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Are Industrial Vending Machines the Correct Answer for Sani-Matic?

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Are Industrial Vending Machines the Correct Answer for Sani-Matic?

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By

Amy Pedersen

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## Abstract

The benefits of a Vendor Managed inventory, if implemented properly and fairly, can be very beneficial for both the customer and the supplier. In this paper we will look at many of the benefits of VMI and the use of industrial vending machines. Showing how VMI can help to save a company both time and money will be discussed.

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## Are Industrial Vending Machines the Correct Answer for Sani-Matic?

Amy Pedersen

Under the Supervision of Professor Wendy Brooke

### **Statement of the Problem**

Sani-Matic is a manufacturer of sanitation equipment for food, beverage, pharmaceutical, personal care and biotech companies on a global level. They build machines and cleaning accessories that range from a very basic stainless steel tube to a custom made cleaning solution that is custom engineered and manufactured to the customer's specifications. With the extreme growth Sani-Matic has been experiencing over the past few years and due to some recent additions to their sales staff in regions of North America, they have also had to increase their workforce. In particular, they have made additions to their grinding and welding departments. The combination of the addition of these employees and the large increase in the usage of grinding, welding and safety supplies made it necessary to take a closer look at the usage of these supplies to determine the reasons for the increase.

They currently don't have a program in place that allows them to determine which employees are using the products or which specific jobs the products are used for. All of the supplies are charged to a general ledger account for either grinding supplies, welding supplies or safety equipment. Sani-Matic would like to be able to track which employees are using which items and for which job categories these items are being used for. (Such as food, beverage, pharmaceutical, personal care or biotech.)

Having the ability to track items at this level of granularity will provide them the necessary tools to evaluate the increase in supply usage. Should they find the increase is related to specific jobs, it might warrant increasing the price of that unit as it costs more to build.

However, if the increased usage is more employee related, that would indicate that employees may need additional training.

## **Literature Review**

### **Benefits of VMI**

VMI suppliers often have the experience and expertise needed to better anticipate demand or inventory needs. VMI benefits the supplier because they have the ability to better anticipate the customers' needs which can lead to higher customer satisfaction. In addition, if access to the customers' inventory data is made available, a VMI-type of program can more effectively automate what are often labor-intensive manual processes – thereby benefitting both parties. Partida (2013).

Field, who was recognized on Inc. magazine's 2013 5000 list, has the ability to provide VMI services globally and use technology to optimize the supply chain to ensure order-processing accuracy and efficiency. Stocking levels at the customer and at Field are modified based on consumption. This ensures parts are available where and when they are needed, streamlines the supply chain, and reduces the exposure to slow movement and obsolescence. Field's data-driven approach to VMI effectively manages the inventory turns as well as part availability. Leaning out the process and using technology throughout the organization allows Field to stay competitive. Derry, A. (2013)

### **Benefits of Industrial Vending Machines**

Weaver (2007) mentions the benefits of what he calls an automated dispensing machine. The benefits include curbing of inventory costs, inventory control, and reporting capabilities. He also states that the average round-trip time to the tool crib and back is fifteen minutes. Once the automated dispensing system is installed the average is reduced to less than four minutes, a total

average savings of more than eleven minutes per trip. With the use of a system like this, a company can realize cost savings from a decrease in the time spent at the tool crib along with the transit time, reduction in inventory and carrying costs.

It is estimated that an average purchase order costs a company \$150 for the time it takes personnel to process it. With the ability to have reports sent directly to the vendor, there is no need for a purchase order to be cut, allowing personnel to be eliminated or given more productive tasks.

### **Consignment of Inventory**

According to Zheng, S., Gosavi, A., & Li, L. (2010), the use of VMI along with consignment inventory can be cost effective for the customer because it has the ability to increase the level of service, reduce inventory levels, along with the reduction or elimination of ordering and planning costs. There are also advantages for the supplier, it make the coordinating of supplies easier and if planned properly, can reduce the need for transportation.

With a consignment inventory VMI system, the supplier retains ownership of the inventory until the item is sold, if supplied to a retail store or used if, supplied to a manufacturer. In this article, information on newsvendor solutions, solution methodology which includes the semi-Markov decision process (SMDP), reinforcement learning (RL), function approximation and inventory allocation are examined. When VMI systems are used, they need to be carefully optimized and can have a significant impact on system profits. It is best to identify a system that is optimal for both parties.

