

LEAN SIX SIGMA PRINCIPLES

DELIVERING EFFECTIVE CHANGE TO COMPANIES IN THE HUDSON VALLEY

LEAN SIX SIGMA

“We were able to reduce patient cycle time, free up physician time and increase throughput, aka revenue!” states Amelia Gifford, graduate of the Lean Six Sigma (LSS) Green Belt program offered by the Rochester Institute of Technology (RIT) at Dutchess Community College (DCC) when she worked at Adirondack Oral and Maxillofacial Surgery in Albany.

Lean Six Sigma, the result of merging two continuous improvement approaches, has become a significant force within organizations in all sectors to optimize processes and drive out waste. By combining Lean with Six Sigma, organizations are achieving both speed and accuracy.

LSS utilizes the **DMAIC** (Define-Measure-Analyze-Improve-Control) structured method (see Figure 1) to improve processes with a focus on reducing waste and using data driven decisions to drive customer satisfaction and bottom-line results. While LSS may have started in the manufacturing sector, it is just as effective in the transactional or administrative segments of any business. It is being applied to services, healthcare, education, not-for-profit, and government sectors. Traditionally, individuals and organizations immediately start brainstorming solutions when a

problem emerges, resulting in short-term gains and the need to revisit the issue in the future. Instead, DMAIC seeks to implement a breakthrough improvement that is more lasting.

DMAIC starts by defining the project in terms of the objectives and the resources that will be required. The “Define” stage focuses on identifying a clear problem statement and project objectives, and culminates with the signing of a Project Charter, signifying the approval of management to move forward. In the “Measure” stage, data and information are gathered that will help to characterize the current process capability and better identify problems. In the “Analyze” stage, data and

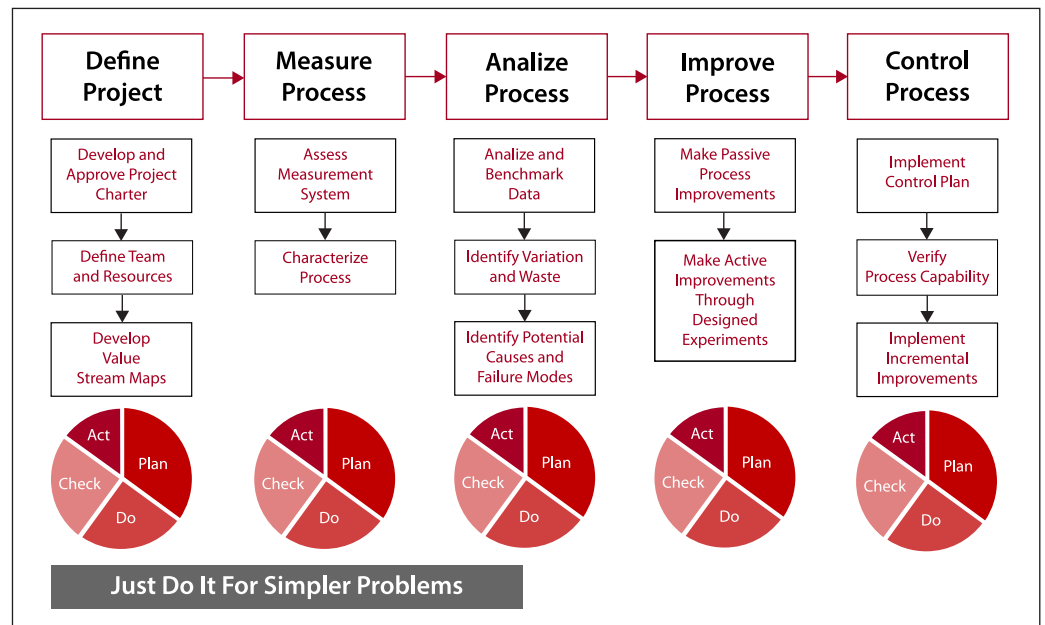


Figure 1: DMAIC Process

information are used to identify variation, waste and ultimately the root causes of the problem. Once the root causes are understood, the team can move to the “**Improve**” stage where improvement strategies and plans for implementation are developed and the necessary changes are implemented. Finally, the “**Control**” stage is critical to ensure that the improvements are sustained. This might include updating work instructions and documents, providing training, and having a method to monitor the process performance. Through the DMAIC process teams likely will identify simpler problems or opportunities which often result in ‘quick wins’ for the organization.

