

It's not magic but logic that's giving an Indiana engine distributor record returns on assets invested in parts inventory.

By Michael J. Major



ramatic. The word gets used to the point of exaggeration, but it's the right word to describe the changes made at Cummins Mid-States Power of Indianapolis during the past year.

This engine distributorship was the test case for a new parts inventory management system developed by Cummins Engine Co. in conjunction with a Chicago-based management consulting firm.

The results speak for themselves: During the eight-month trial period, the new approach decreased required inventory investment by 38% while increasing overall parts availability from 81% to 91%. Distributor management reports that they achieved the highest return on assets in their 28-year history.

Not surprisingly, the new program, known as "optimized inventory management" or optimizer for short, is gradually being made available to the 32 other Cummins distributorships throughout the country.

This story is about the optimizer concept and how it's being used successfully at Cummins Mid-States Power. But it's also a study in how a manufacturer can work in partnership with its dealers and outside suppliers for the ultimate benefit of the customer.

PROBLEMS AND SOLUTIONS

Mid-States began searching for a solution to an inventory problem in early 1994. The problem was simple—inven-

'THE OPTIMIZER' CREATES NEW HIGHS AND LOWS



A new inventory management system has enabled Cummins Mid-States Power of Indianapolis to achieve every dealer's goal of reducing stock levels while increasing availability for customers.

tory, and too much of it. Dewey Spence, who manages the company's inventory and computer systems, recalls: "We recognized that we were overstocked in our Indianapolis branch, which also acted as a warehouse for our two other territorial branches."



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Terry Harris
Chicago Consulting

We did this to take advantage of a Cummins program that provided special discounts to distributors who did their own warehousing. But our inventories were too much for the marketplace.

"The statistics we had for inventory turns showed we were way overstocked,

and we had the gut feeling that we were carrying a lot of obsolete inventory."

Meanwhile, back at the Cummins factory in Columbus, Ind., the search was on for ways to help distributors overcome these types of problems. Pam Tully, materials director for Cummins, explains, "We've come to realize that our success is tied to our distributors' success. Whatever efforts we make to help them ultimately helps us and our customers."

Cummins was working with Chicago Consulting managing partner Terry Harris on a new open architecture computer system that would link distributorships with the factory and other suppliers. The company asked Harris to conduct a test of optimized inventory management at Mid-States. The system had been used successfully in other fields, but was new to this industry.

Prior to trying this new approach, Mid-States relied on several traditional and widely used methods of inventory management, according to Spence. The first was a manual procedure in which parts were ordered according to set parameters such as order point, quantity and lead time. The company also used a

computer-based statistical forecasting method that relied on order history analysis, classification of parts according to how frequently they were ordered and safety stock allowances.

While these methods had worked in the past, they were coming up short today for several reasons. One factor is the increasing financial pressure, as dealerships seek to get a higher return on assets invested. A bloated parts inventory works against that objective.

Another factor is the quicker introduction of new parts and obsolescence of old ones, which increases the likelihood of a distributor having outdated stock in inventory.

Finally, there is the human factor. "Many people just don't have the skills to properly use the old systems," according to Spence. "It is a difficult task to monitor the system demands and keep up with all of the changes needed to make them work properly."

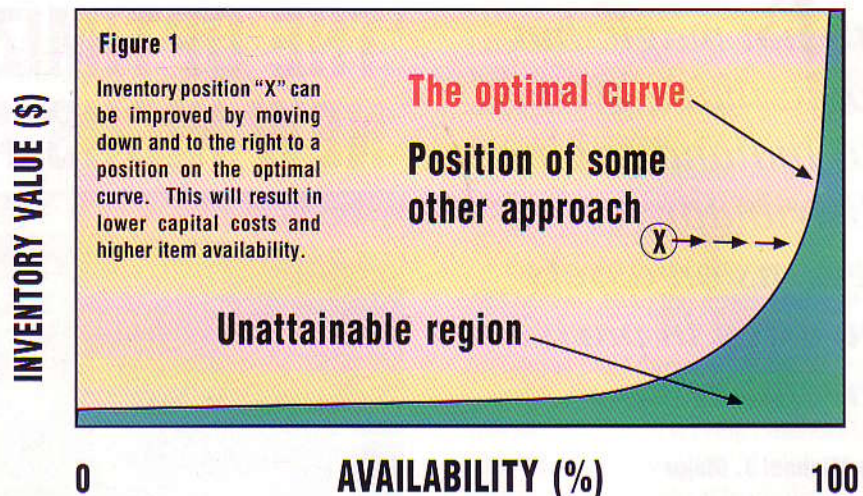
Enter Chicago Consulting and the optimizer system. "Our new approach is both complex and simple," explains Terry Harris. "It's complex in that it uses sophisticated mathematics. This, however, is invisible to the user. It's simple in the sense that with it the user can specify an availability level. The system will then create an inventory that achieves that availability at the lowest possible inventory investment."

