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INFORMATION REVIEW ON THE STUDY AND DEVELOPMENT OF OPTIMAL OUTERWEAR PACKAGES

Abstract. *The scientific article investigates the development of a new package of materials with increased requirements. To determine how relevant the selected clothing package was, studies were conducted. The mass market market of Almaty was investigated. The results of the survey revealed that the consumer wants to have a product made of modern fabric, made with high quality, that the cost may be slightly higher than on the market, and necessarily taking into account the fashion trend for the current year. As a result of the study, a demi-season trench coat made of eco-leather material was selected for design.*

Keywords: *eco-leather, clothing package, abrasion, ergonomics, polymer coatings.*

Introduction

In the garment industry, a variety of materials are widely used in the manufacture of clothing, which differ in structure and properties. The right choice of materials largely determines the quality of the product, its appearance, form and wear resistance, and the complexity of manufacturing [1].

In this regard, the issue of scientifically based differentiation of materials for the manufacture of outerwear is currently insufficiently investigated.

In this regard, there is a need for a comprehensive study of pressing bags for outerwear. And on this basis, to develop a fundamentally new package of materials with increased requirements, good quality, low weight and affordable price.

Due to their education and previous experience, most of the specialists who come to these enterprises have knowledge about the design and technology of clothing made of fabrics, including information about packages of materials. However, the package of leather clothing is characterized by a more complex composition, a wide variety of applied materials and a predominance of adhesive compounds, that is, it has a specific design. Without experience, it is difficult to determine how processing methods will affect the design of the connection, and how this design will affect the properties of the package.

The problem is complicated by the ambiguity of the concept of a package of clothing materials, which persists despite its widespread use, both in literature and in scientific research. In most works, the authors understand the package as a set of layers of materials included in multi-layered types of clothing. This approach allows you to take into account its design, consider the package of materials of any seam or node of the product, creates prerequisites for assessing the quality of the product at the joints at the stage of its design.

Materials and methods

To select and substantiate the object of research of a package of clothing for outerwear, a questionnaire of a survey of consumers in Almaty was developed. The survey was attended by 40 people who were asked to evaluate the ergonomic, operational, heat-protective properties of outerwear. The questionnaire was compiled using the Internet, a network resource through Google forms. According to the results of the questionnaire, it is clear that women in the young age group (18-27) prefer to wear outerwear made of raincoat fabrics.

The result of this survey can be called that the consumer wants to have a set of clothes made of modern fabric, qualitatively made, while admitting that the cost may be slightly higher than on the market and necessarily modern. Based on this analysis, I researched the Almaty city market according to the criteria for the composition of the material, appearance, types of stores and price.

Based on the study of raincoats, we now need to compare fabrics in all categories, the first is the price of main fabrics.

