

Impact Factor:

ISRA (India) = 4.971
ISI (Dubai, UAE) = 0.829
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИИ (Russia) = 0.126
ESJI (KZ) = 8.997
SJIF (Morocco) = 5.667

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

SOI: [1.1/TAS](#) DOI: [10.15863/TAS](#)

International Scientific Journal Theoretical & Applied Science

p-ISSN: 2308-4944 (print) e-ISSN: 2409-0085 (online)

Year: 2020 Issue: 11 Volume: 91

Published: 11.11.2020 <http://T-Science.org>

QR – Issue



QR – Article



Dmitry Olegovich Bordukh

Institute of service and entrepreneurship
bachelor degree

Artur Alexandrovich Blagorodov

Institute of service and entrepreneurship
bachelor degree

Vladimir Prokhorov

Institute of service and entrepreneurship
(branch) DSTU (in Shakhty, Russia)
doctor of technical Sciences, Professor

Yuri Dmitrievich Mishin

Siberian state University of transport messages
Ph. D., Professor,

Pavel Postnikov

Siberian state University of transport messages
candidate of technical Sciences, Professor
Novosibirsk, Russia

Galina Volkova

OOO SPOSN "Ortomoda"
doctor of Economics, Professor
Moscow, Russia

ON THE FORMATION OF EFFECTIVE PURCHASING BEHAVIOR AMONG CONSUMERS OF HIGH-QUALITY AND AFFORDABLE PRODUCTS ON THE DOMESTIC AND INTERNATIONAL MARKET

Abstract: In the article, the authors analyze the effectiveness of the software developed by them for forming the technological process of production of import-substituting products and determining the specific reduced costs, which allows calculating the statistical parameters of the effective technological process of production of high-quality products in various forms of production organization, and the software developed by the authors for calculating the receipt of funds from the technological process of production of quality products guarantees light industry enterprises to obtain stable TA and prevent them from bankruptcy providing them with financial stability.

Key words: financial stability, stability, profitability, profit, demand, availability, quality, demand, competitiveness, import substitution, Union of Federal, regional and municipal branches of government; innovation, economic policy, industrial policy, assortment, assortment policy.

Language: English

Citation: Bordukh, D. O., et al. (2020). On the formation of effective purchasing behavior among consumers of high-quality and affordable products on the domestic and international market. *ISJ Theoretical & Applied Science*, 11 (91), 121-141.

Soi: <http://s-o-i.org/1.1/TAS-11-91-27> **Doi:**  <https://dx.doi.org/10.15863/TAS.2020.11.91.27>

Scopus ASCC: 2000.

Impact Factor:

ISRA (India) = 4.971
ISI (Dubai, UAE) = 0.829
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
ПИИЦ (Russia) = 0.126
ESJI (KZ) = 8.997
SJIF (Morocco) = 5.667

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

Introduction

UDC 519.47:685.37

A prerequisite for the effective operation of the enterprise is the rational planning of production that meets the needs of the market.

The formation of the assortment of light industry enterprises should be based on representative information about the current requirements, their possible dynamics and customer preferences.

Marketing research is used to improve the efficiency of the existing management system at enterprises, adjust production and implementation programs, allowing them to respond to changes in the market.

Marketing research is the main regulator of the company's product policy when choosing directions for development. Marketing research should be understood as a systematic definition of the range of data required in connection with the marketing task facing the enterprise, their collection, analysis and report on the information received, conclusions and recommendations.

A survey was chosen as a method of marketing research. The survey, used most often in various types of research, is a universal method of conducting marketing research. It has a high degree of objectivity, high accuracy of the data obtained, and a relatively low cost. The most accurate data has a mass survey, i.e. polling a large number of respondents.

One of the most important steps in planning a mass survey is sampling. A separate representative of a certain population group acts as a unit.

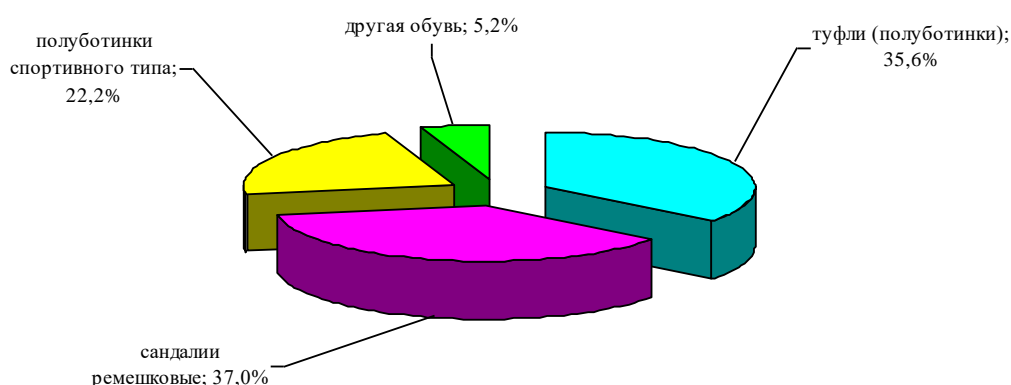
When determining the sample size, it should be borne in mind that the purpose of the survey is to obtain data characterizing the so-called general population, i.e. all carriers of any important trait.

The main idea of the sample is to judge the general in part, so the sample size should be such that it is representative. Questioning is a kind of survey method. The study involved a hundred randomly selected men aged 18 to 55 years, the survey was conducted in the shops of Shakhty and Rostov-on-Don.

The purpose of the survey is to identify preferences in men's shoes for further research of the technological processes of its production for the population of the South - North - Caucasian federal districts and, in particular, the Rostov region. Shoes should be in real demand, and its design and aesthetic characteristics most fully correspond to the consumer preferences of this population group.

The results of data processing are presented in Tables A.1 - A.8 of Appendix A and Figures 1-8.

Seasonal preferences by type of footwear are as follows: shoes (low shoes) occupy a significant place in the wardrobe of a modern man regardless of the season, sports shoes are also a necessary element, especially for respondents of the first age category (18-24 years old). Thong sandals and boots in the corresponding seasons of use were given considerable preference (Fig. 9).



a)

Impact Factor:

ISRA (India)	= 4.971	SIS (USA)	= 0.912	ICV (Poland)	= 6.630
ISI (Dubai, UAE)	= 0.829	ПИИЦ (Russia)	= 0.126	PIF (India)	= 1.940
GIF (Australia)	= 0.564	ESJI (KZ)	= 8.997	IBI (India)	= 4.260
JIF	= 1.500	SJIF (Morocco)	= 5.667	OAJI (USA)	= 0.350

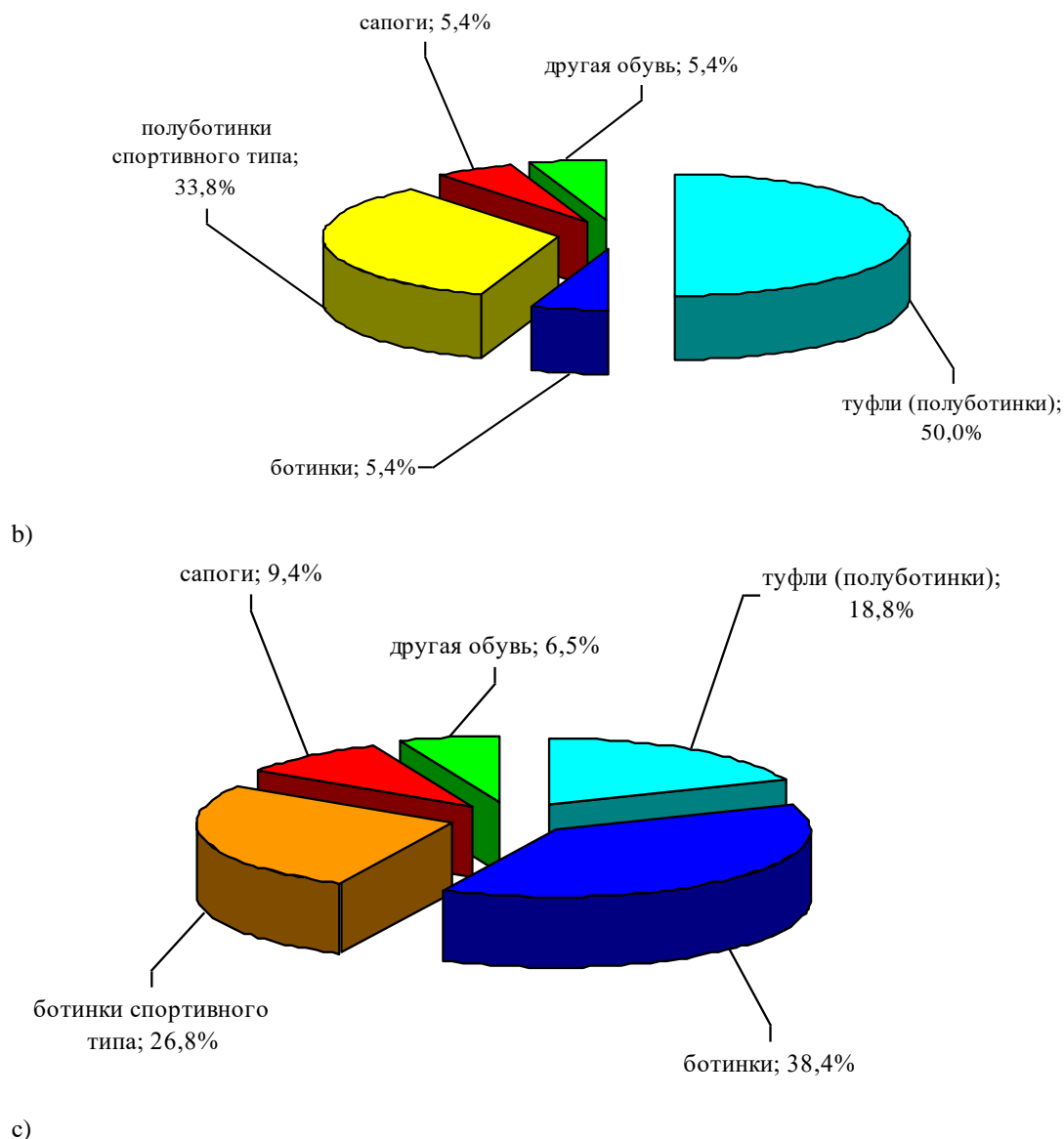


Figure:1 - Purchasing preference charts different types of shoes according to the seasons: a) summer socks; b) autumn-spring socks; c) winter period of wear

Most often the respondents buy shoes of black and brown colors. in general, the color choice of shoes is as follows (Fig. 4.21).

