A vendor inventory management (VMI) program not only improves forecasts and supply chain but it also creates visibility in the supply chain… trust between a vendor and its customers is the key to success … to win the support of customers for a VMI program, it is important that they fully understand its benefits.

A vendor managed inventory program (VMI) is an important collaborative initiative in a supply chain to improve visibility as well as forecasting. In this article we show how Arasco integrated its supply chain within the framework of a VMI program.

WHY VMI?

A collaborative initiative, such as a vendor managed inventory (VMI) program, can reduce costs, improve customer service, and increase sales. It also helps build a strategic alliance between the customer (distributor) and the vendor (manufacturer), which is very important to both. With this approach, a vendor continuously and automatically replenishes its trading partner’s inventory by predicting its customer’s demand. Electronic data interchange (EDI) serves as a crucial link between the trading partners. The key to the success of a VMI program is trust between the two parties—the vendor and the customer.

ARASCO’S FEED SUPPLY CHAINS

Arasco Feed’s supply chains are shown in Figures 1-3. Figure 1 gives upstream channels from seed producers, such as Syngenta, to seed processing plants, crop growers, dealers/traders, and bulk traders/exporters. Figure 2 illustrates an internal supply chain that starts with bulk handling facilities at Dammam Port where it is unloaded for shipment to Dammam Feed Mill (DFM) and Kharj Feed Mill (KFM). At Alkharj, the feed mill complex includes storage silos and warehouses, a feed mill, a pre-mix plant, a fish feed plant, and a glucose and starch plant. From DFM and KFM, the material is shipped down the supply chain as shown in Figure 3.

GOALS

For an effective and successful VMI program, we must first decide what we want to accomplish. In our supply chain setup, 90% of the raw materials are imported from abroad, arriving at the Dammam Port by ship. To improve efficiency, we must offload the materials quickly and then send to our distributors at Dammam yard and Alkharj as quickly as possible because we have a minimum warehouse space rented at the port.

To reduce supply chain costs and maximize throughput, we strive to increase production efficiency and stabilize the production schedule with few changeovers. Similarly, for transportation efficiency, we want to stabilize transportation schedule.

VMI PROCESS

The whole VMI process used by Arasco, which is outlined in Figure 4, can be broken down into three sub-processes: (1) collaborative process, (2) planning and forecasting process, and (3) replenishment process.

Collaborative Process: We recognized early on that in order to have a successful VMI program, we must have a strong collaboration between our customers and Arasco. Therefore, our first task was to select the candidates most suitable for this program. To come up with a list of those candidates, we ran a number of simulations. The results of those
simulations were evaluated and reviewed thoroughly to ensure that we would select the right ones.

The next step was to form a strategic alliance team consisting of VP Sales, VP Finance, VP Operations, Sales & Marketing Manager, Sales Representatives for the Area, and Project Manager for the VMI Program. This team visited all the selected distributors and discussed the proposed VMI program. During this meeting, we explained that we want to use a push strategy to maximize our throughput and improve our supply chain operations, which would result in cost savings that would benefit them either in the form of increased customer service or quantity discounts. However, we did not quantify any savings, nor did we discuss how the savings would be distributed.

After developing the list of potential VMI partners, we started working on the technical parameters. The term of payment, which had been four weeks after the material was shipped, was changed to every week for the material sold by the distributor. It is surprising that even though the distributors that have only cash sales, the cash-to-cash time will be reduced by one week. Regarding the terms of delivery, the trucks will be loaded and products will be delivered during the off-peak production time, reducing the palletizing and double handling costs. The parameters such as re-order points based on usage rates for replenishment, key performance indicators to measure the performance, and cycle counting frequency for inventory accuracy were well defined to execute VMI.

The potential savings are calculated by considering the benefits to Arasco. The major savings resulted from faster unloading of inbound supply from ships, creating space for the unloaded material, producing and delivering the material during off-peak times, and modifying the terms of payment. To win the support of our VMI partners, we proposed sharing of the benefits with them by offering anywhere from 2% to 4% over the sales price, depending on the VMI partner.

After quantifying all the benefits, our strategic alliance team met once again with all the distributors that had shown interest in the program. In this meeting, the team not only pointed out the benefits to be shared and how, but also what kinds of legal agreements must be signed. Initially, we offered only improvement in the service level until other benefits are realized. So, the collaboration that we were seeking was based purely on trust. To build up the trust, the Chairman of Arasco also interacted with key distributors. After this visit, we finalized the list of distributors with whom we would collaborate for this program.

