

## South African Open Pit Mine Filling Station Placement Study

VBKom Projects is a South African Consulting company specialising in Project management, Risk management and Simulation within the mining industry. VBKom Projects were approached by a client to simulate movements of heavy mining equipment in an open pit mine in South Africa. This project was taken on with ongoing support from Simio resellers, such as Analista Modelling Systems (AMS) and forums on [Simio](#) insiders that were invaluable in the completion of this project.

The project is still in progress and this prohibits the declaration of specific details, but the approach followed is provided in this study overview.

The project's aim was to determine the optimal placement of new diesel storage tanks and an accompanied diesel refueling station for the primary haul trucks on the mine. The mine is expanding further away from existing infrastructure. This requires the haul trucks to spend more time on travelling and refueling than haulage. The business case for this project was therefore to reduce the refueling travel and standing time that can be better utilized to move waste and ore. This equates to a significant saving due to the high capital and operating cost of the heavy mining trucks and is of high importance.

The model addressed the following aspects with the capabilities provided by Simio:

- The possible placement/positions for the new refueling station;
- The planned movement of heavy mining vehicle over the life of mine;
- Varying fleet sizes as trucks are decommissioned and brought into service;
- Refueling station processing of vehicles;
- Vehicle task allocation prioritisation process logic;
- Varying distances and speeds between areas as the ore body is mined, e.g. between refueling stations, mining areas, waste dumps and ore crushers;
- Refuel process logic was built in line with the mine operated dispatch system which monitors each truck and fueling station to continually optimize the movement of the trucks; and
- Daily work schedule and crew change over.

“Please view the 3D animation created of the model on YouTube under the VBKom Projects Channel: <http://www.youtube.com/watch?v=0QFiAZ826Vc>”

The ability to make use of standard objects as well as defining specific process logic assisted the team to provide a realistic model that could be verified and validated with operational personnel.

Simio's experiment capability allowed multiple scenarios to be evaluated for each year and simulated for the total life of mine study period. The results indicated that a certain scenario were preferred above the rest due to a lower overall refuel cycle time and distance travelled as well as shorter queue lengths and durations. Further metrics evaluated different fuel station configurations, fueling station utilisation and vehicle fleet sizes. The time saved if the chosen scenario is implemented will justify the cost of building and operating the new filling station.

Our Website: [www.vbkom.co.za/projects](http://www.vbkom.co.za/projects)

## **VBKom Projects Company Profile**

VBKom Projects (Pty) Ltd. is a professional and specialist Project and Risk Management service provider for the mining and capital intensive industries. VBKom Projects provides the following competencies; Project Management Consulting & Facilitation, Simulation, Scheduling & project Controls, Risk Management, Project & Contract Management and Project & Operational Support.

**Analista Modeling Systems (AMS) Company Profile** website: <http://www.analista.co.za>

Analista Modelling Systems (AMS) is a business improvement solution provider focusing its expertise on dynamic business process simulation and performance-based predictive simulation modelling.