

Swirl Flow mixing technology for the gold industry- improving productivity and reducing scale growth

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ABSTRACT

Many mixing tanks used industrially utilise baffles in order to generate the desired flow pattern for good mixing and particle suspension. These tanks have the disadvantage of structure within the tanks which can generate dead zones which are prone to scaling. Conventional mixing tanks also require that impellers be placed closer to the tank bottom which can lead to burying of impellers in settled solids in the case of unscheduled power outages.

CSIRO has developed an alternate approach (Swirl Flow Technology, SF) to tank design which dispenses with the baffles or any other internal structure such as draft tubes. Most installations consist of a single impeller near the top of the tank at a suitable depth to eliminate splashing. This arrangement develops a swirling flow in the tank which provides excellent particle suspension and increases the flow velocity near the tank walls, leading to reduced scaling. Another benefit is that the impeller is not buried in the case of power outage, thus tanks can often be easily restarted.

SF has been installed in mixing tanks in several industries now including alumina, iron ore (magnetite) and uranium. A recent installation has been in a neutralisation tanks at a gold processing plant in Victoria. Since the SF installation this particular tank has demonstrated a significant reduction in scale growth compared with the previous conventional set up. The rationale behind the SF installation is discussed together with the supporting test work. Results from on-going monitoring of the scale growth are presented. The experience from the gold plant installation together with those from other industries can be used as a platform for other opportunities in the gold industry where tanks could benefit from a SF installation.