Individuals leading teams as well as some team members require training in LSS principles, skills, and tools. In order to designate the different levels of training available, the convention of awarding Yellow, Green and Black Belts has been developed. Two of the most popular are Yellow Belt and Green Belt certifications. Note however, that there is significant variation in the certification programs among training providers. The programs offered by RIT are highlighted in Figure 2.

YELLOW BELT

The Yellow Belt (YB) program is an introduction to basic problem solving tools as well as the DMAIC process. YB training lasts three days and has been popular with a wide array of organizations. During the training participants work in teams on specific process improvement problems using the DMAIC process and the tools presented in the training. The program outcome will be a set of recommendations from each team on steps toward an improvement strategy for consideration by management. The team is not required to implement a solution in order to be certified, but many organizations choose to follow through either with the YB team or with others.

One organization that has a good support system for Yellow Belts is the Hudson Valley Federal Credit Union. At the Credit Union participants are nominated by their direct managers. During the program, staff members begin a project that they will complete upon returning to work, presenting their results to an internal Process Council. The standardized method for project execution begins with buy-in from senior management and ensures that teams celebrate their accomplishments and successes. This structure and management support

is critical. The Organizational Excellence team also delivers half-day White Belt overview training to all employees within 180 days of hire date. In the past two years the Credit Union has seen a 35% increase in staff suggestions for process improvements.

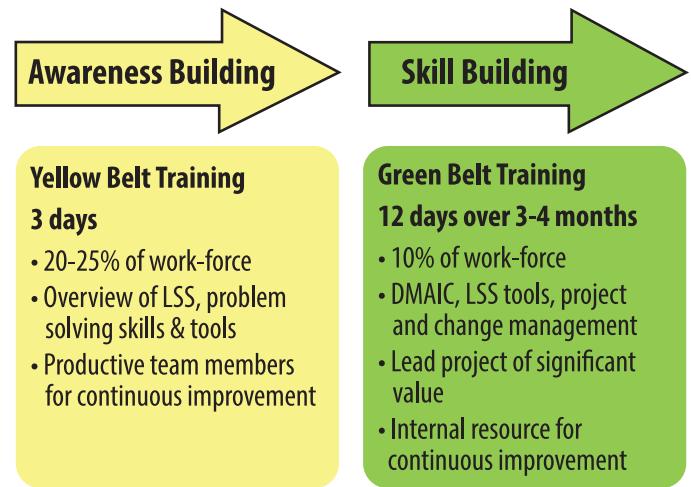


Figure 2: RIT Yellow Belt and Green Belt

Tim Cunningham, Vice President of Manufacturing, at Bell Flavors & Fragrances, has sent 15 employees to RIT’s YB training at SUNY Rockland, SUNY Dutchess and SUNY Orange over the past several years. Tim says “the value of the training is that it provides folks with a common language when it comes to improvement and finally, people understand that change is ok. The goal here is to develop the structure to take full advantage of the training, develop folks who can be drivers of change, and also begin to change the mindset of the organization.” Tim is establishing a steering committee to discuss possible projects and develop a structure for how the projects will be managed. He is planning to have more employees attend the YB program and at least one achieve Green Belt certification to help continue and support the upward direction of the organization.

GREEN BELT

RIT offers a comprehensive Green Belt (GB) program where students receive the equivalent of 12 days of training plus completion of a project. GB training provides individuals with the tools necessary to clearly define a problem, gather and analyze data and information, and implement improvements that can be sustained. The results have been outstanding, with many organizations reporting significant financial benefits, enhanced

customer satisfaction, and reduced costs. The sessions are highly interactive and include both classroom assignments and structured exercises. In addition, participants are required to utilize the tools learned on a project specific to their organization. The benefits of these projects typically more than cover the cost of training.

