

全球仓库配送系统创建高效的物流

梁光雁 徐明 (东华大学 管理学院 上海 200051)

Global Warehouse and Distribution Systems Create Effective Logistics

Guangyan Liang, Ming Xu (School of Management, Donghua University, Shanghai 200051)

Abstract: The heart of any modern manufacturing business is an efficient warehouse management and distribution service. Customers' expectations about product delivery times and availability have changed such that they demand fast service—at low cost and with low errors. This paper introduces a computerized system solution called Warehouse Administration Service System or WASS, which enables the manufacturers, especially those manufacturers who are doing global business, to control their product flow from production to the customer. WASS supports the receiving, storing, shipping and inventory management of goods in which manufacturers create an effective logistics and supply chain management. The paper also shows the successful case that SKF* uses the WASS in its global warehouse distribution network to service customers in the most efficient way and concept of green supply chain.

Key words: warehouse management; warehouse administration service system(WASS); inventory management; logistics; green supply chain; distribution network

1 Introduction

Logistics is the management of the flow of goods, information and other resources, including energy and people, between the point of origin and the point of consumption in order to meet the requirements of consumers. Logistics involve the integration of information, transportation, inventory, warehousing, material-handling, and packaging. Logistics is a channel of the supply chain which adds the value of time and place utility^[2].

An illustration of a company's supply chain shows as here in Fig.1: The arrows stand for supplier-relationship management, internal supply chain management and customer-relationship management^[3].

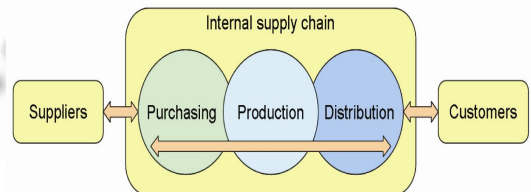


Fig.1 A company's supply chain

1.1 Why is the supply-chain important?

In years past, manufacturers were the drivers of the supply-chain—managing the pace at which products were manufactured and distributed. Today, customers are calling the shots, and manufacturers are scrambling to meet customer demands for options/ styles/ features,

① SKF, whose headquarters is located in Gothenburg, Sweden, was found in 1907. The SKF Group is one of the leading global suppliers of products, solutions and services in the area comprising rolling bearings, seals, mechatronics, services and lubrication systems. The Group's service offer also includes technical support, maintenance services, condition monitoring and training^[1].

quick order fulfillment, and fast delivery^[4].

Manufacturing quality-a long-time competitive differentiator-is approaching parity across the board, so meeting customers' specific demands for product delivery has emerged as the next critical opportunity for competitive advantage.

Companies that learn how to improve management of their supply-chain will become the new success stories in the global marketplace. Benchmarking studies show significant cost differences between organizations that exhibit best-in-class performance and those with average performance^[5].

1.2 Unaware of potential benefits from green supply chain

As the public becomes more aware of environmental issues and global warming, consumers will be asking more questions about the products they are purchasing^[6]. Companies will have to expect questions about how green their manufacturing processes and supply chain are, their carbon footprint and how they recycle.

Companies can find cost savings by reducing the environmental impact of their business processes. By re-evaluating the company's supply chain, from purchasing, planning, and managing the use of materials to shipping and distributing final products, savings are often identified as a benefit of implementing green policies^[7].

Despite the public's focus on the environment, benefits attributed to reducing a company's environmental impact are still not in the forefront of supply chain executive's minds. It appears that many executives are still unaware that improved environmental performance means lower waste-disposal and training costs, fewer environmental-permitting fees, and, often, reduced materials costs. Hopefully the interest in green issues and environmental concern by the public will not wane as economic issues become more important due to the faltering economy.

2 An Efficient Global Warehouse and Distribution System

2.1 The technology

Industry is faced with rapidly changing logistics technology through the development of automated warehouse concepts linked to sophisticated and complex

transportation management systems. Manufacturers such as SKF have taken the opportunity to improve the quality of distribution and warehousing and to make savings through improved efficiencies offered by new logistics concepts.

Through a computer system called the Warehouse Administration Service System or WASS, SKF manages all operative tasks in the warehouses of its global distribution network. WASS has resulted in great improvements in productivity, thanks to more efficient workflows and high accessibility of the system. Since the system's introduction, productivity has improved more than 50 percent. SKF works with completely paperless processes and work-saving solutions based on sound logistics principles. Also, through the system emphasized on the concept of green supply-chain, SKF reduced disposal costs by \$12 million by establishing a reusable container program with their suppliers. Perhaps SKF may have been less interested in green issues if they were making record profits, but in an attempt to reduce costs in their supply chain, SKF found that the cost reductions they identified complemented the company's commitment to the environment.

In simple terms, WASS is a computer system that supports the six main functions required in warehouse administration:

- Goods inwards;
- Goods replenishment;
- Picking;
- Packing;
- Loading; and
- Inventory control.

The WASS concept was developed by SKF in collaboration with MA Systems, a Swedish company with more than 25 years of experience in warehouse automation systems and installations in more than 20 countries worldwide. In essence, WASS supports all the processes that are used in a modern warehouse operation, working on information in real time. Working as simply and logically as possible, it controls the flow of products in and out of the warehouse. WASS also acts as a link between other administrative systems such as customer order-handling, transportation management and ware-

house operations.

