Seaman Corporation

It had been a good decade for Richard Seaman. As the president and CEO of Seaman Corporation, a 45-year-old coated fabrics manufacturing company, he had tripled its sales to over 50 million dollars. His goals for the next five years, among others, were to double that number and to see that 20% of revenues came from products less than five years old. In the coming week he would be going on a retreat with Jim Dye, his senior vice president, to discuss their prospects for achieving these goals, and to determine what changes would be required in the company's organizational structure and processes. In Dick's view, "The way in which we managed the innovation process historically worked well for us, but it is not going to carry us into the next decade."

Seaman Corporation

Seaman Corporation was a 250 person privately owned developer and manufacturer of polymer-coated fabrics, with two 100,000 square foot manufacturing facilities located in Wooster, Ohio and Bristol, Tennessee. (See Exhibit 1 for cost structure.) The Bristol location housed the equipment to manufacture both the fabrics to be coated (base fabric or greige goods) and the machinery required to coat the fabrics. In addition to fabric-coating manufacturing facilities, the Wooster location was the home of both the corporate headquarters and the research and development departments. Both plants had three manufacturing shifts that worked around the clock manufacturing Seaman Corporation's products, which included: truck tarpaulins (for protecting truck cargoes), geomembranes (for waste or hazardous material containment), single ply roofing membrane (for flat roofs), and billboard sign face material. These products accounted for roughly 70% of Seaman Corporation's 1994 and 1995 sales. In addition to these products, Seaman Corporation also manufactured coated fabrics for a number of other applications such as: architectural fabrics (for large awning and fabric buildings), inflatable boat fabric, fuel pillow tanks (for temporary storage of large amounts of fuel), tents for military applications, loading dock seals, and recreational products, such as tennis court wind screens and rain covers for baseball park infields. (See Exhibit 2.) The Freedonia Group, a respected industry consultant, estimated that coated fabrics of all types would grow at a 3% annual rate until the year 2000. Although some growth was expected in Seaman's current markets (see Exhibit 3), Vice President of Sales Donald Hasleton did not expect significant growth in the company's share of these markets, due to increasing domestic and international competition from lower quality products at lower prices.
Dick attributed his company’s growth to both the quality of its products and its ability to find innovative solutions to customers’ coated fabric needs. Sue Reinholt, a truck tarp fabricator and chairperson of the Industrial Fabrics Association International (IFAI) Truck Cover and Tarp Division, had been purchasing fabric from Seaman Corporation for almost 20 years:

They are one of the major players in truck cover fabric, and they are a very good company to deal with. We have never had any problems. They are willing to work with you—if you need special colors they will even do that—their delivery is terrific, they are very service oriented, and they probably put out the best fabric that there is on the market. You do pay top dollar for it, but you are getting the top fabric available. Everyone knows that, in dealing with Seaman, you are dealing with a quality company.

But, according to Jim Dye, being a quality leader was not sufficient to ensure continued success:

Product development at Seaman Corporation is the life-blood and the future life-line of the company. It has historically been the case that we are a niche marketer, coming up with solutions to meet specific customer needs.

Company History

Seaman Corporation began in the basement of a modest home in the small town of Canal Fulton, Ohio in 1947. Norm Seaman, encouraged by his grandfather to start his own business, began his company as a cut-and-sew fabricator of rubber and vinyl products. The company grew by working on subcontracts provided by the rubber companies near Akron, Ohio. In these early years Seaman Corporation fabricated a number of products, which included air mattresses, vinyl seat covers, collapsible ice chests, and vinyl banners. In 1951, Norm moved the company to Millersburg, Ohio, an Amish community, because he believed that his labor-intensive business would benefit from the strong work ethic of the region (which the company continued to view as an asset).

Fabricating products out of vinyl film got Norm interested in the chemistry of vinyl. Ever the visionary, he saw the manufacturing of synthetic fabrics as a growing business. He reasoned that vinyl coated fabrics would be lighter, more weather resistant, and a more durable alternative to the cotton duck and neoprene rubber fabrics that were then being used for truck tarps. Vinyl coated fabrics had another advantage; canvas and rubber-coated fabrics had to be sewn or glued together, while vinyl coated fabrics could be heat welded (or melted) together to form a better seam. Because of its light weight, strength, and durability, Norm decided that nylon fabric would serve as a suitable base fabric for vinyl coating.

At the time there was little known about coating nylon with vinyl, so early research and development at Seaman Corporation took place in the kitchen of the Seaman home. Norm purchased the chemical components that went into vinyl and began to experiment with mixing various compounds as well as ways to coat the compounds onto nylon fabric. Utilizing his wife Irene’s oven and refrigerator, Norm learned the requirements and constraints of coating fabrics. Satisfied with his experiments, he designed and built his own mixing and coating equipment and began manufacturing. The first 16,000 yards Norm produced and sold lost their coating within the first year of use. Norm quickly analyzed the problem, found a solution, and replaced the tarps free of charge. This event was considered the foundation for the company's orientation toward quality.
In the late 1950s, Norm became frustrated with the inconsistent quality and limited variety of the nylon fabrics available from the large mills. Because Seaman Corporation was such a small buyer, the big mills would not make the changes he requested in the designs of the fabric. Feeling that he had no alternative, Norm purchased six looms, and was soon designing and manufacturing Seaman Corporation’s own greige goods.

