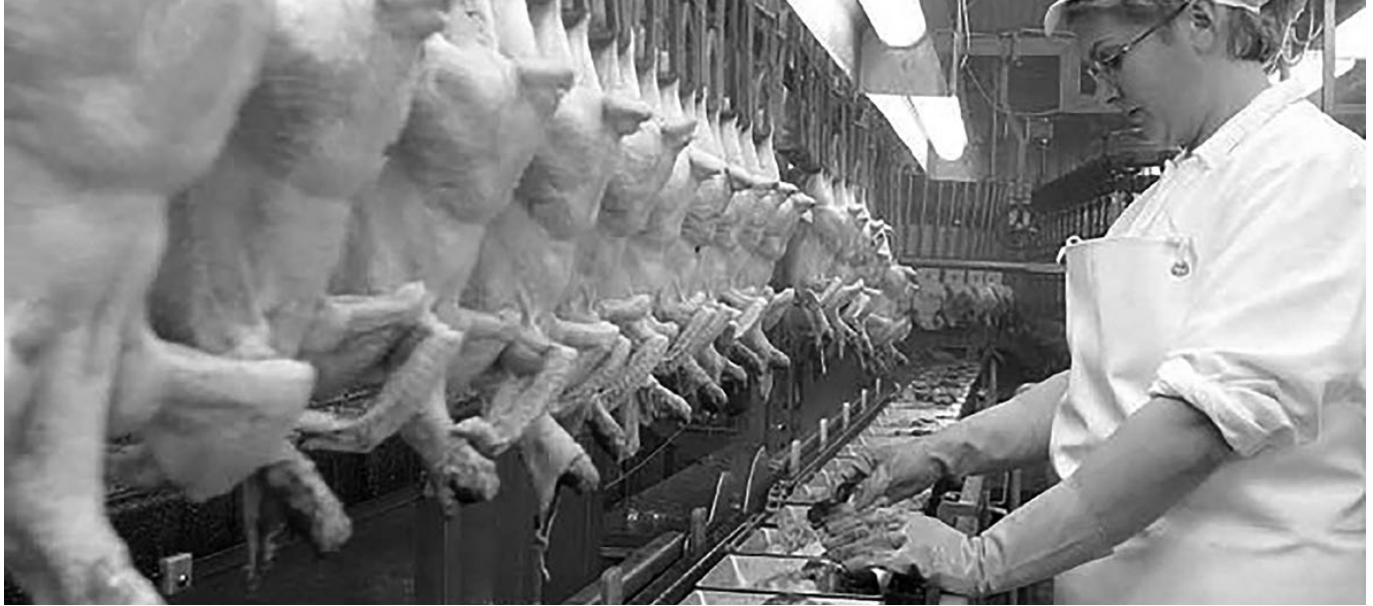


УДК 331.45 (075.8)

Y.I. MARCHYSHYNA, Doctor of Philosophy degree, associated professor,
V.V. MELNYK, Doctor of Philosophy degree, associated professor,
G.V. OSTROVSKA, student

National University of Life and Environmental Sciences of Ukraine
 E-mail: MelnikVika0204@gmail.com



Ergonomic stressors in workers of poultry industry

Abstract. *Ergonomic stressors in poultry industry were characterized. It is noted that the main ergonomic stressors factors that cause traumatic injuries and occupational disease of poultry workers are repetitiveness operations at a rapid pace, forceful exertion, awkward static postures. Organizational arrangements for preventing the development among workers traumatic injuries and occupational diseases have been proposed.*

Key words: *poultry industry, workers, ergonomic stressors, injuries, occupational diseases*

The Ukrainian economic stabilization in 2016 has had a positive impact on poultry production. The poultry industry is one of the fastest growing sectors of the Ukrainian agriculture today. Producers were able to secure uninterrupted imports of poultry meat. The many poultry producers declared production increases in 2017 [1].

The poultry industry's commitment to improving workplace safety is reflected in the significant and consistent decline in illness and injury rates. While the poultry industry remains relatively labor intensive, workers currently enjoy significantly improved safety conditions, with a steady trend of continuous improvement. Promoting safe workplaces has rewards for both workers and businesses, including increased productivity, consistent product quality, improved employee morale as well as reduced expenses associated with injury and illness.

The ergonomics in poultry industry is a broad topic. The ergonomics encompasses the body of knowledge about physical abilities and limitations that are relevant to job design.

