

**DEVELOPMENT OF DESIGN PRINCIPLES AND ARTISTIC CONSTRUCTIVE SOLUTION  
OF OVERALLS FOR EMPLOYEES OF THE BAKING ENTERPRISE**

**РАЗРАБОТКА ПРИНЦИПОВ ПРОЕКТИРОВАНИЯ И ХУДОЖЕСТВЕННО-  
КОНСТРУКТИВНОГО РЕШЕНИЯ СПЕЦОДЕЖДЫ ДЛЯ РАБОТНИКОВ  
ХЛЕБОПЕКАРНОГО ПРЕДПРИЯТИЯ**

**НАН ПІСІРЕТІН КӘСПОРЫН ЖҰМЫСШЫЛАРЫНА АРНАЛҒАН АРНАЙЫ КИІМНІҢ  
ЖАСАЛУ ПРИНЦИПТЕРІН ЖОБАЛАУ ЖӘНЕ ОНЫҢ ӘРТІСТІ КОНСТРУКТИВТІ  
ШЕШІМДЕРІН ҚАБЫЛДАУ**

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*In article, it is stated development and justification of optimum parameters of design of new special clothes for workers of the baking industry. The practical value of research consists in definition of model characteristics of overalls taking into account ergonomic requirements and the correct selection of textile materials the considering working conditions in hot rooms. In result of the conducted scientific research, been get the new overalls for employees of the baking industry confirmed, which prove to be true with the patent for industrial sample No. 2227 of RK.*

*В статье изложены разработка и обоснование оптимальных параметров проектирования новой специальной одежды для рабочих хлебопекарной промышленности. Практическая ценность исследования заключается в определении модельных характеристик спецодежды с учетом эргономических требований и правильном подборе текстильных материалов, учитывающих условия труда в жарких помещениях. В результате проведенного научного исследования была разработана новая спецодежда для работников хлебопекарной промышленности, подтвержденная патентом РК на промышленный образец № 2227.*

*Мақалада наубайшыларға арналған жаңа жұмыс киімінің оңтайлы жобалық параметрлерін әзірлеу және негіздеуі сипатталынады. Зерттеудің практикалық құндылығы ыстық орталарда жұмыс істейтін жағдайларда, арнайы киім моделдеріне қарай эргономикалық талаптарды дұрыс таңдап және оған арнайы тоқыма материалдарының сипаттамаларын анықтау болып табылады. Ғылыми зерттеу нәтижесінде наубайшыларға арнайы жаңа киім жобаланып әзірленді, оның құндылығы ҚР №2227 өнеркәсіп үлгісі бойынша патентпен расталанды.*

**Key words:** ergonomics, technology, design, overalls, working conditions.

**Ключевые слова:** эргономика, технология, конструкция, спецодежда, условия труда.

**Негізгі сөздер:** эргономика, технология, конструкция, арнайы киім, еңбек жағдайлары.

## ***Introduction***

Design of overalls are requirement of any modern sewing branch. Market mechanisms of managing demands from the producer of continuous updating and expansion of the range of overalls, improvement of art and constructive decisions, reduction of terms of preparation of models for production.

For compliance to a basic purpose the art and constructive decision has to be subordinated to requirements of functionality, reliability, convenience, a comfortable state under clothes in operation, the design and compliance to style of the enterprise is also considered.

The assessment of quality of the overalls applied at present at the baking enterprise is carried out by means of questionnaire of a structural and organized set of questions each of which is logically connected with the central research problem [1]. It is known that questionnaire is one of the extended and widely used methods in concrete sociological researches. If by means of supervision the researcher fixes manifestation of protective properties of overalls at present, by means of questionnaire he can receive information on them in the past and the present, and about desire of workers to change these or those characteristics of overalls in the future.

## ***Objects and methods of research***

In the course of design of a set of overalls it is necessary to provide rational manufacturing techniques and processes of unification of details. Besides, it is necessary to provide ergonomics of a design of overalls for workers of baking production.

The objects of researches for processing overalls to workers of baking production was carried out on the following factors:

- name and appointment;
- breed and silhouette form;
- constructive solutions of a volume and spatial form;
- the applied materials;
- manufacturing techniques.

Before starting development of a design of overalls, it is necessary to define accurately basic data, restrictions and the purposes. Overalls as more than once was told, is one of means of protection from adverse effects of the production environment. Ensuring its reliability should be considered a main goal of design as reliability characters all other properties of a product in the course its use [2].

