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Reducing Delivery Lead Time: 13 Weeks to One Week



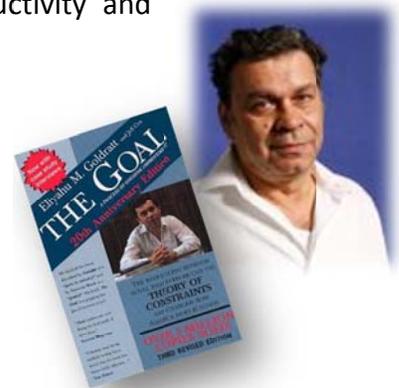
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Dr. Eliyahu M. Goldratt's Theory of Constraints (TOC) management theory has been adopted holistically throughout all divisions of Omron Healthcare Co.--from manufacturing to sales-- to successfully increase growth and profits, and dramatically decreasing inventory levels by 40 percent across the supply chain.

In his best-selling book, *The Goal*, (published in the USA in 1984 by North River Press and in 2001 in Japan by Diamond Publishing Co.) Dr. Goldratt tells the story of how a shutdown was averted in a manufacturing company by using TOC. TOC helped them focus on the production bottlenecks, resulting in major improvements in system productivity and efficiency.

Our experience has shown that TOC can be extremely effective in inventory management as well; at OMD we were able to shorten the time lag for inventory replacement from 13 weeks to one week. In addition, we achieved inventory reductions of 40 percent across the entire supply chain.

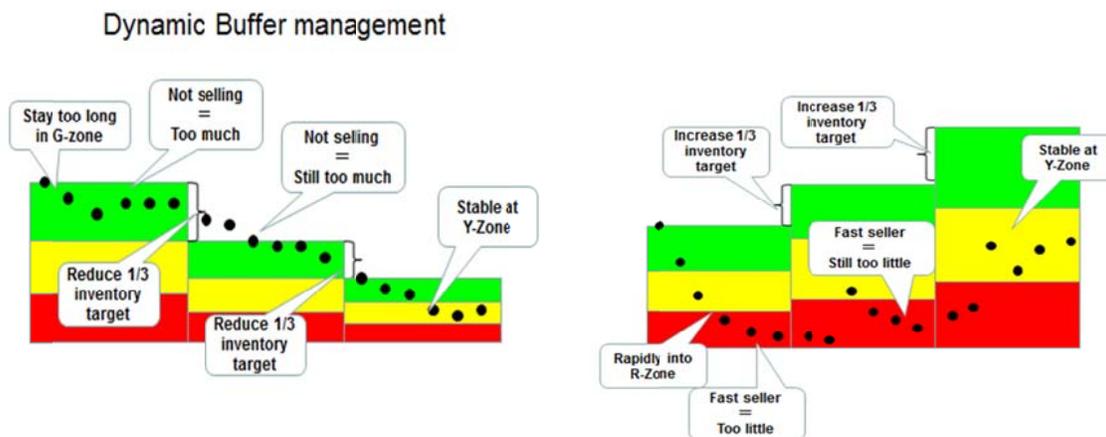
I was transferred in July 2010 to OMD to implement a transformation in inventory management. It was my second stint at Dalian; my first took place in 2003-2008. We utilized Dynamic Buffer Management (DBM), which was referenced in Dr. Goldratt's book, *The Crystal Ball (Isn't It Obvious)* is the title of this book in countries outside of Japan). In the book, the manager of a textile chain needed to balance sales and inventory to maximize profit and ended up reducing stock significantly.



Surplus versus Out-of-Stocks

In DBM, forecasting product demand is considered to be a bottleneck. The goal is inventory optimization. Faced with demand fluctuations for a product, you must determine a buffer size for every stock keeping unit (SKU). The allowable volume of inventory is divided into three parts, coded green, yellow or red. A product in the green zone is selling slower than predicted, which means there is ample stock and no need for replenishment. To reduce the replenishment quantity, the allowable volume of inventory is reduced.

If the inventory volume is in the yellow zone, there is a good balance between supply and demand. However, when inventory moves into the red zone, sales are strong, but inventory is tight. If inventory stays in the red zone for a certain period of time, additional inventory replenishment will be necessary.



This dynamic mechanism ensures that the allowable inventory is directly linked to demand fluctuations and, ultimately, to the actual volume of sales. As a result, both surplus and out-of-stocks can be prevented.

The Fallacy of Forecasting

OMD needed this kind of inventory management because we were reducing the price for products when there were surplus stocks, and out-of-stocks were occurring with those products selling briskly. Previously, we would forecast demand in every corner of the world and a production plan was drawn up based on month-to-month results. We believed we were producing "as required, when required." However, we found that assumption was wrong.