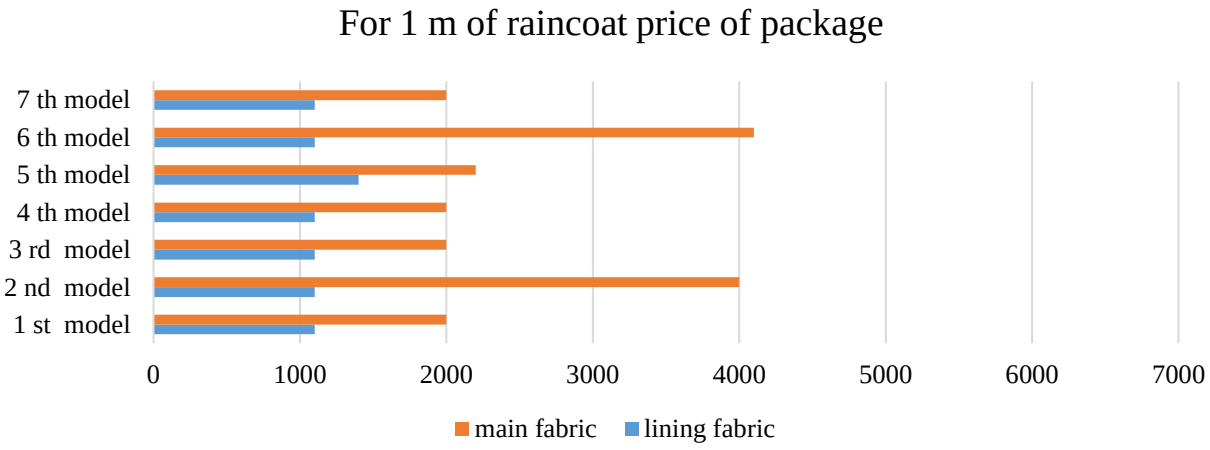


Figure 1 – Graph table for resulting information price of fabrics [authors' material]

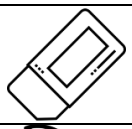
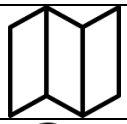
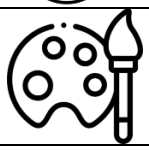
The analysis of the data according the graph showed that polyester materials are most often used and as the basis of lyocell: in places of the greatest perspiration and contact with glue, both in stressed and non-stressed areas.

The second model in the economic part showed very good results for the trench coat material and eco-leather was chosen as the main material. Eco-leather is a material obtained synthetically by applying a microporous ("breathable") polyurethane film on

a woven (cotton or polyester) base. Three-quarters of the material consists of natural cotton or pressed natural leather shavings. The remaining 25% is accounted for by polypropylene, a safe material that makes the fabric waterproof. It is absolutely safe for health, unlike PVC, which is used in the manufacture of leatherette. Polyurethane withstands temperatures from 35 to 100 degrees, so eco-leather can be used in the harshest conditions.

The main advantage of eco-leather is less expensive production and relative safety for the world's flora and fauna. In addition, products made of such material have a longer service life. Other advantages of the material include you can see in table 1.

Table 1 – Eco-leathers properities

№	Name of advantages	Description	Reference
1	2	3	4
1	Abrasion resistance		The material is strong, durable, very resistant to damage and tears, while not losing its flexibility.
2	Tensile strength of the material		It is easily cut and sewn, so needlewomen can adopt it when creating their own masterpieces
3	Flexibility and pliability		Eco-leather clothing does not stretch on the elbows and knees, does not rub on the bends for a long time.
4	Environmental friendliness		Eco-leather is not afraid of frost or ultraviolet. It does not crack in the sun and does not turn brown even in severe frost.
5	Wide range of colors		Aesthetic diversity. Eco-leather can have any color and texture, and colors that are impossible to imagine in the natural habitat of animals.
6	Form stability		Eco-leather clothing does not stretch on the elbows and knees, does not rub on the bends for a long time.
7	Hypoallergenic		It is especially important for those who are allergic to natural skin and animal fur, respiratory diseases or skin irritations.

This type of research contributed to the formation of a clear understanding of the structure of marketing, including confection about a package of clothes and expands knowledge about the problematic issues of the selected eco-leather material.

The result of this survey can be called that the consumer wants to have a set of clothes made of modern fabric, qualitatively made, while admitting that the cost may be slightly higher than on the market and necessarily modern. Based on this analysis, I researched the Almaty city market according to the criteria for the composition of the material, appearance, types of stores and price. Based on the study of raincoats, we now need to compare fabrics in all categories, the first is the price of main fabrics.

Eco-leather was chosen as the main material. Eco-leather is a material obtained synthetically by applying a microporous ("breathable") polyurethane film on a woven (cotton or polyester) base.

In the research work on test samples, Ecotex plus eco-leather materials article 3019 and article 3002, ATTIKA fabrics, LACQUERED eco-leather article YL190-1 were selected based on questionnaires and experimental wear from abrasion were investigated. The qualitative indicators of the main material for the clothing package for the upper eco-leather product were tested in the laboratory of the Almaty Technological University.

