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ANALYSIS OF ORDER SUBSTITUTION AT A TEXTILE COMPANY*E.A.YUKHINA, V.V. GRISHKIN, A.S.YUKHIN***(Moscow State Textile University “A.N. Kosygin”)**

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Precondition for successful operation of an enterprise is the availability of its order portfolio. At present, new form of production is being developed in Russia, which is based on orders that have fundamental difference from those of Soviet times. These orders because of their obscurity and underdeveloped mechanism of production management on a by-order basis are not always effective under the present-day conditions.

Order substitutions are formed due to the fluctuation of quantity and size of orders of various types in different periods of time. Order substitution means replacing one order by another one, using existing equipment.

Classification of order substitution types has been proposed based on the following features: degree of complexity, size, frequency, level of profitability, and frequency of order substitutions.

It is proposed in this paper to use order renewal rate, as well as order mastering rate and removal of orders from production as indirect indicators of order substitution.

Placing new orders and making orders by amending may be possible both by replacing some orders by another ones, and by means of expansion of production volume. Order substitution implies the use of already existing equipment. Therefore, the rate of removing orders from production is considered as indicator which reflects order substitution more complete, by provided that they are replaced by other orders.

Indicators were calculated and analysis of actual order substitution on the basis of a concrete textile enterprise was conducted.

The recommended coefficients can be used to assess the extent of order substitution at a textile company. The estimation of order substitution is required in order to select a group of production orders and identify profitable conditions for order substitution already at the stage of development of the production program. Tabl. 1.

Precondition for successful operation of an enterprise is the availability of its order portfolio. At present, new form of production is being developed in Russia, which is based on orders that have fundamental difference from those of Soviet times. These orders because of their obscurity and underdeveloped management mechanism of the make-to-order production are not always efficient under the present-day conditions. Therefore, the task of improving management of the make-to-order production is very urgent.

When manufacturing on the basis of the make-to-order production, receipt of an order serves as a signal for starting production; this is formalized by drawing up a contract either for development, if the ordered products do not belong to the product mix of a company, or for production and delivery, if the products make up the range of products manufactured by a company, but which are not in stock at the moment of receipt of customer's application. Stocks of finished products are minimal in this case.

On this basis, we can determine the make-to-order production as a production aimed at fulfillment of the received orders in full volume and in accordance with the terms of customer orders, made upon the basis of contracts.

The so-called areas of order substitutions are formed due to the fluctuation in quantity

and size of various types in different periods of time. We shall consider this term as a replacement of one order by another, involving the use of available equipment [1].

The authors propose the following classification of order substitutions.

Table 1

# items pos	Classification criterion	Types of order substitution	Comprehensive description
1	Degree of complexity	Simple/ Complicated	When an order consists of one article of fabric. Then the replacement of one order by another means the replacement of one article of fabric by another one. This situation is possible when the optimal order quantity is less than the output rate of one machine for the planned period. When an order consists of several articles of fabric.
2	Volume	Large, medium and small	When decrease or increase of the size of the order requires order substitution.
3	Intervals	Periodical/Seasonal	When different order intervals require order substitution within those periods of time, when this order is absent. Change of orders depending on seasonal demand.
4	Degree of profitability	Profitable, equally profitable and no gain/no loss	When a particular situation in the company requires order substitution, considering the need to achieve certain financial results.
5	Frequency of order substitution	Frequent/Rare	One time or more for the planned period (month) with one type of equipment. One time for several scheduled periods using one and the same equipment.

It is proposed in this paper to use order renewal rate, as well as order mastering rate and rate of removing orders from production schedule as indirect indicators of order substitution.

Order mastering rate – ratio of a number of mastered orders 3_0 to the total number of orders $3_{B>}$ completed by the company within the reporting period.

Rate of removing orders from production schedule- ratio of a number of cancelled orders 3_c to the total number of placed orders by a company with a given supplier within the reporting period.

Order renewal rate - ratio of mastered orders and those cancelled from the production schedule to the total number of completed orders in the enterprise within the reporting period.

One should take into account that order substitution is possible both with regard to assortment and to volume. Therefore, in calculating indicators of order substitution on product mix, the number of orders is to be

used, and in calculating indicators of order substitution by volume, using the same formulas, natural or price unit of measurement are to be used.

Placing new orders and orders with amendments may be possible both by replacing some orders by another ones, and by means of expansion of production volume. Order substitution implies the use of already existing equipment. Therefore, the rate of removing orders from production schedule is considered as an indicator which reflects order substitution more complete, provided that they are replaced by other orders.

The remaining rates do not reflect order substitutions at full extent, because mastering of orders can be carried out both by increasing of shift- operating equipment, and by commission of the already installed equipment, which was not operational in the previous period.

The results of calculating indicators of order substitution on assortment are given in Table 2.

Table 2

Groups of fabrics	3o	3c	3s	Order mastering rate, %	Rate of removing orders from production schedule, %	Order renewal rate, %
Fabrics for production of industrial rubber goods	27	1	30	90,0	3,3	93,3
Special-purpose fabrics	4	1	4	100,0	25,0	125,0
Fabrics for composite materials	4	1	5	80,0	20,0	100,0
Fabrics for production of individual protective devices (IPD)	13	14	14	92,9	100,0	192,9
Fire-retardant fabrics	4	2	5	80,0	40,0	120,0
Filter fabrics	5	1	6	83,3	16,7	100,0
Parachute fabrics	23	2	23	100	8,7	108,7
Household fabrics	5	0	6	83,3	0	83,3
Total	85	22	93	91,4	23,7	115,1

It can be seen in the Table, that the highest rate of order renewal accounts for the group of fabrics for production of IPD (192.9%), special-purpose fabrics (125%) and fire-retardant fabrics (120%). The order renewal rate for the whole company totaled 115.1%. Rate of mastering new orders of the whole company is also high, accounting for 91.4%. Rate of cancellation of orders for the whole enterprise comes to 23.7%.

Consequently, order substitution at this textile company was carried out at the account of removing almost of a quarter of orders from production schedule (23.7%). Analysis of the order removal rate from the production schedule by groups of fabrics allows to make a conclusion that the biggest part of order substitution takes place in groups of fabrics for production of IPD (100%), and the smallest - in the group of fabrics for production of industrial rubber devices (3.3%). In the group of fabrics for household purpose there was no order substitution at all. Consequently, the proposed rates can be used to assess the extent of order substitution at a textile company. The estimation of order substitution is needed in order to select a group of production orders and to identify profitable conditions for order substitution already at the stage of development of the production program and to determine the advantageous conditions for order substitution.

CONCLUSIONS

1. Classification of order substitution types has been proposed based on the following features: degree of complexity, size, intervals, level of profitability, and frequency of order substitutions.

2. It is proposed in this paper to use order renewal rate, as well as order mastering rate and rate of order removal from production schedule as indirect indicators of order substitution. Therefore, the rate of removing orders from production schedule is considered as an indicator which reflects order substitution more complete by provided that they are replaced by other orders.

3. Indicators were calculated and analysis of actual order substitution, as exemplified by a concrete textile enterprise, was conducted.

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