Komatsu takes engine monitoring up a gear with Cummins integration

Data, AI, and sensors could revolutionise engine management by enabling predictive maintenance, optimizing performance, and reducing emissions

By Craig Guthrie

"Engine insights often have a broader impact on the machine"

Earlier this year, Komatsu and Cummins revealed plans to partner on a new, integrated remote equipment monitoring solution designed to reduce unplanned stoppages, accelerate maintenance execution, and extend component life and maintenance intervals.

By sharing equipment health and performance data over common infrastructure, and collaborating on health analytics, both companies can access the same secure data and develop joint analytics and insights.

Mining Magazine sat down with Simon van Wegen – Director, Mining Solutions at Komatsu, to discuss that specific project and wider trends around asset management.

Q MM: It's exciting to hear about the partnership between Komatsu and Cummins, could you tell us more about it?
SV: Yes, it's truly an exciting development. This initiative stemmed from the recognition that the engine is an integral part of the machine. Both Cummins and Komatsu have their independent monitoring programs focused on the holistic machine. Cummins delves deeper into engine insights. By merging these programs and capabilities, we gain broader and more comprehensive insights into the entire machine. This includes finding ways to integrate technologies to avoid redundancy in hardware and infrastructure, thereby preventing duplicated data sets and minimizing network bandwidth consumption. It's about consolidating technical aspects while also channelling expertise and insight generation into a unified approach for consistent delivery to the customer. This ensures visibility across the board in terms of the insights provided. For example, if there are engine insights that have a broader impact on the machine, we can establish those connections. Ultimately, this fosters a unified case management approach with the customer, ensuring we're all on the same page regarding the overall health and performance of the machine. This extends to considerations around ESG, where monitoring and reduction play a crucial role, especially given that diesel engines are significant contributors to carbon emissions on mining sites.

Collaboration between Cummins and Komatsu could usher in a new era for engine management

Q MM: How did this partnership and solution come about?
SV: The genesis of this partnership lies in recognising that our expertise could be a valuable addition to our customers' maintenance and asset management programs. We wanted to integrate this expertise into the equation, leveraging our extensive experience in machine design and manufacturing. We possess deep knowledge of potential failure modes and performance optimization, which led us to forge a more ongoing partnership with our customers. This involves providing the right tools, people, and processes to monitor equipment effectively. Many of our customers share a common need: improving equipment maintenance for enhanced reliability and productivity. This initiative was born from the idea of creating a monitoring program, ensuring that experts are readily available as needed. Importantly, it's not limited to a small team of specialists, but extends to a broader community of practice focused on similar issues. This enables our monitoring team to access a wider network, connecting with the factory for detailed insights and troubleshooting, as well as collaborating across regions to address similar scenarios.

Q MM: In terms of data usage and architecture, you mentioned avoiding overlap and downtime. Could you elaborate on how the data will be utilised to prevent downtime and potentially enhance productivity and efficiency?
SV: Absolutely. When it comes to the underlying platform components, infrastructure, communications, and processes, our aim is to ensure that useful data from the machine is collected consistently and can be

applied to various use cases. We're not looking to reinvent the wheel for other applications of data and remote monitoring. Beyond improving reliability and productivity by reducing maintenance costs and avoiding downtime, we're also targeting safety. This includes reducing instances where personnel are exposed to hazards while working directly on the equipment. Additionally, we're looking at optimizing machine performance to decrease carbon emissions and the overall environmental impact.

Q MM: Do you think this kind of technological partnership could be replicated with other OEMs or other parts of the machine? Is there a concern about information overload, especially in the context of mining vehicles?
SV: Yes, certainly. Our partnership for engine monitoring serves as a model that could potentially be extended to other parts of the machine for which our factory is not directly responsible. One example is monitoring tire condition, which is crucial for both performance and safety. Electric drive system monitoring and gaining more detailed expertise in those systems are also areas where we could potentially extend this partnership. It's something we're actively exploring, working with the right partners to further enhance the program.

