OEKO-TEX® STANDARD 100 TEXTILE PRODUCT SAFETY MANAGEMENT SYSTEM ROLE IN PRODUCT QUALITY ASSESSMENT ACCORDING TO REQUIREMENTS

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Abstract.
In this article, a prediction model based on the smallest quadratic equation was developed to estimate the level of implementation of the textile safety management system based on the Oeko-tex® standard 100 standard in our country and what the scope of certification will be in the future.

The purpose. Currently, textile products are produced, sold and sold for public consumption in many parts of the world. It is recommended to introduce the Oeko-tex® standard 100 safety management system standard to ensure the quality and safety of textile products and export products. The purpose of the work is to study the level of implementation of the Oeko-tex® standard 100 textile product safety management system and develop forecast parameters for the period up to 2030.

Methods. Scientific observation, statistical observation, statistical analysis, comparative analysis, grouping of data, abstract - logical thinking and the smallest quadratic tip were used in the research. This study serves to predict the level of increase in the next year in the number of hotels and organizations that meet the Oeko-tex® standard 100 criteria.

Results. As a result of the research, it was predicted what the multiplier will be in the next year by calculating the result of the statistical information and the result obtained at the end of the smallest quadrilateral. Based on the existing information on the Oeko-tex® standard 100 certificate, the prediction model was calculated according to the smallest quadruple tip, and by 2030, the number of Oeko-tex® standard 100 textile risk management system in Uzbekistan is 218, or there is a trend of a downward trend. formation and the level of reliability of this situation was estimated to be 94%. Of course, the reliability coefficient of the result was 94%, which is more reliable than the linear pegpecica tip of this tip.

Summary. Based on the analysis of the obtained results, the reliability coefficient of 94% means that this tip is more reliable than the linear regression tip.

Key words: Textiles, Oeko-tex® standard 100, certification, least squares method, prediction model, probability, prediction, observations, coefficient, indicator.

INTRODUCTION

Nowadays, textiles are produced, transformed and consumed in different parts of the world. The impact of growing international trade on textile production needs to be properly assessed. In addition, due to the globalization of trade and the international trade of textile products, each participant must comply with international management system standards [1].

In the world, comprehensive organization of the activities of the textile industry product development center, evaluation of the quality and safety of the textile product according to the public demand and demand, in this, the scientific and research work directed to the problem and solution of the textile risk management system is being carried out. In this section, Oeko-tex® for textile risk management, including the requirements and requirements related to the production of textile products, the production of all kinds of equipment and tools for the textile industry, which serves to improve the quality of the product by processing the raw materials of agricultural products, cotton, and coir. Special attention is being paid to the issue of increasing the ability to develop the most optimal solution based on the possibility and circumstances of closing the demand for standard 100 copies, ensuring the quality and safety of the product, and closing the way to reduce the negative factor that affects the quality and safety of the product [2].

In our company, a wide range of efforts are being made to produce high-quality and safe textile products, to introduce quality management systems to production, and through this, to expand the scope and geography of product export, and certain results are being achieved. In the development strategy of the New Uzbekistan for 2022-2026, among other things, the task of —...in order to realize smooth and problem-free export of products to foreign countries, wide opening of public certification and registration of products to manufacturers...‖ [3]. In the implementation of this task, it is important to close the public health register according to the principles of Oeko-tex® standard 100, the risk analysis and the critical point of risk in the textile industry production system.

Responsibility for certification according to Oeko-Tex® Standard 100 is shared by 17 research institutes that make up the Oko-Tex international community with subsidiaries in more than 40 countries. The list of criteria, which is the basis for testing materials for harmful substances, is based on the results of the latest scientific research and is constantly updated. Research criteria and related research methods are internationally standardized and widely used as a guide to terms and conditions of purchase and delivery in the retail industry.

With a total of more than 51,000 certificates for millions of different products from more than 6,500 companies worldwide, the Oeko-Tex® Standard 100 certification has become the most popular and successful mark for textile products tested for harmful substances[4]. Oeko-Tex is a brand recognized by consumers, which serves as an additional confirmation of product quality for manufacturers.

