Improving the Competitiveness of Oregon Manufacturers: A Case Study at an Oregon Wood Products Manufacturer

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Abstract

A unique partnership between an Oregon State University (OSU) Extension Agent, a US Forest Service employee (working on a technical assistance agreement with the Oregon Economic Development Department), and an Oregon Manufacturing Extension Partnership field engineer is paying substantial dividends to one Oregon wood products firm.

While working under a technical assistance agreement for the Oregon Economic Development Department, Larry Swan, a resource specialist for the US Forest Service, visited wood products manufacturers in northwest Oregon. One company he visited expressed a need for improving product quality, decreasing finished goods inventories, and improving on-time deliveries. The company's primary customer (responsible for approximately 65 percent of sales) was increasing its orders from an Italian company. The Oregon firm felt they were in danger of losing their number one customer and potentially going out of business resulting in the direct loss of approximately 75 jobs. Swan referred the company to Scott Leavengood, an OSU Wood Products Extension Agent with expertise in process and quality control.

Leavengood made several visits to the company to become familiar with the company's personnel, products, processes, and educational needs. Data were collected for use in a training program on statistical process control (SPC). Leavengood conducted the training in 4 weekly sessions in February of 1999. Follow-up assistance has been provided via data analysis and recommendations and a visit to the company to conduct an informal forum to address employee questions and concerns regarding the use of SPC. Within 4 months of the training program, the company President conservatively estimates that the use of SPC will reduce annual operating costs by approximately $50,000 – $75,000. As the company President stated, however, the greatest benefits are often unknowable as they result from profits not lost. In other words, profit they would have lost had they not improved process efficiency and product quality.

To fill the company's need for assistance with decreasing finished goods inventories and on-time deliveries, Leavengood referred the company to Charlie Martin, a field engineer with the Oregon Manufacturing Extension Partnership. Martin has helped the company with Just-In-Time (JIT) manufacturing techniques. The use of JIT techniques is greatly facilitated by the use of SPC. By implementing JIT techniques on a single product line, productivity has increased 58 percent, work-in-process inventory has been reduced by over $80,000, and lead time has decreased from 15 days to 2 days. The company feels that SPC and JIT will be crucial factors in improving their competitive position and growing their business.

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Problem Statement and Target Audience

Several surveys conducted within the past 2 to 3 years have revealed that globalization of the marketplace and foreign competition are among the top concerns facing Oregon wood products manufacturers. While these issues are rather nebulous and thus difficult to address with educational programming and technical assistance, one Oregon wood products firm was able to express its educational needs quite clearly.

Larry Swan, a resource specialist with the US Forest Service has worked extensively with the Regional Strategies program of the Oregon Economic Development Department (OEDD). Recognizing his expertise in wood products-oriented economic development, OEDD hired him on a technical assistance agreement to work with wood products firms in northwest Oregon. While visiting a secondary wood products manufacturer in Tillamook County, Swan learned of the impacts of globalization of the marketplace and foreign competition. The company employs approximately 75 people. Their largest customer (comprising approximately 65 percent of sales) was becoming increasingly stringent on quality specifications and was increasing its purchases from an Italian company. They stated that the Italian company's product was of higher and more consistent quality. The threat of losing their primary customer to a foreign competitor, and thus potentially going out of business, was very real. The company expressed a need for assistance in improving manufacturing efficiency (e.g., reducing inventories and improving on-time deliveries to their customers) and product quality.

Program Goals

The program of educational and technical assistance was designed to improve the company's competitive position through reducing operating costs and improving product quality. The end result will be a successful business that will grow in volume, value, and number of employees.

Program Design, Materials, and Delivery Methods

Larry Swan contacted Scott Leavengood, Wood Products Extension Agent in Klamath Falls. Swan knew that Leavengood had expertise in statistical process control (SPC) and could assist the company with improving product quality and manufacturing efficiency. In addition, Leavengood knew that Charlie Martin, field engineer with the Oregon Manufacturing Extension Partnership (OMEP), had expertise in Just-In-Time (JIT) manufacturing techniques. JIT techniques work best when used in conjunction with SPC. The use of JIT techniques helps companies improve manufacturing efficiency by, among other things, reducing inventories and improving on-time deliveries.