Flexibility is important, as WASS needs to be able to work with a range of warehouse technologies, from traditional manual movement of goods using driver-controlled forklift trucks to fully Automated Storage and Retrieval Systems (ASRS) under direct computer control. The first WASS installation was made in 1995 at the company's European Distribution Centre (EDC) at Tongeren in Belgium. This is SKF's largest product-storage facility, covering an area of 23,500 square metres with a storage capacity exceeding 100,000 locations that have an average of more than 30,000 products in store. Each day the warehouse handles around 14,000 order lines and moves product volumes totally 160 tons.

Despite the differences at individual sites in terms of physical layout, technology and equipment, WASS provides a consistent method of operation based on a series of standard operations that make sure goods coming into the warehouse are registered, validated and stored in determined locations. It also makes sure that products destined to leave are located quickly and retrieved and that the flow of goods is orchestrated efficiently.

Timely information is the key to operating an efficient warehouse management system. Key vehicles within a warehouse such as forklift trucks are equipped with on-board computers linked to WASS using wireless communication. WASS receives its orders from SKF's customer order-handling systems and transmits these orders to the warehouse so that products can be picked from the appropriate pallet locations. In total, WASS handles between 6 and 7 million order lines annually.

2.2 Profiting from the modern system

WASS has resulted in a number of important benefits. For example, it has enabled SKF to increase throughput without increasing resources. This results in savings in operating costs for warehouse and distribution. As WASS works seamlessly with other computer systems, it means that warehouse and transport control can be integrated, internal transportation can be optimized and greater efficiency in transport volumes can be achieved. The fact that WASS operates in real-time information enables more effective stock control. This means that it is possible to reduce the amount of capital

employed in stock or products in transit.

The transportation management system operated by SKF is, in itself, highly complex. It works to a strict timetable and makes sure that local transport systems link into international freight networks, enabling customers to benefit from an integrated system that minimizes, wherever possible, the time for an SKF product to reach a customer's door. Picking of products within the warehouse, for example, is scheduled according to departure times for the trucks.

The opportunities afforded through computer control to reduce inaccuracies in moving products in and out of the warehouse also offer benefits. Increased quality of service to the customer comes from a reduction in picking errors and correct consignment information. Reduced order lead time and demands for special treatments can be managed and controlled without increasing operational costs.

The growth of e-commerce has significant implications for warehouse and distribution management systems. It puts pressure on companies to respond even faster and to provide a greater amount of information and greater access to that information to the customer than ever before.

2.3 An example

One example of the development in logistics to extract greater efficiencies through the use of e-commerce and warehouse management is SKF's involvement in CoLinx LLC. This is a venture set up in 2006 for the North American market by SKF and other companies to share the costs of running logistics and e-commerce activities and to support growth in that market.

One of SKF products, SIBCO, is manufactured by local subcontractors in North America. However, before year 2006, the SKF's authorized industrial distributors started losing their interest to do business in SIBCO products due to poor delivery reliability. Therefore, delivery reliability became the critical factor to avoid the threat of "Sales Loss" and to win confidence of authorized industrial distributors for future growth in SIBCO sales.

Thanks to using the warehouse and distribution system, the delivery reliability of SIBCO products has been improved significantly. Here Fig.2 shows the

excellent improvement result (broken line and real line stand for the situation of delivery reliability before and after usage the system respectively).

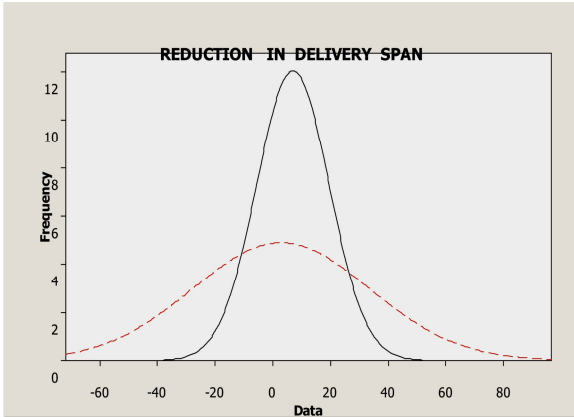


Fig.2 The excellent improvement result

CoLinx LLC operates shared warehouses, a transportation network, freight-bill audit and payment services as well as an information technology group, and it operates in seven locations. Its technology base uses a commercial version of WASS, known as ASTRO, to support all its logistics activities. This system has enabled SKF and its partners to improve their deliveries to customers throughout North America by using a common logistics platform while maintaining control of their own information systems. This reflects the power of a common logistics platform for delivering products to where they are needed.

3 Conclusions

The Warehouse Administration Service System, WASS, is a warehouse management system supplied by ConSafe Logistics. WASS supports the receiving, storing, shipping and inventory management of goods. WASS

makes extensive use of bar codes and radio frequency communication. WASS is used by SKF Logistic Services (SLS) to provide Warehousing Services to both internal SKF customers and external customers as a third party logistics (3PL) provider.

SKF has made a strong commitment to its computerized Warehouse Administration Service System, WASS, which enables SKF to control its product flow from production to the customer. The system now operates in most of SKF's warehouses worldwide and combines software that manages all operative tasks in a global distribution network. WASS has improved productivity through a more efficient workflow. The system has eliminated paper, and the logistics concept employed has enabled novel ways of working and concept of green supply chain.

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