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LOGISTIC CENTRE AND INFORMATION TECHNOLOGY

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1. Introduction

With the advancement of information technology and increased market competition, companies are driven to employ supply chain management strategies to seek competitive advantage. Managing logistics is one component at the core of such strategies. An effective logistics system ensures delivery of the right products and services to the right customers at the right time while minimizing costs and rewarding all participants based on value added to the supply chain. As a component of a logistics system, logistics centres can serve the industry by offering services (storage, transport, distribution, assembly, consolidation, sorting, cross-docking, e-commerce, etc.)

Storage: storage at a logistics centre can reduce supply chain costs due to reduction in inventory costs and possible economies of scale in purchasing. Variations in demand across different projects are combined into one pool of inventory resulting in lower levels of safety stock required to compensate for variations. Thus total inventory is lowered due to pooling or aggregation.

Transport: Depending on the location and function of a logistics centre, transportation costs can be lower or higher depending on the trade-off between inbound

and outbound transportation costs. A shorter lead time is also possible but is related to location and other factors.

Distribution: Various distribution methods can be applied such as direct shipment or milk runs. Material stored at a logistics centre can be supplied just in time (JIT) due to possible proximity to projects.

Assembly: Logistics centres can have assembly capability to supply made-to-order products with a short lead time. Made-to-stock products can be kitted at logistics centres with engineered-to-order products to form assembly packages. In addition, logistics centres can be used to adjust assemblies facing design changes thus, reducing the adverse impact of changes that are ubiquitous in construction.

Consolidation, sorting: On one hand, material ordered in bulk at possibly a discounted rate can be separated at the logistics centre, sorted, and then shipped to the designated project. On the other hand, material coming from different suppliers can be consolidated and then shipped to a certain project.

Delivery and package tracking: Using information systems (e.g., radio frequency identification or RFID), a logistics centre can track the status of material and vehicles throughout the supply chain. This can increase delivery reliability when it comes to correct material orders and timely deliveries.

E-commerce services: E-commerce adds value by replacing physical paper-handling practices such as ordering with electronic ones, thus reducing cost and time. When equipped with the necessary information systems, a logistics centre can apply ecommerce services such as vender managed inventory to reduce lead times and costs while increasing supply chain reliability.

Definition: Logistic Centre is the hub of a specific area where all the activities relating to transport, logistics and goods distribution – both for national and international transit – are carried out, on a commercial basis, by various operators.

The term “logistic centres” generally denotes those sites specially organized for carrying out logistics activities.

Logistics centres generally refer to areas where goods can be stored free of duty and value added tax. They are classified into two basic categories, Type A and Type B.

Type A can be further divided into 2 categories:

- Public logistics centres, which are operated by companies specializing in the logistics business to provide warehousing and logistics services to the public; and

- Private logistics centres, which are operated by companies to provide warehousing and logistics services to themselves and their affiliates.

A Type B logistics centres is an area that is administrated by one company and allows other companies to lease warehouse space to carry out warehousing and logistics services.

2. Why is a Logistics Centre Needed?

Intermodal transportation facilities are an increasingly important tool for transportation planners around the world, and serve a vital role in the global supply chain by ensuring the safe and efficient movement of freight. Some anticipated benefits include:

- Reduced road congestion and air pollution associated with a shift from truck to rail transport,
- Increased regional capacity for handling higher volumes of cargo more efficiently,
- Operational efficiencies leading to enhanced regional competitiveness in goods distribution,
- Value-added opportunities for new rail-dependent manufacturers and other businesses
- Less environmental impact regionally due to centralized siting of various transportation components,
- Increased regional rail-transport vitality which may improve other services such as passenger transport.

The operators may be either owners or tenants of the buildings or facilities (warehouses, distribution centres, storage areas, offices, truck services, etc.) built there. In order to comply with free market rules, a Logistics Centre must be accessible to all companies involved in the activities set out above.

A Logistics Centre must also be equipped with all the public facilities necessary to carrying out the above-mentioned operations. If possible, it should also include public services for the staff as well as users' equipment. In order to encourage intermodal transport for goods handling, a Logistics Centre should preferably be served by a variety of transport methods (roads, rail, sea, inland waterways, air).