The resulting fabric samples were tested for abrasion resistance. The tests were carried out in accordance with GOST 18976-73 [2].

The results tests of fabric samples for abrasion resistance are shown in Table 2.

Table 2 – Test results of eco-leather material abrasion wear

Experience №	Article of the fabric model	Fabric abrasion resistance, number of cycles, τ cycle			
		X1	X2	X3	Average
1	Ecotex plus 3019	2279	1464	1900	1881
2		2165	2104	1400	1856
3		2088	1967	2117	2055
4	Ecotex plus 3002	758	896	623	759
5		704	745	689	713
6		850	839	871	853
7	ATTIKA 03	3112	2973	3194	3093
8		3342	3752	3441	3511
9		2082	1967	2117	2055
10	LACQUERED YL190-1	1938	1901	2000	1946
11		1905	1887	1871	1888
12		1812	1789	1892	1831

The evaluation of the properties of the studied materials was carried out by standard methods. Studies to determine air permeability, water permeability and odor intensity were carried out in laboratory conditions at the LLP «ТЕКС» Materials Testing Center. Test report № 7849/LP dated November 25, 2022. Place of testing: Almaty, mkr-n Camel, Serpin str., 2B. Test object, textile materials, raincoat and jacket (eco-leather), colors: № 1 ATTIKA 03 (brown), № 2 Ecotec plus 3019 (dark blue), № 3 Ecotex 3002 (white), № 4 LACQUERED eco-leather (marsala).

The test equipment and measuring instruments used are shown in the Table 3

Table 3 – Used test equipment and their measurements

№	Name of the equipment
1	Hygrometer psychrometric VIT-2
2	Drying cabinet FL-200/A
3	Penetrometer PVU - 5
4	Automatic Fabric Breathability Tester HTF-020

All test equipment and measuring instruments are certified and verified. All tests were carried out strictly according to regulatory documents, GOST standards and protocols.

Results and discussion

Studies of the resistance of the fabric to abrasion were carried out according to GOST, on the device DIT-M with undirected abrasion on the surface of the samples. As a characteristic for determining the resistance of the fabric to abrasion, the number of abrasion cycles before the destruction of the fabric was used.

Indicators of wear from abrasion of eco-leather materials, for a package of outerwear for girls, are made according to GOST 18976-73. The indicators of the trial samples are presented in Table 1, and tested to obtain the maximum and min values of the number. The DIT-M device was used for the test. From a sample of four types of eco-leather, three samples 3 with a diameter of 80 mm were cut out, which filled the head. Abrasive (seroshinelny cloth art.6405) was strengthened in the disk. compressed air is supplied inside each head, which makes it possible to press the samples against the abrasive. [3]

As a result of the research of the laboratory of physical and mechanical tests on the biological safety of eco-leather materials were considered in Table 3.

Table 3 – Results of the research of the laboratory of physical and mechanical tests on the biological safety of eco-leather

№	Types of fabrics	Fabric composition	Breathability, dm^3/m^2s	Water resistance, mm	Odor intensity, point
1	2	3	4	5	6
1	ATTIKA 03 (brown)	Top: Polyurethane 100% Base: CB 100%	3,81	545	0
2	Ecotex plus 3019 (dark blue)	Top: Polyurethane 100%, Base: Cotton 50%, PE 50%	1,48	324	0
3	Ecotex 3002 (white)	Top: Polyurethane 100% Base: Cotton 50%, PBC 50%	1,12	387	0
4	LACQUER ED eco-leather (marsala)	Top: PU 60%, Polyamide 40% Bas: Cotton 50%; PE 50%	0	387	0
Normative documents and GOST's for three types (breathability, water resistance, odor intensity) of tests					
ND on test methods, ND points			*GOST 12088-77 p.4*	*I № 1.1.10-12-96-2005 p. 24*	*GOST 3816-81p.6*
ND, ND points, ND norms			*ND is not normalized*	*ND is not normalized*	*TR CU 017/2011 art. 4 p.3 no more than 2*

The analysis of this study we allows of two tables resultant tests to draw the following conclusions:

1) ATTIKA 03 has the maximum effect on the abrasion resistance and breathability, water resistance properties too of the fabric.