Impact Factor:

ISRA (India)	= 4.971	SIS (USA)	= 0.912	ICV (Poland)	= 6.630
ISI (Dubai, UAE)	= 0.829	ПИИИ (Russia)	= 0.126	PIF (India)	= 1.940
GIF (Australia)	= 0.564	ESJI (KZ)	= 8.997	IBI (India)	= 4.260
JIF	= 1.500	SJIF (Morocco)	= 5.667	OAJI (USA)	= 0.350

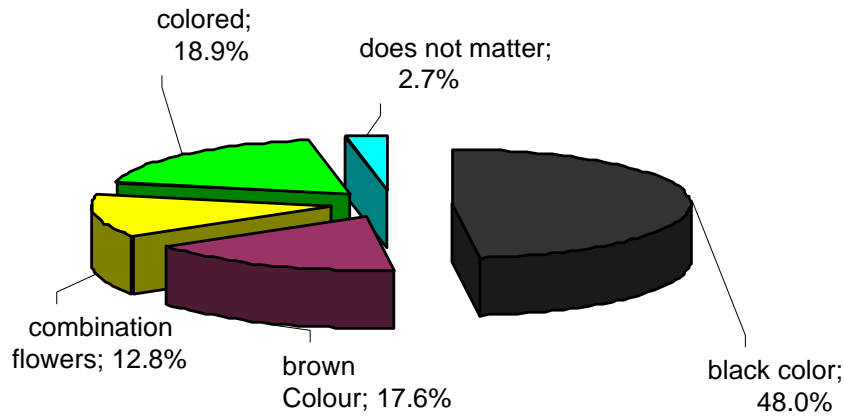


Figure: 2 - Color preferences in shoes

The overwhelming majority of respondents prefer to buy shoes with uppers made from natural materials, which, in their opinion, are more comfortable and prestigious (Fig. 1). If natural materials were almost unanimously chosen for the upper of the shoe, then in the materials of the bottom of the shoe, attention was paid to the seasonality of

operation, which was expressed in approximately equal shares of the presented diagram. Most of the respondents showed significant awareness of the purpose of sole materials, but at the same time, about a tenth found it difficult to answer the question posed (Fig. 3).

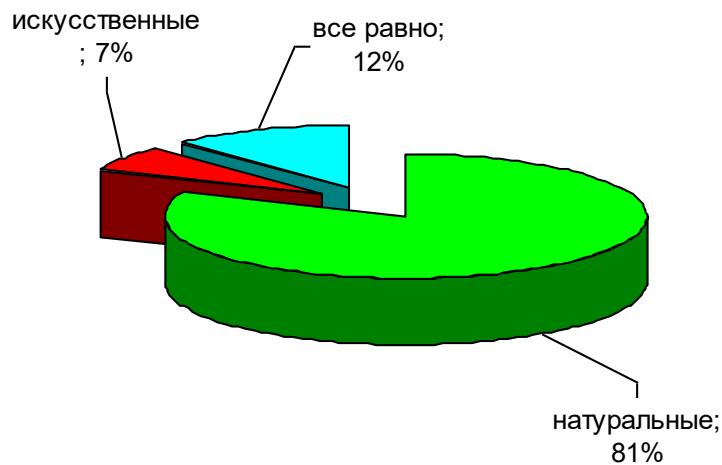


Figure: 3 - Characteristics of shoes by upper materials

More than half of the respondents prefer laces as a way of fixing shoes on the feet, and in the second

and third places with a significant margin - elastic bands and Velcro tape (Fig.).

Impact Factor:

ISRA (India)	= 4.971	SIS (USA)	= 0.912	ICV (Poland)	= 6.630
ISI (Dubai, UAE)	= 0.829	ПИИЦ (Russia)	= 0.126	PIF (India)	= 1.940
GIF (Australia)	= 0.564	ESJI (KZ)	= 8.997	IBI (India)	= 4.260
JIF	= 1.500	SJIF (Morocco)	= 5.667	OAJI (USA)	= 0.350

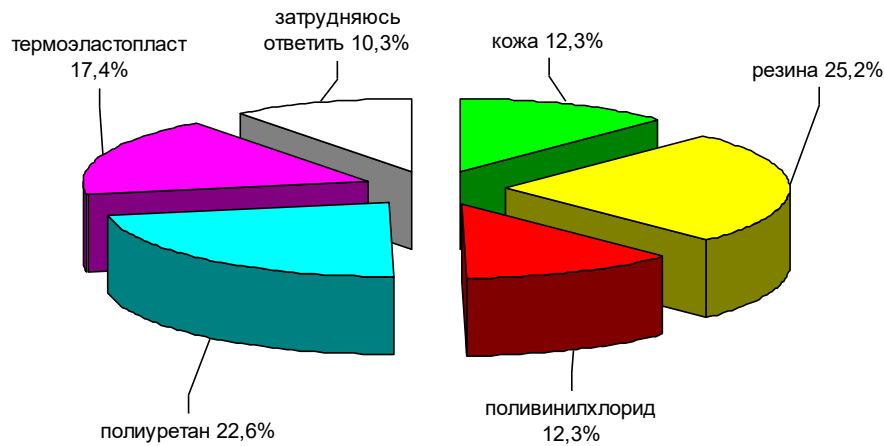


Figure: 4 - Characteristics of shoes by bottom materials

According to the survey results, the optimal number of outer parts in the shoe upper was found to be the smallest and the average, which is probably

explained by the respondents' gravitation towards the classic trends in shoe fashion (Fig. 5).

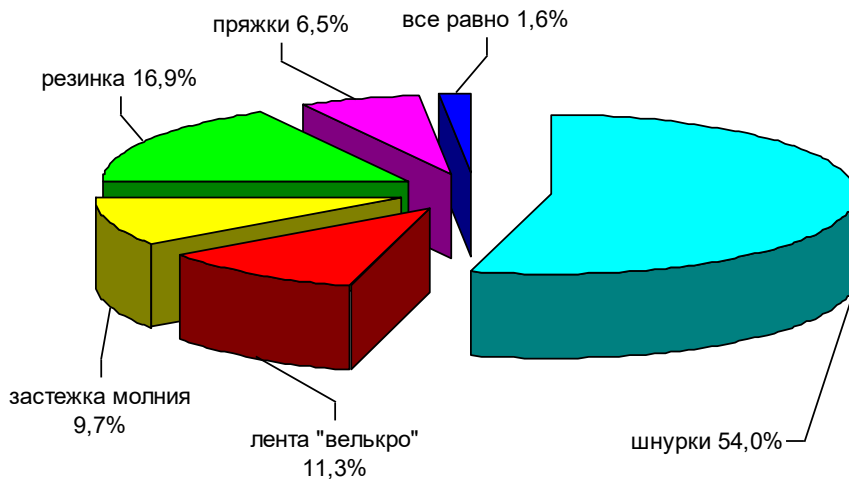


Figure: 5 - Characteristics of preferences for ways of fixing shoes on the foot

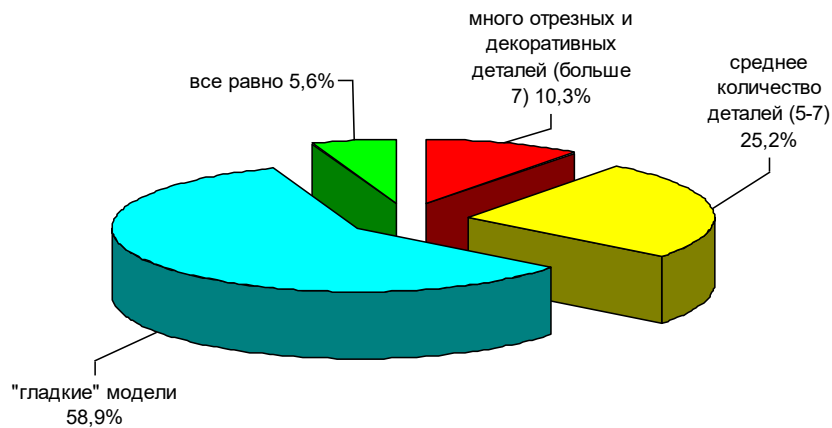


Figure: 6 - The number of outer parts in the shoe upper blank

Impact Factor:

ISRA (India)	= 4.971	SIS (USA)	= 0.912	ICV (Poland)	= 6.630
ISI (Dubai, UAE)	= 0.829	ПИИЦ (Russia)	= 0.126	PIF (India)	= 1.940
GIF (Australia)	= 0.564	ESJI (KZ)	= 8.997	IBI (India)	= 4.260
JIF	= 1.500	SJIF (Morocco)	= 5.667	OAJI (USA)	= 0.350

The distribution of preferences by the types of finishing of the outer parts of the shoe upper blank is shown in Figure 7.

