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Analysis of occupational injuries at enterprises for processing and canning meat and meat food products

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*Introduction.*The article considers the problems and provides the analysis of industrial injuries at meat and meat food productsprocessing and canningenterprises, which have a certain sectoral specificity that affects the formation of working conditions and contributes to the emergence of industrial injuries.
Problem Statement. The aim of this study is to analyze occupational injuries, their causes and to propose appropriate measures to prevent injuries.
Theoretical Part. The initial information is the data of the statistical reporting of the Federal State Statistics Service on industrial casualties by type of activity – Processing and canning of meat and meat food products.
Conclusions. The results of the analysis show the existence of a problem of occupational injuries and the need to introduce and implement a number of measures aimed at improving working conditions and improving safety at work in order to prevent occupational injuries.

***Keywords*:** meat and meat food products processing and canning, occupational injuries, labor protection, occupational safety.

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Introduction. The difficulties of regulating safety of technological processes over the past few years have acquired a large-scale character. The number of accidents in industry, transport, and the agro-industrial complex remains stable, and industrial injuries, which are a negative factor in the economic and social development of the country, do not decrease [1].

At enterprises engaged in processing and canning meat and meat food products, working conditions, pronounced industry specifics, complexity and variety of technological processes, features of equipment operation are associated with a certain danger for workers [2]. Cases of injuries, as well as the death of workers, are noted in such areas of activity as the production of chilled meat, frozen offal, animal fats, offal unsuitable for human consumption, salted, boiled, smoked, dried and other meat, sausage products, etc. The specifics of working conditions differ in the qualitative and quantitative ratio of harmful and dangerous factors of the production sphere (physical, chemical and biological) and the labor process (severity and tension). Workers performing technological operations and implementing labor functions related to processing and canning meat are simultaneously exposed to several types of danger, the most common occupational injuries and diseases are disorders of the musculoskeletal system, skin and infectious diseases, hearing loss [3, 4].

Problem Statement. The objective of this study is to analyze occupational injuries based on data from the Federal State Statistics Service, calculate injury rates according to the generally accepted methods, and study the causes of injuries in the field of the activity under consideration by studying literary sources and proposing measures to prevent injuries.

Theoretical Part. Regular and widespread risk assessment (namely, a combination of the probability and frequency of physical injury or other harm to the health of employees) using the existing volume of statistical information and the signs of tasks being solved at enterprises of any form of ownership and type of activity makes it possible to develop measures to reduce the quantitative and qualitative component of accidents at work, as well as to improve labor safety and its conditions [5, 6]. In such cases, injury risk indicators are usually used, which include the frequency of accidents, the frequency of fatal accidents, the severity of occupational injuries [6]. To calculate these

indicators, let us refer to the data of the Federal State Statistics Service on enterprises for processing and canning meat and meat food products for 2019-2020 (Table 1) [7].

Table 1

Information about victims at meat and meat food products processing and canning enterprises in 2019-2020

Indicator	Numeric data	
	2019	2020
Number of enterprises, units	852	800
of them ones without accidents	714	658
Average number of employees, people	196 476	190 634
Number of victims with disability for one working day or more and with a fatal outcome, people	327	273
fatal outcomes of them	8	8
Number of person-days of disability for victims with disability for one working day or more and with a fatal outcome	14 745	11 092
Number of people with an occupational disease determined in the reporting year, people	2	2
Spent on labor protection measures for the year, thousand rubles	2 202 935.7	3 184 875.9

Table 2 presents the calculation results of the injury rates for the years under review.

Table 2

Injury rates at meat and meat food products processing and canning enterprises for 2019-2020

Injury Rate / Coefficients	Period	
	2019	2020
Accident rate	1.66	1.43
Frequency of fatal accidents	0.041	0.042
Severity of occupational injuries	46.2	41.8

Based on the analysis of the data in Table 1 and Table 2 it can be noted that in general, for the period from 2019 to 2020, the total number of victims at enterprises with the type of activity in question is characterized by a decrease — from 327 to 273. However, to a greater extent, such changes are associated not with improving working conditions, but with a reduction in the number of enterprises and, consequently, a reduction in the number of employees. So, in 2019, the number of processing enterprises amounted to 852 units, and in 2020 — 800 units (due to the general trend towards a decrease in the number of small and medium-sized businesses in the country), the average number of employees during the period under review also decreased — from 196,476 to 190,634 people, and the number of victims decreased — from 327 to 273.

