

READY...SET... CRUSH

Rhonda Knotts, Modular Mining Systems, Inc., USA, details a solution that can reduce inefficiency and truck idle times by automatically reassigning trucks when a crusher is in a 'down' state.

The Arkhangelskgeoldobycha (AGD) Grib diamond mine in Arkhangelsk (Russia) experienced frequent changes in crusher status ('ready' vs 'down') and a lack of communication between the crusher operator and the central dispatcher. These circumstances led to haul trucks arriving at, and queuing for, the crusher when it was non-operational. The mine sought to improve the status notification process which would, in turn, enable haul trucks to be efficiently rerouted to an alternate dumping location when the crusher was down, thus reducing excessive idle time.

Prior to Modular Mining Systems, Inc.'s (Modular) involvement, AGD relied on a traffic signal on the road leading to the crusher to alert haul truck drivers of

crusher status. A green light indicated ready (operational); a red light indicated down (non-operational). As trucks were routinely sent to the crusher when it was down, one or more trucks were regularly left queuing at the traffic light while waiting for the crusher to resume operation. This lowered the mine's equipment utilisation and affected their fuel burn calculations.

At AGD's request for assistance, Modular implemented the DISPATCH® Fleet Management system (FMS); a move which helped the mine maximise the load of its excavator fleet and improve overall equipment utilisation. In addition, a computer was installed to facilitate communication between the crusher operator and the central dispatcher, making it possible for the crusher

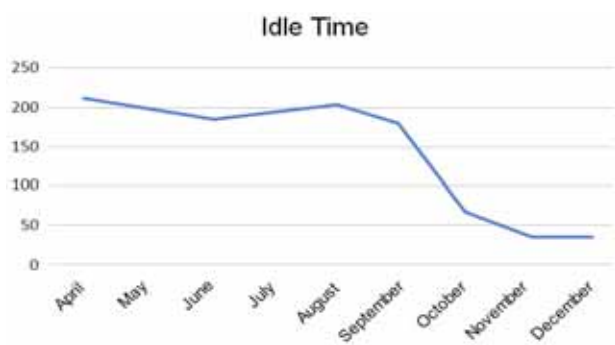


Figure 1. Truck idle time decreased more than 80% over an eight month period.

operator to use the DISPATCH system to quickly and easily notify the central dispatcher of real time changes in crusher status. The central dispatcher was then able to leverage the FMS' optimisation capabilities to change the truck assignments and avoid sending trucks to the crusher when it was out of service.

The DISPATCH FMS' proprietary optimisation algorithm, as well as the improved communication between the crusher operator and the central dispatcher, helped the mine prevent unnecessary truck queues at the crusher. As illustrated in Figure 1, truck idle times dropped from 210 hr/month to 38 hr/month.

Modular and AGD worked together to successfully increase the value that the DISPATCH system brought to the mine's operations. Because the FMS' optimisation capabilities enabled AGD to automate truck assignments, the mine was able to alleviate the problem of trucks sitting idle in the crusher queue. Instead, the FMS automatically reassigned the trucks to more efficient activities, such as hauling waste or sending trucks to parkup, resulting in reduced idle time and increased fleet utilisation.

Ongoing innovation

Building on nearly 40 years of industry experience, Modular has developed the IntelliMine® Mine Management platform. Comprised of the aforementioned DISPATCH FMS, as well as the ProVision®, MineCare® and MineAlert™ solutions, the IntelliMine platform addresses the big picture areas of operations, planning, maintenance and safety. The MasterLink® Wireless Network solution rounds-out Modular's core product portfolio, providing secure, high availability, site-wide connectivity. The components of the IntelliMine Mine Management platform are as follows:

Increased visibility for greater efficiency and higher productivity

The DISPATCH Underground FMS is specifically designed to address the unique challenges of the underground mining environment. A full system overhaul in 2015 incorporated new functionality, enhanced existing capabilities, and updated the central and mobile user interfaces. The DISPATCH Underground system automates all development and production workflows and processes, and supports all common underground

mining methodologies. With the DISPATCH Underground FMS, mines get the visibility they need to track, manage and more efficiently utilise their mobile equipment below the surface.

