

Shortest road to China

Reducing the duration of the Supply Chain between factories in Germany and China

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Faced with increasing demand in China's fast-growing circuit breaker market, the Supply Chain from ABB AG Calor Emag in Germany to ABB Xiamen Switchgear Co., wasn't meeting ABB's standard for an acceptable on-time delivery and delivery time of goods. The plant increased inventory levels to speed up deliveries but this was only a partial solution. Inventory requires a substantial commitment of capital, so the two companies joined forces with a manufacturing team from ABB Corporate Research to ensure acceptable delivery times while at the same time allowing inventory and capital to be released.

Value Stream Mapping (VSM)¹⁾ techniques were used to analyze the whole Supply Chain and identify lead times and inventory levels while modeling the current state of operations. The analysis revealed that it took at least four months – from the time the order was placed on Germany to its delivery – to supply vacuum interrupters and embedded poles to the Chinese factory where they are assembled into circuit breakers.

Because the Chinese market requires a delivery time of one to two weeks for medium voltage circuit breakers, the Chinese factory had to have an enormous stock of vacuum interrupters and embedded poles to meet the delivery schedule expected by their customers. Clearly something had to be done.

To cut the replenishment time so that it equaled the shipping time from Germany to China, a central stock of finished goods was established at the German factory.

The theoretical solution

The solution lay in cutting the replenishment time from Germany to China. Consequently this would provide better service and a potential inventory reduction as well.

Replenishment time included China placing orders with the German factory in Ratingen (*transaction time*), which then ordered components from its sub-suppliers for in-house assembly and testing (*order lead time*) and, finally, shipping. Altogether this chain of events normally took 16 to 18 weeks of which shipping by sea, because it was deemed to be the most economical transportation method, required six weeks. In special cases faster transportation methods other than sea freight have been used to increase the level of service.

Footnote

¹⁾ See glossary on page 74.



Demand driven manufacturing

The overall aim was therefore to cut the replenishment time so that it equaled the shipping time from Germany to China. This was achieved by establishing a central stock of finished goods at the German factory. There was also a target to reduce the transaction, transportation and order lead time as much as possible. Engineers then set about finding ways of achieving this.

Turning theory into practice

The first part of the solution involved having a centrally-located plant warehouse in the vicinity of the Ratingen factory. The purpose of this warehouse is to supply as much equipment as possible (depending on the business plan and service level agreed upon) directly from stock.

Such a warehouse, with shared inventory for the Chinese and other global markets, has several benefits including:

- Inventory levels are kept considerably lower than the sum of locally kept inventories, mainly because of risk pooling.
- The bound capital does not tie up transportation costs and custom fees.
- Replenishing components based on incoming orders (known as a “supplier pull system”) is more cost-effective and has less risk than demand forecasting used previously.

The order transaction process between China and Germany was streamlined and simplified, resulting in a reduction in the time required – from five days to one day – and a near-elimination of transcription errors. This solution now provides the German factory with up-to-date, online information about order intake and stock levels in China. Large potential orders can be communicated even before contracts are signed to: provide vital information about available inventory; and give advance notice to the German factory

ABB Xiamen Switchgear Ltd., China



in situations where supplies have to be ordered.

An inventory calculator has been introduced to set targets for quantities held in stock. This tool allows the calculation of the appropriate stock levels based on historical as well as forecast data, with the aim of meeting future demand in China and other markets served by the plant warehouse. Statistical measures, such as deviation in quantities demanded, are applied within this tool.

A reduction of almost 70 percent in the duration of the Supply Chain between Germany and China has made a considerable difference to the overall business.

Clear results

Eighteen months later the overall results have been impressive. Replenishment time, ie, from the time the order is received in Germany until the goods arrive in Xiamen China, was cut from 18 weeks to 5 weeks by implementing plant warehouse. Also lead times were reduced as follows:

- The order transaction process (between Xiamen and Ratingen) went from 5 days to 1 day by having online orders.
- Order lead time at the German factory fell by roughly 80 percent, from seven weeks to two. Marked improvement stemmed from the introduction of “pull production” in which work is undertaken based on customer orders and not a forecast of possible demand. (Production based on demand forecasts, known as push production, can result in unnecessary production and delay the delivery of actual customer orders.)
- Material lead time at Ratingen fell from 4 weeks to 0 because of raw-material buffers at the factory.
- Shipping or transportation time, door to door, was reduced from six weeks to five. Space is now secured by using a standardized logistic scheme. Once a week a container is taken to a ship on which, by default, space is reserved. Special packaging is used to avoid damage.
- Inventories are down 40 percent despite strong market growth in China.

A reduction of almost 70 percent in the duration of the Supply Chain between Germany and China has made a considerable difference to the overall business. The participants worked with mutual trust towards the same goal of optimizing the overall business rather than the individual businesses. This cooperation has led to win-win results with the competitiveness on the Chinese market substantially strengthened and considerably higher productivity in both factories.

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