

IDENTIFICATION OF THERMAL AND MICROSTRUCTURAL PROPERTIES OF HOT ROLLING SCALE

B. Maalem, D. BERDJANE, L. Tairi, Y. Faci, S. Djemili

Abstract: A significant amount of scale is produced during casting of ingots and processing of hot-rolled products. In manufacturing steel, during the various rolling operations, the amount of scale produced is approximately 0.1% of the annual production of the rolling mills. The quality of the thin sheet during rolling is affected by the behavior of the iron oxide layers formed on their surfaces. For this reason, acids and oils are used for the descaling of slabs and billets by means of pressurized water. The calamine, contaminated by these various acids and used oils, is rejected and stored involuntarily on important areas and pollutes soil and groundwater. Micrographic observations as well as X-ray diffraction analysis have shown that calamine consists mainly of iron oxides. Hematite and magnetite become the main components for oxidation times greater than 1 hour. Characterization tests have shown that calamine is dense ($\rho = 4.8 \text{ g/cm}^3$), its particle size is variable depending on the degree of oxidation (from 0.5 to 10 mm). Simultaneous thermal analysis showed that an increase in mass of the calamine sample with a release of heat. Studies are underway for the physico-chemical characterization of the soils of the storage areas.

Keywords : Scale, Risks, soil, thermal analysis, granulometry, X-ray diffraction