It is vital that a Logistics Centre be managed as a single and neutral legal body (preferably by a Public-Private-Partnership) if synergy and commercial cooperation are to be ensured. Finally, a Logistics Centre must comply with European standards and quality performance in order to provide the framework for commercial and sustainable transport solutions.

Logistic Centre is to assure a high quality level, generating the following transport system effects:

- Optimization of the logistics chain,
- Optimization of lorry utilisation,
- Optimization of warehouse utilisation,
- Optimization of manpower organisation.

3. Intermodality development

Road transport is still the most common transport mode in Europe. According to the White Paper, the demand in road transport has been constantly increasing over the last 20 years, against a steady decrease in rail freight transport. This considered, the most important goals of a Logistics Centre are to bring together the flow of the freight transport managed by the transport and logistics operators; offer very convenient transport and synergic solutions (rail/road/short-sea-shipping), using block shuttle trains on long-range journeys.

Multimodal transport – the use of a number of different forms of transport to move goods, usually meaning more than two modes of transport

Intermodal transport – involves unitized freight movements using more than one mode of transport.

Combined transport – the use of road and rail for the movement of goods in one journey.

4. Location

Location is a key factor for all the transport operators whose main activity is moving freight from one place to one another using different modes of transport. Optimization – or rather reduction – of the delivery time to the final destination or to the following passage of the logistics/transport chain is one of the elements that could make that important difference when a transport operator is being chosen. Assuring fluidity between all the transport connections and coordinating all the transport modes are some of the tasks of a Logistics Centre. This is why most European Logistics Centres are located in hub points for transport and distribution activities. Location at a hub point means, in short, being near the main railway, motorway and seawayarteries.

5. Activities

It should be remembered that the activities referred to in this point are exclusively specific to the company managing the Logistics Centre.

Defining infrastructure necessities

These being:

- Road connections,
- Rail connections,
- Connections with ports.

Defining the Logistics Centre layout

Considering:

- Customs infrastructures,
- Postal/bank/insurance services,
- Offices,
- Intermodal terminals,
- Warehouses.

6. Advantages

Operating inside a specialized area dealing solely with transportation and equipped with all the connected services implies, for transport and logistics operators, benefiting from many advantages:

- Connection with the main road/rail/port networks,
- Transshipment availability,
- Using integrated logistics services,
- Using public services.

7. Importance of information technology

Today, technology is the driving force behind growth, development, and increased productivity around the world and in the distribution and logistics industries. Technology has produced a wide range of innovations, including barcode scanning, automated storage and retrieval systems, state-of the art material handling equipment, computerized freight tracking, voice recognition and advanced communications systems, and the automated purchasing, production and sales systems that support just-in-time inventories and distribution.

The information is the most important strategic resource of the logistics centre, proper handling and processing of information are elementary. That is why up-to-date telematics solutions have to be applied that are based on open network concept. Since the multi central system is built up by more or less independent companies the most important issue of the joint operation is the informatics.

The appropriate open informatics system consists of three separated domain:

- Internal management and controlling system which is an integrated system based on usual modules. It supports the internal informatics and controls the use of resources. Because the features of logistics services different mobile telematics solutions are to be applied.
- Management and control of logistics service centre, in which the planning and timing of capacities are done, marketing activity and joint economic operation are served
- External informatics system, that sets the connections and links to customers and other external informatics systems. It provides information about the offered capacities and services, makes dispositions and traceability possible, supports EDI (Electronic Data Interchange), enables outsourcing.

8. Utilization of RFID technology in the logistic centre

Radio Frequency Identification (RFID) shows great promise for addressing several of the logistics above by providing nearly autonomous inventory management. RFID is a generic term for technologies that use radio waves to automatically identify objects.

