




**From:** Dr. Mikel J. Harry 

**To:** Mr. Gary Reiner  
Mr. Serge Huot

**Subject:** General Guidelines for Operating the Six Sigma Initiative

August 3, 1995

Gentlemen;

This correspondence is supplied to facilitate a deeper understanding of the Six Sigma Implementation and Deployment Process. It is intended to give a good sense of the order in which things will progress, as well as the true nature of those things. Should you desire clarification or additional information, please feel free to contact me at your convenience.

Please recognize that the defined process is for GE Medical; however, it is set up to serve as a model of how to proceed with the other GE businesses as well.

**Step 1: Make Initial Contact With GE Business Unit Management**  
**Milestone:** Completion of the Six Sigma Executive Briefing  
**Timing:** June 30, 1995

Dr. Harry will make the initial contact with the selected GE MANAGEMENT REPRESENTATIVES. In general, one day should be dedicated for this meeting and related presentation.

**Purpose of the Initial Meeting:**

- a) Assess the GE BUSINESS UNIT's current situation in terms of performance improvement.
- b) Discover the GE BUSINESS UNIT's perceptions on what must be done to further improve.
- c) Establish if Six Sigma can be used to facilitate the GE BUSINESS UNIT's long-term goals.
- d) Determine how committed the GE is to long-term improvement.
- e) Understand how Six Sigma can be integrated into the respective GE BUSINESS UNIT.
- f) Assess the GE BUSINESS UNIT's current operation from a Six Sigma viewpoint
- g) Get a feel for how Six Sigma could best be implemented (long-term approach)

**Agenda for the Meeting:**

- 9:00 AM: Presentation by the GE BUSINESS UNIT concerning the nature of their:
- a) products, customers, and suppliers
  - b) business philosophy, strategy, goals, and objectives
  - c) historical actions to improve cost, time, performance, and quality
  - d) current actions to make such improvements happen
  - e) other information the GE BUSINESS UNIT believes to be relevant
- 11:00 AM: OPTIONAL: Tour of a factory (at or near the meeting location)
- a) the tour should focus on the key processes within the factory
  - b) the tour to be lead by the operations manager and the quality officer
- 1:00 PM: *Six Sigma Executive Briefing*
- 4:00 PM: Open forum for discussion
- 4:30 PM: Take decision to make the next step

**Nature of the Six Sigma Executive Briefing:**

The Six Sigma Executive Briefing has been specifically designed for executives, managers, and supporting staff personnel. The briefing will provide an in-depth overview of the fundamental strategies, tactics, and tools necessary for achieving Six Sigma product designs, manufacturing processes, service quality, quality of administration. Specifically, participants of the Six Sigma Executive Briefing will discover:

- The Driving Need for Six Sigma Quality
- The Fundamental Objective of Six Sigma
- The Basic Tenants of Six Sigma Quality
- Key Business Conclusions Resulting From Global Benchmarking
- Six Sigma as a Target for Total Quality Management (TQM)
- The Primary Tools for Achieving Six Sigma
- The Customer's Perspective of Six Sigma
- The Financial Impact of Six Sigma on the Bottom Line
- Strategies and Tactics for Implementing Six Sigma
- Advanced Six Sigma Concepts
- The Impact of Product and Process Complexity on Quality
- The Impact of Six Sigma on Product Reliability
- The Impact of Six Sigma on Manufacturing Cycle-Time
- The Impact of Six Sigma on Inventory
- Developing Six Sigma Suppliers
- How to Create and Maintain Six Sigma Product Designs
- How to Create and Maintain Six Sigma Manufacturing Processes
- How to Create and Maintain Six Sigma Services

In addition, several "real life" case studies will be presented and thoroughly discussed. The cases are configured to clearly illustrate many of the "how to's" with respect to selected Six Sigma implementation strategies and application practices. In particular, the cases will highlight the results which were achieved and how the Six Sigma practices were embodied and institutionalized within the organization.

