

Advantages and features of cross-docking in international and Ukrainian logistics

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Cross-docking essentially eliminates the inventory-holding function of a warehouse while still allowing it to serve its consolidation and shipping functions. The idea is to transfer incoming shipments directly to outgoing trailers without storing them in-between. Modern logistics distinguishes 4 main types of cross-docking: manufacturing, distribution, transportation and retail cross-docking. As for the products, best suited for cross-docking are perishable goods, high-quality goods, pre-packed goods, etc. Among main advantages of cross-docking we can highlight reduction of transportation costs, faster deliveries and distribution, less risks for inventory handling and damage of goods. Still, cross-docking can be followed with some problems, such as violations in control management, damage of goods during transportation or handling. What is more, not all clients are adapted to the new method of distribution, that can lead to difficulties on particular stages.

Key words: Cross-docking, inventory, warehouse, distribution, transportation.

Савченко Л.В., Кузьменко А. ПЕРЕВАГИ ТА ОСОБЛИВОСТІ КРОСС-ДОКІНГУ В МІЖНАРОДНІЙ ТА УКРАЇНСЬКІЙ ЛОГІСТИЦІ

Кросс-докінг суттєво зменшує потребу у функції зберігання запасів на складі, тимчасом як дозволяє виконувати функції консолідації та відвантаження. Ідея полягає в тому, щоб передавати вхідні відправки безпосередньо до вихідних транспортних засобів, не зберігаючи їх між входом та виходом. Сучасна логістика розрізняє 4 основні типи кросс-докінгу: виробничий, дистрибуційний, транспортний та роздрібний кросс-докінг. Що стосується продуктів, найбільш пристосованих для технології кросс-докінгу, ними є швидкопсувні товари, високоякісні товари, фасовані товари тощо. Серед основних переваг кросс-докінгу ми можемо виділити зменшення транспортних витрат, пришвидшене постачання та розподіл, меншу небезпеку для поводження з товарами та пошкодження товарів. Тим не менш, кросс-докінг може бути пов'язаний з певними проблемами, такими як порушення контролю управління, пошкодження товарів під час транспортування та обробки. Більше того, не всі клієнти адаптуються до нового способу розподілу, що може призвести до труднощів на окремих етапах.

Ключові слова: кросс-докінг, запас, склад, розподіл, транспорт.

Савченко Л.В., Кузьменко А. ПРЕИМУЩЕСТВА И ОСОБЕННОСТИ КРОСС-ДОКИНГА В МЕЖДУНАРОДНОЙ И УКРАИНСКОЙ ЛОГИСТИКЕ

Кросс-докинг существенно уменьшает потребность в функции хранения запасов на складе, при этом позволяет выполнять функции консолидации и отгрузки. Идея заключается в том, чтобы передавать входные отправки непосредственно к выходным транспортным средствам, без их хранения между входом и выходом. Современная логистика различает 4 основных типа кросс-докинга: производственный, дистрибуционный, транспортный и розничный кросс-докинг. Что касается продуктов, наиболее подходящими для технологии кросс-докинга, ими являются скоропортящиеся товары, высококачественные товары, фасованные товары и т.п. Среди основных преимуществ кросс-докинга мы можем выделить уменьшение транспортных расходов, ускоренную поставку и распределение, меньшую опасность для обращения с товарами и повреждения товаров. Тем не менее, кросс-докинг может быть связан с определенными проблемами, такими как нарушение контроля управления, повреждение товаров при транспортировке и обработке. Более того, не все клиенты адаптируются к новому виду распределения, что может привести к трудностям на отдельных этапах.

Ключевые слова: кросс-докинг, запас, склад, распределение, транспорт.

Formulation of the problem: While pursuit of the “perfect order” will always be a daily challenge, today’s global marketplace means that

companies are under increasing pressure to quickly fulfill product orders across complex networks – and to do so without making costly errors

that might drive business away. This has led to a rise in the use of cross docking, and the need for an automated solution that ensures the supply chain is not sacrificing accuracy for speed.

The name 'cross docking' explains the process of receiving products through an inbound dock and then transferring them across the dock to the outbound transportation dock [16].

