xstrata
technology services

# XSTRATA TECHNOLOGY

## A SLOW GRIND

www.xstratatech.com

# A SLOW GRIND

*Mineral Processing Manager Greg Rasmussen talks about the role of one of the leading exponents in new mining technology in the introduction of new ideas to the industry*

WRITTEN BY: ALAN SWABY
RESEARCH BY: ROBERT HODGSON

Ralph Waldo Emerson promised that if we built a better mousetrap, the world would beat a path to our door. It's a common theme, though, within the mining industry, that customers aren't so easily weaned away from the technology they know and love.

Xstrata Technology can trace its roots back for over 30 years and many of the new technologies it has developed have been wrought and tested at Xstrata-owned mining sites. Many of its brand names carry the 'ISA' prefix – testimony to their origin at Mt Isa, one of Australia's most successful mines.

It's now the job of Greg Rasmussen, Mineral Processing Manager for Xstrata Technology Canada to spread the message throughout North and South America from his office in Vancouver. "Xstrata is first and foremost a mining company," he says. "The 70,000 strong workforce is divided between six operational divisions and 75 mining and smelting plants with interests in base and precious metals and coal. But through Xstrata Technology, we have no problem in marketing our processing advantages to what are essentially competitors. The technology is there to create greater productivity and efficiencies to serve society as a whole. And from a practical point of view, the more feedback and knowledge we can get from as wide a range of applications as possible, the more we are able to continuously improve the technologies."

The Canadian office was opened four years ago at the same time as the office in

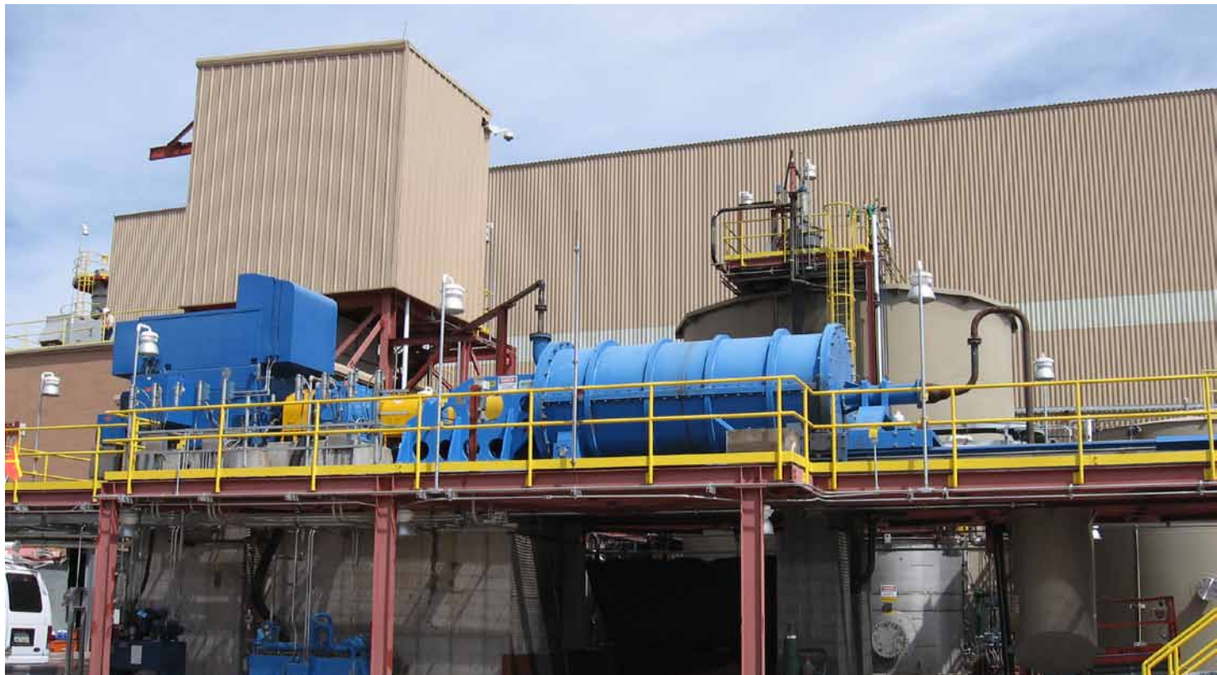
IsaMill in use at Anglo Platinum mine in Amandelbult, South Africa

Santiago, Chile. The 25 staff in both centers have years of operational experience and can talk to customers with an insider's perspective. Discussions about process plant cover both brand new projects and upgrading of existing facilities. They encompass how old machinery can be replaced with newer smaller designs or how a parallel stream can be added to increase output with minimal disruption.

