

Preface

DFSS is a business process focused on improving profitability. Properly applied, it generates the right product at the right time at the right cost. Through its use of product and team scorecards, it is a powerful program management technique.

DFSS is an enhancement to your new product development process, not a replacement for it. A documented, well-understood and useful new product development process is fundamental to a successful DFSS program.

Your new product development process provides the roadmap to success. DFSS provides tools and teamwork to get the job done in an efficient and effective manner. By rigorously applying the tools of DFSS you can be assured of predictable product quality.

DFSS provides a systematic integration of tools, methods, processes, and team members throughout product and process design.

For the majority of organizations, long-term success is tied directly to the new product development process. Tomorrow's revenue and growth are tightly bound to how successful you are at launching new products.

DFSS can serve as a mechanism to revolutionize the way you develop new products. To reap its benefits, you must be prepared to make major changes.

The size of the effort is formidable, but the payoff may be no smaller than company survival.

—Charles Huber and Robert Launsby
“Straight Talk on DFSS” (Six Sigma Forum
Magazine, Vol. 1, No. 4, August 2002)

Design for Six Sigma (DFSS) is a systematic methodology for designing or redesigning products and/or services according to customer requirements and expectations. DFSS project teams integrate characteristics of Six Sigma at the outset of development with a disciplined set of tools, to achieve six sigma performance—a defect rate of 3.4 defects per million opportunities (DPMO), which is 99.9997% perfect.

DFSS is based on the belief that when you design Six Sigma quality into a product or a service, it's probable that customers will be satisfied with that product or service and your organization will benefit financially. By incorporating DFSS, you're virtually assured that your new product or service will perform well in the marketplace.

Although there are variations of DFSS, they all use a disciplined set of tools throughout the design process. Some of those tools will be familiar to you through your experiences with Six Sigma, but some are specific to DFSS. Similarly, the DFSS process, of which there are at least a half-dozen variations, is somewhat similar to the Six Sigma process of DMAIC (define, measure, analyze, improve, and control).

Is DFSS right for your organization? To answer that question, start by answering the following questions:

- How does your organization develop new products and services?
- What is the ratio of product or service failures to product or service successes in your organization?

Only about 60% of new products launched in all industries are a success and about 45% of resources allocated to developing and commercializing new products go into products that are killed or fail to provide adequate financial return. Companies gave the following reasons for the failure of new products (Robert G. Cooper, *Winning at New Products*, p. 25):

- inadequate market analysis: 24%
- product problems or defects: 16%

- lack of effective marketing effort: 14%
- higher costs than anticipated: 10%
- competitive strength or reaction: 9%
- poor timing of introduction: 8%
- technical or production problems: 6%

It's obvious that DFSS could help companies overcome many of the problems that cause new products to fail.

Chapter Highlights

Chapter 1 defines and explains Design for Six Sigma, examines its roots, and debunks some of the more influential myths that have developed around DFSS.

Chapter 2 is devoted to providing answers to the question, "Why do Design for Six Sigma?" It outlines the many advantages of applying Six Sigma principles and tools from the very start, to design products and services.

The core of DFSS is the subject of Chapter 3, which details the activities of each of the phases of this methodology, using as a model the PIDOV method (plan, identify, design, optimize, and verify). Although this method is the basis for our explanation of DFSS, what we say about it applies in general to the other versions, such as DMADV, DMADOV, DMCDOV, DCOV, DCCDI, DMEDI, and DMADIC. (Now you understand why we simplified by choosing only one method!)

Chapter 4 covers metrics, from general guidelines through standards, problems, and measurement to concepts and calculations—including the infamous "Six Sigma shift." It comes first after the basic introduction to DFSS because metrics constitute the scorecard for your DFSS projects: without the right metrics, you can't know how much progress you're making toward your goals.

Breaking away briefly from definitions, figures, phases, activities, and metrics, Chapter 5 gets to the heart of successful DFSS initiatives—the people. It lists the key players—executive leaders, champion, master black belt, black belts, green belts,

and team members—and outlines qualifications, training and preparation, and roles and responsibilities. It closes with advice on working with consultants and then a short bibliography on DFSS and related subjects.

Chapter 6 provides guidelines and tips for implementing DFSS, from practitioners and consultants. This chapter may be relatively short, but the contents are vital to the success of your efforts.

With the foundation formed by the first six chapters, you're ready to get into the tools used by DFSS project teams. Chapters 7 and 8 present the most important of these tools, to the extent possible within the scope of this book.

Finally, the book concludes by offering recommendations for sustaining your DFSS efforts, “keeping the capability” by building on your successes and spreading the initiative throughout your organization and beyond.

From start to finish, this book is dedicated to one proposition—helping you apply Design for Six Sigma to your products and services from the start, where it's easiest and least expensive to achieve the highest levels of quality and performance and the greatest profitability.

Special Features

The idea behind the books in the Briefcase Series is to give you practical information written in a friendly, person-to-person style. The chapters are relatively short, deal with tactical issues, and include lots of examples. They also feature numerous boxes designed to give you different types of specific information. Here's a description of the boxes you'll find in this book.



These boxes do just what they say: give you tips and tactics for being smart in planning for and implementing Design for Six Sigma tools and techniques.



These boxes provide warnings for where things could go wrong when you're learning about and implementing Six Sigma techniques.



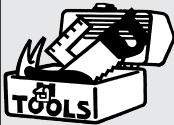
These boxes give you how-to hints for undertaking the tools and techniques of Design for Six Sigma.



Every subject has some special jargon and terms. These boxes provide definitions of these concepts.



It's always useful to have examples of what others have done, either well or not so well. Find these stories in these boxes.



This identifies boxes where you'll find specific procedures you can follow to take advantage of the book's advice.



How can you make sure you won't make a mistake when implement DFSS? You can't, but these boxes will give you practical advice on how to minimize the possibility.

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using this book to move your Six Sigma initiatives forward. We wish you good luck in your efforts.

About the Authors

Since 1994, **Greg Brue**, CEO of Six Sigma Consultants, Inc. and Master Black Belt, has implemented Six Sigma methodologies for some of the world's most recognized companies.

Greg trains Corporate Champions and mentors CEOs, senior executives, and company directors. A regular guest speaker at major business events and quality conferences, he also conducts Six Sigma seminars and monthly Executive Boot Camps. Greg supports numerous corporate Six Sigma implementations by maintaining direct contact with Black Belts, Master Black Belts, Champions, and senior managers.

Drawing on his considerable expertise, Greg developed the *Seven Principles of Problem-Solving Technology* to encapsulate and communicate the vision, purpose, and results of Six Sigma. As a result, he has been instrumental in changing the mindset and infrastructure at major corporations—empowering organizations to achieve significant measurable results. Experienced and expert Six Sigma practitioners, Greg and his team provide the corporate community with the vision, velocity and quantum gains required to decrease defects and increase profitability.

For more information about Six Sigma Consultants, visit www.sixsigmaco.com.

Bob Launsby is President of Launsby Consulting in Colorado Springs, Colorado. Since 1990, he has provided training and consulting in experimental design, problem solving, and Design For Six Sigma (DFSS). Clients include numerous large and small companies in the medical, automotive, computer and bio-medical community. He recently developed and launched Seagate's "DFSS for Marketing" seminar. Bob is the co-author of four books and developer of "DOE Wisdom" software. Visit his Web site at www.launsby.com.