

USING QFD TO ASSURE QS-9000 COMPLIANCE

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Abstract

International trade and commerce is under tremendous pressure to improve quality and customer satisfaction regardless of where the product is made or where it is sold. In the past ten years, various standards and quality systems have arisen to improve the products and services in our lives. However, it is widely known that many organizations, once receiving their certification, find it more difficult to maintain such intense levels of activities throughout all levels and across all divisions. This paper will show how QFD can be used to deploy the responsibilities and measurements of quality to all operational activities in order to assure long term compliance.

Introduction

The global introduction of the ISO 9000 series in 1987 coincided with the signing into law of the Malcolm Baldrige National Quality Award (MBNQA) in the United States. The former, developed in Europe to promote the commonization of industrial standards across the national borders of the emerging European Union focused on the documentation of business and manufacturing processes so that companies could be independently certified that they “said what they did and did what they said.” The MBNQA focused on “understanding the requirements for performance excellence and competitive improvement.”¹

¹ *Malcolm Baldrige National Quality Award 1998 Criteria for Performance Excellence*, p.1

The U.S. Automotive Big 3 (General Motors, Ford Motor Company, and Chrysler Corporation) had begun evaluating supplier quality in 1964 using Military Standards dating back to World War II. With the promulgation of the ISO 9000 and the MBNQA adding increasing documentation burdens to component suppliers, the Big 3 began a movement to create a single automotive quality system standard. Based on the ISO 9001, additional requirements were added that were deemed necessary for the automotive industry, namely Production Part Approval Process, Advanced Product Quality Planning and Control Plan, Potential Failure Mode and Effects Analysis, Measurement System Analysis, and Fundamental SPC. Additional company specific requirements were also added.

These were called the QS-9000 and attempted to combine the best of the quality systems used world wide. For example, Section 4.4.2, Design and Development Planning, specifically calls out Quality Function Deployment as a “supplier design activity [which] should be qualified in.”² The ISO 9000, however, does not incorporate QFD instead focusing only on the product development process as a system. Akao et al, in the papers cited in the references, has proposed a method for incorporating QFD into ISO 9000 system itself in order to directly assure product quality. This method, of course, is applicable to QS-9000. The purpose of this paper, however, is not to discuss how QFD fits into QS-9000 certification, but how QFD can be used to assure that all QS-9000 requirements are met throughout all the business processes of the organization.

QFD for Business Process

QFD, as created by Professors Akao and Mizuno in the 1960s, consisted of two components. The first component focused on improving the quality of new products by translating customer needs into design characteristics and systematically deploying these to manufacturing and production. One of the main tools of QFD for Products is the matrix, the best known being the House of Quality. Akao carefully referred to this as Quality Deployment (QD), but in their zeal to adopt and implement QFD, most Americans in the auto industry and eventually most non-Japanese in nearly every industry, failed to differentiate between QD and QFD. It is QD that is called out in the QS-9000. As a result, the second component of QFD has all but been lost outside of Akao’s native Japan.

The second component of QFD is what is being offered here as a way to assure company-wide compliance with the QS-9000, or with ISO 9000, ISO 14000, or any other standard, for that matter. The second component of QFD focuses on the business processes of the organization, assuring that all operations, function, and tasks done by people are done in such a manner as to assure quality. Akao and Mizuno called this “narrow definition QFD,” with the operative “F” referring to using the techniques of value engineering and function analysis to systematize and improve the business and operational functions of the organization. Such functions include, but are not limited to, planning, design, prototyping, manufacturing, and service. In the research on the ISO 9000 done by Akao, et. al., Akao explained that the combination of QD and narrow definition QFD into “broad definition QFD” was necessary for sustained product and process improvement. While narrow and broad are one way to differentiate the scope of these