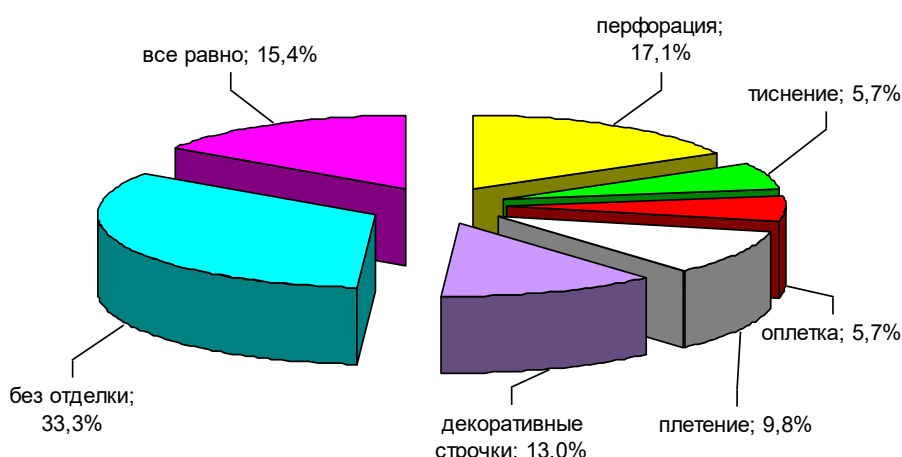


Figure: 7 - Types of finishing of the outer parts of the shoe upper blank
The diagram of the age categories of the respondents is shown in Figure 8

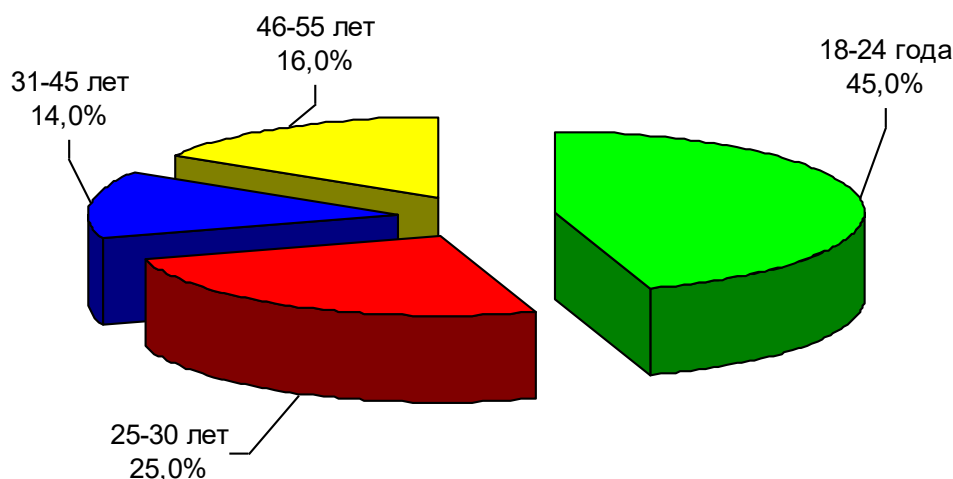


Figure: 8 - Distribution of respondents by age category

Based on the results of the study of consumer preferences, a range of shoe models was proposed that meets the requirements of consumers.

Models on a single base differ in the materials used for the top and bottom of the shoe and the degree of processing of parts and assemblies. In addition, a change in the color scheme of each of the presented models will allow you to transform the presented assortment endlessly, instantly reacting to market demands, and correspond to the fashion trend.

Thus, outwardly similar models are manufactured using various technological processes, which has a significant impact on their cost. As a result, the price of manufactured models varies in a wide range, which allows the company to respond more quickly to fluctuations in demand and increase

its market share, and, consequently, improve its economic performance.

Development of elements of the expert system operational management of multi-assortment production

The footwear market of the South and North Caucasian Federal Districts is oversaturated with types of footwear for the same purpose. Therefore, the head of the enterprise needs to know exactly what will be in demand on the market and how it should be implemented so that the developed range of footwear is chosen by the buyer, withstanding the fiercest competition that generates new proposals.

Impact Factor:

ISRA (India) = 4.971
ISI (Dubai, UAE) = 0.829
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
PIIHQ (Russia) = 0.126
ESJI (KZ) = 8.997
SJIF (Morocco) = 5.667

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

For all this, it is important to build an assortment policy in such a way that, if footwear of the same type arrives on the market, it should differ significantly in price, but meet the requirements of the standard.

The most important task of building the elements of the operational management system for the assortment of a shoe enterprise is the choice of technology that can effectively implement the intended goals in a complex multi-level hierarchical management system. The use of mathematical methods and optimization theory makes it possible to effectively make decisions not only in those conditions when the parameters of the system are known, or they can be represented as fixed values.

The paper proposes new approaches to determining the total number of footwear produced depending on the market situation, prevailing prices and demand, and developing an optimal plan for the production of footwear models.

To determine the total number of shoes produced depending on the market situation, prevailing prices and demand, it is proposed to apply elements of the theory of fuzzy sets. The theory of fuzzy sets has long been applied, mainly for use in systems that imitate human behavior, such as pattern recognition systems, linguistic analysis, search for solutions and others, in which there is no access to the complex mathematical apparatus necessary to describe complex industrial control systems and were highly specialized systems. This approach allows in each case to agree on the requirements of the problem and the required degree of accuracy of its solution.

Techniques based on the theory of fuzzy sets make it possible to use approximate, but at the same time, methods of describing nondeterministic systems that are sufficiently effective, for the analysis of which it is impossible to use standard quantitative mathematical methods. At the same time, all theoretical substantiations of this approach are quite accurate and are not in themselves a source of uncertainty (fuzzy logic and IS).

Unlike traditional mathematics, which requires precise and unambiguous formulations of patterns at each step of modeling, fuzzy logic offers a completely different level of thinking, thanks to which the creative process of modeling occurs at the highest level of abstraction, at which only a minimal set of patterns is postulated.

The basic idea behind fuzzy logic is that you cannot define rules for all occasions. These rules are discrete points in a continuum of possible situations and decisions are made by approximating them. For each case, the known rules for similar situations are combined. This approximation is possible only in cases where there is flexibility or blurring in the words with which these rules are defined. To use the power of human logic in production processes, a mathematical model is needed. To implement such a model, fuzzy logic was developed, which allows you

to describe the decision-making process and its search in an algorithmic form.

When solving problems that contain fuzziness in their formulation and have ambiguity of goals (multicriteria) "maximum income with minimum costs", it is possible to operate with fuzzy input data, namely:

- values continuously changing in time (dynamic tasks);
- values that cannot be set unambiguously (results of statistical surveys, advertising campaigns, etc.).

There is a possibility of a fuzzy formalization of the evaluation and comparison criteria: operating with the criteria "majority", "possibly", "predominantly", etc.; the ability to quickly simulate complex dynamic systems and their comparative analysis with a given degree of accuracy. Using the principles of system behavior described by fuzzy methods, it does not take a lot of time to find out the exact values of variables, compose describing equations and evaluate different variants of output values.

The developed system allows you to build a control model with an unlimited number of input parameters and control blocks and thereby describe the behavior of fairly complex control objects.

Let's consider the construction of elements of a fuzzy expert system. The control algorithm is implemented programmatically using the MATLAB extension package - Fuzzu Logic Toolbox; the assessment of the planned production of footwear is made according to the standards for the removal of footwear from 1 m² of the footwear assembly area and ranges from 0 to 2.8 pairs / m²; shoe price, demand, and market saturation are estimated from 0 to 1 (0 is the worst estimate, 1 is the best).

The system under development has three inputs and one output. Based on well-established customs and intuitive ideas, we will assume that the problem of finding the optimal release is described by the following assumptions:

1. If the demand is low, the price is high and the market saturation is high, the assortment needs to be renewed and the output is reduced to 20-50% of the standard.
2. If the demand is average, the price is average and the market saturation is average, the assortment requires some modification and the output is up to 40-70% of the standard.
3. If the demand is high, the price is low and the market saturation is low, the assortment does not require changes and the output is up to 60-100% of the standard.

The construction of this system is performed using the Mandani inference algorithm.

The structure of the expert system and the resulting set of rules are shown in Figures 9 - 10.

The logical conclusion of any case (Fig. 9) is carried out in four stages: the introduction of fuzziness

Impact Factor:

ISRA (India) = 4.971	SIS (USA) = 0.912	ICV (Poland) = 6.630
ISI (Dubai, UAE) = 0.829	ПИИИ (Russia) = 0.126	PIF (India) = 1.940
GIF (Australia) = 0.564	ESJI (KZ) = 8.997	IBI (India) = 4.260
JIF = 1.500	SJIF (Morocco) = 5.667	OAJI (USA) = 0.350

(fuzzification), inference, composition, reduction to clarity - defuzzification.