If we consider specific statistical data for a longer period (for example, over the last five years), then we should note a downward trend in both the number of enterprises as a whole and a decrease in the number of enterprises that did not have accidents (Fig. 1). The number of employees in the sector under consideration (both as a whole and affected) also tends to decrease. So, in 2016, with the number of employees 175,099, 309 people were injured, in 2017, with the number of employees 212,608, 363 people were injured, in 2018, with the number of employees 197,035, there were 308 people injured, in 2019, with the number of employees 196,476, 327 injured, in 2020, 273 out of 190,634 people were injured.

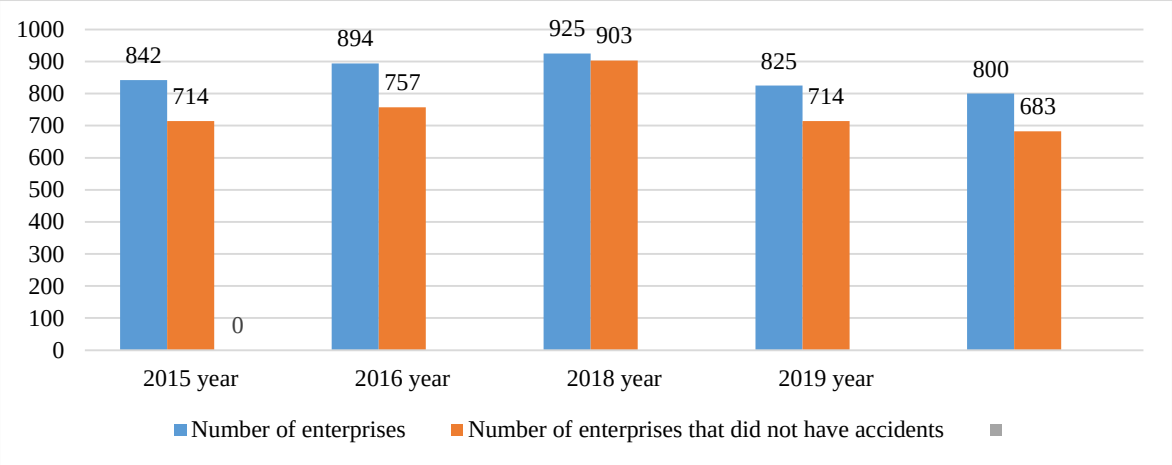

Fig. 1. The number of enterprises for meat and meat food products processing and canning from 2015 to 2020 as a whole and those that had no accidents

Also, the decrease in the total number of victims is associated with an increase in spending funds on labor protection measures, including the purchase of special shoes and clothing, personal protective equipment, organizational, technical, technological, sanitary and hygienic measures, as well as training of workers on labor protection issues. In 2019, 2,202,935.7 thousand rubles were spent on the above-mentioned activities at meat processing and canning enterprises, which averaged 11.2 thousand rubles per employee, and in 2020 3,184,875.9 thousand rubles (16.7 thousand rubles per employee). Figure 2 provides the ratio of such expenses in 2020 by groups

Fig. 2. Expenses for labor protection measures at enterprises for meat and meat food products processing and canning in 2020, thousand rubles

According to the number of researchers [5, 8], the main causes of injuries at enterprises for processing and canning meat and meat food products are unsatisfactory organization of work, imperfection of the technological process, wear and/or malfunction of technological equipment, shortcomings in the organization and conduct of training, training in the field of occupational safety, admission to the performance of labor functions of staff without training in safe working methods, shortage and/or non-use of personal and collective protective equipment, special clothing and footwear, auxiliary tools, the absence of flow charts for carrying out individual works and, as a result, non-compliance with non-hazardous work technology and technological process, weak labor and production discipline (including cases of alcohol, narcotic and other types of intoxication of employees), traffic accidents (including violations of traffic rules).

