AUTOMOTIVE PROCESS AUDITS

Preparations and Tools

D. H. Stamatis

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Practical Quality of the Future: What It Takes to Be Best in Class (BIC)

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To all those who dedicate themselves to improve the quality culture *of an organization through process auditing*

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Preface

The field of quality as time progresses demands "more" quality in all areas of design, manufacturing, and service. This means nonconformances must be removed from the delivered part or service from the supplier base to the customer. The aim is to ever-satisfy the customer.

Over the years, the determination of "quality" has taken many roads, such as visual inspection, MIL-STDS, industrial standards, individual organizational standards, and since the late 1980s international standards. It seems that the international standards are being accepted by many worldwide organizations and are known as the ISO standards published by the International Standards Organization, based in Zurich, Switzerland.

The international standards known as the ISO 9001, ISO 14001, ISO 18001, or ISO 45001 series (and many others for different areas) offer a basic system of quality, environment, or occupational, health, and safety opportunities to build that quality, environment, and safety throughout "a" given organization. In fact, the standards have become the blocks of quality by which "a given" organization can achieve total quality management (TQM) and world-class quality. The standards offer a common foundation for all to work from and at the same time allow for individuality. In fact, these standards have accelerated the use of old methodologies and new methodologies in identifying, controlling, and in some cases eliminating nonconformances. Some of these are the classical seven tools of quality, statistical process control (SPC), Six Sigma, advanced statistical analyses, and auditing.

However, because the standards are for all intents and purposes generic in nature, many industries and organizations have developed their own. Typical standards that fall in this category are the IATF 16949 for the automotive industry and Q1 specifically for Ford Motor Co. There are many more for other industries as well.

This book is about how to validate the prescribed "quality" called out in the Quality Manual (if it exists), procedures, instructions, and standards (whether international, industrial, or organizational). It addresses the structure and the requirements of acceptable documentation for a successful validation of a given organization's quality. It discusses a detailed approach to fulfilling the requirements of the documentation process to the international standards as well as some of the automotive industry and specific requirements of the three largest car companies. These are emphasized by explaining the role of the auditee and auditor.

As such, the book has two basic objectives. The first objective is to provide a reference and a manual for the generalist who deals with documentation. As a result, the target audience is anyone who is interested in or involved with documenting quality issues. The second objective is to explain the methods and tools of the auditing process to help an organization gain and maintain the certification. Thus, the target audience is the individual(s) in any organization who is responsible for the implementation of standards or requirements to "fulfill" customer "requirements, wants, and expectations."

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As any endeavor in life, it takes more than one person to complete a task. The task for writing this book is no different. I have consulted, interviewed, and have had discussions with many professionals in the auditing industry, and I am indebted to so many for their contribution. Without their shared information, without their enthusiasm and prodding me to finish, this work would not have been completed.

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Introduction

Everyone wants excellent product and/or service. However, the way we define excellence is problematic since not everyone has the same definition. For our purposes, excellence in quality is defined by the customer. As such, organizations find themselves in a predicament that forces them to have some sort of standardization.

For the majority of quality issues, concerns, and problems that are encountered in many industries, we have some sort of standardization. However, this standardization is found in the international (ISO) and industry standards (IATF 16949), but it is not 100% accountable for all idiosyncrasies of many organization. This brings us to the customer-specific requirements. Each organization has its own variation of a particular characteristic of quality, and they publish them accordingly.

In the automotive industry, all three standards/requirements/specifications (ISO, IATF, individual specifications) are needed to do business with the OEMs (FCA, GM, Ford, etc.). To be sure, standardization has been instrumental in total improvement especially in our fast-paced movement towards zero defects and 100% customer satisfaction. Standardization has helped organizations to

- Define a quality system that is appropriate and applicable to a given organization
- Demonstrate the organization's (management's) commitment to a management system that maintains quality to their customers
- Compete in international markets
- Follow standard safety and product liability regulation and procedures
- Reduce cost and provide a practical results-oriented target(s)
- Help themselves maintain quality improvement gains
- Minimize supplier surveillance – through second-party audits
- Provide a platform from which to launch a continual improvement program such as total quality management (TQM) or some other program (Shingo, Malcolm Baldrige, etc.).
- Involve ALL employees by stimulating understanding of quality systems and their effect on the organization and its customers.

To help us identify "gaps" between what *we want* and what *we get*, we use audits to evaluate our system and to introduce remedies that will either close the gap or eliminate it completely. Audits however, if they are to be conducted with the seriousness they deserve, are time-consuming and costly. Therefore, all audits, without exception, require preparation. This preparation entails planning. This means having knowledge of the process being audited (training), knowledge of what is expected as an outcome and how to do the actual audit planning.

