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PRACTICAL RECOMMENDATIONS REGARDING OPERATION OF THE COMPLEX OF TECHNICAL AND TECHNOLOGICAL SUPPLY OF ENERGY AND RESOURCE-SAVING PRODUCTION OF LIVESTOCK PRODUCTS AT THE ENTERPRISES OF THE AGRICULTURAL COMPLEX

The article provides practical recommendations regarding the operation of the complex of technical and technological support for energy- and resource-saving production of animal husbandry products at enterprises of the agro-industrial complex. Recommendations are given regarding the operation of heat and mass exchange equipment in the fractional processing of perennial legumes, equipment for pressing in the technology of preparing concentrated fodder and adaptive vibration mill in the technology of preparing concentrated fodder.

Therefore, the specified recommendations determine the important role of repair services of enterprises in ensuring the production of their products, but the level of technical equipment of these units, their organization and management is currently lower than in the main production. As a result, the labor intensity of repairs increases, especially unplanned and complex ones, during which various parts of technological equipment (mechanical, electrical and electronic) are restored, repair costs increase and there is a significant overspending of various types of resources. This is a consequence of the established traditions, when the repair service of machine-building enterprises, which is related to auxiliary production, is given less attention than to the main production.

The article also considers general recommendations that are implemented during the operation of equipment for the production of livestock products at enterprises of the agro-industrial complex. The service life of the equipment largely depends on the maintenance personnel's strict compliance with the operating rules, careful handling and clean storage of machines and devices. It has been established that from 50 to 80% of all accidents occur as a result of violations of operating rules.

Key words: *practical recommendations, heat and mass exchange equipment, fractional processing of legumes, concentrated feeds, vibrating mill.*

Statement of the problem. The world experience of the rational use of resources in animal husbandry indicates that much attention is paid to the intensification and improvement of the efficiency of certain aspects of this industry (forage production, animal husbandry, product processing, etc.). To effectively solve the problem of resource conservation in animal husbandry, a comprehensive approach is used, which allows to achieve a synergistic effect and increase the competitiveness of the entire industry. Therefore, the research of the complex of technical and technological support of energy- and resource-saving production of livestock products at the enterprises of the agro-industrial complex is relevant.

To preserve the appropriate quality and energy value of feed obtained by fractional processing, which is ensured by drying it with active ventilation and intensification of the process of preparing high-protein concentrated feed, which takes place due to the grinding of components by a vibrating mill with spatial-circulatory movement of the working environment when applying an adaptive control system, the primary task is to develop and offer practical recommendations for the operation of this equipment.

Analysis of the latest research. The efficiency of the technological equipment depends on the application of the system of its technical operation at the enterprise. According to the STATE STANDARD, technical operation is a part of operation, which includes: transportation, storage, repair and inter-repair maintenance. The significance of the task of increasing the effectiveness of the technical operation of the technological equipment of machine-building enterprises is determined by the degree of influence of the technical condition of the technological equipment on the effectiveness of the work of the industrial enterprise as a whole and the quality of the products produced at this enterprise. The structure of the system of technical operation of technological equipment and the content of individual types of maintenance and repair should ensure the maintenance of the operational condition of technological equipment with the smallest losses of the main production due to downtime of the equipment with minimal repair costs [1, 2].

Recently, in the field of theory and practice of repair service management, an increasing number of theoretical and applied studies have been carried out, related to the application of the principles of the process approach and standardization methods to the management of repair production with the aim of forming uniform principles (rules and recommendations) that regulate various parties activities of the company's repair service. Until now, a number of serious issues have not been resolved, for example, due to the lack of a criterion for the effectiveness of the repair service, it is difficult to economically justify the planning of technical operation works, to determine the amount of resources necessary to ensure the efficiency of technological equipment, as well as the costs associated with the use of raw materials, materials, spare parts, etc. The problem of managing the effectiveness of the repair service becomes especially acute in case of accidental equipment failure caused by an accident. The restoration of the equipment requires the provision of complex repair teams, which include electricians subordinate to the main power company, electronics technicians subordinate to the chief of the CHPK systems bureau, and mechanic fitters who are subordinate to the chief mechanic of the company. As a result, the duration of repair work and losses of main production due to equipment downtime increase [1, 2, 6].