The main problem is that this technology requires special conditions for the introduction and not every company outside of Europe or the USA can afford it in the short term.

To successfully implement and manage cross docking, it is important to recognize some of the key challenges and associated solutions that go hand in hand with it [7].

Analysis of main sources and publications: The main research in cross-docking today is based on the work of such scientists as James Aaron, Ron Crabtree, Dave Eyestone, Mike Torch, Michael J. Gardner, Kevin Gue, Jeff Cox and others. Significant impact for the existence and future development was also made by scientist of Logistics Institute at Georgia Tech University and University of Houston – Downtown, as well as European Logistics association.

The purpose of the work: Analyze the advantages and disadvantages of cross-docking, the scheme of work, the main areas of application, prospects, as well as the possibilities of its implementation in Ukrainian supply chains.

Materials and research results: Cross-docking is the practice of unloading goods from

inbound delivery vehicles and loading them directly onto outbound vehicles. By eliminating or minimizing warehouse storage costs, space requirements and inventory handling, cross-docking can streamline supply chains and help them move goods to market faster and more efficiently [12]. Cross docking takes place in a distribution docking terminal; usually consisting of trucks and dock doors on two (inbound and outbound) sides with minimal storage space (Fig. 1).

In simple terms, inbound products arrive through transportation such as trucks/trailers, and are allocated to a receiving dock on one side of the 'cross dock' terminal. Once the inbound transportation has been docked its products can be moved either directly or indirectly to the outbound destinations; they can be unloaded, sorted and screened to identify their end destinations. After being sorted, products are moved to the other end of the 'cross dock' terminal via a forklift, conveyor belt, pallet truck or another means of transportation to their destined outbound dock. When the outbound transportation has been loaded, the products can then make their way to customers. The products usually spend less than 24 hours at the terminal, sometimes even less than an hour.

In most cases, the products sent from the manufacturing area to the loading dock has been allocated for outbound deliveries. In some instances, the products will not arrive at the loading dock from the manufacturing area but may arrive as a purchased product that is being

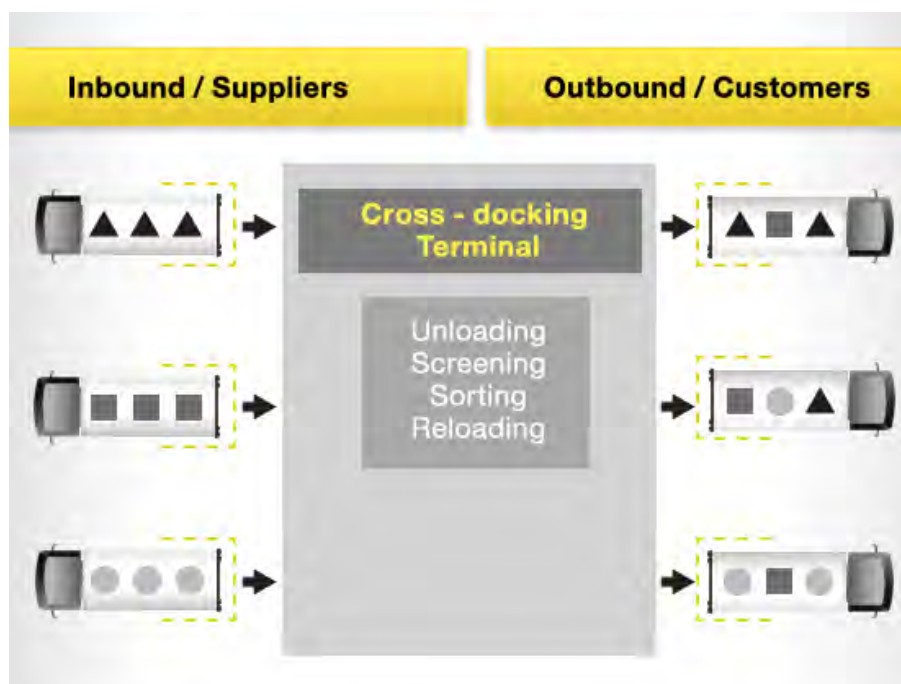


Fig. 1. The process of cross-docking [1]

re-sold or being delivered from another of the companies manufacturing plants for shipment from the warehouse.

