

CASE STUDY

Improving site safety while maximising throughput

GEAR

Application
Single site

Module
Shutdowns

The Customer

A world leader in the production of commodities globally. Primary business focus lies on extraction of minerals, but with significant operations in refining, especially of iron ore.

The Challenge

Regular maintenance shut windows are scheduled to ensure that a major processing plant is maintained optimally for it to process at its maximum capacity. During these shut windows, there are thousands of maintenance tasks that must be carried out that all have:

- the next required time
- repeating frequency
- duration
- number of workers and required skills

Each shut window varies in duration and requires a large workforce to conduct the maintenance. A major concern during each shut is keeping an acceptable level of safety risk by managing the amount of workers on site.

The challenge was to create an effective shut strategy that aimed to reduce worker related safety risks, maintain the plant effectively, while maximising plant throughput.

About GEAR

GEAR uses industrial mathematics to optimise asset maintenance strategies and schedules while adhering to complex constraints such as task interactions, contractor limitations, safety thresholds and system impacts.



The Value



Efficiency

Removal of redundant shut windows



40%

Reduction of workers during peak maintenance periods



Throughput

Increase in overall throughput



The Solution

To achieve the desired result of increasing site safety, it was important to lower the number of workers on site per shut. Off the shelf software was not available and the size and complexity made this a particularly difficult problem to solve. Working closely with the customer, Polymathian designed and developed bespoke optimisation software that integrated with their existing system.

This software acts as a decision support tool and utilises the latest in mathematical programming to provably select the best allocation of maintenance tasks to shuts given the challenge. The tool is able to be used operationally and strategically; operationally to allocate maintenance tasks to shuts, and strategically to evaluate alternate shut strategies. Not only is the tool able to produce the optimal strategy, it helps to validate and cleanse many thousands of rows of maintenance related data.

In addition to the software, Polymathian provided consulting services to run a number of scenarios and to make recommendations.

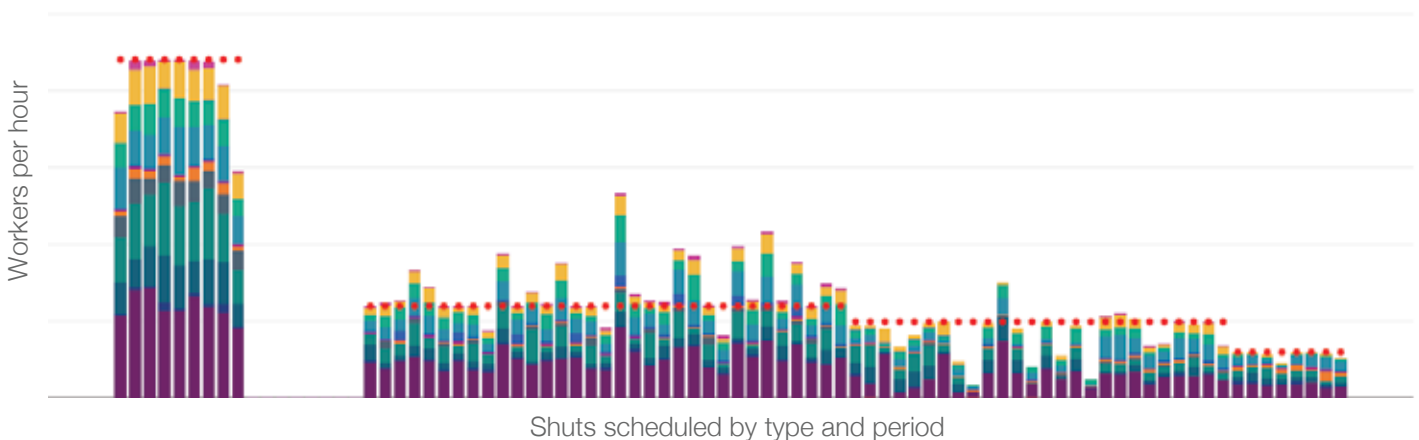
The Benefits

Polymathian were able to recommend a strategy, that removed unnecessary shut windows and resulted in:

- a better stockpiling profile
- improved maintenance conformance
- an increase to throughput
- cost savings by removing unnecessary shut windows
- minimal loss of tool time

As a result, the tool successfully produced a strategy that saw a 40% reduction of workers during peak maintenance periods. This was a phenomenal result as it greatly reduced the site's safety risks while improving overall plant throughput. This was all achieved with minimal disruption to previous planning processes and rapidly delivered in fourteen weeks.

Workers Required Per Shut



Recommended optimised strategy for maintenance shut windows.