



# **A Win-Win Approach to Supplier Management in Manufacturing**

Emergence of Lean Supplier Management

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6/1/2006

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## INTRODUCTION

According to research published by the Aerospace Industries Association's (AIA) Aerospace Research Center, aerospace sales, orders, exports and employment all increased significantly in the last couple of years, especially as defense-related industry categories showed robust growth. Indicators show a healthy industry that continues to demonstrate strength and resilience despite significant challenges in the last several years.

Whilst this upward trend signifies great opportunities for aerospace manufacturers, it also creates a number of challenges. Globalization and consolidation are rapidly reshaping the aerospace industry as a whole, and OEMs are continuously pressing for more and better services from their suppliers at less cost. In addition, OEMs are increasingly outsourcing manufacturing and supply chain services to system integrators. Today, an estimated 70-80% of component manufacturing is based in the supply chain. Thus, the ability to build and manage a lean and flexible supply chain has become key to successful manufacturing in aerospace. A lean supply chain requires lean manufacturing. It is the engine that drives lean supply chain efficiencies.

## THE EMERGENCE OF LEAN SUPPLY CHAIN MANAGEMENT

The concept of Supply Chain Management (SCM) is perhaps one of the most critical management concepts in today's aerospace manufacturing. According to the Council of

Supply Chain Management Professionals (CSCMP), Supply Chain Management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, who can be suppliers, intermediaries, third-party service providers, and customers. This includes third-party logistics providers who have become a vital part of the globally integrated supply chain network. In essence, Supply Chain Management integrates supply and demand management within and across companies.

Over the past 30 years, SCM has evolved significantly as is shown in Figure 1.

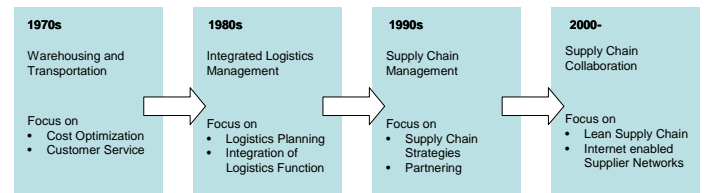


Figure 1: Stages of Supply Chain Management

The first phase of SCM is characterized as the 1970s inventory 'push' era that focused primarily on physical distribution of finished goods. During the 1980s and 1990s companies realized that the productivity could be increased significantly by managing relationships, information and material flow across enterprise borders. Today, Supply Chain Collaboration leads to trust relationships where partners cooperate as if they were a single entity. As supply chains become more complex and widespread globally,

the management of contractual obligations related to quality, performance, and on-time delivery need to be flowed down and the results be made visible through several tiers of suppliers. Furthermore, Supply Chain Collaboration is driven by the implementation of lean concepts, the results of which are visible and beneficial to both the customer and the supplier in closely integrated trading-partner networks.

This paper discusses three success factors for efficient lean supply chains:

- The ability of OEMs and integrators to effectively certify, select, and develop suppliers based on their performance, and their preparedness to share risk.
- The capability of suppliers to drive down costs, streamline operations and reduce the variability in their processes, and their willingness to engage in and constantly enhance a collaborative relationship with their customers.
- The deployment of innovative collaborative solutions allowing customers and suppliers to share and interact on critical data in real-time.

## **OEMs AND SUPPLIER RELATIONSHIPS**

As supplier networks become increasingly widespread globally, the early identification and management of risks in the supply chain that could affect product and service quality becomes an absolute necessity. OEMs and integrators are investing in the identification of 'best value' sources based on data about a supplier's performance with respect to quality and on-time delivery, as well as subjective data about responsiveness and business viability. This data is not only used to select good suppliers and eliminate bad ones. It is also the basis for the development of solutions and tools that aid the communication and interaction with suppliers, such as supplier portals, eSourcing tools, procurement portals, etc. Whilst these tools greatly improve the flow of information between customers and suppliers, there are a number of additional factors to consider when assessing their effectiveness.

### **INTERNAL VERSUS EXTERNAL DATA**

The data and information shared through these portals is mostly historical rather than real-time. In addition, the majority of supplier assessment metrics are 'second-hand' or externally measured, rather than internal to the supplier's processes. An example is the supplier defect rate, which is one of the key measures used by customers to rate and compare suppliers. It is one of the factors impacting the effective total cost of doing business with a given supplier. However, it is an external measure only and does not give an indication of a supplier's manufacturing or internal defect rate. It is merely an indication of a supplier's effective 'defect-detection' capability, which can come at a high cost to the supplier and the customer.

### **THE COST OF COMPLIANCE**

The majority of aerospace suppliers today produce parts for more than one customer. In order to satisfy their customers' needs, suppliers are required to access a multitude of supplier portals to provide data in the format specified by their respective customers. Whilst the use of the portals is mostly free of charge, suppliers have to invest in administrative resources to meet the increasing number of requests for information and to manage the many tools provided to them by their customers.

### **TRUST RELATIONSHIPS**

Another challenge is the inherent lack of trust. Many suppliers are reluctant to share sensitive internal data with their customers. Given the unique nature and complexity of the aerospace manufacturing business, with long-term contracts and many sole-source suppliers, supply chain owners have to look for more effective ways to build win-win relationships with their suppliers.

## **SUPPLIERS AND LEAN MANUFACTURING**

Lean manufacturing is a management philosophy focusing on reduction of the 7 wastes (Over-production, Waiting time, Transportation, Processing, Inventory, Motion and Scrap) in manufactured products. By eliminating waste, quality is improved, production time is reduced, and cost is reduced. Lean "tools" include constant process analysis

(kaizen), "pull" production (by means of kanban), and mistake-proofing (poka yoke).

