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## JK invention turns bauxite into 'gold'

A Western Australian bauxite refinery has potentially saved \$20 million with the installation of a Twin Chamber Pulp Lifter, recently invented by a research student at the University of Queensland's Julius Kruttschnitt Mineral Research Centre.

Sanjeeva Latchireddi developed his invention as part of the internationally renowned AMIRA/JKMRC P9 project, which attracts substantial financial support from the mining industry.

One of the project's sponsors, Alcoa World Alumina Australia, approached the JK MRC to help solve a problem occurring inside the semi-autogenous (SAG) mills used at their Wagerup refinery.

"The restriction was being caused by the inefficiency of how the end of the mill pumped the material out," JK MRC Comminution Research Manager Dr Steve Morrell said.



***JKMRC PhD student Sanjeeva Latchireddi with a pilot scale version of JKJetLift***

Sanjeeva recognised that if you changed the design of the pulp lifter - a paddle wheel type apparatus at the mill's end - you could make the 'pump' work a lot better."

Mr Latchireddi's idea was to 'feather' this propeller which pushes the slurry out.

"A problem with the old pulp lifters is that as the slurry is lifted up, not only does it slide out through the discharge, but it can also slide back through the holes in the grate which it first passed through, effectively 'short circuiting' the process," Dr Morrell said.

"Sanjeeva has angled the blades to keep slurry from going back through the grate, which eliminated short circuiting."

After extensive trials using an ANI pilot scale SAG mill at the JKMRC's facilities in Brisbane, the new pulp lifter began to take on the appearance of a turbine from a jet engine, leading to its recent development and marketing as JKJetLift.

"Alcoa's Wagerup refinery in Western Australia is the first operation in the world with the new pulp lifter," Dr Morrell said.

Before the new pulp lifters could be installed, Alcoa engineers had to adapt the prototype's design to fit their commercial scale SAG mill. Alcoa then fabricated the lifters and monitored mill performance.

"Installation of JKJetLift at Wagerup has increased throughput by 15 per cent from 390 tonnes an hour to 450 tonnes an hour, which is regarded as a massive increase by industry standards."

He said the installation has been so successful that Alcoa may not need to install another mill at Wagerup as planned for the next expansion, effectively reducing the capital required from \$30million plus to around \$10million.

Alcoa Technology Development Group Senior Chemical Engineer Mr Denis Nicoli said the design and manufacture of the Twin Chamber Pulp Lifter (JKJetLift) is one of the mineral processing industry's most significant advances in recent years.

"The new pulp lifter has alleviated congestion in the mill, allowing us to look at increasing throughput by raising the mill's speed and increasing ball charge," he said.

"These options were not previously available due to the restriction placed on the mill by the old pulp lifter."

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