2) Ecotex plus 3002 has a minimal effect on the abrasion resistance of the fabric.

3) In the properties breathability, water resistance Ecotex plus 3002 (white) and Ecotex plus 3019 (dark blue) they showed very similar results, this is because they have similar fabric composition.

4) For all types of fabric on the test, the intensity of the smell shows 0, which means that over time, when wearing clothes, an unpleasant smell does not come out, as happens in most cases.

3) With increasing pressure on the device, the composition and appearance of eco-leather to abrasion increases

4) When the pressure on the device decreases, the appearance and abrasion resistance also decreases.

As a result of the analysis of these sections, the following optimal solutions were obtained that allow us to determine the main type of eco-leather that we will use in the future to create a clothing package and develop a model as clothing. Of all the selected tissues for the study, ATTIKA 03 showed a very good result on average with normative indicators and its result is quite consistent with the standardization of norms.

Of the various reasons leading to deterioration of the properties of textile products during their operation, and in some cases making it impossible to continue using the products for their intended purpose, abrasion, especially in fabrics for outerwear, is the main factor.

Conclusion

In conclusion, types of fabrics were proposed for creating a package of clothes that fully meet the requirements of fabrics used in the manufacture of outwear for women, correspond to the purpose of the products, are in demand by consumers and on the market and are very profitable according to economic requirements.

In order to check the package of clothing in accordance with the standards for raincoat fabrics, laboratory studies were conducted on the properties of physico-mechanical and biological safety. The study was done in LLP «TEKC» according to the relevant normative documents, GOST's, and protocols. Based on them, ATTIKA 03 was chosen as the most effective fabric. This fabric, according to the studied indicators, meets the basic requirements for a clothing package to prepare for the design of outerwear.

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СЫРТҚЫ КИІМНІҢ ОҢТАЙЛЫ ПАКЕТІН ЗЕРТТЕУ ЖӘНЕ ӘЗІРЛЕУ

Аңдатпа. *Ғылыми мақалада жоғары талаптары бар материалдардың жаңа пакетін әзірлеу зерттелген. Таңдалған киім пакетінің қаншалықты өзекті екенін анықтау үшін зерттеулер жүргізілді. Алматы қаласының бұқаралық нарығы зерттелді. Сауалнама нәтижелері бойынша тұтынушы сапалы орындалған заманауи матадан жасалған бұйымға ие болғысы келетіні, құны нарыққа қарағанда сәл жоғары болуы мүмкін және ағымдағы жылға арналған сән бағытын міндетті түрде ескеретіні анықталды. Зерттеу нәтижесінде жобалану үшін эко былғары материалдан жасалған деми-маусымдық тренч таңдалды.*

Түйін сөздер: *эко былғары, киім пакеті, тозу, эргономика, полимерлі жабындар.*

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ИССЛЕДОВАНИЕ И РАЗРАБОТКА ОПТИМАЛЬНЫХ ПАКЕТОВ В ВЕРХНЕЙ ОДЕЖДЕ

Аннотация. *В научной статье исследована разработка нового пакета материалов с повышенными требованиями. Чтобы определить, насколько актуальна тема выбранного пакета одежды, были проведены исследования. Было исследовано рынок масс маркет города Алматы. Результатом опроса выяснилось, что потребитель хочет иметь изделие из современной ткани, качественно выполненный, что стоимость может быть немного выше, чем на рынке, и обязательно учитывающий направление моды на текущий год. В результате исследования был выбран демисезонный тренч из материала эко-кожи для проектирования.*

Ключевые слова: *экокожа, пакет одежды, истираемость, эргономика, полимерные покрытия.*