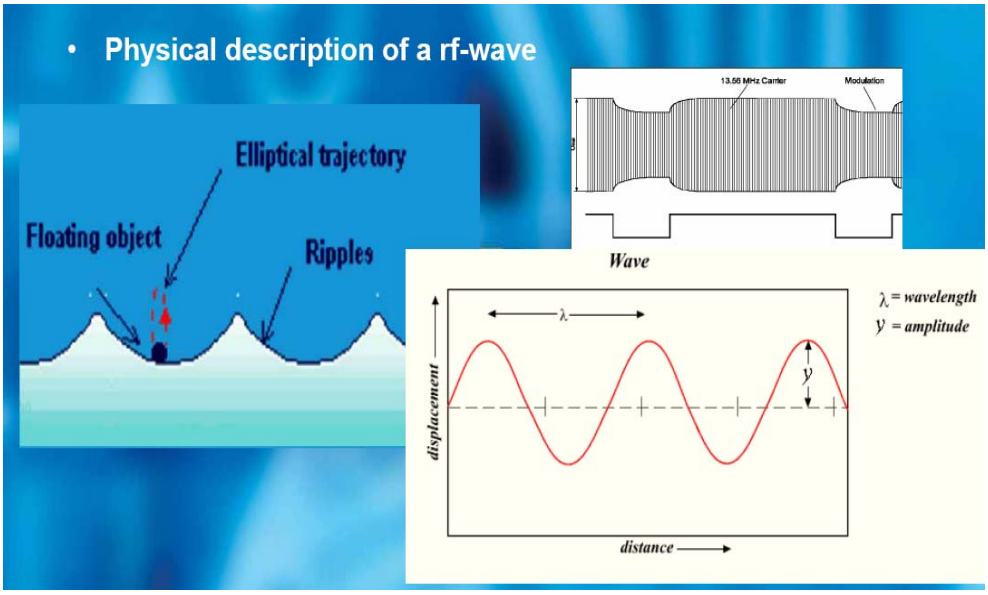

Fig. 1 *RFID is based on radio waves*

There are several methods of identification, but the most common is to store a number that uniquely identifies an object on a microchip that is attached to an antenna, which in turn is attached to the object.

The chip, which is typically less than 5 mm across, activates a signal when it approaches an electronic reader. Following figure 2 shows trend of prices RFID tags.

The primary difference between RFID and the barcodes is that RFID does not require line-of-sight. Barcodes must be scanned at specific orientations to establish line–of-sight between the barcode and the reader, while RFID tags theoretically need only be within the range of a reader to be read. With no line-of-sight requirement, the tag transmits information to the reader, and the reader converts the incoming radio waves into a form that can be read by a computer system. An RFID tag can be active (with a battery) or passive (powered solely by the signal strength emitted by the reader). RFID systems must be supported by an advanced software architecture that enables the collection and distribution of location-based information in real time.

