THE BENEFITS OF FOLLOWING A ROBUST DEMAND PLANNING PROCESS FOR PARTS

BY JOHN ZIMMERMAN
Product Support Supervisor
Caterpillar Inc.

"Failing to plan is planning to fail."

This common business adage applies to every aspect of every operation in every industry. Without a defined plan and set of goals, businesses move forward without a clear roadmap for where they're going. Success is impossible to achieve if you don't know what it looks like.

In the business of mining, planning is essential to every step in the life of a mine — from mine development to ore production, from equipment management to the reclamation that comes at the end of the mine's life.

Successful equipment management, for example, relies heavily on planning to ensure machines are delivering the high availability and productivity sites need to meet their production goals. Essential maintenance, repairs and rebuilds must be performed in a timely manner — a goal that is impossible to achieve without a defined plan that ensures the parts, components and resources necessary to perform the work are readily available.

Effective maintenance organizations understand the need for well-established processes, supported by appropriate resources, and executed by skilled and well-trained personnel. Our decades of partnership and collaboration with these organizations gives us a solid understanding of the processes and techniques that are effective, as well as those that must be identified in order to correct or avoid them.

When we succeed, we reap the benefits. Machines last longer, perform better and deliver higher availability. We see overall improvements in productivity and reductions in costs that lead to a better bottom line.

IMPLEMENTING A MODEL FOR MAINTENANCE

Believing that the key for success when it comes to equipment management is a strong partnership between miners, Cat® dealers and Caterpillar, we have developed a maintenance model for mining equipment to help accomplish this goal. The model includes and lays out 10 distinct maintenance processes and routines:

1. Preventive Maintenance
2. Condition Monitoring
3. Backlog Management
4. Planning & Scheduling
5. Parts Management
6. Component Management
7. Repair Management
8. Human Resources/Training
9. Performance Evaluation
10. Continuous Improvement

A proactive maintenance support system is one in which the condition and application of equipment is monitored constantly. Maintenance events must be efficiently and effectively managed and executed, supporting the goal of "repair before failure." By identifying potential problems before failure, a mine site can avoid unscheduled downtime, productivity loss and potentially more costly repairs.

Structuring a maintenance model that is open and flexible is imperative. Having the ability to incorporate valuable techniques and new approaches will boost machine availability and deliver the high uptime mine sites need to meet their production goals. The result is a safer, more productive operation at a lower owning and operating cost.

FOLLOWING A DEFINED DEMAND PLANNING PROCESS

When it comes to successful equipment management, a robust demand planning process between the mine, local dealer and Cat representative is critically important. This process ensures key replacement parts and components are being properly planned for and communicated back to all parties.

Caterpillar's demand planning process combines sophisticated forecasting with our own and our dealers' experience to estimate the demand for various items at various points in the supply chain. The goal is to maximize asset availability by having components and piece parts available at the right place at the right time.

Within the Caterpillar maintenance model referenced earlier, the activities that support demand planning fall under several processes, including Planning & Scheduling, Parts Management, Component Management and Repair Management.

The demand planning process incorporates a number of planning and parts ordering tools and takes into consideration the detailed maintenance and repair recommendations developed for Cat mining machines. These tools help mines improve machine uptime through parts availability.

There are two types of demand planning orders. One type is dedicated to parts that are earmarked for servicing a specific component or tied to a machine serial number. These parts can also be used to support dealer Component Rebuild Center (CRC) activities. Another type of order is for consumable parts (e.g., oil filters), which are used as stock orders for dealers. These orders are filled based on priority.

Planned Component Replacements

The Planned Component Replacement Process (PCR) is a demand planning tool used by Caterpillar to improve parts support for our dealers and customers throughout the lives of their mining machines. Each quarter, we reach out to our mining dealers to review their equipment fleets and populate the PCR template with planned dealer rebuilds, the need for Reman parts and components, and new product needs at the major component level. We use this information to ensure we have material available in the network when it is needed to perform component rebuilds and change-outs — and ultimately to maximize machine uptime.

