Advanced Logistic Systems Vol. 8, No. 2 (2014) pp. 35-50

THE EFFECT OF DIFFERENT PACKAGING CONCEPTS ON LOGISTICAL COSTS AND STOCKS

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Abstract: With the choice of the proper packaging of the product to be transported our objective is to keep the products safe and whole. Furthermore, besides supporting marketing goals other objectives are the reduction of stocks deriving from logistical costs and lead time, avoiding losses deriving from damages and compliance with expectations regarding cleanliness, etc. The aim of this study is to introduce the correlations between stock changes and costs incurring from different packaging concepts. The cost elements are introduced along certain packaging alternatives and along a diversely narrowed supply chain. These cost elements need to be quantified throughout the calculation process. The aspects of selecting an optimal packaging concept can be conducted along three significant dimensions which are the following – cost, stock, impact on environment.
Keywords: wrapping, packaging concept, cost, stock, efficiency

1. Introduction

The activity of packaging is of strategic importance nowadays in operating efficient logistical processes. In order to meet the expectations of our partners and to stabilise our market position it is necessary to develop an efficient and economical packaging concept with the support of our suppliers.

It is necessary to use standardised packaging materials in order to manage efficiently the large quantity of goods arriving to the manufacturing plants, and the expectations need to be precisely defined towards our suppliers.

It is practical to integrate the wrappings into the complete material flow including the packaging process conducted by the supplier, dispensing, transportation, reception of goods, incidental processing in production and stock management, and warehousing before assembly. The proper packaging device contributes to reaching numerous goals [7]:

- more rational manageability,
- flexibility,
- lower costs,
- efficient protection of goods,
- reliable transportation,
- efficient stock management.

In order to maintain low stock levels and flexible procurement management it is practical to determine the minimal delivery quantity in case of each supplied item according to the smallest packaging unit, that is one box quantity each. In case of each transportation the optional multiple quantity of the minimal delivery quantity can be ordered flexibly from

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the supplier – taking into consideration the stack management principles – deriving from the low delivery quantities and based on the determined demand and prescheduled frequency of product delivery.

2. The structure of packaging concepts

In order to reduce stocks and costs we need to determine the optimal packaging unit and the size of the box in case of each item being supplied. Several aspects need to be taken into consideration when selecting the type of the empties:

- utilising the storage capacity of the box,
- gross weight of the box,
- number of material movements, etc.

At first the development of emerging demands during supply period time can be used as a good starting point when the optimal box size needs to be determined. At this point in case of determined demands it is worth taking into consideration the actual data of previous periods and the expected demands of upcoming periods. Being aware of the demands, by simulating the packaging quantity article by article the number box movements of each period can be calculated. Thus it turns out how many boxes are necessary to serve the emerging production demand for a given period. Our goal is that the content unit of each box should cover the complete lead time for the smooth supply of production in case of normal production utilisation, but should not result in unnecessarily high stock levels.

The following aspects need to be taken into consideration when selecting the proper wrapping: size of the product, distance of supplier, the typical volume arriving from the supplier and expenditures of packaging activity.

In case of a single use wrapping it is worth using those box types in practice in which the boxes can be stably put and adjusted to each other, the smaller boxes can be perfectly adjusted to the profile of the bigger boxes. In order to reduce the transportation costs of empty wrappings we can use conically adjustable, thus concealable and collapsible wrappings. A wide spectrum of the above type wrappings are available in the market [10].

During the determination of the packaging concept we need to choose from fundamentally two different methods:

- packing in single use wrapping,
- packing in multiple use wrapping (Figure 1).

In each case from the above methods the analysis need to be carried out with regard to the evaluation of the different categories of expenditures and the advantages and disadvantages related to the given method. During the evaluation the following most important cost elements can be compared in case of different methods considering the data of given factual period with the simulation of real transportations and using historical data [9]:

- procurement cost of wrapping,
- transportation cost,
- packaging expenditures,
- cleaning of wrappings,
- managing generated waste,

- the stock level of purchased parts,
- internal lead time,
- cost of product damage and complaints,
- cost related to stock level, etc.

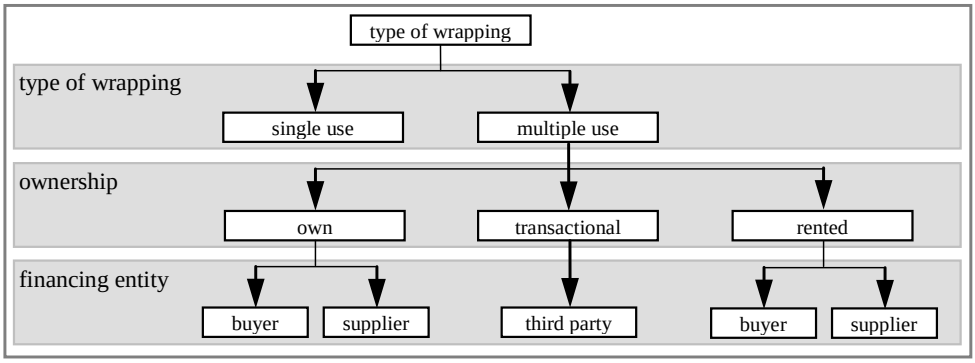


Figure 1. Systemizing packaging concepts

3. The effect of packaging concepts on costs

Among the cost elements related to packaging the costs related to wrappings and the human resource cost of packaging can be mentioned as well. Among the costs related to wrappings further categories are distinguished such as costs related to procurement, costs related to stock and eventually costs related to the management of the generated waste [1].

