

Recommendation For The Development Of Modified Materials In The Manufacture Of Working Clothes

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The article analyses the questionnaire survey for designing new working clothes among 130 employees of the assembly shop of the automobile plant in Uzbekistan, researching the physical and mechanical properties of existing fabrics and recommendations on the development of modified materials in the manufacture of working clothes, taking into account the climatic conditions of Uzbekistan.

Keywords: working clothes, questionnaire survey, technological process, physical-mechanical parameters, fiber composition, surface density, hygroscopicity, shrinkage, modified material.

When choosing a material for sewing working cloth, you need to look not only at its appearance, but also take into account the various properties, because it depends on them whether the clothes will be comfortable and how long they will last. An important indicator that must be taken into account is the hygroscopicity of the fabric [1]. Currently, industrial enterprises produce different types of working clothes. Since special protective clothing is the main protective agent, the manufacturer should take into account all requirements for working clothing.

Almost all working clothes produced in Uzbekistan are made of Chinese fabrics. Since Uzbekistan is far from the oceans and seas, it has a continental climate: the sky is open and sunny, the temperature is extremely high, the annual precipitation is small, but the evolutionary potential is developing. Fabrics from China are not suitable for such climatic conditions. In the climatic conditions of Uzbekistan, it is advisable to use fabrics with high hygroscopic properties for working clothes.

Hygroscopicity is the property of any material to absorb and retain moisture from the air. Fabrics that have hygroscopicity are heat regulators between the environment and the human body.

The relative humidity of the air in a closed room is always lower than outdoor. Therefore, the absorption of moisture by clothing in the room will always be less than outdoors. The process of adsorption and condensation of moisture vapor should occur with the release of a large amount of heat, which compensates for a decrease in ambient temperature when moving from a closed room to an open space [2].

The hygroscopic properties of textile materials are essential for the technological processes of their processing, the manufacture of garments and the operation of clothing. Working clothes requires materials with high sorption properties, the ability to wetting and capillary absorption of moisture.

The main direction of expansion and improvement of the range of fabrics is not only the development of new types of fibers and threads, as the modification of existing materials in order to give them new predefined properties.

Nowadays, a large number of various methods have been proposed for the modification of fibers and threads, some of which are already being used in industry at various stages of the production and processing of fibers and threads.

Cotton material is the most common for special-purpose clothing, its main property is hygroscopicity, this material absorbs moisture and allows the skin to breathe.

However, excessive moisture absorbed by the material is poorly displayed outside. To enhance the hygroscopicity and moisture-wicking properties of clothing, it is recommended to add other fibers to their composition, for example, viscose, lycra, elastane or spandex.

Viscose fiber is a physically modified fiber. Fabrics with viscose fibers have increased strength, resistance to abrasion and repeated bending [2].

Present days scientific researches and experiments are carried out to study the fibrous structure and chemical composition of fabrics used for various industries workers clothes and to increase their chemical and physical properties [3-5].

Nowadays, working clothes that prepared for various enterprises workers does not mean that Uzbekistan fully meets the climatic conditions in terms of exploitation, hygienic and technological characteristics.

Because most working clothes is manufactured without considering the working conditions of the workers, their work functions and ergonomic behavior. Therefore, it is an urgent matter taking into account the employee's demand for working clothes in designing of working clothes.

Employee's working process at the car shop manufacture of automobiles in Uzbekistan and hygienic and exploitative requirements of the working clothing were studied. The following conclusions were drawn when a survey consisting of 30 items were taken from 130 workers. At the crusher workshop, mostly workers aged between 30 and 45 are engaged in collecting body parts in a closed building and most of them work steep.

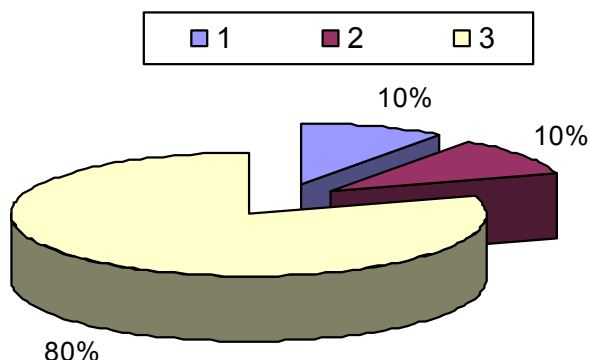
The survey questionnaires included questions about the suitability working cloth set by its aesthetic, exploitative, hygienic, ergonomic and technological requirements. As it is known by state standard requirement working clothes should be given once a year. The suitability of the existing apparel was determined to be ahead of time. 130 workers 45 showed less than 6 months duration and 85 of them show the the minimum duration given in survey questionnaires, as 6 months. To the question "Does the quality of fabric satisfy you?" 20% of the respondents answered positively, 80% respondents responded negatively, that most workers reported sweat condition during the day.

