



Julius Kruttschnitt
Mineral Research Centre

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FCTR strengthens Australian link with South African mineral processors

By David Goeldner, JKMRC Communications Coordinator



The FCTR at Lonmin Platinum's Karee Mine in South Africa

A new pilot scale rig aimed at enhancing the use of flotation for mineral processing world-wide is being commissioned in South Africa, and is the brainchild of researchers at The University of Queensland's Julius Kruttschnitt Mineral Research Centre.

The JKMRC's Professor J-P Franzidis and his colleague Dr Emmy Manlapig, approached equipment manufacturers sponsoring the world's longest running mineral processing project - the AMIRA P9 Project - for their help to build a Floatability Characterisation Test Rig in 1997.

Wemco, now part of Baker Process, took up the opportunity to build the rig which was completed earlier this year and is currently being commissioned at Lonmin Platinum's Karee Mine in South Africa.

P9 Project Leader Professor J-P Franzidis said the rig would stay in South Africa until at least the end of this year after which time it will be packed up and sent to the lead-silver Cannington Mine in north-west Queensland.

The concept and research behind the FCTR has come squarely from the P9 project and is potentially one of the project's greatest achievements in its 37year history.

The unit is intended to test and validate P9's flotation models aimed at improving the flotation process at sponsor sites through - among other factors - the design of better equipment and improved circuit designs.

The FCTR is also seen as an important testing ground for JKMRc's flotation computer-based simulation package JKSimFloat, which is nearing completion.

But essentially, the idea behind the FCTR is to allow researchers to treat streams of material going through a plant at any particular time.

Doing so helps the research team predict what would happen if a variable was changed, such as the feed rate or recycling a stream, in a large tonnage operation.

Mining companies as a general rule don't appreciate this intensive 'hands-on' style of research being conducted on a full scale plant, as it can interfere with production, and make the plant potentially unstable leading to down time.

However, this problem is resolved with a pilot scale test rig running alongside the plant, returning whatever is used back into the main stream.

Professor Franzidis said the intention is to take the rig to various P9 sponsors sites over the next few years. Each P9 project extension runs for four years.

Now with significant South African sponsorship, and the research collaboration with the University of Cape Town, the plan is to share the rig between South Africa and Australia for two years at a time during the life of a project extension.

Professor Franzidis said that while the rig is working with platinum at the moment, there is no reason why it should not be used with any other ore.

The idea ultimately is to optimise flotation circuits by having a simulator to model flotation plants, because current designs are mostly 'hit and miss'.

"This is the only piece of equipment of its kind anywhere in the world that we know about," Professor Franzidis said.

"As a research tool, it is available to all sponsors of the P9 flotation module, of which a significant number are South African."

Commissioning the FCTR at Karee Mine

In Brisbane for the June 1999 P9 meeting, Lonmin Platinum Consulting Metallurgist Bert Knopjes said commissioning the plant hasn't been easy, but potentially worthwhile in terms of Lonmin's plans for the next few years at Karee Mine and other sites on the Lonmin Platinum property.

"We want to know what happens with platinum recovery if we scale up to 50 cubic metre flotation cells from 16 cubic metre," Mr Knopjes said.

"We plan to run the FCTR against 16 and 50 cubic metre cells to get some sort of scale-up number to see whether there is a difference in the performance of different size cells on platinum ores."

But getting the numbers will come only after exercising patience with 'teething problems' synonymous with new technology.

Mr Knopjes said it was easier to build a million tonne a month plant than it is to build a one tonne an hour plant.

"It's tricky because they've had to scale down, not up," he said. "We've got lots of experience and a feel for making things bigger, not smaller."

Despite its size, the FCTR is a full scale float plant, fully instrumented, and scaled down to two tonnes an hour, and it incorporates Mintek's Floatstar flotation control system.

"We've got tiny dart valves and level control, for example, that we are trying to use while feeding normal plant material through it," Mr Knopjes said.

"But we firmly believe we can get some models out of this and we have an interest in power draw, so the FCTR may help us work out our optimal power usage," he said.

"Traditionally we've always put extra energy into platinum flotation, but that may be for non-scientific reasons, and we also want to know if performance decreases as cell size increases."

Mr Knopjes is one of a number of sponsors who are keen to take advantage of test work conducted at sponsoring companies' sites.

"We are looking to get flotation models inside JKSimFloat based on platinum ores," he said.

"The sponsor's advantage with onsite test work is that results from data used in the models are immediately useful because it comes from your own plant."

Mr Knopjes said he was also hoping to take the FCTR to three of Lonmin's five platinum processing plants within a 20 kilometre radius of the Karee Mine. Doing so would test the portability of the rig prior to the rig being dispatched to Australia.

THE LINK WITH UCT

The research connection between the University of Queensland's Julius Kruttschnitt Mineral Research Centre and the University of Cape Town came principally through following similar, yet complementary, interests in the flotation process used in the mining industry.

The link formalised in 1996 through UCT's joining in the AMIRA P9L project as a research collaborator of the JKMRC, initially in the area of flotation through UCT's Department of Chemical Engineering and now also the Department of Mechanical Engineering, where collaborative research is being conducted in rock breakage.

Given the significant South African presence in the project, UCT researcher Martin Harris has been given the responsibility of coordinating the FCTR's use in South Africa.

Approximately 60 representatives from some of Australia's and South Africa's largest mining houses were at the JKMRC in Brisbane during the first week of June to review progress of the P9L Project, which is nearing the end of its current four year extension.

UCT representatives including Professor Cyril O'Connor, Mr Martin Harris, Dr Malcolm Powell and Mr Peter Gaylard were at the international meeting.



Interest at the P9 Review focussed on the FCTR and the potential for further collaborative research between Australia and South Africa in both flotation and comminution (rock breakage) over the next few years.



The team behind the FCTR met in Brisbane, Australia, from 31 May to 3 June 1999 to review progress of the AMIRA P9 project which has led the development of the test rig. From left are: Ken Rahal (JKMRC), J-P Franzidis (JKMRC), Mike Nelson (Baker Process Inc), Martin Harris (UCT), Bert Knopjes (Lonmin Platinum), Mark Cradock (Baker Process Inc). In front are Rob Coleman (UCT) and Ken Levin (Baker Process Inc).

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