CAT® MINESTAR™
EDGE

AN OPERATIONAL ECOSYSTEM
FOR YOUR SURFACE MINE

WHAT IF YOU COULD?

HAVE NEAR-REAL-TIME ACCESS TO INFORMATION

GET DATA THAT IS 98% ACCURATE

HAVE VISIBILITY TO YOUR ENTIRE OPERATION

MAKE CHANGES IN-SHIFT WHILE ALREADY
KNOWING THE IMPACT THEY WILL HAVE
FURTHER DOWN THE VALUE CHAIN

WITH CAT® MINESTAR™ EDGE, YOU CAN.

GIVE YOUR OPERATION AN EDGE

More than 25 years ago, Cat® MineStar™ changed the way mining companies operate — targeting individual portions of the mining operation and delivering unprecedented gains in efficiency, safety and productivity.

MineStar Edge is a new technology platform that delivers more connected, integrated, scalable and intuitive products that extend further up and down the value chain. It creates an operational ecosystem that gives you visibility to every aspect of your operation, allowing you to efficiently execute your mine plan and deliver optimal quality to the plant and to the surface. MineStar Edge makes it possible to measure, manage, analyze and optimize your entire operation. And because it's delivered as a cloud-based, subscription-managed application, it lowers costs and delivers a better user experience.

As you strive toward optimization, you need an ecosystem partner that allows you to focus on managing your operation rather than your technology. Wherever you are in your optimization journey, Caterpillar and MineStar Edge make that possible.

GET EASIER, FASTER ACCESS TO BETTER DATA

UNPRECEDENTED DATA ACCURACY

The best technology systems available today — when used to their full potential by personnel — deliver information that is about 80 to 90% accurate. MineStar Edge provides data that is 98% accurate. The platform makes use of Artificial Intelligence — data fusion and machine learning — to determine and communicate the accuracy of the information it is providing. Most data is automatically provided by the machines themselves, which eliminates the need for operator input and the risk of incorrect data entry.

NEAR-REAL-TIME INFORMATION

Near-real-time reporting is one of the most powerful features of MineStar Edge. Having access to the most up-to-date information allows mines to make quick adjustments to meet production goals rather than waiting until the end of the shift to determine if goals were realized. These decisions have an immediate impact on productivity.

A SOLUTION FOR MINES OF ANY SIZE

MineStar Edge allows sites to start small and scale up to a full operational ecosystem. Users select an offering by role, function or task — paying only for those functionalities they need. This model makes buying and using technology more cost-effective and efficient and allows operations of every size and type to more easily take advantage of the benefits technology makes possible.

IMPROVED USER EXPERIENCE

Because it is delivered as a cloud-based, subscription-managed application, MineStar Edge lowers network requirements as well as associated costs of deployment, service and training. Mines are not required to invest capital in servers and database solutions that are sometimes required with mining technology solutions.

The cloud-based platform also speeds the time from order to use, and allows automatic upgrades, updates and fixes. In addition, sites have the option to have some applications hosted locally to ensure higher connectivity and less latency.

"The biggest impact for us has been that we now have instantaneous feedback on how we're doing on a day-to-day basis. We have goals for our equipment and superintendents that we expect them to meet on a daily basis. They now have a tool that they can use, whether they're in their office or out here on the field that tells them how they are doing right now. So we don't have to wait until the end of the shift to find out how many load counts we had, how much material we move. They can now get instantaneous feedback on how they're doing."

MARC KENLEY
PROJECT MANAGER
RASMUSSEN VALLEY MINE

EQUIPMENT TRACKING

Insights to help you better manage assets

"What excites me about the future is MineStar Edge reduces my workload from a paperwork standpoint. This system allows us to make everything paperless and simple and automated so that we don't have people stuck in offices looking through timecards every single day anymore."

BRADY BAXTER
MINE ENGINEER
RASMUSSEN VALLEY MINE

GET DETAILED DATA ON EVERY MACHINE

Traditionally, sites have used pencil and paper to keep track of information on the majority of their equipment assets. Even if they leverage Production Recording technology to get data on the load / haul cycle, they have lacked access to the same information for non-production machines like water trucks, dozers, graders, drills, light vehicles, etc.

MineStar Edge Equipment Tracking provides information on these mobile assets, no matter the manufacturer. It tells supervisors what the fleet is doing, who is operating which machine, and how they are spending their time.

By replacing paper with accurate recording, supervisors can better understand utilization and make decisions about equipment investments and effectivity. Equipment Tracking provides insights that help mines better manage their assets, and as a result they deliver more value and mines enjoy a lower overall cost of ownership.

WHAT DOES EQUIPMENT TRACKING BRING TO YOUR OPERATION?

Equipment Tracking consistently provides a basic level of information on all assets, including data on locations and movements, velocity, payload, cycle times and fuel level, as well as Service Meter Readings and time utilization. Supervisors can view scheduled and unscheduled downtime along with scheduled and unscheduled operational stoppages.

