

Case 4

Quality Upstream at HI-TECH Semiconductor

The quality review meeting had just ended. Ty Rock, purchasing director at HI-TECH Advanced Materials, left the room more than a little frustrated. Despite Ty's best efforts to improve supplier quality, incoming materials continued to fall below the established standards. Worse yet, Ty knew that quality requirements were only going to increase over the next year. After all, HI-TECH's customers seemed to be insatiable in their demand for higher levels of quality. Indeed, it was the insistent urging of HI-TECH's most important customers that had led HI-TECH to undertake an arduous quality improvement effort known as the Standardized Supplier Quality Assessment (SSQA). Given the continued customer-driven quality pressure HI-TECH was under, Ty's mandate was clear—he had to figure out how to get HI-TECH's key suppliers to ramp up their quality.

THE QUALITY CHALLENGE

As a supplier of semiconductor manufacturing equipment to customers such as Intel, Motorola, and National Semiconductor, HI-TECH's quality dilemma had its roots in events that had transpired over a dozen years earlier. Rapidly losing market share to fierce Asian semiconductor manufacturers, members of the Semiconductor Industry Association had received government approval to establish a cooperative research and development organization called SEMATECH. SEMATECH began operations in 1987 with 13 charter members with the primary objective of developing advanced semiconductor manufacturing technologies. By cooperating with Sandia National Laboratories, Oak Ridge National Laboratory, and the Electrical Power Research Institute, SEMATECH rapidly became a major force in helping the major semiconductor manufacturers stem the competitive tide. By 1992, U.S. semiconductor manufacturers had captured 44 percent of the worldwide semiconductor sales to lead the world in chip sales for the first time since 1984.

One aspect of SEMATECH's commitment to global leadership was the development of the Standardized Supplier Quality Assessment. SSQA was designed as a tool to assist suppliers in developing a comprehensive quality-driven operating system. The goal was to achieve the highest quality products delivered on time

and at a reasonable cost. SSQA involved 114 distinct elements organized into 3 major modules:

1. Module 1 was based on the International Standards Organization quality standard—ISO 9000.
2. Module 2 was based on Malcolm Baldrige National Quality Award criteria.
3. Module 3 was based on Motorola Quality Software requirements.

With a unified voice, the SEMATECH members "invited and encouraged" their first-tier suppliers, including HI-TECH, to implement SSQA if they wanted to retain preferred supplier status. The first-tier suppliers were provided some initial training in SSQA implementation and then given 6 months to document their practices using the 114 SSQA elements as guidelines. At the end of the 6 months, a team of managers from SEMATECH companies visited HI-TECH to go over the process and help identify the key areas for improvement. With opportunities to improve identified and targeted, HI-TECH was able to dramatically enhance its quality performance.

SEMATECH initially worked with HI-TECH and the other first-tier suppliers to extend the implementation of SSQA upstream. However, the leverage dynamics were quite different and almost no progress was made. Whereas SEMATECH companies spoke with a common voice and represented the vast majority of its first-tier suppliers' sales, second-tier suppliers sold to a variety of customers outside the semiconductor industry. Further, most of the second-tier suppliers were very small and resource constrained. For example, NPF, one of HI-TECH's key sheet metal suppliers, had a total of 147 employees working in 2 shops. NPF sold to all of the major semiconductor first-tier suppliers as well as to companies in the commercial and defense aerospace industries. Companies like NPF balked at the idea of implementing SSQA, arguing that it simply did not fit their situation. SEMATECH quickly turned the responsibility for upstream quality improvement over to the primary first-tier players like HI-TECH.

A STREAMLINED APPROACH

To alleviate the resource concerns of the upstream supply base, several representatives from the first-tier suppliers modified the basic SSQA program, selecting the elements

most applicable to small businesses. The result was the Small Business Operating System (SBOS), which consisted of only 44 critical elements. SBOS was initially launched in 1995. Unfortunately, SBOS was not received any better than its predecessor. The semiconductor industry was thriving and there was no imminent and pressing need for change. To complicate matters, the primary first-tier suppliers were communicating different expectations to the upstream supply base. Without a common voice, it was easy for the second-tier suppliers to just say no to SBOS.

THE CURRENT DILEMMA

By 1998, the success of the mid-1990s had disappeared. Huge amounts of excess capacity plagued the industry, and semiconductor prices had plummeted. Further, new manufacturing capabilities were coming on line, creating considerable uncertainty regarding the new technological standards for the industry. The combined impact of these two events was that the major semiconductor manufacturers dramatically scaled back their purchases of manufacturing equipment. Capital expenditures dropped by as much as 70 percent. This precipitous decline was quite painful for HI-TECH and the other first-tier suppliers. This downturn forced the entire semiconductor industry to reevaluate its competitive position.

HI-TECH, together with the other first-tier suppliers, refocused on the quality issue and brought SBOS back to

the forefront of its strategic initiatives. In fact, for the first time, all of the key first-tier suppliers agreed that improving quality was mandatory and that SBOS represented a viable and practical approach. Unfortunately, getting the second-tier suppliers to seriously look at SBOS continued to be a serious challenge. NPF's management team was representative of the lower-tier suppliers as it voiced the opinion that SBOS was still too resource intensive. Besides, NPF's managers argued that simply focusing on ISO 9000 might be more beneficial because ISO certification might be more readily accepted by its non-semiconductor customers.

As Ty thought about the past 5 years and the previous efforts to implement SBOS, he wondered what it would take to get suppliers like NPF to adopt SBOS. One thing was clear: Supplier quality performance was inadequate and it was his job to help suppliers get quality right, right now.

QUESTIONS

1. What are the comparative strengths of a customized quality certification program like SBOS and a general quality certification program like ISO 9000?
2. What do you see as the most important barriers to achieving widespread acceptance of SBOS? Can Ty realistically expect to overcome these barriers? How would you suggest he proceed?

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