Application of selected logistic methods in the area of supply logistics

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In the current period of the market economic system, all companies are exposed to constant pressure from competitors, as well as a constant increase in cost in their business. In such environment, it is still necessary to find new ways to increase the profitability of the business and to consolidate its position on the market. With the inflow of foreign capital in Slovakia, new concepts, tools and techniques start to apply in many companies. The application of these concepts leads to an increase in company's revenue and financial strength. One of these tools is logistics.

An appropriate application of logistics methods in the process of logistics management can lead to the cost reduction related to the supply, inventory reduction and improvement of products for customers. One of the most important areas of logistics also includes issues related to the inventory management.

Inventory management aims to optimise the entire process from production to distribution, including all the processes that alternate between all units of the supply chain.

The article is oriented on supply logistics of engineering companies in the area of batch production. Production is characterised by a smaller number of types of product dimensions. Production is realised on NC machines reprogrammable for different product dimensions.

In the article, the attention is aimed at the application of two methods: deterministic model in the case of absolutely determined, non-constant consumption and the Harris-Wilson model.

Key words: *logistics, supply, EOQ model, deterministic model*

Introduction

Logistics has now become important for the company's overall competitive strategy, which is reflected in logistics performance, such as inventory management or customer service level definition in strategic planning (Harrison et al., 2014; Boysen et al., 2015; Arnold, 2008). The automotive environment targeted by the article is a typical sector facing global competition, and the most important factors are innovation and a high level of customer care. As a result of the competitive struggle, there is a great deal of pressure to reduce costs through efficient management and the use of modern inventory management methods (Edl & Kudrna, 2013).

The basic criterion for inventory management is the optimisation of total costs connected to the maintaining of inventories, with the emphasis on the full coverage of unexpected needs with a degree of certainty (risk) and deviations during deliveries and stocks (Pawliczek et al., 2015).

The degree of security is also subject to optimisation. The current and insurance inventory is kept at a level that assumes the minimum cost of purchasing, stocking and maintaining inventories, and the costs incurred when stocks are not covered. They are based on the principle of market equilibrium, respectively when the buyer has a stronger market position (Ruiz – Torres & Mahmodi, 2010; Rahdar et al., 2017). They are also based on an analysis of inventory management costs. Maintaining inventory is associated with certain costs (Serrano et al., 2017). Inventories are tied to money that does not yield interest. An effective inventory management system should allow stocks to be maintained at the optimum level (optimal inventory) (Lee et al., 2017).

Complex inventory management systems include inventory, stock inventory control, inventory calculation, inventory control system, etc. (Saenz & Koufteros, 2015). For this purpose, computer technology is used to a great extent. Existing inventory computerised systems make it easier to record all transactions connected with inventories. These systems also include programmatic inventory information processing (Mou & Zhang, 2016). Information is available in real-time. In inventory management systems, inventory optimisation models are used.

Nowadays, many companies pay particular attention to inventory optimisation (Rahim et al., 20105). Optimization can bring an economic effect on the business, particularly in terms of savings. According to German research, in 82% of the companies surveyed, the potential for inventory savings ranged between 15-25% of their size (Roldan et al., 2017).

One of the most important inventory optimisation criteria is to minimise total storage costs and inventory provision (Straka et al., 2017).

Based on the knowledge gained by studying the supply optimisation, there have been developed several optimisation models (Chuang & Chiang, 2016).

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The article examines two chosen methods in detail: the Harris-Wilson Model (Economic Quantity Model), indicating the optimal order quantity that minimises inventory costs and deterministic model in the case of absolutely determined, non-constant consumption (Trebuňa & Pekarčíková, 2013).

Used methods

1. Deterministic model in case of absolutely determined, non-constant consumption

Deterministic model in case of absolutely determined, non-constant consumption is used if future demand is for the planning period T non-constant, but totally unknown. The main task is to determine the size of orders, so the sum of costs for keeping supply and the total cost of all orders during the period T is minimal (Schulte, 1994; Trebuňa & Pekarčíková, 2013). For calculation, it is needed to know formulas shown in Table 1.

Tab. 1. Parameters used for calculation of absolutely determined, non-constant consumption [Schulte, 1994]

Parameter	Characteristic
C_s	Cost for 1 order
C_1	Cost of maintaining the amount of stock per unit of time
Q_i	Number of stocks
The cost of maintaining inventory is independent of the size of orders. Maintenance cost is calculated only from supplies that are kept at the warehouse during the entire time of consumption period.	