Because the poultry industry is labor intensive and because meat processing requires sharp tools and repetitive motion, selecting proper equipment for the job is critical. In the poultry industry established rules mandate protective equipment for the eyes, face and head, protective clothing, respiratory devices, machine guarding devices to protect employees against a variety of hazards (including chemical or mechanical irritants), and many other workplace safety requirements. The employers are not only responsible for providing equipment, but maintaining that equipment in a safe, sanitary and reliable condition. The employers are also responsible for providing safe work practices that do not put workers at additional risk. Given these conditions, the poultry industry has worked diligently to comply with rules and standards, and to provide safe working conditions in all phases of plant operations.

The one-third of all occupational injuries that result in time away from work are due to musculoskeletal injuries. The musculoskeletal disorders, due to forceful exertion or repetition, are

some of the most common injuries found in these industries. In addition to the risk of musculoskeletal disorders, poultry workers face exposure to chemicals and pathogens, as well as potential injuries caused by tools and machines. The injury and illness rates in the poultry industry have declined, those rates remain higher than rates in the overall manufacturing sector.

The poultry processing industry has reduced occupational injuries and illnesses by almost half over the last years. Despite these efforts, the musculoskeletal disorders are still prevalent in the poultry processing industry. Many poultry processing jobs involve physically demanding work. Some poultry workers make more than 25000 cuts per day processing chickens. These processing tasks involve factors, including repetition, force, awkward and static postures, vibration, which have been identified as increasing the risk of incurring injury. Many of the operations in poultry processing occur with a chilled product or in a cold environment. The cold temperatures in combination with the risk factors may also increase the potential for musculoskeletal disorders to develop.

Factors that increase risk for musculoskeletal disorder development are called ergonomic stressors. The ergonomic stressors that poultry processing workers may face include the following:

Ergonomic stressors	Characteristics of harmful and dangerous factors
Force	Physical effort required to lift, push, pull, grasp and pinch items in the work environment. Heavy lifting places high forces on the back. Other jobs that require high force exertions from the hand, wrist and shoulder. Force is often required to handle and control equipment, tools, raw materials and finished products.
Static postures	Assuming and holding any posture for a long period of time can place stress on the body, particularly if the posture is not neutral. Static postures can accelerate the development of fatigue and discomfort.
Repetition	Performing the same motion or series of motions continually or frequently
Awkward postures	Body postures that deviate from normal resting or neutral positions place unnecessary stress on muscles, tendons and bones. Examples of awkward postures include reaching above shoulder height, kneeling, leaning over an assembly or sanding table, bending the wrist during spray operations, and twisting the body while lifting.
Vibration	Vibration is the physical exposure to rapidly oscillating tools or machinery. Powered hand tools or anywhere an operator comes in contact with a vibration source, such as a tow motor operator, are places to look for this stressor.
Contact stress	Physical contact between the body and sharp edges of tools, equipment and products. Pressing the body against a hard, sharp edge, such as the edge of a work table, is an example of this stressor.
Environmental factors	Cold, heat, lighting and noise are factors in the work environment that can directly influence worker comfort and can indirectly influence risk of injury through interaction with the above-mentioned physical stressors. Other environmental factors (slick work surfaces) can directly increase the risk of injury.

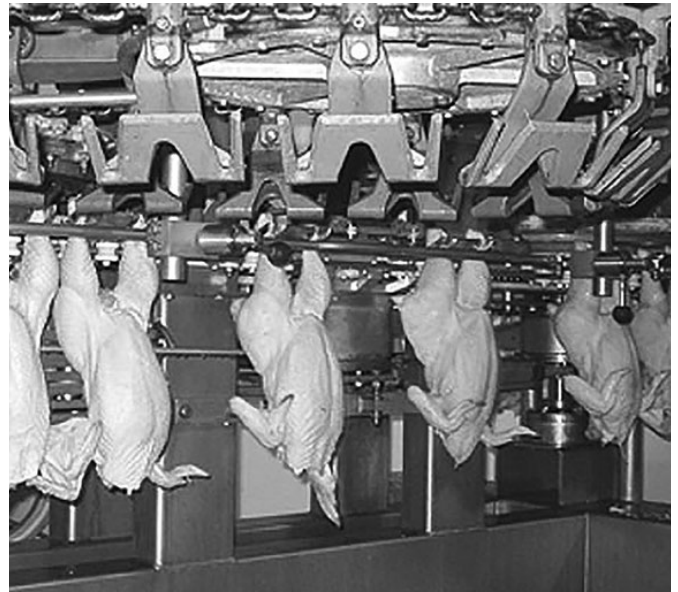
Many jobs combine multiple stressors in a single job. For example, a single job might combine awkward shoulder and back postures in reaching across the work table, force in lifting, exposure to vibration, repetitive wrist motions, and contact stress with a sharp work table edge. The combination of multiple stressors within a job or work task can create an increased risk of injury [2].