In the late 1960s, a new type of coating process (hot-melt coating) was being developed. This process allowed manufacturers to use more complex chemical mixtures to make superior products, and to coat their fabrics better. Eager to take advantage of the new technology, Norm purchased a hot-melt coating machine and worked for two years to help his employees master the complexity of its use. Their success with the new technology led to more durable, complex fabrics and, consequently, to new markets.

Relying on government contracts, the company grew slowly through the 1950s and 1960s, making products primarily for the truck cover industry (tarps) and the military (such as tents, body bags, air mattresses, and covers for missile shelters). As Seaman Corporation sales increased, so did its need for additional manufacturing capacity. In 1976, Norm learned that a competing coating plant in Bristol, Tennessee was struggling financially and was being sold by its conglomerate owner. The company had a different type of hot-melt coating system that, even after eight years, was not properly operational. Seaman Corporation purchased the plant, and within six months had the machine operational. Another major expansion of physical facilities occurred 11 years later in 1987, when the company moved its Millersburg operation to a new manufacturing facility and headquarters in Wooster, Ohio.

In 1978, with two manufacturing plants and with his wife and five children employed by the company he created, Norm Seaman died from lung cancer at the young age of 55. As he had planned, his eldest son Richard took over the company.

Dick’s first job for Seaman Corporation had come at the age of 8, when he and his brother were enlisted to conduct the company’s first market research project; they counted every truck tarp they saw on the way to the family’s summer vacation in Canada. In 1968, after many years of working for the company during the summers, and after graduating from the MBA program at Bowling Green State University, Dick joined the company as a full-time employee. At this time Seaman Corporation was, in Dick’s words, a growing business, but struggling financially:

Dad was good at new product development, but we had little money for capital investment. We had to build most of the equipment or buy old equipment to put in place. Nonetheless, dad was always pursuing new things to do.

**Corporate Strategy Since 1978**

Under Dick’s leadership, the company grew from $10 million in sales in 1978 to over $50 million in 1995. (See Exhibit 4.) Believing strongly in the importance of careful planning processes and deliberate organizational improvement, he implemented a series of programs designed to fuel the company’s growth and place it in the ranks of world-class business excellence. Exhibit 4 depicts the programs and the sales growth experienced during each program. In 1982, Dick initiated the Seaman “Strategic Planning Era.” At this time, he assembled the company’s first Board of Directors, consisting of himself, his mother Irene (as Treasurer), and several external business experts. Because the company had never had an explicit growth-planning process, setting up such a system was the first step in this “era.” The system was designed to accomplish three goals: (1) Compare the company’s strengths and weaknesses against competitors’ strengths and weaknesses; (2) Identify business opportunities, focusing on those that were perceived as both important and feasible for effective development by the company; and (3) Articulate these strategies to the entire organization to
facilitate a clear focus on them. The process began each year in the early spring, with a series of meetings between upper and middle levels of management for the purposes of reviewing the past five year's sales reports, comparing the current year against the plan for the year, forecasting sales in all product categories for the upcoming year, and analyzing the operations of each function (including sales and marketing, manufacturing, and finance) to meet anticipated demand. The forecast drafts were refined through an iterative process involving all levels of management. The final plan was presented and discussed at the annual August meeting of all salaried employees, a month before the start of the next fiscal year, to ensure that everyone in the organization understood the objectives, opportunities, and challenges for the upcoming year.

Although the strategic planning process appeared to have a positive effect, by the mid-1980s it appeared that the company could not effectively deliver on many of the opportunities that were uncovered. In particular, the company's manufacturing capabilities could not keep up with increasing demand. In response to this realization, Dick declared a "Quality Initiative Era," developing a formal quality management program focused on both external and internal customers. Because employees were frustrated and confused by attempts to fully adopt several processes implemented in large companies, Seaman developed its own quality process. The "CARE Quality Commitment" process was designed to provide focus to the strategic planning process by identifying the company's vision, core values, and guiding principles. (See Exhibit 5.) The result was a quality-management system focusing on all aspects of Seaman's business, with quantitative measures for success on all dimensions. In relation to external customers, the CARE acronym stood for "Customers Are the Reason for Excellence," and embodied three principles with accompanying "indicators of excellence (IOEs):" leadership principles (such as visible quality leadership, obsession with the customer, and uncompromising integrity), 100% customer satisfaction principles (such as service that is delivered when promised and anticipating customer requirements), and quality principles (such as never-ending improvement and measurement against best in class on all Seaman functions). In relation to internal customers, CARE stood for "Competitive Advantage Requires Excellence," and embodied four principles with accompanying IOEs: strategic quality planning principles (such as never-ending strategic quality planning and recognition of a global market environment), development of human resources (such as best-in-class personnel selection and training), systems and measurements (such as real-time information on process cycle times), and quality assurance of 100% total customer satisfaction. Exhibit 6 illustrates the central elements of this final principle, and typifies the thoroughness with which each CARE principle was explored. Each of these quality initiatives was undertaken by cross-functional and cross-level teams within Seaman.