With fuel being one of a site's largest expenses, the ability to visualize and export fueling records is a key benefit of Equipment Tracking. This feature automatically measures fuel events — from when the machine was fueled to what was put in the tank and how long fueling took — allowing operations to manage the efficiencies of their fueling processes and fuel consumptions. It reduces or eliminates errors because data is collected automatically, and also lowers the cost of fuel.

EQUIPMENT TRACKING

Providing a level of detail that goes beyond what occurred

When your equipment is not being productive, do you know why?

Is it sitting idle due to shift change or operator breaks? If it is stopped for maintenance, is that downtime scheduled or unscheduled? Equipment Tracking automatically measures time when equipment is not being productive and provides information you can use to measure and manage your processes.

FEATURES & BENEFITS

+ Gathers SMU data continuously from all assets. Data is no longer gathered manually through operators recording on paper or calling over the radio — eliminating incorrect entries.

+ Delivers high-accuracy data recording, reducing downstream errors when the position is referenced for automatic collection of information.

+ Provides the ability to replay shifts in great detail, helping sites answer Production Recording questions and providing information for incident investigation and material tracking investigation.

+ Records the time that equipment is available, down, operating or stopped due to a non-operating activity, providing accurate KPIs for use in time utilization models and leading to increased productivity and production.

+ Automatically measures time when the equipment is not being productive and will attempt to classify with a machine-learning approach, reducing or eliminating missed or incorrect time measuring and giving operations information they can use to measure and manage their processes — specifically those that have production loss impacts.

+ Helps sites measure and manage equipment downtime and classify it as scheduled or unscheduled, providing a key indication of the effectiveness of the site's maintenance and reliability programs, which can reduce downtime and lead to improved productivity.

+ Allows operations to better manage and measure equipment operators, including allocating them to machines and tracking performance, and provides operators with KPIs about their personal performance — helping operators improve and leading to a more consistent operation and reduced cost per ton.

+ Helps operations improve equipment availability, reliability and production by measuring, managing and ultimately reducing machine health events and making data easily accessible.

"MineStar Edge is ideal for mines that are just getting started with technology. Your initial investment is significantly less and your opportunity for ROI is much higher as well. Especially those that have been running on pen and paper for so many years."

TYLER SIMMONS
INDUSTRY SOLUTIONS MANAGER
WESTERN STATES CAT

PRODUCTION RECORDING

Finding opportunities hidden within every shift

Every mining operation has opportunities hidden within every shift. But how do they find those opportunities if they're not accurately measuring what's happening during that shift? From payload to dig rates to operator breaks — every activity has an impact on productivity and an opportunity to be improved.

MineStar Edge Production Recording helps sites find those opportunities by giving them visibility to the entire mining operation. When paired with Equipment Tracking, it delivers an accurate and automated near-real-time solution that measures and reports on every aspect of the load-haul-dump cycle without requiring any operator input. The result is a boost in productivity and a reduction in the overall operating costs of managed assets: mine, material and machines.

For many sites, traditional comprehensive fleet management systems can be too complex and cost-prohibitive, requiring significant investments in time and money to set up and maintain. Production Recording, however, is an easy-to-use subscription-based solution that delivers the key functionality all sites require: accurate, real-time production data.

"One of the things that stuck out immediately was that we were not loading our trucks to the minimum requirement that we asked of our employees. We had about 30% of our trucks being light-loaded. If you're going to run the equipment, you're going to burn the fuel, you're going to pay the labor wages — you want to load the trucks to capacity."

"The numbers showed that in one year's time, we could eliminate one full truck out of our haul's cycle. That equated to $400,000 in savings a year. And that's just one small thing. So that change alone paid back for this system within a little over a year's time."

MARC KENLEY
PROJECT MANAGER
RASMUSSEN VALLEY MINE

TAKE ADVANTAGE OF THE OPPORTUNITIES

+ **Missed production targets.** Every mine has production goals such as total tonnes moved, dig rate, rate of material put through crusher, etc. All impact management's ability to measure progress toward production. Accurate information allows them to course-correct — in real time — to ensure the operation is on target.

+ **Payload compliance.** Under-loading trucks means not getting maximum value from the truck or the cycle and impacts cost per ton. Over-loading can impact component life, boost maintenance costs and increase unplanned downtime. Finding a balance equates to more effective machine utilization over the course of a shift.

+ **Shift changes / long operator breaks.** The goal of an efficient mining operation is to effectively use all resources. Shift change and operator breaks, while necessary, must be managed to reduce the impact they have — keeping operators productive and reducing machine idle time.

+ **Misplaced loads.** When material is dumped in the wrong location, mines take an immediate hit to their profitability. For example, if waste is dumped into the crusher or ore is dumped into the waste pile, the result is lost revenue. And if the blend is inaccurate, the finished product will result in less profit.