As a result of research, it was formed as an opportunity to create a safety standard in the textile production chain and to test products for the presence of harmful substances at any stage of the production process.

Test samples are checked by independent institutes affiliated with Oeko-Tex for Ph compatibility, formaldehyde content, extractable heavy metals, chlorine carriers and preservatives such as pentachlorophenol and tetrachlorophenol [5].

Nowadays, allergenic dyes are especially important for textiles. Textile dyes, which are divided into several types (eg, disperse, reactive, acid and direct), are the main cause of contact

dermatitis. The rise in contact dermatitis from clothing is undoubtedly due in part to greater awareness of the condition. Although clothing dyes can be allergens, there is a difference between a skin test where the dye is in direct contact with the skin and a dyed fabric where the dye cannot easily transfer to the skin. However, excessive dyeing of the fabric can easily affect the skin. Hypersensitivity to dyes is very common in people with allergies. Statistically, a 2020 study found that 12.3 percent of subjects who underwent skin allergy testing were allergic to dyes or allergenic resins. Disperse Blue 124, 106 and 85 account for the majority of sensitizers in the group of allergenic dyes. The results also showed that disperse dyes cause purple contact dermatitis. The presence of allergenic and harmful dyes, which is very important for clothing, is also important for children's toys, since the materials can often come into direct contact with the skin [6].

Also, the dependence of the test price on whether the manufactured product belongs to one of the four Oeko-Tex classes is characterized by the indicators in the casting:

I = goods for children under three years of age
II = products in contact with the skin (blouses, shirts, underwear)
III = products not in contact with the skin (coats)
IV = fittings and decorations (tablecloths, textile coverings, curtains, fabric floors, mattresses)
The more the textile product comes into contact with the skin, the stricter the requirements.

It should be noted that the main purpose of the Oeko-tex® standard 100 certificate is to harmonize the textile safety management system at the global level, because this textile safety management system works together with other popular international management system standards such as Oeko-tex® standard 100. Also, the Oeko-tex® standard certificate provides assurance in the global supply chain, allows the product to cross the border and increases the confidence of the customer [7].

It has been studied by many foreign and local scientists on the scientific, methodological and practical issues of quality management, textile safety management systems formation, implementation and implementation problems in textile production enterprises. In particular, Stefan Mecheels, A.B. Licitsyn, I.M. Chernukha, Paulo Camraio, Yu. Teylop, N.I. Dunchenko, L.P. Bessonova and scientists of our country G.E. Shaikhova, H.T.Salomov, S.A.Abdurakhimov, P.P.Ismatullaev, A.A.Artikov, I.P.Asqapov, G'.H.Hamrakulov, N.Sh.Muminov, G.I.Shaikhova, Sh.A.Toraev, A.Sh.Azizov and others in his works and researches, general aspects, requirements and issues of quality management, introduction of textile safety management systems, product quality management, factors affecting product quality were studied [8].

As a result of these studies, the management of production enterprises, quality management systems are being used with certain positive results, but in the process of textile production, the indicators of the introduction of standards based on the principles of "Oeko-tex® standard 100" are used to determine the future results, the parameters of forecasting using mathematical models. development has not been studied enough in our republic.

METHODS.