Taking into account the fact that modern technological equipment is produced using the latest technological advances, it is necessary to organize the joint work of engineers and mechanics, for example, with representatives of the supplier company or the manufacturer's company already at the stage of equipment installation, because after the end of the commissioning work, the factory services will remain one-on-one with new equipment and must be able to operate it correctly in the conditions of serial (and, as a rule, continuous) production. Of course, it can be denied that there are warranty obligations of the supplier, but there is no need to compare the concept of repair work and the ability to operate the equipment. In addition, the operating documentation for the supplied equipment should be studied not only by representatives of engineering services, but also by personnel who directly operate this equipment. This necessity is also connected with the fact that any unit of equipment in its technical description contains information about routine work (practical recommendations) that must be carried out at the end of each shift (working day, month, etc.) mandatory. It is especially important to carry out regulatory work and observe the rules of operation (practical recommendations) of equipment for the technology of fractional processing of perennial leguminous grasses (heat and mass exchange equipment, adaptive vibrating mill for grinding concentrated feed).

The purpose of research. The purpose of this study is the development and implementation of practical recommendations for the operation of a complex of technical and technological support for energy- and resource-saving production of livestock products at enterprises of the agro-industrial complex.

Presentation of the main material. The following are the general recommendations to be followed during the operation of the equipment [2, 6]:

a) before starting the machine, make sure that it is clean, serviceable, correctly assembled, connected to the pipelines, the position of the regulating bodies (cocks, valves), the serviceability of the fences that block the devices, the tightness of the screwing of the oil drain plugs (in the absence of oil leakage), the presence of lubrication friction parts, check the level and cleanliness of the lubricant in the crankcase, the serviceability of grounding, measuring devices (devices) and automation, the presence of raw materials, water, steam, cold, electricity, the absence of foreign objects on the machine (rags, nuts, keys, washers, etc.);

b) during start-up, determine the order of turning on the electric motor (drive), supply of raw materials, steam, water, cold; after turning on the electric motor, the load on the machine is increased gradually, avoiding overloads, making sure that the working parts of the machine move correctly in the direction of rotation of the electric motor, which is indicated by the red arrow on the machine body, the gear enclosure and the electric motor fan enclosure;

c) during the operation of the machine, a set mode is set, which is controlled on the devices and visually (observation), as well as by periodic sampling and conducting analyzes in the factory laboratory to determine the content of fat, moisture, dry substances, etc.; the performance of machines with speed variators can be adjusted only during machine operation; monitor the absence of flow of raw materials, product, working fluids (water, freon, etc.), lubricants, the temperature of bearings, the absence of belt slippage, chain jerks, increased vibration, extraneous noise, rumbling, etc.;

d) after the end of the operation of the equipment, determine the sequence of stopping the supply of raw materials, steam, water, cold, turning off the electric motor; after stopping, the car is disassembled according to daily disassembly; parts in contact with the product are cleaned and washed manually with bristle or kapron brushes and rags in a solution of soda ash, and then in hot and cold water and dried; equipment parts are dried on racks, tables, pyramids not far from the machines; rubber pads are dried in a horizontal position so that they do not stretch; in addition to manual washing, continuous (circulation) washing of equipment and pipelines is widely used in the dairy industry.

Do not neglect the general recommendations regarding the organization of equipment operation.

The operation of the equipment must be carried out in accordance with the requirements of the Technical Operation Rules (TTE), the Industrial (production) Safety Rules (PVB), the STATE STANDARD, which outline the basic organizational and technical requirements for the operation of the equipment. All regulatory and technical documentation (NTD) in force at the enterprise for the operation of the equipment must meet the requirements of the specified documents [3, 6].

Regardless of the departmental affiliation and forms of ownership of enterprises (state, joint-stock, cooperative, individual, etc.), when using equipment for the production and provision of services at the enterprise, the correct operation of the equipment must be organized, which largely determines its serviceability during the entire term services.

Correct operation of the equipment involves:

- development of job and production instructions for operational and operational and repair personnel;

- correct selection and placement of personnel;

- training of all personnel and verification of their knowledge, job and production instructions;

- maintenance of equipment in good condition through timely maintenance and repair;

- preventing the equipment from carrying out works that have a negative impact on the environment;

- organization of reliable accounting and objective analysis of violations in the operation of equipment, accidents and the use of measures to establish the causes of their occurrence;

- execution of orders of the State Technical Supervision Authority.

