

D.H. Stamatis

Advanced Quality Planning

**A Commonsense Guide
to AQP and APQP**



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A PRODUCTIVITY PRESS BOOK

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American companies realize that to regain their quality edge and dominance in the market place, they need to make fundamental changes in the way they operate. Recently, they have discovered the value of the systems approach to planning and the necessity to adopt quality as a business strategy. The goal is to produce products and services that continuously match customer needs.

Advanced Quality Planning: A Commonsense Guide to AQP and APQP is the first book dedicated to explaining with clarity and detail the total Advanced Quality Planning (AQP) process and how to set quality planning in the framework of a business strategy. The book provides a close look at the basic and advanced concepts of AQP so that both the novice and experienced user will be able to apply AQP appropriately and effectively. In addition, you will learn the "Big Three" automotive companies' required use of Advanced Product Quality Planning (APQP), a specialized version of AQP that emphasizes the product orientation of quality. A clear itemized list of Chrysler, GM, Ford, and Tier I suppliers' requirements is included, which reveals exactly what they would like to see implemented in their suppliers' processes.

Written in a practical format, the book takes you step-by-step through the advanced quality planning methodology, providing you with an overview and discussion of the role of teams in AQP, and its key components including: scheduling, creating a product definition, prototype development, manufacturing preparedness, analytical techniques, documentation, reliability and maintainability, and their implementation. Also included are checklists to help plan the actions that will be appropriate for their respective projects, and appendixes containing a sample business plan and a case study of Chrysler's Process Sign-Off, which demonstrates the results of an effective AQP implementation.

This book is recommended for the program manager who is responsible for selecting the proper quality tools and management techniques necessary to fulfill the quality planning strategy.

D.H. Stamatis, Ph.D., is president of Contemporary Consultants, which specializes in quality issues including standards, management, and deployment. He is an adjunct faculty member at Central Michigan State University and has authored numerous books, including *Documenting and Auditing for ISO 9000 and QS-9000* (Irwin, 1996).



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To Tim and Stephen

Acknowledgments

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I thank my clients, who helped me articulate some of the concepts and concerns about advanced quality planning (AQP, or APQP in the automotive sector). Because of them, I learned the reality of APQP. Special thanks are reserved for the Ford Motor Company—the ACD (now Visteon) and the Vehicle Operations divisions—for allowing me the opportunity to do their training. In the process, I have learned to appreciate their focus and methodology, and to understand why APQP is an indispensable tool in the quality process. I also thank Mr. W. McCarthy for his valuable contribution to the entire project and especially for the business plan.

Finally, I acknowledge all my seminar participants—over the years—for their suggestions and insights into the APQP process. I have learned a lot from them and hope that, in writing about APQP, I have done justice to their suggestions.

Preface

Once undisputed leaders in the world, American companies' command of markets has eroded. To be sure, though macro-economic factors like the exchange rate and trade policies have harmed our ability to compete, the competitive problems were chiefly the result of ineffective management practices. Among these problems, the lack of planning is the predominant factor in losing the quality edge to foreign markets.

American companies are fighting back. They are addressing all sorts of ways to improve products, services, and return on investment. Some of the more specific items include:

- More focus on quality and customer satisfaction
- Increased numbers of people involved in quality improvement
- Greater teamwork
- Greater positive coverage in newspapers and magazines
- Introduction of international standards (ISO 9000)
- Industry-specific standards (QS-9000, AS9000)
- The Malcolm Baldrige National Quality Award
- Intensified training and education
- Use of statistical methods for quality improvement
- Planning for quality

The results from these changes have been well documented over the past several years. However, these changes have been somewhat disjointed and the competitive position of many of our organizations has not improved substantially. There is now a much greater awareness of the urgency for fundamental change in the way that organizations operate, as well as a recognition that prevention is better than appraisal systems. One realization made by many organizations is the value of the systems approach to planning, specifically as follows:

The necessary fundamental change is that quality must be adopted as a business strategy. This strategy is applicable to all types of organizations including manufacturing and service companies, schools, hospitals, and government agencies. The aim of this strategy is to enable the organization to produce products and services that will be in demand, and to provide a place where people can enjoy their work and take pride in its outcomes.

Quality planning, then becomes the means to accomplish the goals and objectives of the organization, such as increased profits or share of the market, growth, better educated citizens, a cleaner environment, lower costs, higher productivity, or increased return on investment. Deming (1986, p. 3) refers to this as the quality chain reaction. Traditionally, increased quality has been thought to come only at the expense of lower productivity and higher cost. This misconception is a result, in part, of trying to improve quality by inspection or solving problems, rather than by improving products and processes.

If quality is to become a business strategy, top organizational managers must understand quality as a planning strategy and provide leadership for carrying out this strategy. Some important attributes of the planning strategy include:

- Providing methods to reach the goals of the organization
- Sustainable over the long-term
- Balancing internal and external focus

- Compatibility among different businesses in the organization
- Remaining useful despite changes in the marketplace
- Understandable to and supported by all members of the organization

It has been said many times and in many ways that the difference between planning and not planning may be demonstrated by the “bottom line” of an organization. The difference, of course, is in the attitude and perseverance of the involved individuals. It is a matter of a winning and successful attitude in everything we do. From an advanced quality planning perspective, the “right” attitude may be articulated as illustrated below.

A Winner

says, *Let's find out*

says, *I was wrong*, when
makes a mistake

goes through a problem
makes commitments

listens

explains

says, *There should be a*
better way to do it

paces herself

focuses on advanced
planning

A Loser

says, *Nobody knows*

says, *It wasn't my fault*,
when makes a mistake

goes around it, and never gets past it
makes promises

waits until it is their turn to talk

defends or explains away

says, *That is the way it's*
always been done

has only two speeds—
hysterical and lethargic

focuses on appraisals

The purpose of this book is to set quality planning in the framework of a strategy, using three basic elements:

1. The foundation of the strategy
2. The organization as a system
3. The methods to insure that changes result in the improvement of quality

This book is recommended reading for anyone interested in quality planning.

AUTOMOTIVE APQP

Quality planning is fundamental to the competitiveness of the automotive industry. Applied appropriately, it enhances suppliers' ability to develop and produce products and systems that satisfy their customers. Quality planning in the automotive industry is based on the principles and requirements outlined in the *Advanced Product Quality Planning and Control Plan Reference Manual*, as appropriate to the product or system being supplied to the customer.

Some of the key ingredients of automotive APQP are the following:

SPECIAL CHARACTERISTICS. Cross-functional teams, including the customer where required, identify and agree to product and/or system characteristics during the preparation of FMEAs and Control Plans. Process controls are established for all special characteristics.

FEASIBILITY REVIEWS. Manufacturing feasibility of proposed products and/or systems prior to contracting to produce those products and/or systems. Feasibility studies are documented appropriately.

FAILURE MODE AND EFFECTS ANALYSIS. (Design and Process FMEAs). Efforts to incorporate FMEAs in both design and manufacturing processes to achieve defect prevention rather than defect detection is of major interest. Customer required FMEA approval requirements are met prior to production part approval, as required by the customer. Process FMEAs consider all special characteristics.

CONTROL PLANS. Control plans at the system, subsystem, component, and/or material level, as appropriate, for the products supplied to our customers are required as part of the process control. Control plans are approved by the appropriate customer engineering and/or quality activity unless this approval requirement is waived by the customer. The control plans cover three distinct phases, as appropriate.

- Prototype
- Prelaunch
- Production

In addition, control plans are reviewed and updated as appropriate when any of the following occur:

- The product has changed
- The processes are changed
- The processes become unstable
- The processes become noncapable