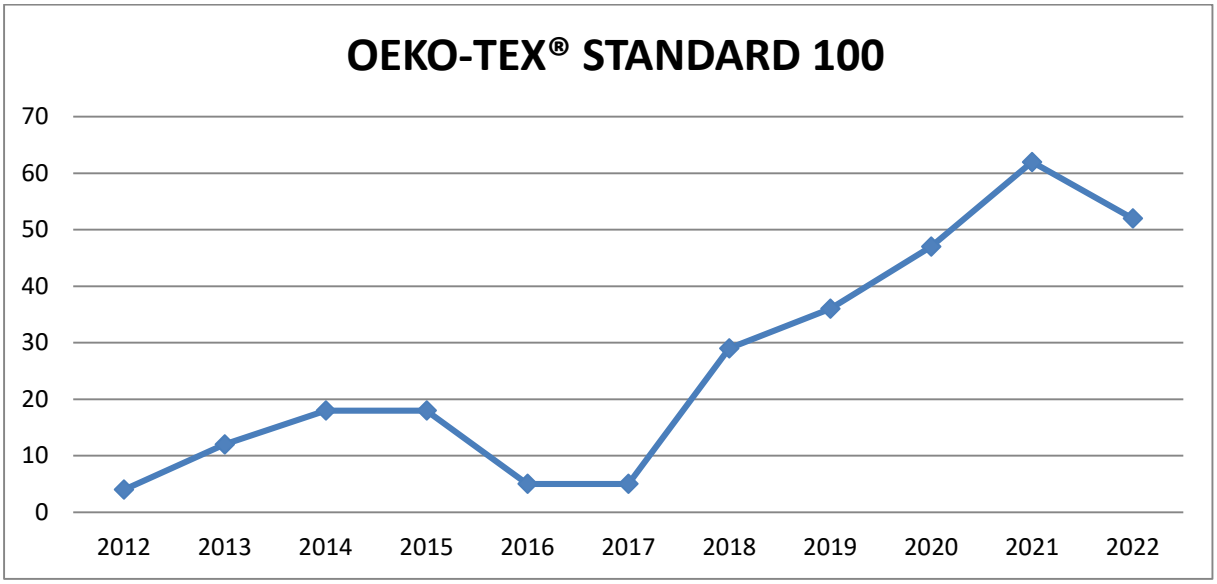
Based on the above considerations, we have studied the statistics of the implementation of Oeko-tex® standard 100 standards in the textile production enterprises of the Republic of

Uzbekistan, the number of certificates for 2012-2022, and developed parameters for forecasting the future results with the help of mathematical models.

Scientific observation, statistical observation, statistical analysis, comparative analysis, information grouping, abctpact - logical reasoning were used in the research. This study serves to predict the level of increase in the next year in the number of hotels and organizations that meet the Oeko-tex® standard 100 criteria.

Today, textile products are produced, traded and consumed in many parts of the world. Moreover, due to the globalization of trade and the globalization of textile production, it is possible to rely on a participatory global management system [9].

Accordingly, in the last decade, the textile industry of our country received the Oeko-tex® standard 100 certificate (1st grade), which reflects not only the required quality of textiles, but also the desire of this industry to improve its image in the domestic market. Also, the Oeko-tex® standard 100 certificate is a potential marketing tool to enter the external market because it is a common language with the interested party [10].



Picture1. Dynamics of Oeko-tex® standard 100 certification in Uzbekistan

Using the statistical data for the years 2012-2022 (Table 1), for the period from 2022 to 2030, the Oeko-tex® standard 100 textile risk management system is predicted to be closed (prognosis) in the smallest quadruple tip closure. was published [11].

In this research, Oeko-tex® standard 100 certification was obtained in our country from 2012 to 2022.

Available data used to build a forecast model

Table 1

Year	Counter (Xi)	OEKO-TEX® STANDARD 100 given certificates (Yi)
2012 year	1	4
2013 year	2	12

Year	Counter (Xi)	OEKO-TEX® STANDARD 100 given certificates (Yi)
2014 year	3	18
2015 year	4	18
2016 year	5	5
2017 year	6	5
2018 year	7	29
2019 year	8	36
2020 year	9	47
2021 year	10	62
2022 year	11	52

When assessing the current situation, the information in Table 2 will be used to assess the situation and form the package for the next year according to the Oeko-tex® standard 100 certificate.

We use the following mathematical equation (1.1) to accurately predict the nonlinear parabolic regression equation in the smallest quadrilateral tip closure.

$$Y = a * x^2 + b * x + c \qquad (1.1);$$

In this functional relationship, a, b, c are unknown quadruples, and to determine the unknown quadriplegic, we use the smallest quadruplet option from the mathematical quadriplegic. The smallest quadriplegic tip represents the following condition:

$$f(x) = [\sum_{i=1}^{n} y_t - a * x_t^2 - b * x_t - c] - min; \qquad (1.2)$$

The least quadratic function with its model (a*x^2+b*x+c) requires that the quadratic of the ayipmalap has the smallest value. If the power of the expression is equal to two, it is the sum of the absolute value of the sum, that is, the sum of the square of the sum is the smallest value. This means that the values of the function and the model should be close to each other. Therefore, the model represented by the equation (1.1) is valid. In order to find the unknown parameter, from the formula (1.2), the coefficients for the unknowns a, b, c are taken and set to "0":