The analysis can be further divided according to the place of the emergence of costs. It raises the question who pays for which items or processes within the supply chain, namely which costs and in what proportion the supplier and the buyer share.

Throughout the packaging concept more versions can be generated depending on the fact whether single use wrappings or multiple use wrappings are integrated into the system. In the latter case further analysis may be conducted concerning the fact that which market participant will invest in multiple use wrappings, thus other participants can enter into the conventional supplier-buyer chain.

In case of single use wrappings the procurement cost of wrappings incur each time and typically the supplier finances it who indirectly integrates this cost into the price of the parts. As a result in case of suppliers using a multiple use wrapping this cost is subject to agreement, in some cases the supplier decreases the prices proportionate to the cost of the wrappings partly or completely (Figure 2, version a.).

The procurement cost of multiple use wrappings can mean a huge burden due to the one time investment cost, but during the expected life cycle multiple returns can be realised. When procuring own multiple use wrappings it has to be considered that the logistical needs of the whole procurement need to be planned which can show a multiple value compared to the stocks in the warehouse. On the whole when determining the procurement and operational arranging demands we need to expect the use of wrappings at the following places:

- the wrappings of purchased parts stored in warehouse;

- the wrappings of purchased parts used in production processes;
- wrappings to be washed and wrappings being washed;
- accumulated buffer stock in order to be able to fulfill fluctuating demand;
- empty wrappings on the road towards the supplier, as transit stock;
- the wrappings of the purchased parts on the road from the supplier to the plant, as transit stock;
- buffer stock at the supplier.

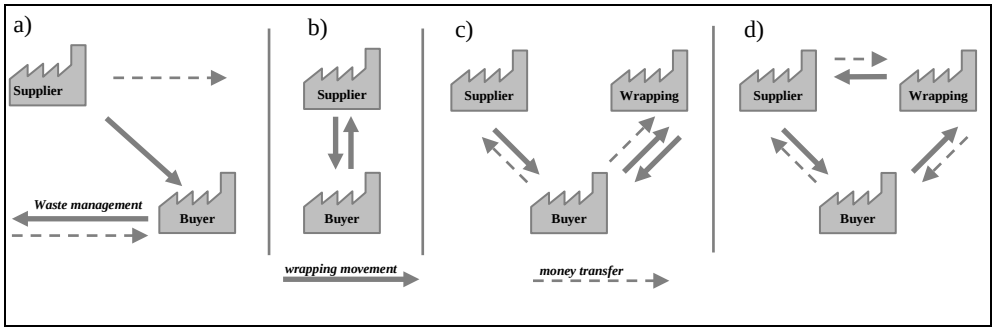


Figure 2. The operational model of different wrapping concepts

As a result of the above, considering the complete procurement logistics, the demand of the wrapping stock can be multiple of the stock range of coverage of the purchased parts (Figure 2, version b).

The procurement cost in case of the third version is the rental fee of the wrapping which can be analysed by requesting bids from several service providers. The advantage of the rented wrappings is that they are typically supplied in a washed condition and with minimal excess stock, and the supply and collection of the wrappings are managed with the involvement of a collection point located closest to the plant. This way the transportation costs of the empty wrappings to distant locations can be decreased (Figure 2, version c).

One of the characteristics of the transactional wrappings is that in case of each transportation the wrapping used for the packaging of the supplied parts is resold for a predetermined price. The part supplier purchases the clean wrappings from a given distribution centre which is resold to the buyer parallel with the parts typically for the same price as the procurement price. The company purchasing the parts resells the empty wrappings to the distributions centre (collection point). The repurchasing price of the wrapping is a predetermined lower amount. This margin covers the cost elements of the transportation, wear and tear, cleaning of the wrappings and the calculated profit of the distribution centre. Of course according to the agreement between the buyer and the supplier this utilisation fee can be optionally divided between them (Figure 2, version d). Further advantage of this concept is that always the necessary, but sufficient amount of clean wrappings are available in the supply chain, and regardless of the usage time there is no daily rental fee. This method is typically worth choosing if the stock range of coverage is high.

Except for the one time investment the operational model of different wrapping concepts for each transaction is demonstrated in Figure 2.

The optimal model from the above ones can only be chosen after serious calculations, however it has to be emphasized that due to the different geographical locations of the suppliers the calculation can lead to different results in case of different suppliers. It has to be mentioned that in case of a given supplier those articles which are characterised by different sizes and sales might require the application of different packaging concepts. From the above statements it can be concluded that a company with a complex production system cannot rely on only one optimal solution.