To facilitate these prerequisites, a checklist is strongly recommended. It is a path (map) of what, where, how, and why things are completed in a particular way, and it guides (facilitates) the flow of information to document whether or not all the requirements are being fulfilled. If not, you pursue deeper and find out what is missing, why

is missing, and what can you do about it. In some cases, a checklist is a way to make sure you do not forget significant questions but more importantly will help the auditor to identify "trails" that were not originally thought of.

In this book, we provide the reader with an overall review of the standards and several possible checklists that can help in the process of auditing. We have included sample checklist for the ISO standards, industry standards, and customer-specific standards. We are aware that in all cases, predefined checklists have been published by all the entities involved; however, for many suppliers, these documents may be difficult to obtain and/or there are many suppliers which on their own want to improve through audits. This book hopefully will help in pursuing continual improvement. Specifically, the book covers the following:

Chapter 1: Introduction to international quality standards: It provides an overview of the standards and their requirements.
Chapter 2: Introduction to industry quality standards: It provides an overview of the automotive industry standards and their requirements.
Chapter 3: Introduction to customer-specific requirements: It provides an overview and discussion of the organizational standards for Ford's, Fiat-Chrysler's, and General Motors' specific requirements.
Chapter 4: Documentation: It discusses the documentation process and the requirements.
Chapter 5: Checklist: It provides a rationale and several examples of checklists for the ISO standards, IATF, and customer-specific requirements.

1 Introduction to International Quality Standards

OVERVIEW

ISO is an independent, non-governmental international organization with a membership of 164 national standards bodies. Its origin began in 1926 as the International Federation of the National Standardizing Associations (ISA). This organization focused heavily on mechanical engineering. It was disbanded in 1942 during the Second World War but was re-organized in October 1946 with delegates from 25 countries under the name of United Nations Standards Coordinating Committee (UNSCC) with a proposal to form a new global standards body. The new organization officially began operations in February 1947, having the central secretariat at Geneva, Switzerland. The main roles and responsibilities of ISO are just to draft and publish standards (https://www.iso.org/standards.html. Retrieved on January 10, 2020).

As useful as the ISO standards are, there is a confusion about its name. Contrary to public usage and knowledge, ISO IS NOT an acronym. Rather, it is the Greek word ἴσος, meaning "equal." This was selected purposely since if they had chosen the name of the country, there would have been different acronyms as the words would have been different. For example, the name of the organization in French is *Organisation internationale de normalisation* and, in Russian, Международная организация по стандартизации (*Mezhdunarodnaya organizatsiya po standartizatsii*). One can appreciate the ISO selection as the official name for its clarity, simplicity, and ease of usage worldwide. In the words of the ISO organization, we read the explanation thusly: "Because 'International Organization for Standardization' would have different acronyms in different languages (IOS in English, OIN in French), our founders decided to give it the short form *ISO*. *ISO* is derived from the Greek *isos*, meaning equal. Whatever the country, whatever the language, the short form of our name is always *ISO*." As such both the name *ISO* and the ISO logo are registered trademarks, and their use is restricted (about us: https://www.iso.org/standards.html. Retrieved on January 10, 2020).

Through its members, it brings together experts to share knowledge and develop voluntary, consensus-based, market-relevant international standards that support innovation and provide solutions to global challenges.

International standards make things work. They give world-class specifications for products, services, and systems, to ensure quality, safety, and efficiency. They are

instrumental in facilitating international trade through standardization. As of July 2019, the ISO has published 22,933 standards and related documents, covering almost every industry, from technology, to food safety, to agriculture and healthcare. ISO international standards impact everyone, everywhere. Even though the standards have been translated in many languages, there are three official languages: English (with Oxford spelling), French, and Russian (https://www.iso.org/standards.html. Retrieved on January 10, 2020).

The most popular of the standards are the 9000 (quality), 14000 (environmental), and 45000 (occupational, health, and safety) series. All of them are reviewed every 5 years and revised as necessary. All of them are audited for conformance and/or compliance depending on the standard. Other standards also cover day-to-day activities that affect us all, including cinematography, shoes sizes, thermal insulation, and textiles.

The breakdown of the count of ISOs produced thus far are

- International Standard = 20,038
- Technical Report = 849
- Technical Specifications = 559
- Guide = 40
- Publicly Available Specifications = 28
- International Standardized Profile = 13
- International Workshop Agreement = 11
- Technology Trends Assessment = 5
- Recommendation = 1.

In this book, we will focus only on the three major ISO standards that deal with quality primarily in the automotive industry. We believe that these standards, when used appropriately, help the organization that uses them in creating products and services that are safe, reliable, and of good quality. The standards help businesses increase productivity while minimizing errors and waste. By enabling products from different markets to be directly compared, they facilitate companies in entering new markets and assist in the development of global trade on a fair basis. The standards also serve to safeguard consumers and the end-users of products and services, ensuring that certified products conform to the minimum standards set internationally (https://www.iso.org/standards.html. Retrieved on January 10, 2020).