In the early 1990s, Dick realized that, to meet the new customer expectations that had been raised by the company's CARE Quality Initiative, he had to more closely integrate the sales, marketing, and customer service functions—initiating his third "era." One element of this initiative involved inviting customers to visit the company for a one-day orientation seminar, during which they were flown in the Seaman plane first to the Wooster headquarters for a CARE presentation and then to the Bristol plant for a tour. Another element involved carefully investigating the interaction of customer service, sales, and production in determining the degree of on-time delivery. This investigation uncovered a number of hidden lags. For example, the credit department was gathering credit information on customers, occasionally delaying shipment of orders past the promised date. As a result, once the production and sales departments had determined a reasonable promised delivery date, production began notifying the credit department several days in advance of that date to ensure that all information was acquired on time. This effort increased on-time delivery (as measured by shipping on the specific date promised) from 65% in 1992-1993 to 95% in 1994-1995. In general, the quality initiative and the integration of functions succeeded in drastically increasing the perception of Seaman's leadership in the industry. A 1990 survey of industry customers indicated that 36% ranked Seaman first on industry knowledge, product line offering, and general industry leadership. Although this was more first-place rankings than any other company had received, Richard evaluated the data in a different light. He suggested to his management that two thirds of
their customers thought that their competitors did a better job than they did. When the same question was asked of customers in 1993, 87% awarded first place to Seaman Corporation.

In 1995, Dick declared that the next five years would constitute the company’s “Technology Era,” the goal of which was to improve technology management concerning product development and process development. The near-term goals were to improve first-run yields and shorten the cycle times of product development processes. The longer-term goal was to use innovation to fuel the company’s growth to the $100 million mark.

Looking back on his 18 years of managing Seaman Corporation, and the growth it experienced during that period, Dick said:

“This isn’t a rocket science business; it isn’t sexy compared to many other high growth businesses. But we do have unique products that are helpful and attractive in an industrial fabric business. Most importantly though, building this business is based on trying to understand the real basics of good business management, articulate the principles, train people in them and then help them execute those principles effectively.

As important as business processes were to him, Dick credited Seaman’s employees with much of the company’s success: “We have good people, quality people, many of whom have been part of the culture for a long time. They are committed to this company and to helping it grow.”

The culture of Seaman Corporation was both steeped in its history and oriented toward a new generation. Geneva Pond, a technical consultant in the R&D department, was the first employee hired by Norm 45 years earlier, and had often baby-sat Dick when he was a young child. Clearly, she had a strong psychological investment in the company that she helped to grow and that still afforded her a respected position. “It is hard to think of Richard as my boss. The company is like such a family to me.”

Attempts to integrate a new generation of employees into the Seaman culture and to train them in the new business processes and technologies they would need were made in a number of ways. Human Resource director Mike Searcy developed a new series of training programs each year, directed toward employees at all levels, and designed to address basic skills, advanced technical competencies, management techniques, and effective team interaction. In addition, Mike and Dick initiated programs to increase cohesiveness within and among the two Seaman facilities, such as an annual Wooster-Bristol softball tournament, complete with an impressive trophy. As a way of keeping in contact with the ideas and the concerns of company employees, Dick instituted monthly birthday parties at each facility, where he would share refreshments and informal conversation with those employees who had had birthdays in the previous month.

**Manufacturing at Seaman**

The industrial coated fabrics manufacturing process involves three steps. First, the base fabric is either knitted or woven; next the chemicals used to coat the fabrics are formulated and mixed; and finally the base fabrics are coated. In most cases the final fabric is sold in rolls, cut to customer specified sizes.
Knitting and Weaving the Base Fabric (Greige Goods)

The knitting or weaving of the base fabrics is the most time consuming portion of the manufacturing process. As of 1995, Seaman Corporation manufactured 30 styles of fabrics out of nylon and polyester. Fabric styles differ in the weight of yarn used, number of threads per square inch, weaving construction, and stitch type. The particular knit or weave used depends on the requirements of the final product, such as the tear strength (the amount of stress the fabric can tolerate before ripping), the weight, and the ability of the fabric to lay flat (an important factor for architectural fabrics and roofing membranes).

Seaman Corporation’s development of new knits and weaves was largely determined by the customer. Most often, customers would provide Seaman with a sample of a fabric that they desired, so that it could be duplicated (sometimes with modifications). New base fabric took anywhere from one week, if it was very similar to an existing Seaman fabric, to six months, for a totally new fabric that was unlike anything the company had ever handled.

