BIG DATA AND ARTIFICIAL INTELLIGENCE (AI)
IN STEAM GENERATORS

Written by:

M. Sc, P. Eng. Reinaldo Figuera;
Operations and Completion Manager,
Nakasawa Mining & Energy Ltd.

"**At Nakasawa we focus on continuous innovation and we incorporate into our equipment the functionality of being continuously and remotely monitored through massive data processing; and thus optimize each phase of the Steam Injection Process**".

How to optimize the operating variables in a Steam Injection Process? Proper data processing will define the quality and control of all variables that make up a Steam Generation System, which is integrated by a series of sensors and instruments that generate a large amount of data, and its reading frequency can be adjusted every second or more time; resulting in a large volume of data and a real-time hyperlocal view of the steam injection process quality.

Through a new digital platform (based on a fast, scalable, robust and open source writing language), data is collected in real time to map all operating variables **(steam volume, steam quality, pressure and temperature in each of the core points of the convection, radiation, cyclonic separator, wellhead and downhole completion);** the behavior of each section can be inferred and actions or alerts can be issued to optimize the steam injection process.

MASSIVE DATA PROCESSING (BIG DATA):

By processing all this data together, the platform automatically detects the critical points in each section of the generation system and sends this information to the operators or control room through a simple mobile application. The speed of processing this data contributes to the taking of opportune actions that can be carried out automatically, if they do not represent a risk for the operation of the equipment, or instead, warnings are generated to the operator for the taking of quick actions with the purpose of solving a problem or improving a process.
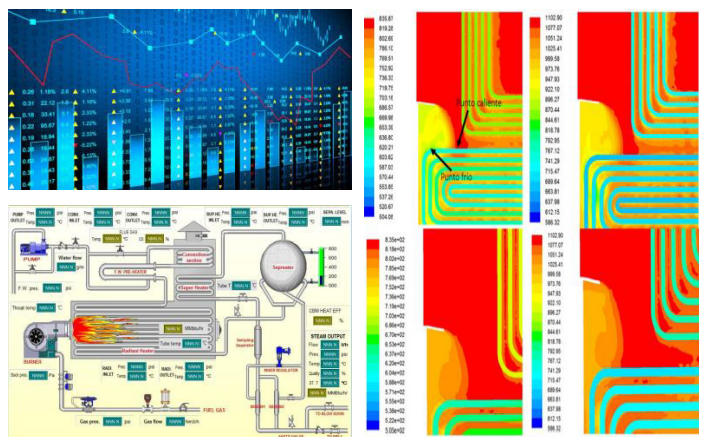
The programming language of the digital platform contains an extensive library of tools that facilitate the analysis and management of data, and allow linking the algorithms of regression, classification and grouping for a rapid processing of the operating variables; as well as providing the system with machine learning functionalities, which can be supervised at any time by the field operator or technical team.

Convection Zone and Economizer Thermal Profile, generated through BIG DATA processing