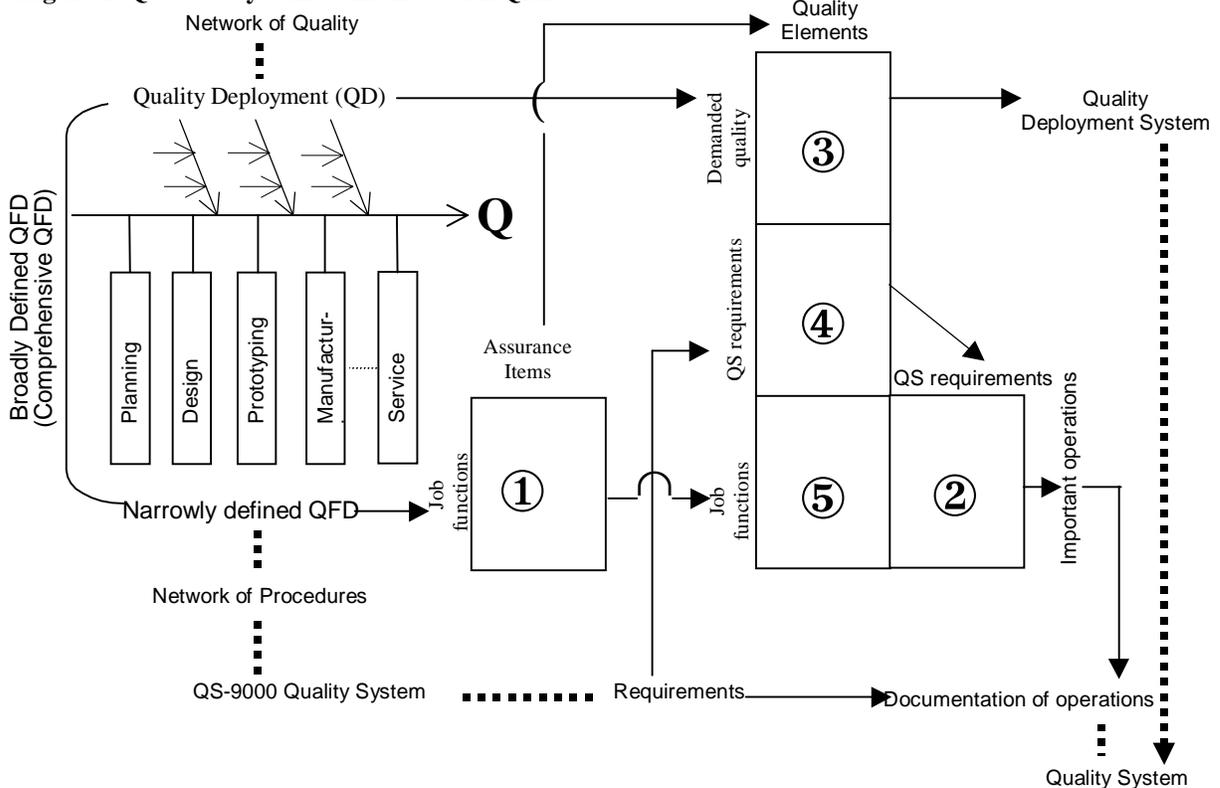
² *Quality System Requirements: QS-9000*. Second Edition (1995). Automotive Industry Action Group. P. 16.

methods, their quality girth is not easily understood by the non-QFD specialist. Members of the QFD Institute have coined more generic terms that are easily understood by QFD beginners. Table 1 translates Akao's technical QFD jargon into generic terms. The left side of Figure 1 shows how these fit together.

Table 1. QFD Naming Systems.

Focus	QFD Jargon	Generic
Understand customer needs and translate into product features, and assure throughout manufacturing and production.	Quality Deployment	Product Focused QFD
Assure that all organizational functions properly understand and execute their job tasks in accordance with established standards.	Narrow Definition QFD	Process Focused QFD
Combination of the above two.	Broad Definition QFD	Comprehensive QFD.

Figure 1. QS-9000 System Combined with QFD.



Many approaches have been used to assure the quality of activities of business processes, particularly the creation, compliance, revision, maintenance of industry or government standards. The QFD Research Committee of Union of Japanese Scientists and Engineers (JUSE) reports much creative research done by

its Subcommittee for Development Control and Engineering. One unusual attempt includes the “Tables and Tables” that was invented and used by Florida Power and Light Co. in America.

In this paper, the authors propose, from the standpoint of the QS-9000 Quality System, an approach for building a true quality system that ensures the final product quality through combined use of the QS-9000 and QFD. Presented here is a system of understanding how the specific jobs we do everyday in the automotive business interact with and assure customer satisfaction, design quality, and compliance with QS-9000. The results are a way to confirm that each person in the organization understands how to do their job in such a way that a quality product is assured.

QS-9000 and Process Focus Quality Function Deployment

In order to create documentation of operations (such as quality manual, internal regulations, procedures, records, etc.) that QS-9000 emphasizes, first the operational functions must be clearly identified. Operational function deployment does just that. As shown in Matrix ①, Operational Functions determined through Process Focus QFD are deployed into Assurance Items that describe the purpose of each function.

Matrix ② shows which Operational Functions support the QS-9000 requirements. This both clarifies that there are specific organizational activities for each QS-9000 requirement, and also prioritizes Operational Functions according to how frequently and how strongly they relate to the QS-9000 requirements.

Matrix ③ is the House of Quality from Product Focus QFD that translates customer needs (demanded quality) into design quality characteristics.

Matrix ④ clarifies which QS-9000 requirements relate to assuring that the quality characteristics will be met.

Matrix ⑤ clarifies which Operational Functions are associated with assuring that the quality characteristics will be met.

The relationships between these different components can be augmented by prioritizing them based on customer need priorities determined in the Product Focus QFD and then cascading these priorities from matrix to matrix.

Finally, operations can be documented using standard operating procedures, QC Process Sheets, etc. A detailed case study is presented in the Bibliography.

Conclusion

QFD, because it examines both the product and the process by which the product is designed, can be a powerful ally in obtaining and maintaining QS-9000 certification. This series of linked matrices allows us

to see the QS-9000 requirements from more than just the perspective of a standard. QFD allows us to see how the standards are needed to assure that every individual in every job function plays a vital role in understanding what the customer wants, how to design and build it, and finally how to continue to provide outstanding after service.

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