Given the duration and time commitment of the GB program, participants need to be selected wisely. Ideally, they should have a good understanding and knowledge of the organization, its' systems and products/services, and be a respected member of the organization with leadership potential. They should be team players and possess good communication, analytical and project management skills. They do not need to be Lean Six Sigma Yellow Belt certified. Many organizations often

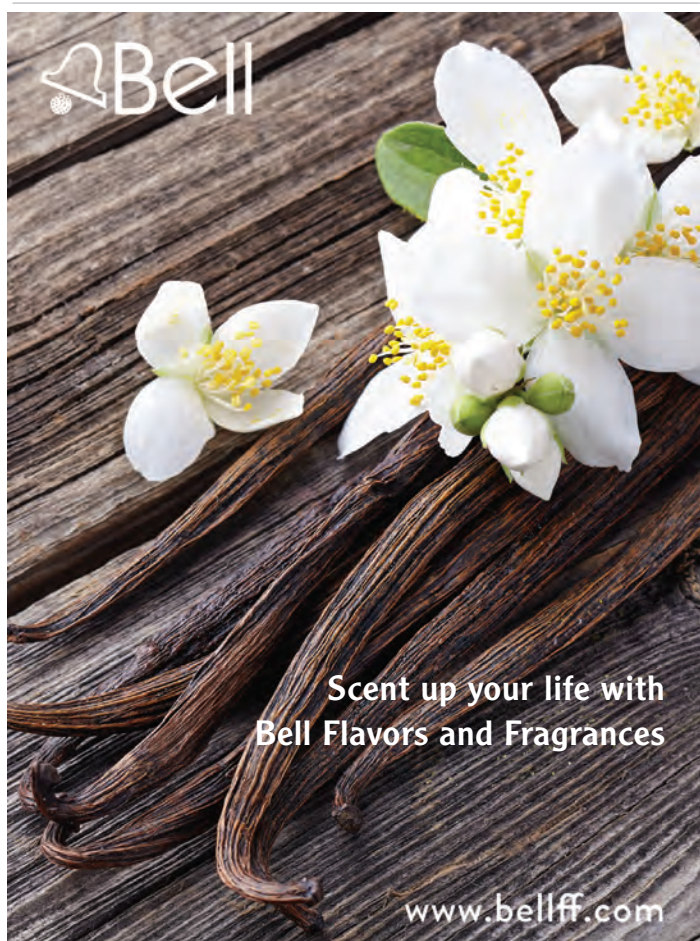
Ratings of Importance for Filters		9	8	7	7	7	6	Total Score
Projects	Filters	Financial Impact (Profit or Cost Savings)	Decrease Reworks / Errors	Improve Information and Data Management	Increase Customer Value (Willing to Pay For It)	Increase Employee Value (Retention & Morale) for Top Performers	Time & Resources to Complete Project	
	Reduce time from needs analysis to proposal	9	6	9	1	6	6	277
	Increase field tech load capacity	6	6	6	6	6	6	264
	Ineffective product installation and customer support policy	6	9	1	3	6	9	250
	Reduce administrative rework (paperwork, data entry)	3	9	9	1	9	3	250
	Customer satisfaction measure	9	1	1	9	6	6	237
	New employee orientation program (improve employee up to speed)	1	9	6	1	9	6	229
	Improve internal communication	1	6	9	1	9	6	226
	Improve recruiting	3	6	1	6	6	9	220
	Reduce technical rework (billing trouble, tickets, work orders, and contracts)	3	9	6	1	6	1	196
	Product portfolio offerings	6	1	1	6	6	6	189

Figure 3: Prioritization Matrix

target emerging leaders as appropriate candidates for LSS GB certification.

Jenniferr Witmer, Quality Assurance Coordinator at Metallized Carbon Corporation, also was a LSS GB student at DCC. For her, “the most valuable part of the training was the different Lean Six Sigma tools that can be used to find the root cause of the problem and upgrading your knowledge to different environments, no matter the industry.” The certification process is comprised of hands-on work on business projects and experience with implementation of principles to real life situations. Benefits have included improvement to business processes, sustained quality improvement and cost reduction in different areas of the business.” After certification, she became the team leader for the audit process within her organization. LSS tools that she has continued using to reduce waste, defects, and customer complaints, include brainstorming, the cause & effect matrix, control plans, cost of quality, 5S, 5 whys, setup reduction, measurement system analysis, FMEA and flowcharts.