THE OPTIMIZED APPROACH

How does optimized inventory management work and what does it optimize? It optimizes availability per dollar—availability of the whole inventory per dollar of inventory investment. This makes it very different from other approaches.

With it an inventory planner can specify any availability level and be guaranteed that the inventory investment is the lowest possible. Alternatively, the planner can specify any inventory investment level and be guaranteed that the optimized approach will result in the highest availability possible.

"Most other approaches allow the user to specify an availability level. However, they require higher investment than this approach," says Harris. "Only a few other approaches allow the



user to specify an inventory investment. Those that do, however, result in lower availability."

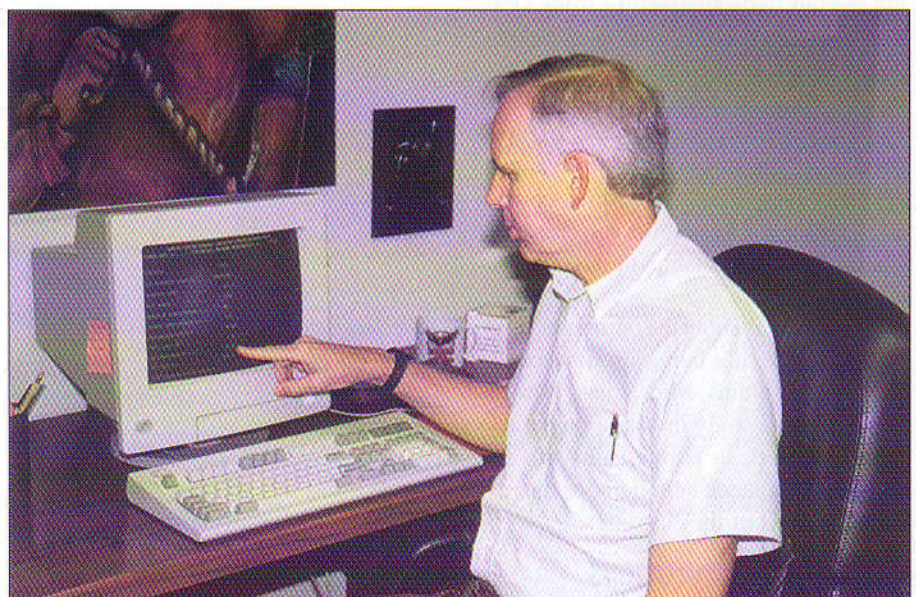
Availability is calculated by treating demand for an item as a random variable. It's represented by a probability distribution. The availability of an item is calculated using the probability distribution of that item. Then the availability of the whole inventory is calculated by weighting the availability of each item by its forecast demand.

The optimized approach creates an optimal curve (see Figure 1). The curve defines optimal inventory positions along the availability and cost spectrums—

inventory positions that specify the level of each item. The curve creates an unattainable region below it—one that cannot be reached by any approach. All other approaches are above the optimal curve.

Improvements are made when an inventory planner moves to a point on the optimal curve to increase availability and reduce cost at the same time. Any point on the optimal curve to the lower right is better. It provides lower cost and higher availability.

The optimal curve is developed by constructing optimal inventory positions item by item. It then recommends



Dewey Spence, who manages Cummins Mid-States Power's inventory and computer systems, demonstrates the optimizer approach. The system "optimizes" availability per dollar—availability of the whole inventory per dollar of inventory investment.



A 38% reduction in inventory investment means there's plenty of empty shelf space at Cummins Mid-States Power. At the same time, the dealership has increased overall parts availability from 81% to 91%.

orders that achieve the optimal position—orders that increase the on-hand to the optimal position item by item. This part of the approach utilizes the on-hand, back order, on order, lead time and forecast usage data of each item, just like other approaches.

In fact, the optimized approach is designed to fit inside existing software, so there is no need to replace current systems. It replaces safety stock calculations and, as such, fits between the forecast and manual order review. The optimized approach takes forecasts and other data as inputs and recommends orders. The difference is that this system is working with much different logic—optimizing logic.

