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Running with the Pack: JIT & Automation for Small Manufacturers

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Current literature reveals that savings from 5% to 90% are available from implementing various aspects of Just in Time (JIT) concepts and from implementing various types of automatic machines. While both JIT concepts and automation programs have been widely implemented and highly successful in large manufacturing companies, many smaller manufacturing companies have wondered whether it would be economically feasible to utilize these same techniques and derive these same benefits.

Altamont Manufacturing and Design, a small manufacturer of pistol grips, bow handles and shooting accessories faced this question. Altamont began business as a contract shop for the firearms industry and later developed an extensive line of grips for the retail aftermarket. Altamont successfully initiated JIT and automation concepts, thus proving that they are viable methods for substantially reducing costs and increasing sales of a small manufacturing company.

Factory Layout

When Altamont Manufacturing moved to a new factory location at the end of 1989, it redesigned its factory floor. The factory was traditionally structured and operated with mostly older machinery. Each segment of the production process was departmentalized. Materials, when delivered, were put into a store room and, when required for a production run, were placed into the first stage of the production process. Once the first stage work was completed, the materials moved to the next production stage, where they would sit in bins until they could be processed further. This stop-and-go system was often a slow, drawn-out affair, taking weeks or even months to complete a cycle.

The new philosophy focused on the layout of machines and equipment to obtain a continuous flow of a product from start to finish. Machinery and equipment were relocated into a cell or island layout comprised of small autonomous production units that produced a product from start to finish. Each cell was centered around a Computer Numerically Controlled (CNC) machine whereby coded instructions were used to control and operate the machines. Each cell was capable of producing any number of products that comprised a family of products. Items in a product family were similar in nature and could be produced with only minor changes in the machinery and equipment. As an example, one of the work cells was capable of producing up to twenty different pistol grips.

This new arrangement made it possible to eliminate non-value-added activities from both the production and the distribution processes. Non-value-added activities are any product-related activities that do not add market value to the product yet add cost. Inspection time, move time, queue time and storage time are examples of activities that do not add value to the product. Consequently, the layout focused on eliminating and/or minimizing these activities.

Altamont eliminated 90% of the previous non-value-added activities through factory layout improvement. Obviously, modifying factory layout is a major step in reducing unnecessary cost.

Inventory Levels

As a result of the continuous production process, inventories between operations were essentially eliminated. Reducing inventories reduced the associated costs such as storage facilities, material handling, record-keeping, pilferage, obsolescence and the opportunity cost of capital. According to one estimate, 35% of the total assets of a small manufacturer are tied up in inventory. Adoption of JIT can free 80 to 90% of the inventory investment. The increased cash flow can be used effectively elsewhere in the business.

Even more important, large inventories hide operating problems and, as was the case with Altamont, these undiscovered problems were usually not resolved until unnecessary cost had been incurred. The large inventory hid machine operators' mistakes in producing defective grips, as well as the machines' inability to produce within tolerance. They were not discovered until the next step in the operation. With low inventory levels, any mistake disrupted the production process and attracted attention. Corrections can be made immediately, thus improving quality and eliminating rework and waste.

While maintaining minimum inventories was very important, it was sometimes difficult to achieve such a status where all inventories were at the desired minimum level. To receive raw materials at the right time, at the right location and in the right quantity, the company had to establish special relationships with its suppliers, and it was here that Altamont encountered some difficulties not applicable to large manufacturers.

A large company possesses greater bargaining power due to its volume purchases. The larger companies can require their suppliers to deliver more frequently in smaller lots. Altamont was not in this fortunate position but was in some circumstances able to get delivery just in time. For example, some suppliers were also small companies for whom Altamont was a major customer, providing some bargaining power.

Likewise, where in some cases the purchased part was one of the large supplier's standard outputs, it was possible to receive frequent deliveries. While frequent deliveries resulted in increased shipping costs, these cost were insignificant compared to the savings the JIT system achieved.

