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WAREHOUSING METHODOLOGY

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Introduction

Warehousing is one the most important parts of logistics system, which provides storing of products (e.g. raw materials, parts, semifinished products, products) at places of their origin and between the place of origin and the place of consumption. It also provides information about state, conditions and placement of storing products to the management. Warehouses enable to get over space and time. Manufacture stocks secure the continuity of production. Trade goods stocks secure fluent supplying of consumption business chains.

1. Organization inside the dispatch store

The main object of the chapter is to disclose critical (uneconomic) places and to propose new solutions in work organization and technology of warehousing [1].

- split the storage (area) of dispatch store on the basis of stock holding,
- hierarchic split from several main warehousing sectors up to single pallet places,

- mark warehousing places with care (we advise the "Jungheinrich" system),
- implement an IS (information system) for gathering information about goods location in the store according to sector split,
- optimize the placement of goods in store with reference to quantity and stock turnover of the goods and traffic and handling costs,
- make the best account of store volume - vertical stocking (level stocking), make use of rack systems.

Store split

In order to have accurate records of warehouse goods' location it is necessary to split the store into sectors and faithfully record single warehousing places so placements of goods into these places. Warehousing halls are meant to be the main sectors. Further split would be according to the rack rows. The pallet place would be the final level to be recorded. It is necessary to respect those at marking in the store.

Store information system

The effectiveness of the store split and marking would extensively increase when using an information system to record the placement of goods. The condition is that the IS is linked with the order system, thanks to that it is easy to print the dispatch document for a concrete order – a list of goods with their accurate location.

By using an appropriate information system it is possible to find out the accurate position of every concrete goods. The disadvantage is in the need of faithful data input entering (location of goods), which is entirely a human activity in the reason about conditions.

The information system should meet following requirements [1]:

- a) Basic data controlling:
 - the store and the in-store places,
 - in-store equipment, vehicles.
- b) Stock receipt - recording and processing the stock receipt.
- c) Stock release:
 - recording and processing the stock release,
 - list of cases and delivery notes,
 - parcel stickers.
- d) Factorial stock keeping - automatic and manual preparation of goods for commission.

e) Store management:

- automatic and manual place assignment in store,
- stake strategy according to different criteria,
- free place operating,
- the restocking and out-stocking function.

f) Statistics:

- times and sorts manipulation,
- stock movement,
- stocking goods time.

It is advantageous to link this IS with the corporational system. Co-operation with system of orders is a necessity. By the help of the IS it is quite easy to get the statistics. The statistics and the “history” are very important for future strategic decision making [1].

Some examples of firms dealing with information systems in transportation and logistics:

- CID International Inc. – LOGI – <http://www.cid.cz/logistika.htm>
- Oltis Ltd.
- ICZ Ltd.
- Jerid Ltd.
- Unis Computers Ltd.

Marking in the store

It is necessary to mark sectors and other stocking places graphically – solid placement of permanent schedules with numerical code (mark) of concrete storage place. For this marking we advise to use the “Jungheinrich” system. Using this marking may minimize needless rides because of searching, detours and commotions, which are retarding access times in storage and they are expensive. The help of uniform organizational numbering can realize every warehousing strategy: places assignment (quite chaotic, in part chaotic, fixed), alphabetic classification, route optimisation, route optimisation, and inventory management [2].

At placing schedules optics play an important role. Properly designed size, colour, and font type lead to a fast and easy recognition even from a larger distance!

For efficient traffic control of handling devices inside the store it is necessary to mark the path, roadways, their delimitation, routing, and orientation legends. Suffices by colour on store floor.

Description of number code system

The logic of store split matches the 3D system of coordinates, which unmistakably defines every rack place. The Z-axis belongs to rack series or rack aisles. The X-axis belongs to lengthways position. The Y-axis belongs to vertical position. This way numerically constructed key contributes essentially to rationalization by the help of organizational numbering. Numeral key faces without complication, quickly and in work-methodical logical sequence to rack places [4].

