

THE USE OF LATERITES AS RAW MATERIAL FOR THE CEMENT INDUSTRY - A CASE STUDY.

1SHIMADA, H., 2YAMAMOTO, J.K., 3NAKAMURA, R.T., 3PINTO, M.A., 3VERGANI, A. 1Instituto Geológico-SMA, São Paulo, Brazil; 2Instituto de Geociências-USP, São Paulo, Brazil; 3S.A. Indústrias Votorantim, Votorantim, Brazil.

In the cement manufacturing, a raw mix constituted by limestone and clay or clayey material is burned in a rotary kiln. Chemical reactions in the kiln transform the raw mix minerals into others, giving the Portland clinker. The fine grinding of the clinker with additives like gypsum and blast furnace slag in appropriate proportions gives the Portland cement. The composition of the raw mix is controlled by chemical parameters: lime saturation factor (LSF), alumina modulus (AM) and silica modulus (SM), related to the proportions of CaO , SiO_2 , Al_2O_3 and Fe_2O_3 . The MgO content must be limited to 4 %. When the clay is deficient in Al_2O_3 and Fe_2O_3 , it demands the addition of correctives like bauxite and iron ore to the raw mix, in a sometimes expensive operation. This was the case of the Unity 1 of Fabrica de Cimento Votoran, located in Votorantim city, State of São Paulo, where the clayey material, a weathered phyllite, is deficient in those oxides. A study for an alternative material for the correctives listed above was carried out and a laterite deposit, formed from the tropical weathering of granite batholith, close to the factory, was identified as a potential source of such material. Computer simulations of the raw mix composition and clinker production tests using the laterite were performed. The results have proved the successful substitution of the correctives by adding the laterite to the clayey material.