

MineOS – Proof-of-Work Operations for Iron Ore

MineOS adds the missing operational layer that verifies work at the source. It connects planning to reality with proof-based execution — ensuring critical mining actions are planned, executed, verified, and accountable without replacing your dispatch, ERP, or plant control systems.

1. Why Iron Ore Needs MineOS Now

- Shrinking grade margins and dilution risk
- Dependence on crusher/beneficiation continuity
- Contractor-driven execution variability
- Invisible losses between plan vs. reality

Existing systems show movement and totals; they rarely prove correct execution at the face.

2. The Global Execution Gap

- Answers today: Where did equipment move? How much output? What broke?
- Missing answers: Right grade? Segregation kept? Why did plant stop? Where did value leak?

MineOS converts daily work into verifiable Proof-of-Work to close this gap.



3. Why No Single Global Tool Exists

- Fleet: tracks movement, not material integrity
- ERP: stores records, not execution proof
- Safety: logs incidents, not behaviors
- Analytics: explains history, not live causality

MineOS uniquely unifies task-level proof, grade accountability, mine-to-plant causality, contractor discipline, and AI execution intelligence.

Core Concept: Proof-of-Work Operations

Work is no longer self-reported. Each critical activity is a micro-task with evidence rules. Completion requires operational proof — not paperwork.

- Grade-specific excavation confirmation
- Stockpile segregation validation
- Crusher feed continuity proof
- Rehandling detection and attribution
- Downtime causality tagging

Proof Examples

- Face photo + shovel GPS + geofence tag
- Segregation boundary photo + stockpile ID
- Feeder uptime + queue telemetry
- Truck cycle anomaly + double-handling flag
- Time-synced stop reason linked to task

Operational DNA – Key Differentiator

Mine Reality	DNA Profile	Outcome
Ore body behavior, grade variability, equipment mix, plant sensitivity, contractor practices.	Acceptable cycle times, quality thresholds, task dependencies, deviation tolerance.	Performance judged against site-specific DNA — relevant, fair, and actionable.

Shift Execution & Proof Engine
Auto Task Sequences: Pit to Crusher
Dependency Rules
Multi-signal Proof Exception-First Validation
Outcome: Execution Verified

Grade Discipline & Material Integrity
Grade Verification
Segregation Enforcement
Rehandling Detection
Outcome: Prevent Grade Loss at Source

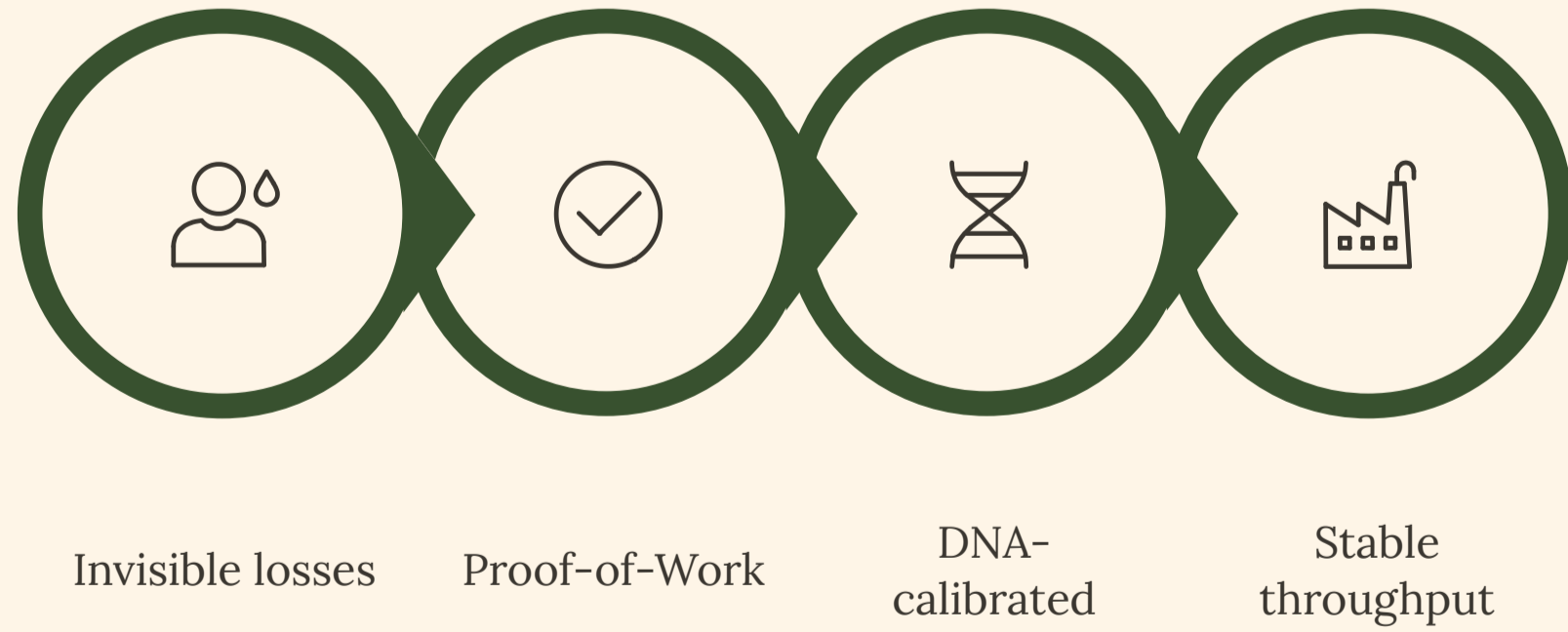
Plant Continuity Protection
Crusher Feed Continuity
Start-Stop Causality Downtime Intelligence
Mine-to-Plant Alignment Downtime Intelligence
Outcome: Trace Disruptions to Mine Actions