Q MM: Zooming out a bit, considering the collaborative effort between major manufacturers like Komatsu and Cummins, do you believe this makes the concept of remote equipment monitoring more appealing to miners, especially in terms of sustainability, given the focus on engine sustainability?
SV: Absolutely. This partnership is viewed very positively. It's not just about receiving messages on a screen, but about having a named person you can reach out to as needed. It's about having someone available to discuss specific challenges related to the machine. In addition to the remote monitoring program, we complement it with embedded resources. This involves placing Komatsu personnel directly in the team on the mining site to ensure that the insights generated can be effectively translated into the right actions for maintenance practices. This combination of remote monitoring and embedded resources is a highly effective way of closing the feedback loop, ensuring that actions are taken and that value is captured. It aligns with the goal of many of our customers, who want to enhance their capabilities in this aspect of their operations. Working alongside them allows us to facilitate their growth and maturity in this area, and eventually, they may even take on some of these responsibilities themselves.

Q MM: Given the openness of the analytics and insights, could you provide an example of a scenario where this technology could be particularly useful for a miner?
SV: Certainly. Let's touch on sustainability. This is a critical concern for mine operators. By having access to richer data and engine health information, we can detect issues early, such as a failing fuel injector leading to increased fuel consumption compared to similar machines in the fleet. Addressing this promptly has a cumulative effect over the life of the fleet. While one instance might not seem significant, the impact across the entire fleet over several years can be substantial. We monitor various aspects not only for the health and performance of the equipment but also for its environmental impact. This helps customers assess how they can make a significant impact on their existing fleet's carbon footprint.

Q MM: Looking at the digitalization of remote equipment monitoring and asset management, how would you assess the current state of mining in this regard, and how do you anticipate it evolving over the next five years?
SV: Currently, this is still an evolving area. One challenge is ensuring that the right people stay in their roles for the long term, which can be a struggle in the industry. This is where we can play a role in capturing knowledge and integrating it into digitalized systems and technologies. This will likely be a catalyst for significant change in the future, especially as we start to leverage technologies like AI, which is becoming a major focus area. This will enable us to be more proactive in generating insights and detecting problems. Addressing the skills gap on the mining site will be a key focus moving forward. We need to figure out how to better integrate that knowledge into the system and leverage new technologies to bridge any gaps.

Q MM: Does the aspect of change management and skills tie into your embedded resource system, where you have team members working directly with clients?
SV: Yes, exactly. Having embedded resources at the client's site helps with the maturity of the program and the integration of knowledge back into the system. One challenge we face is providing insights and ensuring that work is actually carried out. Capturing that feedback can be quite challenging. We're looking at ways to potentially get visual evidence, like before and after photos, and understand the actual improvements or results achieved. This helps us refine our approach for future similar scenarios. Having these resources on site helps ensure that we're capturing that information and using it to drive improvements in the program. It also enables us to better automate detection in the future, creating a more efficient and streamlined process.

Q MM: Finally, you mentioned positive safety impacts. Could you elaborate on how this technology achieves that?
SV: Certainly. In maintenance, technicians often find themselves in hazardous environments when working directly on the machine in the field. Conditions can be challenging, with high temperatures and dust, and in some cases, the machine may still be powered. By having remote access to machine data, we can start to perform some of these activities away from the immediate vicinity of the machine. This includes tasks like inspections, diagnostics, and troubleshooting. Many of these activities can be done remotely, with guidance provided to the operator over the radio, for example. Additionally, we can incorporate these activities into preventative maintenance programs, where they were previously conducted directly on the machine. This means we have more information about the machine's condition going into the maintenance event, reducing overall downtime. It also provides us with much more detailed insights, enhancing the work package for technicians when the machine undergoes maintenance. Overall, it's about minimizing instances where personnel are directly exposed to hazards while performing certain activities on the machine.

"We're not looking to reinvent the wheel"