When one discusses quality in any form, invariably the topic will be something like: But what standards are being followed? Or what quality management standards (QMS) the organization operates under?

To answer these fundamental questions, let us examine them in a very cursory form. First, the issue of QMS and then the practical meaning of "quality standards" in very general terms. So, a quality management standard establishes a skeleton for how an organization manages its key activities in a given enterprise. This, of course, is an agreement within the organization that provides the "way" of doing something, either making a product, managing a process, or delivering a service. On the other hand, a quality standard is a detail document detailing the requirements,

specifications, guidelines, and characteristics that products, services, and processes should consistently meet in order to ensure specific characteristics such as

- Their quality matches expectations.
- They are fit for purpose.
- They meet the needs of their customers and ultimate users.
- Some form of standards is an essential element of any QMS.

Therefore, one may come to a conclusion that the purpose of quality management standards is simply a way for businesses to satisfy their customers' quality requirements and for a range of other reasons, such as

- Ensuring safety and reliability of their products and services
- Complying with regulations, often at a lower cost
- Defining and controlling internal processes
- Meeting environmental objectives
- Meeting customer's needs and expectations.

When an organization is "truly" committed to following quality management standards, they are often more likely to

- Increase their profits
- Reduce losses or costs across the business (through less rejects and rework)
- Improve their competitiveness
- Gain market access across the world
- Increase consumer loyalty (due to consistent quality).

The international standards are one way to demonstrate commitment to quality and validate that quality with audits to a given organization. To be sure, ALL international standards fall under the control of the International Organization for Standardization (ISO), which is based in Zurich, Switzerland. In this book, we will address ONLY some of the common ones that deal with quality, environment, occupational hazards and safety as well as the automotive standard known as the IATF 16949 and three customer requirements from Ford Motor Company, General Motors, and Fiat Chrysler Automotive.

ISO 9001

General Comments

This standard is considered to be the basic generic quality standard for ALL organizations that are interested in quality. Over the years, it has been revised several times, and the current one is the ISO 9000:2015 series which provides the structure for the entire standard. However, the certifiable standard is the ISO 9001:2015 which covers the seven specific principles of any QMS. They are

1. *Customer focus*: The primary focus of quality management is to meet customer requirements and to strive to exceed customer expectations.
2. *Leadership*: Leaders at all levels establish unity of purpose and direction and create conditions in which people are engaged in achieving the quality objectives of the organization.
3. *Engagement of people*: It is essential for the organization that all people are competent, empowered, and engaged in delivering value. Competent, empowered, and engaged people throughout the organization enhance its capability to create value.
4. *Process approach*: Consistent and predictable results are achieved more effectively and efficiently when activities are understood and managed as interrelated processes that function as a coherent system.
5. *Improvement*: Successful organizations have an ongoing focus on improvement.
6. *Evidence-based decision-making*: Decisions based on the analysis and evaluation of data and information are more likely to produce desired results.
7. *Relationship management*: For sustained success, organizations manage their relationships with interested parties, such as suppliers.

The key changes from previous revisions to the new ISO 9001:2015 which must be addressed in any audit dealing with this standard are as follows:

1. There is no requirement for a quality manual (however, highly recommended).
2. Its emphasis on organizational context and risk-based thinking is of paramount importance.
3. There is no requirement for the management representative. Now the leadership clause is more inclusive for the top management.
4. The standard does not include a specific clause for "Preventive Actions." Now preventive actions are sprinkled in the entire standard.
5. The terms "document" and "records" have been replaced with the term "documented information." Documented procedure in ISO 9001:2008 has been replaced by maintained documented information, and documented record in ISO 9001:2008 has been replaced by retained documented information. However, for all intents and purposes, the requirements are the same as before. The names have changed.
6. In 2008 version of the standard, the term "product" was used. Now it is more inclusive and covers both *Produc*t and *Services*.
7. The term "continual improvement" has been enriched with the addition of the term "improvement."
8. Outsourcing is now an external provider. The term "purchased product" has been replaced with "externally provided products and services." The term "supplier" has been replaced with "external provider." Control of external provision of goods and services addresses all forms of external provisions.
9. The new standard does not make any reference to the exclusions which was only for clause 7 in ISO 9001:2008. However, in ISO 9001:2015 after proper

justification any of the requirement of this international standards may not be included in the scope, provided that it does not affect the organization's ability or responsibility to ensure the conformity of its product and services and the enhancement of customer satisfaction.