Size of orders in the *i*-th period (Schulte, 1994):

$$x_i = Q_i,\ x_i = Q_i + Q_{i+1}, \ldots\ldots.,\ x_i = Q_i + \ldots\ldots + Q_n \quad i = 1, 2, \ldots\ldots., n \qquad (1)$$

Tab. 2. The parameters determining size of order [Schulte, 1994].

Parameter	Characteristic
t_i	Beginning of the *i*-th period
Q_i	The amount of expected consumption
$n(i,j)$	Sum of ordered cost which should cover the demand in the *i*-th to the *j*-th period and the sum of costs for maintaining inventory
$n(i,j) = C_s + C_1 \sum_{k=i}^{j} (t_k - t_i) Q_i \qquad i = 1, 2, \ldots, n, \quad j = i, i+1, \ldots, n$	
$f(j)$	the minimal achieved cost for assurance necessary reserves to cover consumption from the beginning of the planning period to the *j*-th period
$f(j) = \min_{1 \le i \le j} [n(i,j) + f(i-1)], \qquad f(1) = Cs$	

2. Harris – Wilson model

This model is based on the existence of bipolar cost structure (Bazal et al., 2017). The calculation of model is described in Table 3.

Tab. 3. Harris – Wilson model [Gros].

Parameter	Mark	Formula
The acquisition cost for one delivery	c_s	
Costs for maintenance and storage of inventory per unit of time	c_1	
Optimum size of order	x_{opt}	
The number of orders over the period	v	$v = \frac{Q}{x}$
Aggregate costs	$N_1(x)$	$N_1(x) = vc_1 = \frac{Q}{x} c_s$
The aggregate costs of maintaining and storing supplies	$N_2(x)$	$N_2(x) = \frac{x}{2} Tc_1$
The function of total cost	$N_c(x)$	$N_c(x) = \frac{Q}{x} c_s + \frac{x}{2} Tc_1$
Harris-Wilson formula - absolute size of order	$x_{opt.}$	$x_{opt.} = \sqrt{\frac{2Qc_s}{Tc_1}}$
The interval between two orders	t*	$t^* = \frac{Tx^*}{Q}$
The number of orders during the period T	v	$v = \frac{Q}{x}$
If we substitute the expression for the optimal size of deliveries to the cost function $N_c(x) = \frac{Q}{x} c_s + \frac{x}{2} Tc_1$, we get the expression for calculating the minimum total cost: $N_c(x_{opt.}) = \sqrt{2QTc_s c_1}$		

3. Experimental verification of selected methods in the case of optimisation selected items

Highly innovative methods related to the field of inventory optimisation are verified by advanced manufacturers. As a typical supplier, the company oriented on manufacturing the most innovative gearbox was selected.

Based on the analysis of internal information of the selected company, practical part is focused on the optimisation of supply items and the attention is paid on the application of the deterministic model in case of absolutely determined, non-constant consumption and Harris- Wilson model. These methods have been applied in actual conditions, at which the selected methods can be applied to other selected companies after the arrangement of input data.

Two supply items were chosen for experimental verification of methodology. The name, marking and dimension of each item is shown in Table 4.

Tab. 4. The characteristics of material items [Getrag].

Marking of item	Name	Dimensions: diameter, thickness, weight	Price
AV4R4886AB	Differential case for Kuga model	64mm x55mm, 1,2kg	850 €
6G9R7B28ODB	Double synchronizer of driving	101mm x 21mm 0,567 kg	142 €

3.1 Application of method in the case of absolutely determined, non-constant consumption and Wilson´s model when optimising supply items

To determine the optimal ordering strategy, it is needed to include the information concerning the production plan of gearboxes. The article presents results using MS Excel as widely available software that makes it possible to test the selected ordering strategy and choose the one that achieves the lowest possible cost.

Optimization of supply item AV4R4886AB using the deterministic model in the case of absolutely determined, non-constant consumption

Data related to the detailed production plan of gearboxes for a period of 1 year are shown in table 5.

Tab. 5. Production plan of gearboxes for Kuga model [Getrag].