How this optimal solution can be chosen? In practice based on the Pareto principle is worth choosing the suppliers and items that expectably best contribute to the costs along different aspects, e.g. volume to be transported and geographical distance, or grading properly the number of boxes to be transported. After this the cost elements need to be listed and the expected costs of each packaging concept need to be calculated, in some cases estimated. One possible version of the matrix of cost elements is introduced in Table I.

Table I

One possible version of the matrix of cost elements

Name of supplier…	**Packaging concept**			
Cost element	single use wrapping	multiple use wrapping		
		own	transactional	rented
Procurement cost of wrapping				
Transportation cost				
Packaging expenditure				
Cleaning of wrapping				
Waste management				
Cost of product damage				
…				
etc.				
Expected total cost				

By summarising the values related to certain cost elements and packaging concepts the expected total cost related to the given method can be determined, from which the concept representing the lowest value means the optimal solution to the given case.

Besides transportation and procurement costs other already mentioned further factors need to be taken into consideration during the calculation in case of each supplier. The listed cost elements can be put into two categories, fixed and variable costs. E.g. the washing of the boxes is independent from every variable in the model, some agreed price, this unit price is neither affected by the frequency of washing, nor the frequency or distance of transportation. Similarly repackaging after arrival can be considered as a fixed cost. However, certain part of the cost elements that are related to quantity behave as a variable cost, eg. incurring transportation cost rises depending on the geographical distance.

These two categories are needed, because these significantly simplify the calculations in practice through which it is decided in case of which supplier the single use wrapping is optimal and when it is necessary to switch to multiple use wrappings, and when it is worth purchasing wrappings from a third party (Figure 3.)

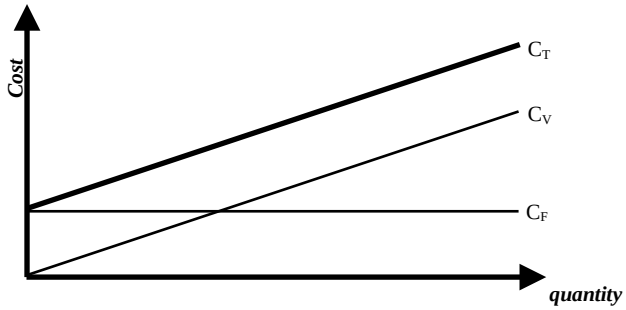


Figure 3. Correlations of cost elements

Total cost can be determined as the sum of fixed and variable cost:

$$C_T = C_F + C_V \quad (1)$$

where

C_T – total cost [EUR],
C_F – fixed cost [EUR],
C_V – variable cost [EUR].

When the transportation cost is determined the costs incurred regarding the procurement of the parts and the transportation costs regarding the supply of empty wrappings need to be taken into consideration. Contrary to transporting in cardboard, the advantage of packaging in multiple use plastic boxes is that the wrappings in the cargo hold of the transporting vehicle – e.g. plastic boxes – can be piled up without damaging the product, this way the capacity of the cargo hold in the truck can be utilised in 100 %.

Due to the piled-up stacks the transportation cost related to the procurement of parts can decrease significantly, however this method takes its toll, since in order to pile-up the stacks the empty wrappings need to be transported as well, in which case contrary to the single use wrapping – where this transportation method cannot be applied – significant costs incur.

Since the cost of transportation increases proportionately to distance, thus in case of certain suppliers the decision can be determined based on the geographical location of the supplier. The farther the supplier is, the farther the empty wrapping needs to be transported and farther the goods can be picked up. As it was concluded earlier the resultant of the transportation cost is negative contrary to the single use wrapping, namely with the increase of the distance, higher and higher „losses" are realised, then at a certain point the advantages and disadvantages deriving from the shift to multiple use wrappings level off. Beyond this geographical distance the multiple use wrapping is more unfavourable than the method of single use wrapping, and this relation is valid vice-versa.

Volume proportionate discount can be characteristic to certain part of the cost elements, thus e.g. it might occur that in case of wrappings received from third parties the unit price decreases proportionately within ranges when volume increases. We can receive discounts in case of transportation costs as well. As a result the variable that is otherwise linearly

related to quantity becomes a linearly ranged (Figure 4. version a.) cost element or a cost element that is characterised by a curve from one of the functions (Figure 4. version b.).

