



Monitoring underground equipment is not only a safety issue but it also helps owners and operators reduce costs by scheduling routine maintenance.

Under CONTROL

KEEPING TRACK OF WHAT'S HAPPENING UNDERGROUND

The uptake of new technologies in underground mining has been historically sluggish. Indeed, many global suppliers of mining technology that service both open-pit and underground mines have entered into the underground fleet management space long after their open-pit deployments. Underground sites generally make up a smaller portion of the clientele of fleet management solution providers. This is not to say that underground mines are less developed or less efficient than open-pit mines; rather, this suggests that managers and shareholders in the mining sector—especially in the underground realm—should be acutely aware of advances in mining technology and the factors that slow their integration into operations.

Special Report*

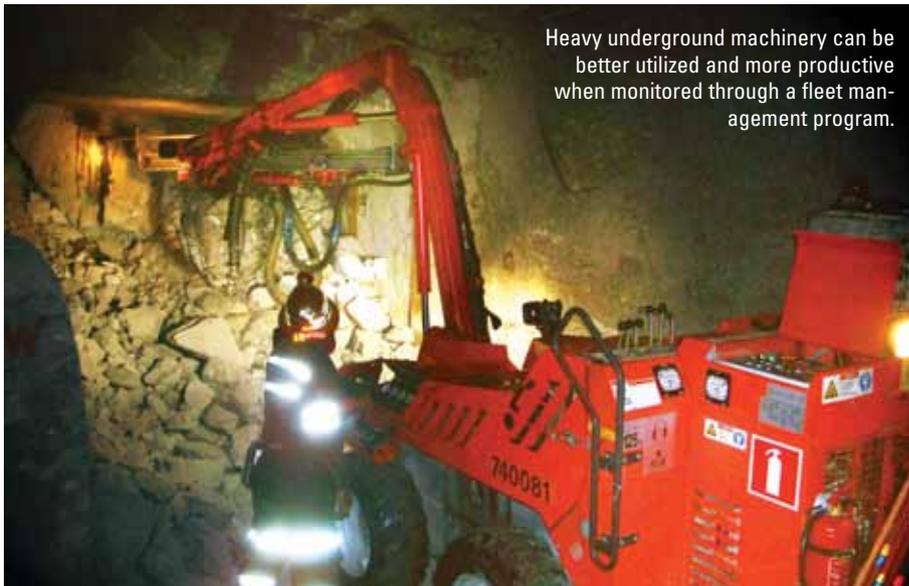
Since the first underground fleet management system was introduced roughly two decades ago, such systems have seen ups and downs in industry popularity. Many major underground operations have at one time or another sought to benefit from the transparency and detailed reporting of fleet management systems, but in the decade following the introduction of Modular Mining Systems Canada Ltd's DISPATCH underground system, installations surged and an underground fleet management market was born. In the late 1990s, underground system sales were keeping pace with their open-pit counterparts.

Within a few years of this boom's peak, however, the demand for underground fleet management declined almost as quickly as it had risen. The decreased interest in mine management software by 2002 led many underground operations to adopt voice production tracking systems. Because several mines had already set up control rooms for tracking and reports, the transition to voice systems was relatively easy. While underground mines have continued to adopt new technologies since 2002 in other areas, the adoption rate of

computerized fleet management has been comparatively flat in the last decade.

There is a general rule to observe within this cycle of popularity: mining tools follow trends. Whether this involves haul truck development or mining systems, industry opinion fluctuates in what it deems necessary or effective. Given that the demand for underground fleet management systems is currently lower than the open-pit sector for previous periods, it is only a matter of time until the cycle pushes underground fleet management software back to where it was in the 1990s. A review of the adaptation of technology in other fields, such as automation, shows that technologies do in fact follow cycles of popularity.

So what can substantiate the idea of a cyclical underground fleet management market? The first wave of underground fleet management was ushered in by the promise of underground haulage optimization. What mining technology companies have learned, however, is that significant effort is required to evolve systems from



Heavy underground machinery can be better utilized and more productive when monitored through a fleet management program.

haulage optimization—what adds the most value in the open pit—to the process optimization required by underground mines. Haulage optimization proactively enhances production on an assignment-by-assignment basis using real-time “snapshots” of

equipment location, status, etc. Underground process optimization, on the other hand, requires much more than just instantaneous information.

Decision making is different underground. Managers must consider the

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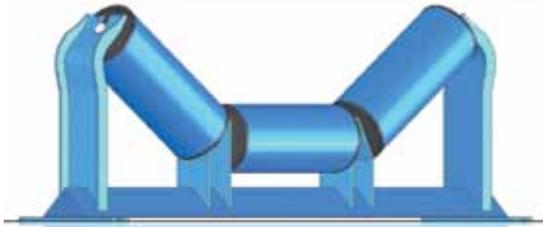


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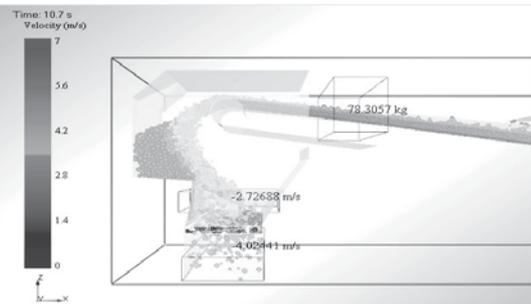
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status of each location as well as their remaining tonnage, combined with any planned quantities of work. Only with an accurate knowledge of these can they make better decisions that increase production. This is true not only for haulage decisions but also for drilling, blasting digging, and support tasks. Although haulage via Load-Haul-Dump (LHD) loaders is vital to underground mining success, problems associated with other processes, such as drilling, can encumber the performance of the LHD Fleet.

An underground fleet management solution must track several processes in order to match the increased production of its open-pit counterpart. For example, the throughput of a Block Cave mine can be optimized by addressing issues surrounding the LHD's activities (such as mining to plan) as well as the secondary breaking units used to clear up hung-up draw points. By responding faster to down drawpoints, drawpoint availability goes up. With this increased drawpoint or "face" availability, the LHD utilization and tonnage output increase as well.

Recognizing and continually evaluating the list of processes in underground mining, our modular designed underground system can be built to meet the process optimization needs of all underground mines, including the tracking of haulage and non-haulage machinery alike. The system ensures that mining activity follows a plan when one is available, and it automatically generates a plan for equipment requiring one. Very few mines schedule beyond their dig and haulage fleets; therefore, it becomes important to generate

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real-time plans for equipment performing upstream and downstream processes to the equipment that have plans available.

The process optimization features are designed to meet the needs of block cave and open stoping mining methods. However, they can be customized to accommodate multiple underground mining methods and both upstream and downstream processes. In addition to the trend towards process optimization in underground mining, there is a shift towards predictive maintenance philosophies, such as reliability-centered maintenance (RCM) and remote condition monitoring. This has already factored into the growing uptake of real-time maintenance management systems. Considering the advantages surrounding process optimization, it is a safe bet that a resurgence in popularity of underground fleet management systems is under way.

It is important to realize that several parties stand to benefit from the return of this trend, not just fleet management providers. The adoption of more proactive underground fleet management systems is also good for other technology adaptation. This ranges from simple things like on-board sensor systems all the way to more elaborate communication technologies like tele-remote operation and autonomous mining equipment. Such advances, with fleet management solutions at the forefront, will make underground mines safer, smarter and more productive. **CMJ**

*Information for this article provided by Stephane Cantin, Product Manager, DISPATCH Underground, Modular Mining Systems Canada, Ltd.

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