MONTH	**JANUARY**	**FEBRUARY**	**MARCH**	**APRIL**	**MAY**	**JUNE**	**JULY**	**AUGUST**	**SEPTEMBER**	**OCTOBER**	**NOVEMBER**	**DECEMBER**
SUM	1716	1976	2545	1482	1490	1526	12	2490	1384	1604	1870	828
SUM	**18 923**											

For calculation of the method mentioned above, it is important to draw up a summary of the ordered quantity of items AV4R4886AB- differential case for the Kuga model - see Table 6. One piece of material item is needed for producing the gearbox.

Tab. 6. Overview of the ordered quantity of item AV4R4886AB [Getrag]

MONth	**JANUARY**	**FEBRUARY**	**MARCH**	**APRIL**	**MAY**	**JUNE**	**JULY**	**AUGUST**	**SEPTEMBER**	**OCTOBER**	**NOVEMBER**	**DECEMBER**
QUANTITY	1440	1920	3120	1785	2790	1045	240	1200	1680	1440	1800	720
SUM	**19 180**											

To calculate the costs associated with one order, it is important to know the following parameters:

- C_1- annual storage costs for one item consisted of:
  - ✓ price
  - ✓ interest rate
  - ✓ storage costs
- C_s - ordering costs (transport)

Calculation of costs associated with one order (item AV4R4886AB)

- C_1 - annual storage costs for one item:

Price per 1 piece: € 850

Rental of storage space: 11,949 x 12 = € 143,388 pallet / year

Dimensions of differential case: Diameter: 64mm, Thickness: 55 mm, weight: 1, 2 kg

Storage costs:

The material supplier is logistics centre. Based on internal data provided by the logistic centre, storage costs were calculated.

V = 64 x 64 x 55 = 225 280 mm^3 = 225, 3 cm^3

Pallet dimensions: 800 x 1200 x 800 mm = 768 000 000 mm^3 = 768 000 cm^3

Number of pieces on one pallet: 768 000 / 225, 3 = 3 409 pieces / 1 pallet

Storage costs: 143, 388 / 3 409 = € 0, 04206 / year

C_1- annual storage costs for 1 item:

Price x interest rate + storage costs

850 x 0, 037 + 0, 04206 = 31, 49206 €

- C_s - ordering costs (transport)
  Transportation to GFT: 1120 €
  Transport is combined, goods is collected from different suppliers. The price of standard full truck load is 1120 € for the road line Košice - Köln.
  In this case, *Cs - ordering costs* (transport) is 1120 €.
  Table of values n (i, j) is calculated in the Microsoft Excel on the base of formulas:

$$n(i,j) = C_s + C_1 \sum_{k=i}^{j} (t_k - t_i) Q_i \tag{2}$$

$i = 1, 2, ..., n; j = i, i + 1, ..., n.$

By sequential calculation of values $f(j)$ for j=1,2,...,12 according to the formula

$$f(j) = [n(i,j) + f(i-1)] \tag{3}$$

the amount of minimum costs is determined.

The calculated results are shown in Table 7. Calculations show that minimal achievable cost is $f(12)$ = **72 784,76 €.**

Tab. 7. The calculation of n (i,j) and the minimum cost of item AV4R4886AB

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2		Period	1	2	3	4	5	6	7	8	9	10	11	12
3		ZO	1	2	3	4	5	6	7	8	9	10	11	12
4		Q_i	1140	1920	3120	1785	2790	1045	240	1200	1680	1440	1800	720
5		C_s (€)	1120											
6		C_1 (€)	31,49											
7	The optimal size of order - Values n (i,j)													
8		i/j	1	2	3	4	5	6	7	8	9	10	11	12
9		1	1120											
10		2	61584,8	1120										
11		3		99375,23	1120									
12		4			57333,33	1120								
13		5				88982,9	1120							
14		6					34029,21	1120						
15		7						8678,09	1120					
16		8							38910,47	1120				
17		9								54026,7	1120			
18		10									46468,6	1120		
19		11										57805,71	1120	
20		12											23794,3	1120
21	Minimal costs (€)													
22			1	2	3	4	5	6	7	8	9	10	11	12
23		f(x)	1120	61584,8	62704,8	63824,8	64944,8	66064,8	67184,76	68304,8	69424,8	70544,76	71644,8	**72 784,76**

Optimization of supply item 6G9R7B280DB using the deterministic model in the case of absolutely determined, non-constant consumption

Material item 6G9R7B280DB is used in the production of all types of gearboxes. Production plan of gearboxes is given in Table 8.

