AIRBUS FASTENERS’ SUPPLY CHAIN OPTIMIZATION

How to stock, prepare and distribute in the most efficient way?

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This article is based on a study carried out at AIRBUS SAS in Toulouse, France. The overall purpose of the study was to analyze the current logistics practices concerning fasteners within two major production sites and to come up with recommendations leading to a more cost effective and integrated solution. The study was production oriented and is focused on the distribution flows to the points of consumption.

BACKGROUND

AIRBUS is facing a deteriorating cash and profit position following problems to deliver its products on time and additional costs. In order to keep on competing in the aeronautical market, a turnaround project (Power8) has been launched aiming at implementing a new business model with lighter and more cost-efficient processes, a refocus of the industrial base on core activities, the development of large industrial partners and a truly integrated organization. In this strategic reconsideration, the supply chain optimization must play a major role and might highlight relevant improvements on the current processes.

PROBLEM ANALYSIS

Even though dealing with fasteners seems meaningless, Boeing experience through the 787’s project has proved that any shortage or quality problem in the fasteners supply can lead to significant delays and economical consequences1. Thus Airbus must develop a supply chain proper to the fasteners specificities. The future solutions shall define the most efficient way to deliver those goods from suppliers to the points of consumption on time, quality and at the lowest costs. It therefore involves a perfect knowledge of the existing processes in order to determine where potential savings can occur. Drawing a new supply chain requires furthermore a total knowledge of the concerned goods in order to define their corresponding sourcing and inventory strategies as well as a process to make their availability at the production area cost effective.

PURPOSE

- To map the current practices within two major Airbus plants, Hamburg and Saint Eloi (Toulouse) production sites, concerning the fasteners logistics
- To analyze and determine areas of improvements in the Kanban and Freestock2 processes from the preparation to the delivery to the points of consumption
- To build proposals and offer recommendations able to streamline the deliveries focusing on the right physical flow

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1 Wallace, J. “Mad dash to finish 787 gets trickier”, Seattle Post-Intelligencer, May 2007

2 Freestock is the similar method to the Kanban process but applied in Germany
of fasteners with most reduced lead time, with their advantages/drawbacks, risks and deployment conditions

**METHODOLOGY**

The *system view* is the most suitable approach and can be motivated by the definition of a supply chain: this is both a network and a system. The sequence of connection among organizational units constitutes this network while the interdependence of activities, organization and processes contributes to its systemic properties. Furthermore the study was led following an *abductive approach* mixing both deductive and inductive notions by using not only qualitative information but also quantitative data adding different perspectives to the analysis. Such information was obtained through the existing literature concerning the topic, interviews and visits of the different production sites. Reliability and validity of the proposals were both maintained through the constant visits performed at the production level verifying all information gathered through interviews and meetings. Moreover despite being a member of the project team, the study is truly objective due to its goals of global changing. And therefore every actor needed to analyze and think as an outsider in order to propose innovative solutions.

**CURRENT SITUATION & AREAS OF IMPROVEMENTS**

Mapping the current logistics processes over the two plants helped at getting a global understanding of the situation. It highlighted the zones where potential improvements could occur and above all underlined the fact that different tools were implemented within each entity contributing to the global non-integrated supply chain. At the time the study began, many improper operations through the way of managing the fastener’s logistics were noticed, constituting obstacles to the Power 8 objectives. In addition to the differences in this domain between Saint Eloi and Hamburg practices, limiting the integration of Airbus as a single company, many non value adding activities and worthless operations were performed all along the processes. Fasteners were not treated as a low value commodity with a limited strategic importance, making the operative costs relatively high. Even though systems such as Kanban or Freestock with their associated infrastructures were already set up, inventory levels remained incredibly high. In Hamburg, few parts could reach a twelve months inventory level! Improvements of the WIP inventory management including forecasting and ordering operations were therefore necessary.

Airbus works with four different types of logistics flows: SWK (Supplier-Warehouse-Kanban), SWC (Supplier-Warehouse-Consumer), SC (Supplier-Consumer) and SK (Supplier-Kanban). Unfortunately the whole range of fasteners parts was managed under a single flow instead of adapting it to their characteristics and their consumption frequency. The sourcing strategy was not rationalized and as a consequence there were no strong limitations in the purchasing policy. Thus Airbus was provided with fasteners by more than 150 suppliers involving the supply of identical parts by many different suppliers. Despite the outsourcing of the physical logistics, enabling the company to concentrate on its core activities, the decentralization of the logistics operations had created many break bulks all along the material and administrative flows. Indeed several service providers were contracted involving many transfers of responsibilities and costly non value adding tasks. This was illustrated by the existence of several parasitical storing points or warehouses enabling these transfers of responsibility. It involved also a redundancy in the logistics tasks increasing even more the costs that should be maintained as low as possible.
Finally the material flows and the production showed some disturbances due to unsuitable delivery means and improper traceability.

