OCTAVE

WHITE PAPER

# Mine smarter, not harder

How to achieve peak productivity through operational and maintenance excellence

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# Introduction: Get data and innovation on your side

If it's not grown, it's mined. That simple truth puts mining at the core of the decarbonized and digitized world being built today. And the pressure is rising. The International Energy Agency (IEA) predicts mineral demand from electric vehicles (EVs) and battery storage alone will grow between ten and thirty-fold up to 2040.

This creates a major opportunity for miners, even with the headwinds. Geopolitical risk, supply chain disruption, market swings and the fast pace of digital transformation continue to reshape the industry. Even this battle-tested sector is seeing challenges it has never faced. Managers and operators are expected to deliver greater value while navigating these complex problems. Meeting demand requires improving ways to extract, optimize and recover critical minerals and metals, amid declining ore values, rising prices and increasing environmental pressures.

## Changing attitudes, achieving pace

To achieve these aims, digitization proves essential and leaders increasingly recognize its value. More than half (59%) of respondents in a recent EY survey for its 'Top 10 Risks and Opportunities for Mining and Metals Companies in 2025' said digital initiatives are critical to the success of the organization. Yet, the consultancy highlights that while the culture has shifted toward digitization, a significant challenge remains in overcoming an entrenched old-fashioned mindset.

But there is no time to waste. As Deloitte highlights in its annual report, Tracking the Trends 2025: Leading Through Transformational Change in Mining and Metals, assuming market commanding positions in the current complex, rapidly evolving landscape may require, low-cost, efficient and smart operations, as well as a streamlined business. It's not enough to merely maintain business-as-usual. The most resilient companies are riding the wave of change and adopting digitization to improve productivity, increase efficiency and raise safety standards while also striving toward their sustainability and social obligations.

## Data and digitization: An opportunity for operational excellence

Operational excellence, driven by digitization, particularly software-as-a-service (SaaS), smart sensors, connectivity and cloud computing can derive more value while incurring less operational costs. It's well-established that automating time-consuming, manual tasks and integrating data across operations helps companies lower costs, enhance operational transparency, efficiency and productivity and improve decision making.

For leaders who are constantly under time and productivity pressures, digitization delivers proven value. So, what do smart operations look like? This white paper explores how digitally enabled mining operations can unlock new levels of value, heighten safety, increase resilience and adaptability and mitigate risk.

# From document to data-centric management

Early starts, late finishes, capturing data, monitoring process and equipment performance, machine handling, routine safety expectations and, finally, shift handover. The daily grind on a mine site is anything but slow and there are many vital procedures to get through in a 12-hour rotation. And many of them still rely on outdated, manual systems such as paper-based forms, spreadsheets and siloed databases. In a typical shift, supervisors may spend hours compiling paper-based handovers or manually logging inspection data. These documents are then filed away, inaccessible to the people who need them most. Data gets duplicated, safety procedures are inconsistently followed, and insights are lost in the shuffle, all of which introduce operational and safety risks. These legacy processes can create inefficiencies, increase the risk of human error and hinder operational visibility across teams.

## Manage data, not documents

Paper documents are just another barrier to accessing your data. By moving to a data-centric approach rather than relying on physical documents, mines can streamline workflows, connect information across systems in the cloud and reduce administrative burden. Intelligent digital forms completed on handheld devices, for example, adapt dynamically based on input, eliminating irrelevant fields and duplication, reducing completion time. Sensor-connected equipment can feed real-time data (e.g., pressure or temperature checks) directly into digital forms, automatically updating dashboards and reports without manual data measurement and entry.

Mobile apps and cloud-based platforms empower field teams to log notes, complete risk assessments with GPS-tagged timestamps and communicate safety concerns in real time. A single pane of glass can integrate myriad data sets for a quick view. Operational consistency is ensured; when one procedure is updated in one place, all related documents and forms reflect the change instantly. The information is accessible on-site and in the control center. In addition, digitizing processes can attract and retain the younger, tech-savvy generation entering the workforce. Gen Z will soon be a major part of the workforce, marking the next generation of mining talent.

**Octave Tempo Operations Management**

Octave Tempo Operations Management (formerly j5 Operations Management Solutions) connects work with external databases and operational data sources. Using templates, a multinational tier-1 mining company reduced manual entry from more than 40 data points to just 12. At AGL Energy's Loy Yang open-cut brown coal mine, Tempo Operations Management solutions are used throughout operations to meet the company's extensive process requirements. It reports time savings, as well as achieving a group approach to daily production and shift handover meetings, as just some of the benefits.

**Consistent performance**
Ensure reliable and informed formatting, structure and content for optimal shift-to-shift communication.

**Centralized data repository**
Eliminate paper, spreadsheets, scattered databases and disconnected applications.

**Web browser and mobile-based**
Tempo Operations Management solutions are readily available within a familiar web browser environment and entries can be recorded from a mobile device.

