

CHAIRMAN'S ADDRESS

When we started planning, during the final quarter of the year 2008, the PROCEMIN 2009 seminar, the mining industry globally was going through quite a difficult time. The recession in the Global Economy – which culminated in the collapse of the US real estate market and led to great losses in high-risk mortgages – spread quickly to other countries and sectors of the Global Economy, heavily affecting the refined copper market during the last four months of 2008.

In August, the Metals Stock in London closed at 340.7 c/lb with an annual average to date of 367.1 c/lb. However, on 24 December the price reached 125.7 c/lb, marking a 63% drop from 29 August. Such a price had not been registered since the middle of 2004.

The violent fall in copper prices is the consequence of the heavy recession of the Global Economy and it has caused an important decline in the demand for refined copper. According to the production indexes of the end of 2008, manufacturing activity dropped to its lowest levels in many of the major economies including Japan, Europe and the USA. In the USA the index fall reached numbers that had only been seen in 1982, particularly in the automotive sector.

The effect of the crisis was manifested in copper mining, especially in those countries with high production levels. In Chile, according to the Cesco reports, almost ten million dollars in investment plans have been frozen, seven million of which correspond to the postponement or temporary suspension of projects from BHP Billiton and Anglo American, among others.

On the other hand, sites with a cost per unit lower than the sale price began to close. Such was the case for the Lince de Michilla pit in Chile, for Freeport primarily for its operations in the USA, and for a significant number of mines in Africa. Many mines in operation began to take drastic measures to reduce costs and alleviate some of the effects of the crisis.

At the beginning of 2009, no industry expert or analyst was able to anticipate the intensity and depth that this process would reach nor determine how long it would last. From this emerged a series of interpretations of the recuperation process that were expressed using several letters of the alphabet. This is how we came to talk about an economic recovery curve with a V, L or W shape, which can be interpreted as one more expression of the uncertainty that we lived in at the beginning of the year.

It was under these circumstances that we began meeting to plan this event, and in the process we even considered for a moment cancelling the seminar. In a crisis so deep, we thought we were going to receive little response from the world of engineers and process specialists, given that they were going to be preoccupied managing the crisis and considering that seminars are the first cutback in such situations.

However, during the course of the year signs of recuperation

of the Global Economy began appearing, which in the case of the copper market can be summarized by the positive shift in the demand for refined copper in China. According to Brook Hunt's estimation, this shift would reach an annual growth of 23%, highlighting the rise in some areas such as the automotive sector which rose nearly 90% in the period from January to August.

The Metals Stock in London has reacted with a consistent rise in copper prices whose average value has risen significantly each month up until October, registering an increase at the end of this month of 137% with regard to the minimum achieved on the day before Christmas in 2008.

This also represents a good support for short-term prices, production losses caused by shut-downs at mine sites due to strikes in America, especially in Chile, and suspension of productive processes due to technical problems. Such was the case at the underground Olympic Dam mine and the crushing processes at Escondida, which were aggravated by a drop in the copper grade.

However, in spite of this good news, some experts indicate that the state of the economy is still weak and that this is demonstrated by the fragility of the financial sector in industrialized countries. They are threatened by loan payments and a decline in consumer activity on top of the risk that China's economy may develop too quickly and lead to inflation.

The crisis managed to shake the world enough for business executives to question many of their policies. This reinforced a strategic approach with a vision in which companies would not face the future, but rather several possible futures, by developing alternative plans for action as a way to withstand the level of uncertainty.

It is for this reason that when we look back we are glad that we made the decision to go forward with this seminar. In doing so, from the perspective of those who work in mineral processing, we may contribute to the way this sector should confront the crisis in terms of marginal process efficiency and plan development for maximum asset utilization by taking advantage of time availability and searching for innovation. Likewise, mine-process planning becomes important as a way to permanently evaluate the optimal point of operation when faced with varying price scenarios.

The crisis must be more than a barrier that restrains us. It must create incentive to draw upon all our abilities to overcome it. This is the challenge that awaits us.

Many thanks,

Gerhard Von Borries
PROCEMIN 2009 CHAIRMAN
VI INTERNATIONAL MINERAL PROCESSING SEMINAR
Antofagasta Minerals, Chile

PREFACE

PROCEMIN 2009, held on 2-4 December, 2009 in Santiago, Chile, is the sixth of a series of international seminar on Mineral Processing initiated in 2002 by GECAMIN and Mining Engineering Department of the Universidad de Chile.

Clearly, the year 2009 posed major challenges for all companies active in the global mining industry as a result of the financial crisis and the adverse business climate. Nevertheless, PROCEMIN 2009 turned out to be once more a unique opportunity for executives, operators, researchers and suppliers from the global mining and minerals processing industry to analyze and discuss recent developments in technological innovations, process and equipment design, and new projects and plant expansions. The main objectives of the PROCEMIN seminar were: (I) To enhance the exchange of knowledge and experiences in the mineral processing of copper, molybdenum, gold, silver, iron and other base metals, (II) to identify best practices as well as new, outstanding technologies and procedures and (III) to generate a global networking platform among professionals engaged in mineral processing.

These Proceedings contain 54 papers written by authors from 15 different countries, including Argentina, Australia, Brazil, Canada, Chile, China, Finland, Germany, Iran, Peru, Poland, Russia, Switzerland, United Kingdom and USA. The papers have been organised by area of interest, including Keynote Lecture (1), Plenary Sessions (2), Crushing & Grinding Simulation (7), Energy Efficiency in Comminution (3), HPGR (5), Fundamentals of Flotation (6), Flotation Process Development (8), Flotation Simulation (3), Flotation Control & Optimization (6), Project Management & Plant Operation (4) and Tailings & Water Management (9).

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The Organising Committee also wishes to thank the following sponsors (as of 17 November in alphabetical order) for their generous support:

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Finally, we would like to thank all the delegates who attended the Seminar exchanging their valuable knowledge and expertise, thus contributing to the great success of this VI version of the International Mineral Processing Seminar. We are looking forward to seeing you all again during the next edition of PROCEMIN, in the year 2011.

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PROCEMIN 2009

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PROCEMIN seminar was organised by *The Mining Engineering Department of the Universidad de Chile* and **GECAMIN**.

THE MINING ENGINEERING DEPARTMENT, UNIVERSIDAD DE CHILE The Mining Engineering Department was founded on 7 december 1853 by the Rector Andrés Bello and the then president Manuel Montt. Since the graduation of the first four engineers in 1856, the Department has trained over 1200 professionals for one of the most important Chilean industries. Leadership of the Universidad de Chile graduates in such projects as block caving, heap leaching and El Teniente converter, have brought the university a worldwide recognition. The department conducts research in such areas as mineral resources evaluation, geostatistics, mine planning, mining technology, mineral processing, hydro-electrometallurgy, environment and mineral economics.

GECAMIN Gecamin is a private company founded in 1998 in Santiago, Chile, with the purpose of designing, planning and producing technical events focused on technology innovations and process management in the mining and metallurgical industry. Gecamin strives to produce high quality events which allow Chile to be a centre of excellence for meetings on mining related topics.

Gecamin is committed to efficiently serving the mining professionals by constantly monitoring the industry trends, detecting and satisfying the clients' needs of technical knowledge exchange, through organising events that meet their highest expectations. This commitment is sustained through a quality management system based on the international ISO 9001:2000 standard.

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- Promote the exchange of knowledge and creation of collaborative technical networks between mining professionals worldwide
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