Many within the company and within the industry praised the Seaman knitting and weaving operation as “stellar.” By the mid-1990s, however, the company was not able to meet the demands of its own manufacturing process for greige goods, and began buying fabric from other companies. Larry Anderson, the knitting and weaving supervisor, said:

We have 13 old and 4 new knitting machines. The old machines are 20 plus years old, and are really limited. The new machines have more than double the speed, and the quality is much better. It really takes a lot of time and man hours to keep those old machines running. I have to get parts made for those machines, because the company that made them is out of business now. We are almost forced to look for new machines in the knitting area. Somewhere we have to stop and say that we have to phase these things out.

Chemistry

The chemistry involved in the coating compounds was traditionally Seaman’s strength. It is from the specific mixture of chemicals that the final product derives most of its performance characteristics. Given the importance of the chemistry to the final product, production supervisor Hal Bayer stressed the need to start with superior compounds: “Our compounds are the best that are used. If product A is better than product B and product A costs 10% more, we will use it.” New developments in chemistry were largely contingent upon the chemical manufacturers (such as Du Pont) developing new products.

Coating the Fabric

The first step in the coating process is the application of an adhesive coat or “pad coat” to the base fabric. This initial coat, which prepares the greige goods for the coating of vinyl, begins with the heating of the fabric, to flatten it and prepare it to accept the coating compound. After a liquid adhesive is pressed into the fibers, the fabric is passed through an oven which cures the adhesive onto the fabric. When the fabric comes out of the oven, it is flattened again, cooled, and inspected for greige good defects or any dirt or oil that could affect the finished product. The fabric is electronically scanned to insure consistent thickness and, finally, it is rolled up.

The second coating step, which is by far the most difficult step in the creation of an industrial coated fabric, is the hot-melt coating. For this step, nearly all of Seaman’s products were run through either a Bema coating line (in Bristol) or a Zimmer coating line (in Wooster). (Both machines were
named for the European companies that manufactured them.) These machines were 30 years old, believed to be the only working ones in North America. To describe the hot-melt coating process, Hal Bayer began with a screen analogy:

Think of the greige goods as if they are a window screen. The “pad coat” is like painting a screen with a brush. The holes in the screen do not get filled in, but the screen is painted. The Bema and Zimmer lines take a dry chemical mixture, melt it into almost a sheet of plastic and cover the painted screen with it, filling the holes. These machines coat only one side of the fabric at a time, and nearly all of our products require a second pass on the other side. In addition, a few products receive a final “face coat” on a separate line which is similar in process to the initial “pad coat.” During production, a sample is taken from every 100 yards of fabric manufactured, to be laboratory tested for consistency. Finally, we do 100% visual inspection of the finished product. The hot-melt coating line often becomes the bottleneck in the manufacturing process. So many things can happen on that line, it takes a total coordination effort to get things to be perfect.

While Seaman Corporation produces a quality product for its customers, it does pay the price, in relatively low first-run yields—sometimes as low as 60%. Says board member George Howick:

They have changed very little in their production process. It requires a lot of material handling which is a source of lower productivity and scrap. There is too much opportunity for human error, and little feedback control, so you must rely on the operator.

In the view of Joel Moore, a Bema operator, “The problem is that some of our machinery is outdated. We are trying to run state of the art fabrics, and in some respects we don’t have the equipment needed to do it.”

However, updating the hot-melt coating lines was not a straightforward proposition. The machines were very expensive ($3-5 million), were too large to bring in for a trial run, and were so complicated to run that a certain degree of down-time would be required for operator training and for machine fine-tuning with the Seaman compounds to get any new system fully operational. Moreover, federal environmental protection requirements would apply to any new equipment, requiring further capital investment by the company. Nonetheless, there was considerable discontent with the vagaries of the current hot-melt coating process and the difficulties it caused. According to Larry Anderson, supervisor of knitting and weaving:

If I was in the coating area, I would be kicking and screaming and pounding the table. I would be wanting my new equipment out there. I have been fortunate since I have been with the company, but my counterparts in coating have not been so fortunate.

Jim Dye summed up his view of the manufacturing issues this way:

We do a real good job at designing a product from a chemistry perspective, but I don’t think we do as good a job at designing a product from a manufacturability perspective. Theoretically the product should run on a machine, but they often don’t. There is as much smoke and mirrors as there is science in what we do.
History of Development at Seaman

In its early years, Seaman Corporation grew largely because Norm continued to look for new uses for coated fabrics in addition to truck tarps. In the 1950s, he developed products primarily for the military. Developing fabrics for one of these military applications, missile covers, led to the development of Seaman Corporation’s second major product line, fabrics for architectural structures. These included air supported structures and tension structures, for uses ranging from portable structures for military tank storage to air structures that cover tennis courts. In a few years, the company became one of the leading suppliers of architectural fabrics in North America. According to Dick,

We went from truck tarps to architectural fabric structures, driven by my dad trying to replace traditional materials that were out there. What we did was very simple, yet very difficult: He applied new technologies and new ideas to pretty ordinary, unglamorous problems like keeping truck cargoes and people from getting wet.