The type of working clothing was chosen by 10% of workers as "overalls + shirt", 10% of workers as "jacket + semi-overalls + shirt " and 80% of workers as "jacket + trousers+ shirt " (Pic.1). The existing set of working clothing consist of "jacket + semi overalls + shirt". During the talk with the workers about the working clothing, it has also been discovered that the actual size of working clothing used does not correspond to the body size of most workers (for example, the size of the 54 set corresponds to the size of 56 worker). Besides, workers were objecting to the quality of the fabric and to the seams quality in the clothing

A number of proposals were made by the Safety Department and the staff:

1. Developing a new model of working clothing responding to hygienic and exploitative requirements. In this case for assembly room employees offered to use fabric with hygroscopic property and increasing the exploitation time of the working clothing.

2. Developing working clothing based on climatic conditions of Uzbekistan. To date, the factory is operating according to the requirements of the Russian Federation's state standart. It is clear that the climatic conditions of Russia and Uzbekistan are quite different.



Pic.1. Demand for a set of working clothing.

1 – overalls + shirt; 2 – jacket + semi-overalls + shirt; 3 – jacket + trousers + shirt.

From the observations and surveys, it has been revealed that for the first time the assembly room workers work in closed conditions means that the special clothing needs to meet hygienic requirements. As it is known, relative humidity in the closed building is always lower than the open area, so that the garment absorbs moisture, which means that the hydroscopicity is low.

From the above considerations, it is possible to conclude that automobile manufacturing enterprises assembly room workers' new uniform designing considering the hygroscopy of the fabric, the design of the clothing and the exploitation requirements.

When analyzing the quality characteristics of the existing working clothing in the survey, it was concluded that workers were experiencing frequent sweats all day long, which had a negative impact on the working process.

The working clothing for the employees of the enterprises produced using imported fabrics, which are available in the domestic market. The physical and mechanical properties of various structural embroidered fabric were investigated at the Tashkent Institute of Textile and Light Industry [6-7] and the results of the results were shown in Table 1 and Diagrams 1-2 in order to determine the cause of the negative occurrence.

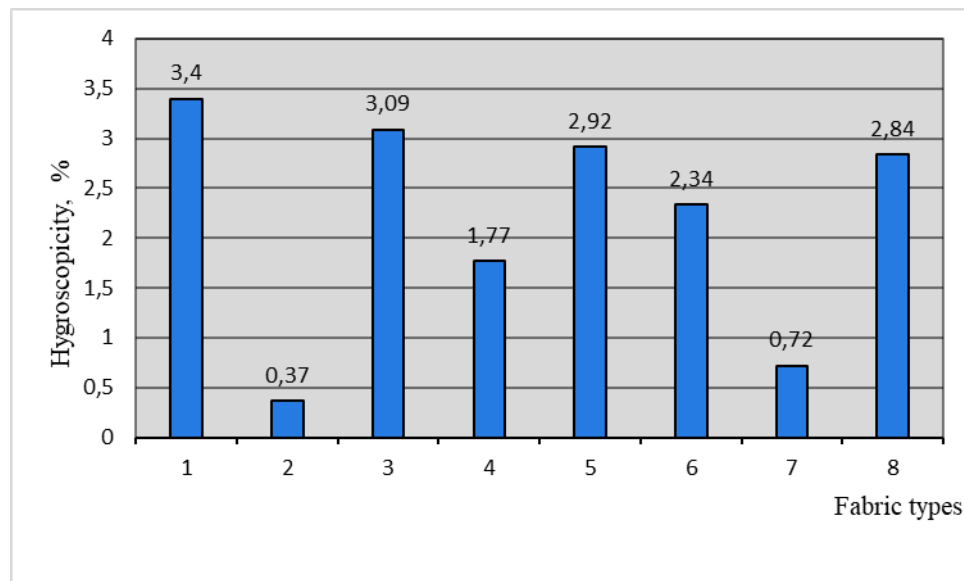
The analysis of existing fabrics shows that the fiber composition of the fabrics is made of polyester and cotton fiber, twill and plain weave, the thickness of the fabric is 0.4-0.52 mm and the surface density is 193.6-264 g/m². One of the basic physical properties of textile fabrics is the ability to absorb water and moisture, which is the hygroscopic characteristic. Employees at the plant found that most of the sweat cases during the day depend on the fabric content of the fabric.