PRODUCTION RECORDING

Helping mines of all types and sizes boost efficiency and increase production

Production Recording helps mines of all types and sizes improve the efficiency of their operations and increase their overall tons produced. The data it provides identifies opportunities, allows sites to make changes within the shift, and delivers insights on how those changes will impact production if implemented.

The accuracy of the data gives personnel such as Pit Supervisors, Mine Managers and Install Technicians the confidence they need to make quick, real-time decisions related to operational execution. Data can be accessed on a mobile tablet device as well as through a web-based application. A production dashboard provides information on the operation, including defined materials, active load and dump areas, active load and haul equipment, and active crushers. The dashboard enables viewing of hourly production metrics as well as cumulative shift-to-date production metrics for the site, material, load and dump areas, equipment, and the crusher.

Beyond the shift, Production Recording allows sites to continually monitor and make operational decisions and implement training that will allow them take advantage of the opportunities they uncover.

"It became very apparent to us that during every shift change, we were losing somewhere a little over an hour to an hour and 15 minutes of productive time. So because of that, we chose to go to a hot seat change-out, where we don't park equipment until the relief shift is out in the field, ready to get on that equipment. So we gained another hour of production there … and we've seen a 10 to 15% increase in production from that simple change."

MARC KENLEY
PROJECT MANAGER
RASMUSSEN VALLEY MINE

FEATURES & BENEFITS

+ Monitors and provides highly accurate data on load and dump counts, tons moved and Bank Cost Per Meter/ Bank Cost Per Yard.

+ Provides the ability to track progress against plan in real time throughout the shift.

+ Allows users to drill down to see the performance of entities such as individual machines, areas, routes, materials and operators.

+ Calculates and visualizes the expected production at the end of the shift for the site and individual entities including site, load and dump areas, routes, loading tools and trucks, and material.

+ Enables sites to review production records from the point of view of the material transaction and movement from the load face to the dump, including the times, machines and operators involved.

+ Delivers accurate transactional records that can be used as a source of truth for material movements.

PROVEN RESULTS

Sites using Production Recording have seen:

29%
REDUCTION
IN UNDERLOADS

17%
REDUCTION
IN SHIFT
CHANGE TIME

ROI IN
3
MONTHS

25%
INCREASE
IN PRODUCTION

IMPROVEMENTS
IN ACCURACY OF
THE BLEND RECIPE

TECHNOLOGY SOLUTIONS
FROM A MINING MANUFACTURER

Caterpillar isn't just a manufacturer that makes machines and technologies for mining; we are a mining company with a unique, hands-on knowledge of mining operations. Cat technologies for mining were designed specifically for that purpose.

Cat MineStar Edge comes with a number of other significant benefits:

TRAINING

We offer a comprehensive suite of web-based, instructor-led and on-site and simulation training to help you rapidly deploy technologies and get up to speed quickly — so you can start reaping the benefits.

SUPPORT

In partnership with the global Cat dealer network, we help you achieve critical availability, optimize performance and realize the full value of your investment.

IMPLEMENTATION

We provide expertise and work hand-in-hand with Cat dealers to successfully install, deploy and integrate products into your environment, and then ensure a smooth transition to your own team.

CYBERSECURITY

We take a proactive approach to ensure your connected assets and the data they provide are protected against risks.

TESTING AND VALIDATION

Individual components are heavily validated, and systems are integrated and tested to ensure reliability and performance of hardware on machines.

DURABILITY

We understand the physical challenges inherent with mining, and our technology solutions are built to withstand them.

"I use the MineStar system when I'm sitting at my desk at the mine. And I will check it numerous times during the day to see how our operations are doing. And not only that, I will use it at night, I will use it on weekends. Before this system, I had no way to check other than to text or email our superintendents to ask them how their shift is going. Now, whenever I feel like it, I can log onto the system, and I can see where they are in the shift. I can see what they've done up to that point. I can see changes they made. I can see how much equipment is up and how much equipment is down. I use the system all the time."

MARC KENLEY
PROJECT MANAGER
RASMUSSEN VALLEY MINE

Cat® MineStar™ Edge is a part of MineStar Solutions, a comprehensive suite of integrated technology offerings designed specifically for the mining industry. The offerings are scalable, work with any brand of equipment and share data across exiting machines, systems and technologies. No matter the size, type or complexity of your operation, MineStar Solutions can help you deal with the challenges you face every day: Controlling costs. Extending equipment life. Working more productively. And keeping people safe.

CAT MINESTAR EDGE

For more complete information on Cat products, dealer services and industry solutions, visit us at www.cat.com

Materials and specifications are subject to change without notice. Featured machines in photos may include additional equipment. See your Cat dealer for available options.

CAT®