Problem Statement Worksheet (Hypothesis Formation)

What changes can Monalco Mining make to ore crushing operations and associated equipment maintenance practices to cut estimated annual ore crusher maintenance costs by at least 20% before the end of Q3 2019?

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1 Context

Monalco Mining is an iron ore mining company facing a declining iron ore market. The price per ton of iron ore fell to $55, nearing Monalco's operating break-even point of $50. Under current operating and maintenance regimes, escalating maintenance costs threaten the company's profitability. The management team at Monalco indicates a need to reduce annual maintenance spending for ore crushers. Subject matter experts report significant discrepancies in annual spending on the maintenance of these assets, and preliminary investigations suggest ample room for improvement.

2 Criteria for success

A 20% reduction in annual ore crusher maintenance costs would safeguard Monalco's profitability for the foreseeable future. To counteract anticipated increases in maintenance spending over the course of this year, proposed changes must be tested and implemented by Q3 2019.

3 Scope of solution space

Ore crushing operations and related equipment management and maintenance practices. Changes should be implemented within the calendar year, by the end of Q3.

4 Constraints within solution space

The ore crusher OEM imposes a lower bound of one maintenance event for every 50,000 tons of ore processed. Cuts to maintenance events must not exceed this limit. An unspecified production volume must be maintained. Additional information is required.

The reliability engineering team is likely to oppose a reduction of maintenance events and cuts to the ore crusher maintenance budget. It will be necessary to schedule a meeting bringing together the reliability engineering department head, the maintenance subject matter experts, and the asset integrity manager, followed by a subsequent meeting with the reliability engineering team. This should lessen friction in subsequent interactions with reliability engineering and support compliance with proposed changes.

4 Constraints within solution space (contd)

Ore crusher maintenance costs are estimated to exceed $45M for 2019. Proposed changes should be tested and implemented no later than Q3 2019.

5 Stakeholders to provide key insight

Chris Hui - Insights and Analytics team lead
Chanel Adams - Reliability Engineer
Jonas Richards - Asset Integrity Manager
Bruce Banner - Maintenance SME
Jane Steere - Principal Maintenance
Fargo Williams - Change Manager
Tara Starr - Maintenance SME

6 Key data sources

Ore Crusher System - A high-level process map specifying how individual crushers interface with related resources and personnel.

Data Historian - Information on how many tons of ore have been processed by each crusher. According to diagrams provided by SME Tara Starr, T3000 sensor information is streamed to and potentially logged in Data Historian.

T3000 DCS - The system responsible for streaming sensor information from ore crushers to Data Historian, including vibrations, temperature, and humidity.

Ellipse (Archival) Database - Work orders and equipment logs generated prior to SAP upgrade.

SAP Database - All past and present work orders and equipment logs generated since upgrading from Ellipse.