**Step 2:** Prepare GE BUSINESS UNIT Six Sigma Champions  
**Milestone:** Completion of the Six Sigma Champion Program of Study  
**Timing:** August 28 through September 1, 1995

**Role of the Six Sigma Champion:**

The selected GE BUSINESS UNIT must identify a Six Sigma Champion to lead the initiative. In essence, the Six Sigma Champion is a senior GE BUSINESS UNIT manager. This person is the principal conduit for flowing Six Sigma into the organization, as well as the key contact for the Six Sigma Academy. This person is fully responsible for the planning, communication, and coordination of those activities associated with the implementation and deployment of Six Sigma. Recognize that, in some cases, more than one champion will be needed depending upon the size of the Business Unit; e.g., Division Champions.

**Program of Study:**

The intent of this program of study is to provide the selected candidate(s) with the managerial and technical knowledge necessary to facilitate the leadership, implementation, and deployment of Six Sigma. The instructional goal is to transfer and reinforce the fundamental Six Sigma strategies, tactics, and tools necessary for achieving breakthrough in key product designs, manufacturing processes, services, and administrative processes. Naturally, the resulting certification denotes and communicates a high level of executive commitment, dedication, competency, and leadership.

Each instructional segment will concentrate on the underlying philosophy, supporting theory, conventional practices, and application dynamics related to the Six Sigma strategies, tactics, and tools. In addition, each segment will focus on the critical implementation issues and mechanics which surrounds the instructional material. Directly following each segment, the participant will synthesize the key points of instruction and then contribute to the progressive development of a model Six Sigma implementation plan aimed at his/her respective business. After contributing to the progressive implementation model, the participant will be provided an out-of-class assignment. Naturally, the objective of such an assignment is rooted in the belief that we "learn by doing." With this as a backdrop, knowledge is translated to action.

Through this program of study, the instructional material delivered within the classroom is smoothly blended into an implementation and deployment plan. In turn, such plans are translated to front-line practice within the targeted business. In this context, program delivery follows the Six Sigma Plan-Train-Apply-Review (PTAR) model. As should be apparent, such a model is founded upon the merits and benefits most commonly associated with a closed-loop feedback system.

**Reference:**

Additional detail concerning the Six Sigma Champions can be found in Chapter 24 of the fourth edition book entitled *"The Vision of Six Sigma: A Roadmap for Breakthrough"* authored by Dr. Mikel J. Harry.

**Step 3:** **Prepare GE BUSINESS UNIT Six Sigma Master Black Belts<sup>1</sup>**  
**Milestone:** Completion of the Six Sigma Master Black Belt Program of Study  
**Timing:** August 28 through September 1, 1995 (Session 1)  
 September 11 through September 15, 1995 (Session 2)

**Role of the Six Sigma Master Black Belt:**

With regards to the MASTER BLACK BELT (MBB) selection process, it is fully recognized that finding ideal candidates is often a very difficult and tedious process, as a MBB possesses several unique skill sets. As a consequence, can be used in many different roles within the organization. To help guide the process of selection, the following list of attributes and characteristics describes the composite nature of an ideal Master Black Belt. In this manner, one can begin to see what underlies the MBB mentoring process, as well as the many roles which a MBB can perform. However, one must remember that the principal role of a MBB is that of teacher and mentor to the OPERATIONAL AND TECHNICAL BLACK BELTS.

- *Operational or Technical Black Belt certification (prior to MBB certification)*
- *A strong academic background of a technical nature*
- *Experienced, successful, and recognized in an array of job assignments*
- *Displays humility and the never ending desire to learn and grow*
- *Keen interest in industrial problem solving*
- *Strong interpersonal and communication skills*
- *Team player with competitive instincts*
- *Very strong leadership ability*
- *Believes in relationships and maintains a process focus*
- *Tactical as well as technical understanding of process improvement*
- *Commands respect among subordinates, peers, and superiors*
- *Significant instructional and facilitation experience*
- *A self perception which reflects the nature of a change agent*
- *Ability to "step out of the box" and try new things*
- *A believer in managed risk taking and shared reward*
- *Recognizes the role and importance of corporate politics*
- *Effective negotiation skills*
- *Knows the process of business and the meaning of customer focus*
- *Experienced with process and business metrics*
- *Knowledgeable and experienced in quantitative benchmarking practices*
- *Experienced in presentation and instructional materials development*
- *Understands the technical foundation of quantitative risk assessment*
- *Knows how to initiate and win an internal consulting contract*
- *Can establish valid success criteria for internal consulting contracts*
- *Good understanding of engineering tolerance analysis and optimization*