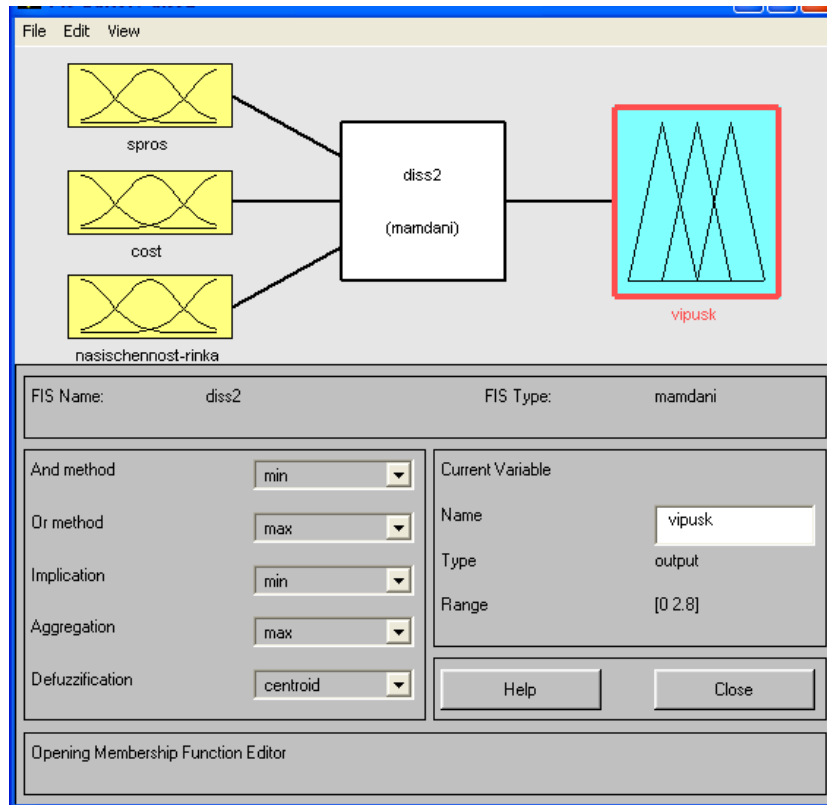


Figure: 9- The structure of the expert system

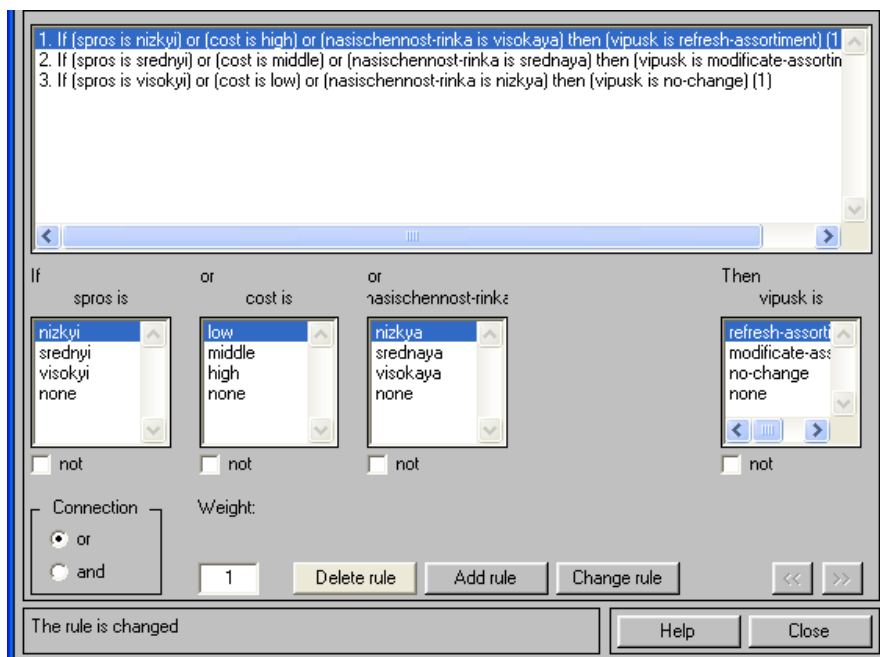


Figure: 10 - Final rule set

For greater reliability of the results obtained when optimizing the total number of shoes produced, depending on the market situation, prevailing prices and demand using modern mathematical methods, it

is necessary to construct a geometric image of the process under study and use it to choose the most rational decision on the volume of output (Fig.11,12) ...

Impact Factor:

ISRA (India) = 4.971	SIS (USA) = 0.912	ICV (Poland) = 6.630
ISI (Dubai, UAE) = 0.829	ПИИИ (Russia) = 0.126	PIF (India) = 1.940
GIF (Australia) = 0.564	ESJI (KZ) = 8.997	IBI (India) = 4.260
JIF = 1.500	SJIF (Morocco) = 5.667	OAJI (USA) = 0.350

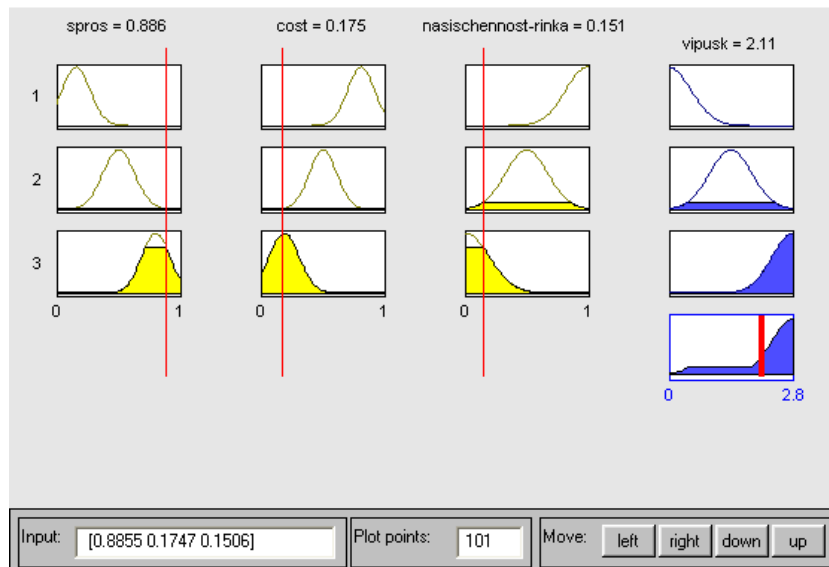


Figure: 11 - Mandani inference routine
 (high demand $S = 0.886$, low price $C = 0.175$, market saturation low $N = 0.151$, estimated output - 2.11 pairs / m2)

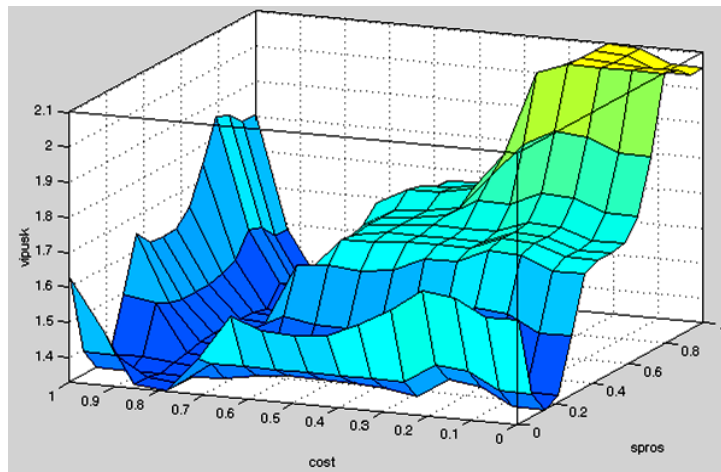


Figure: 12 - Geometric image of the dependence of the estimated output on demand and price with a fixed variable "market saturation" $N = 0.151$

The constructed geometric image of three factors with a fixed value of one factor makes it possible to establish the influence of two other factors on the output volume and to choose an extreme ratio between the number of shoes produced and the value of price, demand and market saturation factors within the

allowed price and marketing constraints. the volume of footwear production with a fixed market saturation at a low level, an enterprise needs to achieve high demand for products and reduce its cost by regulating pricing.

Impact Factor:

ISRA (India) = 4.971	SIS (USA) = 0.912	ICV (Poland) = 6.630
ISI (Dubai, UAE) = 0.829	ПИИИ (Russia) = 0.126	PIF (India) = 1.940
GIF (Australia) = 0.564	ESJI (KZ) = 8.997	IBI (India) = 4.260
JIF = 1.500	SJIF (Morocco) = 5.667	OAJI (USA) = 0.350

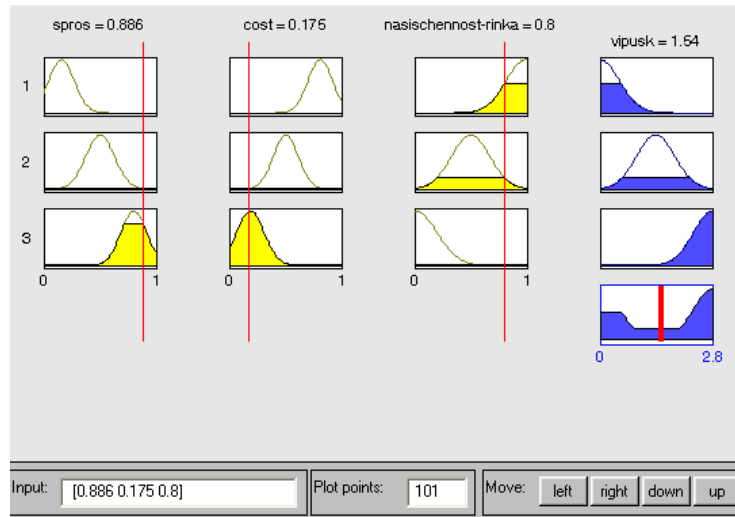


Figure: 13 - Inference procedure according to the Mandani algorithm (demand is high $S = 0.886$, price is low $C = 0.175$, market saturation is high $N = 0.8$, estimated output - 1.54 pairs / m2)

With a high market saturation, the maximum production volume is at 1.4–1.5 pairs / m2 and can be regulated by the introduction of new types of footwear into production. With high cost and low demand for

manufactured models, consideration should be given to reducing production costs through design updates and the use of new materials.

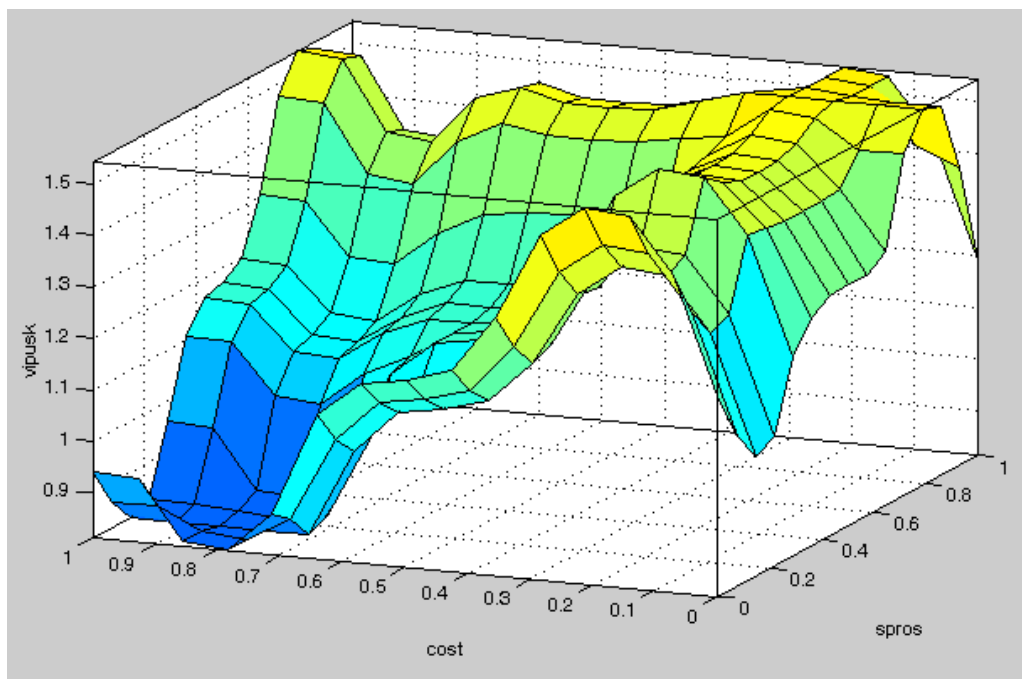


Figure: 14- Geometric image of the calculated output dependence on demand and price with a fixed variable "market saturation" $N = 0.8$

Determining the production plan in order to maximize the profit from the sale of manufactured products is a linear programming task and is solved using the "Search for a solution" option in Microsoft® Excel. Development of the optimal production plan for shoe models is based on the profitability ratio and production costs of specific models that occupy the greatest share in the cost of production and are

conditionally variable costs. These include the following costs:

- costs of raw materials and basic materials;
- costs of auxiliary materials;
- costs of basic and additional wages of production workers with deductions for the unified social tax.