"The unfortunate reality," says Rasmussen, "is that new mining projects are likely to be linked with lower grade ores that at one time wouldn't have been considered. But the non-stop demand for minerals means we have to find ways to exploit these deposits which invariably involves ever more complex processes. If this is to be done economically, it calls for more efficient technologies and techniques to minimize environmental impacts."

> "WE HAVE NO PROBLEM IN MARKETING OUR PROCESSING ADVANTAGES TO WHAT ARE ESSENTIALLY COMPETITORS"


IsaMill uses a ceramic medium which wears ten times slower than steel



Morenci Copper Mine, Arizona

**70,000**

Xstrata's global workforce

At the start of all processing circuits is the need to crush and mill the mined ore. Lower grades often need finer grinding and it was, in fact, the need to grind material down to less than 7 microns which led to the development of IsaMill. "Conventional mills use steel balls as a grinding material," says Rasmussen. "This can often lead to complications in the metallurgy. IsaMill uses a ceramic medium as small as 1mm, which wears ten times slower than steel and is metallurgically inert."

IsaMill also does away with cyclones as a means of grading and separating material. "Cyclones are very inefficient," says Rasmussen, "and often lead to material unnecessarily re-entering the grinding process. The horizontal design of IsaMill lends itself to a smaller footprint and less energy usage than alternatives and enabled us to rapidly scale up to larger 3MW and 8MW mills. For the first time we were able to offer the advantages of inert stirred milling to high tonnage, mainstream grinding. The Xstrata philosophy is to develop easy to operate technology and in the case of IsaMill, easy to maintain plant where a

Anglo Platinum's Amandelbult mine, South Africa

team of just two are able to complete a disc and liner change in eight hours."

There are now 113 IsaMills installed worldwide, although the Americas are lagging well behind in this respect. "Four years ago," recounts Rasmussen, "when we opened the office, we had only four IsaMills in North America. Now there are 22 due to be in operation by 2013 including the seven projects underway at the moment."

In order to simplify the supply chain, only the most critical components are imported from Xstrata's manufacturing plant in Germany. Ancillary equipment such as motors and gearboxes and as much of the steelwork and electrics as possible are sourced from suppliers close to the project location.

Another process originally developed for Xstrata but today widely used throughout the mining industry is the Jameson Cell flotation process, driven by fluid mechanics. In the late 1980s, conventional column cells were failing to meet Xstrata's needs and metallurgist Professor Jameson was called on to take a fresh look at flotation techniques. The first commercial installation was completed in 1989 and produced fine bubble generation without external equipment or spargers and intensive mixing without mechanical agitation.

With their high throughput in small tanks, the cells provide fast response and easy process control for a wide range of product grades and recoveries. Since then it has been continuously improved and is now on version IV, said to combine the original advantages of small footprint and small bubble size but with more robustness and operator friendly use.

> "IN OUR TESTS WE USE REPRESENTATIVE SAMPLES AND PROVIDE ACCURATE SCALE-UP DATA ON BOTH POWER AND PRODUCT SIZE DISTRIBUTION"

**113**

**IsaMills installed worldwide**

Part of the problem all purveyors of new technology encounter is the understandable concern that however good the story might sound, it could fail to live up to expectation once put into practice. Rasmussen and his team address this problem with proven one-to-one direct scale-up from laboratory test-work. "In ball mill laboratory tests, for example," he says, "25mm balls in a small laboratory ball mill will have different trajectories and interact differently with the shell lifters and ore particles than in a large production ball mill. While techniques such as the Bond Work Index and 'scale up factors' are useful for coarse grinding, they can significantly underestimate grinding needs below 100 microns. In our tests we use representative samples and provide accurate scale-up data on both power and product size distribution."

So it seems that Ralph Waldo Emerson was wrong, but inventors the world over have always known this. Innovation always needs to be accompanied by patience and persistence. BE

For more information about Xstrata Technology visit: **www.xstratatech.com**


## XSTRATA TECHNOLOGY

**www.xstratatech.com**

Produced by:

ACHIEVING BUSINESS EXCELLENCE ONLINE

BE BusinessExcellence

www.bus-ex.com