

Improved Mine Throughput ensures sustainable Return on Capital

Background

Optimal throughput is a key objective for the successful operation of any manufacturing or processing business. In the mining industry in particular, in order to obtain maximum return on the significant capital investment in the physical assets involved, ensuring continuous throughput is a major focus for the complete chain of command. Failure to meet throughput objectives becomes a major source of distraction for management which too often, attempts to solve ore shortages by 'forcing' and 'enforcing' production targets. This focus on short term fixes and the lack of attention to addressing root causes frustrates operators who attempt to satisfy unattainable short term targets and lose sight of the long term goal.

In this client case study, The Asset Partnership working closely with mine operations, has shown that a revolutionary process view of the operation together with appropriate planning decisions allows increased throughput to be achieved and high levels of asset utilisation.

Need

Our Client had ambitious plans to increase throughput volume by 10% within a 4 month period to allow budgets to be achieved with the financial year. Volume is a function of the interplay of a multi-node ('siloed') production system and its associated inventories, each node of which on the face of it at least, had more than enough "demonstrated" capacity to meet these plans.

Actual volume being achieved at the end point of the system was well below demonstrated capacity and the system operated with an extraordinarily high standard deviation. The key issue in terms of making or exceeding plan was "How to substantially reduce the variability of the system with inventories between nodes matched to nodal variability".

Approach

Following a detailed process definition phase, during which the team analysed and quantified the Root Causes of the reduced throughput and extreme variation, the project drew up a new business model for the operations. This business model was then implemented with planning processes, operational meetings, with clearly defined measures and accountabilities changed to reflect the new model.

Following the bedding-in of the process changes, the client was confident enough to allow the organisation structure to be changed to align with the new process responsibilities.

ASSET MANAGEMENT MATTERS

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THE ASSET PARTNERSHIP is an Australian based consulting organisation which works with clients to assist them achieve substantially higher and sustainable value from investment in physical assets.

THE ASSET PARTNERSHIP's value propositions are to provide clients with:

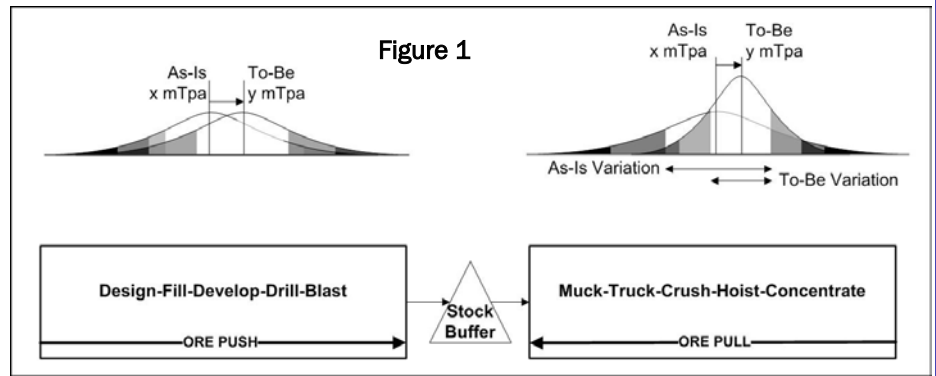
- *Rapid, measurable and significant increases in asset productive capability*
- *Reductions in asset ownership costs and operating risks*
- *Optimised capital outlay*



The New Business Model

The process analysis showed how operations involved 2 distinct process flows, each having their own process characteristics.

Figure 1 shows these flows and demonstrates the As-is and To-be conditions designed in our solution.



The Ore Push

The processes within the *Ore Push* were characterized by:

- Longer lead-times
- Extended decision cycles
- High potential underground interactions
- Impact on mine NPV
- Scheduled 'time buffers' to protect downstream operations
- Supply Push driven

The Broken Ore Stock Buffer

The *Pull* process is deliberately separated from the *Push* by a buffer of broken ore that is designed to allow:

- Different process variability upstream and downstream
- Protection of downstream flow to ensure the pull process never stops for want of broken ore

The process constantly monitors the level of buffer available both in the immediate term as well as long term in order to protect future throughput of ore to the Concentrator

The Ore Pull

The processes within the *Ore Pull* are characterized by:

- Short lead-times
- Fast decision cycles
- Factory-flow mentality
- Inventory buffers connect customers and suppliers within a balanced flow
- Continuous throughput
- Demand Pull driven

Outcomes

The following graphs are an extract from the process scorecard implemented as an integral part of the solution to allow

Figure 2

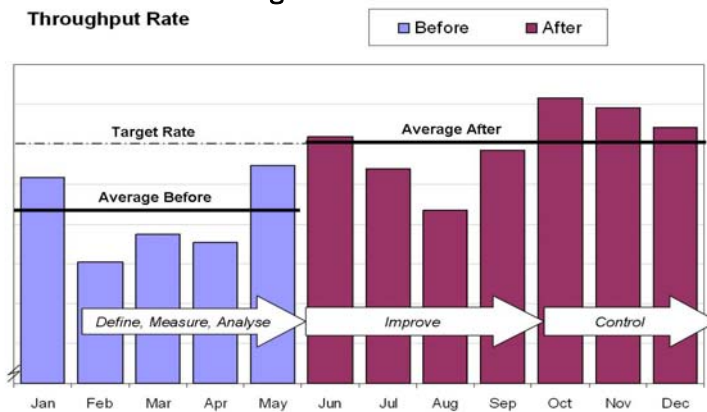


Figure 2 depicts the throughput run-rates as measured throughout the project. The team focused on balancing the flow of ore through the nodes with the intent of getting more out with less input effort. This less input effort manifested itself as windows of time that allowed 'opportunistic' maintenance to be performed. Which, through fine-tuning, allowed for addition reliability of the major systems.

Figure 3

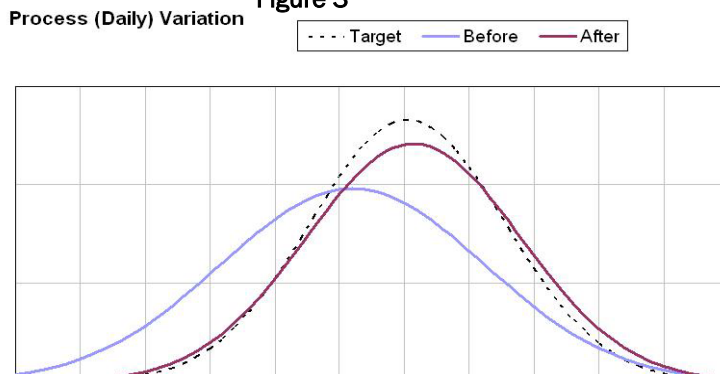


Figure 3 depicts the standard deviation as measured at a daily level within the process. The target shown is in actual fact the maximum variation that is achievable within the mode of operation of the mill. Milling being the last process in the operations.