Cross docking solutions allow companies to expedite shipments to customers, which means that customers often get what they want when they want it – the goal of optimized supply chain. But the risks of cross docking, which will be examined below – make it a process that's best left for the one-offs and not implemented into your standard operating procedures.

As you may see from the graph below (Fig. 2), *inventory warehouses* act as a buffer against increased demand in a traditional supply-chain model.

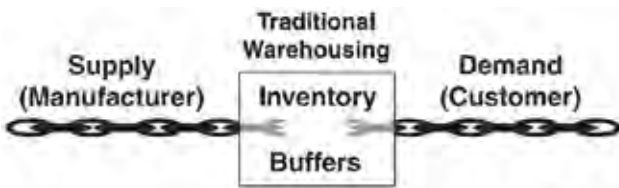


Fig. 2. Supply-chain-management uses inventory buffers (traditional warehousing) [3]

Yet the advancement of technology enabling *real-time information exchange and analysis* has made it possible now to shorten the cushion of supply inventory on hand, such as just in time (JIT) stocking, which enhances a company's operations and inventory efficiency—allowing for less capital to be tied up in inventory (Fig.3).

In simpler terms, cross-docking could be thought of as a hub, or spoke and wheel, network of distribution (Fig.4) like many airlines you may be familiar with use, for example United Airlines in Guam, Cathay Pacific in Hong Kong both use a hub and spoke model for their airline logistics.

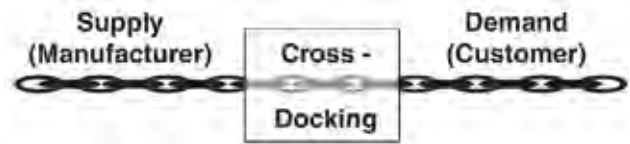


Fig. 3. Synchronized supply chain with cross-docking [3]

Types of Cross Docking

There are a number of cross docking scenarios that are available to the warehouse management. Companies will use the type of cross docking that is applicable to the type of products that they are shipping.

- Manufacturing Cross Docking – This procedure involves the receiving of purchased and inbound products that are required by manufacturing. The warehouse may receive the products and prepare sub-assemblies for the production orders.

- Distributor Cross Docking – This process consolidates inbound products from different vendors into a mixed product pallet, which is delivered to the customer when the final item is received. For example, computer parts distributors can source their components from various vendors and combine them into one shipment for the customer.

- Transportation Cross Docking – This operation combines shipments from a number of different carriers in the less-than-truckload (LTL) and small package industries to gain economies of scale.

- Retail Cross Docking – This process involves the receipt of products from multiple vendors and sorting onto outbound trucks for a number of retail stores. This method was used

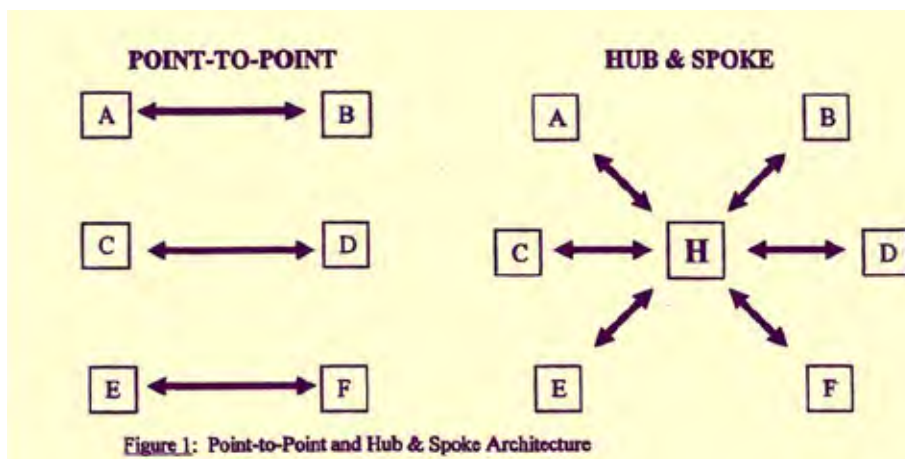


Figure 1: Point-to-Point and Hub & Spoke Architecture

Fig. 4. Shows Point-to-point and Hub&Spoke Architecture of supply chain [17]