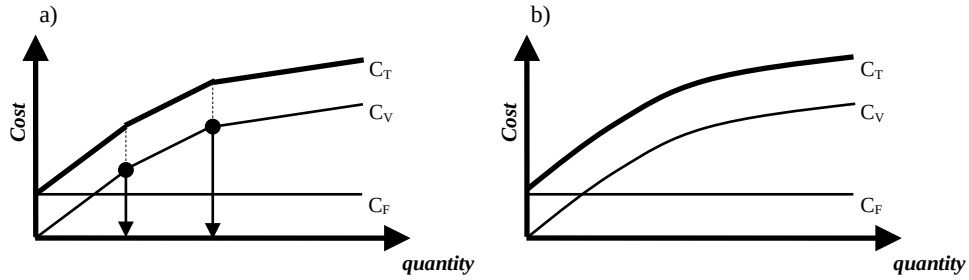


Figure 4. Correlation of cost elements modified by volume proportionate discount

4. Environmental awareness

Besides the costs incurred, however a further aspect is to decrease ecological footprints which can be achieved by reducing the amount of generated waste. Thanks to the multiple use wrappings, besides the smaller amount of waste the environmental impact deriving from the transportation of empty wrappings should not be left out of consideration, e.g. CO_2 emission and noise pollution. Similarly the cleaning of the wrappings has environmental impact even with the use of solvent free washing technology.

On the other hand the emerging environmental impact can be reduced in case of transportation in cardboards, since the supplied foils, cardboards, single use wood pallets become recyclable if managed properly.

Our actual ecological footprint is hard to quantify due to the complexity of the numerous above factors, anyhow the impact of our activity needs to be monitored.

5. The effect of packaging concepts on stocks

The task of the stock management is to determine the optimal stock level and to dynamically maintain the stock level adjusting to the buyers' (or internal) needs. The market competition puts a higher and higher pressure on companies, therefore logistics meet new challenges as well. An efficient solution can be the toolkit of lean management to these challenges. In the framework of lean approach the value-adding activity and expenditures need to be determined from the products and services that are valued by the customers. The only thing that represents value is what the customer pays for, any other expenditure means losses in which basically two categories are distinguished depending on the fact how much the given product or service is indispensable. Many steps do not generate value, but using the current technologies and means of production it is inevitable, meanwhile it can be determined that other activities do not contribute to customer value creation. While in the former category the goal is to precisely map the given expenditure and reduce its extent, in case of the latter category the goal is to immediately eliminate the given expenditure [2] [12].

Why it is important to interpret value creation? The packaging activity allocated to the incoming parts is to be listed in every case in one of the above two categories, namely it is typically not a value creating activity. However, in practice it can be concluded that the items to be transported – except in some cases – need to be packaged to some extent, thus it has to be categorised as an activity that cannot be eliminated completely therefore the goal of logistics is to reduce this activity.

A third aspect besides the cost elements and environmental factors is influencing our stock levels. Generally it can be concluded that lead time allocated to certain activities mean a certain level of committed stock in the supply chain, eg. if the reception (quantity and quality control, labelling, packaging, etc.) of the goods requires two days, then these items squeeze our stock capacity immediately after their arrival, at the same time until the closure of the complete reception process these items are not available for production. The company needs to generate a stock for the this lead time period, thus the company needs to maintain a higher stock level proportionate to the incoming items, in other words production and dispositions should be planned as if these stocks did not exist at all.

This lead time needs to be calculated into the procurement time, and items under reception should not be considered relevant, thus when the material requirements planning (MRP) is executed the system does not take these stocks into consideration [6].

As a result the reduction of internal lead time is of key significance which generates the permanent reduction of stock level. One of the tools of reducing lead time is introducing multiple use wrappings, since after the arrival of the goods the reception process will be significantly faster due to the elimination of repackaging activity and the elimination of waste management deriving from repackaging.

With the interpretation of the function explaining stock management mechanisms – known as saw-tooth diagram – the effect of the selected packaging concept on stocks can be introduced. The diagram below indicates stock changes from the aspect of freely available stocks (Figure 5).

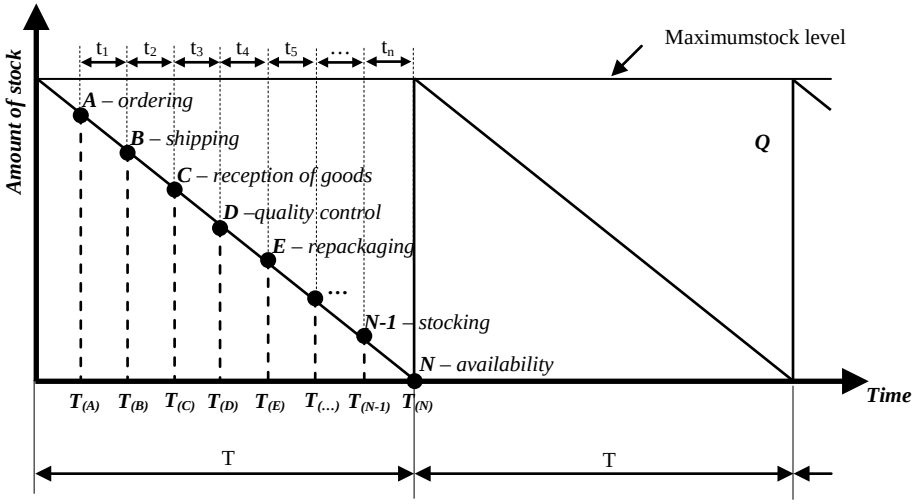


Figure 5: The operation of stock management mechanisms from the aspect of free available stocks