$$\begin{cases} f_a(x) = \frac{df}{da} = 0 \text{ яъни } \frac{df}{da} = 2\sum_{t=1}^{n}[y_1 - ax_1^2 - bx_1 - c] * [-x_1^2] = 0 \\ f_b(x) = \frac{df}{db} = 0 \qquad \frac{df}{db} = 2\sum_{t=1}^{n}[y_1 - ax_1^2 - bx_1 - c] * [-x_1] = 0 \\ f_c(x) = \frac{df}{dc} = 0 \qquad \frac{df}{da} = 2\sum_{t=1}^{n}[y_1 - ax_1^2 - bx_1 - c] * [-1] = 0\,. \end{cases} \qquad (1.3)$$

Using (1.3)- action, the following equation (1.4) is derived:

$$\begin{cases} \sum_{i=1}^{n} y_i x_i^2 = a\sum_{i=1}^{n} x_i^4 + b\sum_{i=1}^{n} x_i^3 + c\sum_{i=1}^{n} x_i^2 \\ \sum_{i=1}^{n} y_i x_i = a\sum_{i=1}^{n} x_i^3 + b\sum_{i=1}^{n} x_i^2 + c\sum_{i=1}^{n} x_i \\ \sum_{i=1}^{n} y_i = a\sum_{i=1}^{n} x_i^2 + b\sum_{i=1}^{n} x_i + \sum_{i=1}^{n} c \end{cases} \qquad (1.4)$$

here: n is the sample size, Xi is the observation in the i-step, Yi is the value of the observation in the i-step [12].
Using the information in table 1, we fill in table 2. We can find the unknown a, b, c coefficients of this equation using the information in table 2 below:

$\overleftrightarrow{Y}$ **–Yi-** is a table for finding the absolute value of the y-observation

2nd Table

Years	X	Results	$X_i * Y_i$	$X_i^2 * Y_i$	X_i^2	X_i^3	X_i^4	$(Y_i - \overleftrightarrow{Y}_i)^2$	$(Y_i - \overline{Y})^2$	$\overline{Y}$
2012	1	4	4	4	1	1	1	24.24	492.03	
2013	2	12	24	48	4	8	16	11.51	144	
2014	3	18	54	162	9	27	81	71.49	324	
2015	4	18	72	288	16	64	256	39.18	324	
2016	5	5	25	125	25	125	625	103.86	25	
2017	6	5	30	180	36	216	1296	222.00	25	26.18
2018	7	29	203	1421	49	343	2401	9.83	841	
2019	8	36	288	2304	64	512	4096	8.49	1296	
2020	9	47	423	3807	81	729	6561	29.56	2209	
2021	10	62	620	6200	100	1000	10000	114.57	3844	
2022	11	52	572	6292	121	1331	14641	105.8	2704	
TOTAL	66	288	2315	20831	506	4356	39974	740.58	12228.03	

We find the unknown coefficient by solving the equation (1.5) below:

$$\begin{cases} 20831 = a * 39974 + b * 4356 + c * 506 \\ 2315 = a * 4356 + b * 506 + c * 66 \\ 288 = a * 506 + b * 66 + c * 11 \end{cases} \quad (1.5)$$

here: a=10.4974; b= -2.202; c=0.628, the reliability coefficient is calculated by formula (1.6) [3].

$$R^2 = 1 - \frac{\sum_{i=1}^{n}(Y_i - \overleftrightarrow{Y_i})^2}{\sum_{i=1}^{n}(Y_i - \bar{Y})^2} \quad (1.6)$$

here: Yi – the value of the observation in the i-step, $Y\overleftrightarrow{i}$ – the accepted value of the equation (1) in the i-step, $\bar{Y}$- the total value of the Y-observation.