### **Benefits of VMI**

There are many positive reasons that companies use or offer VMI. Customers may be able to negotiate better prices when they agree to allowing a supplier to manage their inventory. If a customer agrees to purchase a certain average monthly spend, a supplier may be willing to give the customer a deeper discount. If the required monthly spend is within reach, the customer can easily realize cost savings. How does this benefit the supplier? If the customer decides to consolidate vendors to meet the required monthly spend, the supplier is guaranteed continuous sales along with the possibility of additional sales. Just this concept alone, when applied properly can be financially beneficial to both the customer and the supplier.

Other reasons that companies use VMI are; reduction in the administrative costs involved in keeping track of the inventory, issuing the purchase order, receiving and stocking the products. When the customer gives the supplier access to inventory levels and product usage, the supplier is able to offer the customer a truly hands-off approach to the fulfillment of agreed upon products. This frees-up time for employees to concentrate on other areas of their job. When a supplier's main objective is to maintain its customers agreed upon stock levels, the chance for stock outs are decreased. This is valuable because companies aren't turning away customers due to purchasing not placing an order in a timely manner.

There are many advantages for both the customer and the vendor when they participate in a win – win partnership. Figure 1 represents the operational cost structure between the partners in the VMI system.

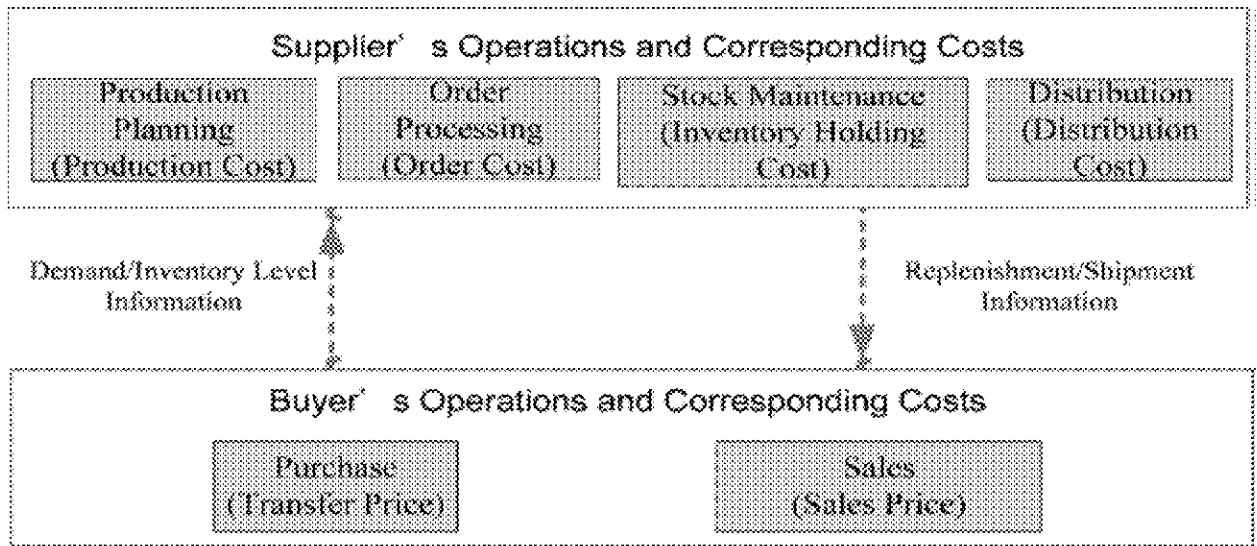


Figure 1 Cost structure of the VMI System Liao, S., Hsieh, C., & Lin, Y. (2011)

As you can see from table 1 below, both parties, the vendor and retailer assume both benefits and risks. It is important that both parties feel comfortable with the amount of risk they are assuming. From the table below you will notice that the risk involved deals with cost, technology and trusting that the other party follows through with their agreed upon roles and promises. These would include the vendor not increasing the cost once they have fully implemented VMI or the retailer not allowing the vendor critical information needed to determine min / max levels. For all of these reasons, it's important for both the vendor and retailer to choose their VMI partner wisely.