Tab. 8. Production plan of gearboxes for [Getrag].

MONTH	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JÚLY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SUM	18990	17270	23140	15700	18370	19610	7440	15860	14380	14650	15400	7000
SUM	187 810											

The overview of ordered quantity of the item is shown Table 9.

Tab. 9. Overview of the ordered quantity of item 6G9R7B28ODB [Getrag]

MONTH	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SUM	12 864	17 984	19 648	15 488	18 304	21 120	15 488	18 304	22 528	22 528	17 984	15 264
SUM	217 504											

Calculation of costs associated with one order (item 6G9R7B280DB):

- C_1 - annual storage costs for 1 item:
  Price for 1 item: 142 €
  Rental of storage space: 11,949 € pallet / year
  11,949 x 12 = 143,388 € pallet / year
  Dimensions of differential case: Diameter: 64mm, Thickness: 55 mm, weight: 1, 2 kg
  Dimensions: Diameter: 101 mm, Thickness: 21 mm, weight: 0,567 kg
  Storage costs:
  Material supplier is logistics center. Based on internal data provided by logistic center, storage costs were calculated.
  V = 101 x 101 x 21= 214 221 mm^3 = 214,2 cm^3
  Pallet dimensions: 800 x 1200 x 800 mm = 768 000 000 mm^3 = 768 000 cm^3
  Number of pieces on one pallet: 768 000/214,2 = 3585 pieces / 1 pallet
  Storage costs: 143,388/3585 = 0,03999 €/ year
  C_1 - annual storage costs for 1 item:
  Price x interest rate + storage costs
  142 x 0,037 + 0,03999 = 5,29399 €

- *Cs* - ordering costs (transport)
  Transportation to GFT: 1120 €
  Cs - ordering costs (transport) is 1120 €.
  Based on the equation (1), the table of values $n(i,j)$ is calculated in MS Excel. The values of minimum cost are determined using the formula (3). The minimum achievable cost is $f(12)$ = **107 527,12 €**.

Evaluation

Analysis of the existing situation and the above calculations indicate that the logistical system is fairly balanced. For item AV4R4886AB, the minimum costs is $f(12)$ = 107 527,12 €. The calculations show that it is not necessary to connect the various orders and the optimal amount of orders is 12.

Practical aspects of Wilson's formula in the case of supply item AV4R4886AB

In the case of Wilson's relationship it is needed to take into account the existence of two groups of costs:
1. annual storage costs for 1 item - C_1
2. ordering costs (transport)- C_s

Calculation of minimum achievable costs - N^* is based on previous formulas, when
Q = 19 180
C_s = 1120 €
C_1 = 31,49206
T = 1,
then the optimal size of the order is:

$$x^* = \sqrt{\frac{2*1120*19180}{31,49206*1}} = 1168,013266$$

The interval between two consecutive orders (cycle time) is:

$$t^* = \frac{1168,013266}{19180} = 0,060897459 year = 22,228 days$$

The number of orders during the period T:

$$\nu = \frac{19180}{1168{,}013266} = 16{,}42104637$$

The minimum achievable total cost N* associated with optimal management of inventory:

$$N = 1120 * 16{,}42 + \frac{1}{2} * 31{,}49206 * 0{,}060897459 * 1168{,}013266 * 16{,}42 = 36780{,}80\,Eur/year$$

<u>Practical aspects of Wilson's formula in the case of supply item 6G9R7B280DB</u>

Parameters necessary for the calculation of the minimum achievable costs:

Q = 217 504

Cs = 1120 €

C1 = 5,29399

T = 1,

then the optimal size of the order is:

$$x^* = \sqrt{\frac{2 * 1120 * 217504}{5{,}29399 * 1}} = 9593{,}256906$$

The interval between two consecutive orders (cycle time) is:

$$t^* = \frac{9593{,}256906}{217504} = 0{,}044106117\,year = 16{,}09873276\,days$$

