Stockpile management

A well-established underground manganese mine in the Northern Cape province of South Africa improved its stockpile management methodology using MineSuite.

The operation is able to provide a variety of products in a relatively short time. Mined material is conveyed to the surface, crushed and screened, then hauled and stockpiled into multiple stacks. Individual stacks are surveyed and analysed to generate an accurate profile.

Shortcomings include the time-consuming efforts when loading a consignment to be railed, and grade control compliance issues caused by loading individual stacks into individual wagons.

The MineSuite Management Information System was first implemented on site in 2005. The performance of processes is measured from the underground ROM bins where material is tipped, through the underground silos to surface silos. Plant performance is measured in two crushing and screening plants.

When the site needed to track material from the plant onto individual stacks to reconcile plant production, the new load-out operation provided an opportunity for MinLog to include this in their MineSuite offering.

Expansion project

The mine expansion and improvement project culminated in a blending bed and train load-out station upgrade.

Two stackers, a reclaimer and fully automated load-out station were built and assembled at the mine to facilitate the rapid load-out of railed consignments to increase production levels. The project scope started at trucks tipping material from the stacks into one of two bins each feeding a stacker.

Various product stockpiles are stacked according to pre-defined requirements, including product and volumes. The process aims to ensure each stockpile is stacked as soon as it is reclaimed, ensuring continuous availability of product.

Stockpiles are designed to cater for two consignments before being depleted. The reclaiming process commences as soon as a new consignment arrives and ends when the consignment departs. The objective is to load a complete consignment within 3 hours or less, an 80% reduction in turnaround time.

MineSuite solution

It became apparent that a gap existed between the stacks and the truck tips. MineSuite had not been used to measure load-out activities, so had no information regarding the stacks and their allocation to consignments. Manual handling with spreadsheets was no longer feasible.

MinLog was tasked with providing a solution, and the analysis phase identified that train activities were also not being managed appropriately.

A Train Load-out and Dispatch Module was implemented to manage train activities and to assign arrived consignments to stockpiles for the load-out station control system to engage the reclaimer appropriately.

A new Stockpile Management Module (SMM) now handles stockpile planning, allocation of stacks and stockpile monitoring.

> The Stockpile Management Module was developed and deployed within 3 months.

MinLog was able to identify and design the SMM around the given process flow as demanded by the stacking, reclaiming and load-out processes, with special consideration to various functional roles. These roles were clearly defined with respect to fitting into the process before any functionality was developed.

Another functional requirement was to manage and monitor the stockpile state changes. These are quite complex, as each stockpile caters for two consignments. In addition, the control environment had to be designed to handle automated state changes and be integrated with the SMM.

The mine expansion and improvement project is in its final stages, and feedback is extremely positive. MinLog has delivered on time, within budget and in scope, developing a new, fully functional module in record time.