<i>Retailer</i>		<i>Vendor</i>	
VMI benefits	VMI risks	VMI benefits	VMI risks
Reduce inventory and cost	Information visibility allows opportunistic behaviour	Increase inventory flexibility	Order process is not abandoned by customer
Fewer stock outs	Dependency on vendor	Reduce lead time variability	Initial technology investment
Increase service levels/ product availability	Switching costs	Consistent ordering pattern	Difficulties in technology integration
Fill rates improvement		Reduce transportation costs	
Increase inventory turns		Optimize physical distribution	
Reduce transactional costs		Warehouse efficiency	
Reduce ordering and planning costs		Real time access to information	
		Competitive advantage relationship	

**Table 1.**  
VMI benefits and risks for both parties

**Source:** Dong *et al.* (2010); Kulp *et al.* (2004); Sari (2007); Sui (2010); Waller *et al.* (1999); Yao and Dresner (2008)

### VMI and Consignment Inventory

In a situation of consignment, the inventory is delivered to the customers' site, however they aren't charged for any of the items until they have been sold or consumed. See figure 2 for a flowchart of the process when consigned inventory is stored at the customers' site.

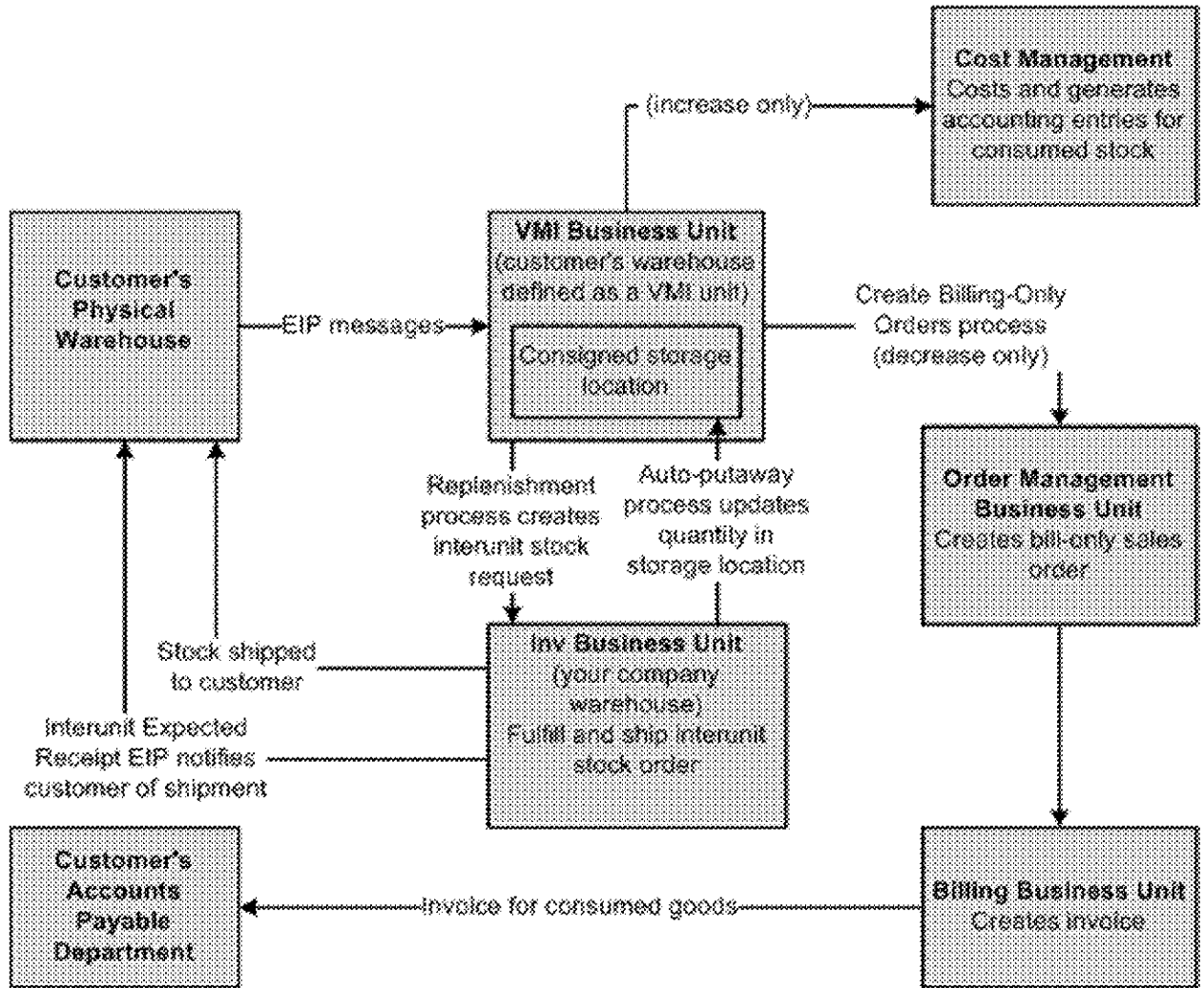


Figure 2 The process flow for Vendor Managed Inventory when consigned items are stored at your customer's location. (Oracle.com)