<sup>1</sup> August 28 through September 1: The Champions and MBB's will be concurrently exposed (in the same class) to the Strategies, Tactics, and Tools associated with the successful application of Six Sigma. During this week of training, the participants will discover the Vision of Six Sigma (as well as the related system of tools) and then formulate detailed deployment plans and operational objectives for each of their respective businesses. The aforementioned training will be conducted in Phoenix, Arizona.

September 11 through September 16: The MBB's will return to Phoenix, Arizona for their second week of training. This particular session is focused on the application and deployment of advanced Six Sigma Tools and Tactics, as well as the Breakthrough Strategy. The Champions do not participate in this training session.

- *Strong computer skills (spreadsheet and statistical applications)*
- *Applies nonparametric methods and procedures when appropriate*
- *Understands fundamental management and business practices*
- *Knows how to perform organizational intervention*
- *Very comfortable with mathematical statistics and DOE*
- *Comfortable with survey design and analysis methods*
- *Knowledgeable about the organization and its products/services*
- *Maintains a strong sense of loyalty to the organization*
- *Is aware of and knowledgeable about best manufacturing practices*
- *Understands and strongly believes in the basic tenants of TQM, DFM, etc.*
- *Applies TQM, DFM, etc. to nonmanufacturing processes*
- *Enjoys the process of setting, selling, and achieving stretch goals*
- *Ability to work and talk with people at all levels of the organization*
- *Can speak the language of management and walk the talk of business*
- *Participates in strategic planning, implementation, and deployment*

The Master Black Belt mentoring process will provide a select number of individuals within a GE BUSINESS UNIT with the knowledge and skills necessary to best guide, propagate, and mature the black belt infrastructure. The two independent mentoring sessions will be primarily focused on application tactics with a secondary focus on tools. The intent is to present the MBB candidate with those methods and techniques (both technical and nontechnical) which best exploit the full power of advanced problem solving and process improvement methods.

#### **Program of Study:**

Naturally, the MBB development process assumes that each MBB candidate already understands and applies the fundamental tools of breakthrough as taught during the operational and technical level black belt training; i.e., descriptive statistics, hypothesis testing, analysis of variance, design of experiments, statistical process control, etc.

Although the primary focus of the mentoring process is tactical in nature, several advanced improvement tools will be presented and thoroughly discussed from an application (as well as theoretical) point of view. In addition, real-life application case studies will be spontaneously presented and carefully analyzed to reinforce understanding and use of the advanced tools.

It should also be noted that every Master Black Belt possess a unique set of strengths and weaknesses. Each candidate should be self-aware of their particular set. During the course of mentoring, the candidates will review their set of strengths and weaknesses with the composite group and should be prepared for candid discussion and commentary.

Prior to the second mentoring session, each candidate must prepare a one hour training module (not to exceed 1.5 hours) on an application topic of their choosing; however, the topic must be tool related. In addition, the selection must **not** be a "first order" tool; e.g. Pareto analysis, fishbone diagrams, Xbar and R chart, etc. At the appropriate time during the mentoring process, each candidate will present their module (in instructional form) to the composite group. The module should be related to and focused on an advanced tool and its industrial application. For example, response surface methodology, design of experiments applied to product design, process variable performance tolerancing, financial risk analysis, application of nonparametric statistics to industrial problems, EWMA control chart, Chi-Square applications, etc. The MBB will be critiqued on their delivery, content, graphics, style of presentation, etc.