During the interpretation of the function $T_{(A)}$ stands for the time of making the order, while $T_{(N)}$ is the quality controlled, freely available stock. It can be logically concluded that the reception of the goods should be between these two points – it is indicated by $T_{(C)}$, from which moment the stock is indicated in the analytics as well. Between points $T_{(A)}$ and $T_{(N)}$ numerous further activities arise at the supplier and at the buyer as well. The assessment and tracking of the time necessity of these activities depend on the objectives deriving from the organisation's strategy. As a result the specification and in-depth assessment of the activities occurring between ordering and availability of the stocks should be adjusted to the objectives of the company.

The time allocated to certain activities can be measured by the time passed between the starting and finishing time of the given activity, namely

$$t_n = T_{(N)} - T_{(N-1)} \tag{2}$$

Based on the above correlation the time necessity can be determined in case of any activity, eg. time to be allocated to quality control (t_4):

$$t_4 = T_{(E)} - T_{(D)} \tag{3}$$

where

$T_{(D)}$ – starting time of quality control,
$T_{(E)}$ – starting time of repackaging = finishing time of quality control.

After the detailed listing of the given activities and determination of time periods necessary for their execution, with the summary of the sub activities the complete time necessity of the process can be determined:

$$T = t_1 + t_2 + \ldots + t_n = \sum_{i=1}^{n} t_i \tag{4}$$

where

T – the time necessity of the complete analysed process [time unit].

Typical to the conventional economic analysis certain companies strived for optimising only their internal activities, therefore only internal processes and potentials were analysed. As a result of these analyses the supplier tried to use the lowest time and financial expenditures in the implementation of packaging activity, while the interest of the buyer was contrary to the above, namely the buyer wanted to require the implementation of all activities from the supplier.

The result of this unilateral optimisation could only bring optimal solution randomly, and often it depended on the market position of the given market participant who was benefitted from the agreement. Contrary to this if the processes of the supplier and the organisation are collectively analysed in the supply chain, in order to realise mutual benefits it is worth deciding which participant should execute the packaging activity [8].

It is worth examining along the three concepts below in order to find out which method brings an ideal or almost ideal solution in case of the supply chain (Figure 6.). The primary difference between the alternatives is whether the wrappings arriving from the supplier are

directly suitable for storing the supplied items in them and for serving the production, or it only serves transportation purposes and after arrival the repackaging of the items becomes necessary. For comparison a third alternative, the narrowed process (lean logistics) is indicated as an ideal status [5] [11].

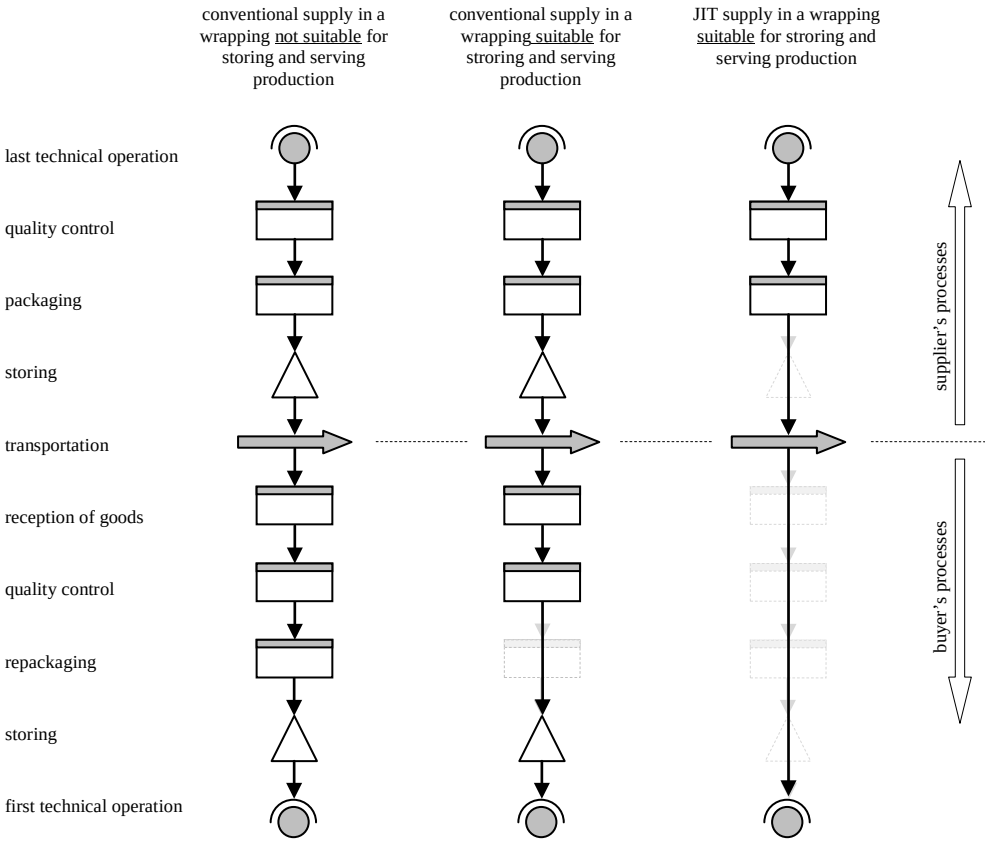


Figure 6. Activities of supply chains that can be characterised by different packaging concepts

