

Problem Statement Worksheet (Hypothesis Formation)

How can **Monalco Mining** reduce annual maintenance expenditure by 20% within the next year by (1) avoiding 'excess wear' to cut down maintenance event and/or (2) doing maintenance every three year or every 50,000 tons of iron ore processed, without facing resistance from the reliability team.?

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1 CONTEXT

(1) Background of issues

Monalco Mining is one of the world's largest iron ore mining companies. Demand for iron has been increasing around the world and market prices have ramped up significantly to \$110 per ton of iron ore. To accommodate market demand, Monalco has invested heavily in operating technologies such as ore-crushers and has poured money into maintenance to maximize production of iron ore. However, with the increased market supply, which is rapidly overtaking demand, prices have now shifted downwards, averaging \$55/ton.

(1) Management decision

In response to worsening market conditions, the management team at Monalco has decided to focus on streamlining costs, particularly maintenance expenditure, to limit the impact this has on the business' profitability

2 CRITERIA FOR SUCCESS

Successful for this project = A clear set of actions to test to reduce annual maintenance expenditure by 20% over the next year.

3 SCOPE OF SOLUTION SPACE

A exploration and plan for the reduction of the maintenance expenditure will be conducted specifically for the ore crushers, which Monalco purchased as part of Monalco's CAPAX enhancement initiative.

4 CONSTRAINTS WITHIN SOLUTION SPACE

There are 'excess wear' which caused the increase of the maintenance cost. Therefore, some optimized plan for the Ore production will be needed.

Monalco maintain the ore crushers every year. The maintenance event should be reduced and conducted every three years or every 50,000 tons of iron ore processed without resistance from the reliability engineering team.

5 STAKEHOLDERS TO PROVIDE KEY INSIGHTS

Chanel Adams	: Reliability Engineer,
Jonas Richards	: Asset Integrity Manager,
Bruce Banner, Tara Starr	: Maintenance SME,
Jane Steere	: Principal Maintenance,
Fargo Williams	: Change Manager,
Chris Hui	: Team Leader

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6 KEY DATA RESOURCE

(1) Main Data Resource

1. Data Historian
contains data on how many tonnes of Iron Ore we have processed with the ore crushers.
2. Ellipse
contains data on the old work orders that used to be raised for equipment, before our upgrade to SAP.
3. SAP
contains data on equipment logs and work order requests that have been raised for maintenance work for ore crushers and other pieces of equipment

(2) Additional Data Resource

4. T3000 DCS
contains raw streaming data on vibrations, temperature, and the humidity of the ore crushed to Data Historian
5. Ore Crusher System
contains a high-level process map outlining how the Ore Crusher System works for individual ore crusher models.

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