Through the 1960s and 1970s, Seaman Corporation relied predominantly on government contracts, and in 1965 Norm purchased a small plant in Sarasota, Florida for the manufacturing of air supported structures. During this time, Norm designed a steel frame structure that sold (along with the fabric to cover it) primarily to the military for portable buildings. Dick traced the history of this product line:

With the military portable buildings, Dad designed and developed a good product, and there were a few promising customers in the private sector. But we weren’t a good marketing company, so we never got the consistent volume that we would have liked. We would sell some here and there that kept us going, then we would get a government contract, and make some more significant money. After my father passed away in 1978, we did not have the engineering talent that was innovative enough to make the design changes that were needed to keep us competitive with other non-military products that were coming out. So, in the late 1980s, we discontinued that product line and ended up closing the Florida operation in 1991.

In 1970, Norm hired a dynamic young chemist who had just finished his double Master’s degrees in chemistry and chemical engineering. Bala Venkataraman was instrumental in developing the company’s third major product line, through his discovery of a polymer that kept vinyl both flexible and chemical resistant. Because of its chemical resistance, and its ability to withstand extreme shifts in temperature, this new product could be used to contain hazardous waste, oil and other dangerous chemicals, and it could do so in extreme environments. This geomembrane was brand named XR-5®.

In the early 1980s, the single-ply roofing business was just getting started. At the time large sheets of rubber were being used to cover the large flat roofs of commercial buildings. Some roofing customers who had heard about Seaman’s geomembrane material and its properties began to purchase it and use it as a roofing medium. Dick, not wanting to jump blindly into a new market, did his own research into the single-ply roofing market. He talked with a number of single-ply roofing installers, including his college roommate’s father, to discuss the pros and cons of rubber roofs, as well as how to market to roofing manufacturers. Convinced that this could be a lucrative business, he had Bala head up the development of this new product, and together they developed a roofing product that was more puncture-resistant and chemical-resistant than rubber. In addition to having a longer life, this new product was much easier to install. Branded FiberTite®, this product would become the company’s fourth major product line. Dick made the decision to sell FiberTite® directly
to roofing contractors, to insure quality of installation of the finished product, because Seaman would be ultimately responsible for the warranty.

Seaman Corporation's newest major product line was initiated when Bala attended a sign convention, in 1986. He was at the convention for an unrelated purpose, but met some individuals who were interested in making signs using painted fabrics. Bala told them that the company he worked for could make the product they were looking for. When these customers expressed strong interest, Bala and his team set about developing a product that could serve as the sign-face material for billboards.

In 1990, after a twenty year career with Seaman Corporation, Bala made the decision to leave the company. He left to become the President of a metal stamping business in Wooster, in which he had an equity interest. He joined the Seaman Corporation Board of Directors in 1995.

**Current New Product Development**

The R&D department at Seaman Corporation consisted of R&D manager Frank Bradenburg, three chemists, two lab technicians, and an administrative assistant. This department, which reported to Senior Vice President Jim Dye (see Exhibit 7), was responsible for a number of activities in addition to new product development. They provided technical customer service, helping customers determine their product performance requirements, and determining whether customers' needs went beyond standard products. In addition, customer complaints about products were directed to R&D; often, a customer would send back a sample for R&D to check. Frank and his team performed competitive analyses of products, when a sales person would submit a sample of a competitor's fabric with a request for a comparison to Seaman's products.

R&D would also provide technical support for both plants. Many times, when processing problems developed in the plants, an R&D person would be brought in to determine if the problem was mechanical or chemical in nature. Although the plants did have their own technical support personnel, these individuals were industrial engineers rather than chemists, and they frequently requested help from the R&D department. Finally, any major changes to equipment to improve processes were supported by R&D.

Frank Bradenburg reported spending 50-60% of his time with customers, primarily on the telephone, but frequently traveling to the customer's location. This work generally took two forms: providing technical support in the use of Seaman products, or discussing with customers ways in which Seaman products might better meet the needs of their business. He said, "We are a technical company and we have always been very responsive to our customers; somebody in the company has to do this." He spent about 15-20% of his time talking to suppliers, to monitor pricing, and the remainder of his time doing administrative work or interacting with manufacturing. Given the sophisticated chemistry involved in their coating processes, the R&D staff spent most of its time working directly to support customers or manufacturing, or evaluating raw materials such as yarns and chemicals. Frank estimated that the group, as a whole, spent about 35% of its time on new product development. In Dick's words,

When Bala was around, he could handle all the responsibilities of R&D because we were smaller at that time. He handled it pretty much as a one-man show, and as we grew that became more of a problem. Since his departure we have more effectively managed the administrative flow of the work, but little has changed in improving the actual effectiveness of creative new product development.
Seaman Corporation saw itself as primarily developing products to fill niche markets, and most of its new products were driven by the demands of current customers. Frank Bradenburg divided the sources of new product ideas into three categories: (1) About 50-60% were updates or improvements of existing products, driven by competitive pressures or demands from the customers for product improvements; (2) About 25-30% were suggested by a current or potential customer. In the vast majority of these cases, the Seaman researchers could use their current technology to develop a new product for the customer; (3) About 10-20% were directed toward notably different products from those that currently existed, and about half of these were directed toward an entirely new market.