In the case of joint operation of the equipment between the lessor and the lessee, there is a contract that stipulates specific obligations to keep the equipment at their disposal in good condition, the procedure for its use and repair.

Direct operation of the equipment is carried out by the operating personnel at the location of the equipment.

Heads of divisions under whose supervision are operational and operational and repair personnel must have technical training in accordance with the equipment, carry out professional management and control of the work of the personnel subordinate to them.

The list of engineering and technical personnel positions is approved by the head of the enterprise.

Persons under the age of 18 are not allowed to work on complex installations. Interns of universities and technical schools are not allowed to work independently. They can be at workplaces only under the supervision of a person with appropriate technical training.

Before being assigned to independent work or when transferring to another job (position), as well as when there is a break in work for more than one year, the staff must undergo a medical examination and training at the workplace.

Upon completion of the training, the employees' knowledge must be tested, after which they are assigned the appropriate security group.

After the knowledge test, each employee must undergo an internship at the workplace lasting at least two weeks under the guidance of an experienced employee, after which he can be allowed to work independently. Admission to internship and independent work for engineering and technical personnel is issued by the order of the enterprise, for workers - by the order of the workshop.

The verification of knowledge of the rules, job and production instructions is carried out as follows:

- primary – before admission to independent work;

- duty - once a year for operational and operational-repair personnel, once every three years for engineering and technical personnel;

- off-duty - when the employee violates the rules and instructions, at the request of the heads of the technological workshops, State Technical Supervision.

Persons who have not passed the knowledge test are re-tested no earlier than 2 weeks and no later than 1 month after the date of the last test.

The service life of the equipment largely depends on the maintenance personnel's strict compliance with the operating rules, careful handling and clean storage of machines and devices. It has been established that from 50 to 80% of all accidents occur as a result of violations of operating rules. This leads not only to premature wear of parts and assembly units, malfunctions, failures and breakdowns of equipment, production of defective products, but also makes the work of service personnel dangerous. Practice shows that accidents, as a rule, occur as a result of violations by employees of the rules of operation and maintenance of equipment. Correct operation of the equipment park in dairy production allows to ensure timely processing of milk, compliance with technological regimes in the production of dairy products and, therefore, the rhythm of the enterprise's work, as well as high product quality.

In the dairy industry, direct maintenance of machines and devices during their operation is the duty of production workers. On complex equipment - these are operators, on other machines and devices - apparatus technicians. All of them undergo special training (training) and attestation with the assignment of the appropriate rank. Qualified adjusters supervise the work of operators and hardware operators. Maintenance and adjustment of technological equipment is carried out by on-call fitters, electricians, as well as fitters of measurement and automation services.

At least once every 2 years, and for new types of equipment - as they arrive at the enterprise, all service personnel undergo a technical minimum program to study the equipment, the principle of its operation and the rules for operating machines and devices. The classes are conducted by the engineering and technical workers (ITP) of the dairy plant without breaking away from production with groups of specialists in the classroom (technical office), as well as with each employee directly at the workplace, that is, close to the machines and devices. After studying the technical minimum program, a special commission chaired by the chief engineer of the enterprise conducts an attestation of the trainees, based on the results of which one or another grade is assigned and a certificate for the right to operate the equipment is issued. Periodically, depending on the profession, employees undergo re-certification.

The heads of production departments, together with the chief mechanic of the enterprise, develop local instructions for the operation of complex machines and devices (vacuum evaporation units, dryers, freezers, presses, mills, etc.), which are compiled on the basis of the technical documentation of manufacturing plants (or firms - for foreign equipment) and standard safety instructions. Local instructions are approved by the chief engineer and the plant committee of the enterprise's trade union.

Instructions are posted in workshops in a prominent place near the machines. It is allowed to start work on any type of equipment only after studying the instructions and mastering the practical skills of working on the machine.

For the correct operation of the technological equipment, the service personnel must study the design and rules (recommendations) for the operation of the equipment in depth and in detail and strictly follow them, regularly and correctly perform maintenance and repair of the machines, avoid overloading the equipment.