by Wal-Mart in the 1980s. They would procure two types of products, items they sell each day of the year, called staple stock, and large quantities products which are purchased once and sold by the stores and not usually stocked again. This second type of procurement is called direct freight and Wal-Mart minimizes any warehouse costs with direct freight by using cross docking and keeping it in the warehouse for as little time as possible.

- *Opportunistic Cross Docking* – This can be used in any warehouse, transferring a product directly from the goods receiving dock to the outbound shipping dock to meet a known demand, i.e. a customer sales order.

Products Suitable for Cross Docking

There are materials that are better suited to cross docking than others. The list below shows a number of types of material that are more suited to cross docking:

- Perishable items that require immediate shipment;
- High-quality items that do not require quality inspections during goods receipt;
- Products that are pre-tagged (bar coded, RFID), pre-ticketed, and ready for sale at the customer;
- Promotional items and items that are being launched;
- Staple retail products with a constant demand or low demand variance;
- Pre-picked, pre-packaged customer orders from another production plant or warehouse.

Advantages and Disadvantages of Cross Dock Solutions

So how does a company decide whether cross-docking is the right fit for its logistics strategy? Here is a list of advantages and disadvantages of cross-docking to assist the decision process.

Advantages of Cross Docking Include:

- *Material Handling.* At the cross docking terminal, material handling will be streamlined and therefore efficiency will be greatly improved (i.e. in-motion labeling, in-motion weighing, label verification, destination scan, etc.).
- *No Need for Warehouse.* In many cases, the traditional warehouses will be replaced by the cross dock facility, which is easier to construct and requires less square footage, and, hence—provides both variable and fixed asset cost savings for a company. When using a 3PL for cross-docking, in a case like Kickstarter or Indiegogo fulfillment, most cross docking companies maintain a dedicated cross dock warehouse.

- *Packaging and Storing Cost.* The storing cost will be reduced because, with this method inventory's time in a warehouse should be minimal, and the extra packaging cost will also decrease due to automation practice in the cross-docking terminal.

- *Transportation and Distribution Cost.* Since products destined for a similar end point can be transported together, there will be full loads for each transportation trip and thus drive down the transportation costs in scale. Additionally, as the routing is now optimized (hub and spoke) with the elimination of unnecessary processes like "pick-location" or "order picking", less miles will be wasted and therefore fuel and associated vehicle service costs will be driven down.

- *Products Screened More Quickly.* Products will be screened more efficiently with the application of streamline and automation at the terminals, this can greatly reduce the time parcel spend in shipment.

- *Products Reach Customers Faster.* As a positive sequel to the accelerated screening process, there will be a high turnover of products which means that products can now be delivered sooner to the customers [4].

- *Less Risks for Inventory Handling.* Since a warehouse is no longer needed, concerns of inventory management risks are no longer necessary.

However, besides the upsides of cross-docking, one should also consider the relative risks of your cross-docking strategy. Below are a couple of risks that we have identified.

Disadvantages of Cross-Docking to Consider:

- *Partners May not Have Storage Capacities.* Cross-docking helps cut cost with the elimination of warehouse, yet if the company's potential partners do not have the necessary storage space, the inventory problem will be a burden for effectively implementing cross dock.

- *Freight Handling May Cause Product Damage.* As the cross dock is well calculated in order to implement, any additional freight handling may jam the system and cause damage among products.

- *Management and Attention Required.* Efforts to set up a cross-docking system cannot be overlooked. It takes time, planning and money to design for it to work effectively. In addition, labour costs are also inevitable for the moving and shipping of stocks at the terminal.

- *May not Deliver Right Product On Time.* Outbound users have to bear the risk that a supplier might not be able to deliver the right product in its right amount on time due to a systematic error.