Excessive exposure to these risk factors can lead to musculoskeletal disorders. We use the term musculoskeletal disorder to refer to a variety of injuries and illnesses that occur from repeated use or overexertion, including: carpal tunnel syndrome, epicondylitis, tendinitis, trigger finger, rotator cuff injuries, muscle strains and low back injuries. The employers should consider a musculoskeletal disorder to be work-related if an event or exposure in the work environment either caused or contributed to the disorder, or significantly aggravated a pre-existing disorder. For example, when an employee develops carpal tunnel syndrome, the employer needs to look at the hand activity required for the job and the amount of time spent doing the activity. If an employee develops carpal tunnel syndrome and his or her job requires frequent hand activity, forceful exertions or sustained awkward hand positions, then the problem may be work-related. If the job requires very little hand activity, then the disorder may not be work-related. Activities outside of the workplace that involve substantial physical demands may also cause or contribute to musculoskeletal disorders. In addition, development of musculoskeletal disorders may be related to genetic causes, gender, age and other factors.

There is evidence that reports of musculoskeletal disorders may be linked to certain psychosocial factors such as job dissatisfaction, monotonous work and limited job control. These guidelines address only physical factors in the workplace that are related to the development of musculoskeletal disorders. Poultry processors can usually meet this goal by changing work methods, equipment or workstations. Many changes can be made without significantly increasing costs and many ergonomic changes result in increased efficiency by reducing the time needed to perform a task. Many poultry processing companies have already instituted programs that reduce musculoskeletal disorders, reduce workers' compensation costs and improve efficiency.

The ergonomics is an effective approach to reducing the number and severity of work-related injuries. The ergonomics is the practice of designing equipment, work tasks and work environments to conform to the capability of the worker to create more efficient workplaces and prevent injuries to employees. This guideline deals only with the identification and control of ergonomic hazards that may cause musculoskeletal disorders. A musculoskeletal disorder is an injury or disorder of the muscles, bones, nerves, tendons, ligaments, joints, cartilage and/or spinal disks that may be caused or contributed to by exposure to work activities and conditions involving certain risk factors.

The term "work-related musculoskeletal disorders" refers to musculoskeletal disorders to which the work environment and the performance of work contribute significantly or musculoskeletal disorders that are made worse or longer lasting by work conditions. In general, musculoskeletal dis-



orders develop when physical stressors overcome the body's ability to heal and repair itself. Physical risk factors in the workplace, or "ergonomic stressors," along with personal characteristics and social factors, are thought to contribute to the development of musculoskeletal disorders. Some musculoskeletal disorders are caused by physical exposures in nonworking activities. Other medical conditions can cause or contribute to the development of musculoskeletal disorders. Musculoskeletal disorders can also result from certain psychosocial factors such as job dissatisfaction, monotonous work and limited job control. Work-related musculoskeletal disorders may occur in the form of cumulative and acute trauma disorders.

Cumulative trauma disorders can result from exposure to repetitive, forceful or awkward tasks over a period of time. Each stressful situation results in microtraumas to the specific region of the body, such as a muscle or tendon. Without adequate recovery, the accumulation of microtraumas results in pain, discomfort, numbness, reduced strength and/or inhibited dexterity. Symptoms of cumulative trauma typically cannot be associated with one specific event in time.

Acute traumas, such as lacerations, fractures, strains, sprains, contusions or bruises, can generally be attributed to a one-time specific instantaneous event. These traumas are often easier to diagnose and treat because the causative stressors and affected body regions are more readily identified. Acute traumas considered "ergonomics-related" include such injuries as muscle strains, low back pain, lumbar strains and other back concerns.

The tendinitis is an inflammation of a tendon usually associated with overuse of that tendon or rubbing of the tendon against bone. Epicondylitis is an inflammation of the tendon attachments on the inside of the elbow. Medial epicondylitis is associated with repetitive flexion of the wrist while exerting a grip force. Lateral epicondylitis is associated with repetitive gripping exertions with an extended wrist. Carpal tunnel syndrome is a group of signs and symptoms associated with swelling within the carpal tunnel. The carpal region stretches from the lower palm to the tender portion of the wrist. A bundle of tendons and the median nerve are

located within the carpal tunnel. Exposure to stressors can cause swelling within the tunnel. This can also cause the tendons to enlarge and impinge the median nerve resulting in pain and numbness. Tenosynovitis is an inflammation of the synovial sheath that covers the tendon. Trigger finger is a common term for tendinitis or tenosynovitis that causes locking of the fingers while bending or flexing.