The lean manufacturer focuses on improving product performance and quality while at the same time reducing cost. In the area of quality management this means looking beyond quality inspection and control. Lean management classifies inspection as a redundant process in an organization with entrenched quality management. Quality has to be built in all processes, eliminating the need for costly secondary 'defect detection' activities. A delay between production and quality inspection for example, may mean that a problem goes undetected while multiple defective parts are produced. Only if quality data is captured and analyzed in real-time, can production problems be identified instantly and resolved quickly. For example, real-time 'defect alerts' on the shop floor can effect production stoppage before additional 'bad' parts are manufactured. The results are significant savings in scrap and rework cost, and improved line capacity balancing and increased throughput.

The statistical analysis of inspection data highlights unstable processes, thereby pointing to trends, root causes of problems, and to areas requiring process improvement action. The results are capable processes which are statistically unlikely to produce defects, thereby yielding a low internal defect rate. Since the external defect rate can never be greater than the internal (produced) defect rate, the internal defect rate proves to be a more accurate measure of supplier quality.

This approach requires a solution that provides visibility by the customer to the suppliers' internal process capability. Furthermore, a supply chain will be the most efficient the faster this data is analyzed and disseminated through the supply network to identify current and potential problem areas.

## **A COLLABORATIVE SOLUTION**

The above discussion highlights the need for collaborative solutions that 'connect the dots' in the extended supply chain to ensure visibility through several tiers of suppliers and logistics providers. At the same time the solution must provide effective tools to customers and

suppliers to enable proactive management of supply chain events.

Past efforts to integrate customer and supplier systems have failed due to the complexity and often incompatibility of the systems. The solution can be provided through a single web-based platform that offers suppliers an internal solution for manufacturing and quality management that is based on aerospace industry standards and requirements. At the same time, the web-based solution allows suppliers to link customer-specific data to the customer, such as First Articles for approval, internal defect rate, internal rejections and causes, and process capability of key characteristics.

## **THE NET-INSPECT SOLUTION**

Net-Inspect is a web-based portal solution for Supply Chain management, which combines top functionality for complex quality requirements with global capabilities and proven integration. The solution creates transparency throughout the manufacturing process and the supply chain, breaks down traditional hierarchical boundaries that obstruct problem-solving, and virtually eliminates the need for costly quality and supplier management infrastructures. The Net-Inspect solution is designed to enable and accelerate lean and other performance improvement programs with the objective to reduce cost, improve process capability and ultimately improve the bottom line. The web-based solution allows companies to share quality performance data with their customers in real-time. It also allows supply chain owners to gain visibility to internal supplier performance, thereby enabling standardization and transparency throughout an entire common supply base. The flexibility of the system enables users to choose the functionality that will provide them with the most short- and long-term benefits, whether it is through online AS9102 first article management, real-time manufacturing capability and control for variation management of key characteristics, as defined by AS9103 requirements, or supplier collaboration. The web-based, web-hosted infrastructure makes the solution easy to implement and very affordable, independent of size and complexity of a company, whether it has 3 or 3,000 users.

## CONCLUSION

We have defined lean Supply Chain Management as a supply chain operational and strategic management philosophy that utilizes internet-enabled collaborative solutions to effect the continuous improvement of supplier network quality and performance. A lean supply chain network is empowered to generate value at the lowest cost through the collaborative, real-time synchronization of market information, demand priorities, capability and delivery metrics.

Collaborative solutions such as Net-Inspect can be extended throughout the supply chain network benefiting suppliers, third-party providers, and customers through:

- Improved quality through the elimination of defects and continuous improvement based on real-time data
- Higher on-time delivery performance due to predictable capacity management as a result of capable production processes
- Reduction in direct manufacturing cost (i.e. through the elimination of scrap and rework)
- Cost savings through the elimination of non-value added secondary inspection through in-process inspection
- Full compliance with industry standards such as AS/EN9100, AS/EN9102 and AS/EN9103
- Ability to share real-time manufacturing, quality and performance data throughout the supply chain network.

## CUSTOMER SPOTLIGHT

Vought Aircraft adopted the Net-Inspect solution as part of its Preferred Performer Program (P<sup>3</sup>), encouraging suppliers to use the system for First Article Inspection Reporting and Variation Management of Key Characteristics. The supplier data is shared with Vought through the Net-Inspect Portal, providing Vought with real-time access to supplier quality and performance.



## P<sup>3</sup> Program Incorporates Use Of Electronic Tools

Vought's Preferred Performer Program (P<sup>3</sup>) is undergoing an update to reflect the value and efficiency that electronic tools bring to manufacturing and delivery of quality products. The changes will be reflected in the next update to VWI 7.4.051M "Supplier Instructions and Program Control Requirements" to be released soon. The changes will include:

### All Levels

- Blue or Green Quality Profile rating
- Use of Net-Inspect for all Vought FAIs
- Use of Net-Inspect SPC for all key characteristics flowed down by Vought
- Satisfactory delivery performance
- Use of aerospace electronic document management system for submitting certifications, test reports, etc. to Vought

### Platinum Level additions

- 50% of remaining Vought part number key features in the Net-Inspect SPC system
- Average Cpk of 1.33 for all part numbers in the SPC system (average of all Cpk's)

### Gold Level additions

- 30% of remaining Vought part number key features in the Net-Inspect SPC system
- Average Cpk of 1.20 for all part numbers in the SPC system

### Silver Level additions

- 10% of remaining Vought part number key features in the Net-Inspect SPC system
- Average Cpk of 1.0 for all part number in the SPC system

### Bronze Level

- Suppliers who are delegated by an AAQG/IAQG member OEM can have the initial PCA (Product Conformity Audit) waived if until they have met the 12-month delivery requirement

Current Quality profile and Product Conformity Audit score criteria remain the same for the various levels.

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