

Froth recovery air monitoring



Mining and Metals Case Study 201-1

Application

The concentration and separation of ores in mineral processing operations often requires the use of flotation cells to concentrate and collect the beneficial minerals. Flotation cells rely on precise froth handling for increasing recoveries in roughing, scavenging, and cleaning applications. Accurate and, more importantly, repeatable air mass flow measurements are essential for the efficient operation of large flotation tank cells.

An Australian manufacturer of mining process equipment has developed a method of flotation tank cell automation called "Frothmaster". The Frothmaster system acquires digital images of froth and processes the images by using sophisticated computer imaging and processing routines. This processed data produces very accurate measurements of the

froth as it flows across the flotation cell surface and the froth collection that launders the size of bubbles and stability of the froth.

These parameters are used as indicators of froth appearance to evaluate process performance. The parameters are processed to a controller that calculates new set points for the air flow, tank level, and reagent dosages. The flotation cells react to these new set points and manipulated variables that result in the froth characteristics reaching their desired level again.

Challenge

A mass flow meter, instead of traditional volumetric style flow meters, was required to accurately control the air flow to the flotation cells. Volumetric flow meters were not selected because they are ineffective in directly measuring the volume of air in the flotation tank in relation to the volume of air flowing through the air feed piping. This was due to the large temperature change that occurs in ambient air when compared to the small temperature change that occurs in the slurry.

Project parameters

User	Mining recovery facilities
Location	Various locations
Media	Air
Flow Range	1.25 to 125 SFPS [0.40 to 38 NMPS]
Pressure Range	10 to 50 psia [0.7 to 3.4 bar(g)]
Temperature Range	40° to 100°F [4° to 38°C]

Solution

FCI's ST98 FlexMASter® thermal mass flow meter was selected to be used with the Frothmaster system to monitor and insure that the air flow is closely related to the bubble volume within the flotation tank thereby resulting in increased frothing performance.

The ST98 FlexMASter mass flow meter features exceptional accuracy and repeatability and is not affected by changes in temperature and pressure. The accuracy of direct mass versus volumetric flow measurement provides a level of control that greatly improves product quality and yield for many processes.

FCI flow meter specifications

Model	ST98 FlexMASter®
Media	Air/gas
Flow Range	0.75 to 600 SFPS [0.21 to 172 NMPS]
Pressure Range	0 to 250 psig [0 to 17 bar(g)]
Temperature Range	-40° to +500°F [-40° to +260°C]

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