Another potential barrier to implementation of JIT is the geographical dispersion of suppliers and the resulting costs associated with transportation. Large companies have often been able to get their suppliers to move closer to them. For the small manufacturer this is not realistic and they bear the extra cost. In striving to achieve smaller and more frequent deliveries, combining purchase requirements with other companies in the same locale can be very effective.

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This results in larger quantities and/or orders to the supplier and, in some cases, suppliers have been known to locate a storage depot in the immediate area.

JIT delivery problems can be addressed while simultaneously maintaining a buffer inventory of raw materials and finished goods as all parts do not need to be delivered just in time to adopt JIT.

Automation

Automation greatly increases the quantity that can be produced in a time period, plus it substantially reduces the labor cost required to produce the product. One of the major technological changes to influence small business was the introduction of Computer Numerically Controlled (CNC) machines. This enabled firms to use coded instructions to control and operate machines.

The price of CNC machines has decreased dramatically in the last 10 years, making them cost effective for the small manufacturer. Other new uses and applications of this technology exist with CAD (Computer Aided Design) and CAM (Computer Aided Manufacturing). Altamont utilized both of these. The CAD is a laser manufactured by Applied Laser Technology, Inc., and connected to an IBM PC which was used in manufacturing custom designed inserts for various products by use of a standard design software package.

Altamont also utilized CAM. For example, a computer-controlled Shoda router was able to do very detailed z-axis curves, an essential element in the manufacturing of pistol grips. The Shoda allowed Altamont to increase its production from one grip at a time to four simultaneously. Once set up, the operator needed only to supervise the machine periodically by putting new blocks of wood in the machine when the routing was complete. These machines freed the operator to do other tasks, resulting in a substantial decrease in labor cost.

Altamont also purchased an automatic bagging machine which heat-sealed plastic bags for shipping the grips. This process also proved to be a tremendous time-saver.

Pull Through Production

The customer placing an order triggers the purchasing of materials and the scheduling of production. This pull through concept resulted in an increase in the number of machine set-ups. To maintain manufacturing efficiency, set-up times had to be reduced. At Altamont, it took four hours for a new set-up on the older machinery. This was replaced by Fadel CNC 88 computerized machinery and the set-up/change was eventually reduced to approximately ten minutes.

Increased Sales

As a result of JIT and automation, Altamont was able to not only increase its domestic sales but was also able to expand its market to include foreign sales. Altamont's thrust toward JIT implementation was also aimed at becoming a JIT supplier. When a customer requested prototypes and prices, Altamont was able to supply these within a week, reduced from the former four-week wait. As a consequence Altamont found customers contracted for an average of seven or eight projects rather than three or four.

Altamont found it was able to accept specialized orders for quantities as low as 200 units. Previously it had not even consider an order for less than 2,000 units. Tooling could now be completed in less than a day where it used to take two weeks. Because of the factory's ability to produce in small lots, quickly and at a lower cost per unit, Altamont found it economically viable to manufacture higher quality components for its customers' products. For example, one of the bow handles it made for a customer was made of the highest quality impregnated walnut for the same cost and selling price Altamont used to charge for a lower quality plastic handle. This boosted Altamont's sales and production increased from 15,000 units in 1987 to 80,000 units in 1990. Altamont also found it was able to create markets that had not previously existed because the lower production cost had made it possible to become competitive.

The improved quality and pricing—a direct result of automation and JIT efforts—enabled the company to successfully move into the export market. In 1990, exports (mainly to Italy and the Orient) had grown to approximately 10% of total sales.

Employees

Production employees were now in charge of a production cell and were expected to run the different types of machines within that cell. This new work environment required a multi-skilled work force with the ability to accomplish more than one specific task. Workers were required to operate more than one machine, perform routine maintenance, help with set-ups, and identify and repair minor breakdowns.

The JIT environment emphasized continuous improvement and suggestions from employees to improve manufacturing processes. Employees were rewarded for ideas implemented. Altamont employees reacted favorably to their enhanced job descriptions and seemed to thrive on the increased variety.

