The Boeing Supply Chain Model

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On January 29, 2003, Boeing decided to design an all-new airplane made out of composites. They called it the 787 and the design idea was to make the plane light and fuel-efficient, to be a long range airplane. The dream for this aircraft was to move manufacturing to its Tier 1 suppliers who would coordinate with Tier 2 and 3 suppliers, and all Boeing would have to do was assemble the parts and save a whole bunch of time, effort, and money.

This decision was a huge gamble, considering Boeing was designing a revolutionary airliner made out of composite materials, and giving up “hands on” control of most of it.

A brief history of the 787 project:

April 2004 — Boeing’s board approves the project and all Nippon Airways order 50 planes. Deliveries are set for summer of 2008.
June 2006 — Boeing announces that bubbles are found in the composites on a prototype section.
April 2007 — Sales exceed 500 planes and Boeing looks to accelerate production.
June 2007 — They find that the cockpit section is out of line with the fuselage.
June 2007 — An industry-wide shortage of fasteners causes production problems.
October 2007 — Boeing delays first deliveries by 6 months.
October 2007 — Michael Bair, GM of the 787 program, is replaced, saying suppliers of major components of the 787 have fallen short of Boeing’s expectations.
December 2007 — CEO Scott Carson says there will be no further delays in the 787 program. Then a 3-month delay is announced in April.
September 2008 — Installation of improper fasteners and a union strike pushes

deliveries into first quarter of 2010.

June 2009 — Designers find that reinforcements are needed where the wing joins the fuselage, which will further delay the first deliveries.

August 2009 — Boeing discovers microscopic wrinkles in the fuselage skin and has to install a composite patch over the area.

August 2009 — Boeing orders Italian supplier, Alenia Aeronautica, to halt production of fuselage sections.

August 2009 — Boeing announces a $2.5 billion charge to third quarter earnings and pushes deliveries to the 4th quarter of 2010 — 2 years later than the original schedule.

Evaluation

It is important to evaluate the problems of the Boeing supply chain model, because many American manufacturers would like to off-shore manufacturing to lower their costs, and just focus on sales and engineering. Even small manufactures would like to outsource components for lower costs, but still be able to make customer delivery commitments. This last statement may be the heart of the issue and a paradox because lowering costs through outsourcing may be a contradiction to just in time or quick deliveries.

So far, I think it is safe to say that Boeing's Supply Chain Model isn't working and is a good lesson for other manufacturers who want to outsource all manufacturing (except assembly). Here are some key points to consider:

Type of design and product – To outsource a brand new airplane model based on composite technologies is a really big risk. Perhaps it makes more sense to try this supply chain model on a product that has already been in production in the U.S. (like the 747).

Logistics Software – Boeing decided to use the E20 open applications, implemented as on-demand services on the Exostar network, for multi-tiered supply chain functions. They talk about this software as if it were some kind of magical communication network, even though they are contracted to 30 Tier 1 suppliers all over the world who may run into many unknown problems in the process that can only be solved by human communication and intuition.

Supplier Collaboration – To make a system work with 30 Tier 1 suppliers who manage hundreds of Tier 2 and Tier 3 suppliers, one would assume that Boeing would be working overtime to establish a wonderful working relationship with these suppliers. But right from the beginning, Boeing forced the Tier 1 suppliers to design and build all tooling for their part of the airplane without any compensation from Boeing. Boeing has clearly dumped much of the risk on their suppliers. The biggest danger of this approach is if some of the suppliers find out they can't make any money on the contract and decide to bail out during the production stage. Boeing could face more delays, which could lead to more order cancellations.

Communications – Boeing must communicate with 30 Tier 1 suppliers all over the

world in different time zones, who speak different languages, and have different cultures. Interpersonal skills and the ability to build real relationships will be the key to success. Boeing must have people around the clock to answer questions and to work through problems.

Control – The old way of manufacturing the parts with U.S. vendors gave Boeing a lot of control over the supply chain with many controllable alternatives. In the new outsourced model, natural disaster, political unrest, and financial problems on Tier 3 suppliers can prevent a fuselage section from being delivered – which stops assembly. This model turns over most of the control of production to foreign suppliers. So far the only solution that Boeing has used as an alternative is to buy the supplier.

Conclusion

Boeing should be awarded the Medal of Honor for their willingness to take such huge risks with the most important airplane in their history.

As a model for other manufacturers (i.e. assembling the final product and outsourcing the manufacturing all over the world), it may be in keeping with the demands of globalization but is probably too risky for most American manufacturers. This is a debate about a revolutionary approach to cost savings vs. giving up control. If it works, Boeing will pioneer a new manufacturing model for globalized manufacturing. But if they can't control deliveries or quality with the new process, they will face more order cancellations and perhaps even an unsafe plane. In a few words, "They are betting the farm."

Mike Collins is the author of Saving American Manufacturing.

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