Proving Best Practice Gravity Gold Design and Operation

L D'Uva[1] and G Heard[2]

1. Lisa D'Uva (bEng), Senior Metallurgist, Gekko Systems lisal@gekkos.com
2. Goldie Heard (bEng), Senior Metallurgist, Gold Fields Limited, Gruyere Mine, Goldie.Heard@gruyerejv.com

The development of the three stage gravity recoverable gold test work and modelling, by the late André Laplante and the AMIRA P420 Gold Technology group respectively provided tools that have become the foundation of best practice design and operation of gravity gold circuits using batch centrifugal concentrators. Test work and modelling have enabled the design of predictable, low risk gravity gold circuits, and facilitate continuous improvement.

Gekko Systems in collaboration with Gold Fields Limited were involved in the design of the Gruyere and Granny Smith gravity circuits in 2018 and 2014 respectively, and the upgrade of the Agnew gravity circuit in 2012 and again in 2018. Identifying the opportunity for optimisation and continuous improvement, Gold Fields carried out mill and gravity surveys at each of the respective sites post-commissioning to generate baseline performance data. Modelling of the survey data through the AMIRA P420 BCC Gravity Model generated recovery curves specific to the ore treated and the mill and gravity circuits being operated, enabling both the variation in the recovery established during design, and opportunities to increase baseline recoveries to be verified.

The paper details the application of test work, modelling and performance monitoring of the Gold Fields Greenfield, retrofitted and existing gravity gold circuits. The Gold Fields case studies compare the BCC Gravity Model predicted gold recoveries to those being achieved in plant operation. The paper highlights the competency of modelling in best practice gravity gold circuit design and operation, and demonstrates its benefits, reliability and shortfalls.