

Decision Support for Ore Sorting and Preconcentration in Gold Applications

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The ability to apply methods to upgrade coarse feed in gold plants through a process of selective processing has always been of interest. The level of interest has waxed and waned over the last 30-40 years, but improvements in methods and pressure to increase the efficiency of resource utilization have driven greater interest. The resources, not simply being the orebody itself, but the requirements for energy and water and the level of intensity applied.

Despite various advances in technology, the market penetration of selective coarse upgrading, either via physical means (screening, DMS) or sensors (particle or mass sorting), is still limited. In relation to gold, such uptake is further compounded by low concentration and the lack of commercial sensors for direct detection.

In this paper, the authors examine some of the key factors impacting the rate and degree of uptake in the gold sector.

Selective processing, or preconcentration, can take many forms, with this paper primarily examining sensor based particle sorting and DMS. In terms of the challenges, the main areas impacting acceptance and deployment are:

- Ability to match ore and/or waste characteristics to the preconcentration measure;
- Presence of material properties providing strong proxy responses;
- Achieving the required level of upgrade;
- Complexity and cost of associated plant to feed units and to take away product and waste;
- Attitudes towards recovery and the associated value trade-offs;
- Techno-economic drivers for the project.

Understanding each of these factors should allow better first-pass assessments to be made. Such awareness will then logically increase the chances of practical and value-adding applications being identified and progressed, rather than being lost in the fog of uncertainty that pervades this area.