Apart from the risks associated with cross dock for the supplying company, here are a few more prerequisites to check off the list:

- *Adequate Transport Carriers.* A sufficient amount of transportation fleet is needed in order for a cross dock to run smoothly as a large amount of its process depends on its shipping.

- *Computerized Logistics System.* It is very important to have an intelligent integrated system enabling suppliers to keep abreast of the latest point-of-sale information (i.e. sales activities and trends) which offers insight of future orders. For instance, Wal-Mart with 85% of its merchandise using cross-docking operation, is known to use a private satellite communication system to transmit its real-time information to the users.

- *High Volume to be Cost Effective.* Economies of scale also applies here. High amount of products can drive down costs including operating costs and transportation costs.

Cross-docking as a result of success of European companies

Nowadays, cross-docking became one of the main logistics target function for TOP European companies, such as Pfenning [13], Lufapack Fulfillment [14], Yusen Logistics [15], etc. Especially in the case of high-volume products with high inventory turnover frequency or of products with constant high sales quantities (e. g. articles always sold at a low price), it makes sense to reduce the conventional inventory warehousing to a minimum or to do without it completely. In such logistics systems, goods are pre-commissioned direct to the receipt area via a trans-shipment platform, the “cross-docking point”, for example to a branch store. Whether we are talking one-step or multi-step cross-docking, depends on whether the goods are delivered to the branch store “as packed by the supplier”, or are bundled into logistical units at the cross-docking point and issued to the branch [8].

One of the best examples of cross-docking importance is “Walmart Logistics”. Walmart is the largest retail corporation of discount department and warehouse stores in the world. In 2017, the company's global net sales amassed approximately 481.32 billion U.S. dollars. These figures have grown considerably over the last few years; increasing about 0.8 percent in 2017 compared to the prior fiscal year. Walmart's market share in 2017 was up to 5 percent in electronics & media. As of the 2017 fiscal year, the company operated more than eleven thousand stores throughout the world and this figure is more than likely to increase as the company continues to expand into new markets [9].

The use of cross-docking in Ukraine

In August of 2009, the company “Raben Ukraine” opened the first in Ukraine professional cross-dock area of 5400 m². Cross-dock is located on the street. Brovarsky, 150, smt Bolshaya Dymarka (Brovarsky district, Kiev region). Now there are about 13000 m² of cross-dock area of classes “A” and “B”.

51 hydraulic loading and unloading ramp, two entrance gates of the new warehouse are designed exclusively for reloading cargo. Thus there is no long-term storage area. The efficiency of work on the processing time of cargo increased by 30%, operational capacity – by 140%. Cross-dock is equipped with a system of 24-hour video surveillance and all processes are based on the use of scanners, without which the work of professional cross-dock is almost impossible [5].

There are several methods of the cross-docking in “Raben Ukraine”.

The transshipment of goods. The method includes the reloading of goods from one transport into another, often of a different type. For instance, from a van into a car or vice versa.

The delivery of cargo, sent from different manufacturers. This method allows to combine (commingle) goods from different suppliers into one party which will soon be sent to a customer. Shot lots of different cargos are first delivered to a cross-docking site, then they are reloaded to a single transport and sent to a final customer.

The retail distribution of a shipload. Cross-docking also gives a possibility to receive a bulk quantity of goods from the manufacturer and then send it in shot lots to several market outlets.

By virtue of these methods and the availability of customs-licensed warehouse “Raben Ukraine” has a possibility to get customs clearance of goods as and when necessary or not to get it at all (if the goods go in transit under customs control), resale cargos changing the cost of goods, the seller, the customer and so on [6].

Conclusion. Cross-docking shows great results during being applied by European logistics companies, such as Zammler, Walmart and others. It has a great potential for future development of economic stability of any country, but requires introduction of new working conditions, especially in Ukraine. Our companies face a number of limitations, like lack of financial investments, caused by high rent prices for warehouses. In addition, cross-docking must be supported with well-managed technological and software innovations, what can be reached by full transformation of companies' organization model.

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