



**HONEYWELL
FORGE**

A FLUID OPTIMIZATION WITH HONEYWELL FORGE SMART APC

Leveraging Artificial Intelligence and Machine Learning to save water and energy

Case Study

THE SCARCITY SCORE

In a world facing increasing water scarcity and droughts, many industries face water-related operating risks and capital expenditures. Ones that threaten their financial performance and even their license-to-operate. The mineral extraction industry in particular faces the dual challenge of increasing water management costs and growing public scrutiny of the use of water resources.

Stricter environmental regulations and changing climate patterns have multiplied the mining industry's challenges to secure water supplies.

Despite successful efforts to manage water usage more efficiently, increasingly tougher environmental rules are increasing miners' costs and risks.

In particular, those operating in

arid regions or close to populated communities, water management is often the number one area of investor scrutiny, due to its direct impact in the License to Operate for a project.

MANAGING FLOW

Water scarcity in the minerals' concentration process has many impacts. Not only it is a direct cause of production reduction, because of the need to either reduce throughput or fully stopping production lines, but also it puts more stress on some of the equipment, which can result in catastrophic failures and unplanned shutdowns.

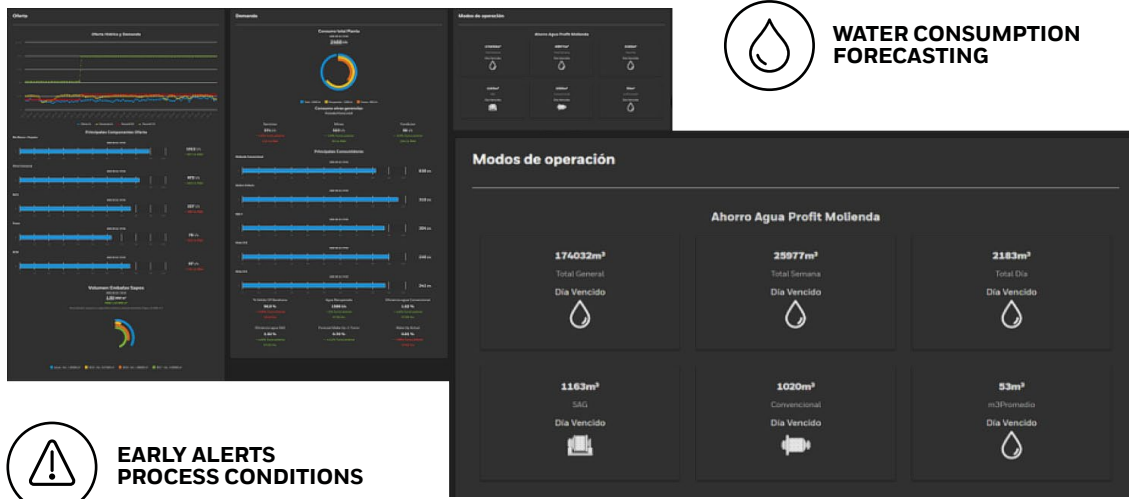
In reduced water conditions, thickeners are subject to torque events. These events can result in damage to drives or rake mechanisms.

In one large copper operation in Chile,

the severe drought of the previous years and the lack of rain in the first months of 2019 caused a very low levels in the water reserves. A study suggested the operation had only a few weeks of water before needing to shut down several concentration circuits.

With this in mind, the Honeywell team engaged in an initiative aiming to improve plant operation during periods of water restriction.

Using Artificial Intelligence and Machine Learning, the idea was to design and implement a water resource supply and demand information platform, for management through water-saving operation modes in Profit Controller applications, integrating multiple data sources in conjunction with a demand forecasting model and alerts against deviations.



The aim of the information and management platform for water resources was to save water in the concentrator plant, based on Profit modes of operation, supported by forecasting models and alerts.

For this the ability to predict the consumption of fresh water in the Concentrator Plant based on current

processing levels, water consumption and recovery conditions, given a future processing assumption was key, as well as timely resource management, consumption planning and supply distribution planning.

The Semi-Autogenous Grinding and Conventional Grinding (Water Consumption and Processed Mineral) and Thickeners (Discharge Solids

Percentages and Valve Opening) process units were considered, too.

An Artificial Intelligence and Machine Learning model was used to predict water demand. The objective was to predict the following Makeup value (Fresh Water Flow / Sum of Tonnages), with grouped data every 4 or 8 hours (forecast for the following 4 hours or next shift).



SAVINGS AND SAFETY

The amount of saved water by this initiative was considerable. An average of 25,000 m³ of water per week was saved. This not only represents a huge environmental improvement, but also allowed the plant to keep operating when water availability would have otherwise forced production lines shutdowns.

Also, the number of torque events-related events – which are due to low water conditions in thickeners – were reduced to zero. This also implies a higher asset and plant availability, reduced maintenance costs, and increased equipment longevity.

The overall benefits of the initiative represent annual values of over USD 5 M, as well as a better environmental and safety footprint.

This document is a non-binding, confidential document that contains valuable proprietary and confidential information of Honeywell and must not be disclosed to any third party without our written agreement. It does not create any binding obligations on us to develop or sell any product, service or offering. Content provided herein cannot be altered or modified and must remain in the format as originally presented by Honeywell. Any descriptions of future product direction, intended updates or new or improved features or functions are intended for informational purposes only and are not binding commitments on us and the sale, development, release or timing of any such products, updates, features or functions is at our sole discretion. All pictures shown in this document are for illustration purposes only; actual product may vary.

Honeywell® is a trademark of Honeywell International Inc. Other brand or product names are trademarks of their respective owners

Honeywell Connected Enterprise

715 Peachtree Street NE
Atlanta, Georgia 30308
www.honeywell.com

Case Study | Rev | 04/2021
© 2021 Honeywell International Inc.

**THE
FUTURE
IS
WHAT
WE
MAKE IT**

Honeywell