

Cost Savings by Outsourcing Development & Standardization of Materials and Process Specifications

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Introduction

Today, practically there is no economic or manufacturing activity that isn't outlined, either partly or wholly, by process of standardization. There is a worldwide acceptance of process standardization which is closely related to globalization and transformation of various regulatory processes at both national, regional and/or international levels. Standardization can help simplify complicated turnaround process that in turn reduces lengthy loops and eases out matters that are diversified, intricate, and chaotic if not controlled. Manufacturing organizations often face huge expenses in terms of excessive inventories, lack of strand procurement processes and diverse material purchase. To improve operational readiness, and to reduce cost, standardization of materials and process specifications comes as a relief. Standardization can be achieved by using most common, cost effective, readily available and reliable material, parts and processes to ease out the manufacturing processes.

For any manufacturing industry, specifications are required during the design stage of a component/assembly/system. Specifications are structured documents that set out the requirements which component/assembly/system are expected to provide. Specifications are essentially the vehicle of communication between producers and users. They serve as a common language, define property and quality requirements and establish safety criteria.

Standardization of material and process specifications creates value at countless levels. To understand standardization of specification and processes, we need to understand two keywords, i.e., 'standards' and 'specification'. Let's dive deeper into these words to understand how they help in achieving higher results by roping in well-defined practices and processes to meet cost & performance objectives. 'Specifications' are often interchangeably referred to as 'standards'. However, there is basic difference between the two.

What is a Standard?

A standard¹ is a document that defines the characteristics of a product, process or service, such as dimensions, safety aspects, and performance requirements. The International Standards Organization (ISO) coordinates standards world-wide.

What is a Specification?

A specification¹ is a set of conditions and requirements of precise and limited application that provide a detailed description of a procedure, process, material, product, or service for use primarily in procurement and manufacturing. Standards may be referenced or included in specifications.

While standards are mostly developed and maintained by standard producing bodies¹ viz. ASTM, AMS etc., it is common for industries to develop their independent specifications based on own specific requirements.

Development of in-house material and process specifications requires expertise and cost. As per the report² on "Materials and Processes Specifications and Standards" by National Academy of Science for Department of Defense, USA, published in 1977, "the cost of developing a company specification is estimated to vary from \$600 per specification to \$2500 per specification, exclusive of the research, testing, characterization, and other tasks necessary to complete the data base for the specification". In addition to the development costs, there are costs involved in maintenance of already developed specifications.

Quite often however, it can be observed that within an industry there are existences of parallel material and process specifications having equivalent requirements. Absence of systematic approach to standardize material and process specification's development and maintenance activity is the prime factor responsible for this loss of effort and cost. For critical parts it is intuitive that industries (OEMs) prefer to keep an end to end control on research for new product and therefore development and maintenance of specifications are carried out in-house. However for all other parts, the entire exercise of specifications development and maintenance can be profitably outsourced.

Development of Material & Process Specifications

The basic principle beneath any industry specification is essentially the same. When a need for a specification is identified and established, the specification is drafted by a team of cross-functional experts. Important aspects of a specification draft can be summarized as follows:

- **Competitiveness:** The specification must be as generic as possible so as to attract multiple suppliers and ensure fair competition, and get a better bid.
- **Clear & Terse:** Since specifications are essentially documents of pronounced technical significance, it must be ensured that all requirements are clearly defined so as to find the right product. At the same time, it needs to be ensured that the specification is not over burdened with unnecessary details as this will lead to confusion and therefore lower the chance of getting most suitable product at best price.
- **Involvements of Suppliers:** For critical sectors, it is advisable to involve suppliers in specification's development especially for the key characteristics. However this should not lead to the formation of a compromised document favoring any particular supplier.
- **Quantifiable Requirements:** It is important to ensure that all the requirements defined within the specification must be quantifiable. Subjective terms must be avoided.

It must be ensured that the specification includes information regarding the necessary precautions that needs to be taken during formation, assembly or delivery of the product. Also, the acceptance/rejection criteria and specific delivery requirements must be included in the specification.

Standardization of Materials and Process Specifications

Standardization has been a vital ingredient to progress of any manufacturing industry ever since the dawn of industrialization. Henry Ford's hundred years old statement "To standardize a method is to choose out of many methods the best one and use it" is a testimony to the fact that the concept of standardization is not new. However putting to practice the essence of standardization is a mooted concept still today. Standardization promotes uniformity, and uniformity of output is groundwork to ensure quality. Any industry that is committed to standardization ensures, through a scheme of well-defined documents, that the best available method for a particular action is used across the industry by all personnel until there is some improvisation in the method and thereafter the improvised method becomes standardized. This cycle of using the existing best method till it gets superseded by a new best method is continuous and unending. Adherence to standardization is an inherent culture in any manufacturing sector which strives to ensure high quality and consistent output.