# Keep operations going, 24/7, 365 days of the year

The grind for miners never ends, quite literally. As global demand for resources rises and significant new deposits become harder to find, mining operations are under pressure to extract more value from existing assets without pause. Mines run 24/7 and to meet growing productivity, profitability and sustainability expectations, every system and process must perform reliably. This calls for efficient and effective maintenance strategies, something often missing at mine and other industrial sites. For example, one construction and maintenance company operating at mine sites has reported that, using a spreadsheet-based system, it takes over 200 hours to generate work reports, resulting in a high risk of errors in its material takeoff (MTO) process.

Maintenance costs can account for around 30-50% of the overall haulage costs of a surface mining operation that uses truck and shovel fleets for overburden and ore removal. This presents a huge opportunity for cost reduction. One critical enabler of continuous, efficient operations and maintenance is faster, more accurate insight into asset health, performance and management. After all, when machinery fails, production halts, costing millions. It's worth investing money in proactively preventing failures. This is where tools like digital twins, smart data integration, cloud computing and SaaS come into play.

## Proactive, not reactive

Digital twins and enterprise asset management solutions provide a scalable system of real-time data from physical assets, turning complex datasets into clear, actionable intelligence and providing a single source of truth. They allow for predictive and prescriptive maintenance, giving operators foresight into equipment performance enabling smarter decisions across the value chain. For example, imagine knowing a conveyor motor will drop to 80% efficiency in four weeks and could hit 60% soon after. With this foresight, teams can choose when to act – order parts in advance (getting ahead of unpredictable supply chains), schedule repairs during low-impact windows and reduce unplanned downtime.

Operations managers, even in off-site control rooms, can monitor everything in real-time. Work orders can be triggered automatically and routed to the right team and supported with permits, all without paperwork delays and while leaving a clear audit trail. What's more, remote support tools, such as video calling of off-site specialists, can support field personnel, streamlining fault diagnosis and corrective actions – simultaneously addressing skills shortages.

## Octave Attune EAM and Octave Attune APM software

Octave Attune EAM (formerly HxGN EAM) gives operators the tools needed to help solve critical asset maintenance challenges, including increasing asset efficiency. Features and benefits include:

**45% reduced inventory costs**

**70% improvement in labor utilization**

**35% increase in asset uptime**

Octave Attune APM (formerly HxGN APM) software is a comprehensive solution with purpose-built tools to expose risk and operationalize asset strategies. Features and benefits include:

**1-4% increase in mechanical availability**

**Up to 10% cost reduction in annual maintenance spend**

**25% improvement in asset mangement team productivity**

One of North America's largest independent mining tire specialists has more than 5000 trucks in operation and conducts a million tire inspections yearly. Using Attune EAM, it successfully streamlined tire inspections without disrupting daily operations. Inspections had previously taken trucks out of operation for up to eight hours.

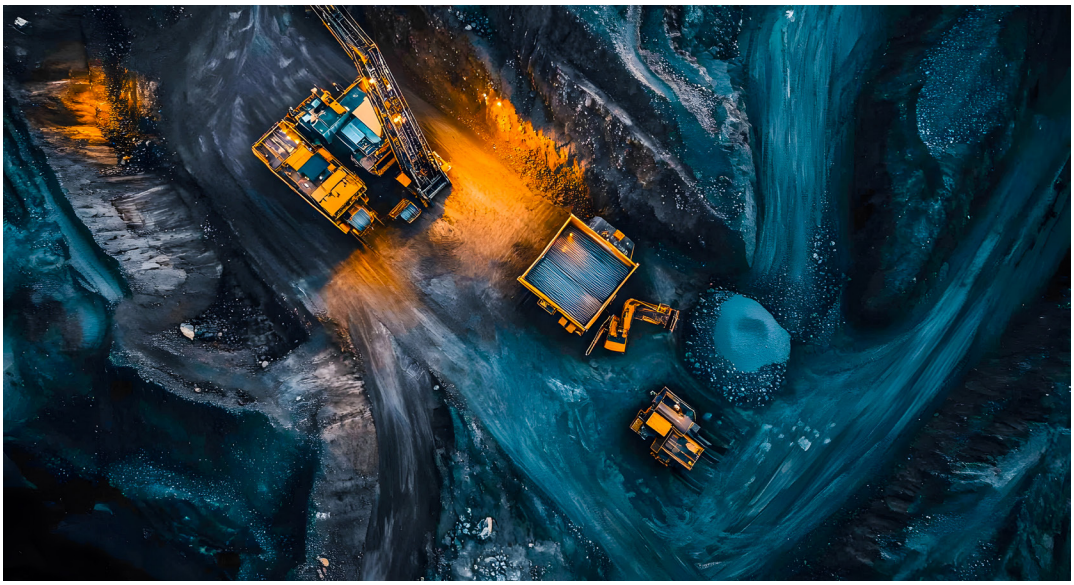
# Safety first

People are the lifeblood and engine of any mine and processing site. When serious accidents happen, staff are devastated, morale is shaken and operations cease for often unknown periods of time. That's why the industry is focused on a safety-first approach, one that goes hand-in-hand with highly efficient and productive operations. Yet outdated cultures, practices, protocols, human error and poor communication – known safety risks – are often difficult to weed out of the shop floor.