This can be beneficial to both the supplier and the customer. Consignment of inventory allows the customer to have immediate availability of the product without using its capital on

inventory. Consignment of inventory is also useful to the supplier in many ways. The customer might be more willing to take delivery of items that are of a higher dollar value than they would be willing to stock in a traditional purchasing situation. They may be willing to stock new or unproven products along with quantities that they normally wouldn't feel comfortable stocking. The supplier is also able to store the products at the customers' location, saving on valuable warehouse space and helping to provide better customer service.

### **Current Situation and Future Need**

Sani-Matic currently has an industrial vending machine that they lease from Fastenal. Fastenal is a company that prides themselves as the local, one-stop source for a spectrum of OEM, MRO and Construction supplies (Fastenal.com). This machine contains Fastenal stock such as batteries, utility knives and blades, flashlights, and gloves along with a few other high usage supplies. Before Fastenal installed this machine, individual managers were responsible for storing these items. Having managers store these items was problematic; when employees needed items they had to go locate the manager, taking time away from productive work for both the employee as well as the manager.

The Fastenal vending machine is a Helix machine, similar to a coil vending machine that dispenses potato chips, candy bars and other less fragile items. After having used the Fastenal vending machine, Sani-Matic was interested in expanding the use of vending machines. They would like to find an industrial vending machine that would allow them to vend many different items, some more fragile than others. Examples of some of the more fragile items are diagnostic tools that are periodically calibrated and, precision abrasives that could easily be damaged if dropped during dispensing. They would also like to dispense items that are too heavy or large to dispense in a helix vending machine. They additionally would like to have ability (not available

in the current machine) for employees to be able to return items to the machine. This becomes necessary when items are initially retrieved but not used or tools that are stored in the vending machine, have been used, and now need to be stored once more.

### **Styles of Industrial Vending Machines**

After researching options for the different types of industrial vending machine that are available, they were able to determine that they required something that was customizable, easy for the employee to operate, had reporting capabilities and would grow with their needs. Some of the different types of vending machines that are available consist of lockers, carousels, drawers, remote - coil dispensing, and cabinet styles. Due to the ability to customize the number and size of items that can be stocked in the carousel style machine, along with its small footprint, it was determined to be their best option.

### **Manufacturers of Industrial Vending Machines**

There are a number of different companies that manufacture industrial vending machines. Sani-Matic already has a Fastenal vending machine as well as a vendor managed inventory relationship with them, they first looked at what additional machines Fastenal had to offer. Other manufacturers include CribMaster, SupplyPro, PPE Vending, CAP Vending and AutoCrib.

Sani-Matic currently has two vendors that have the ability to provide the RoboCrib, AutoCrib's carousel style industrial vending machine, ApTex and TNA. ApTex is currently one of their VMI vendors for their abrasives and are one of AutoCrib's Premier Distributors. Because of this Sani-Matic was able to work with ApTex to determine the quantities of individual items that they purchased from them over a 12 month period. They have done very little business with TNA, but felt it would be worth contacting them so they could compare what the two companies had to offer.

ApTex brought one of their RoboCrib 1000's to Sani-Matic's location to show how it worked and to allow employees who would be using it to test it. It is important to make the employees feel that they have a say in the changes. Employee involvement and buy-in helps make change go more smoothly. For those employees that haven't bought into the change, those that have; can help convince them that this is a good thing. Some people are going to be resistant to change, just because they are not comfortable with change in general or technology in this case. It will also be important for people to know that the reason this change is being made is to help them do their jobs more easily. It will help organize supplies as well as ensuring that the supplies they need will be available.

