



**ID: 271**

**Solid-liquid fluidization & its applicability in mineral processing – An initial study on iron ore fines**

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**Abstract**

This paper highlights the potential application of solid-liquid fluidization in the beneficiation of iron ore fines. Liquid-fluidized beds are a type of gravity separators, which stratify the various minerals into layers according to their different specific gravity. A bed of particles of different size and density is fluidized by an upward and downward movement of water. The repeated fluidization allows settling and segregation of particles according to size & density. Decreasing ore grade and increasing tailings generation present difficulties in beneficiation by conventional methods such as flotation, selective flocculation as these methods are size and material/reagent specific. Hence, researchers have started using the fluidization process for the separation of valuable minerals trapped inside low-grade ores and fines/tailings. In the present study, hydrodynamics and fluidized bed behaviour of the iron ore fines have been studied. Physical phenomena such as pressure drop and bed expansion have been discussed in detail. Equations already exist in the literature for calculating these parameters. Calculated and experimental values have been compared. These phenomena as a function of feed size, static bed height, superficial water velocity have been observed and expressed in the form of graphs.

**Keywords:** Iron ore fines, Superficial water velocity, Hydrodynamics, Bed expansion, Pressure drop.