With the comparison of activity chains that comply with the diverse packaging concept it can be easily concluded that with the choice of proper packaging method and narrowing of the processes the value process is simplified and accelerated.

Let us suppose that the buyer would like to narrow its processes in which it tries to optimise the stock level and the expenditures as well. Throughout the narrowing of the supply chain the first task is to indicate the given activities chronologically, determining time-and expenditure necessities and stocks. It is not the objective of this study to introduce in detail the toolkit and methods of lean management, however in order to analyse the effect of different packaging concepts on logistical indicators, it is indispensable to be aware of these basic correlations.

After the arrival of the goods, at the moment of reception the supplied value is

immediately indicated in the analytics, at the same time until the items are stored they go through many operations, (eg. quality control, repackaging, internal material movements, note of receptions, etc), during these complete series of activities the stock is not available for production. Every organisation should strive for the reduction of lead time in the reception of goods in order to achieve a more efficient operation, since the given lead time means unavailable stocks, therefore each operation period is represented as a from of stock as well.

The determination of optimal order quantity does not belong to the objectives of this study, thus when considering packaging concepts, we calculate with supplies with already determined frequencies (T period time) and optimal order quantity (Q). Our goal is to illustrate what are the correlations between packaging activities, stocks and costs.

In order to be able to introduce the effects on stocks, the tooth saw diagram demonstrating the stock management method needs to be traced in a way that the stock changes are shown from the aspect of the stock indicated in the analytics (Figure 7). To do this, the time of the stock increase needs to be modified, thus the vertical line drawn to $T_{(N)}$ (availability time of stored free stock) time representing stock increase needs to be shifted along the time axis towards $T_{(C)}$ time.

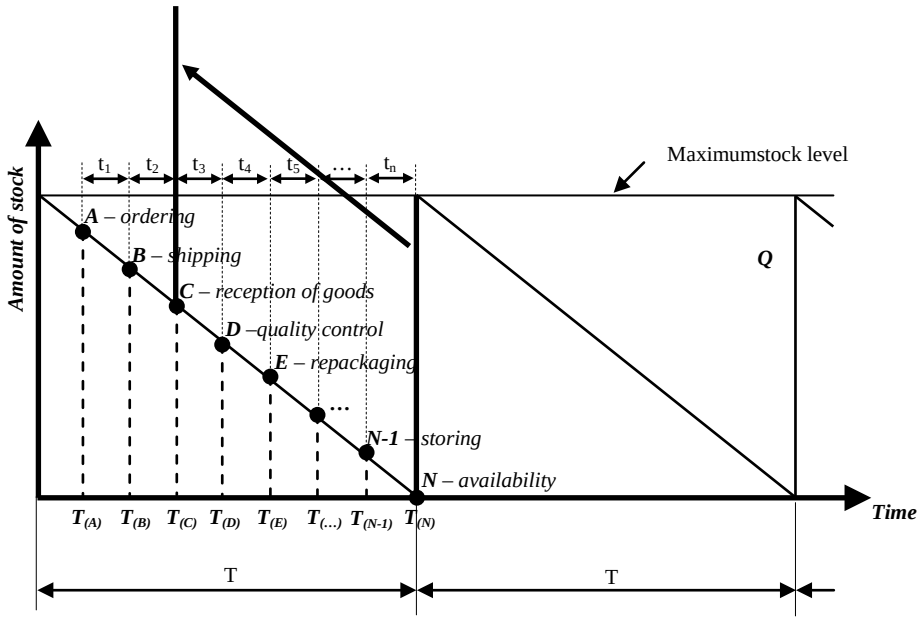


Figure 7. The operation of stock management mechanisms from the aspect of stock indicated in the analytics

By tracing the whole diagram it can be seen that the minimum stock level moved upwards, and the stock increase was shifted to an earlier phase in the activity chain, thus it shifted from $T_{(N)}$ time to $T_{(C)}$ time (Figure 8).

It can be seen on the modified tooth saw diagram that the theoretical minimum stock level shifted upwards, and this level coincides with the stock level available at the moment

of the arrival of the goods. This is logical, since until the complete storing of the incoming stock is finished, the demand for utilisation is continuous which only can be satisfied from the available stocks. As a result between the arrival of the goods and the availability period the organisation needs to generate stock in order to satisfy its utilisation needs (e.g. in form of safety time or safety stock).