PCR is incorporated into the overall Caterpillar Maintenance and Repair processes and routines and is an essential piece when it comes to the management of components. The goal is to make sure we achieve optimum useful lives for each component while also ensuring we maintain high machine availability and minimize downtime for the replacement.

Scheduling and execution of the PCR follows a well-defined criteria and strategy that takes into consideration a number of parameters, such as initial component life predictions, site maintenance practices, and the application in which the machine is being used. The health of the component is tracked, trended, monitored and factored into the timing of the exchange plan. It's important to track not only actual performance but also to record its history, including failures, repairs and rebuilds.

Once it has been determined that a component is due to be exchanged, there are several options for replacement, including dealer rebuild, remanufactured components, or new. Component availability and acquisition time are key factors to be considered in the decision-making process. Cost is also a consideration and details such as component exchange quality and downtime need to be included in addition to the initial cost of the component to the contract.

The final plan should consider and include the availability of labor, facilities, tooling, installation parts kits, and special instructions associated with the exchange. Other jobs (backlogged repairs) that will take place during the "window of opportunity" provided by the component replacement need to be considered as well.

The execution phase should include not only the task itself but also the commissioning of the "new" component and protection, handling, and transportation of the used component for return. The final steps are to perform a quality check of the work and to document the process via the work order for inclusion in the machine/component history files.

Planning down to the serial number

In 2015, Caterpillar launched a new initiative that takes planning and forecasting to the next level. This proactive demand planning approach takes parts and component planning down to the exact serial number on a piece of equipment, significantly improving supply chain planning and parts availability. Additionally, it improves our collective knowledge on when parts and components will need to be replaced and helps improve the physical availability of equipment by ensuring a machine is not down while waiting for parts to arrive.

The initiative began with four mining products: Rotary Drills, Electric Rope Shovels, Hydraulic Mining Shovels and Draglines. Given the potential for unique parts content from machine serial number to serial number and/or model to model, we outlined how the process should work, what data needed to be captured at the serial number level, and what action would be taken based on that data.

Today we have begun capturing data for all mining equipment, including underground machines. We're working with Cat dealers to help them develop the process for all machines in their territory. Progress continues to be made not only in the percentage of machines covered in the initiative but also in the quality of the input being received. The target for the program is to achieve a minimum outlook of 18 months.

The program gathers:

- Site name
- Serial number
- Critical component part number
- Part description
- Quantity needed
- Validated date when needed
- Repair strategy (New, Reman or Rebuild)

The program provides essential information to help Caterpillar and Cat dealers make the appropriate inventory decisions to ensure we have the right parts available to support rebuilds or replacements. It helps us understand whether we are achieving the target PCR life for the parts on the machine, or whether customers are prolonging the component service intervals. Our product groups use the data to investigate opportunities to improve the lifecycle of parts and lower the customer's overall cost of ownership.

The initiative also benefits our dealers and customers by helping them better understand when parts and labor will be required. Dealers can ensure they are properly planning for these requirements, while our customers can plan outages accordingly.

TAKING ADVANTAGE OF PARTS ORDERING OPTIONS

Whether miners are looking for new, used or remanufactured parts, being able to get them when they need them is critical to keeping machines running. Caterpillar offers a number of options to facilitate this important process.

Customers can order from more than a million items in our online parts books. With over 20 facilities and more than 1.5 million square meters (16 million square feet) of storage space, there is no other logistics system in the world that can offer the same support.

When it comes to planning ahead for parts and components, we recommend working with our global network of approximately 170 Cat dealers, who support nearly 200 countries through over 2,100 branches. Most dealers maintain extensive parts inventories and leverage sophisticated forecasting systems to make sure they have or can quickly obtain the parts and components mines need to reduce downtime. They can locate and communicate a timeline for delivery in a matter of minutes.

Cat Integrated Procurement System (Cat IP)

Recent studies have found that even among those companies considered best-in-class, shifting to an integrated procurement process allows them to realize huge savings.

Thanks to the Cat Integrated Procurement (Cat IP) System, many Caterpillar customers are streamlining their operations and reducing transaction costs by automating their procurement and invoicing processes and integrating with supplier systems.

