

WAYS TO REDUCE TIME LOSSES THAT OCCUR IN PRODUCTION PROCESSES AT GARMENT AND KNITTING ENTERPRISES**Mamatkulova Saida Rakhmatovna**Fergana State Technical University, Department of Light Industry Engineering,
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Annotation: Increasing production efficiency, reducing the cost of products and ensuring competitiveness in modern garment and knitwear enterprises is one of the urgent issues. The time losses that occur in this process have a direct impact on the economic results of the enterprise. The main causes of time losses are due to the organizational, technical, logistical and human factor, and modern management systems, digital technologies, ergonomic workplaces and effective planning are important to reduce them. This article analyzes the scientific foundations, technological solutions and practical proposals to reduce time loss at garment and knitwear enterprises.

Keywords: garment and knitting industry, time waste, production efficiency, Lean manufacturing, logistics, ergonomics, digital management, technological process, labor productivity, automation.

Аннотация: В современных швейно-трикотажных предприятиях повышение эффективности производства и снижение себестоимости продукции являются актуальными задачами. Потери времени в производственных процессах напрямую влияют на экономические результаты предприятий. Основными причинами таких потерь являются организационные, технические, логистические и человеческие факторы. Их снижение требует внедрения современных систем управления, цифровых технологий, эргономичных рабочих мест и эффективного планирования. В статье рассматриваются научные основы, технологические решения и практические методы сокращения потерь времени.

Ключевые слова: швейная промышленность, потери времени, эффективность производства, бережливое производство, логистика, эргономика, цифровое управление, технологический процесс, производительность труда, автоматизация.

The garment and knitwear industry occupies an important strategic place in the light industry system, which plays great role in the sustainable development of the economy, ensuring employment of the population and increasing export potential. Products of this industry are not only widely used in everyday life, but are also one of the most in demand on the international market. Today, in the context of sharply increasing level of competition in the global economy, manufacturing enterprises are faced not only to produce products, but also to produce them quickly, efficiently and cost-effectively. Especially in the garment and knitting enterprises, the production processes consist of many stages and interconnected systems, and the efficiency of each stage directly affects the overall result.



Practical experience shows that in many sewing enterprises, despite the insufficiency of production capacities, a significant loss of time occurs due to the incomplete optimization of processes. These losses are due to factors such as interruption of production flow, interruption of machinery and equipment, disruption of material flow and improper distribution of manpower.

Time losses are often assessed as "hidden losses" in the production system that are not directly visible but have a serious impact on the cost efficiency of the enterprise in the long run. As a result of them, the cost of products increases, production capacities are not fully utilized, the level of timely execution of orders decreases and the competitiveness of the enterprise in the market weakens.

In this regard, the scientific and practical task is to study on a scientific basis the time losses that occur in production processes, to identify the mechanisms of their occurrence and to develop effective measures to reduce them. Especially in modern production systems digitalization, automation and the introduction of the principles of lean production plays an important role in solving this problem.

In this article the main causes of time losses in production processes of garment and knitwear enterprises, their economic consequences and modern optimization methods are analyzed scientifically. Organizational and technological solutions serving to increase production efficiency are also considered.

The production processes in the garment and knitwear enterprises are formed as a complex and multi-stage system, the effectiveness of which directly depends on the continuity and balance that each process has. Theoretically, the system of production is considered as the process of transformation of resources (labor, material, technique and time) into products in harmony with each other. In this system, time is one of the most important and non-renewable resources, and its improper distribution or waste has a significant negative impact on production efficiency. Time losses are therefore interpreted as "hidden losses" in the economics of production, and they are often not directly visible, but have a major impact on the overall outcome.

According to lean production theory, the operations that take place in any production system are divided into two main groups: value-creating processes and value-creating processes. In cases where the share of processes that do not create value in garment and knitting enterprises increases, the flow of production is disrupted, resulting in losses such as excessive waiting, unnecessary effort, processing and excessive transportation. Especially in conditions where the production line needs to run continuously, every small interruption will cause the whole system to slow down through the chain effect. In this context, the production of the garment and knitting is considered as a "flow system" and its effectiveness depends on the balance of processes.

Practical production experience shows that time losses at sewing and knitting enterprises are formed as a result of several key factors. Organizational factors play an important role in the first place, i.e. as a result of improper planning of production processes, inoptimal organization of workplaces, and uneven distribution of workload during the shift, the balance of the work flow is disturbed. This condition creates narrow points called the "bottleneck" and locks production speed to the weakest joint. The second important factor is related to technical infrastructure, which is caused by wear and tear of sewing machines and auxiliary equipment, incomplete maintenance of the preventive maintenance system, and a shortage of spare parts, which cause interruptions in production processes. According to statistical observations, in many enterprises a significant share of time losses is attributed precisely to technical failures.