By end of the second mentoring session, each candidate will have developed a personal assessment and development plan. Essentially, the plan guides the MBB candidate toward further skill development. In closing, it is worth noting that a certified Master Black Belt is fully capable of independent training and coaching of Operational and Technical Black Belts, as well as providing strategic and tactical assistance to the Business Unit Champion during the course of Six Sigma implementation and deployment. Therefore, great care and consideration should be given to those individuals selected as MBB candidates. Essentially, the MBB program represents an on-going career challenge for those selected. The mentoring process is just the first step on a never ending journey of personal and professional development.

**Step 4:**  
Milestone:

**Initiate GE BUSINESS UNIT Six Sigma Black Belt Process**  
Initiation of Black Belt Certification Process

Timing: To Be Determined

**Role of the Six Sigma Black Belt:**

The Black-Belts are a cadre of individual contributors from various discipline areas which, when adequately trained and technically supported, can serve as change agents, internal consultants, tool mentors, and assist Six Sigma Champions. The Black-Belts are the paradigm shifters within an organization. They stimulate management thinking by posing new ways of doing things, challenge conventional wisdom by demonstrating successful application of new methodologies, seek out and pilot new tools, create innovative strategies, and develop others to follow in their footsteps. The Black-Belts can speak the language of management (e.g., money, time, organizational dynamics, etc.) and the language of individual contributors (e.g., implementation details, quality tools, statistical techniques, problem solving methods, etc.) The Black-Belts carry a very high level of peer respect and are clearly seen as leaders -- They manage risk, set direction, and lead the way to breakthrough improvement.

**Description of the Black Belt Certification Program:**

The intent of the *Six Sigma Black Belt Certification Program* is to develop and implant on-site Six Sigma experts within a Business Unit of General Electric. These on-site experts are referred to as "Six Sigma Black Belts." Black Belts have the ability to; a) effectively develop and lead line-of-sight or cross functional process improvement teams, b) work with, mentor, and advise middle management on the formulation and subsequent implementation of process improvement plans, c) utilize and disseminate the Six Sigma tools and methods, and d) network with other Black Belts around the world for the benefit of their Business Unit. The aim is to produce highly credible breakthrough success stories using the four-phase Breakthrough Strategy and then transfer the application methods, techniques, procedures, and tools to their peers and process improvement teams.

The central focus of the program is on developing an in-depth understanding of the Six Sigma philosophy, theory, tactics, breakthrough strategy, and application tools. Particular emphasis is placed on the tools of breakthrough -- statistics, quantitative benchmarking, process control techniques, process diagnostic methods, and experiment design. Throughout the certification process, the Black Belt Candidate will discover how the key tools are blended and sequenced to form a scientific and repeatable process for solving critical manufacturing, engineering, service, and administrative problems.

Target Population:	Experienced engineers and operations personnel.
Prerequisites:	Technical background and leadership ability
Instructor:	GE Business Unit Master Black Belt
Location:	Established by the Master Black Belt
Timing:	As per the Business Unit project schedule
Class Size:	Minimum of 20 participants per class Maximum of 30 participants per class
Workbook:	<i>"The Vision of Six Sigma: A Roadmap for Breakthrough"</i> <i>"The Vision of Six Sigma: Tools and Methods for Breakthrough"</i>
Software:	<i>"Six Sigma Scorecards: Spreadsheet Applications"</i>

**Black Belt Program of Study and Certification Process:**

Prior to initiating the certification process, the Business Unit Six Sigma Champion identifies 25-30 Black Belt Candidates. The intent is to create a relatively homogeneous group of candidates in terms of the organizational structure and geographic site locations. Following this, the Champion meets with the Master Black Belt so as to coordinate the program delivery.



The program delivery is divided into 4 instructional sessions, where each session correlates to one of the four phases contained within the Six Sigma Breakthrough Strategy.

