Consistent information for online process control

Traditionally, flotation plant operators have had to depend on visual assessments of froth appearance when making operative decisions. As interpretations between operators can vary greatly from shift to shift, this can lead to inconsistent process results.

The Outotec FrothSense™ system enables the plant to overcome subjective factors in order to provide consistent information 24 hours a day for use by operators, process control and optimization. The FrothSense system measures several essential properties of froth appearance, including froth speed, direction, bubble size, froth stability and froth color, while also providing statistical data related to these variables. The measured froth properties, together with on-stream analyzer assays, allow the creation of efficient and robust strategies for advanced flotation process control by using a system such as Outotec ACT. In addition, FrothSense delivers live video streams from the froth cameras directly to the control room.

Benefits

- Provides consistent information
  - For use by operators
  - For process control and optimization
- Stabilized process
  - Through the usage of froth properties in process control
- Flexible operation
  - Fully automatic operation
  - Consistent performance
  - Convenient monitoring
  - Simple installation, operation and maintenance
Outotec FrothSense features

FrothSense is a tool for froth surface analysis providing real-time measurements and statistics of:
- Froth speed and direction
- Bubble size distribution
- Froth stability
- Froth color (RGB and CIE-LAB)
- Missing overflow at froth lip - error detection

A typical FrothSense installation has several froth imagers mounted on top of flotation machines. The imagers feature an advanced Power over Ethernet (PoE) solution that makes it possible to transmit all data and power for both the camera and the LED lights with just one standard Ethernet cable. The imagers are networked through FrothSense Connection Cabinets to a FrothSense Analysis Server, which runs the necessary machine vision algorithms and acts as an interface to the plant automation network using OPC.

In order to fully utilize the real-time froth analyses, the FrothSense system is accompanied by Outotec ACT Advanced Process Control system. The ACT system makes it straightforward to control the froth speed of the camera-equipped flotation machines, or optionally even to build a comprehensive grade-recovery system for the optimization of the entire flotation circuit.

Main advantages of FrothSense are:
- High-quality digital network cameras
- Lightweight, allowing easy handling and installation
- Simple cabling – single cable for all data and power for imager and lights
- Central data analysis in FrothSense Analysis Server

In addition to the online analyses of FrothSense, the captured image data can be saved for future inspection. This feature is especially useful in process studies, or if the need arises to develop new algorithms in FrothSense.

FrothSense Server
The FrothSense server is the heart of the operation as it captures and analyzes the footage delivered by the camera network and publishes the results using an OPC server.

FrothSense Imager Assembly
The FrothSense Imager Assembly consists of a high-resolution color camera, controlled LED lighting and a convenient mounting tube. The imager module is designed for flotation plant environments.

FrothSense Connection Cabinet
The FrothSense Connection Cabinet provides a central connection point for up to 16 imagers, featuring both fiber-optic and copper media connections to the plant network. The system supports virtually any network topology, such as the star or ring configurations. The cabinet is equipped with IP67-rated connectors that eliminate the need for opening the cabinet when connecting cameras. The system is designed for easy maintenance access, having all the power supply units and fuses for the cameras and lights in one convenient place.
Outotec solution with FrothSense, ACT and Courier for advanced flotation control
Outotec FrothSense is delivered as an operational package containing:

- Froth Imager Assemblies
- Connection Cabinets
- Analysis server
- FrothSense and ACT Software license
- Automatic froth speed control

(US Patent No. 6,778,881 B1)g

Outotec - A lifetime of service
Outotec provides services for the entire lifecycle of your asset, from single pieces of equipment to entire plants. Outotec offers services through a global network of service centers that are committed to providing support whenever needed.

Outotec services are designed to optimize the customers’ plants, equipment and processes. They cover everything from spare parts and maintenance to plant evaluations and upgrades, as well as project management and training.

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Outotec provides leading technologies and services for the sustainable use of Earth’s natural resources.

As the global leader in minerals and metals processing technology, Outotec has developed many breakthrough technologies over the decades. The company also provides innovative solutions for industrial water treatment, the utilization of alternative energy sources and the chemical industry.

Outotec shares are listed on NASDAQ OMX Helsinki.