Control of spiral classifiers for the concentration of iron ore

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ABSTRACT
Spiral classifiers are gravity concentrators used for processing coal and heavy minerals such as it is the case for the concentration of heavy iron oxide minerals from light silica gangue minerals. The concentration process usually consists of a rougher bank of spirals followed by two stages of cleaning in spirals. The control that is mainly carried out by the operators aims at maintaining a target concentrate grade at a maximum recovery. The control is mainly conducted by adjusting the wash water addition and the openings of the concentrate ports of the rougher spirals. The control is seldom extended to the cleaner spirals. The conventional control strategy is assessed using a process simulator that uses a spiral model allowing modifications to the wash water addition, concentration port openings and position of the reject splitter. The advantage of extending the control to the cleaner spirals is demonstrated although such control would be difficult to achieve without an on-line analyzer that can provide real-time assays of the solids flowing in the strategic streams of the circuit.

Key words: Spiral classifiers, Iron ore, Wash water, Spiral cutter