Accountability Ledger
Immutable Task Records
Supervisor Approvals
Contractor Traceability Audit-Ready History
Outcome: Evidence over Disputes

AI-Driven Execution Intelligence

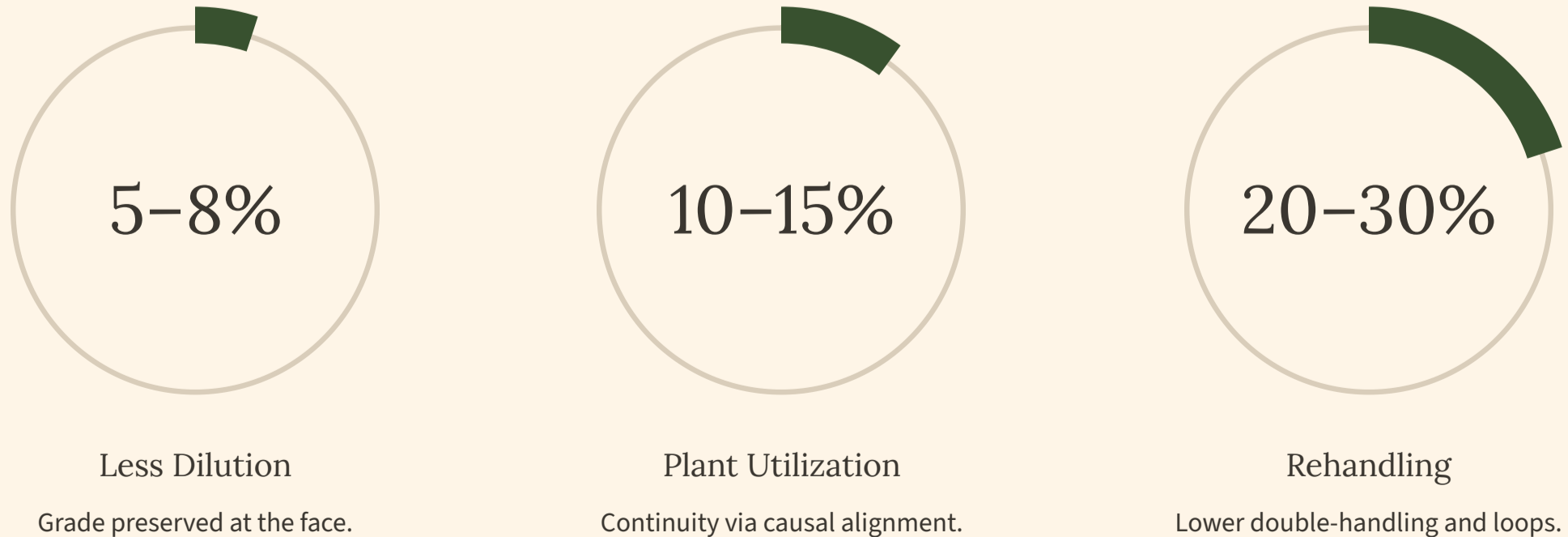
- Early Warnings**
Predict shift failure risk from sequence drift, queue health, and face readiness.
- Hidden Loss Patterns**
Uncover rehandling loops and micro-stops masked in averages.
- Dilution Signals**
Correlate grade dilution with task behavior and bench sequencing.
- Root Cause**
Link plant downtime to upstream execution with time-synced causality.

“Recurring grade dilution in Bench-4 is caused by sequencing deviation, not ore quality.” — Insight surfaced before loss accrues.



MineOS shifts operations from volume-driven to value-driven by institutionalizing proof, preserving accountability, and stabilizing mine-to-plant flow.

Conservative Outcome Promise



Plus: fewer contractor disputes, faster closure, and stronger execution discipline — with no process change and no disruption, only verified execution.

MineOS: The Missing Execution Layer

Ensuring iron ore is mined, handled, and delivered exactly as intended — every shift, every bench, every ton.