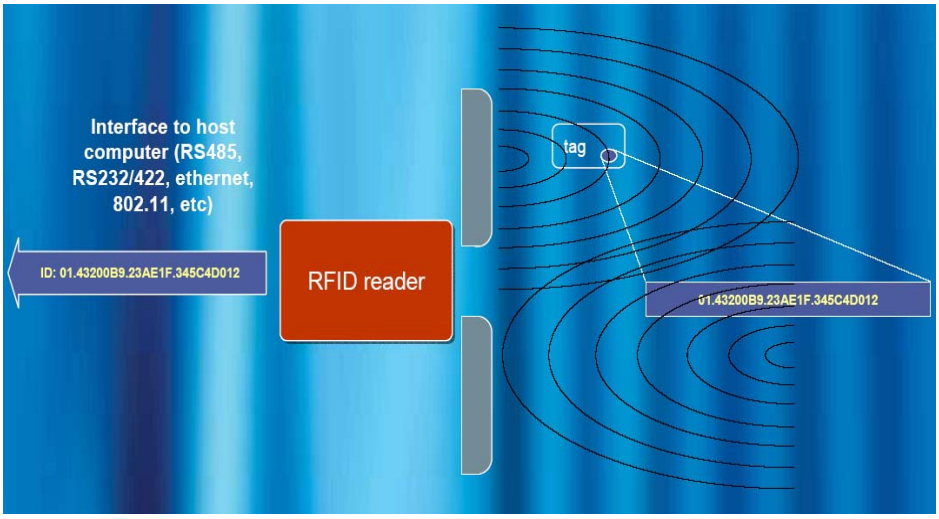

Fig. 2 *Dropping Prices for RFID Tags open new Markets*

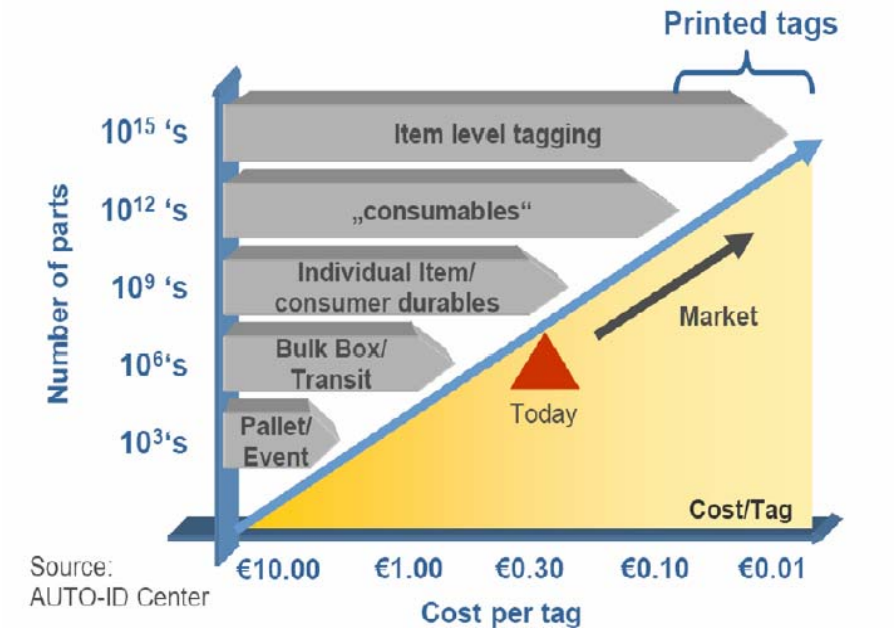

Fig. 3 *Working principle RFID*

An RFID system consists of tags and readers. RFID tags are small devices containing a chip and an antenna that store the information for object identification.

Tags can be applied to:

- containers,
- pallets,
- cases,
- means of transport

RFID - a logistics centre can track the status of material and vehicles throughout the supply chain. This can increase delivery reliability when it comes to correct material orders and timely deliveries.

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Resumé

LOGISTICKÉ CENTRUM A INFORMAČNÍ TECHNOLOGIE

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Příspěvek se zabývá problematikou logistického centra a informační technologie. Dále popisuje služby (např. skladování, doprava, distribuce, třídění, konsolidaci zásilek, atd.), které nabízí logistické centrum. V současné době má velikou významnost a důležitost využívání moderních informačních technologií v rámci logistického centra. V další části příspěvku je popsána moderní technologie radiofrekvenční systém identifikace (RFID) a její možnost využití v logistickém centru.

Summary

LOGISTIC CENTRE AND INFORMATION TECHNOLOGY

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This article deals with the logistic centres and information technology. A logistic centre is the hub of a specific area where all the activities relating to transport, logistics and goods distribution – both for national and international transit – are carried out, on a commercial basis, by various operators. The operators may be either owners or tenants of the buildings or facilities (warehouses, distribution centres, storage areas, offices, truck services, etc.) built there. In order to comply with free market rules, a Logistic Centre must be accessible to all companies involved in the activities set out above. A Logistic Centre must also be equipped with all the public facilities necessary to carrying out the above-mentioned operations. If possible, it should also include public services for the staff as well as users' equipment. In order to encourage intermodal transport for goods handling, a Logistic Centre should preferably be served by a variety of transport methods (roads, rail, sea, inland waterways, air). Today, thanks to technology, many distribution operations are computerized, automated, and equipped with state-of-the-art material handling equipment and information systems.

Zusammenfassung

LOGISTIKZENTRUM UND INFORMATIONSTECHNOLOGIE

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Dieser Beitrag fokussiert auf das Logistikzentrum und auf die Informationstechnologie. Das Logistikzentrum bietet verschiedene Dienste (zum Beispiel: die Lagerhaltung, der Transport, die Distribution, die Sortierung und so weiter) an. Der artikel behandelt Radiofrequenz-Identifikation RFID auch.