An important element of LSS is project selection. Encouraging all employees to identify processes with waste as well as reviewing data on process performance can elicit a large number of potential projects. Given the limited resources available to work on process improvement, these project ideas need to be reviewed and assessed based on strategic goals and other organizational priorities. This is where a prioritization matrix with filters and a rating scale can be helpful to rank potential projects and arrive at a consensus (see figure 3 for an example from one organization). This can



Green Belt/BlackBelt		Organization/Division/Unit				
Business Unit Leader		Financial Reviewer				
Sponsor		Sponsor Phone and Email				
		Target and Completion Dates				
Management Approvals		Date Approved				
Element	Description	Team Charter				
1. Process:	Describe the process in which the opportunity exists. Attach a SIPOC model to show relationship to suppliers, inputs, outputs, and customers.					
2. Problem Statement:	Describe the project's purpose, scope, and linkage to strategic objectives.					
3. Objectives:	What improvement is targeted and what will be the impact on the key indicators. Examples of key improvement indicators are: <ul style="list-style-type: none"> • RTY - Roll Throughout Yield using % or Defect Per Unit • COPQ - Cost of Poor Quality in \$ 	Improvement Indicators	Baseline	Goal	Entitlement	Units

Figure 4: Project Charter

greatly reduce the likelihood of spending time on low-impact projects.

Note that LSS projects should not include those where a solution has already been determined and is ready to be implemented. This also applies to a very general situation such as implementing software. Instead, a good LSS project is one that will benefit from the DMAIC process and will allow the team to uncover a potentially creative, breakthrough solution.

GB's typically pair up in teams of two and spend approximately 6–8 hours each week working on a project. Aligning project work with an employee's job responsibilities can help to minimize the impact of this time commitment. Formal tollgate reviews with the project sponsor are held at the completion of each phase of the DMAIC process. Project sponsors have managerial responsibility and can assist by removing barriers and providing support as needed, by mentoring and coaching the GB.

Once a project has been selected and assigned to the GB, a team is formed and tasked with further detailing the process under review, determining a problem statement, and identifying the project objectives including potential financial returns. This information is summarized in a one-page project charter document (see Figure 4).

In addition to a description of the process, the

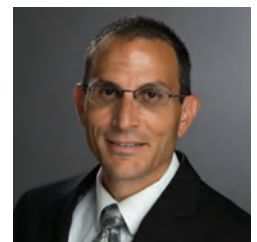
problem statement, objectives and potential business results, the charter also identifies the unit within the organization where the project resides, key stakeholders, team members, potential benefits for customers, and additional resources and special requirements that may be needed. Once the project charter is reviewed and approved by the sponsor, it is essentially a contract between the GB and the project sponsor.

The project component of the LSS Green Belt program is one of the major factors in its success. Organizations are encouraged to pursue major projects that can have significant benefits. The value of the projects will vary depending on the type and size of the organization. In the past 5 years, RIT's CQAS organization has trained 400 GB

students from approximately 100 organizations. About 50% have been from manufacturing organizations, 30% from service organizations, and 20% from healthcare and education. As reported by those organizations, typical projects have realized financial benefits between \$25,000 - \$40,000. The teams working on these projects are usually cross-functional, which ensures that different viewpoints are considered. Projects frequently take several months to complete after training has ended. With leadership support, significant impact can be achieved, not only by increasing profitability but also by enhancing customer satisfaction and ultimately changing the mindset of individuals and the culture of an organization.

Amelia Gifford states, "The most rewarding and valuable aspect of the LSS green belt training was that I was able to implement the tools & techniques I learned in the classroom at my organization. I saw firsthand the power of LSS! I find myself continuously evaluating waste around all processes in my personal and professional life."

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