RESULTS AND PROPOSALS

Fasteners were classified as C-items, following the ABC analysis based on volume value, and as non-critical items in accordance to the Kraljic model. Therefore the study focused on minimizing handling costs in the inventory operations and delivery to the points of consumptions. Objectives were to enable fasteners to be delivered in suitable quantities and at the right time to the work stations. Furthermore due to the fasteners’ segment market and the large number of suppliers able to provide Airbus, costs required for changing supplier should be reduced through a not too high degree of collaboration. This means that investments into the collaboration must be limited in order to avoid any problem of dependency. Nevertheless Airbus was working with a too high quantity of suppliers, and project oriented the sourcing strategy towards the selection of four lead suppliers. Thus purchasing operations are simplified and relationships between both parties are closer enabling a better integration. However Airbus could maintain competition between those four partners and does not expose itself to risks provoked by a single sourcing configuration.

The best retained solution for decreasing inventory levels and costs related to this activity is the VMI under consignment. The company will thus transfer the stocks property to its supplier with all the operations associated. In order to limit the dependency on the provider caused by such solution, Airbus must manage electronically its stocks in order to keep traceability of the stored goods. Implementing this solution will eliminate parasitical flows. Hence three selection criteria will help to choose the four suppliers contracted. Suppliers with best schedule adherence and quality performances will thus be selected, but they will furthermore have to be able to implement a proper VMI solution fitting with Airbus processes. However implementing a VMI system with four suppliers working within the same facility seems impossible and requires outsourcing the physical logistics to a service provider. Furthermore due to the characteristics of this service, Airbus must rely on a single lead service provider. The break bulks, which appeared when analyzing the current practices, would then disappear. This European lead service provider will take over the whole physical logistics by managing the different central warehouses and this concerns all the commodities. Concerning our scope, the service provider would be in charge of handling, storing, defining Kanban/Freestock sizes and delivering to the points of consumption.

Thus suppliers and the lead service provider must either work with an information system compatible with Airbus’ SAP system or with their customer’s system itself. As written previously and in order to keep its independency, Airbus investments into these collaborations must be as low as possible. After having balanced logistics costs and holding costs through a Total Costs Analysis, results led to the conclusion that Kanban and Freestock should be sized for two weeks duration. This change would involve higher replenishment frequencies but would enable the company to free cash previously frozen in stocks holdings and to perform high cost savings. Items with low consumption do not enter in the scope because they should be removed from the Kanban and Freestock systems and be managed under SWC flow.

These quantities were previously available in Kanban and Freestock modules located close to the work stations, compelling workers to move to those areas. Through the constant will of eliminating unnecessary tasks, an

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2 Mattsson, S.A. (2002), Logistik i försörjningskedjor
improvement of the delivery means was studied. Using assembly kits delivered to the work station containing a quantity of fasteners determined previously will indeed eliminate any useless moves of the workers. This will also contribute to limit over consumption and to perform high savings by using re-usable packages.

All those changes should move the supply chain to a more cost effective and competitive model helping Airbus achieve its objectives. Nevertheless releasing all these responsibilities to some external companies involved the creation of a decision support tool called PFEP (Plan For Every Part) consisting in making available all information from procurement to manufacturing. Every actor could therefore get access to data that were not accessible in the former system, making decisions more reliable.

**CONCLUSIONS & RECOMMENDATIONS**

These proposals must be understood as a long term strategy that can not be applied in a short period of time. Some of them even require changes in organization, large investments and in the approach of thinking the logistics. At the moment parts of the solution described in the previous section are tested as pilots within located stations of the production sites in order to bring results and concrete savings of such implementation.

Thus reduction of the number of suppliers, implementation of the VMI model under consignment can be applied on the future programs still at their premises for which supply chain is under design. For current programs such as A320 family, the supplier choice will be slowly decreased and parts will be gradually moved from Airbus to concerned suppliers’ property.

The implementation of a European lead service provider imposes relevant changes in the organization. A centralized organization coordinating the whole logistic must be set up so that the provider works under one single authority and above all for defining a strategy as a whole. However political problems might come up since every program has currently its own logistics department. PFEP might deal with the same kind of issue since it offers the opportunity to release data from different departments into a single database.

Some other proposals must require high investments. Distributing fasteners at the work stations in specific panoplies for one operation of one assembly part compels precise forecasts. Forecasting could not be based anymore on past consumption but on a perfectly defined BOM. However due to the continuous changes at the production level on fasteners fixed onto assembly parts, keeping a BOM up-to-date is difficult and requires high investments in personal and tracking tools.

“Airbus single way-of-working” is thus more than ever the condition of success in logistics as well as in many other fields of the business before other companies make a step into the closed competition of the aeronautics industry.

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5 Bill Of Material