Such causes of occupational injuries at enterprises for processing and canning meat and meat food products

should also be noted as the specificity of the "man — technological equipment — environment" system. The peculiarity of technological equipment during operation consists in the presence of mechanical, electrical, thermal hazards, noise, vibration, radiation, hazards caused by non-compliance with ergonomic requirements, as well as problematic automation, as a result of which a significant part of the stages of the technological process depends on skills, experience, human health, his/her training, reaction time, physical and mental state. The originality of such an environment is characterized by the presence of harmful and dangerous factors of biological nature, as well as hazardous and aggressive factors that determine the human condition, for example, the sight and smell of blood and internal organs of animals [9, 10]. Thus, during the implementation of labor and professional activities, the employees of the enterprises in question may have injuries associated with the operation of technological equipment and the implementation of the technological process, and injuries of a mental nature. In this regard, professional selection is important, taking into account the employee's ability to resist aggressive factors of the production environment.

Focusing on the relationship between industrial injuries and technological equipment at meat processing and canning enterprises, we note that often cases of injuries are caused by malfunction and wear of machines and mechanisms (such as saws, meat grinders, cutters, lifts, mincing machines, etc.), close contact of workers with dangerous production equipment or tools (for example, when working with knives) [11], imperfection of technological equipment (due to the absence or malfunction of protective devices on equipment, for example, on a machine for processing intestines, there are no devices that ensure safety of loading and unloading, pressure monitoring and control devices, for example, vacuum boilers, locks at power grinders and crushers, fences, for example, electric dehumidifiers, etc. emergency switches, for example, on the line of primary processing of poultry, etc.), non-compliance of the placement of technological equipment with safety and ergonomics requirements (for example, the discrepancy between the distance between the work places of boners and trimming workers, the lack of devices for storing hand knives during the operation of the machine operator for removing the skin from the fat, etc.), non-compliance with labor protection rules when working with technological equipment. The main types of injuries in the above cases are limb injuries, fractures, dislocations, burns, electric shocks, etc.

The causes of injuries at enterprises, including the type of activity under consideration, are also the organization of work production that does not meet the requirements, low level of equipment of workplaces and their maintenance in an inappropriate condition. The organization of the workplace involves equipping it with the necessary means and objects of labor and creating appropriate conditions to guarantee the safety of the work performed and determine the well-being, efficiency, productivity of the working person.

The unwillingness of the employers to introduce and improve the labor protection system, to revive the relevant services and to include labor protection specialists in the staff is the primary source of the causes of injuries at enterprises, and as a result there is no regular monitoring of compliance with labor protection legislation, the implementation of labor protection measures, safe behavior and compliance with the rules and requirements of labor protection by employees, including [12].

As the cause of occupational injuries, it is necessary to highlight the lack of a special assessment of working conditions at workplaces, production control over the implementation of sanitary norms, rules, hygienic standards and the implementation of sanitary and anti-epidemic measures. Due importance is not attached to the development and implementation of appropriate preventive measures; the actions of persons responsible for them are not controlled.

Conclusions. To improve the safety of workers of enterprises for processing and canning meat and meat food products, it is necessary to develop a set of organizational, technical and sanitary-hygienic measures aimed at injuries prevention, while the main objectives of such measures should be to increase the effectiveness of occupational safety training and assistance in the participation of employees of the organization in occupational safety activities,

professional selection in terms of suitability in connection with the specifics of production, guarantee the safety of production equipment, processes, technology improvement, ensuring the safety of buildings, structures, premises, the territory of the enterprise by maintaining them in good condition, repair, replacement, etc. normalization and maintenance of sanitary and hygienic working conditions at optimal and acceptable levels by preventing excess of the established occupational safety standards and permissible levels of hazardous and harmful production factors, eliminating their sources, stabilizing work and improving the effectiveness of collective protection, providing workers with the necessary protective equipment not only in accordance with the current standard industry standards, but also in accordance with actual necessity, pragmatization of work and rest regimes, therapeutic and preventive maintenance and training in methods and techniques for first aid to victims, regular analysis of hazards and risk assessment arising from the peculiarities of the working environment and the organization of the labor process, assessment of working conditions, production control, planning measures to prevent and reduce the risks of injury and occupational safety measures.

When implementing such measures, their joint implementation by the company's managers, specialists in the field of labor protection and direct participants in the labor process is important. The implementation of measures to improve the working conditions and labor protection of employees will reduce, and in the future eliminate injuries at meat and meat food products processing and canning enterprises.

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