



JAMIESON GROUP

Client Success

CORTEZ HILLS OPEN PIT - Maintenance



Preventative Maintenance Project

Background

Cortez Gold Mine is a large gold mining and processing facility in Lander and Eureka County, Nevada, United States, located approximately 75 miles (120 km) southwest of Elko. It is owned and operated by Barrick Gold and comprises the Pipeline and South Pipeline deposits and the Cortez Hills deposit. Pipeline and South Pipeline are open pit mines, while Cortez Hills is an underground and open pit mining operation. Under continuous operation, Cortez has been open longer than any gold mine in the state of Nevada. It is Barrick's and Nevada's largest gold producer.

The Challenge

Cortez Management commissioned the Jamieson Group to undertake a Business Review in the Mine Operations Department. Jamieson Group commenced a fourteen week project to launch the Mine Improvement Program and to address four focus areas of opportunity identified during the Business Review:

Focus Area one: Organizational Development.

Focus Area two: Technical Limits.

Focus Area three: Short Interval Control (SIC).

Focus Area four: Maintenance. Preventative Maintenance Review and standardize major PMs (shovels and trucks) with the objective of reducing the duration of E-PM tasks (large PMs) to standardize tasks, planning, sequencing, manning and staging. The objective being to reduce the E-PMs duration from 12 to 10 hours.

This case study focusses on Focus Area four - Maintenance – Preventative Maintenance.

The Approach

The Management Team responsible for the project were keen to have their people, particularly the Supervisors, involved in the project from the outset. The Jamieson Consultants were therefore working with a highly qualified Task Team of Cortez employees who provided local expertise and ensured high levels of buy-in. This has been critical to the success of the Project.

Cortez Mobile Maintenance structures its PMs into five categories based on the number of hours the machine has operated and therefore the size and complexity of the PM. There are five levels of PM: A-PM; B-PM; C-PM; D-PM; and E-PM.

Initially it was felt the greatest improvement would be achieved if the duration on E-PMs was reduced by two hours, the rationale

being the E-PM had the longest duration. An initial study of the planning and execution of all PMs showed the same shut down duration of twelve hours. The exception was the A-PM which required a simple oil sampling to ensure compliance with the warranties. Thus the greatest opportunity was to reduce the PM duration on all B, C, D, and E Shovel and Truck PMs.



Project at a Glance

REGION

North America - Nevada

INDUSTRY

Mining

COMMODITY

Gold

KEY ACHIEVEMENTS

- 45% reduction in current average time to execute a PM
- 3.1% increase in Shovel availabilities
- 5% increase in Truck availabilities



The planning documentation for all Shovel and Truck PMs was reviewed. Twelve full day PM execution observations on Shovels and Trucks were documented and presented to the Maintenance Management Team. The average duration of all PMs involved 16 hours of down time while, without exception, the actual work duration was less than six hours. This included the down time associated with releasing the equipment from Operations and washing the Trucks, which often added three to four hours to the PM.

Existing PM documentation was broken down into discrete activities which varied between 150 and 300 individual steps per PM. These steps were simplified and reordered to allow for specific activities to be removed from the PM. Those that could be more efficiently performed at another time, such as inspections, were separated from the PM and, in an effort to reduce the travel time (waste) involved in working on a large piece of equipment, we ensured all work for a particular area of the machine was grouped and the Work Order was laid out area by area.

The planning documentation and observation data on all PMs was workshopped and re-engineered with the Maintenance Planning Group which generated ideas that were then reviewed with the Maintenance Supervision Group, also during a facilitated Workshop.

A new Pre-PM Inspection process, along with all of the above processes and documentation, was then tested in the field. Once the testing was completed PM work packets were amended and crew and supervisory training was completed. Changes were then implemented to the staging of the work in preparation for PM, and for communicating with Supply Chain and Operations regarding the release and re-commissioning of mobile equipment.

Mobile Maintenance Supervisors, Planners and the Reliability Engineering groups Position Descriptions and Task Lists were amended to match the new processes, and a Skills Flexibility Matrix was populated specific to the skills needed to effectively plan and execute each PM.

The final process change was the implementation of supervisory quality assurance checks during the PM. This SIC has proven to be instrumental in controlling the quantity and quality of the work.

All planned maintenance is now taken into consideration by

Technical Services when detailing the weekly to shift mine plan. The Maintenance Schedule is presented to Technical Services on Thursdays after Maintenance and Operations have agreed on the Maintenance Schedule for the week.

The 'Maintenance Aware' by shift targets form part of the SIC which is delivered to Operations each morning. Any Operational reluctance to comply with the plan is discussed and agreement is reached between Operations and Maintenance as to what equipment will be released to maintenance the following night and day shifts.

The Success

In a short fourteen weeks the Project KPI in Mobile Maintenance has far exceeded the goals. Improvements in morale and increases in the levels of discretionary effort through clarity of purpose, working in conjunction with new and efficient processes, improved supervision, communication and cooperation with customers and suppliers have had a beneficial flow on effect to all maintenance activities. Current average time to execute a PM has been reduced by 45%; Shovel availabilities have risen 3.1% and improvements in the quality of work execution have seen a turn-around in the declining MTBF KPI. Truck availabilities have risen 5% and again work execution quality improvement has had a positive impact on truck MTBF.

These have been achieved while the Maintenance Department has remained 4% (\$3,000,000) under YTD Maintenance Budget.

In addition to the original brief a Mobile Maintenance KPI Dashboard and Review Process was developed and installed. And, to further support 'Sustainability', a self-executed program of Continuous Improvement (CI) was designed and implemented in Mobile Maintenance. 'Plans on a Page' were developed for each functional area of Mobile Maintenance detailing a number of CI initiatives and simple 'CI Top Ten' report was implemented which will be used by each functional lead to communicate progress of each CI Project on a weekly basis to the Mine Senior Leadership Team.

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