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Қ. И. Сәтпаев атындағы Қазақ ұлттық техникалық зерттеу университеті

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ИЗВЕСТИЯ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН
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NEWS

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OF THE REPUBLIC OF KAZAKHSTAN
Kazakh national research technical university
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NAS RK is pleased to announce that News of NAS RK. Series of geology and technical sciences scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of News of NAS RK. Series of geology and technical sciences in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential content of geology and engineering sciences to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабарлары. Геология және техникалық ғылымдар сериясы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Web of Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабарлары. Геология және техникалық ғылымдар сериясы Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді геология және техникалық ғылымдар бойынша контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Известия НАН РК. Серия геологии и технических наук» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Известия НАН РК. Серия геологии и технических наук в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному контенту по геологии и техническим наукам для нашего сообщества.

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THE DEVELOPMENT OF A MINI WORKSHOP OF OBTAINING MIXED FERTILIZERS NEW RANGE BASED ON «ZHAMB-70»

Abstract. Analysis of data presented in the state program for the production and sale of agricultural products processing. The main reasons for the situation, determined the purpose and objectives of further research and implementation of the objections of improvement and production of new range of mixtures.

Provides technical information and materials on the way out of the situation by establishing mini workshops for production of ecologically pure and safe mixtures of the new range. The necessity of using modern means of labor protection and life safety in industrial conditions is shown.

The factors and risks of ensuring safety through the use of devices and equipment to reduce the psychophysical load of the personnel of the mini-workshop are considered. The production process is associated with many factors, the dominant of which is the lighting, climate and the dangers arising in the production environment. The kinds and types of risks are given, of which the most dangerous technogenic risk and emergency situations. Threats of dangers – professional, technical and ecological are shown. The factors of internal and external hazards, which are divided by the properties of their impact and potential threat.

Keywords: efficiency of fertilizer mixtures, mini shop, equipment, signaling and alerting means, illumination, temperature regime, microclimate, industrial sanitation, labor protection.

Introduction. At present, the composition of mineral fertilizers available on the market (nitroamphoski, sulphoammophos, etc.) does not fully satisfy the needs of crop producers in obtaining the right batteries. Using such mixtures, the farmer is forced to inseminate or reinforce one or another nutrient element of fertilizers, which affects the yield and quality of crops and products.

The way out of the situation is the use of environmentally friendly fertilizer blends - dry granular mineral fertilizers, made to order with the choice of the ratio of nutrient components. The main advantage of fertilizer is the ability to give the plant only those elements of nutrition that are necessary for it during development and fruiting. This excludes the possibility of overdosing on other components and besides, the constituent parts of the fertilizer are easier to store, since they are more resistant to caking and are not hygroscopic.

In modern conditions, partial and complete replacement of conventional fertilizers with mixtures is hardly possible because of the need to obtain them from different single fertilizers, obtained in most cases in the field [1-11].

Therefore, it is best to produce them in mini-shops of different regions of our country, which leads to the economy of material resources of agricultural producers and transport costs.

Properties of sorption substances. Based on the physico-chemical properties of glauconite according to the works of the authors [2-16], it was established that they reduce the content of heavy metals As, Pb, Mg and other elements from 64% to 99% and more, and radionuclides by 95-97% from aqueous solutions and are good feed additives for various animals.

The purpose of the first research direction is to develop the optimal technological compositions of fertilizer mixtures based on the difficult mixed fertilizer "ZHAMB-70" containing a moisture retaining substance, trace elements and humates [17-19].

This allows, along with the mechanochemically activated properties of the phosphate part of the fertilizer mixture, to produce a new range of mineral fertilizers that provide by the introduction of glauconite sorbing heavy metals and radionuclides, as well as zeolite.

Zeolite is permeated with a system of channels and has a well-developed surface for selective sorption of elements and molecules. This system of channels plays the role of a «molecular shield» for the sorption of nitrates, ammonium, alcohols and other substances. Therefore, the environmental safety of agricultural products is carried out due to the ability of glauconite and zeolite to adsorb radionuclides, heavy metals, alcohols and nitrates from aqueous solutions, and vermiculite to retain moisture and ensure its root system, leading to water savings for irrigation [18,19].

Ecologically mixtures "ZHAMB-70" of obtaining issues safe. Along with the above, the issues of obtaining environmentally friendly fertilizer, positively affecting the safety of life not only the surrounding animal and plant world, but also the development of technical bases of modern production of mixtures were raised. These issues include the organization of the enterprise in the form of a mini-workshop, equipped with modern devices and equipment, allowing compliance with the safety standards of the operating personnel of the production line. It is accompanied by the creation of not only sanitary and hygienic, but also other technical aspects of the temperature in the working mix, compliance with safety standards, ventilation, lighting and fire safety, requirements for the maximum permissible concentration and maximum permissible emissions of waste into the environment and their reuse in the process [20].