The mathematical concepts behind the optimizer have been around for a long time. The advent of more powerful and less expensive business computers has made this number-intensive system practical for all sizes and types of businesses.

What's the impact of moving from a point above the curve? Harris reports, "We have tested the optimal approach on dozens of actual inventories and other frequently used approaches. We've tested it with leading manufacturers and distributors, with multi-billion dollar organizations and small ones, too.

"Inventory cost reductions of 30-40% are common. Availability increase of tens of percentage points are routine—from 85% to 95%, for example. We usually see 40-70% reductions in stockouts with the optimized approach."

CUMMINS MID-STATES GETS RESULTS

Cummins Mid-States started using the optimizer in May 1994. Inventory planner Dewey Spence decided to target a fill

rate of 99%. He reviewed the first order carefully, looking for problems that might crop up. He adjusted a few items on the first orders based on demand information he knew the forecast system did not have.

In order to give the new system a fair test, he also passed the manual review process to others in the company who had routinely reviewed orders before. With persuasion and gentle direction, Spence got his people to follow the system through a trial period. Within a few months, they became believers.

The first set of items managed with the optimized approach had a combined inventory value of \$536,000. At the start of the test, the "first pass availability," as measured by Spence's manual method, was 80.6%. In two months, the inventory investment decreased to \$420,000 and the availability increased to 89.8%.

By January 1995, the inventory investment was down to \$360,000 and availability was up to 91.1%. Since then, the company has rolled out the approach to two other branches and expanded it to other lines.

While the numbers certainly look good on paper, what about the more practical issues? Inventory management, which has always been a combination of automation and common sense, becomes subject under this system to a complex mathematical formula that only the soft-



The parts customers need are still on hand at Cummins Mid-States Power, as Dewey Spence demonstrates.

ware developers can understand.

Pam Tully of Cummins agrees: "It is difficult to understand the mathematical equations. But you don't have to. All this system does is change the logic and make it more efficient and less susceptible to human error.

"The system does take some getting used to," she continues. "It can seem like an affront to common sense. If somebody just sold 10, they naturally think another ten of the same item should be purchased. It's normal for someone to be resistant to a computer that tells them something different."

Spence agrees that there was a certain resistance to change. "Basically, when you cut out so much inventory, you leave a lot of empty spaces on the shelf. Many of the service people questioned whether the parts staff knew what we were getting into.

"You really need to talk to people, persuade them, show them the measure-

ment tools, and let them see results. It will make them believers."

SHARING THE BENEFITS

Development costs for the optimizer system were shared by Cummins and all 33 of its distributors.

The manufacturer plans to make the optimizer available to all its other dis-

"Everybody in the channel wins with an approach that decreases cost and increases availability."

Terry Harris

tributors, starting with Cummins Southwest in Phoenix. The goal is to implement the system at another six distributorships this year, but the company stresses its commitment to a gradual process so that each installation can proceed in an orderly fashion.

Consultant Terry Harris notes that this sensitivity to the needs of distributors is indicative of the philosophy Cummins used throughout this project.

"They recognize that their distributors are partners in serving other dealers and end-users," he states. "Helping their distributors be efficient helps the whole channel. Everybody in the channel wins with an approach that decreases cost and increases availability." ■

Mike Major is a business writer in Port Townsend, Wash.

ABOUT CHICAGO CONSULTING

Chicago Consulting specializes in helping companies increase sales, market share and profits by developing customer satisfaction strategies for them. The idea is that satisfied customers keep coming back. They stay longer and buy more.

In most industries, customers are aware of all suppliers and may do business with each. Consequently, the supplier who satisfies customers better than his competitors sells more, keeps customers longer and causes competitors' customers to switch to that supplier.

Customer satisfaction is a simple concept but hard to execute. Most companies embrace the idea but don't know how to implement specific actions. Chicago Consulting develops the strategy and then works with companies to bring results to their bottom lines.

Optimized inventory management is an example. It was originally developed while consulting with the Square D Corp. The firm developed a strategy that necessitated high levels of availability for its electrical dealer customers. Implementing this resulted in the OPTIMIZER. Square D is using the approach in its distribution centers and with customers.

Chicago Consulting works with organizations in a variety of functional areas—distribution, customer service, marketing, production and field sales. Whatever it takes to provide customer satisfaction and achieve sales and profit objectives are areas in which the firm works.

The concept of customer satisfaction as a way to increase sales and profits is a powerful one. Chicago Consulting has developed other specialized techniques and is able to translate what's worked in one industry or company to another.

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