The third main factor is related to logistics and material flow, and the untimely delivery of raw materials and semi-finished products leads to disruption of the production chain. In the garment and knitwear industry, it is important that the material flow be continuous, as each stage is directly connected to the next. If the material stops at one point, the whole production line fails. The fourth factor is related to human resources, and the qualifications, experience, attitude and



psychophysiological status of workers directly affect the speed and quality of production. Monotonous and highly intensive work processes increase fatigue, which leads to an increased number of errors.

Aside from that, technological imbalances in production processes are also one of the major causes of time wasting. For example, if the cutting section operates at high speed, slow operation of the seam section causes material accumulation and the production flow is disrupted. This situation indicates an imbalance in the production system and reduces the overall productivity.

Theoretically, time wasting is not just a technical or organizational problem, but a complex systemic problem. It affects all stages of production and dramatically changes the economic results. As a result of loss of time, production capacity is not fully utilized, cost of products increases, energy and labor resources are wasted, and the level of timely delivery of orders decreases. This weakens the competitiveness of the enterprise in the market.

For this reason, an integrated approach is recommended to minimize time losses in modern production theories. Such an approach includes the Lean manufacturing system, Just-in-Time logistics, Kaizen's philosophy of continuous improvement, and digital manufacturing systems based on Industry 4.0. These systems allow for real-time control of production processes, reduce redundancy and maximize resource utilization.

In general, a theoretical analysis of time losses in garment and knitting enterprises shows that this problem has a multifactorial and interrelated system. To effectively reduce it, an integrated approach is needed, not only in one direction, but also involving organizational, technical, technological and human factors together.

Process Stage	The main problem	Type of time loss	Cause	The solution line
Mowing (cutting)	Material Waiting	Loss of wait	Logistical disruption	JIT System
Stitch	Parking	Loss of maintenance	Depreciation	Preventive maintenance
Press	Overtime	Process Slow	Technological incompatibility	Automation
Packaging	Excess action	Transportation loss	The workplace is incorrect	Ergonomics
Quality control	Processing	Defect Removal	Low qualification	Teaching

Theoretical analyses show that time losses in garment and knitwear enterprises are formed as a complex and multifactorial system. Because each production step is interdependent, even a small interruption at one point significantly reduces the overall system efficiency.

Therefore, a systematic approach to the optimization of production processes is required. This approach should encompass not only technical but also organizational, economic, and human factors.

Time loss that occurs in the production processes at the garment and knitwear enterprises is one of the most important and complex problems of modern industrial production systems. Theoretical analyses conducted show that time losses affect almost all stages of the enterprise's activities and are manifested as the main factor reducing production efficiency. These losses have a direct impact not only on economic outcomes, but also on organizational, technological, and social processes.



On the basis of the results of the study, it can be noted that the main sources of loss of time are improper organization of production processes, insufficient development of technical infrastructure, disruptions in the logistics system, as well as shortcomings due to the human factor. These factors are interlinked, each of which can disrupt the continuity of production flow.

Notably, imbalances in the production line (bottleneck cases), equipment downtime, and interruptions in material flow stand out as the most common forms of time wasting. As a result of such situations, the enterprise cannot fully utilize production capacity, the productivity of labor resources decreases, and the cost of products increases.

In modern production systems, a number of effective approaches have been formed to minimize time losses. The implementation of lean manufacturing principles, digitalization of production processes, the use of the Just-in-Time logistics system and continuous improvement based on the Kaizen concept can give significant results at enterprises. These approaches serve to optimize production processes, reduce redundant operations and ensure rational use of resources.

In addition, the role of the human factor in the production system is considered to be very important. Errors and delays that occur in production processes can be significantly reduced by upskilling of workers, improving working conditions and organizing ergonomic workspaces.

In general, reducing time losses in sewing and knitting enterprises is not only a technical or organizational issue, but also a strategic task that requires an integrated scientific approach. Effective solution of this problem serves to increase the production efficiency of enterprises, improve product quality, reduce cost and strengthen competitiveness in the international market.

As a result, it can be said that minimizing time losses remains one of the crucial factors in the sustainable development of the modern sewing and knitwear industry.

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