Impact Factor:	ISRA (India) = 4.971	SIS (USA) = 0.912	ICV (Poland) = 6.630
	ISI (Dubai, UAE) = 0.829	ПИИИ (Russia) = 0.126	PIF (India) = 1.940
	GIF (Australia) = 0.564	ESJI (KZ) = 8.997	IBI (India) = 4.260
	JIF = 1.500	SJIF (Morocco) = 5.667	OAJI (USA) = 0.350

Table 1 - Initial data and functional dependencies

	types of products			maximum share in structure cost	maximum value in cost products
	model 1	mode 1 2	mode 1 3		
coefficient of consumption of basic materials per unit of production	0.78	0.75	0.7	0.86	= MIN (\$ B \$ 8: \$ D \$ 8) * E3
coefficient of consumption of auxiliary materials per unit of production	0.04	0.03	0.04	0.05	= MIN (\$ B \$ 8: \$ D \$ 8) * E4
coefficient of expenditure of deductions for labor remuneration of production workers	0.07	0.08	0.06	0.09	= MIN (\$ B \$ 8: \$ D \$ 8) * E5
profitability ratio	0.3	0.2	0.3	0,4	= MIN (\$ B \$ 8: \$ D \$ 8) * E6
cost of 1 pair	1200	1250	1050		
initial values	0	0	0		
target cell	= B8 * B9 + C8 * C9 + D8 * D9				
limitation of main materials	= B3 * B9 + C3 * C9 + D3 * D9				
limitation of auxiliary materials	= B4 * B9 + C4 * C9 + D4 * D9				
limitation of wages	= B5 * B9 + C5 * C9 + D5 * D9				
profit limitation	= B6 * B9 + C6 * C9 + D6 * D9				

Impact Factor:

ISRA (India) = 4.971	SIS (USA) = 0.912	ICV (Poland) = 6.630
ISI (Dubai, UAE) = 0.829	ПИИЦ (Russia) = 0.126	PIF (India) = 1.940
GIF (Australia) = 0.564	ESJI (KZ) = 8.997	IBI (India) = 4.260
JIF = 1.500	SJIF (Morocco) = 5.667	OAJI (USA) = 0.350

B10		=B8*B9+C8*C9+D8*D9					
	A	B	C	D	E	F	G
1		виды изделий					
2		модель 1	модель 2	модель 3	максимальная доля в структуре себестоимости	максимальное значение в себестоимости продукции, руб.	
3	коэффициент расхода основных материалов на единицу продукции	0,78	0,75	0,7	0,86	903	
4	коэффициент расхода вспомогательных материалов на единицу продукции	0,04	0,03	0,04	0,05	52,5	
5	коэффициент расхода отчислений на оплату труда произв. рабочих	0,07	0,08	0,06	0,09	94,5	
6	коэффициент прибыльности	0,3	0,2	0,3	0,4	420	
7							
8	себестоимость 1 пары, руб.	1200	1250	1050			
9	выпуск, пар	132	1062	5			
10	целевая ячейка	1491150					
11	ограничение "основные материалы, руб."	903					
12	ограничение "вспомогательные материалы, руб."	37					
13	ограничение "оплата труда, руб."	95					
14	ограничение "прибыль, руб."	254					

Figure: 15 - Results of calculating the optimal assortment

Поиск решения

Установить целевую ячейку:

Равной: максимальному значению значению:

минимальному значению

Изменяя ячейки:

Ограничения:

-
-
-
-
-
-

Figure: 16 - Entering initial parameters

The price of one pair of shoes, the cost factors in the cost structure, the profitability factor are presented in Table 1, the maximum percentages for the calculation items in the cost of production and the total price of the manufactured product (output) are also

given - the objective function, which should take the maximum value.

As a result of solving the problem for three types of models, the numerical value of the objective function was obtained, namely: the total production

Impact Factor:

ISRA (India) = 4.971
ISI (Dubai, UAE) = 0.829
GIF (Australia) = 0.564
JIF = 1.500

SIS (USA) = 0.912
PIIHQ (Russia) = 0.126
ESJI (KZ) = 8.997
SJIF (Morocco) = 5.667

ICV (Poland) = 6.630
PIF (India) = 1.940
IBI (India) = 4.260
OAJI (USA) = 0.350

cost of the entire assortment range of models and the optimal number of produced shoe models.

Justification of the choice of shoe manufacturing technologies

and requirements for the designed technological processes

The beginning of modeling the development of any organizational system is structural modeling, which is necessary to optimize projects (Figure 4.36). For structural modeling of the designed technological processes for the manufacture of a new range of shoes and optimization of existing technological processes, the procedure for preparing technological documentation is considered (Fig. 17).

The main feature of this procedure is that when preparing sets of design technological documentation, it is planned to develop not only promising, but also directive technological processes. Let us consider in more detail the main goals, objectives and differences of such technologies that allow, in the technological part of a reconstruction or technical re-equipment project, to reasonably answer the main questions:

- about new technological solutions;
- mechanization and automation of technological processes;
- the composition of the applied technological equipment, including imported;
- the use of low-waste and non-waste technological processes;
- the use of more progressive transport and technological schemes for the movement of packaged goods;
- new methods of technical control and testing of products;
- minimization of production waste, emission of harmful substances;
- determination of the composition of production processes for waste disposal.

In addition, a set of design technological documentation, promising and directive technological processes allow you to answer other important questions:

- on the calculation of fuel and energy and material balances of technological processes;
- assessing the need for basic types of resources for technological needs;
- labor input, machine input and maintenance output;
- calculations of the number of pieces of equipment, areas, number of employees;
- execution of drawings of technological layouts and equipment layouts.

Let's characterize the essential content and distinctive features of the technologies used in projects. Let's start this analysis with the definitions of the concepts of "project", "prospective" and "directive

technological process". They are defined in the Unified Process Documentation System as follows.

1. A promising technological process is a technological process corresponding to the modern achievements of science and technology, the methods and means of implementation of which, in whole or in part, have to be mastered at the enterprise. 2. A set of directive technological documentation is a set of sets of documents for individual technological processes necessary and sufficient for carrying out preliminary enlarged engineering, organizational and economic tasks, when deciding on the launch of new products into production in relation to the conditions of a particular enterprise.

3. A set of design technological documentation is intended for use in the design or reconstruction of an enterprise. Working technological processes, ie technological processes carried out according to working technological and (or) design documentation during reconstruction and (or) technical re-equipment should be revised and replaced by new, more advanced technologies.

In the technological document flow diagram (Fig. 4.38), in accordance with the Unified System for Technological Documentation (ESTD), the following rules for the use of sets of technological documentation are adopted, which are linked to the stages and stages of design preparation for production.

In a typical shoe manufacturing technology, there are ready-made recommendations for performing the operations of making shoes for some of the most common types. However, in practice, there are often cases when it is required to develop a new technological process for making shoes, choose the most effective from the existing set of technological processes, or perform a comparative analysis of technologies at the cost of making shoes. All this is especially important in modern conditions of meeting market demand with a frequently changing assortment of shoes, the emergence of new types of shoe machines, technologies, forms of organization of production, etc.

Each production process is considered either as a set of changes that the objects of labor undergo, or as a set of actions of workers aimed at an expedient change in the objects of labor. In the first case, they talk about the technological process, in the second - about the labor process.

The technology determines the structure of the technological process, which allows, if necessary, to divide the main and auxiliary operations into elementary ones.

Given the variety of technologies, equipment, characteristics and types of raw materials, the organization of shoe production with a wide range of products, it is advisable to combine shoe assembly operations into the following groups:

- preparatory operations preceding molding;
- molding the upper blank on the last;

Impact Factor:

ISRA (India) = 4.971	SIS (USA) = 0.912	ICV (Poland) = 6.630
ISI (Dubai, UAE) = 0.829	PIHIQ (Russia) = 0.126	PIF (India) = 1.940
GIF (Australia) = 0.564	ESJI (KZ) = 8.997	IBI (India) = 4.260
JIF = 1.500	SJIF (Morocco) = 5.667	OAJI (USA) = 0.350

- processing of a tightened shoe upper;
- attaching details of the bottom of the shoe;
- finishing of shoes.

A detailed description of these groups by operations is presented in the diagrams (Fig. 4.39–4.43).

Table 4.3 shows a generalized technological process for assembling shoes, a list of equipment and its characteristics.

At the present stage of economic development, technology has acquired particular importance in concretizing the strategy of resource consumption, reducing their scarcity, and increasing the efficiency of their use.