In recent years, technical standardization has been a priority subject for many bulk manufacturing industries. Everywhere there is an increased focused on innovation. But there is also an understanding that the maximum benefit of innovation can only be leveraged by effective diffusion of latest innovation across all parties. This can be best achieved by inculcating a culture of standardization.

QuEST Global has been a part of an important project involving standardization of materials and process specifications for a major aero engine customer. With operations at multiple locations, a huge overlap of specifications were identified and mapped. With extensive technical discussions involving experts from different locations, the current best practices were identified and new specifications were drafted. For just a portion of operations, this standardization activity resulted in approximately 60% reduction in number of specifications that had to be kept live, as shown in Figure 1. After multiple internal reviews by technical experts and discussions with suppliers, these new unique specifications were taken for approval from airworthiness authorities. These specifications have now been released to users. Since these new specifications were formulated with inputs from multiple locations and therefore involved varied suppliers, supplier development activities were also carried out at all locations to mitigate the capability gap, if at all existed, at the suppliers end.

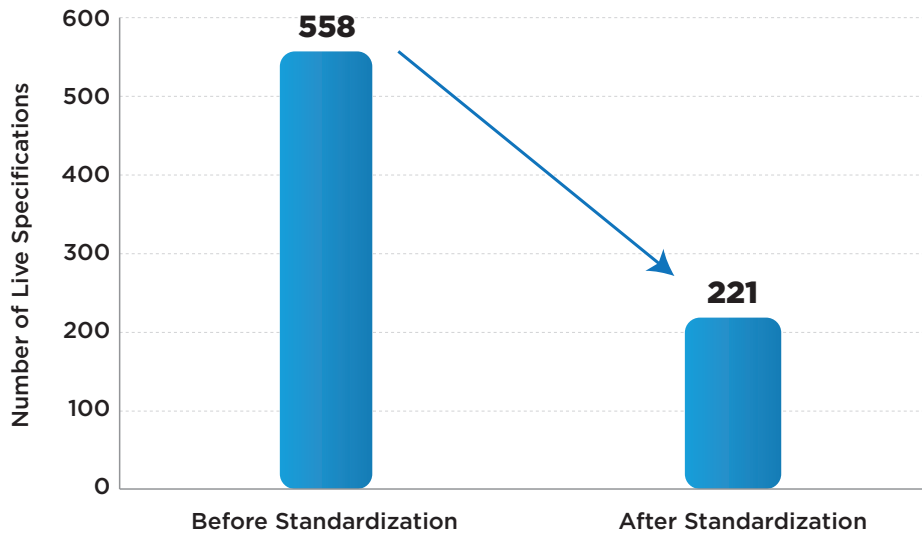


Figure 1: Graph showing number of live specifications before and after standardization initiative

Outsourcing Specifications Activity

Today, OEMs (Original Equipment Manufacturer) have a choice to outsource technical standardization activities to ESO (Engineering Services Outsourcing). Today’s business, obsessed by cost concerns and low margin of error for almost any product, are more focused than ever towards formulating effective and aggressive outsourcing strategies. In today’s competitive market, OEMs are moving towards empowering ESO organizations as equal engineering partners. The cost savings that an OEM can benefit through such collaboration is pronounced.

QuEST Global prides itself in providing high quality on-time and on-budget delivery of engineering services to all its customers through flexible operational models. With huge pool of talent working across the globe, QuEST is committed to drive excellence in all its operations.

For the materials and process specifications activity the Value Stream Map (VSM) can be seen in Figure 2. Having high technical capability and streamlined operations, any OEM can consider outsourcing > 80 % of the activity to QuEST Global. With strong IP protection policy we have for our customers, we have proven capability to carry the entire activity for all kinds of materials and processes.