Dick’s goal was to see that, over the coming five years, the corporation maintained a level of at least 20% of revenues coming from products less than five years old. (See Exhibit 8 for data on the company’s annual revenues from new products.)

In some instances, products were developed by R&D in the absence of interaction with the marketing function. In those cases, the product idea arose during R&D’s technical support of customers. For example, the department had been working with a customer in California that fabricated inflatable boats. Through this link, the main fabric supplier to that fabricator learned of Seaman Corporation’s general expertise and approached Seaman’s R&D department with the need for a higher-quality, lower-cost inflatable boat fabric than the one they were currently importing. The fabricator’s technical experts worked with Frank Bradenburg on the specifications, and Frank developed a superior product. However, because the sales and marketing functions at Seaman had not become involved in the process, there were no mechanisms in place for identifying and working with potential new customers. As a result, months after the product was completed, the original customer remained the only customer.

Typically, the R&D department would develop a product in the lab and, once they were satisfied with the chemistry and the process, they would then schedule an R&D run on the actual production equipment. While some R&D runs were scheduled at the Bristol facility, the majority of R&D runs were performed at the Wooster facility because of its proximity to the R&D department and because the individuals who ran the line during the day shift were experienced at conducting R&D runs. At one time R&D runs were scheduled once a week, but they had become less frequent, due to heavy production demands for the equipment, and were scheduled as needed—often entailing a several day wait. Frequently, the test runs resulted in failure or partial failure. According to Hal Bayer, who was responsible for scheduling production at the Wooster Facility:

Frank is knowledgeable about the machines and the capabilities, but no one knows how the compound is going to react on the production line—I don’t know either—until we actually try it. It will usually work in the lab, and the R&D people do a real decent job of not putting bombs out there. But then we put it on our production equipment and what was a half hour run turns into an eight hour clean up project.

Many within Seaman were frustrated by the slow rate of new product development, beginning with the president:

The bottom line is that, when we find new product opportunities or the need for product improvements, it takes us an awful long time to get the product commercialized.

Here’s an example. Fabric for the billboard or sign industry has been a good product line for us, and it represents some of the most innovative work we have done. However, it also reflects some of the serious issues that we have in our technology and innovation process, because it is taking us too long to come up with
just the right fabric that these customers really want or need. Our primary customer still doesn’t buy 100% of the product they use from Seaman Corporation. In trying to keep this customer happy, we have fallen behind in market opportunities. Those opportunities have been taken by other systems that use other types of fabric.

We have been in this business for nearly 6 years, and we still do not have the fabric that this business can use. We were the first in, and we should be driving this business. We do have the largest market share, but we are still much more reactive than proactive.

Don Haselton, vice president of Sales, was also concerned about product development cycle time. “We had a billboard product for our main customer, and all we had to do was tweak it for the next large customer. But it took us two years to finally develop that product. We need to be able to take new technology and bring it to market in a fully efficient and timely manner.”

Although R&D spent only a minority of its time on new product development, there were many development products at some stage of completion or under consideration. In fact, in 1995, there was a total project list of approximately 60 projects aimed at the development of completely new products or new products to support customers’ needs. Frank Bradenburg met monthly with his R&D staff to review all projects, after which Jim Dye met with Frank, Don Haselton, and Steve Fenske, the Wooster plant manager, to review the top 5 or 6 projects. However, there was little clarity on just which projects were considered active. As Jim Dye described the situation,

What happens now is that, if we have an idea, do some work on it, and discover that it probably doesn’t have market viability, we continue to work on the project. We simply don’t make that decision to kill the project. We lower the priority and the time that is spent on it, but it still remains in the back-log until someone brings it up again. Then we criticize ourselves for taking too long to commercialize the product.

Another issue was much discussed among Seaman’s R&D personnel and among those within the company who were most focused on the success of new product development: the need to fully understand the uses, or possible uses, of new products—before those products were developed. Most of Seaman’s customers were fabricators, and in some cases they did not fully understand the market they were developing a product for. As Jim Dye put it, “From an end product point of view, we are only as good as our fabricating partners, and our fabricating partners are typically small mom-and-pop type operations, and in some cases they don’t fully understand the end product use.”

Dick agreed:

The problem is that the target keeps changing. We keep modifying the product that we put out there, because we haven’t effectively determined what is needed right at the outset. We tend to determine what is needed on the basis of what a customer is telling us, but the customer doesn’t always understand all of the attributes of coated fabrics in a way that allows him to tell us everything that is needed. So we do what he says, he tries it, it doesn’t work, so we come back and do it again.

The Future of Seaman Corporation: Opening the Technology Era

When asked to reflect on the likelihood that Seaman Corporation will be able to achieve its stated goal of $100 million in revenues by the year 2000, most people within the company stated that they believed the goal was achievable – although they did not see just how the company could get
there from the structure, processes, and systems that were in place in 1995. As Hal Bayer described it, "It is like Dick is always hanging the carrot out there for us to reach, and when we get close to it, he will hold it out a little farther. We keep going for it, and we know that he is not going to lead us into a wall." Many believed that innovation was the key, but echoed the sentiments of board member George Howick when he said:

Seaman Corporation has always done a very good job of providing good solutions to specific customers, but it has not been good at opening new markets with new products.