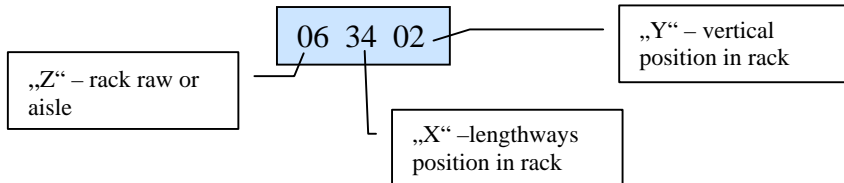


Fig. 1 Numerical code example

This numerical code has many advantages. It is simple, extensible, supports an easy orientation in the store and it is easy to remember. Plus it optimally suits for computer application.

2. Location of regional stores

For a detailed analysis it is necessary to know the detail logistic costs [4]:

- stocking in the central store and also in each regional distributive store,
- handling in the central store and also in each regional distributive store,
- cost of supplying the regional distributive stores,
- distribution and delivery in attraction periphery.

Establishment of a delivery store is useful, if the savings on transportation costs and increasing amount of delivery exceed the hold costs. It is necessary to start from comparing the costs of private (or external rented) store, from distribution costs and from the number of these regional stores.

Following graph shows the transport and inventory costs increase along with more stores, and decreasing distribution costs of these stores. The cumulative curve of total costs optimal shows number of distributive stores in its minimum.

Geographical allocation of stores can be solved by a help of locate-allocate methods. The size of demand in single regions (microregions, towns, municipalities), transportation network of CR, unitary delivery costs of trucks and delivery vehicles [4].

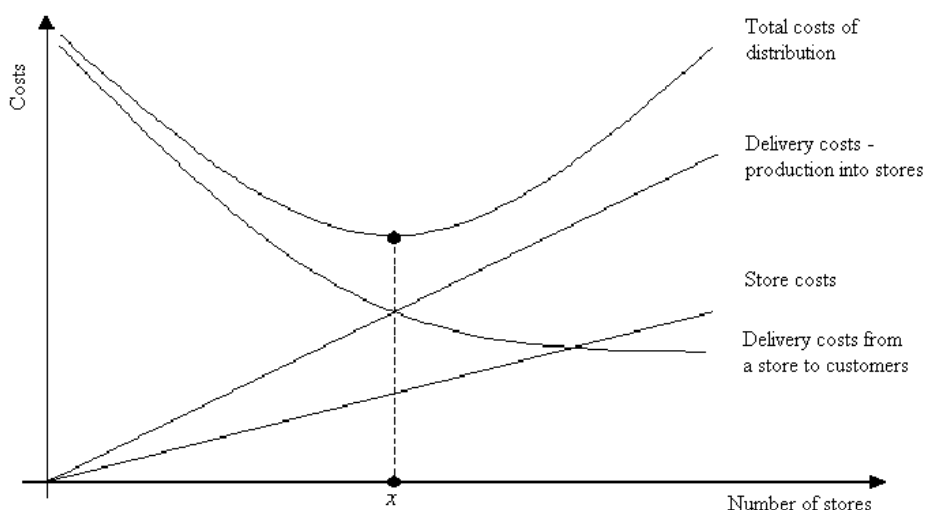


Fig. 2 Distribution costs depending on number of stores

The x point shows the optimal number of stores with minimal costs of distribution.

Organizational changes in production

In order to decrease the need for store spaces it is necessary to improve the production capacity adaptation to demand – seasonal fluctuations.

Stocking is generally an expensive necessity. Though the goods do not gain any additional value. It is necessary to minimize the time needed for stocking produced goods, thus to change the product on the production lines more often and to limit the necessity of stocking a huge amount of one-assortment-goods thanks to that.

For the change of product on the line decision making it is necessary to know these in detail [3]:

- the production lines efficiency,
- the heftiness (financial, time) of changing the product on the production line,
- the period of goods turnover (for how long an average sort of goods is in the store),
- the pallet storage costs.