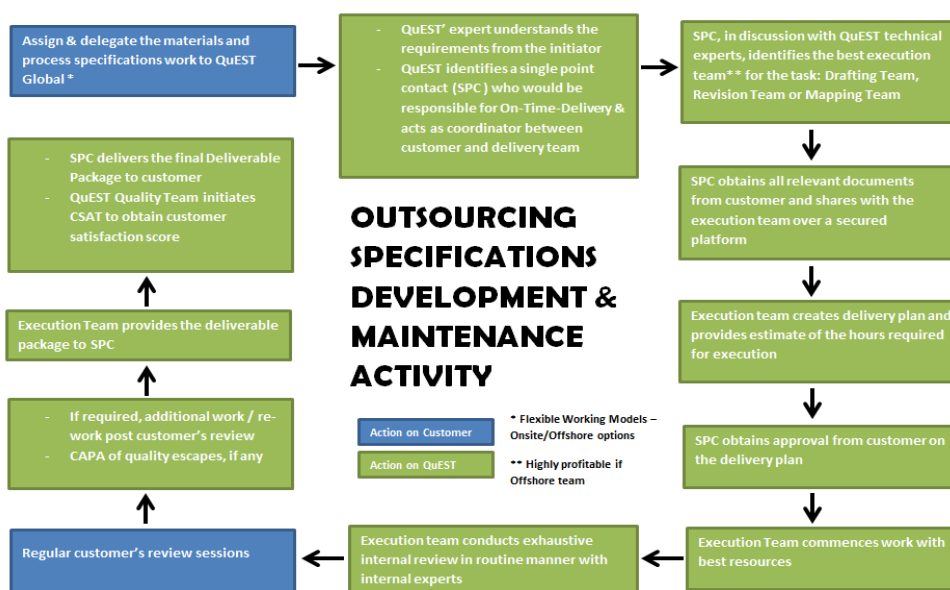


Figure 2: Value Stream Map Of Specifications Activity

Summary

This paper discusses critical aspects regarding development and standardisation of material and process specifications. With common intention of industries to be profitable as a unit globally, it would be beneficial for any OEM to have a methodical approach to standardization initiatives. Though this write up centered on specifications, parallel learning can be applied to many other engineering systems like engineering drawings, BOM, engineering manuals, etc.

QuEST Global is competent to drive end to end execution of projects using agile methodologies, under stringent time frame and at competitive prices. We understand that with new technological advancements, if the standardization initiatives for our customer are not systematic, proliferation of item would occur. This will lead to burden of additional cost to the industry which can be easily avoided. With strong policies related to IP protection of our customers, we are confident to handle the activity for all engineering details.

QuEST Global, as an engineering outsourcing organization, has been able to make its footprint in global market within a short span of time. QuEST Global is a premier engineering outsourcing organization providing range of services across various verticals including aero structures, aero engines, automotive, hi-tech and oil & gas. Over the period of time, QuEST has developed its capability to carry out complex engineering projects in all these and several other domains.

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About the Authors

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Pankhuri Sinha is a Project Leader at QuEST Global. She is a graduate of Metallurgical Engineering and has close to 10 years of experience in the field of Metallurgical & Material Sciences.

Prior to joining QuEST, she was a Manager in R & D and Scientific Services department in Tata Steel. Her area of expertise includes metallurgical failure analysis of engineering components, material selection, material and process specification's development & maintenance and technical publications.

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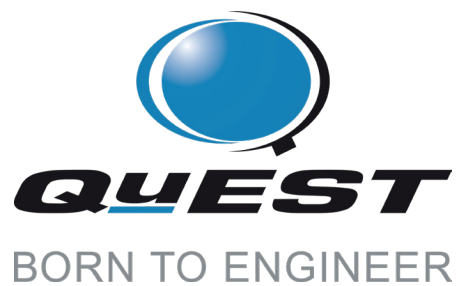


Rajesh Kumar Handuja is Chief Engineer with QuEST Global. He has approximately 32 years of experience in aero engine industry. He is a Bachelor in Mechanical Engineering and holds an MBA in HR.

Rajesh started his career with Indian Air Force. During his 20 years career with IAF, he has gained experience in On-Wing/ Off-Wing maintenance on aero engines. Based out of Bangalore office in India, Rajesh is working with QuEST since Feb 2008. He is currently leading the Engineering Services as

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About QuEST Global

For more than 20 years, QuEST Global has been a trusted global product engineering and lifecycle services partner to many of the worlds' most recognized companies in Aero Engines, Hi-Tech, Aerospace & Defense, Transportation (Automotive and Rail), Power and Industrial, Oil & Gas and Medical Devices industries. With global presence in 14 countries, 65 global delivery centers and 12,000+ personnel, we are at the forefront of the convergence of mechanical, electronics, software and digital engineering innovations to engineer solutions for a safer and cleaner world. QuEST's deep domain knowledge and digital expertise aim at helping customers accelerate product development and innovation cycles, create alternate revenue streams, enhance consumer experience and make manufacturing processes & operations more efficient.

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