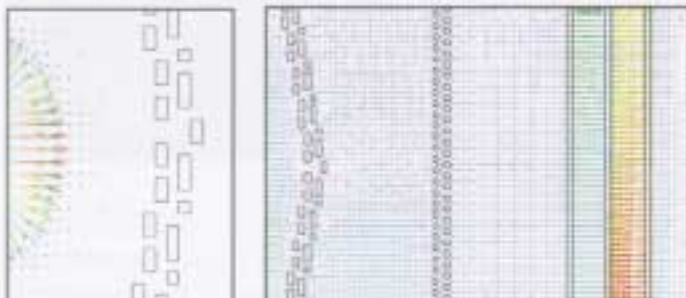
The latest Research Highlights from LIGHTNIN

In an effort to optimize solvent extraction processes and help customers increase profitability, LIGHTNIN is conducting a major research project on mixer settler technology. The results of the first phase of the project, a comparison of current settler designs, were recently presented at the Randol Copper Hydromet Roundtable '95. Following are highlights of this important research project.

Visualizing the settling process

Computational Fluid Dynamics (CFD) with Computational Fluid Mixing (CFM) software allows LIGHTNIN to plot the flow patterns inside the settler. This tool allows us to compare the performance of several settler configurations, and ultimately to develop new configurations that will optimize performance and reduce operating costs.

Analysis of the Inlet

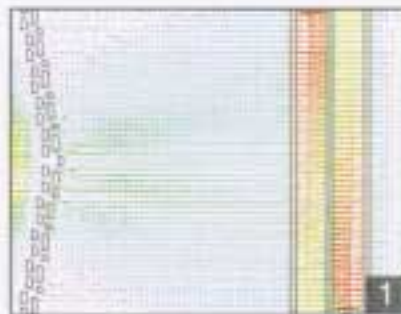


This study shows the changes in flow patterns when we install redirection vanes in the settler inlet. Before the vanes are added, there are large areas in the corners with virtually no flow. This results in processing inefficiency and expensive chemical holdup. The addition of redirection vanes permits maximum utilization by creating better flow in the corners of the settler.

News from LIGHTNIN Sales Reps

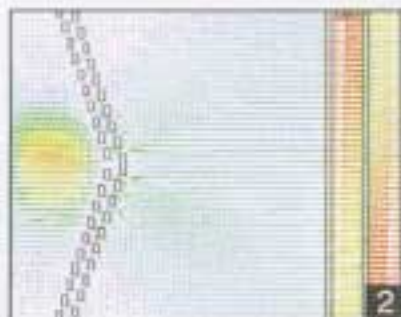
We are pleased to welcome a new representative serving the mining/minerals market in Brazil:

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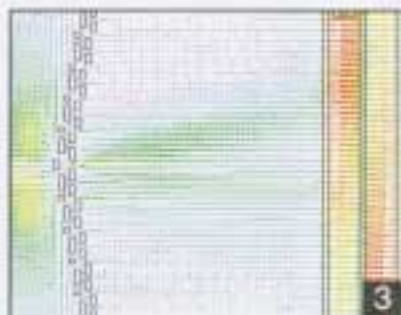


This study shows the impact of changes in angle in the picket fence. The three CFDs show:

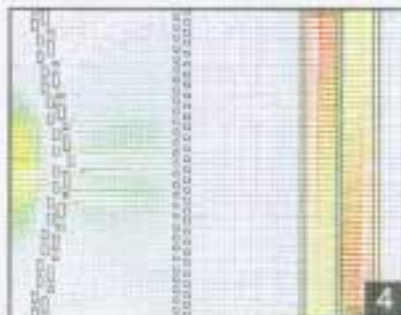
- 1) the typical angle used in current settler systems,
- 2) an increased angle and



- 3) a concave picket fence. The concave angle distributes the flow behind the picket fence, but creates an uneven and undesirable flow pattern past the fence.



- 4) This study shows how the addition of a coalescence barrier after the picket fence straightens the flow feeding the overflow weirs. The barrier also enhances control of the emulsion interface between the aqueous and organic phases to produce cleaner split solutions.



Further research is planned to focus on design optimization in the settler discharge areas.

Looking ahead

The next phase of the research will include testing of new designs—some radically different from current technology—to develop the next generation of mixer settlers. In keeping with our 75 years of leadership in mixing technology, tomorrow's solvent extraction systems are on the drawing board today at LIGHTNIN.

Up-pumping Technology Optimizes Mixing in High-Pressure Oxidation Systems

Good solids suspension and oxygen dispersion are critical to pressure oxidation systems used to process gold and copper ore slurries. Axial flow hydrofoil impellers, such as the LIGHTNIN A315, provide excellent slurry suspension. Unfortunately, they can cause abrasion to the tank wall due to the high velocities under the impeller. Flooding and coalescence can also be problems, particularly with high-viscosity slurries.