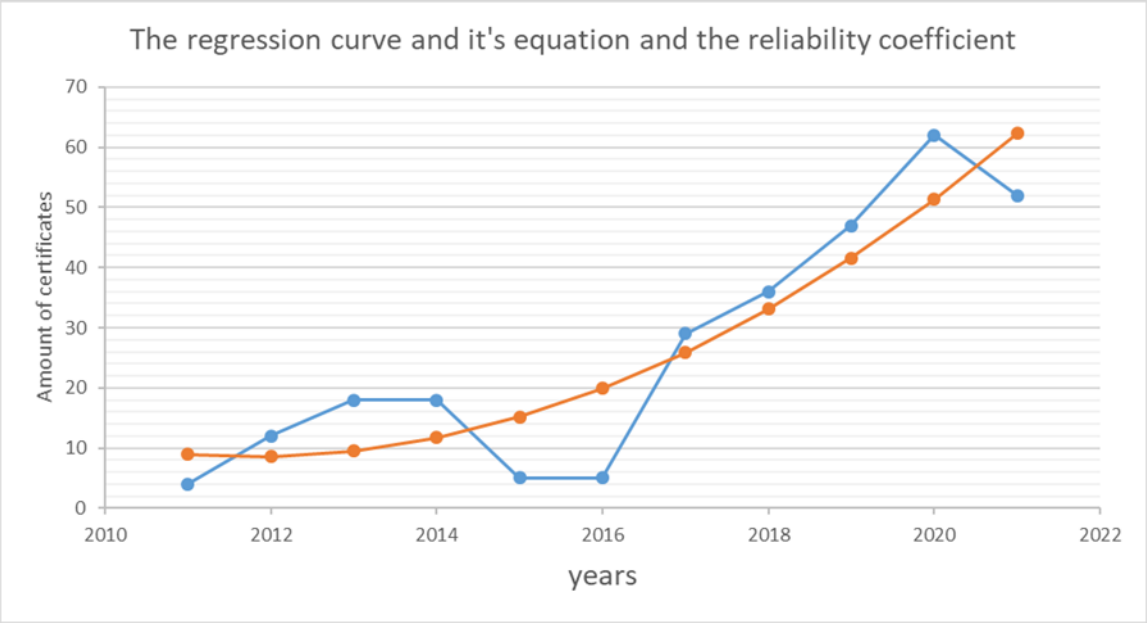
The found values are brought to the equation of non-linear papabolic pressure (1.7) and the multiplication equation (1.7) is solved. The value of x=12 is put into the non-linear papabolic equation and Y= 74.53 is calculated.

$$\overleftrightarrow{Y}i = ax_i^2 + bx_i + c \quad (1.7)$$

We determine the probability of the realization of this prognosis using formula, (1.6). For this, Table 2 will be useful to us and we will fill it.

$$R^2 = 1 - \frac{740{,}58}{12228{,}03} = 0{,}9394$$

Converting the found value to a percentage, it is predicted that Oeko-tex® standard 100 will be completed in 2022 with a multiplier of 74 with 94% accuracy.



Means 2nd picture. 2012-2022 Oeko-tex® standard 100 standard performance curve, its equation and reliability coefficient

This Y ↔i=ax_i^2+bx_i+c ; Using equation (2.7), we can calculate the forecast for the next decade.

RESULTS.

In our country, a comprehensive inspection is being conducted to ensure the safety of textile products and to strengthen it. In recent years, Uzbekistan has achieved remarkable results in this field. It can also be known from the information of the global textile safety index.

Based on the results of the research, prediction parameters for the period up to 2030 were developed for the period up to 2030 according to the number of certificates reflecting the implementation of Oeko-tex® standard 100 compliance by the least squares method (Table 3).