For example, Seaman did a study of the laminate market in the early 1990s and decided to enter the market. Although the technology was considerably different from the coated-fabrics technologies the company was currently using, and although the market was different in some significant ways, the company felt that there were enough similarities that it could effectively leverage its expertise. Although the original investment for the used laminate equipment was $400,000, and although the equipment had been operational for 3 years, revenue from laminate sales in 1995 was only $60,000. On reflection, Dick felt that the company mistakenly believed it could effectively penetrate that market because it did not truly understand existing relationships in the business.

George Howick further analyzed the company's difficulties with new product innovation:

Many good new products have been developed by focusing on customers' needs, but that brings along many failures, too. Customers aren't always very good at specifying what they need.

In the near term, however, Dick was not convinced that radical new product development was necessary:

In the future, our marketing department will have to do a better job of looking at totally new businesses that we might get involved in. But I am not overly concerned about that right now. I think that if we can make our new product development process more efficient and effective, and shorten the cycle time, we have a tremendous amount of new product potential right in our back yard.

As Dick and Jim prepared for their retreat to discuss the company's future, they wondered whether and how the structure and processes of Seaman corporation might have to be altered to fully implement "The Technology Era." Jim observed that, "Over the last five years, the appetite for new products has continued to grow without really building the organization to achieve that desired growth around it." With the company as it was currently constituted, could they achieve a rate of 20% of revenues from new products, and double the company's sales by the end of the millennium? Ultimately, would they be able to preserve and advance the innovative spirit of a company that was founded on the entrepreneurial drive to find new uses for coated fabrics?
Exhibit 1

SEAMAN CORPORATION
CONSOLIDATED STATEMENT OF INCOME
Twelve Months Ending December, 1995

<table>
<thead>
<tr>
<th></th>
<th>1994/95</th>
<th>1993/94</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>% to Sales</td>
<td>% to Sales</td>
</tr>
<tr>
<td>Gross Sales</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Deductions</td>
<td>2.50</td>
<td>2.60</td>
</tr>
<tr>
<td>Net Sales</td>
<td>97.50</td>
<td>97.40</td>
</tr>
<tr>
<td>Total Cost/Goods Sold</td>
<td>73.70</td>
<td>74.10</td>
</tr>
<tr>
<td>Gross Profit</td>
<td>23.80</td>
<td>23.30</td>
</tr>
</tbody>
</table>

Operating Expenses:
- Sales & Marketing     | 6.70    | 7.30    |
- Tech. Service Costs   | 0.90    | 1.00    |
- R&D Engineering       | 1.30    | 1.30    |
- Divisional Admin.     | 0.20    | 0.20    |

Total Operating Exp.    | 9.10    | 9.70    |

Contribution            | 14.70   | 13.60   |

Corp. G&A Exp.          | 7.90    | 9.00    |
Oper. Income            | 6.80    | 4.50    |

Other:
- Inter. Exp. Net       | 1.80    | 1.70    |
- Other Inc./(Exp.), Net| (0.20)  | 1.10    |

Inc. Bef. Tax           | 4.80    | 3.90    |
Taxes on Income         | 1.70    | 1.20    |
Net Income              | 3.10    | 2.60    |

Source: Seaman Corporation
Exhibit 2

Seaman Corporation

Architectural Fabric

Air Supported Structure

Truck Tarpaulin

Recreational Fabric

Geomembrane

Military Tent

Single Ply Roofing Membrane

Portable Structure

Oil Boom
## Exhibit 3

**Estimated Industrial Fabric Shipments**  
(Units are in millions of square yards)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tr>
<td>Geosynthetics</td>
<td>360</td>
<td>380</td>
<td>400</td>
<td>435</td>
<td>458</td>
<td>489</td>
<td>8.0%</td>
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<tr>
<td>Automotive</td>
<td>285</td>
<td>290</td>
<td>300</td>
<td>292</td>
<td>345</td>
<td>355</td>
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<tr>
<td>Airbag</td>
<td>4</td>
<td>7</td>
<td>12</td>
<td>20</td>
<td>32</td>
<td>51</td>
<td>60.0%(^b)</td>
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<tr>
<td>Safety &amp; Protective</td>
<td>225</td>
<td>250</td>
<td>275</td>
<td>300</td>
<td>322</td>
<td>364</td>
<td>7.5%</td>
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<tr>
<td>Medical</td>
<td>2.1</td>
<td>2.3</td>
<td>2.4</td>
<td>2.6</td>
<td>2.8</td>
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<td>7.5%</td>
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<tr>
<td>Single-Ply Roofing</td>
<td>115</td>
<td>110</td>
<td>110</td>
<td>115</td>
<td>117</td>
<td>121</td>
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<tr>
<td>Tarpaulin</td>
<td>105</td>
<td>110</td>
<td>110</td>
<td>112</td>
<td>113</td>
<td>116</td>
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<tr>
<td>Banners &amp; Flags</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>13</td>
<td>15</td>
<td>19</td>
<td>18.0%</td>
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<tr>
<td>Architectural Fabrics</td>
<td>3</td>
<td>3</td>
<td>3.25</td>
<td>3.5</td>
<td>3.7</td>
<td>5.1</td>
<td>3.5%</td>
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<tr>
<td>Awnings and Canopies</td>
<td>19</td>
<td>19.5</td>
<td>19.5</td>
<td>20</td>
<td>22</td>
<td>25</td>
<td>6.0%</td>
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<tr>
<td>Marine Fabrics</td>
<td>19</td>
<td>18</td>
<td>18.5</td>
<td>19.2</td>
<td>17</td>
<td>18</td>
<td>7.0%(^c)</td>
</tr>
<tr>
<td>Casual Furniture</td>
<td>49</td>
<td>50</td>
<td>50</td>
<td>52</td>
<td>53</td>
<td>53</td>
<td>3.0%</td>
</tr>
<tr>
<td>Tent &amp; Tent Rental</td>
<td>10</td>
<td>10</td>
<td>10.5</td>
<td>11</td>
<td>11</td>
<td>13</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