The number of orders during the period T:

$$\nu = \frac{217504}{9593{,}256906} = 22{,}67259202$$

The minimum achievable total cost N* associated with optimal management of inventory:

$$N = 1120 * 22{,}68 + \frac{1}{2} * 5{,}29399 * 0{,}044106117 * 9593{,}256906 * 22{,}68 = 50803{,}1999\,Eur/year$$

<u>Evaluation</u>

On the basis of calculation of the models mentioned above, we used the actual data of production quantity. If we use Wilson´s formula as the reference model for the production of higher-type production (mass production), then it is more preferable to order in shorter ordering cycles. For item AV4R4886AB, order cycle is 22 days at an overall cost reduction of 35 003,96 EUR. For item 6G9R7B280DB, it is more profitable to order in the order cycle of 16 days at a minimum cost reduction of 56 723,92 EUR.

3.2 Practical aspects of deterministic model and Wilson´s formula when the ordered quantity is modelled

<u>Results and discussion</u>

The basic objective of the article is to characterise the issue through the theoretical knowledge acquired from the studied literature and to analyse the current situation in the supply area using own research in the company and to propose measures for improvement supply logistics in the automotive industry.

Providing that the fluctuations in orders will be larger next year, reduced state of ordered quantity was modelled. All other parameters remain unchanged.

Optimization of supply item AV4R4886AB using the deterministic model in the case of absolutely determined, non-constant consumption when the ordered quantity is modelled

The overview is shown in Table 10.

Tab. 10. Modelled review of ordered quantity of item AV4R4886AB.

MONTH	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SUM	970	950	1540	885	1780	470	35	680	970	765	870	98
SUM	10 013											

The data of annual storing cost for one item and ordering cost remain unchanged:

C_1 - annual storage cost: 31,49206 €

C_s - ordering cost (transport): 1120 €

Using MS Excel, the table of values *n*(*i*,*j*) and the amount of the minimum cost *f* (*j*) for *j* = 1,2, ..., 12 is calculated. The minimum achievable cost is *f*(12) = **42 219,68 €.**

Optimization of supply item 6G9R7B280DB using the deterministic model in the case of absolutely determined, non-constant consumption when the ordered quantity is modelled

In the case of the double synchronizer, newly ordered quantity for the next period, given in Table 11, was modelled. The table shows that the total order quantity, in this case, is 73 345 pieces.

Tab. 11. Modeled review of ordered quantity of item 6G9R7B280DB.

MONTH	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
SUM	750	2992	1987	5890	210	8430	6770	7152	11 260	12 380	9892	5632
SUM	73 345											

In connection with the calculation of selected method it is needed to take into account following types of costs:
C_1 - annual storage cost of one item*:* 5,29399 €
C_s - ordering cost (transport): 1120 €
Using MS Excel, the table of values *n* (*i*,*j*) and the amount of the minimum cost *f* (*j*) for *j* = 1,2, ..., 12 is calculated. The minimum achievable cost is *f*(12) = **22 830,90 €.**

Evaluation

The rundown of development the minimum cost of selected material items is shown in Fig. 1. Minimum achievable costs for item AV4R4886AB reaches the final value *f*(12) = 42 219,68 € and for item 6G9R7B280DB it is *f*(12) = 22 830,90 €.

