



Business Backgrounder

What is Six Sigma?

Six Sigma is a highly disciplined process that helps focus on developing and delivering near-perfect products and services. Why Sigma? The word is a statistical term that measures how far a given process deviates from perfection. The central idea behind Six Sigma is that if you can measure how many "defects" you have in a process, you can systematically determine how to eliminate them and get as close to "zero defects" as possible.

Six Sigma Quality Efforts Have Measurable Impact

Six Sigma is a business approach developed by Motorola in the late 1980s that involves the identification and elimination of costs that do not have any value associated with them. Initiated by Motorola's then CEO, Bob Galvin, Six Sigma has become a successful methodology for reducing costs, improving performance, and enhancing customer service. Other corporations, including many firms in the paint and coatings market, have since adopted Six Sigma and achieved significant and measurable gains.

"Six Sigma is a rigorous, focused, and highly effective implementation of proven quality principles and techniques," says Thomas Pyzdek, a Six Sigma consultant and author of Six Sigma publications with QA Publishing and McGraw Hill. Six Sigma programs involve the identification of organizational improvement efforts that will result in significant financial benefit to the company through improved

products and services to their customers. According to Mr. Pyzdek, companies that have not adopted a Six Sigma approach typically are operating at the three or four sigma level and have costs of 25–40% of their revenues associated with their quality efforts, most notably with fixing problems. Those companies that have implemented Six Sigma often spend less than 5% of their revenues on quality-related issues.

Six Sigma does not involve any fancy new quality techniques. It incorporates various established methods in the Define-Measure-Analyze-Improve-Control (DMAIC) performance improvement model. Once goals are defined at all levels of the company, the existing system is measured to identify the baseline against which progress will be monitored. The system is then analyzed to identify gaps in current and desired performance levels and changes are implemented to achieve the improvements. Controlling the system to maintain the new level of

by Cynthia Challener,
JCT CoatingsTech
Contributing Writer

performance is the final step in the process.

The Six Sigma quality methodology has an established infrastructure that supports the improvement efforts and assists the organization with the significant culture change that accompanies adoption of a Six Sigma approach to doing business. It is imperative for success that companies implementing Six Sigma have strong commitment from the very top of the corporation on down. Six Sigma Champions, Sponsors, Master Black Belts, Black Belts, and Green Belts all receive some level of training in quality management, change management, project management, statistical analysis, and more.

Champions and Sponsors are typically high level individuals who provide the necessary support and resources for those actively identifying and implementing quality improvements. Master Black Belts provide the technical leadership of a company's Six Sigma program and oversee the work of Black Belts and Green Belts. Master Black Belts coordinate the efforts of Six Sigma project teams and are actively involved in analyzing company information to identify areas that need improvement. Black Belts are the team leaders for individual Six Sigma projects and are responsible for managing them and bringing them to completion. Green Belts retain their operational role in the organization, providing process expertise as project team members.

According to Mr. Pyzdek, in companies with successful Six Sigma implementations (Allied Signal, Motorola, General Electric, Johnson & Johnson, etc.), there is typically one Master Black Belt for every 1,000 employees. Black Belts complete on average five to seven projects per year, with reported average savings per project of \$150,000 to \$243,000 each. "These are not huge mega-projects pursued by initiatives like Business Process Re-engineer-

ing," says Mr. Pyzdek. "Yet, by completing five to seven projects per year per Black Belt, the company will add in excess of \$1 million per year per Black Belt to its bottom line." A company with 1,000 employees could save over \$14 million per year.

There are several critical factors for successful adoption of the Six Sigma approach. "The top three factors needed for a successful implementation are management commitment, management commitment, and management commitment," stresses Joe Barckett, a senior consultant with Excel Partnership, Inc., a business and management training and consulting firm. He adds that management's lack of commitment is the number one reason most management initiatives, including Six Sigma, fail. Top management must be totally committed and trained so that they fully understand the methodology and are aware of the required resources (human, financial, and technological).

Companies must also have excellent communication and internal data collection capabilities in order to have the necessary information available for analysis of current conditions, according to Mr. Pyzdek. Training must be conducted to ensure that minimum capabilities are possessed by all company employees.

The necessary infrastructure and a system developed for monitoring and measuring improvement must be put in place. "With top management commitment and employee involvement, the Six Sigma philosophy can bring improved customer satisfaction, significant bottom line results, and a commitment to improvement to any company in any industry," says Mr. Barckett. He goes on to note that another impor-

tant factor is trust. "Management must trust that the team, if given the proper resources, will do what's best for the organization while the team must trust management to implement their solutions."

Careful selection of projects is critical so that goals are measurable, aligned with corporate strategy and directly linked to financial results.

Two key challenges face companies that wish to adopt the Six Sigma approach. In addition to ensuring total commitment from top management, companies need to be prepared for the culture change that must occur. "How Six Sigma is introduced and implemented throughout the organization is critical," notes Mr. Barckett.

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"Most companies underestimate the change management challenge and don't anticipate the roadblocks nor prepare a plan to address them. This puts all the good work the team has done at risk of not being implemented. This in turn leads to a feeling of failure of the Six Sigma philosophy and a management by best-seller mentality within the organization."

Several companies serving the paint and coatings market have adopted the Six Sigma approach. "As many companies have done, Grace looked to Six Sigma to bring a way to systematically grow the profitability of the company, to bring a common language, and problem solving process to the company, and to also bring a 'one company' focus with the various divisions of Grace," says Bill Rodebaugh, director of Six Sigma with W.R. Grace. Full year savings for the company, including all divi-

sions, has been approximately \$50 million annually for 2001 to the present. Grace has revenues of approximately \$1.8 billion. Investment in the program was highest (about \$1 million per year) in the first few years and included training, employee, and software costs.