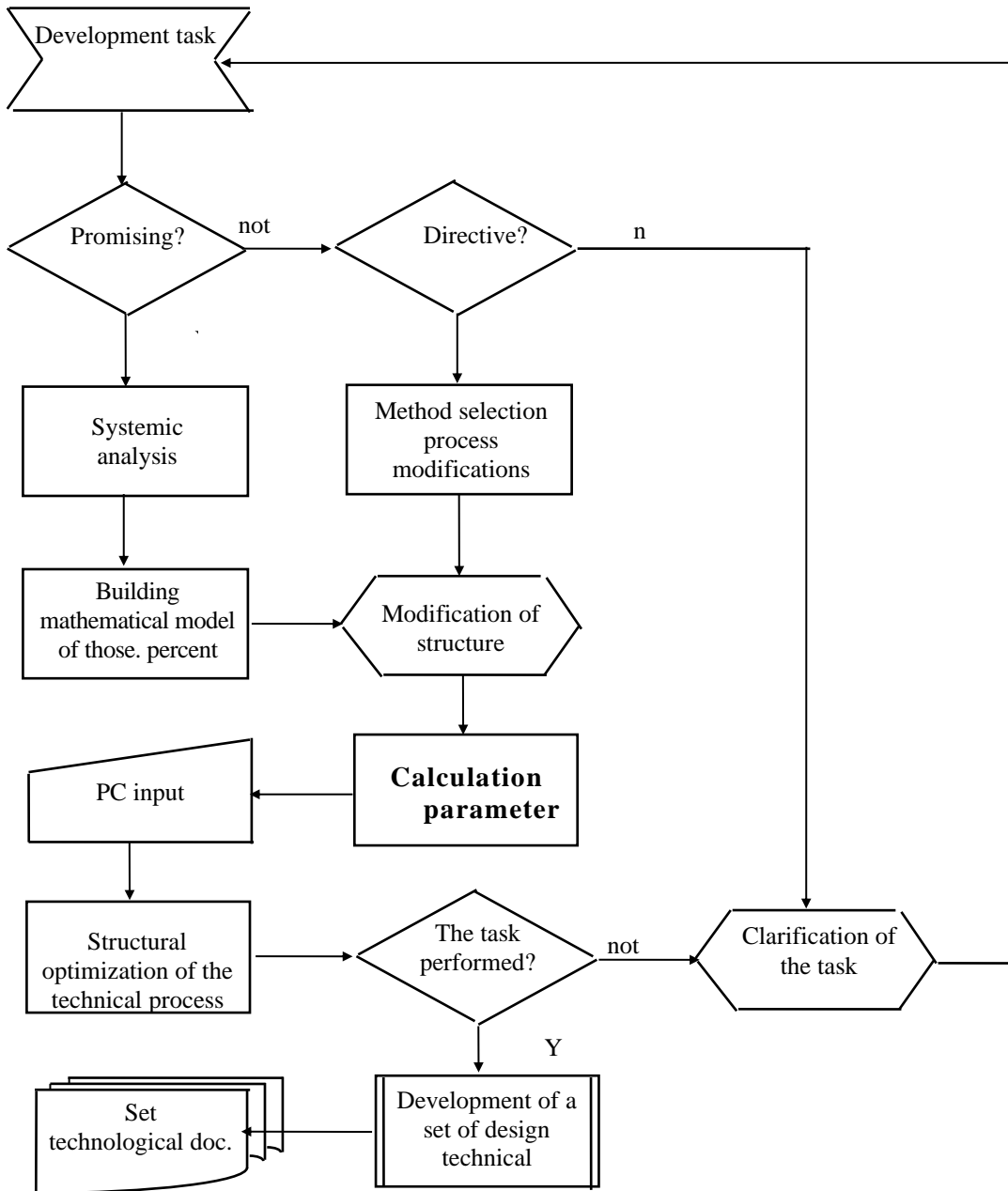


Figure: 17 - Information and functional design diagram technological processes

Impact Factor:

ISRA (India) = 4.971	SIS (USA) = 0.912	ICV (Poland) = 6.630
ISI (Dubai, UAE) = 0.829	ПИИИ (Russia) = 0.126	PIF (India) = 1.940
GIF (Australia) = 0.564	ESJI (KZ) = 8.997	IBI (India) = 4.260
JIF = 1.500	SJIF (Morocco) = 5.667	OAJI (USA) = 0.350

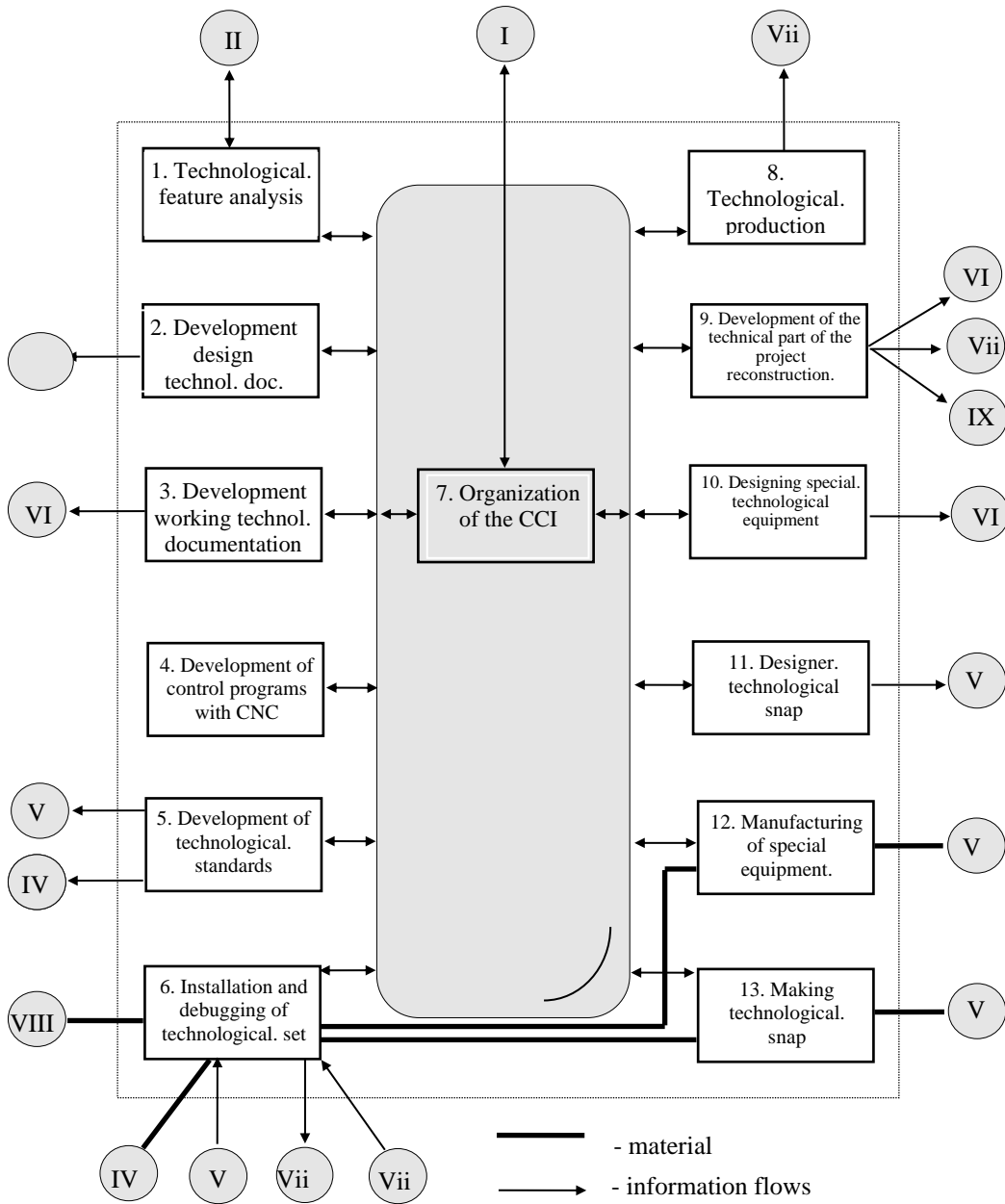


Figure:18 - Block diagram of the functions of technological preparation of production

Impact Factor:

ISRA (India) = 4.971	SIS (USA) = 0.912	ICV (Poland) = 6.630
ISI (Dubai, UAE) = 0.829	ПИИЦ (Russia) = 0.126	PIF (India) = 1.940
GIF (Australia) = 0.564	ESJI (KZ) = 8.997	IBI (India) = 4.260
JIF = 1.500	SJIF (Morocco) = 5.667	OAJI (USA) = 0.350

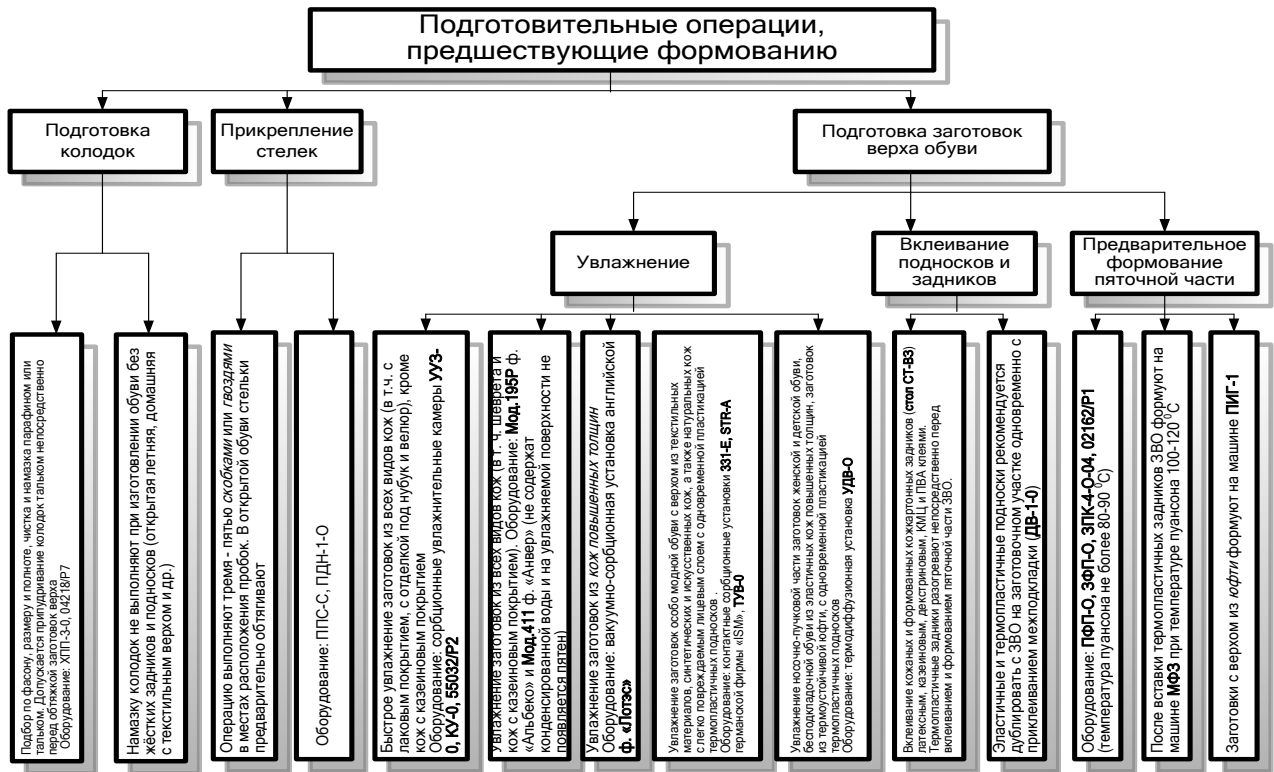


Figure 19 - Preparatory operations prior to forming



Figure: 20 - Molding operations of the shoe assembly technological process

Impact Factor:

ISRA (India) = 4.971	SIS (USA) = 0.912	ICV (Poland) = 6.630
ISI (Dubai, UAE) = 0.829	ПИИЦ (Russia) = 0.126	PIF (India) = 1.940
GIF (Australia) = 0.564	ESJI (KZ) = 8.997	IBI (India) = 4.260
JIF = 1.500	SJIF (Morocco) = 5.667	OAJI (USA) = 0.350

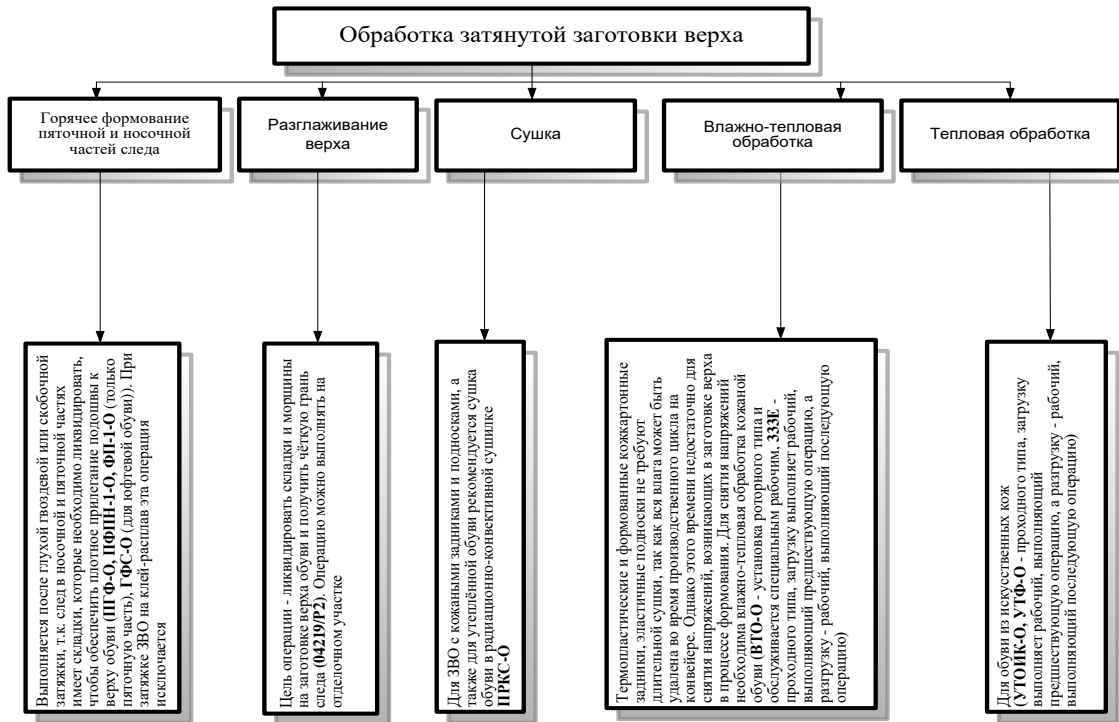


Рис. 3.41. Операции фиксации формы ЗВО технологического процесса сборки обуви

Figure: 21 - Operations for fixing the form of the ZVO of the shoe assembly technological process

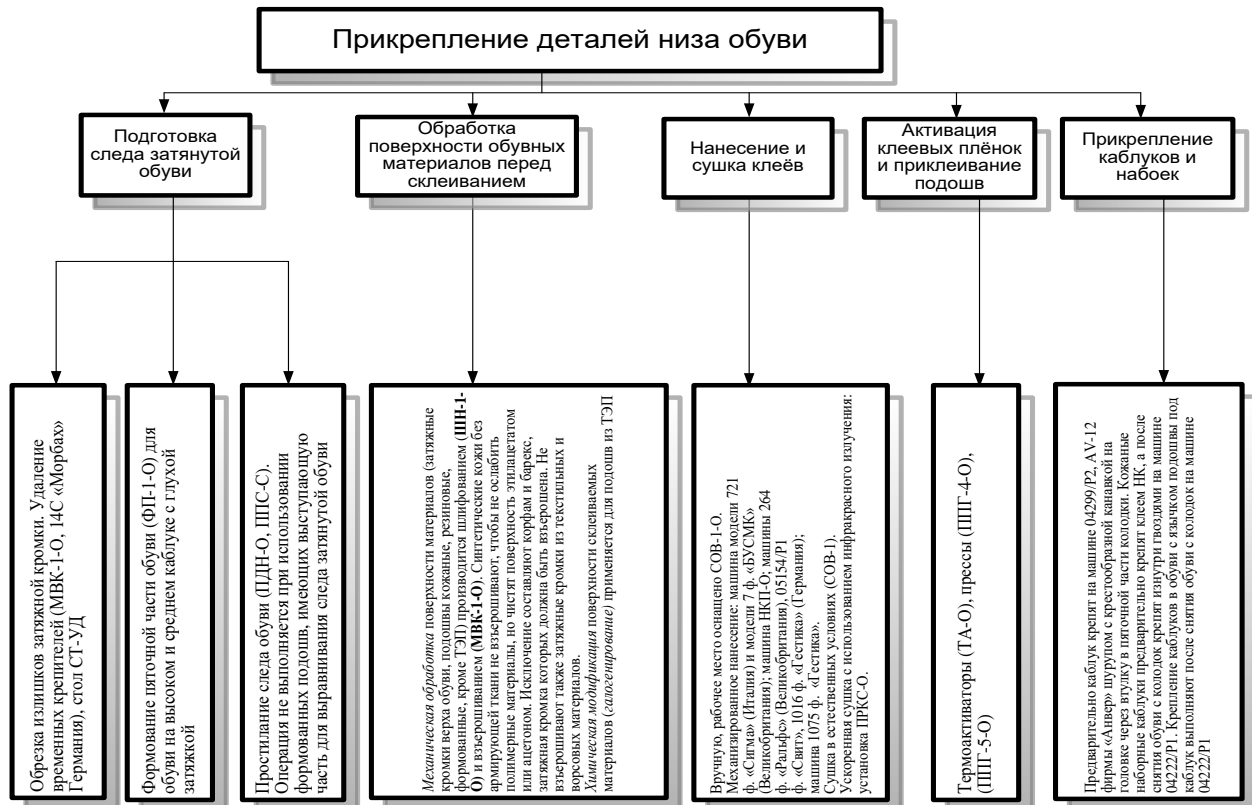


Figure: 22 - Periods of attaching details of the technological process of shoe assembly

Impact Factor:

ISRA (India) = 4.971	SIS (USA) = 0.912	ICV (Poland) = 6.630
ISI (Dubai, UAE) = 0.829	ПИИЦ (Russia) = 0.126	PIF (India) = 1.940
GIF (Australia) = 0.564	ESJI (KZ) = 8.997	IBI (India) = 4.260
JIF = 1.500	SJIF (Morocco) = 5.667	OAJI (USA) = 0.350

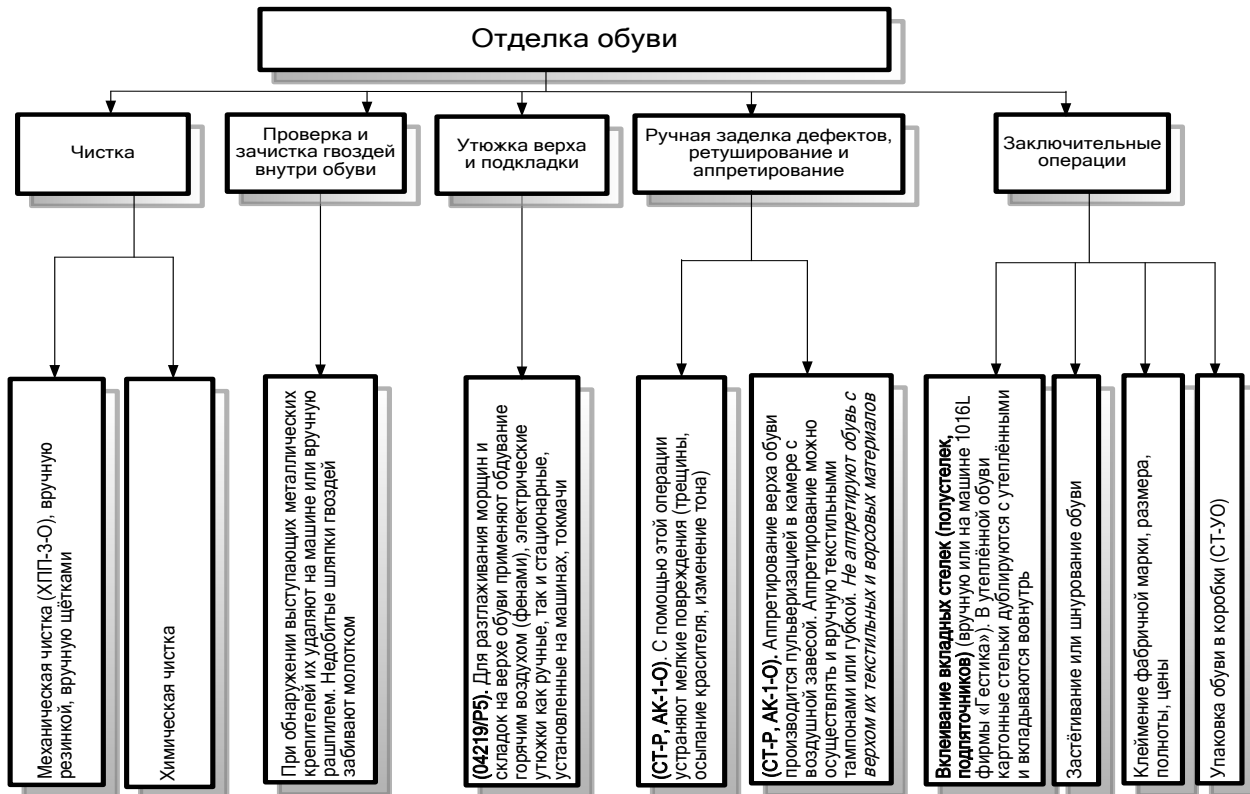


Figure: 23 - Finishing operations of the shoe assembly technological process

Table 2 - Generalized technological process of shoe assembly

N o.	the name of the operation	Discharge		Time rate, min (mash / manual)		Production rate, steam (machine / manual)	amount workers, people	Equipment	Capital investments for equipment, rubles	Area, occupied (sq.m)	Power engine	Performance equipment
		m	R	m	R							
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Launching blanks on the conveyor	2		0.33		1454.55	0.55	conveyor	500,000	57,360	1.1	150
2.	Moistening the workpiece	3		0.14		3428.57	0.23	URP / 2	150,000	1.603	26.12	
3.	Attaching the insoles to the last	2		0.28		1714.29	0.47	10/11 / C	250,000	0.720	0.5	250
4.	Spreading talcum powder		2	0.55		872.73	0.92	ST-B		0.360		96
5.	Toe insertion, overlap and pre-molding of the toe section of the ZVO with thermoplastic toe cap	3		0.59		813.56	0.98	02253 / P1	254000	0.265	0.3	250
6.	Bonding leather-cardboard backs		2	0.62		774.19	1.03	ST-VZ		0.507		175
7.	Pre-molding of the heel	3		0.60		800.00	1.00	02021 / P2	168000	1,360	five	150
8.	Insertion of thermoplastic heels and	3		0.94		510.64	1.57	G504CF	110,000	0.5670	1,2	350