The advantages of up-pumping

Up-pumping, using the LIGHTNIN A340 impeller, can solve many of these problems:

- Up-pumping induces air into the system and often eliminates the need for a sparge system.
- Gas bubbles rise naturally into the rotating impeller blades, where they are reduced. When the bubbles reach the surface, the draft tube action of the up-pumping system forces them down the side walls. Gas-liquid mass transfer is enhanced by as much as 50%, with significantly reduction in blending time. Flooding is eliminated.
- Foaming can be reduced or eliminated by adjusting the location of the upper impeller. This produces a more efficient flow pattern within the tank and increases output.
- Up-pumping eliminates high impinging velocities at the tank walls, which reduces abrasion and improves mechanical stability.
- Up-pumping increases the working volume and enhances system productivity.

Find out how up-pumping can improve your productivity.

To request a copy of LIGHTNIN's technical paper on up-pumping in high-pressure oxidation systems, call 1-888-MIX-BEST (U.S. and Canada) or 1-716-527-1623.



SAVE THESE DATES

SME – March 3 – 4, 1999 in Denver.
Visit us at booth #643.

ALTA 1999 Nickel Pressure Leaching and Hydrometallurgy Forum – May 10 – 13, 1999 in Perth, Australia. Billiton and LIGHTNIN will present a joint paper.

ISEC '99 - July 11-16, 1999 in Barcelona, Spain.
LIGHTNIN will present a paper.

ALTA 1999 Copper Hydrometallurgy Form - September 6-9, 1999 in Surfer's Paradise, Australia.
LIGHTNIN will present a paper.

Copper'99/Cobre '99 - October 10-13, 1999 in Phoenix, Arizona. LIGHTNIN will present a paper.

Trade Show Update RANDOL

Randol Copper Hydromet Roundtable '98

The recent Roundtable highlighted a number of innovations in hydrometallurgical extraction and recovery. A full day was devoted to the oxidation of sulfides, with significant focus on bio-oxidation. This session was led by Ab Bruynesteyn, a pioneer in these technologies. Another full-day session was conducted on cost-saving innovations in solvent extraction and electrowinning (SX-EW). LIGHTNIN presented results of the first phase of a major research project (see highlights on page 2). Roundtable attendance was up, and participants generally agreed that the opportunity to network with operations and research leaders from five continents was the most valuable aspect of attendance.

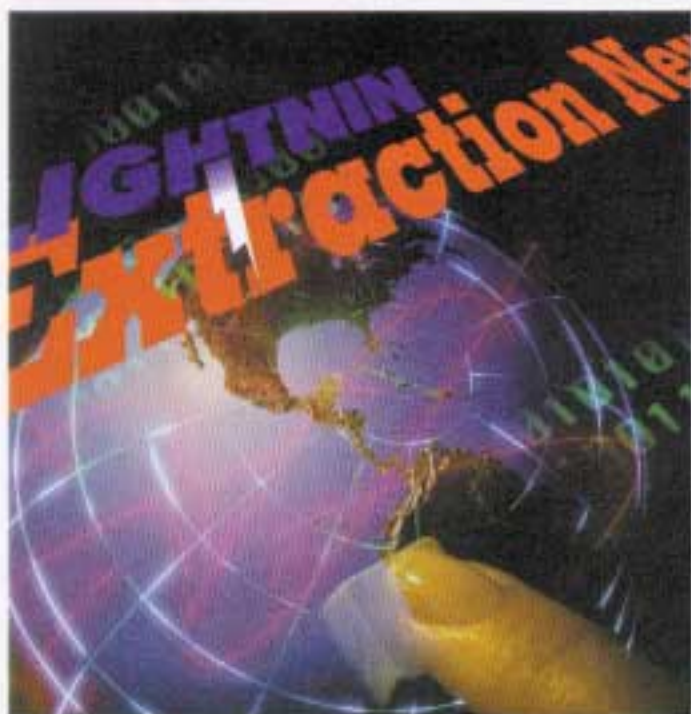


The event, held in Perth, Australia last May, was the largest ALTA event to date, with 240 delegates attending the NiCo forum. Key themes included design aspects of the new generation laterite

projects, new developments in hydrometallurgy of sulphide concentrates and new developments in technology and equipment. Andrew Forrest, CEO of Anaconda Nickel, was Keynote Speaker at the Forum Dinner.

The Copper Forum, held in Brisbane, Australia in October, was attended by 130 delegates. A full-day Sulphide Symposium addressed hydrometallurgical treatment of sulphide ores and concentrates. Other key topics were heap leaching technology and new developments in solvent extraction, electrowinning and ion exchange. During his Keynote Address at the Forum Dinner, Graeme Miller of CMPS&F emphasized the leading role Australia is playing in copper hydrometallurgy.

Lightnin Extraction News Goes On-Line!



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