ApTex also supplies abrasives and welding supplies to one of Sani-Matic's vendors that Sani-Matic outsources some of their welding and grinding work to. The invoices for these supplies are sent to and paid by Sani-Matic. Providing the material to their outsource vendor does two things for them, it helps increase in yearly spend with ApTex, thus allowing better pricing and since they provide all of the materials and supplies to the outsourcing vendor, they are strictly billed for the labor for the outsourced product. This increase in yearly spend will later be shown to help decrease their lease payment on the RoboCrib.

T&A provided a quote for abrasives that was similar to the ones that ApTex supplies. T&A brought in one of their factory representatives so they could discuss with Sani-Matic what their needs were. Although the final cost of the RoboCrib was the same with each vendor, the abrasives that T&A would supply would cost more.

### **Quotes received and Monthly Spend Required**

As stated above, quotes were requested from both ApTex and T&A for the AutoCrib / RoboCrib and abrasives. The quote that ApTex provided gives the option of leasing the

AutoCrib for 60 months or 72 months while T&A wasn't comfortable with extending the lease past 36 months. ApTex was also willing to put the inventory held in the machines on consignment, only invoicing monthly and only for the items that were dispensed. Included in the quote was no charge for a weekly delivery, not even a fuel surcharge. The CFO was very interested in the consignment inventory aspect of the proposal along with receiving only one invoice a month. The previous year's data shows 503 invoices were sent from ApTex, the reduction from over 500 to 12 invoices annually will provide an incredible saving of both time and money. The data below shows invoices from 2013. It additionally, demonstrates the potential savings if they were to consolidate their vendors along with consolidating their invoices to just one invoice a month.

Vendor	Number of Invoices	Number of TCM PO's	Annual Spend
Abrasive Specialties	38	0	\$ 37,276
Technical Tool Solutions	17	0	\$ 18,273
T&A	3	0	\$ 401
Badger Welding Supplies	652	1	\$ 192,195
Total Safety	45	0	\$ 19,957
Fastenal	363	363	\$ 285,739
ApTex	503	0	\$ 266,751
<b>Total</b>	<b>1621</b>	<b>364</b>	<b>\$ 820,592</b>

	Month	Year	60 months	72 months
A/P's time spent \$25 a hour @ 8 invoices an hour	\$ 422	\$ 5,066	\$ 25,328	\$ 30,394

This information shows the total savings if they were to consolidate all of the listed vendors to just using ApTex. If they were to just continue to use ApTex to purchase the products they currently do, they would be able to reduce their invoices from 503 a year to 12 invoices a year, a reduction of 491 invoices. Sani-Matic would still have the potential to save over \$1500 annually on invoice processing costs alone.

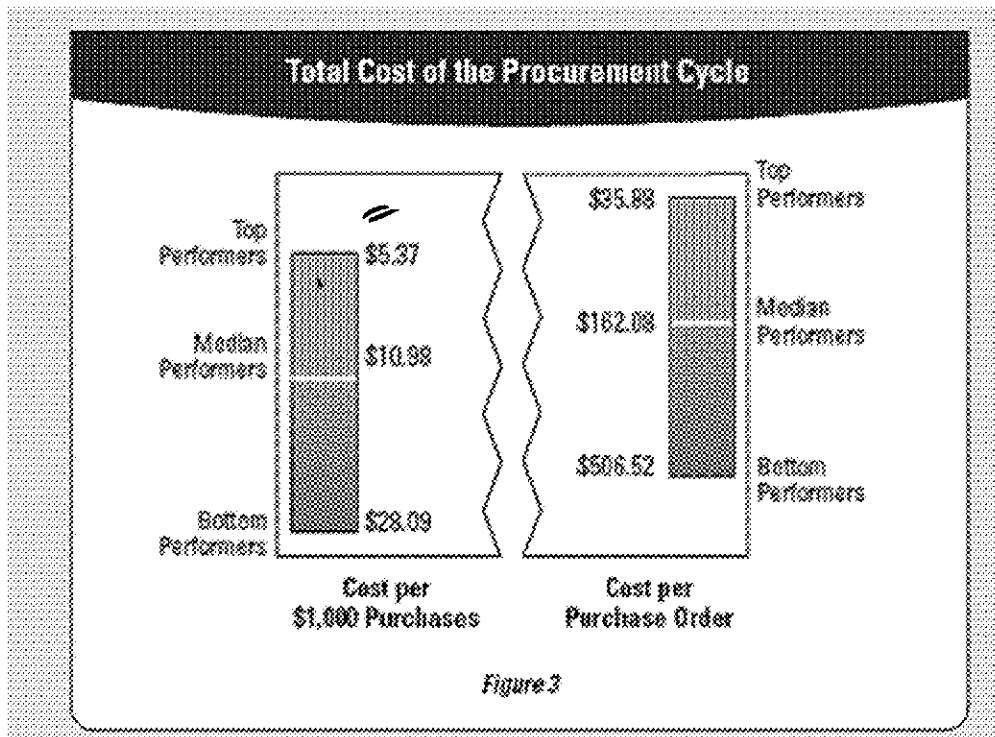
The lease for the RoboCrib is payable on an annual basis. Below is the required monthly average and annual spend required to decrease or eliminate the lease payment. As shown above, in 2013 Sani-Matic’s yearly spend with ApTex was \$266,751. This amount brings the cost per month to \$300 per month however, just with the addition of \$37,276 spent with Abrasive Specialties along with \$19,957 spent with Total Safety and only fifteen percent of the yearly spend with Fastenal equaling \$42,861 would allow Sani-Matic to receive all three of the RoboCrib 1000’s at no cost.