Basic recommendations for increasing operational performance of technological equipment.

To increase the operational performance of machines and equipment, the following can be mentioned:

- mechanization and automation of the main production processes, as well as transport, warehouse and loading and unloading operations;
- urgent commissioning of uninstalled and inactive equipment;
- elimination of downtimes of machines during shifts and even during the day, increasing the variability of operation of existing equipment;
- in order to avoid the stoppage of production, the creation (within the norms) of a stock of reserve equipment;
- modernization (improvement) and replacement of outdated equipment;
- improvement of production and labor organization;
- timely and complete provision of the enterprise with raw materials, materials, spare parts;
- centralization of equipment repair.

Recommendations regarding the operation of heat and mass exchange equipment in fractional processing of perennial legumes.

Drying leguminous herbs is an important stage in their processing in order to preserve and increase the shelf life. However, this process can be accompanied by certain problems, such as loss of useful substances, low drying efficiency, non-compliance with quality standards, and unsatisfactory level of energy efficiency. Given the growing importance of legumes in global food production, producers and scientists are faced with the challenge of optimizing drying processes and using heat and mass transfer equipment to achieve high quality and efficiency of dried legumes.

In order to reduce the loss of useful substances, ensure compliance with quality standards, increase energy efficiency and ensure stable production profitability, practical recommendations for the operation of equipment for drying leguminous herbs should be followed.

The analysis of technological processes of legume processing is a necessary stage for the development of effective recommendations for optimizing the drying of these valuable agricultural crops. By looking at each stage of this process, we can identify the factors that affect the quality and efficiency of drying legumes [3, 4, 5].

The first stage of the technological process consists in the reception of raw materials - legumes. It is important to take into account the quality of the raw material, its moisture, uniformity and cleanliness. If the raw material contains impurities, it can significantly affect the effectiveness of the drying process and the quality of the dried products. Recommendations for this stage may include sorting and cleaning the raw material before drying.

At this stage, legumes are prepared for the drying process. They can be crushed or crushed to facilitate the drying process and increase the surface availability for moisture evaporation. Optimization of this process may include selection of the optimal fraction and particle size for maximum drying efficiency.

The drying process itself includes the effect of heat and ventilation on the raw material in order to evaporate moisture. It is important to precisely control the temperature and humidity of the air entering the raw material, because incorrect parameters can lead to overheating or underdrying of leguminous herbs. Also, the drying efficiency may depend on the thickness of the raw material layer and the time it stays in the dryer.

After undergoing the drying process, dried legumes may undergo additional processing such as cooling, sorting and packaging. It is important to ensure proper refrigeration and storage conditions to prevent moisture reabsorption and environmental exposure to dried products.

The choice of optimal heat and mass exchange equipment is one of the most important components of the effective process of drying legumes. This choice can have a significant impact on productivity, quality of dried products and overall profitability of production. To develop ours recommendations for optimizing the choice of heat and mass exchange equipment, we will carefully analyze the key factors affecting this process.

The first aspect of choosing heat and mass transfer equipment is to consider the different types of equipment available on the market. The most common types include rotary drum, agitation, roller, and conveyor-based dryers. Each of these types has its advantages and disadvantages, and the choice should be based on specific production needs and constraints.

The question of energy efficiency is an important aspect of the choice of heat and mass exchange equipment. The availability of alternative energy sources, such as natural gas, firewood, solar panels, etc., can significantly influence the choice of technology and type of fuel for equipment. It is important to consider the chosen equipment in terms of its cost and environmental impact.

The size and scale of the heat and mass transfer equipment are also important selection factors. They must correspond to the scale of production and available production space. Large equipment can provide great performance, but may require significant investment and infrastructure.

The equipment should be able to adjust temperature, humidity and other parameters to achieve optimal drying results. Technological features such as automatic control and monitoring can simplify the drying process and ensure consistent product quality [8, 10].

Last but not least, the cost of equipment and the availability of technical support. Manufacturing and maintaining heat and mass transfer equipment can be costly, so it is important to consider the total costs over the entire life cycle of the equipment.

The choice of the type of equipment depends on the specific requirements of your production and the characteristics of the legumes. For example, for large volumes and fast drying, it may be appropriate to use rotary drums, and for smaller volumes - convection dryers.