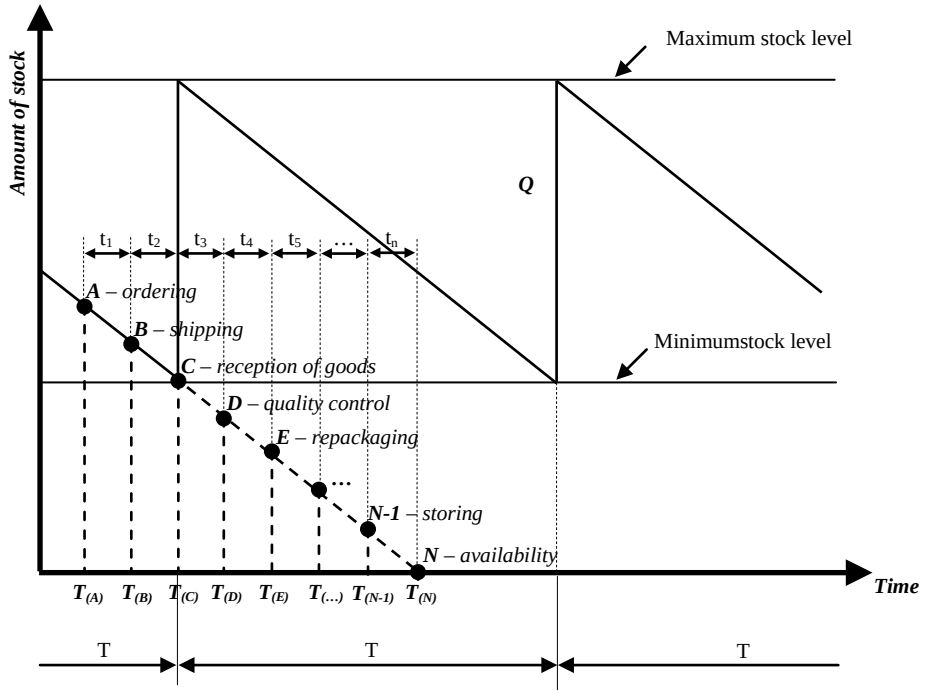


Figure 8. The stock covering the lead time of activities

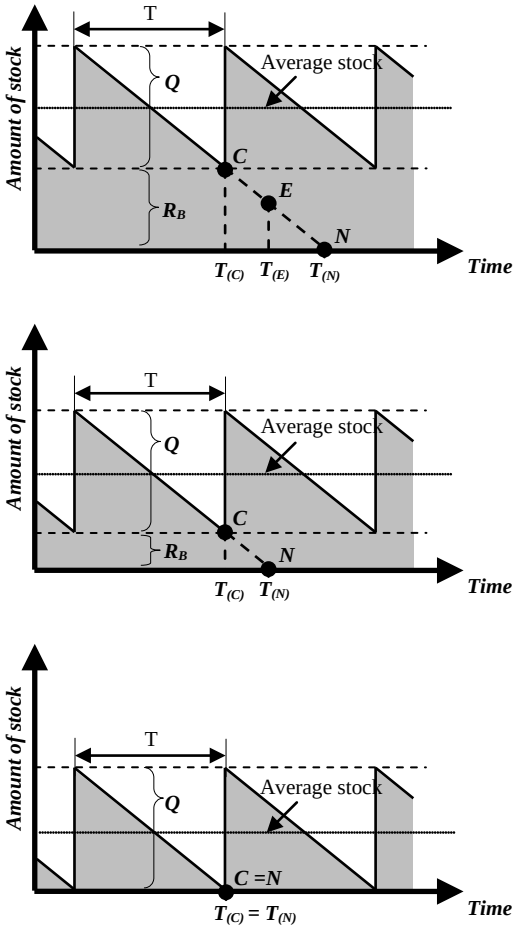
Comparing the above indicated three alternative series of activities the correlations can be illustrated in the diagrams below (Figure 9).

With the help of a simple trigonometric formula the correlation can be easily conducted from the above diagrams, meaning that the utilised stock during a given time period is similarly proportionate to the stock utilised during an arbitrary time interval, assuming the continuity of utilisation and steady intensity:

$$\frac{T}{Q} = \frac{T_{(N)} - T_{(C)}}{R_B} \tag{5}$$

where

Q – order quantity [EUR],
T – time period of deliveries [min],
$T_{(C)}$ – time of reception of goods,
$T_{(N)}$ –time of availability of stored free stocks,
R_B – safety stock level [EUR].



a) Conventional supply in a wrapping <u>not suitable</u> for storing and serving production

Between T(C) and T(N) time every logistical activity is executed (reception of goods, quality control, repackaging, labelling, etc).

b) Conventional supply in a wrapping <u>suitable</u> for storing and serving production:

Between T(C) and T(N) time every logistical activity is executed except repackaging (reception of goods, quality control, repackaging, labelling, etc).

c) JIT supply in a wrapping <u>suitable</u> for storing and serving production:

$T_{(C)}$ and $T_{(N)}$ time coincide, therefore there is no actual time necessity between the reception of goods and the availability period.