Source: Industrial Fabric Association International

\(^a\) Estimated  
\(^b\) Based on 14.9 million vehicles being produced  
\(^c\) Based on strong economy; segment relies on disposable income
Seaman Corporation
Sales Growth
(Dollars in Millions)

Source: Seaman Corporation
Seaman Corporation
Innovative Customer Solutions through Fiber and Polymer Technology

OUR VISION
Seaman Corporation will be the Best "CUSTOMER-DRIVEN BUSINESS TEAM"
Seeking "Value Engineered" Fabric Opportunities in Global Markets
by Expanding our Weaving, Compounding, Coating and Applied Fabric Engineering Skills
to Meet or Exceed the Product and Service Requirements of our Customers

Simply the Best Coated industrial Fabric Products in the World...

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Seaman Corporation
Innovative Customer Solutions through Fiber and Polymer Technology

CORPORATE VALUES
• A Commitment to Profitable Growth Objectives
• A Competitive Global Presence
• A Dedication to High Ethical Standards, Integrity and Honesty
• An Obsession with Product Quality and Customer Service
• A Commitment to Total Customer Satisfaction
• Partnerships with Customers and Suppliers
• The Pursuit of Continuous Quality Improvement
• Continuous Training and Development for all Employees
• Employee Creativity, Innovation, Initiative and Involvement
• Informality and Openness in the Workplace
• Pride in our Corporate History and Accomplishments

FUNDAMENTAL BUSINESS PRINCIPLES
With Our Customers and Suppliers
• Integrity and Honesty in all Business Relationships
• Long-Term Mutually Beneficial Business Partnerships
• 100% Total Customer Satisfaction
• A Corporate Closeness to the Customer
• Innovative Product and Service Development
• Products and Service that Meet or Exceed Customer Expectations
• Continuous Quality and Value Improvement in Products and Service

With Our Employees
• A Safe Work Environment
• Effective Communications with all Employees
• Continual Opportunity for Training and Career Growth
• Employee Participation in Decision-Making Activities
• Recognition and Reward for Team and Individual Contribution

For Our Company
• Profitable Growth Objectives
• Proactive in Health, Safety and Environmental Issues
• A Positive and Active Presence in our Communities
COMPETITIVE ADVANTAGE REQUIRES EXCELLENCE

QUALITY ASSURANCE OF 100% TOTAL CUSTOMER SATISFACTION

100% Total Customer Satisfaction Drives the New Business Development Process for Both Product and Service.
Total Quality Begins with the Product Design Process Partnership with the Customer to Understand End-Use Requirements.
Utilize Cross-Functional Teams in the Design Process
Design for Manufacturability
Partnership with Suppliers Throughout the Design and Commercialization Process
Continually Reduce Process Cycle Time and Improve Process Capability by:
Utilizing Just-In-Time Principles to Eliminate All Non Value-Added Processes and Activities
Utilizing Statistical Process Control Analytical Techniques to Improve All Value-Added Processes
Utilizing the CARE Process Improvement Team Roadmap
Develop Supplier Relationships that Continually Measure and Improve the Quality of Materials and Services Received
Continually Measure and Improve First-Run Yield:
The Elimination of Any Defect in the Manufacturing Process Increases First-Run Yield
As First-Run Yield Increases, Average Cycle Time per Unit Processed Decreases and Cost Per Unit Decreases
Continually Measure and Improve Equipment Effectiveness
Increase Equipment Utilization
Increase Equipment Uptime

INDICATORS OF EXCELLENCE (I O E'S)

Product Development Cycle Time From Concept to Commercialization
Number of New Product Introductions
% of New Product Successes
New Product Profit Contribution
Supplier Performance Evaluations
Cycle Time Reduction of All Processes
Utilization of SPC Concepts
Cpk of 1.33 in All Processes
First-Run Yield
Equipment Effectiveness
Seaman Corporation
Percent of Sales From New Products
(Products that did not exist 5 years before)