Appearance of overalls can be very unusual, but thus functionally justified. Important initial information for the designer is the printing houses of harmful and dangerous production effects given about character. They define a type of overalls and its completeness [3].

On the basis of these market researches and the state-of-the-art review of a situation of overalls structural and logical schemes, rational routes of design are determined by the baking enterprises, the principles and computer technologies for synthesis of object of design from standard elements of the existing overalls designs for design and creation of the new improved models of the production clothes developed by us for bakers are developed [3,4].

Development of computer technologies happens in the direction of expansion of technological capabilities of SAPR, and by research of new ways of computer realization of problems of design of overalls [4].



Figure 1 – Model A

New overalls for workers of baking production

The newest computer technologies of design of overalls are requirement of modern sewing production. As, development of a design of overalls rather difficult process, influences success of results of design of overalls a large number of factors, first of all knowledge and professional skills of the designer.

Potential opportunities of computer technologies allow establishing the level of prospects of design at initial stages of a stage for achievement of the result applied in this development.

Scientific researches in the field of computer realization of design stages concern development of basic, model and main designs [5].

The design of the unified overalls model was developed, for bakers by computer program

the «Grafis». Uniqueness of this system consists in possibility of work on known techniques of designing and its transformation, which are already initially put in the program. It allowed using directly dimensional signs and the principles of designing of a technique for achievement of optimum landing which showing at the figure 2 and 3.

Feature of a set of these overalls is freedom of a cut of the main details therefore this set is suitable for men and women of bakers and is unified.

Interesting feature is the so-called mechanism of inheritance of parameters of a maternal detail affiliated which of it were developed. Acted as a maternal of a detail, as a rule, a basic design with all model lines, and in relation to all wereaffiliated details, dependent on it.

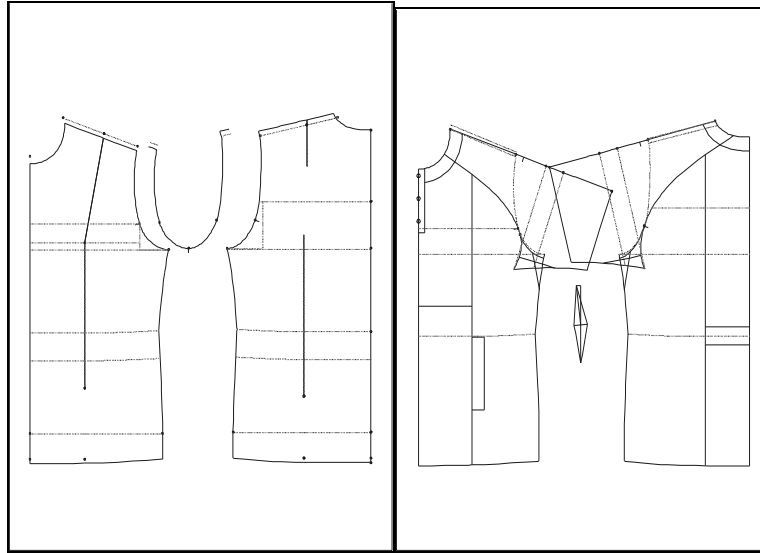


Figure 2 – BK and MK of overalls of workers of baking production

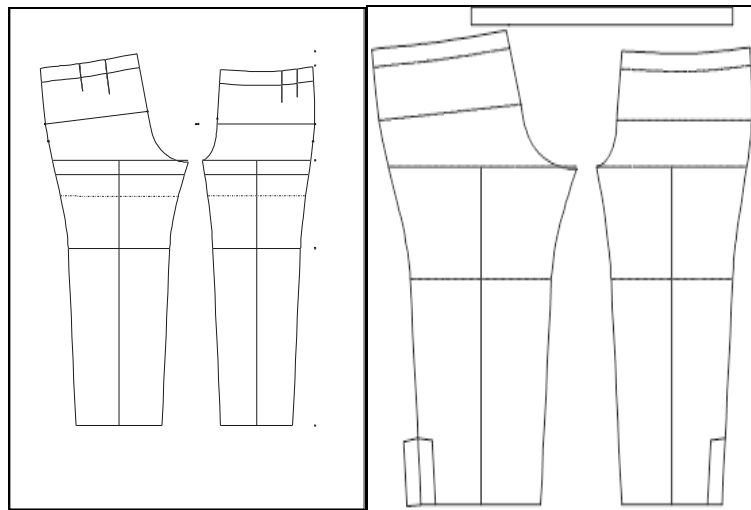


Figure 3 – BK and MK of trousers of workers of baking production

## *Results and their discussion*

Results of research of working conditions and poll of workers, the analysis of the operating overalls, scientific and technical information, and also the created requirements to special clothes of workers of baking production the art and constructive solution of models of special clothes allowed to develop for protection against the increased air temperature and the general production pollution.