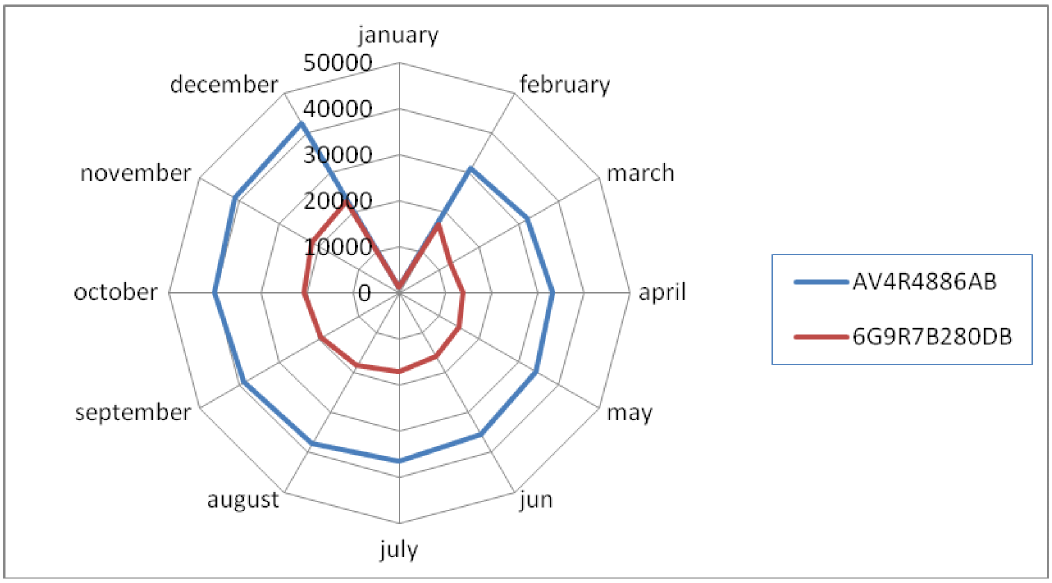

Fig. 1. Development of the minimum cost of material items in the case of modelled quantity.

In the case of reduction the ordered quantity, the optimal number of orders of material item AV4R4886AB is 11, at which the orders in 6th and 7th month will be connected. The second material item is 6G9R7B280DB. As the results of calculations show, it is necessary to combine orders in the 4th and 5th month and thereby reduce the optimal amount of orders to 11. The optimal ordering strategy is followed (Table 12):

Tab. 12. The optimal number of orders.

	AV4R4886AB		6G9R7B280DB	
	Ordering strategy (number of units to cover consumption)	Month	Ordering strategy (number of units to cover consumption)	Month
1	970	1st	780	1st
2	950	2nd	2 992	2nd
3	1540	3rd	1 987	3rd
4	885	4th	6 100	4th and 5th
5	1780	5th	8 430	6th
6	505	6th and 7th	6 770	7th
7	680	8th	7 152	8th
8	970	9th	11 260	9th
9	765	10th	12 380	10th
10	870	11th	9 892	11th
11	98	12th	5 632	12th

The optimal ordering strategy of solved material items is shown in Figure 2.

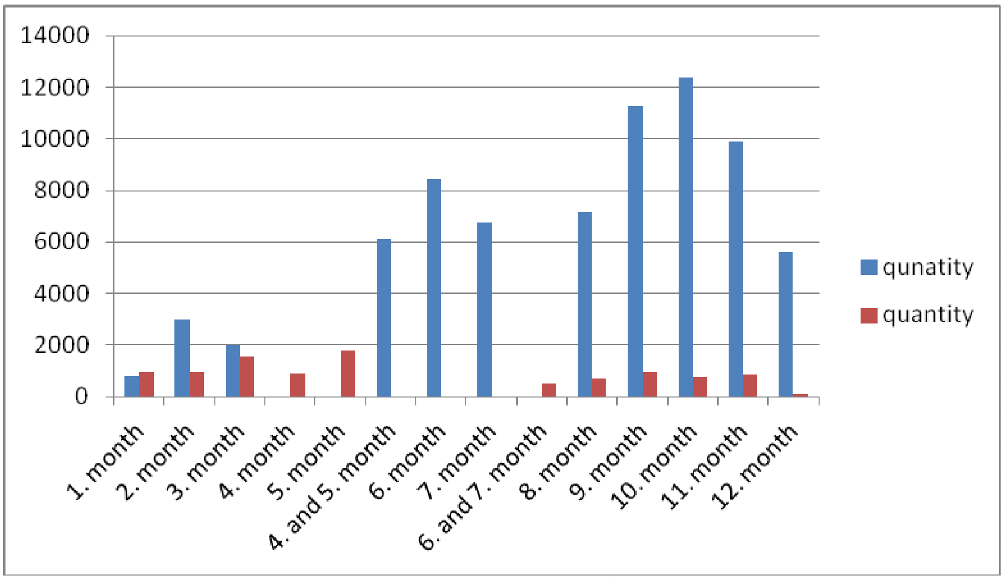

Fig. 2. The optimal ordering strategy of material items.