10. The term "work environment" now is replaced with "environment for the operation of processes."

Among the many benefits of this generic quality standard are as follows:

- There is an increase in customer value.
- There is an increase in customer satisfaction.
- There is an improvement in customer loyalty.
- There is noticeable enhancement in repeat business.
- There is an increase in the reputation of the organization.
- There is an expansion of the customer base.
- There is an increase in revenue and market share.
- There is an increase in the effectiveness and efficiency in meeting the organization's quality objectives.
- There is better coordination of the organization's processes.
- There is an improvement in communication between levels and functions of the organization.
- There is a propensity to develop and improve the capability of the organization and its people to deliver the desired results.
- There is an improvement in understanding of the organization's quality objectives by people in the organization and increased motivation to achieve them.
- There is an increase in involvement of people in improvement activities.
- There is an increase in personal development, initiatives, and creativity.
- There is an increase in people's satisfaction.
- There is an increase in trust and collaboration throughout the organization.
- There is an increase in attention to shared values and culture throughout the organization.
- There is an increase in the ability to focus effort on key processes and opportunities for improvement.
- There are consistent and predictable outcomes through a system of aligned processes.
- There is an increase and willingness to optimize performance through effective process management, efficient use of resources, and reduced cross-functional barriers.
- There is a willingness to enable the organization's leadership to provide confidence to interested parties related to its consistency, effectiveness, and efficiency.
- There is improved process performance, organizational capability, and customer satisfaction.
- There is an enhanced focus on root cause investigation and determination, followed by prevention and corrective actions.

- There is an enhanced ability to anticipate and react to internal and external risks and opportunities.
- There is enhanced consideration of both incremental and breakthrough improvement;
- There is improved use of learning for improvement. There is an enhanced drive for innovation.
- There is an improvement in decision-making processes.
- There is an improvement in the assessment of process performance and ability to achieve objectives.
- There is an improvement in operational effectiveness and efficiency.
- There is an increased ability to review, challenge, and change opinions and decisions;
- There is an increased ability to demonstrate the effectiveness of past decisions.
- There is enhanced performance of the organization and its relevant interested parties through responding to the opportunities and constraints related to each interested party.
- There is a common understanding of objectives and values among interested parties.
- There is an increased capability to create value for interested parties by sharing resources and competence and managing quality-related risks.
- There is a well-managed supply chain that provides a stable flow of products and services.

The actions that one may take to conform to validate these requirements and benefit from them are many. However, these are some essentials that both the auditee and auditors must – at least – consider to incorporate into their checklist to pursue and validate the QMS.

- It must identify and recognize the direct and indirect customer of the organization who receive value from the organization.
- It must understand customers' current and future needs and expectations.
- It must link the organization to its objectives, to customer needs and expectations.
- It must communicate customer needs and expectations throughout the organization.
- It must plan, design, develop, produce, deliver, and support products and services to meet customer needs and expectations.
- It must measure and monitor customer satisfaction and take appropriate actions.
- It must determine and take action on relevant interested parties' needs and appropriate expectations that can affect customer satisfaction.
- It must actively manage relationships with customers to achieve sustained success.

- It must communicate the organization's mission, vision, strategy, policies, and processes throughout the organization.
- It must create and sustain shared values, fairness, and ethical models for behavior at all levels of the organization.
- It must establish a culture of trust and integrity.
- It must encourage an organization-wide commitment to quality.
- It must ensure that leaders at all levels are positive examples to people in the organization.
- It must provide people with the required resources, training, and authority to act with accountability
- It must inspire, encourage, and recognize the contribution of people.
- It must communicate with people to promote understanding of the importance of their individual contribution.
- It must promote collaboration throughout the organization.
- It must facilitate open discussion and sharing of knowledge and experience.
- It must empower people to determine constraints to performance and to take initiatives without fear.
- It must recognize and acknowledge people's contribution, learning, and improvement.
- It must enable self-evaluation of performance against personal objectives.
- It must conduct surveys to assess people's satisfaction, communicate the results, and take appropriate actions.
- It must define the objectives of the system and processes necessary to achieve them.
- It must establish authority, responsibility, and accountability for managing processes.
- It must understand the organization's capabilities and determine resource constraints prior to action.
- It must determine process interdependencies and analyze the effect of modifications to individual processes on the system as a whole.
- It must manage processes and their interrelations as a system to achieve the organization's quality objectives effectively and efficiently.
- It must ensure the necessary information is available to operate and improve the processes and to monitor, analyze, and evaluate the performance of the overall system.
- It must manage risks which can affect outputs of the processes and overall outcomes of the QMS.
- It must determine, measure, and monitor key indicators to demonstrate the organization's performance.
- It must make all data needed available to the relevant people.
- It must ensure that data and information are sufficiently accurate, reliable, and secure.
- It must analyze and evaluate data and information using suitable methods.
- It must ensure people are competent to analyze and evaluate data as needed.