The work force generally accepted the new system, though operation of the CNC machines required a considerable amount of retraining. The initial project of pro-

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gramming of the computerized equipment to meet Altamont's specific needs was both stressul and frustrating, as well as time-consuming. However, this problem was more specifically related to the change to more high tech automation and not JIT.

Quality Improvements

JIT improves quality since any deviation from prescribed standards results in stopping the production process. Everyone becomes actively involved in solving quality problems. The computerized machinery also improves quality immensely. There were substantially less rejects and waste. By changing over to a Fadel CNC, Altamont was able to turn what was previously scrap wood into for bow handle inserts. Quality control was significantly improved and was attributed mainly to the accuracy of the new computerized machining.

Conclusion

JIT and automation are here to stay. Both small and large manufacturers receive many of the basic benefits from a JIT system, such as shorter set-up and lead times, reduced work-in-process inventory, higher quality and better productivity.

Clearly the benefits of adopting JIT and automation into Altamont's manufacturing environment have gone beyond the initial goals of increased efficiency and flexibility. When JIT is adopted by small manufacturers, it provides them with advantages over traditional manufacturing systems, such as lower cost, quality improvements, higher productivity and less working capital tied up in inventory.

Small U.S. manufacturers must understand the basic principles and philosophy of JIT and update their production equipment if they are to be competitive in today's business environment. On a global scale, foreign competition is increasing and competition does not discriminate between small and large companies. Altamont's move toward implementing some of the elements of the JIT philosophy has been done concurrently with its move toward more highly technical, automated equipment. It has been successful.

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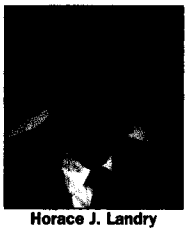
Celebrating 25 Years of Commitment



Horace J. Landry

In recounting his 25-year tenure, Landry said, "Words are inadequate to express my appreciation for the opportunity to have served as a trustee for all these years. The experience has been most rewarding. Certainly I have been fully compensated in working with such dedicated trustees with whom it has been my pleasure to serve since the establishment of the Scholarship Foundation." In addition to his service to NSPA, Landry continues to be a very active and strong supporter of Syracuse University, where he earned his masters degree in accounting. He was honored at Syracuse's 1993 Alumni Reunion where he was named one of four individuals to receive the Melvin A. Eggers Senior Alumni Award, presented for loyal service.

NSPA Scholarship Foundation, 1010 N. Fairfax St., Alexandria, VA 22314-1574

Senior Trustee Urges Support of Scholarship Foundation's 25th Anniversary Campaign

"The future of our professional society depends on the young people who we are able to help towards reaching their ultimate goals. As the elder member of the board, I hope that my gift will be an example for all members of NSPA to follow in support of the 25th anniversary campaign."

Horace J. Landry
Scholarship Foundation Trustee

The NSPA Scholarship Foundation continues to seek member support of its special 25-year, $25-per-member fund raising campaign. The campaign, introduced at the 1993 NSPA Convention, has so far raised $7,320 in contributions. With the potential to raise $25,000, the Foundation is appealing to all NSPA members for support. Trustee Horace J. Landry states, "This funding is critical to the Foundation's mission of awarding scholarships to high caliber accounting students. We must provide — more than ever — for the financial support of those deserving accounting students who will represent us as the future leaders of our great profession. Let's reiterate our commitment to youth by giving the gift that lasts."

Individuals contributing $25 or more will receive a special anniversary lapel pin (see design above) designed to symbolize 25 years of NSPA member commitment to youth. A special drawing will also be held among all contributors, regardless of the amount of contribution. Two winners will receive copies of Prentice Hall's *Portfolio of Accounting Systems*, valued at $80. The Foundation is a 501(c)3 nonprofit organization and all contributions are 100% tax deductible.

Organized in 1969, the NSPA Scholarship Foundation has provided financial encouragement to hundreds of students over its 25-year history. Following a March 10th application deadline, the Foundation will consider over 1,000 qualifying applications for 1994-1995 academic year scholarship awards. Recipients will be announced in July, 1994.