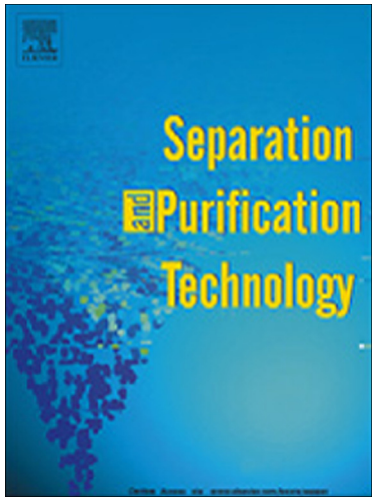

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Effect of settling test procedure on sizing thickeners

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ABSTRACT

The Main portion of the water in mineral processing plants is recovered in thickeners. The required cross-sectional area for thickeners is generally calculated using the Coe-Clevenger, and the Talmage-Fitch methods. Over the years, changes which were made in the original settling tests procedure led to inaccurate results owing to floc structure variation especially for the flocculated suspensions. In this study, the effect of flocculation history, defined as the initial solids concentration where the flocs first were formed, on their settling velocity was investigated using batch settling tests. The suspensions used for settling tests were prepared by two different methods to arrive at equal solids fractions. The methods were the conventional procedure of adding solids to a known amount of liquid and decantation. Results of all settling tests (with and without flocculant) on various ores, and coal suspensions showed that the settling velocity of particles in any solids fraction of suspension in the mass settling region could be affected (up to 5 fold) by solids content of the suspension at which flocs were first formed. The decantation method provided lower settling velocity compared to that of the conventional procedure. This was attributed to different flocs structure and size which were indirectly verified by the settling tests. In the case of Interkarbon coal preparation plant, this translated to 27% underestimation of the thickener capacity. It was then concluded that the settling tests performed to determine the required cross-sectional area for thickening should be carried out either on a single sample with the solids concentration of the thickener feed or various concentrations from the feed to the underflow concentrations provided that the samples obtained by decantation of the feed sample.