Why Should I Upgrade My Quality Management System to Comply with IATF16949?

Everyone is aware of the tragic events of April 14, 1912. This is the night that the White Star Line's "unsinkable" ship Titanic struck an iceberg and sank, taking more than 1500 souls to a premature watery grave. For years the belief was that the iceberg tore a long gash through the ship's hull causing it to take on water and sink. After the wreck was "discovered" in September of 1985, multiple investigative explorations would follow. On several of these, researchers sought to determine how the ship sank. To their surprise no gash was found, but they did locate multiple vertical openings of the hull plates in the area believed to have impacted the iceberg.

Now this is a very interesting mystery, but what does it have to do with modern day industrial Quality Management Systems (QMS)? To cut to the chase, scientists at the US National Institute of Standards and Technology (NIST) probed this mystery and came away with a very compelling theory. Lead researcher, Timothy Foecke, discovered that the wrought iron rivets used to attach the bow and aft hull plates were substandard. He discovered that many of these rivets contained high amounts of slag, entrapped exogenous inclusions that weaken the strength and metallurgical toughness of the iron. A simple interpretation, the parts were weak and not capable of performing at the level they were expected to. Foecke theorized that when the ship struck the iceberg, the impact forces were such that they caused the rivet heads to separate, opening the hull plates allowing water to flood into the Titanic and cause her to sink.

At this point you may still be asking about how this has anything to do with a quality system. As part of his project Foecke engaged a social scientist/historian, Jennifer McCarty, to investigate if there was any explanation for these substandard parts. Remarkably, records from Titanic's Irish ship builder Harlan and Wolfe divulged that they had experienced significant wrought iron rivet shortages during the period they were building the Titanic. To address this problem, they made two fateful decisions. First, they declared that the rivets could be produced from Number 3 "Best Quality" bar instead of the traditional Number 4 "Best-Best Quality" bar. Secondly, they increased their supply base by opening their doors to multiple small and unknown forges. It is highly likely that one or more of these new, but not really vetted suppliers produced rivets that were substandard and incapable of holding up to the rigors experienced during the collision.

Today, these cavalier manufacturing practices would simply not be allowed for any organization that claimed to abide by a modern-day, registered QMS. Had Haran and Wolfe had a robust QMS, like ISO 9001 or IATF 16949, it is possible that the wrought iron rivets would have been stronger and maybe resulted in fewer or no hull plates separating. For this reason, this makes the Titanic a compelling example of why a QMS is so crucial to today's manufacturing businesses.

So, what is a Quality Management System (QMS)? It is a little unfortunate that the first word in the title is "Quality". This is not because it is wrong, quite the contrary these systems are all about making good quality parts. In my opinion the problem this instills is that many read the word "quality" and immediately think it is a program that belongs only to the "Quality Department". Nothing could be more wrong because a company's QMS is simply about the way a company goes about their business. As such, every company has a QMS. Not every company, however, has a registered QMS to an industry standard such as ISO9001 or IATF 16949. In fact, the subject of this article, IATF16949, is an automotive industry specific QMS that adds an additional 277 requirements above the 135 contained in ISO 9001. **Therefore, IATF16949, like its foundation, ISO 9001, is a standard that dictates the minimum system requirements that a company should have in-place to receive recognition and certification.**

Unless a customer requires it (and some do), companies do not need to be certified, but those that do achieve registration are easily recognized by potential and current customers as a step above those not registered.

Now that we understand that IATF 16949 is a standard which sets forth some minimum capabilities and requirements to achieve registration, what is its fundamental underlying philosophy? For the last century or more, the traditional way of thinking about quality is that "parts are fine as long as they stay within a defined set of limits." Another way of saying this is that parts are good if they are "in specification. To gauge this, we must thoroughly investigate finish parts to "detect" when one is bad. In many industries this may actually be a suitable strategy, but it does create challenges for high volume producing industries like fasteners. There are simply too many parts to be able to inspect them all. Therefore, we must consider a better way. Starting in about the 1950s, Japanese manufacturers began using novel manufacturing techniques. Their techniques involve collecting data to control the process. The fundamental reasoning was best articulated by the Japanese Quality Specialist, Taguchi. Taguchi developed what would become known as the "Taguchi Loss Function". In essence it says that a customer becomes less satisfied with a product as it begins to stray from its ideal condition. In other words, a part could be "in specification" but still fails to satisfy the customer. The only way to produce good parts, therefore, is to understand the process. This philosophy can best be summed up as, "good process equals good parts." To adopt this philosophy manufacturers must have tools that allow them to understand what kind of parts are being produced from their process and once the targeted ideal condition is dialed in to have tools to monitor the process and notify operators that it is getting off-track. The new QMS systems , such as ISO9001, IATF16949, and AS9100 are all fundamentally based on this process control philosophy.

