



Data and Interoperability Case Study

CASE STUDY: THE APPLICATION OF MAGNETICALLY ATTACHED VIBRATION TECHNOLOGY TO REDUCE IDLE TIME



The Problem and How it was Addressed

This case study covers Imerys' use of magnetically attached vibration monitoring technology to reduce excess idling and the fuel burn associated with it.

Whilst excess idling is a known issue within the mining industry, several factors can make it difficult to collect and act on basic metrics:

- Diverse fleets (mixed OEM, size, type, and age)
- Unable to get OEM-neutral data
- Restricted use of OEM platforms and ability to easily access the data
- No centralized fleet management systems (FMS) and/or local FMS
- Data connectivity within the mining environments

Having the ability to measure basic metrics such as idling time and working time (not just engine hours) can mitigate these challenges.

However, there is a gap in the mining technology market because many existing solutions:

- Are cost prohibitive
- Require significant amounts of supporting infrastructure
- Require high levels of ongoing management

After trialling three different supplier technology solutions, Imerys has partnered with MachineMax, an award-winning startup whose technology is both wireless and affordable. The solution is a magnetically attached vibration technology that can be broadly implemented on mobile mining equipment, as well as some stationary machines such as pumps and crushers. In some cases, it has been found to be effective to place multiple devices on the same machine to measure different activities (e.g., a separate device on a drill head to differentiate between the motor running and the actual drill time).

To begin the implementation, a proof of concept (POC) site was selected on the basis of location for ease in engagement and support. The operational management was interested in the data. Following the success of the POC, it was decided to roll out the initiative globally.



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Stakeholders Involved During Implementation

Stakeholders involved during the field-testing included:

- The Corporate Mining and Resource Planning team (project manager), with support from the Corporate Continuous Improvement team and site management.
- Mining site operations teams.
- Technology supplier (MachineMax) and, as the project progressed, additional suppliers for fuel systems, drones, LiDAR, payload scanning, and other entry level mine fleet management systems.

Key Challenges

The key challenges noted in the table below were successfully addressed during the implementation.

Challenge	Description	How it was addressed
Data privacy with personnel	Concerns regarding data sets relating to human activity.	Workforce meetings to: <ul style="list-style-type: none"> • Discuss the transparency of the system • Anonymize the data • Provide regular feedback to the operators • Union approval (where required)
Change management and answering “what’s in it for me”	<p>From a supplier perspective, demonstrating quick-win site level value to the site management was a key challenge.</p> <p>From the corporate perspective, getting buy-in from operations for a corporate led project was also a challenge.</p>	<ul style="list-style-type: none"> • “Playbooks” • In-house case studies • Supplier support to the overarching project management from IMERYS • Transparent & open communication from the start of the process • Corporate and/or supplier time on site • Shared understanding of the issues on both sides of the testing
Contractor engagement	<p>The project required putting the devices on their machines.</p> <p>Concern regarding the client getting full visibility of how the contractors manage their fleets.</p>	<ul style="list-style-type: none"> • Agreement with contractors to share any gains identified • Joint commitment in contracts to include continuous improvement and data sharing
Multiple time zones	With multiple time zones and shift patterns it is challenging to combine data to create global reports/dashboard.	<ul style="list-style-type: none"> • Supplier enhanced the platform’s data structure and developed reports
The ability and commitment of suppliers	The hardware and software were available, but the reporting system/dashboard was limited, making it difficult to identify actionable insights and cascade the information.	<ul style="list-style-type: none"> • Subject matter experts in fleet reporting helped with ongoing site development to identify “actionable insights” • Sub-team created to develop dashboards



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Integrating additional data	Integrating additional data from: fuel management systems, OEMs, drone imagery, payload systems etc.	<ul style="list-style-type: none"> • Incremental approach starting with exporting data from the various supplier’s portals and creating reports externally • MachineMax getting APIs, data links etc. with the view to replicating the reports in their system/portal so that from the user perspective there is only a single source of information/data
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Ongoing Site Development and Challenges

While testing, and during the implementation, there were several ongoing challenges:

- Connectivity and power on the mine site and/or in the pit
- Accessing and using OEM data to supplement the vibration data
- OEM-neutral measurements and connectivity

Although these challenges are ongoing, Imerys continues to work with OEMs to study and identify best communication strategies such as getting APIs (Application Program Interface).

End Benefits and Outcomes

The technology being used does not require wires and is fitted to machines by magnetic attachment, allowing for quick and easy physical application. This enabled data access while minimizing operational impacts. The implementation of the vibration technology allowed:

- Visibility of all equipment (both rented and owned) across the organization
- Detection of incorrect equipment being used for a job resulting in lower productivity
- Idle time reduction of up to 10% of total work time (depending on machine type)
- Fuel saving of up to 4% (of total fuel burn per machine)
- Reduction in CO₂ emissions

Deployment is still ongoing; therefore, some benefits might still be unknown.

Future Considerations and Next Steps

The following were noted as actions that could help mitigate potential challenges in future projects:

- Appoint a dedicated project manager at each site, despite the apparent simplicity of the implementation
- Identify the “what’s in it for me” at each site and target these to get the initial buy-in/acceptance
- Spend more time on site highlighting the benefits and embedding in processes

The following successes will be carried on for future implementation of technology:

- Development of “playbooks”/site-specific reference material
- Ensure sufficient external resources are available onsite during implementation to provide support and governance simultaneously as the technology and processes are embedded on site
- The POC site had perceived “low hanging fruit” (i.e., quick wins) and was large enough so that the early gains were quickly materialised. The site also had a mix of owner operated and contractor machines which developed experience in both deployment types



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Imerys intends to complete the group-wide roll out of the technology and continue to develop a group-wide dashboard. Additionally, there are plans for continued development with MachineMax to identify and develop additional value that the system could provide.

Key Insights from the Experience

Despite the simplicity of the device and the data metrics, project management and change management are still key issues for a group-wide roll out. Identifying and focusing first on the “what’s in it for me” items, for those onsite, is key to a successful implementation. The development of “playbooks” for each step of the implementation process significantly improves the level of engagement and speed of uptake. Transparently generating and using objective data is another key success factor.

Successfully working with a start-up not only allows for but requires flexibility as the project develops.

When historically sites have largely been free to make their own technology decisions, increased engagement and physical presence on site may be required to:

- Navigate complexity (both technical and organisational)
- Assist in the administration of the project
- Assist in overcoming procurement/resource hurdles
- Ensure the project remains on schedule

The level of planning and resourcing from both client and supplier ahead of the deployment and embedding phases is directly correlated to project success.

GMG Data and Interoperability Working Group

This group aims to address challenges that the industry faces related to data management, interoperability, and integration through work that supports and enables common language, data quality, data exchange, data sharing, and data access. Do you have a case study you would like to share? [Contact us.](#)

About GMG

The Global Mining Guidelines Group (GMG) is a network of representatives from mining companies, original equipment manufacturers (OEMs), original technology manufacturers (OTMs), research organizations, academia, regulatory agencies, consultancies, and industry associations who collaborate to tackle the challenges facing our industry. GMG aims to accelerate the improvement of mining performance, safety, and sustainability by creating guidelines and white papers that address common industry challenges, facilitating collaboration and expanding the industry’s knowledge base. GMG also hosts and supports events that bring mining stakeholders together along with external industries to address the industry’s challenges, successes, and innovations. Learn more about GMG at <https://gmgroup.org/>