



April 2021

MOGALAKWENA NORTH CONCENTRATOR SIMULATION STUDY

Anglo Platinum

Anglo American Platinum requested a dynamic simulation of the Mogalakwena North Concentrator to review plant design changes required for the proposed upgrades. From the simulation study, the most feasible solution in terms of throughput and capital investment was to implement the Low Capex option. This option only sacrificed 8% on plant throughput and resulted in a multimillion dollar saving.

By Willem Daling

INTRODUCTION

Anglo American Platinum requested a dynamic simulation of the Mogalakwena North Concentrator in order to review plant design changes required for the proposed upgrades. The upgrades under investigation were

- Asset Review Improvement Project (ARIP)
- Low Capex
- Debottlenecking Project (DBP)

Main Objective

The primary objective of the study was to analyse the production capability of the Mogalakwena North Concentrator for each operational scenario by identifying bottlenecks within the system.

Challenges

This project received considerable pushback from management because the suggested design could achieve the same throughput as the existing design but at a lower capex contribution.



APPROACH

SET developed a detailed plant model in the latest Simio® Software version to allow for 3D animation of the processing operations. The model included:

- Conveyors,
- Grizzly,
- Feeders,
- Screen splits,
- Crushers,
- Primary Mill,
- Bins, Silos, and Stockpiles

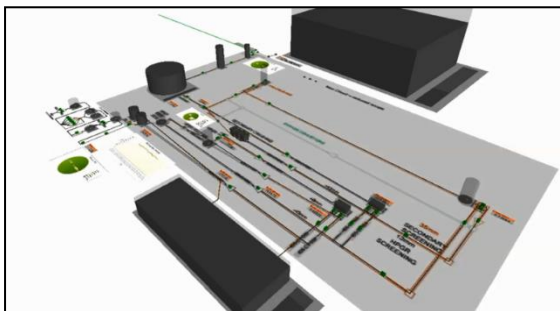


Figure 1: Illustration of the 3D model

The model tested the following scenarios to establish the best update solution:

- Current plant operations as the base case
- Asset Review Improvements Project (ARIP)

- Wet Plant Upgrade
- Wet Plant Upgrade with finer blasting
- Debottlenecking Project (DBP)



Figure 2: On-site construction

RESULTS

The results of the simulation model aided the client in making an informed decision on the large capital investment in the unstable South African Mining environment.

The study identified key areas of concern and the simulation model was used as a platform to compare the results of the different upgrade options.

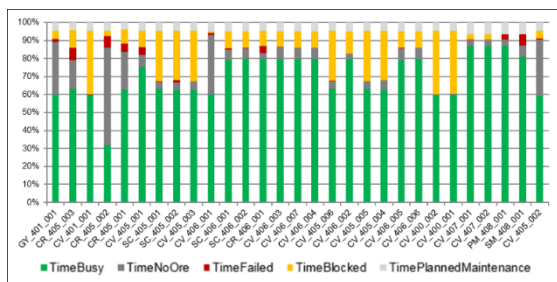


Figure 3: Equipment Utilisation Breakdown

The model also enabled the client to experiment with multiple improvement options until the key objectives were addressed. The image below displays the throughput comparisons for the different scenarios.

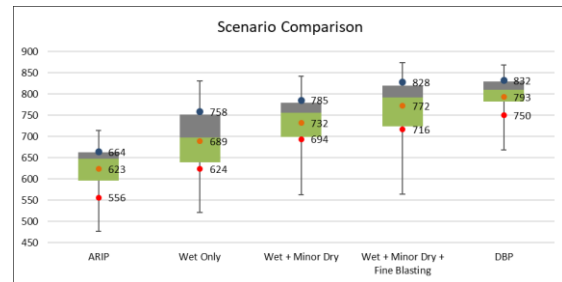


Figure 4: Improvement Option Results

Critical recommendations were made to assist the client in their decision making with regards to the upgrade option to implement.

The simulation model indicated that the debottlenecking project will deliver the highest throughput but at the highest capital investment. The most feasible solution in terms of throughput and capital investment was to implement the Low Capex option.

This option only sacrificed 8% on plant throughput and resulted in a multimillion dollar saving.

ABOUT

4SIGHT | SET

Simulation Engineering Technologies (Pty) Ltd (SET), now part of 4Sight Holdings Ltd., is a consulting company and a leader specialising in creating accurate, discrete event computer simulation models.

The company's mission is to increase a company's outputs with optimal process change decisions that are made with a high sense of certainty and trust.

SET's business model enables its clients to make intelligent decisions that will help reduce capital spend while increasing required throughputs.



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