Digitization offers a powerful path to improving safety outcomes by giving teams the tools they need to act faster, stay informed and reduce exposure. As already noted, cloud-based platforms centralize operational data, making it easier for supervisors and field crews to access accurate, up-to-date information, whether they're in the control room or on-site, and reduce the overall administrative burden.

## More focus on safety, less on paperwork

When supervisors spend less time tied to paperwork and more time in the field coaching crews, safety performance improves. Digital tools can automatically flag and capture critical events during the shift, pre-populating handovers and alerting incoming teams to hazards or pending issues. This proactive flow of information builds situational awareness and strengthens accountability across shifts. At a time when labor shortages mean staff are overall less experienced, a leading factor in safety risk, digitization helps lighten the load and reduce their exposure to dangerous situations. By automating routine tasks and confirming compliance before work begins, crews can stay focused and confident in the field. Reducing hands-on maintenance requirements with digital twins and predictive maintenance lowers the risk of hand and other related injuries, that are common during maintenance. In addition, digital systems can reduce unnecessary safety alarms that distract teams and take their focus away from what matters.



## Alarm management

Attune EAM and Attune APM reduce unnecessary maintenance and Tempo Operations Management reduces administrative burden; and all facilitate real-time data sharing. Octave Tempo Control System Effectiveness (formerly PAS PlantState Integrity) platform eliminates unnecessary alarms. Deploying the latter, Newmont, formerly Newcrest, was able to reduce alarm rates, which had exceeded 100,000 per day (69 alarms per minute), by 98%.

**Reduce fatigue, improve effectiveness**

A person can only process so much information. Streamline and optimize your alarms to improve effectiveness and reduce operator fatigue.

**Stop the noise**

Eliminate the noise in your system so operators can clearly see the alarms that need to be seen.

**Multiple assets, one solution**

Manage all your alarms seamlessly, regardless of where they come from, with a vendor-agnostic solution.

# Reducing risk, boosting efficiency

There's no getting away from it, mining is a high-risk business. From the inherent dangers of heavy equipment and hazardous environments to the cyclical nature of commodity markets, miners are accustomed to the hustle. But today's risk landscape is even more complex. Operators must navigate decarbonization targets, stricter environmental and social governance requirements, growing transparency expectations and the strategic risk of falling behind in digital transformation.

Cloud-based, connected solutions offer a powerful way to manage and have a unified view of these risks while improving operations and maintenance efficiency. As outlined in this report, digital interconnected platforms give mining leaders greater visibility into asset performance, regulatory and safety compliance and workforce productivity. They collect operational data and present it in digestible formats so operators can use it to make informed decisions. For example, production analytics solutions help uncover inefficiencies across the mining value chain, allowing leaders to identify bottlenecks and make smarter, faster decisions.

In the process, operations become more transparent and accountable from pit to port. Dealing with digitized data and not paper documents simplifies regulatory compliance. When auditors or regulators request documentation, relying on paper-based records can lead to delays, inconsistencies or missing information and subsequent monetary fines. Digitization, on the other hand, offers instant access to complete, time-stamped records that are easily searchable and shareable, streamlining internal and external reporting. In a competitive, high-stakes environment, digital tools empower mining operations to mitigate risk, meet environmental and safety goals and achieve sustainable operational excellence.

# In for the win: Unlocking cost-effective operations and maintenance strategies

The mining industry is still grappling with how best to adopt digitization. But there is little doubt that it should. The environmental, productivity, safety and efficiency benefits will give mining companies and their portfolios a competitive differentiator.

Cost-effective mining at scale will not happen without innovation, says Deloitte in its report. 'Particularly as resources deplete, costs rise, talent becomes scarce and environmental pressures increase,' it adds. Rapid transformation is now urgent, it says, recommending miners review and adapt current business models, consider new ones and push ahead with the partnerships and innovation that will enable the sector to meet demand in a sustainable, optimal way. Along with this is the need for collaboration, working with technology developers and a clear vision for innovation and outcomes driven by strong leadership resulting in robust bottom lines. Now is the time to take the lead.

## New, better operations await. Don't hesitate.

Octave helps your organization prepare for the next normal. Whether you need to digitalize operations, modernize processes or accelerate continuous improvement, we provide the tools to move with confidence. From better decision-making and more leadership time in the field to preventing accidents, strengthening compliance and more, we support your entire digital transformation journey.

Octave delivers more than software. We partner with you every step of the way.

## About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property, and assets– for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency, and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.