

Optimising minerals processing

Using technology to minimise energy used and maximise resources recovered

Challenges

Mineral processing plants need to economically and sustainably separate valuable minerals from waste. Numerous challenges exist for the optimisation of mineral processing plants in a cost effective and energy efficient manner.

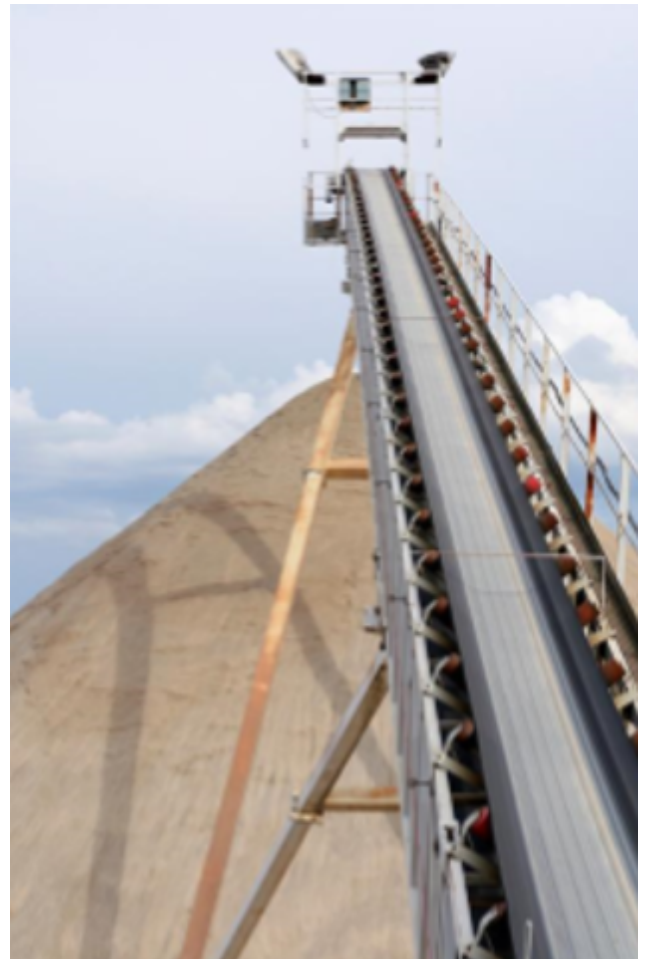
Specific challenges include:

- the maintenance or increase in throughput through the mineral processing circuits whilst ensuring recovery and grade of products are acceptable commensurate with consistent cash flow and minimisation of energy usage and production costs
- ensuring that maintenance, lifetime and utilisation of equipment is consistent with cash flow and profit requirements
- using and/or development of sensor technologies so that process variables for the mineral processing assets are determined accurately, reproducibly and precisely. This requirement facilitates correct determination of process performance indicators as well as opportunities for improved process control
- reducing energy and water consumption
- reducing environmental impacts
- improving processing technology so that marginal ore bodies are accessible for processing
- the understanding of the ore body and how its characteristics influence its processing (geometallurgy)
- the understanding of the process products and how they influence the subsequent steps such as smelting/refining.

The challenge in improving the overall process is that making even small changes to optimise one section of the flowsheet can have unintended or unwanted impacts on several other sections. The key is to understand exactly what is happening within each area of a plant and with each aspect of the processing being undertaken.

Solutions

An understanding of the mineral processing flow sheet, the ore mineralogy and unit operations provide valuable insight into the optimisation that may be required. This insight can be obtained using plant surveys, appropriate sensor measurements and an understanding of the processing route. In some situations the sensor or measurement approach needed for plant optimisation may not yet be available.



Mineral sands, like other mineral processing industries, faces numerous challenges in optimising plant performance.

However, a particular way of thinking about the process – using mathematical models and multiple types and numbers of sensors – may yield the information needed for targeted optimisation.

The fundamental science supporting the diverse processes associated with minerals processing is common to many industries, allowing knowledge from other industries to be applied. The requirements of energy efficiency and sustainability are also common to many industries. Where necessary the researching and developing of new technology is also available.

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expertise in action

hrl: can also provide world-class expert analytical services in relation to optimising minerals processing plant operation.

Drawing on more than three decades experience – including extensive onsite work on mineral processing, sugar processing, coal and power station optimisation – hrl: personnel can assist with the key steps used in mineral processing operations such as comminution, gravity concentration, and dewatering.

Benefits

hrl: world-class expert analysis services assist client decision-making by providing informed predictions of the downstream processing performance of specific ores – information that is critical in evaluating a resource, and in taking the decision to develop that resource.

Clients benefit from hrl: world-class expert analytical services that help predict the performance of their processing plant.

Clients enjoy process optimisation that helps deliver ‘concentrate’ to meet their need for cost-effective ore handling, transport and further processing.

hrl: analytical services including assistance to:

- develop methods to allow cost-effective processing of low-grade or problematic ores
- optimise recovery rates of valuable minerals from ore processed
- transform material into a physical form that helps to optimise downstream processing
- remove minor or toxic elements to improve grade, recovery and downstream processing
- reduce processing inputs including energy
- reduce environmental impacts.

Need more information? Go to hrl.com.au

The company's NATA Accredited Laboratories number is 561.

HRL Technology Group's ISO 9001 Quality Management is certified by BSI under certificate FS605116

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