1-table

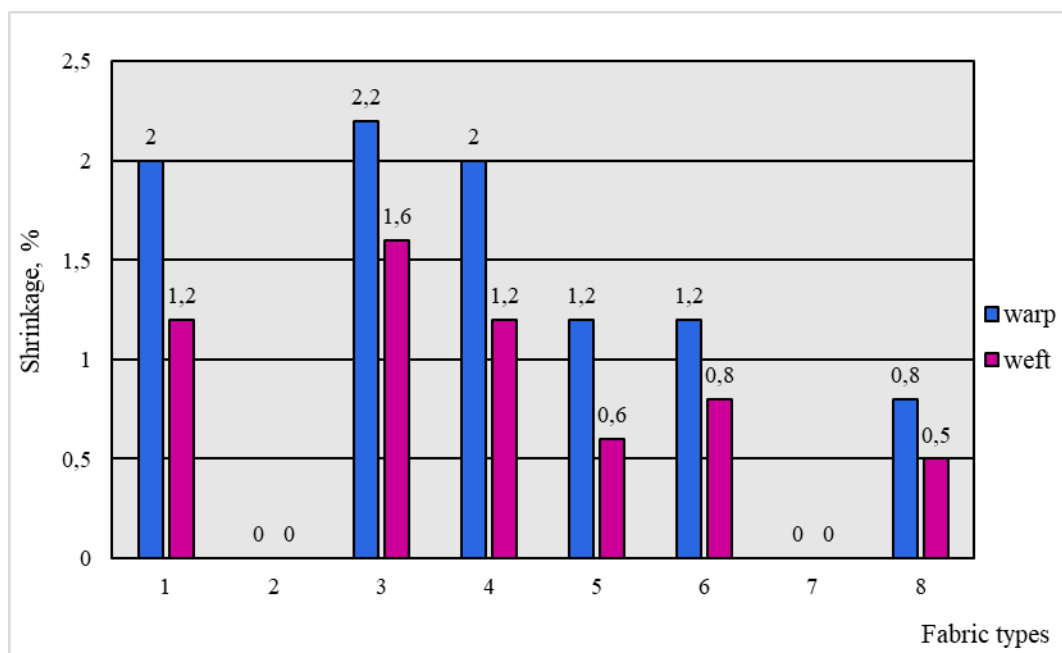
Working clothes fabrics physical-mechanical properties

№	Fabric title	Fabric code	Fiber composition,%		Fabric thickness, mm	Shedding	surface density, g/m ²	Hygroscopicity, %	Shrinkage, %	
			Warp	Weft					warp	weft
1	Working clothes	1	32,0 - PE, 68-c/f	100- PE	0,52	twill	210	3,4	2	1,2
2		2	100 - PE	100 - PE	0,41	plain	162	0,37	0	0
3		3	100 - PE	9,4 - PE, 90,6- c/f	0,45	satin	265	3,09	2,2	1,6
4		4	81,4 - PE,	81,4 - PE,	0,4	twill	244	1,77	2	1,2

			18,6-c/f	18,6- c/f						
5		5	68,1 - PE, 31,9-c/f	65,7 - PE, 34,3- c/f	0,42	repston	238	2,92	1,2	0,6
6		6	53,9 - PE, 46,1-c/f	66,0 - PE, 34- c/f	0,42	twill	240	2,34	1,2	0,8
7		7	100 – PE	100 - PE	0,41	plain	220	0,72	0	0
8		8	80,8 - PE, 19,2-c/f	80,3 - PE, 19,7- c/f	0,39	twill	194	2,84	0,8	0,5



Pic.1. Hygroscopic indicators of Fabric types (1-8- Fabric codes)



Pic.2. Fabrics shrinkage rates

The results of the research show that 3-fabric has 90.6% of cotton fiber in its weft direction, so it shrank 2.2% in warp direction, 1.6% indicator on weft side 1 and 4-fabrics of cotton and polyester fibers has shrinkage 2% by warp, 1.2% by weft, 100% with polyester fiber composition fabric does not has shrinkage in both directions.

The hygroscopic feature of textile fabrics is important in the process of dressing and technological process of its preparation and processing. Depend on its chemical composition and molecular structure cellulose and protein fibers are characterized by high hygroscopic properties.

The viscose fiber than the cotton fiber is 1.8 times higher in the moisture absorption characteristics. Most synthetic fibers, including polyester fibers, have low values of absorption of moisture, since the hydrophilic group does not participate in them.

Considering the above mentioned, modified fabrics with the addition of viscose fiber are recommended for the manufacture of working clothing with high hygroscopic properties, because the loose, low-end structure of viscose fibers compared to cotton fibers causes their higher ability to absorb moisture, despite their identical chemical composition.

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