

# Problem Statement Worksheet (Hypothesis Formation)

**How can Monaco Mining Company streamline their annual operational costs by reducing the maintenance costs of the ore-crushers by 20% this year?**

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## 1 Context

Monaco Mining Company expanded their operational capacity through purchasing additional machinery while the market price for iron ore rose to \$110/ton. The market price for iron ore has now fallen to \$55/ton. Monaco Mining Company has a \$50/ton break-even point, and needs to reduce the annual operational costs in order to return a profit while withstanding the worsening market conditions.

## 2 Criteria for success

- Annual maintenance expenditures for the ore-crushers will be reduced by 20%.

## 3 Scope of solution space

- Reduce annual maintenance expenditures of \$30M for ore-crushers by reducing standard maintenance to every three years rather than every year.

## 4 Constraints within solution space

- Current maintenance expenditures are projected to raise to \$45M annually by the end of this year.
- Excessive wear routinely placed on the ore crushers results in 80% of the maintenance requests, and per OEM requirements, one maintenance event must be completed for every 50,000 tons of ore processed.
- Resistance from the reliability engineering team is expected.

## 5 Stakeholders to provide key insight

- 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

- Data Historians - quantity of ore already processed by ore-crushers
- Ellipse Maintenance Database - work orders placed prior to SAP
- SAP - equipment logs, work orders, and maintenance requests for placed after the update from Ellipse
- T3000 DCS - Sends raw streaming data on vibrations, temperature, and the humidity of the ore crushed to Data Historian
- Ore Crusher System - includes high-level process map outlining how the Ore Crusher System works for individual ore crusher models

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