Early challenges for Grace included the selection of the first wave of Black Belts, the filling of the day-to-day work of the early Black Belts, the selection of the early projects, and the management of a new program. "Strong leadership from the Grace executives who were stressing the importance of early success and working through the Black Belt transition overcame these issues," explains Mr. Rodebaugh.

Dow's ambition is to grow better and bigger by redefining itself as a solutions-oriented science and technology company, according to a Dow spokesperson. Dow's mission is "to constantly improve what is essential to human progress by mastering science and technology." "We have set our aspirations purposefully high, and these higher aspirations have fueled the company's journey toward Six Sigma and Business Excellence."

Dow began full scale implementation in 2000, and since that time nearly 3,000 projects have been completed. There are now approximately 800 trained Black Belts, business Champions to drive the implementation, and local Champions to make certain that Black Belts are supported at the local level. "One challenge we had to overcome was giving the program authority," notes the spokesperson. "Six Sigma at Dow is integrated into the business strategies of the company rather than being relegated to a corporate role. In effect, this decision has added vigor to Dow's implementation of Six Sigma by placing accountability for results

directly on the shoulders of the business leaders of the company," he explains. Dow's stated goal of achieving \$1.5 billion in cumulative earnings before interest and taxes from Six Sigma by year-end 2003 was achieved a full year ahead of schedule.

Albemarle Corporation chose to implement Six Sigma to reduce costs and increase customer satisfaction, according to Romesh Juneja, process improvement advisor for Albemarle. The company began by implementing Six Sigma in its manufacturing organization and then expanded to the transactional side

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of the business. "We found that initially some members of our management team were skeptical," notes Mr. Juneja. "However, as Six Sigma began to deliver results, they began to believe in the power of the approach." Six Sigma has helped Albemarle find root causes of complex problems. Typical savings per Black Belt project have been about \$200,000.

"The Six Sigma Quality Program was implemented and has become an important part of the GE culture in today's competitive environment, because it is an environment which leaves no room for error," says Micaela Bulich, general manager of Six Sigma quality, GE Plastics. "Globalization and instant access to information, products, and services have changed the way our customers conduct business—old business models no longer work. We must delight our customers and relentlessly look for new ways to exceed their expectations." The

company started its quality efforts in the 1980s with its Work-Out program that introduced management and employees to the fundamental cultural change necessary to have a successful Six Sigma effort.

At GE, Six Sigma goes beyond small point improvements in product quality to the very fabric of the organization as a whole, adds Ms. Bulich. "It is a process for both improving performance and helping to ensure consistency in the delivery of a product or service." Most importantly for the company, Six Sigma focuses on the customer.

Throughout GE, the program that drives this customer focus is known as "At the Customer, For the Customer" (ACFC). "Our customers continually demand higher quality in the products and services that we produce and provide, and Six Sigma enables us to continuously and rigorously measure those elements the customer identifies as 'critical-to-quality,' and delivers differentiated products and services to our customers by delivering a competitive advantage in their marketplace," Ms. Bulich explains.

Six Sigma has become a permanent initiative at GE. During 2002 the company completed more than 50,000 projects, focused primarily in three areas: working with customers on their issues; improving internal processes to improve customer interfaces and generate cash; and improving the flow of high-technology products and services to the marketplace. "Overall, Six Sigma has changed the DNA of GE—it is the way we work—in everything we do and in every service we deliver," Ms. Bulich says.

DuPont turned to Six Sigma because the company was looking for a fundamental change in its approach to productivity, and the company's senior management believed that Six Sigma was a good fit with existing quality systems,

notes Bruce Simmons, Global Six Sigma Manager for DuPont's Performance Coatings Strategic business unit. The company sent management teams to Six Sigma Academy for training, then formed a leadership team, developed a deployment plan, obtained training resources, and selected people to be trained as Black Belts.

"The biggest challenge for DuPont was the fact that Six Sigma is a fundamentally different way of doing business," says Mr. Simmons. "Six Sigma provides a methodology rather than establishing goals, and is a real culture change. We were successful in our implementation because we paid attention to the culture change issue and focused on how the change would impact our people and their values," he explains.

The value of Six Sigma goes beyond the obvious potential cost savings. "Besides the monetary benefits, it has changed the language of process improvement and problem

solving to a more systematic and disciplined approach," says Mr. Juneja. Used properly, Six Sigma accelerates business strategy, according to Dow's spokesperson. "It is essential to clearly position Six Sigma as the way in which work is done. Most business roles involve solving problems and closing the gap between reality and a desired state. Six Sigma is a methodology, a tool set and a mindset that is ideally suited for solving problems," he adds.

All of these companies are planning to expand their Six Sigma efforts in the near future. Albemarle is implementing Six Sigma in transactional processes to improve cycle time and reduce costs of service oriented processes. Grace continues to drive its Six Sigma program with savings expectations at or above early year levels. The company is planning expansion at a functional level, and various areas like laboratory and maintenance have been targeted for training and implementation of Six Sigma.

DuPont is initiating projects that are more visible to the customer. "The essence of Six Sigma is to focus more on the customer and to respond to the voice of the customer by making sure measures support customer needs appropriately," says Mr. Simmons. "Six Sigma is a long and difficult journey. We will continue to evolve and build on the existing foundations we have created to improve processes throughout the company." He adds that in the future, Six Sigma will be necessary for a company to thrive and be successful.

"Although the approach is simple, it is by no means easy. But the results justify the effort expended," says Mr. Pyzdek. "Research has shown that firms that successfully implement Six Sigma perform better in virtually every business category, including return on sales, return on investment, employment growth, and share price increase." 