Therefore, in the second direction of research, research is being conducted on the development and creation of a small enterprise at the modern level with the comfort of the service personnel.

Speaking about the system "man – habitat – mechanical means", it is necessary to remember that here there is a mobilization of psychological and physiological functions of the personnel serving technological process. The speed of technological processes and their relationship with the human reaction in the current situation, associated with external sources of irritation, depending on the information received, requires more attention and reaction to the received signal information.

Human labor in any modern automated and mechanized production is the process of interaction between man and the production environment associated with the main and working capital, which include equipment and machines, raw materials and fuel and energy resources, etc.

A person who manages a certain technological process must quickly and accurately navigate in the current situation, ensure constant monitoring of actions to perform the controlling duties entrusted to him and ensure uninterrupted operation and the system and incoming signals, without forgetting self-control.

The foregoing requires increased attention to human security not only in production conditions, but also the culture of its provision. The safety of the workplace includes the organization of the workplace serving them and such working conditions that, if possible, affect the service personnel of hazardous and harmful production factors or their impact not exceeding the requirements of regulatory and technical documents and labor protection legislation. Therefore, the provision of safe working conditions is one of the most important requirements to the workplace to ensure the safety of the staff in its environment, affecting the level of industrial injuries and the safety of basic and auxiliary means of any enterprise.

Influence factors LS in the industrial cond. It is well known that a number of factors ensuring safety and smooth operation are necessary to create favorable working conditions for the personnel of the enterprises for the production of fertilizers and mixtures.

These factors include the following:

- lighting;
- ventilation;
- electrosecurity;
- fire safety;
- explosion safety;
- vibration and noise;
- the earthing and neutral earthing;
- health and safety;

- microclimate;
- firing;
- industrial sanitation, water and sanitation, other information and communication systems.

A threat to the safety of a production facility can be professional, including the protection of maintenance personnel, technical protection of buildings, structures, machines, equipment and devices, as well as environmental protection – including environmental protection.

In our case, which has all three threats to the safety of the production facility. The most important is the professional, since the object of protection is the service personnel, the individual who provides the output of certain products with certain qualitative and quantitative indicators. Therefore, the organization of safety of working conditions and the production cycle for the production of mixtures must comply with the current legislative and regulatory documents, with the use of modern means of automation and control of the process, devices, reactors, devices and auxiliary means of protection and support of the production process.

One of these production processes is the production of a fertilizer mixture, which is associated with the use of dust-releasing raw materials, such as man-made, phosphoric and carbon-containing raw materials, natural aluminosilicates, and fuel-energy resources.

To obtain products of appropriate quality, the danger of the production environment plays an important role, which depends on the degree of complexity of the work performed; exclusion from the process of traumatic equipment; timely and quality maintenance, repair, testing, inspections, technical inspection of equipment and machines, in the order and terms established by operational documents; state standards and specifications for equipment of specific groups, types, models, rules of arrangement and safe exploitation, and legislative acts; use equipment only as intended, in accordance with the requirements of the operational documentation, the organization of the manufacturer; the operation of machinery, apparatus and equipment by employees or service personnel having appropriate qualifications to the profession; having passed in the prescribed order training, training and testing of knowledge on labour protection; introduction and use of devices, machines and equipment of more advanced designs, brake devices of automatic control and alarm systems, remote control, warning signals of fire danger, stopping devices and equipment, etc.; the use of legal and regulatory documents in ensuring safety, assessment of the intensity of the labor process, assessment of occupational risk by classes of working conditions, assessment of occupational risk according to the formula Fayka-Kinna, etc. [21-30].

The implementation of all these provisions will ensure uninterrupted and high-quality production of target products and safe life of the entire production cycle, economic and ecological well-being of the population and the environment, including living organisms.

So, for example-the microclimate and lighting are one of the most important components of a comfortable environment of human work. Light has a strong impact on the human body, physiological and emotional state. Insufficient and uneven lighting, as well as pulsations affect the functioning of the visual apparatus, the performance and the psyche of the personnel serving the technological process.

Therefore, the design of lighting elements in industrial enterprises, including in mini-shops, in addition to meeting the requirements of various state Standards and rules of safe operation, must meet two basic requirements:

- provision of sufficient lighting (light);
- effective and safe performance of tasks by the service personnel in the conditions of the illuminated workplace and industrial stirring.

The choice of the types of lighting devices and installations providing the required illumination in the production room shall be made on the basis of the following factors:

- presence of dust, moisture, chemical aggressiveness, fire and explosion hazard of the operating environment and service areas;
- architecture and technological design of the production process, the presence of differences in heights, farms, technological bridges, reflecting the properties of walls, ceiling, floor, working surfaces of technological and auxiliary equipment, the size of building modules;
- requirements for the quality of lighting, including the rate of lighting, rational use of light flux, high efficiency and sufficient lighting power.