Since 2001, Caterpillar has been an industry leader in the integrated procurement of parts by facilitating nearly 1,000 connections between customer business systems and their Cat dealers. Customers who procure parts and receive electronic invoices through these connections often experience transaction cost savings of 50 percent or more, depending on their current processes.

Cat IP helps companies grow their businesses without adding labor, helping them eliminate low value-add activities that were previously done manually. The system helps companies lower costs by reducing:

- Time spent processing and managing purchase requisitions and orders
- Invoice entry time
- Reconciliation time for invoices to purchase orders
- Time for managing parts catalogs (possibly eliminating self-hosting catalogs)

One customer's process assessment showed that over half of their manual process steps were eliminated during ordering, shipping/receiving, invoice reconciliation and accounts payable.

Cat IP helps improve ordering efficiency in a number of ways. Orders are placed from the customer's business system to the Cat dealer's system — reducing manual effort and time spent waiting at a counter or on the telephone, eliminating duplicate entry and reducing the number of returns. Electronic invoices can then be sent directly to the customer's business system and automatically reconciled with the original purchase orders.

Studies from Hackett Group, Aberdeen Group and PaymentView.com estimate that 15 percent of manual orders are error-ridden, about 3.5 percent of invoices contain errors, and suppliers typically require at least 20 minutes to correct an error. These errors and more can be significantly improved through an integrated process. Cat IP is estimated to improve order accuracy overall by as much as 80 percent, reducing costly errors that lead to downtime and lost productivity.

Users can select parts from several sources: Caterpillar's online parts manuals, Frequent Order lists created on parts.cat.com, or their own business system's list of Cat parts and prices. They receive parts prices and availability instantaneously, even after hours, to facilitate emergency orders. And customers with stocks of Cat parts and an appropriate system can automatically generate stock replenishment orders to the Cat dealer without manual intervention.

Additional information on Cat IP is available from local Cat dealers.

Parts.cat.com

Parts.cat.com makes it possible to shop anytime, day or night, for new Cat Parts, Cat Classic™ Parts, Cat Reman (remanufactured parts), and surplus and used parts.

The site offers more than 1.4 million genuine Cat parts and is accessible anywhere, from any device. Parts can be shipped to any location, including the closest dealer store.

The easy-to-navigate site allows customers to save frequently-ordered parts for future ordering. They can see parts availability in real time, view parts images and manual information, and search for parts using the serial number of a specific piece of equipment.

The site is continually improved and enhanced to better meet customer needs — from optimizing pages for use on mobile devices to allowing users to share lists and order parts across multiple dealers.

ACHIEVING AN IDEAL STATE

What does fully optimized parts demand planning look like? Caterpillar envisions a mining enterprise with a completed and validated site plan for every piece of equipment, down to the serial number, by critical component. This ideal state will maximize asset availability by ensuring sites have the right part at the right place at the right time.

Reaping the benefits

The potential benefits of optimized demand planning are significant. By having a greater understanding of what is needed, when it is needed, and where it is needed, mining companies can expect:

- Higher machine availability, leading to greater productivity
- A thorough understanding — both at the site level and by their Cat dealer — of each machine's current condition and repair strategy
- Improved parts availability
- A reduction in emergency freight and fees
- Maximized compliance with Planned Component Replacements

Demand planning also impacts Cat dealers, making it easier for them to help their mining customers get the most from their equipment investment and meet production goals. Dealers benefit from:

- Improved visibility to and a better understanding of parts and service needs for individual sites
- The opportunity to be proactive consultants to their customers
- Better coordination of planning across departments, including Parts, Service and Component Rebuild Centers

Continually improving

Caterpillar, too, leverages the benefits of demand planning to improve the way we serve both customers and our dealer network. We gain a better understanding of our own equipment — the actual vs. planned lifecycle of machines, parts and components, as well as the total cost of ownership. We can identify and close gaps and improve budgeting for our own parts and labor needs, which translates into lower costs for our customers.

We're committed to helping our customers and dealers develop the necessary processes and systems so demand plans can be fully and reliably leveraged. We are leveraging the lessons we've learned and incorporating best practices from our dealers and customers around the world who have robust demand planning processes already in place, and applying these lessons to our dealers and customers in other geographic areas.