Figure 9. The development of stock level in case of different packaging concepts

Rearranging the above formula it can be confirmed that for the determination of safety stock level the lead time of every activity following the reception of goods requires a certain level of committed stocks:

$$R_B = \frac{T_{(N)} - T_{(C)}}{T} \cdot Q \qquad (6)$$

Based on the above correlation the stock level generated for the lead time of the given activity can be concluded restricted to the time necessity of any activity, eg. in case of quality control:

$$R_B = \frac{T_{(E)} - T_{(D)}}{T} \cdot Q \qquad (7)$$

where

$T_{(D)}$ – starting time of quality control,

$T_{(E)}$ – starting time of repackaging = finishing time of quality control.

With the improvement of the above correlation the expected average stock level related to the given concept can be defined:

$$\overline{R}=\frac{Q}{2}+\frac{T_{(N)}-T_{(C)}}{T}\cdot Q \tag{8}$$

where

$\overline{R}$ – average stock level [EUR].

Comparing the three above mentioned concepts it can be concluded that with the decrease of the allocated time to activities following the reception of goods, a proportionate decrease of average stock level can be observed. In that ideal case (e.g. JIT supply) when it can be provided that the time of the reception of the goods and the time of availability of the free stock coincide, then there is no need for the execution of further activity requiring time necessity between these two events, thus consequently there is no need for a safety stock that would be otherwise necessary due to lead time.

6. The effect of stock decrease on logistical costs

Assuming a rational behaviour that the organisation keeps in mind the quantification of costs besides the effects on stock, it is worth mentioning the analysis of costs related to stock. Basically three different cost categories can be distinguished such as costs incurred due to shortage of stock, costs related to procurement and costs related to storing stocks [3].

Stock shortage results in a significant consequence in case of manufacturing companies which can generate falls in revenue due to insufficient production and penalties deriving from jeopardising customer needs, thus in our further analysis it is assumed that stock shortage is not allowed.

During the quantification of costs it was earlier concluded that it is not our goal to determine the optimal order quantity, therefore during the analysis of packaging concepts we already calculate with a diversely determined frequency (given T time period) of deliveries and optimal order quantity (Q). As a consequence the frequency of deliveries and quantities to be supplied are considered fixed, thus procurement cost is assumed as given.

The storing and management of the given stock generate costs as well for the organisation. Such a stock storing cost can be eg. procuring devices necessary for storing, the opportunity cost (not a productive surface) of storing surface allocated to storing, and finally the expected internal rate of return of the capital invested in the stock, so the cost of financing.

Knowing the specific costs (c_k) of stock management per time unit and the average stock level ($\overline{R}$) the expected stock management cost per time unit can be determined:

$$C = c_k \cdot \left(\frac{Q}{2}+\frac{T_{(N)}-T_{(C)}}{T}\cdot Q\right) = c_k \cdot \overline{R} \tag{9}$$

where

C – cost of stock storing per time unit [EUR/time unit].

By complementing the above formulas the stock management cost can be determined related to the lead time of an arbitrary activity [4].

On the whole it can be concluded that being aware of the time necessity required for packaging activity the cost differences can be quantified regarding the concepts. With the knowledge of these cost differences a substantiated decision can be made.

7. Selecting an optimal packaging concept

Considering the three above aspects (cost factors, environmental impacts, stock level) the decision on the given packaging method can be made based on quantified data.

The decision on utilising single or multiple use wrappings is quite a complex task, since it can be determined that in case of certain suppliers the adjustment of certain box sizes is economical, while in other cases it is not. This derives from the fact that there is no significant difference in expenditure regardless of the box size between the time periods allocated to repackaging the boxes, approximately the same time period is required for repackaging all box types. On the contrary transportation costs vary proportionately with capacity, thus with the increase of the box sizes the geographical distance definitely decreases where the relation between the two methods turns.

Its complexity primarily resides in the fact that suppliers generally deliver in different size of boxes adjusting to the given article numbers, and in case of these boxes the economical aspects can be interpreted at diverse geographical locations.

8. Summary

Primarily those suppliers should be practically shifted to the use of multiple wrappings which have the highest volumes of supply, and deriving from their geographical distance the incurring costs due to the supply of wrappings are proportionate so far to the cost savings deriving from decrease of packaging activity.

Of course the above assumptions need to be controlled and checked regularly, since economic factors are always in motion, among others transportation cost changes, the procurement cost of wrappings, cleaning cost, supplied volume and the lead time and expected time of processes within the organisation. As a result it is practical to review the system occasionally and make the necessary changes during which the change itself should be treated as a new factor that always carries uncertainty factors (risk) and costs in itself.

Acknowledgements

This research was partially carried out in the framework of the Center of Excellence of Mechatronics and Logistics at the University of Miskolc.

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