How Rithmik would have prevented a $650,000 engine failure 21 days before it happened.

At a Peruvian copper mine, the OEM onboard alarm on a CAT 793F haul truck fired 7 minutes before failure. Here's what Rithmik's analytics platform saw that the onboard system missed.

$650,000
Preventable engine failure cost

21 days
Early warning from Rithmik's analytics platform

vs.

7 minutes
Warning from the OEM onboard alarm

Rithmik is a prescriptive analytics platform for surface mining operations.

Diagnosis, not just detection. Purpose-built AI for mobile mining equipment that tells the right team what to fix and why, bridging the gap between operations and maintenance — reducing maintenance costs, improving availability, cutting unplanned downtime, and optimizing fuel efficiency.

01 — Context / Problem

A CAT 793F haul truck at a Peruvian copper mine failed catastrophically under maximum load on December 28.

It was the latest in a series of systemic engine failures on this fleet. After the failure, the operator engaged Rithmik to examine whether it was predictable, when, and how.

> *The question: was the failure detectable before it happened, and if so, when?*

02 — Anomaly Detected

Given only the truck's historical sensor data, Rithmik's analytics platform flagged an anomaly on December 7, 21 days before the failure.

A sudden step increase in engine oil restriction, subtle enough to go unnoticed by the onboard systems, was the first visible symptom of progressive damage.

On December 23, a scheduled maintenance cycle addressed the visible symptom but left the underlying damage intact. Five days later, the truck failed under maximum load. The OEM onboard alarm activated seven minutes before the failure.

03 — Signal Analysis

Rithmik Proprietary Analytics Model, Engine Oil Differential Pressure

04 — Failure Mode Diagnosis

A Maintenance-Induced Failure With 80% Confidence

Failure Mode
Oil contamination from maintenance event causing progressive component wear.

80%
Confidence

Evidence
Oil contamination likely introduced during maintenance on December 8 led to elevated filter differential pressure.

Oil temperature 104°C vs coolant 93°C — suggests friction heating from metal-to-metal contact.

104°C
Oil Temperature

93°C
Coolant Temperature

Category
Maintenance

Component
Engine - Lubrication System

Date
December 8

05 — Outcome

A $650,000 Preventable Failure

Had Rithmik's platform been running at this site, the failure would not have happened. The anomaly flagged on December 7 was actionable for 21 days. Instead, 14 days of continued operation passed before any maintenance action, and when it came on December 23, it addressed the symptom but not the damage. By then, the damage was irreversible.

On December 28, under maximum load, the compromised components failed. Oil pressure dropped, filter differential increased, oil temperature spiked, and the engine derated.

> *"Rithmik showed their AI solution could reveal early indicators of genuine equipment issues beyond what was available from the manufacturer's alarms.*

— Superintendent of Reliability
Canadian Mining Operation

Book a 20-minute walkthrough at **info@rithmik.com** and see what Rithmik would surface on your fleet.