3 RoboCrib 1000's over 72 months	Total cost \$93,570	Annual spend of / Cost per month	Monthly average
		\$356,000 = \$0	\$29,667
		\$267,000 = \$300	\$22,250
		\$178,000 = \$600	\$14,833
		\$89,000 = \$900	\$7,417

Initially, Sani-Matic was planning on consolidating only a portion of the products purchased from Fastenal along with all of the items supplied by Abrasive Specialists, T&A and Total Safety however, after researching what Fastenal had to offer to include price, quality and service, they decided to consolidate as many of the Fastenal items as possible. Sani-Matic will still use Fastenal for emergencies and specialty items. With this consolidation, Sani-Matic will decrease the number of invoices by an estimated 789 invoices. This leaves them with a total of 832 invoices a year compared to 1621, for a savings of \$2,466 a year just in the cost to process the invoice. This doesn’t include the cost saving of not having to process a PO, receive, stock or the savings allowed by consignment of inventory.

APQC, a member-based nonprofit organization that is the leader in benchmarking and best practice, reported that there is a significant gap between the top and bottom performers in procurement effectiveness. The difference between the top performers, \$35.88 per PO compared

to \$506.52 for the worst performers. These numbers can vary due to the complexity of the product ordered.



Source: APQC Performance Benchmarks: Procurement (scdigest.com)

In 2013 Sani-Matic had a total of 364 purchase orders that were issued to vendors that could have been included in a vendor managed inventory system. Were the items handled under VMI, it could have saved the company \$54,600 .

An automated dispensing machine can assist with an overall reduction in consumption of supplies by twenty percent. The reduction and therefore savings, comes from the ability to better control waste and inventory levels. This is achieved through accountability, dispensing, controls limits and a pull system for tools and supplies. The machines, with their reporting capabilities make employees more accountable and conscious of what they are requesting from the machine. Additionally specialized packaged quantities save on waste, upper control limits are set so that

tools are not used for incorrect processes, leading to a decrease in usage and an increase in savings.

### **CEO and Plant Manager's Take on the RoboCrib**

After information was presented to the CEO and Plant manager, they felt that with the reporting capabilities, potential cost savings for supplies and administrative costs along with a decrease in the potential for obsolete items and savings allowed by the consignment of inventory, the RoboCrib vending system was a great option. Even though they were interested in the RoboCrib, they were in the infancy stages of re-designing the layout of their second location, plant two. Initially the plan was for two of the RoboCrib 1000's to be installed in plant two and one AutoCrib 1000 to be installed in plant one.

They did discuss having one of the RoboCrib 1000's installed at plant one, since the re-design was in the infancy it hadn't been decided if the grinding department at plant one would eventually be relocated to plant two. This would make the need for the RoboCrib at plant one obsolete. It was decided to wait until plans had been completed for plant two and where the grinding department would be located.

### **Conclusion**

Sani-Matic feels that once plant two is ready for the installation of the RoboCrib 1000's, it will be a great tool to help reduce costs, provide secure storage, and allow for better decisions to be made because of the reports that will be available to make educated decisions. In the process of determining if Industrial Vending would be beneficial, Sani-Matic discovered many ways they could realize additional cost savings. These include consolidation of vendors and invoices, a possible decrease in usage along with better pricing, all of these leading to thousands of dollars in yearly savings.

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