ALTERNATIVE METHODS OF COMPANY'S INVENTORY LEVEL OPTIMIZATION

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The paper discusses the shortcomings of current systems of inventory management. The author suggests using the function of economic order quantity in accordance with irregular demand, supply and various safety stock.

The source of forming and filling of stock of any enterprise is the flow of inventories.

Calculation of optimal level of order which makes up the stock to optimal level should be in the basis of stock level optimization. Optimization criterion is, as a rule, the minimum of total costs connected with stock: order placement costs, loading and unloading costs, transportation costs and storage costs. The task of optimal stock size calculation can be solved analytically. Wilson formula is the most famous and widely used method of calculating an order Q.

$$Q = \sqrt{\frac{2AF}{iC}}, \qquad (1)$$

where A is the cost of initiation and fulfillment of an order; F- sales forcast for the period; i-the share of storage expenses for the periodT in the cost of stock for the same period; C - cost of a unit of a product.

Though Wilson formula is rather attractive, it is based on a number of assumptions. Stability of demand, immediate delivery and work on the basis of the assumption that the delivery will not be delayed, in fact makes such stock flow theoretical and unreal.

Let's solve the task of material flow by defining the minimum of costs function taking into consideration specified limitations.

Let's find the minimum of costs function Z:

$$Z = A\sum_{i=1}^{m} n_i + C\sum_{i=1}^{m} n_i Q_i + \\ + iC\sum_{i-1}^{m} \frac{S_0 + S_i}{m+1} \to \min,$$

A is cost of one delivery; n -количество поставок; i is specific costs of stock storage (%); S_0 ,S_i is the size of stock in the beginning of the first month and the end of month; C is constant; n, Q, $S > 0$; n is integer. It is essential that the total volume of delivery nQ is not less than the planned demand minus residue on the end of the previous period.

$$n_i Q_i \geq F_i + R_i - S_{i-1}.$$

Reserve stock is calculated using the formula of Ch. Bodenstab on the basis of deviations M of factual sales from the forecast with assumption of reserve coefficient α:

$$R_i = \alpha M(0.1 + 0.07(T + D),$$

where D is a delivery period- the period from the moment of order forming and its delivery to the supplier to the moment of commodities arrival to the warehouse, $T = \frac{4}{n}$ is the period between deliveries.

The number of deliveries during the period is defined as the ratio of the necessary volume of deliveries to the size of optimal lot of delivery Q:

$$n_i = \frac{F_i - S_{i-1} + SS_i}{Q_i}.$$

Introduction of reserve stock figure in the formula of optimal delivery lot will allow to consider the costs of compensation of loss caused by deficit. The following approach made it possible to take into account parameters which were not considered by the standard formulae of calculation of optimal delivery lot. Irregular demand during the period is taken into consideration. Deliveries are planned on the basis of forecasted demand for the period.

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1. Average level of stock is defined with an account of planned irregular realization and takes into consideration the size of reserve stock.

2. Interval of delivery is individual for each period.

3. The level of stock does not fall below the level of reserve stock.

4. Reserve stock is not a constant value. It decreases up to 3 % when deliveries become more frequent.

5. It should be mentioned that the use of this approach allows to reduce stock of commodities up to 30% and increase its profitability about 2 times. So, up to 20 % of money frozen in non-liquid assets is released.

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