<u>Practical aspects of Wilson´s formula, if the ordered quantity is modelled (AV4R886AB):</u>

Parameters necessary for the calculation of Wilson's formula:

Q = 10 013

C_s = 1120 €

C_1 = 31,49206 €

T = 1

Calculation:

The optimum size of the order:

$$x^* = \sqrt{\frac{2*1120*10013}{31{,}49206*1}} = 843{,}9283613$$

The interval between two consecutive order:

$$t^* = \frac{843{,}9283613}{10013} = 0{,}084283267\,year = 30{,}763\,days$$

The number of orders during the period T:

$$\nu = \frac{10013}{843{,}9283613} = 11{,}86475116$$

The minimum total cost N * associated with optimal inventory management:

$$N = 1120 * 11{,}85 + \frac{1}{2} * 31{,}49206 * 0{,}084283267 * 843{,}9283613 * 11{,}865 = 26560{,}79986\, Eur / year$$

<u>Practical aspects of Wilson´s formula, if the ordered quantity is modelled (6G9R7B280DB):</u>

Parameters necessary for the calculation of Wilson's formula:

Q = 73 345

C_s = 1120 €

C_1 = 5,29399

T = 1

The optimum size of order:

$$x^* = \sqrt{\frac{2 * 1120 * 217504}{5{,}29399 * 1}} = 5570{,}801801$$

The interval between two consecutive orders:

$$t^* = \frac{5570{,}801801}{73345} = 0{,}075953395\, roka = 27{,}7229894\, days$$

The number of orders during the period T:

$$\nu = \frac{10013}{843{,}9283613} = 11{,}86475116$$

The minimum total cost N * associated with optimal inventory management:

$$N = 1120 * 13{,}17 + \frac{1}{2} * 5{,}29399 * 0{,}075953395 * 5570{,}801801 * 13{,}17 = 29500{,}90767\, Eur / year$$

<u>Evaluation</u>

On the basis of calculation the models mentioned above, we used the modelled data of production quantity. If we use Wilson´s formula, for item AV4R4886AB, the order cycle is 30 days, and the minimum achievable cost is 26 560,79 EUR. For item 6G9R7B280DB the order cycle is 28 days, whereby minimal achievable cost is 29 500,91 EUR. A detailed overview is shown in Table 13.

Tab. 13. Evaluation of results based on the application of Wilson's formula.

Material item	**Optimal ordered quantity** [pieces]	**Cycle length** [days]	**Number of orders during the period T**	**Minimal achievable cost** [EUR/ year]
AV4R4886AB	843,93	30,76	11,86	26 560,79 EUR
6G9R7B280DB	5570,81	27,72	13,17	29 500,91 EUR

Discussion

The main task, based on the implementation of selected methods, was to perform the optimum ordering strategy when reaching the lowest minimum cost.

In the calculation, data provided by the selected company was used. For verification, two material items were selected: the differential case for Kuga model and double synchronizer of driving. The results of the calculations show that the logistics system is optimally adjusted.

Assuming that in the future there would be fluctuations in orders, we reduced ordered quantity of material items. In this case, the optimal number of orders was reduced. On the base of calculations, we determined the optimal ordering strategy for the next planning period.

Selected methods that were verified in real conditions is possible to implement in other companies, in which the correct application of logistics methods will make the whole process of supply logistics more efficient.

Conclusion

Nowadays, when information technology moves the world and enables fast communication between companies and people, manufacturing and commerce can respond much more quickly to market demands. Of course, this trend is reflected in rapidly changing of storage requirements. If storage does not want to be a brake on further development, it must adapt to this situation. Warehouse management is one of the most difficult elements of logistics (Gros, 1996). Decisions on the choice of storage, size and number of storage facilities and inventory management have a significant impact on the ability of an enterprise to meet customer needs.

The article aimed to propose a way of inventory management and to choose the appropriate application of logistic methods, based on the analysis carried out in the company. It is necessary to pay attention to inventory level and to maintaining good relationships with suppliers trying to buy in quantities so that the material is used in the short term.

The analysis has shown that by setting optimal inventory levels, the company has achieved the optimum ordering system, at the right time and in the optimal amount. Based on a more efficient ordering system in the company, there is no order for a small number of items, late delivery and therefore no goods in stock, which should allow companies to fulfil orders from customers smoothly. On the other hand, there is no order for too many goods to be held in stock for a long time. In the case that such situations do not occur, it is possible to assume a significant reduction in the average stock level and hence a reduction of capital stock in inventories.

Acknowledgement: *This article was created by implementation of the grant project VEGA 1/0708/16 "Development of a new research methods for simulation, assessment, evaluation and quantification of advanced methods of production".*

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