

IBP1710_11 DESIGN OF A NEW DYNAMIC SIMULATOR FOR HYDRAULIC TRANSPORT OF FLUIDS IN LONG-DISTANCE PIPELINES José M. Muñoz

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ABSTRACT

The stage of beginning of a mining industrial installation, requires to evaluate the feasible operational strategies for the first transport of fluid (water, tailing and/or concentrate), to identify the possible associate risks and to obtain the optimal handling of the systems, to identify the possible associate risks and to obtain the optimal handling of the systems.

A dynamic simulator for the hydraulic transport of the fluids becomes a useful tool for the stages of beginning and the control of the operation in regime.

Through this computer tool, different scenes can be simulated: different volumes and concentrations in weight, batch of pulp, water batch, tendency to the plugging, beginning of flights, energy dissipation (choke) stations with different ring configurations, filling of pipes, among others, obtaining the approximated behavior of the most important variables of the system in function of time, such as: the pressure in different points from monitoring, volumes, position of the fluid in the pipe, approximated location of the flight point or plugging, etc.

The main advantages of this new software are: (i) no require to operate the industrial installation, maintaining his integrity, eliminating the environmental and of the people risks,(ii) to repeat, the times that are necessary, the simulated scene, (iii) to evaluate the flexibility of the systems, (iv) to opportunely detect the possible changes or adjustments in his design, (v) to predict the behavior of the variables of the system and (vi) to train to the operators, being indicated the more frequent operational faults and the form to avoid them, going ahead to possible events of risks.

A simulator needs a stage previous calibration. In the case of operative industrial facilities, variable such as pressure, volume, density, among others, are due to compile, to analyze and to use for the suitable adjustment of the parameters of the model. Nevertheless, in the stage of beginning of a mining operation, the parameters established in the advanced engineering must be used, which added to the experience of the specialist, will allow a good approach to the real situation.

1. INTRODUCTION

The IIMCH (Instituto de Ingenieros de Minas de Chile) Chile plans for a deficit of approx. 23,000 professionals, technicians and workers in the mining sector by 2020 according to the level of planned investment in the business for the country.

In Brazil, according to official figures of the International Group for the Study of Copper (ICSG, International Copper Study Group) and the Brazilian Mining Institute (IBRAM), projected that the country will reach a production of 475,000 tpa of copper by 2014, this means it will be doubling its current capacity.

The situation is no different for Peru, the ICSG according to its global projection of copper for 2020 on a volume of 22.5 million tonnes a year, estimates a 22% global market share for that country rather than 8% today.

It's easy to see then that the projected situation for Chile, regarding the deficit of qualified professionals should be quite similar to South American countries and not dissimilar to the rest of mine-producing countries worldwide, directly involving a significant increase in contracts with little or no experience.

Having a control room operator with no experience in handling industrial products is insane. That operator may even depend on the temporary closure of the mine in case of making the wrong decisions. Therefore, new operators should have an intensive induction basic of hydraulics, hydraulic systems operating, simulators, emergency management, among others. Moreover, they should have frequent re-training (annual or bi-annual), with simulated