The problem is that forecasted demand often varies from actual demand, resulting in a time lag between the time a good is produced and the time when it sells. If the demand at the selling time is less than forecast, inventory will be too high, and, conversely, if the demand is greater

than forecast, there will be out-of-stocks. Before introducing DBM, the time lag for replenishing stock (replenishment lead time) was 13 weeks or more. During that time period, sales could change significantly from the forecasted numbers.

What we needed to do was stop forecasting and tie inventory more directly to actual sales to prevent surpluses and out-of-stocks. We also needed to drastically shorten the replenishment lead time of parts that went into the product. Although we were only waiting for a few of the 100 or more parts required assembling a product, it didn't matter; a product cannot be completed if even one part is missing.

A Win-Win for Everyone

To shorten the replenishment lead time – our bottleneck – OMD assured the parts supplier that our company would take over excess material and finished parts in case they were discontinued. Parts were then supplied immediately and procurement lead time was reduced sharply. Furthermore, the introduction of DBM enabled our parts supplier to reduce its finished parts inventory.



If the replenishment lead time of a product is shortened, both surplus and out-of-stock SKUs are greatly reduced. Out-of-stocks can mean lost sales opportunities; a surplus can mean discounted products. Eliminating both will lead to an increase in sales and profits.

The parts supplier, in turn, becomes more profitable with the increase in sales. And the retail store, which doesn't have to wait for inventory, is more profitable as well. It becomes a "win-win" relationship for everyone.

The Challenge of Introducing TOC

Initially, this may be difficult for companies to understand since they are familiar with the conventional way of managing inventory. They often cannot accept the fundamental tenet of TOC, which is "it is necessary to just focus on the bottleneck."

At the beginning of the TOC implementation, 40 executives and managers, including President Kiichiro Miyata, met for two three-day TOC training camps. Even at the end, all of management still did not understand and accept TOC.

It was a similar situation with the Chinese employees of OMD. Although four months were spent studying TOC in advance, they were familiar with making a product by batching according to a production plan. The anxiety over the new method of small-lot production was not easily reduced.

Results Eliminate Concerns

Our goal was to reduce replenishment lead time from 13 weeks or more to one week. Until now, four weeks were typically allocated for the assembling process. We decided to test DBM initially with only four models in August 2010. If that was successful, we would introduce it further.

The end result was that we were able to shorten replenishment lead time from 13 weeks to only one. Employees involved in manufacturing other models took note and the introduction of DBM was expanded to 14 models. Again, replenishment lead time was shortened to one week, resulting in a reduction of stock of the finished goods in the factory warehouse and in the regional sales warehouse by an average of 40 percent.

Eventually, DBM was expanded to apply to 50 models. This was influenced largely by the Japanese earthquake disaster on March 11, 2011, which made it very difficult to forecast demand. As a result, many employees switched over to a “replenishment to consumption” inventory mindset and it became obvious that there was more certainty in replacing only the portion that was sold.

While advancing DBM, there was also Kaizen – continuous improvement – in the factory line. Due to the TOC implementation, we were paying particular attention to when capacity was at the lowest and became a bottleneck. Only four workers were added, and production output during an eight-hour workday increased from 530 units to 830 units -- by 1.6 times in only six days.

The DBM production transformation has started, but there is still room for improvement. Looking at the factory itself, it does not appear to have changed much. What has changed is a more direct link between sales and production because of DBM. Furthermore, because the demand to our parts supplier also changed, parts are supplied more quickly. If these measures continue, we look forward to seeing a very different manufacturing scenario from the past.

Notes:

OMRON

Omron Manufacturing of Dalian (OMD), located in China, is part of Omron Healthcare Co. Ltd (OHQ), a subsidiary of Omron Corporation, with headquarters in Kyoto, Japan. OMD is a full-service company that develops, manufactures and sells healthcare equipment. It supplies 80% of Omron's global demand for key products that include blood pressure monitors and digital thermometers for home use, as well as arteriosclerosis monitors used in hospital settings.

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Nikkei Business, the flagship magazine of Nikkei Business Publications is Japan's leading weekly business magazine for top and middle managers. The current circulation is more than 270,000.



Goldratt Consulting helps companies to immediately accelerate cash flow and profits, and with the same actions begin to strengthen the company for exponential growth. Dr. Eli Goldratt founded Goldratt Consulting as part of The Goldratt Group in 2003. The company is headquartered in Israel and represented on every continent. Our leadership roster contains the most highly renowned TOC experts in the world.