Therefore, on the basis of economic and aesthetic considerations, on the design, light distribution and limitation of blinding action, specific types of lamps will be selected, taking into account artificial and natural lighting, high-altitude differences of production facilities, their purpose and other factors.

The next aspect of sanitary standards is the temperature in the working space and the air circulation system with ventilation systems.

Speaking of light, don't forget about the main aspect of project and installation work- the device of individual protection of personnel from electric shock, in addition to the grounding and earthing devices.

The elements of the structure of technogenic risks. Any industrial, technological and technical object on which danger can arise is a direct object of danger. Therefore, the amount of damage caused by it can also serve as a potential threat even in normal operation and even more so in emergency situations.

Concerning to the industrial technological object, its danger can be determined by the following sign:

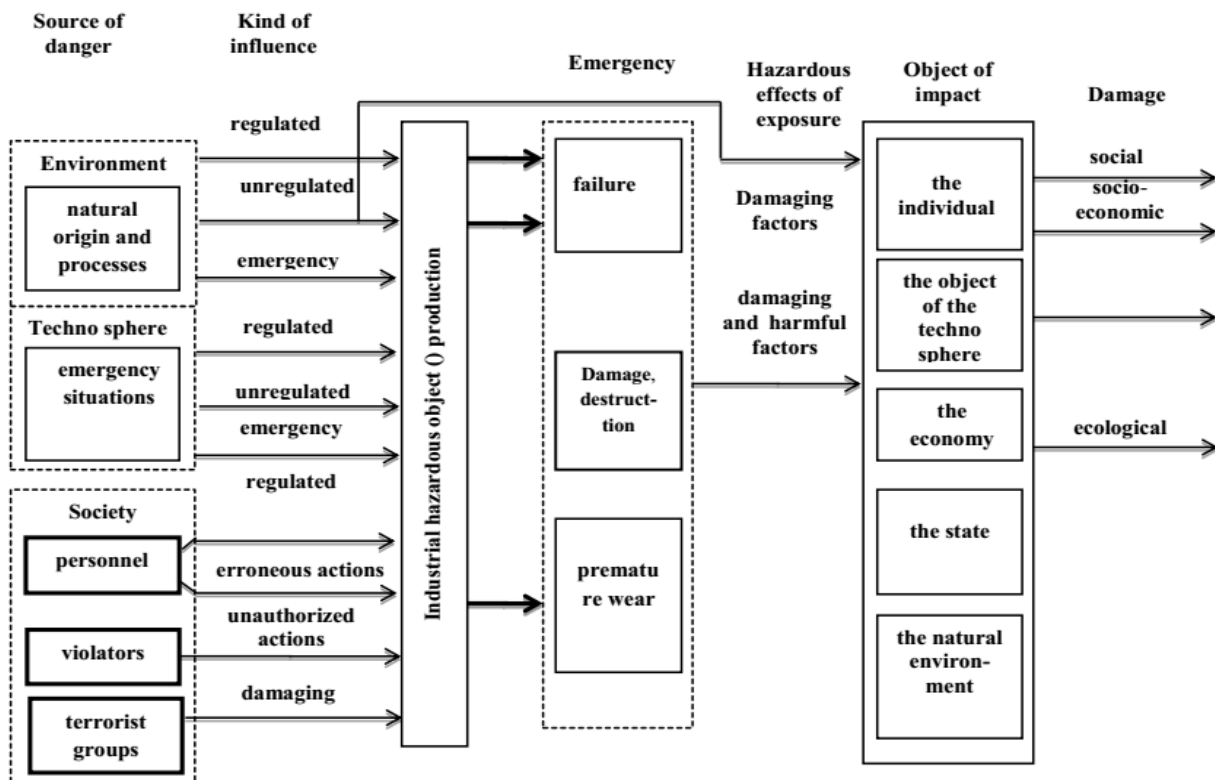
- the number of generated and accumulating hazardous and technogenic wastes and energy sources;
- the mechanism of damage in the normal conduct of the process and emergency situations;
- by type of danger-mechanical, thermal, electromagnetic, radiation and other;
- by the nature of possible emergencies.

Exposure to the above hazards may result in the following damages:

- health of the servicing device or equipment on which technological processes occur as mechanical damage in the form of risk, occupational diseases and possible death;
- violation of the state of the industrial enterprise of the technosphere in whole or in part resulting in damage or even destruction;
- environmental consequences and damage to the environment, which generally affects the economy of any state in which the industrial technological facility is located.

The qualitative and quantitative effects of hazards cause the above effects with a certain probability after exposure and are characterized by risk. Which are divided into radiation, technological, technical, environmental, economic, technogenic, social and others.