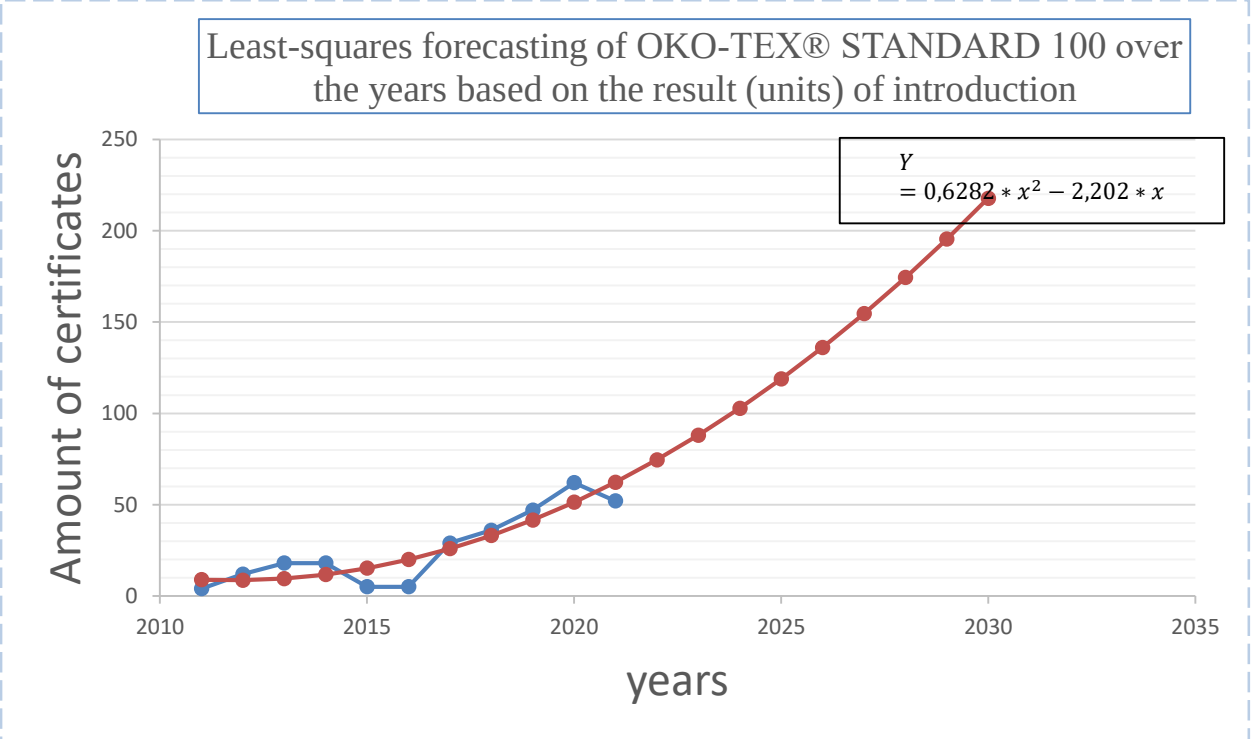
Assessment schedule for next year

Table3

Years	X	OEKO-TEX® STANDARD 100 The result of closing during the year (units)	$\overleftrightarrow{Y}_i$
2012	1	4	8,92
2013	2	12	8,61
2014	3	18	9,54
2015	4	18	11,74
2016	5	5	15,19
2017	6	5	19,90
2018	7	29	25,86
2019	8	36	33,09
2020	9	47	41,56
2021	10	62	51,30

2022	11	52	62,29
2023	12		74,53
2024	13		88,04
2025	14		102,79
2026	15		118,81
2027	16		136,08
2028	17		154,61
2029	18		174,39
2020	19		195,44

Based on the above data and values, the following graph (3-picture) was obtained for the mathematical modeling practice of the smallest quadratic point.



3rd picture. Oeko-tex® standard 100 certification indicators for next year

Therefore, based on the above analysis, it is estimated that by 2030, there will be 195 factories receiving Oko-tex® standard 100 textile product safety management system certification in Uzbekistan, or the formation of a curvilinear growth trend and the reliability level of this situation will be 94%.

DISCUSSIONS.

As a result of the research, it was predicted what the multiplier will be in the next year by calculating the result of the statistical information and the result obtained at the end of the smallest quadrilateral. Of course, the reliability coefficient of the result was 94%, which is more reliable than the linear regression tip of this tip.

CONCLUSIONS.

As a result of the conducted research, it can be concluded that 195 certificates will be issued in 2030 and the reliability coefficient will be 94%. With the help of this prediction, it is possible to

determine the level of implementation of the quality and safety management system in enterprises from the point of view of textile safety, and what work should be carried out on certification.

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