Impact Factor:

ISRA (India) = 4.971 **SIS (USA) = 0.912** **ICV (Poland) = 6.630**
ISI (Dubai, UAE) = 0.829 **PIHII (Russia) = 0.126** **PIF (India) = 1.940**
GIF (Australia) = 0.564 **ESJI (KZ) = 8.997** **IBI (India) = 4.260**
JIF = 1.500 **SJIF (Morocco) = 5.667** **OAJI (USA) = 0.350**

	pre-molding of the heel of the ZVO											
9.	Putting the workpiece on the last and installing the heel	4		0.44		1090.91	0.73	02015 / P5	250,000	0.598	0.23	270
10.	Tightening and tightening of the toe-bundle part of the ZVO with preliminary moistening and plasticization of the sock	6		0.62		774.19	1.03	K73STI K	1576800	1,436	5.5	90
11.	Tightening the glue part with hot melt glue with templates	6		0.46		1043.48	0.77	01211 / P1	1,200,000	1.011	7	270
12.	Heel tightening	4		0.39		1230.77	0.65	640 C	1,150,000	0.861	1.5	90
13.	Tightening the nose-beam part of the ZVO with melt glue	6		0.39		1230.77	0.65	PAL-G	1,500,000	1,500	4.86	140
14.	Tightening of the heel with tex and the heel with hot melt glue	6		0.39		1230.77	0.65	PIC K 24SZ, Cerim	1,851,000	1,715	5.5	120
15.	Covering ZVO		fi ve	1.73		277.46	2.88	ST-R		0.360		
16.	Glueing the lingering edge and insoles with glue, drying		2	0.54		888.89	0.90	ST-R		0.360		
17.	Heel tightening		4	8.00		60,000	13.33	ST-R		0.360		
18.	Hauling bundles and stretching		4	2.83		169.61	4.72	ST-R		0.360		
19.	Tightening the toe-beam part of the ZVO		4	9.90		48.48	16.50	ST-R		0.360		200
20.	Tightening the gel part of the ZVO		4	2.92		164.38	4.87	ST-R		0.360		113
21.	Wet-heat treatment of shoes	2		0.80		600.00	1.33	wet heat treatment chamber "Granucci"	142840	1,766	27.9	200
22.	Hot air wrinkle removal	2		0.83		578.31	1.38	04219 / P5	154740	0.353	0.18	113
23.	Removing staples or tex from insoles		2	0.36		1333.33	0.60	ST-UD		0.992		130
24.	Hot molding of footprint	2		0.91		527.47	1.52	04286 / P22	140350	0.671	2.7	125
25.	Trimming and tufting excess trailing edge, dust removal	3		0.64		750.00	1.07	automatic K71S	165000	0.855	2.7	240
26.	Attaching the shank	2	2	0.51		941.18	0.85	02015 / P5	105000	0.299	0.7	175
27.	Forgiveness of the footprint	2	2	0.81		592.59	1.35	02015 / P5	105000	0.299	0.7	150
28.	First glue on the tightening edge, drying	2		0.87		551.72	1.45	02068 / P4, COB	127900	2,582	2.7	150

Impact Factor:

ISRA (India) = 4.971 **SIS (USA) = 0.912** **ICV (Poland) = 6.630**
ISI (Dubai, UAE) = 0.829 **PIIHQ (Russia) = 0.126** **PIF (India) = 1.940**
GIF (Australia) = 0.564 **ESJI (KZ) = 8.997** **IBI (India) = 4.260**
JIF = 1.500 **SJIF (Morocco) = 5.667** **OAJI (USA) = 0.350**

29.	Second spreading with glue on the tightening edge, drying	2		0.87	551.72	1.45	02068 / R4, PRKS-O	173900	4.442	15.38	125
30.	Treatment of the slow surface of the soles	3		0.89	539.33	1.48	MVK-1-O	174700	0.671	2.7	one hundred
31.	Solvent treatment of non-running soles (halogenation)	2		0.30	1600,00	0.50	A200 / D	100,000	0.661	0.08	
32.	Glue soles (soles and heels)	2		1.30	369.23	2.17	car 1066 "Fortuna " German y	80,000	0.671	2.7	300
33.	Thermal activation of adhesive films	4		0.94	510.64	1.57	133, Italy	130,000	0.528	0.16	125
34.	Bonding soles and heels	4		0.93	516.13	1.55	press AS 1800K	127000	0.280	0.16	150
35.	Cooling shoes	3		0.50	960,00	0.83	refrigera tor compart ment FR3200	198000	0.409	4,3	75
36.	Milling the edge of the sole (lateral surface of the heel)	6		1.39	345.32	2.32	04105 / P6	58500	0.657	2.2	75
37.	Attaching heels	2		1.89	253.97	3.15	ST-B		0.360		
38.	Milling heels	3		0.47	1021.28	0.78	04105 / P6	58500	0.657	2.2	75
39.	Sanding the edge of the soles and the side of the heel	3		1.91	251.31	3.18	04059 / P1	95000	0.528	0.75	138
40.	Sanding soles	3		1.81	265.19	3.02	04059 / P1	95000	0.533	0.75	138
41.	Cleaning the top and bottom of shoes	2		0.87	551.72	1.45	04207 / P1	84790	0.650	1.9	198
42.	Removing shoes from the last	3		0.54	888.89	0.90	1200, Italy	186000	0.459	1.1	250
43.	Attaching the plastic heel from the inside	4		0.77	623.38	1.28	04222 / P1	238740	0.440	0.42	250
44.	Checking and cleaning nails inside shoes	2		0.50	960,00	0.83	device PES-R		0.360		
45.	Bonding of heels and insoles	2		0.58	827.59	0.97	car 1066 "Fortuna " German y	80,000	0.671	2.7	300
46.	Inserting insoles	2		0.32	1500.00	0.53	ST-B		0.360		
47.	Hand finishing shoes	fi ve		0.83	578.31	1.38	ST-B		0.360		
48.	Lacing, fastening finished shoes	2		0.65	738.46	1.08	ST-B		0.533		
49.	Shoe packaging	2		0.44	1090.91	0.73	ST-UO		0.533		

Impact Factor:

ISRA (India) = **4.971**
ISI (Dubai, UAE) = **0.829**
GIF (Australia) = **0.564**
JIF = **1.500**

SIS (USA) = **0.912**
ПИИИ (Russia) = **0.126**
ESJI (KZ) = **8.997**
SJIF (Morocco) = **5.667**

ICV (Poland) = **6.630**
PIF (India) = **1.940**
IBI (India) = **4.260**
OAJI (USA) = **0.350**

The output parameters of the technological process of shoe manufacturing are described by complex multifactorial dependencies and are influenced not only by deterministic, but also by random parameters and their interconnections, therefore, the technological processes of shoe

assembly were chosen as the object under study as the most theoretically and experimentally studied, the most acceptable for setting and solving the problem of forming and evaluating the effectiveness of an agile workflow.

References:

1. (2017). *The concept of import substitution of light industry products: preconditions, tasks, innovations*: monograph / VT Prokhorov [and others]; under the general editorship of Doctor of Engineering Sciences. Sciences, professor VT pro-khorov; Institute of Services and Entrepreneurship (branch) of the Don State Technical University (p.334). Mines: ISOiP (branch) DSTU.
2. (2018). *Management of the real quality of products and not advertising through staff motivation behavior of the head of a collective enterprise of light industry*: monograph / OA Surovtseva [and others]; under the general editorship of Doctor of Engineering Sciences. Sciences, professor VT Prokhorov; Institute of Services and Entrepreneurship (branch) of the Don State Technical University. (p.384). Novo-Cherkassk: USU (NPI).
3. (1975). *Hegelian Encyclopedia of Philosophical Sciences*, T. 1. Science of Logic: Translation from English Djeman M., "Thought", (p.452).
4. Engels, F. (1961). *Anti-Dühring. K. Marx and Friedrich E .: sobbing*. archive: Ed. m. Gospolitizdat, t. 20. (p.827).
5. (2004). *Philosophical and social aspects of quality* // BS Aleshin, LN Aleksandrovskaya, VI Kruglov, AM Sholom. (p.438). Moscow: Logos.
6. Ricardo, D. (1955). *The beginning of political economy and taxation*. Coll. Op. in 3 t, gt 1, (p.360). Moscow: Gospolitizdat.
7. Galbait, J. (1969). *New industrial society*. (p.480). Moscow: Progress.
8. F. de P. Hanika (1969). *New ideas in the field of management*. (p.124). Moscow: Progress.
9. Beer, S. (1965). *Cybernetics and Production Management*. (p.287). Moscow: Nauka.
10. Aleshin, B.S., et al. (2004). *Philosophical and social aspects of quality*. (p.438). Moscow: Logos.
11. Adler, Yu.P., et al. (1999). What is the coming century for us? (Management of the 21st century - a brief overview of the main trends). *Reliability and quality control*, No. 1.
12. Boytsov, BV, et al. (2007). *Concept of quality of life*. (p.240). Moscow: Academy of quality problems.