Vibration syndrome is a circulatory disorder that is also called the "white finger syndrome." Symptoms such as pain and whitening of hands and fingers are exacerbated by cold and vibration.

Low back pain of cumulative origin is thought to be a result of natural, gradual changes in the passive tissues of the spine (disks, ligaments and vertebrae) with age, but it is thought to be accelerated due to work activities involving repetitive lifting, awkward postures and forceful exertions.

Common muscle strains occur in the shoulders, upper arms, forearms and low back. Low back pain of acute origin is generally attributed to muscle strains of the lumbar region.



Poor lifting postures, heavy loads and/or repetitive exertions are often cited as activities that preceded the acute injury.

An effective occupational safety and health program to address ergonomic hazards in the poultry industry includes the following four major program elements: worksite analysis, hazard prevention and control, medical management, and training and education. Worksite analysis identifies existing hazards and conditions, operations that create hazards and areas where hazards may develop. This also includes close scrutiny and tracking of injury and illness records to identify patterns of traumas or strains that may indicate the development of cumulative trauma disorders.

Once ergonomic hazards are identified through the systematic worksite, the next step is to design measures to prevent or control these hazards. Thus, a system for hazard prevention and control is the second major program element for an effective ergonomics program. Ergonomic hazards are prevented primarily by effective design of the workstation, tools and job. To be effective, an employer's program needs to use controls to correct or control ergonomic hazards including the following: engineering controls, personal protective equipment, work practice controls, administrative controls.

Implementation of a medical management system is the third major element in the employer's ergonomics program. Proper medical management is necessary both to eliminate or materially reduce the risk of development of cumulative trauma disorders through early identification and treatment of signs and symptoms and to prevent future problems through development of information sources.

The fourth major program element for an effective ergonomics program is training and education. The purpose of training and education is to ensure that employees are sufficiently informed about the ergonomic hazards to which they may be exposed, so that they are able to participate actively in their own protection. Employees must be adequately trained about the employer's entire ergonomics program [3].

Conclusions

The major step in identifying ergonomic problems should be analysis of available information. The employers are responsible for providing safe work practices that do not put workers at additional risk. Given these conditions, the poultry industry has worked diligently to comply with rules and standards, and to provide safe working conditions in all phases of plant operations. ■

Є.І. Марчишина, кандидат сільськогосподарських наук, доцент,
В.В. Мельник, кандидат сільськогосподарських наук, доцент,
Г.В. Островська, студентка
Національний університет біоресурсів і природокористування України
E-mail: MelnikVika0204@gmail.com

Ергономічні стрес-чинники у працівників птахофабрик

Анотація. Охарактеризовані ергономічні стрес-чинники у працівників птахофабрик. Відмічено, що основними ергономічними стрес-чинниками, що викликають травматизм та професійні захворювання працівників птахофабрик є повторюваність операцій у швидкому темпі, напруженість праці, незручні статичні робочі пози тощо. Запропоновані організаційні механізми щодо запобігання розвитку у працівників травм і професійних захворювань.

Ключові слова: птахофабрики, працівники, ергономічні стрес-чинники, травми, профзахворювання

Е.И. Марчишина, В.В. Мельник, Г.В. Островская

Эргономические стресс-факторы у работников птицеводства

Аннотация. Охарактеризованы эргономические стресс-факторы у работников птицефабрик. Отмечено, что основными эргономическими стресс-факторами, которые вызывают травматические повреждения и профессиональные заболевания рабочих птицефабрик являются повторяемость операций в быстром темпе, напряженность труда, неудобные статические позы рабочих и другие. Предложены организационные механизмы для предотвращения развития среди рабочих травм и профессиональных заболеваний.

Ключевые слова: птицефабрики, работники, эргономические стресс-факторы, травмы, профзаболевания

References

1. Ukraine. Poultry and Products Annual [Електронний ресурс] //Gain Report. – 2016. – 11 s. – Режим доступу: https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Poultry%20and%20Products%20Annual_Kiev_Ukraine_8-31-2016.pdf
2. Harmse Johannes L. The Impact of Physical and Ergonomic Hazards on Poultry Abattoir Processing Workers: A Review [Електронний ресурс] //Johannes L. Harmse, Jacobus C. Engelbrecht, Johan L. Bekker //Int. J. Environ. Res. Public Health. – 2016. – Режим доступу: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4772217/>
3. Войналович О.В. Охорона праці у тваринництві /О.В. Войналович, Є.І. Марчишина. – К.: Видавничий центр НУБІП України, 2015. – 648 с.