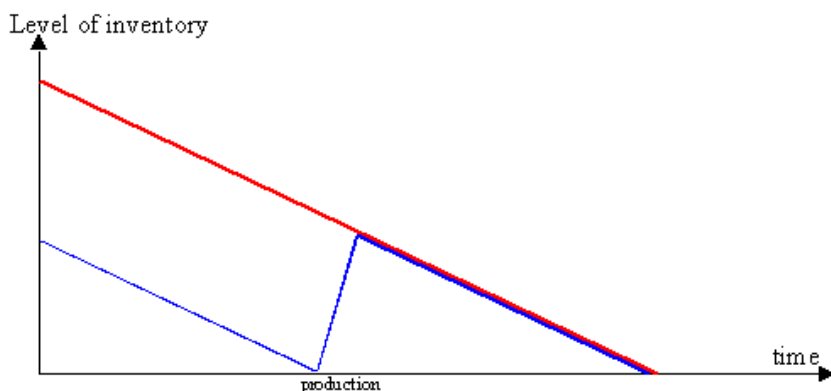


Fig. 3 A lower level of inventory on a change of a product on a production line

A lower need for store capacities on more frequent change of product on the production line results from the graph. The curves describe the stock reduction (of the product) per a certain period. The production of this product must be reopened before the inventory level fall under zero. The blue curve shows the inventory level on condition that the production will restore twice during the monitored period against the variant shown by the red curve.

The store information systems are nowadays necessary for an effective inventory management.

3. Analysis of private or hired (external) store

It is necessary to respect a high number of criteria for the decision making. This criteria contradict each other often.

After simplification, we can say, that one's positives are also the other one's negatives and on the contrary. A brief statement of the positives and negatives of both variants comes after [3].

Private store

Positives:

- less costly from a long-term viewpoint,
- affinity to the firm,
- easier communication (the rules already exist),
- possibility of using know-how of the foreign affiliations,
- the store specialized on its private goods,
- direct control of private goods.

Negatives:

- necessity of private heavy investments,
- problem of putting these one-shot investments through the management,
- no-flexible,
- longer-range return on capital.

Hired store

Positives:

- capital modesty (there are no high costs of building expended at once),
- stricter and accurate cost monitoring (billing),
- higher flexibility, operational working in cases of recession and expansion, during the peak and valley point periods,
- generally a higher flow supervision,
- responsibility delegation on the store operator,
- there is an effect of savings on extent for the store operator,
- the operator provides the personnel,
- additional services.

Negatives:

- selection of a proper store,
- the necessity of the communication standards setting (information systems, terminology, technology, etc.),
- problematic direct communication with a customer,
- operator's lower affinity to the trademark.

	Private store			Hired store	
unstable demand (seasonal character)					X
long-term footing on the market	X				
Fixed, established products	X				
concentrated and stable market		X			
No need for high stocking security				X	
necessary product quality			X		
Stocking and dispatching specialization				X	

Fig. 4 Comparison for the choice of private or hired warehouse

Conclusion

The article solves the problematic of warehousing that plays an important role in all branches of national economy. Logistics activities are required on account of the change of production technologies. Producers of final products realize their completion from delivered components or units. From this the requests for material flows management and physical distribution are increased. The field of storing operations plays here the most important role. New logistics technologies look for the optimization of these processes on account of determination of storing capacity. Modern traffic and transportation technologies decrease costs for transportation and that is the way why we tend to central warehouses in service systems, so called HUB (Hub and Spoke, Nabe Speiche). The level of stores of final products is solved in the article also with the view of changes of production lines, where costs for changes of a production line are compared with costs for production storing.

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Resumé

METODIKA SKLADOVÁNÍ

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Příspěvek řeší metodiku skladování, jako jednu z velmi důležitých činností logistiky. První část řeší organizaci uvnitř skladu a popis kritérií pro informační systém. Druhá část popisuje nákladovou funkci distribuce. Optimální počet skladů odpovídá minimu této funkce. Třetí část uvádí metodické posouzení pro rozhodnutí o vlastním nebo pronajatém skladu.

Zusammenfassung

DIE METHODIK DER LAGERUNG

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Der Beitrag löst die Methode für die Lagerung, als sehr wichtigste Tätigkeit des Logistik. Erstes Teil löst die Organization im inneren Lager und die Beschreibung der Kriterien für das Informationssystem. Zweites Teil beschreibt die Kostenfunktion der Distribution. Die Optimalzahl

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der Lager antwortet auf das Minimum dieser Funktion. Drittes Teil führt die methodische Einschätzung ein für die Entscheidung über eigenes oder vermietetes Lager.

Summary

WAREHOUSING METHODOLOGY

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The article solves the warehousing methodology as one of the most important logistics activities. The first part describes organisation in the warehouse and criteria description for the information system. The second part describes the cost function of distribution. The optimal number of warehouses corresponds to the minimum of this function. The third part brings the methodology evaluation for decision making of private or hired warehouse.