

# Abstracts

## **Occupational sicknesses in the colony**

**Carlos Serrano**

## **Heat balance calculation on a furnace for the production of handmade brick**

**Octavio Hinojosa Ledezma**

**Carlos Velasco Hurtado**

Until now, the efforts done by some institutions or people to improve the situation of the handmade brick production in our city were unsuccessful. The fact is that the economical considerations, social or political matters, have some influence in any plan of remediation or improvement.

The concern about this subject is increasing even more through the time, since the urban sector is growing more and more, covering our city in all directions and reaching in this way to areas where the brick kilns are built.

This paper is the second part of an article that was published in La Revista Metalurgica N° 25 (Diagnostic of the brickwork handicrafts in Oruro city). It gives a summarized way of calculation to determine the heat distribution and the thermal efficiency in one of the furnaces that is located in the north part of the city, and then reach into real conclusions about the problems during the burning and to establish solutions for the brickmakers, the city people and the environment,

## **Bio-oxidation of tin concentrates from the Colquiri Mining Company**

**Octavio Hinojosa Carrasco**

**Gerardo Zamora Echenique**

The oxidation processes are used as preliminary treatment for minerals and sulfurous concentrates in order to make possible the further extraction of valuable metals. The available methods for oxidation are hydrometallurgical and pyrometallurgical processes, the latter ones were widely used for the metal extraction, processes that are being replaced by bio-oxidation.

The present work shows once more, that the bio-treatment process can be an efficient and clean alternative rather than the roasting of tin concentrates. In this way, several tests were run with concentrates from the Colquiri mine.

From a sample with the following composition: 42.67 % Sn, 15.46% Fe, 13.07% S, 0.47% As, 0.09% Sb and 3.40 % Zn, it is possible to eliminate 92% of sulfur and the bio-oxidized product has the following chemical composition: 44.47% Sn, 1.15% S, 0.04% As, 3.64% Fe, 0.08% Zn and 0.04% Sb.

The operation conditions for the bio-oxidation of this type of concentrate were: pH, 1.5; temperature, 35 °C; nutritious medium, tuovinen; grain size, 80% - 75 microns; % solids, 20; time, 18 days ( 3 stages of 6 days).

The disposal of impurities, mainly sulfur and arsenic, from tin concentrates by bio-oxidation solves the environmental problem of the emitted gases produced by the roasting process.

## **Gas desulfurization technologies**

**Nancy Rodriguez Aramayo**

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The choice of a suitable system to clean gases and particles for each industry, becomes one of the most important problems in air pollution engineering, since it is necessary to combine technological aspects with economical and legal limitations.

The flue gas desulfurization processes to remove  $\text{SO}_2$  is based on the irreversible absorption by lime, limestone caustic solutions, or by reversible absorption with sodium citrate, magnesium oxide solutions, etc.

The present work contains a review of the different technologies for cleaning gases. The wet desulfurization process limestone/ $\text{CaO}$  is widely known for huge combustion plants, because of its high grades of desulfurization reached and the amount of raw material available in the market, as well as the further possible use of the by-product obtained. The reason why it is better is because it is a simple method, easy to handle, effective, reliable and cheap.

## **Economical valuation of the air pollution mitigation in Vinto - Oruro**

**Limbert Elmer Ferrel Meneses**

**Napoleon Jacinto Eulate**

Due to the presence of steady negative externalities and a very few positive externalities and as a consequence of the man activities related with the environment, there is the necessity to have environmental indicators which can explain and quantify costs or the external benefit.

In this research work, it was quantified the value which represents the quality of the air environment against the permanent air pollution produced by the metallurgical activities around the area of Vinto near Oruro city by using the contingent valuation method. Through the application of a survey, the treatment of the collected information in the econometric model of Hanemann and according to a logistic distribution, it was estimated the mean individual willingness pay per month Bs.12.24 and an aggregated willingness pay Bs 1'717.467,84 per year.