By result of the developed design of new overalls for bakers, for the statement and approbation of a set, it was carried out skilled a sock.

The main objective skilled socks of overalls consisted in check of protective properties of new materials, in compliance of a design, fastening methods to service conditions, and also in determination of average actual term socks. The method skilled socks allows not only to define suitability of new materials for production of overalls of concrete appointment, but also to establish character and dynamics of wear and destruction [6]. For detection of compliance of the developed overalls to service conditions, and also for an assessment of correctness of the made decisions on ensuring reliability experimental samples of overalls are made and transferred to production tests.

Task skilled socks – detection of features of nature of wear of fabrics of overalls and changes in their structure in use.

As using clothes workers of the baking enterprise, «JSC Corporation AltynDirmen» with similar service conditions of overalls in rooms with the increased air temperature and moisture are chosen.

All skilled products were numbered and distributed to workers after instructing in operation of overalls. Viewing of products was made every other month socks. The noticed wear signs in a place of their arrangement were fixed in a card of the accounting of each product in separateness.

At survey of overalls in the card of the accounting of carrying out skilled socks wrote down its results: compliance of a design to purpose of overalls (whether it is convenient in a sock, whether constrains movements). Nature of wear of overalls:

- Violation of durability of seams;
- Look and places of wear of details of overalls;
- Number of washings, dates of their carrying out;
- Changes in overalls after washings (change of a form of details, change of protective properties of impregnations);
- Date and type of repair;
- The reasons causing wear;
- Standard term socks;
- Remarks on a design of details and knots of overalls;
- Remarks on fabrics of which the skilled overalls are made;
- Compliance of overalls to protective properties;
- Remarks on an overalls design when performing production operations.

According to GOST 25652 – 83 recommendations about care of the developed overalls are developed: to make dry cleaning trichloroethylene; washing – water solution of universal detergent. Frequency of carrying out dry-cleaners, washings and repairs is not regulated and is established in process of pollution of overalls and need of repair.

In the course of washing the overalls are affected by the washing structure, to mechanical efforts of washing, attrition, influence of a light climate during drying, and to thermal influence during the washing and an ironing. In the course of washing, there is a weakening of fibers owing to their destruction.

During skilled socks, 12 inspections of overalls with application of a magnifying glass and microscope are performed, are studied wear topography on concrete surfaces (in an elbow, a breast, a hip, etc.) and specifics of wear of a product. Besides, terms of moral and physical suitability of overalls from the chosen fabric are revealed.

For an assessment of degree of wear, properties and quality of textile materials every other month from skilled socks it was selected on 2 products and researches on the sites of overalls subject to the greatest wear, on indicators of attrition, tensile strength by the corresponding state standard specifications were conducted laboratory. Researches on each indicator carried out on 6 samples – in parallel on two products more precisely to define deviations and a variation row.

At determination of resistance to attrition on the plane of skilled overalls samples of material were investigated on the sites subject to the greatest attrition: forward part of a shelf in the field of a board, external parts of sleeves. Resistance of fabrics to attrition on the plane was made on the DIT device – M according to state standard specification 18976 – 73. As the using-up abrasive it was used Greta (yellow) art. 01208, Greta (cornflower) art. 260706, Orton art.0333, Diagonal art.3515. Abrasive pressure upon fabric made 4,9 N, the speed of rotation of the working area – 100 rpm, change of an abrasive was made through 500 turns. The counter fixed the quantity of cycles of attrition. Resistance of fabrics to attrition was defined before emergence of holes.

When determining explosive characteristics of skilled overalls of test of material were investigated on the sites subject to gaps: side part of a shirt, external part of a sleeve. Durability of fabrics at a gap by a basis and on a duck is determined by means of the explosive PT-250M-2 car, with a constant speed of lowering of the lower clip, according to state standard specification 3813-72.

### *Conclusions*

Studying of a current state of overalls for workers of baking production, taking into account sanitary hygienic standards of the requirement is carried out. By results of market research the new model of special clothes is developed for bakers, taking into account ergonomic requirements, on protective esthetic and operational properties, the characterizing protective functionality of overalls. The positive solution of the expert opinion on issue of the patent for an industrial sample at No. 2014017.3 is received.

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