Organic binders an alternative to Bentonite for iron ore Pelletisation at Jindal Vijayanagar Steel Limited

J.K.Tandon; **D.L.Saralaya;** M.Prabhu; Suresh Kumar

Abstract

Bentonite is well known as a binder additive in molding and foundry. It is also widely used in pelletising of iron ore so that most iron ore pelletising plants consume bentonite as the main binder. This thixotropic clay mineral that acts as an additive, give the iron ore pellets the desired physical and metallurgical properties. However, the amount of binder is relatively high, 0.5-1.0 weight percent. This high level of acid gangue not only decreases the performance of the reducing and melting stages, but also reduces the iron units in the pellet.

The advantages of organic binders over the inorganic binders appear to be obvious with regard to the reduction in gangue content of the fired pellets as well as drop in energy consumption. This have prompted investigations on the use of variety of organic additives including molasses, sugars, starch, cellulose, lignosulphates, humates and many others as possible replacement for bentonite. Generally these attempts have been unsuccessful in that the substances did not meet the standards set by bentonite. However, in spite of these failures, the potential benefits that would derive from the use of organic binder were sufficiently important to reassess this problem.

At JVSL Pellet Plant, with a view to reduce the hot metal production cost and reduce the slag volume at Corex , efforts were directed to explore the applicability of the use of organic binders in pellet making. Two organic binders namely FLOFORM and SIVABIND were tried. This paper deals with the effect of using these binders at various stages/trials at JVSL pellet plant. Their effects on mixing, balling and induration characteristics are dealt in detail.

The investigations indicate that organic binders were advantageous with respect to ballability and green pellet properties. However, induration at high temperature resulted in the decomposition and oxidation of organic binders especially in the temperature range of 250-600 C. The DTA / TG analysis confirmed the findings. The strength of organically bonded pellets during induration were subsequently improved by the addition of 0.2 % bentonite which resulted in the desired metallurgical properties with organically bonded pellets. These pellets during their use in Corex had also resulted in lower slag volume due to the reduction of gangue content.