In the Spring and Summer of 1998, Leavengood made several visits to the company to become familiar with their personnel, products, production processes, and educational needs. Data were collected to assess the current status of the production process and for use in training. It was determined that SPC could pay significant dividends to the

company and a 4-hour SPC Overview for company management was conducted in August. The overview was conducted to ensure that implementation of SPC would be successful by ensuring management understood SPC and were committed to its implementation. Plans were then made to conduct a full 32-hour SPC training program for management personnel and equipment operators.

Prior to the training, a math skills assessment was conducted via a written test. The training was then tailored to suit the math skill level of participants. Leavengood conducted the training in February of 1999 for 16 participants including the company Founder (now retired), President, VP of Engineering, VP of New Product Development, supervisors, and equipment operators. The training was conducted in 8 4-hour sessions (4 consecutive Thursday afternoons and Friday mornings) over a period of 4 weeks. This schedule was selected to, 1) maximize comprehension and retention of information by the students; 2) allow students to practice using what they had learned between sessions; and 3) allow students to bring questions and concerns to the next session. The Northwest Oregon Economic Alliance provided a grant to cover training materials and instructor travel expenses. Technicomp Inc. SPC training materials were rented from Klamath Community College. These materials (videos, student workbooks, and overhead materials) comprised approximately 50 percent of the information presented. The remaining 50 percent were customized materials and hands-on demonstrations developed by Leavengood using company data.

Follow-up implementation assistance has been provided via telephone discussions, customized spreadsheets to assist management personnel with data analysis and interpretation, and a visit to the company. During the follow-up visit, Leavengood spoke with employees on the shop floor and then held a meeting for employees to express challenges and questions surrounding SPC.

During the month of February, between SPC training sessions, Charlie Martin (OMEP spent several days studying their product mix, lot sizes, process flows, capacity constraints and employee attitudes. The resulting recommendations were for a total transformation of their product flows, and business and social systems. The transition was to be done incrementally, cost effectively, and with the enthusiastic help of the operators and support staff. A pilot manufacturing cell was put on-line.

Demonstrated Impact

During the follow-up visit to the company, several program participants expressed their relief about how easy it was to use SPC. Prior to the training, there was great fear surrounding SPC due to "the math." Students found that using SPC was not only easy, but it increased their job satisfaction by enabling them to "work smarter not harder." Employees seemed enthused and excited about their jobs.

In July of 1999, just 4 months following the training, the company President stated that his company has seen significant reductions in scrap and rework, and thus reduced operating costs and improved efficiency, due to the use of SPC. He conservatively estimates that his company will save $50,000 - $75,000 annually. Use of JIT techniques has resulted in a reduction in lead-time from 15 days to 2 days and a 58 percent increase in productivity. Work in process inventory was reduced by more than $80,000.

It is too early yet to state that this program has improved the company's competitive position (a fact that may never be fully known). It is hard to quantify profits <u>not lost</u> due to improving quality. In other words, it is difficult for a company to know how much business they would have lost had they not improved. If the company's primary customer increases its orders to prior levels, this is evidence that the program is working to improve competitiveness. Conversely, should their customer cease to purchase from them in favor of the Italian competitor, this might be evidence that either the program did not work or that the changes were too little, too late. As of August 1999, orders had remained stable.

Program Innovation

SPC was developed in the communications industry and has found widespread usage in the production of armaments, automobiles, and high-tech electronics. Its use in the wood products industry has been limited, at best.

One argument against the use of SPC in the wood products industry is that wood is too variable a raw material and thus what works in industries that use steel and silicon, for example, won't work in wood-based industries. This argument is widespread, and was in fact discussed by company personnel prior to the training. Furthermore, many industry managers feel that their production employees won't be able to tackle the math necessary to use SPC. Leavengood was able to overcome these perceptions through his knowledge of wood anatomy and structure; by spending sufficient time with the company to gain their trust and confidence; by teaching relatively complex subjects using analogies and demonstrations; by using data, examples, and terminology from the company during the training program; and by being available to assist with implementation following the training. The cost savings being realized by the company prove that SPC works in the wood products industry.

Summary

A unique partnership of Extension personnel and Government agency personnel is paying significant dividends to one Oregon manufacturer. By providing training and assistance in SPC and collaborating with other assistance organizations, OSU Extension Service is helping Oregon manufacturers to be more competitive in the global marketplace.