Planning and Forecasting Process: This process included a joint business plan and front-end agreements as well as the creation of monthly and yearly forecasts. The joint business plan and front-end agreements were very important for building trust between the distributors.
and Arasco. In addition, because some distributors had the benefit because of joining the program and others did not, we wanted to make sure that our distributors would not be competing with each other.

The front-end agreements included expectations of both parties, action to be taken if there is a disagreement, and resources required for the successful implementation of this program. Confidentiality agreements had to be signed and the role each partner would play was specified as well.

The joint business plan included partnership strategies, strategic and tactical plans, item management profile, and business plans. To measure progress, KPIs (Key Performance Indicators) were identified, including forecast error, service level, on-time payments, and cycle-counting frequency as defined by Arasco’s customer service team. The partnership strategy included the construction of additional warehousing at the VMI partner site and the customization of truck trailers at Arasco workshops, etc. The item management profile includes the technical parameters such as safety stock, re-order level, order quantity, etc., for individual items. How frequently agreements could be revised also was specified.

Regarding forecasts, Arasco and its customers prepared their own rolling monthly and annual forecasts, which were then reconciled to arrive at one set of forecasts. Forecasts were based on the customer’s business plan, the joint business plan, the number of animals and respective nutrition requirements, historical data, and trend and seasonality.

After the forecasts were prepared and one set of forecasts was agreed upon, the next step was the preparation of a replenishment plan. The success of any VMI project depends very much on replenishment; in this case, we used forecasts as a basis of replenishment. Since most of our distributors were not well versed with computers, we decided to give IT training to their on-site staff. In doing so, we gave them the training and, at the same time, got the feel of their sales.

The re-order level for the site of each distributor is based on its sales rate. Once the re-order level reaches a distributor’s store, the storekeeper sends an SMS to Arasco’s GSM number, which is connected to Arasco’s BaaN Server. Then, its ERP system automatically generates a replenishment order. The replenishment quantity is included in the Master Production Scheduling (MPS) and Transportation Schedule.

Once the order is generated and included in the MPS and transportation schedule, it is a matter of routine to set its delivery schedule. Keep in mind that the Dammam Feed Mill is designed in such a way so that the produced bags can be directly loaded onto trucks. This eliminates the cost of warehousing, palleting, and handling, which comes to about 2 SR (Saudi riyals) per bag. However, we store the material in a warehouse if trucks are not available or not in the queue. While we have a policy that no truck should wait more than three hours before loading, we have created a recreation facility for drivers to rest and freshen up during their waiting period.

Once the material is shipped from our Dammam Feed Mill and reaches a distributor, the quantity is transferred automatically to the distributor’s warehouse. The distributor’s warehouse processes the sales order, which is used for generating the invoice. The sales invoice is then sent out by the Customer Service Management (CSM).

In addition to sending invoices and monthly account statements, CSM computes KPIs to determine performance, schedules visits of sales representatives to ensure everything is on track, provides training to IT staff of distributors, alerts the S&OP team to potential problems, and schedules strategic alliance team visits.
RESULTS

With the implementation of our vendor managed inventory program, forecast preparation was simplified, and the time required to produce them went down from over 300 hours to 60 hours. Moreover, the forecast accuracy steadily improved. During the second quarters of 2006 and 2007, after the implementation of VMI, the Mean Percent Error (MPE) went down from −14% to −4%, the Mean Absolute Percent Error (MAPE) went down from 15% to 9%, and bias almost disappeared. It was learned that earlier forecast error was due to the presence of bias. Inventory turnover doubled and the stock outs and excess stock declined significantly. The customer service level went up from 85% to 93% due to increased on-time deliveries. The number of changeovers in the production schedule declined from 25 to 6 per day. Since each changeover takes about 20 minutes, our efficiency improved.

The VMI program also created many strategic benefits. The number of products produced went down from 245 to 63. The modular bill of material for eight item groups was developed to aggregate the raw material requirements. The forecasting function was formalized and put in the sales and marketing department. Sales & Operations Planning process (S&OP) and Master Production Scheduling (MPS) were introduced as separate initiatives. This exercise also led to the synchronization of all plans including strategic projections, budget, S&OP, and MPS.

By having a great success in the initial program, we decided to launch its second phase to add more customers, including key raw material customers to our program.

CONCLUSIONS

The VMI is a very important program that enhances visibility in the supply chain and improves forecasting. Before taking the VMI initiative, the entire supply chain should be mapped out and all the initiatives required for the supply chain integration be listed. Trust between the vendor and the customer is very important. The well-defined front-end agreements and joint business plans further strengthen the program. To win the support of customers, it is important that they understand that it would help not only the vendor but also the customers.

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