High precision GPS for more accurate results

The ProVision machine guidance solutions, available for shovels, loaders, drills and dozers; utilise high precision GPS to provide continuous navigation and guidance to equipment operators, increasing productivity and facilitating the realisation of planned targets and tasks. The ProVision solutions and optional drill hole stratification module assist mines by providing data and energy calculations that could be used to better refine drilling and blasting processes, leading to more desirable fragmentation.

Proactive maintenance for increased availability

The MineCare maintenance management solution helps mines increase fleet uptime and availability and reduce mobile equipment lifecycle costs. Through the proactive, real time monitoring of asset health and maintenance processes, the MineCare solution has proven to save mines US\$100 000 per equipment unit, per year.

The MineCare 3 solution leverages cloud-based Software as a Service (SaaS) technologies to offer an alternative to the traditional on-premise software installation model. This approach drastically reduces costly capital expenses and minimises the need for specialised IT infrastructure, making the MineCare 3 solution an especially attractive option for smaller sized mines with potentially severe budgetary restrictions.

Increasing awareness to help miners stay safe

The MineAlert Collision Awareness system (CAS), an early warning system that alerts the equipment operator of potential collisions with other CAS-equipped vehicles, is designed to improve operator situational awareness and reduce vehicle to vehicle collisions. Predictive algorithms analyse the location, speed and trajectory of all vehicles in the monitored vicinity and generate warnings and alarms only when hazardous or potentially dangerous conditions exist. Modular's CAS focuses on minimising false or nuisance alarms to provide operators with critical decision-making safety information only when it matters.

Secure, reliable, always-on communications

The MasterLink wireless network delivers the fastest high quality, low maintenance communications possible for opencast mining operations. The MasterLink Enterprise solution delivers maximum network capacity, seamless worksite mobility, enterprise level security and high network availability.

Comprehensive service and support

Modular also offers an array of comprehensive service and support options, underscoring the company's lasting commitment to ensuring that every customer receives

maximum, ongoing value-in-use from their Modular technology investments. Modular's service and support offerings are summarised as follows:

- Performance assurance (PA) delivers proactive application support through in-person engagement with mine personnel across multiple levels to develop tailored, flexible and proactive solutions. Working together, mutually-defined goals and milestones are established, and quantifiable key performance indicators (KPIs) are created and tracked. Participating mines have seen numerous benefits, including enhanced truck productivity, reduced truck queue times, improved net production through shorter shift change duration and lowered equipment maintenance costs.
- Mine plan compliance (MPC), Modular's technology-based consulting approach, helps mines create synergy among departments, processes and systems, thus increasing the mines' ability to consistently execute according to plan. MPC also helps mines facilitate the cultural shift needed to help personnel accept and internalise changes to operating procedures and best practices, ultimately leading to demonstrable improvements in efficiency, performance and process control.
- Remote care condition-based monitoring is provided by teams of specialists working from Modular's geographically distributed Centres of Excellence to remotely monitor and manage the real time telemetry data generated by the mobile equipment fleet. More than 175 ModularReady® original equipment manufacturer (OEM) interfaces relay machine health information utilised by the RemoteCare specialists to identify possible problem areas in advance. RemoteCare can help mines reduce unscheduled downtime and increase equipment reliability, maximise equipment and labour utilisation, lower operational and maintenance costs, and identify best practices at benchmark sites that can be applied enterprise-wide.
- Mission critical support services (MCSS) is dedicated to ensuring that your wireless network delivers maximum reliability,

high availability, and peak performance. Built upon Modular's years of wireless network design and deployment expertise, MCSS provides high touch, onsite and remote support services that are customisable and scalable for every mining operation. Whether performed at the mine, or remotely from one of Modular's regional Network Operations Centres, network support is available 24 hr/d, 365 days of the year.

The future

With the release of the DISPATCH FMS, Modular made its mark as an industry pioneer. As mining continues to move forwards towards a high tech future, the company will lead the way with fully integrated, innovative solutions that give its customers a strong, strategic and competitive advantage in the marketplace. **GMR**



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910-794-9294 | sales-us@rulmeca.com | RulmecaCorp.com
6508-B Windmill Way, Wilmington, North Carolina 28405