The main elements of the structure of man-made risk to human health and life of maintenance personnel in the performance of their professional duties, as well as the population living near the industrial facility are shown in figure.



The elemental composition of the man-made risk

Conclusions. Safety, this is the state of normal, uninterrupted and effective activity of an industrial technological facility in which vital interests of production personnel are launched from internal and external threats arising at the enterprise to external safety factors include man-made and environmental disasters, diversions and terrorist acts. In particular, by heavy metals through the assay the spectra of consumption of organic substances by bacterial communities [33].

The sources of the technogenic emergency include dangerous man-made accidents due to which an industrial emergency occurred on the industrial technological site or on its specific territory. Therefore, when it occurs, the probability of damaging effects of a particular kind of character associated with death, disability, moderate trauma and minor injuries is possible, with the realization of a certain hazard called individual risk. In many industrial plants, a technogenic emergency may arise, which is a violation of normal working conditions and the activities of the staff who serve, and entails a threat to human life and health.

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«ЖАМБ-70» НЕГІЗІНДЕ ЖАҢА АССОРТИМЕНТТІҢ ТУКОҚОСПАСЫН АЛУДЫҢ ШАҒЫН ЦЕХЫН ҚҰРУ ӘЗІРЛЕМЕСІ

Аннотация. АӨК қайта өңделген өнімдерін өндіру мен өткізу бойынша мемлекеттік бағдарламада ұсынылған деректерді талдау. Қалыптасқан жағдайдың негізгі себептері одан әрі зерттеулердің және жаңа ассортименттің тукоқоспаларын жетілдіру мен алуды жүзеге асырудың мақсаты мен міндеттерін алдын ала анықтады.

Жаңа ассортименттің экологиялық таза және қауіпсіз тукоқоспаларын алудың шағын цехтарын жасау арқылы пайда болған жағдайдан шығу бойынша техникалық мәліметтер мен материалдар келтірілді. Өндірістік жағдайларда еңбекті қорғау және қауіпсіздіктің қазіргі құралдарын пайдалану қажеттілігі көрсетілді.

Шағын цехтың қызмет көрсетуші персоналының психофизикалық жүктемесін азайтуға мүмкіндік беретін аппараттар мен жабдықтарды қолдану негізінде еңбек қауіпсіздігін қамтамасыз ететін факторлар мен тәуекелдер қарастырылды. Өндірістік үдеріс көптеген факторлармен байланысты, олардың ішінде ең бастысы жарықтандыру, микроклимат және өндірістік жағдайларда туындайтын қауіптер болып келеді. Тәуекелдердің үлгілері мен түрлері берілген, олардың ішінде ең қауіптілері техногендік тәуекел мен төтенше жағдайлар. Кәсіптік, техникалық және экологиялық қауіптердің қатерлері көрсетілген. Ішкі және сыртқы қауіптердің факторлары келтірілген, олар әсер ету қасиеттері мен әлеуетті қатері бойынша бөлінген.

Түйін сөздер: тукоқоспаның тиімділігі, шағын цех, жабдық, сигнал және хабарлау құралдары, жарық, температуралық режим, микроклимат, өнеркәсіптік санитария, еңбекті қорғау.

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РАЗРАБОТКА ПО СОЗДАНИЮ МИНИ ЦЕХА ПОЛУЧЕНИЯ ТУКОСМЕСИ НОВОГО АССОРТИМЕНТА НА ОСНОВЕ «ЖАМБ-70»

Аннотация. Анализ данных, представленных в государственной программе по производству и реализации продуктов переработки АПК. Основные причины сложившихся ситуации, предопределил цель и задачи дальнейших исследований и реализации в жизнь вопросов совершенствования и получения тукосмесей нового ассортимента.

Приведены технические сведения и материалы по выходу из создавшегося положения путем создания мини цехов получения экологически чистых и безопасных тукосмесей нового ассортимента. Показана необходимость использования современных средств охраны труда и безопасности жизнедеятельности производственных условиях.

Рассмотрены факторы и риски обеспечивающие безопасность труда на основе применения аппаратов и оборудования, позволяющих снизить психофизическую нагрузку обслуживающего персонала миницефа. Производственный процесс связан со многими факторами, главенствующими из которых является освещение, микроклимат и опасности возникающие в производственных условиях. Даны типы и виды рисков, из которых наиболее опасны техногенный риск и чрезвычайные ситуации. Показаны угрозы опасностей – профессиональной, технической и экологической. Приведены факторы внутренних и внешних опасностей, которые разделены по свойствам их воздействия и потенциальной угрозе.

Ключевые слова: эффективность тукосмесей, мини цех, оборудование, средства сигнализации и оповещения, освещенность, температурный режим, микроклимат, промсанитария, охрана труда.

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