In terms of delivery, each instructional session contains 3 days of classroom activity followed by a 21 day on-the-job (OJT) application experience. During the OJT exercise, the Black Belt Candidates are supported and mentored by a visiting Master Black Belt. Each candidate's OJT results are reviewed and critiqued by the instructor (Master Black Belt), local Six Sigma Champion, and the Candidate's classmates. This is called the "Standard Six Sigma Review." From this perspective, we see that each of the 4 instructional sessions follows the Plan-Train-Apply-Review (PTAR) delivery model.

As should be apparent, the Six Sigma Black Belt Certification Process is founded upon the merits and benefits most commonly associated with a closed-loop feedback system. The terms and definitions related to this process are as follows:

	Event	Cycle	Activity Description	Duration
	1	•	Initial Meeting and Planning Session	2 days
1st Month	2	1	Champion Coordination Meeting	1 day
	3	1	Session 1: Black-Belt Training	3 days
	4	1	On-The-Job Application Exercise	21 days
2nd Month	5	2	Champion Coordination Meeting	1 day
	6	2	Standard Six Sigma Review	1 day
	7	2	Session 2: Black-Belt Training	3 days
3rd Month	8	2	On-The-Job Application Exercise	21 days
	9	3	Champion Coordination Meeting	1 day
	10	3	Standard Six Sigma Review	1 day
4th Month	11	3	Session 3: Black-Belt Training	3 days
	12	3	On-The-Job Application Exercise	21 days
	13	4	Champion Coordination Meeting	1 day
4th Month	14	4	Standard Six Sigma Review	1 day
	15	4	Session 4: Black-Belt Training	3 days
	17	•	Contingency	6 days

**Initial Meeting and Planning Session:** These two days are utilized by the Business Unit Champion. The first day is used to mentor the Champion in key deployment issues and/or the various technical aspects of Six Sigma. The second day is used for the purpose of planning, coordinating, and finalizing the various instructional, logistical, and administrative details associated with the ensuing certification process. Of particular importance, the Champion and Master Black Belt have the opportunity to develop a working relationship over the course of these two days prior to launching into a certification cycle.

**Champion Coordination Meeting:** This is the first active day of a certification cycle. Four such days occur over the certification process. Each of the 4 days is dedicated to the Business Unit Champion and is focused on coordinating the immediate instructional activities at hand, reviewing recent on-site developments/applications, performing technical/deployment mentoring to the Champion, and ensuring any last minute administrative/logistical details are taken care of.

**Six Sigma Black Belt Training:** Each of the 4 training sessions requires a 3 day period of classroom instruction, for a total of 12 classroom days across the entire certification process. Recognize that each of the 4 training sessions correlates to the 4 phases comprising the Six Sigma Breakthrough Strategy; i.e., Measurement-Analysis-Optimization-Control.

**On-The-Job Application Exercise:** Following three of the instructional sessions is a time period in which the Black Belt Candidates apply what they have just learned in the classroom. This is called the "On-the-Job Application Exercise," or simply OJT. Each OJT assignment is 21 days in duration. The nature of each of the three OJT assignments (as given to each Black Belt candidate) is established by the Master Black Belt Instructor and are subsequently approved by the Business Unit Champion prior to the actual assignment. During each OJT period, the Black Belts will be partially supported by on-site consulting services. Such services are provided by the Master Black Belt Instructor and/or a visiting Master Black Belt. The Champion and Master Black Belt will jointly establish the on-site consulting support schedule for each OJT period.

**Standard Six Sigma Review:** This day is used by the Business Unit Champion and Master Black Belt Instructor to perform an in-depth review and critique of the OJT assignments given to Black Belt candidates. Each candidate presents the results of his/her exercise to the "class." In this manner, the other candidates are able to see a wide array of applications related to the Six Sigma tools and methods.

**Contingency:** These days are set aside for any residual training, on-site consulting, and/or support activity which must occur to bring logical closure to the given certification cycle.

**Reference:**

Additional detail concerning the Six Sigma Belts can be found in Chapter 23 of the fourth edition book entitled *The Vision of Six Sigma: A Roadmap for Breakthrough* authored by Dr. Mikel J. Harry.