IATF 16949 started as QS9000 about 1997. From its beginning it was a derivative of ISO9000 based standards for automotive industry suppliers. It came about because the US's "Big Three" automotive OEMS wanted to be able to eliminate their individual, and often cumbersome, Quality System requirements and replace them with one universal set of standards that could be utilized by all suppliers across the industry. After several years it was absorbed by an ISO Committee and became ISO/TS 16949. The standard was once again revised in 2016 to become the current IATF 16949 standard. Although ISO 9001 and its derivatives have always been closely linked with the automotive supplement, one of the big updates for IATF 16949 was to completely align it in structure and layout to ISO 9001. This update served to make it obvious that the two are linked together, with the IATF 16949 supplementing ISO 9001. In fact, any company that receives an IATF 16949 registration will also receive an ISO 9001 registration.

The original QS9000 had 20 different parts or topics that it addressed. This was reduced to 8 parts when QS9000 evolved into ISO/TS16949. However, in 2015 ISO 9001 was updated to have 10 parts. Therefore, IATF 16949 was updated to also have ten parts. These are:

0. Introduction
1. Scope
2. Normative References
3. Terms and Definitions
4. Context of the Organization
5. Leadership
6. Planning
7. Support
8. Operation
9. Performance Evaluation
10. Improvement

Since IATF 16949 is a supplement to ISO 9001, meaning that it adds requirements to those already existing, the document basically states that to gain IATF 16949 registration one must meet all the requirements of ISO 9001 and the supplemental IATF 16949 requirements.

What are the Highpoints from Each Section?

Part 1 Scope:

The scope of the document basically tells the user where the standard does and does not apply. ISO 9001 is intended to cast a broad net and be applicable to any industry. IATF 16949 narrows this down to any size manufacturer within the automotive supply chain.

Part 3 Definitions:

This section is for guidance and doesn't have any requirements. However, it is helpful to be able to understand what certain terms mean when used in the standard. Once again, IATF 16949 inserts terms that are specific only to the automotive segment.

Part 4 Context of the Organization:

This section may not be immediately intuitive to some users. It is intended, however, to ensure that organizations understand the internal and external influences that are relevant to their purpose and strategic direction. This section provides guidance on how to define the scope of the QMS. IATF 16949 provides additional guidance regarding exclusions to the scope, a practice where the requirements an organization is prepared to achieve are limited by the organization. In IATF 16949, it stipulates that the only exclusion a company may make are for design related requirements when a company does not have design responsibility. It also adds requirements for product safety that do not exist with ISO 9001.

Part 5 Leadership:

This section is all about detailing top management involvement in the QMS. It includes requirements for Top Management involvement, commitment to customers, establishing a formal Quality Policy, and the rules by which Top Management can delegate authority and responsibility for the different aspects of the QMS. IATF 16949 identifies several responsibilities that require delegation beyond those in ISO 9001.

Part 6 Planning:

This section includes elements for risk assessment, establishing quality objectives, and planning for changes to the QMS. IATF 16949 adds additional requirements for specific risk analyses, taking preventative actions, forming contingency plans and involvement of Top Management in developing quality objectives.

Part 7 Support:

This section starts to really get into the depths and important aspects of the QMS. It provides requirements for training and competency building, having the right tools and infrastructure for individuals to properly perform their jobs, providing a safe environment, calibrating tools and measuring devices, and providing good communication throughout the organization. IATF 16949 adds additional requirements such as adopting Lean Manufacturing techniques, using Measurement System Analysis (a way to monitor the effectiveness of gauges and measuring devices), identifying laboratory requirements, requiring a written Quality Manual (a requirement dropped by ISO 9001), maintaining records, and making sure that pertinent engineering standards are available and up to date.

Part 8 Operation:

This is the section that includes all the operational parameters, such as operation planning and control, customer communication, understanding product requirements, conducting thorough contract and feasibility reviews, maintaining a formal design process (for design responsible entities), managing vendors, managing traceability, and addressing non-conforming product. IATF 16949 adds many additional requirements to this section. Perhaps a few exemplary items are understanding special characteristics, conducting manufacturing feasibility, adding specific supplier selection criteria, using control plans, adopting Total Productive Maintenance practices, managing change control, and adding extra requirements for non-conforming products.

Part 9 Performance Evaluation:

This section covers measuring customer satisfaction, internal auditing, and management review. IATF 16949 adds requirements for process capability studies, additional internal auditing requirements, and expanded management review.

Part 10 Improvement:

This section addresses corrective action and continuous improvement. IATF 16949 adds additional requirements relative to problem solving, error proofing, and expanded continuous improvement.

If you currently do not have a formal QMS or only have ISO 9001, you might be asking why you would want to add the burden of these added requirements? The answer is simple, the IATF 16949 Quality Management System is far more comprehensive than ISO 9001. Adapting your QMS to meet its requirements will make your organization stronger and better, and likely establish you as a superior organization in the eyes of your customers. This reason alone makes achieving IATF 16949 a strategic decision and one well worth considering if you are or aspire to be a supplier to the automotive market segment.

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