It is important to be able to precisely control heat and mass transfer parameters such as temperature, air velocity, etc. Equipment with modern automation systems will facilitate the drying process and quality control.

Control of temperature and humidity plays a decisive role in ensuring a high-quality and efficient process of drying legumes. Accurate regulation of these parameters affects the quality of dried products and the energy efficiency of the process.

The temperature of the gas or air used for drying has a great influence on the process. Higher temperature can contribute to faster evaporation of moisture, but at the same time there is a risk of overheating of raw materials, which can lead to loss of quality and yellowing of products. On the other hand, a low temperature can reduce the risk of overheating, but slow down the drying process.

It is important to find a balance between temperature and drying time for best results. Monitoring and regulation of temperature during the drying process can be done using automated control systems.

The humidity of the air entering the raw material affects the rate of evaporation of moisture from leguminous herbs. Increased humidity can promote more efficient drying, but can lead to excess moisture in dried products, leading to spoilage.

It is recommended to constantly monitor the air humidity and adjust it based on the needs of the drying process and the properties of the raw materials. The use of humidity sensors and automatic control systems can help maintain optimal conditions.

The implementation of monitoring systems and automatic regulation of temperature and humidity can ensure the stability of the drying process and avoid product defects.

Reducing the loss of useful substances during the drying process of legumes is one of the most important tasks in ensuring the quality and efficiency of this technological process. These legumes are a valuable source of protein, vitamins and other nutrients, and preserving their quality during drying is an important goal.

High temperature during drying can lead to denaturation of proteins and destruction of vitamins and other useful substances in legumes. Thus, it is important to set the optimal drying temperature, which would ensure effective evaporation of moisture, while not contributing to significant losses of useful components.

Maintaining optimal humidity during drying is also an important aspect in reducing the loss of nutrients. Over-drying can lead to loss of quality, and under-drying can lead to moisture retention, which can promote the growth of fungi and bacteria.

Reducing drying time can also help reduce nutrient loss. A long drying process leads to a greater loss of moisture and increases the risk of degradation of raw materials.

The implementation of monitoring and quality control systems is a critical aspect of the optimization of technological processes of processing and the use of heat and mass exchange equipment for drying legumes. This allows you to ensure the stability of product quality, detect negative trends and losses in time, and improve production processes.

Monitoring and quality control allow timely response to any changes in the drying processes of leguminous herbs and maintain the stability of product quality. Key benefits include:

- detection and correction of negative aspects of the drying process, such as overheating, under-drying, over-drying and others;
- ensuring compliance with product quality and safety standards;
- reduction of raw material losses and improvement of production profitability.

The first step in implementing quality monitoring and control is to define the critical parameters that need to be measured and controlled. These can be temperature, humidity, drying time, weight loss of raw materials, etc.

Thus, a prerequisite for the implementation of such systems is a thorough analysis of the technological process and determination of the parameters that have the greatest impact on product quality. The development of quality standards is an important step, as they determine the criteria that must be met by the products after drying. These standards may include maximum moisture content, protein content, vitamins, flavorings, etc. [10].

Recommendations for the operation of the adaptive vibration mill in the technology of preparing concentrated feed.

The initial data for the design of adaptive vibrating mills of continuous action are: the technological process, the dimensions of the crushed material and its physical and chemical properties, the annual demand for the final product.

The productivity of the process of adaptive vibration grinding largely depends on the shape of the grinding chamber, the nature of its movement and the movement of the technological load in it. The grinding chamber should be quite rigid and strong. It is made, as a rule, in the form of a thick-walled long pipe with flanges on the ends.

On the basis of the «Methodology for calculating the productivity of a vibrating mill for grinding grain mass» developed by us, a pilot sample of a vibrating mill with spatial circulation movement of loading MVE - 5 and an industrial sample MV - 400 with spatial circulation movement of grain mass were created. To create them on the basis of experimental studies and the obtained experimental dependences of the height of the lift of loading and the speed of transportation on the mode and design parameters of the mill, their mathematical identification in the form of regression equations was performed. Numerical recommendations for the limits of rotation of vibration exciters have been obtained [9, 11].

Recommendations for the operation of pressing equipment in the technology of preparing concentrated fodder.

Before starting up, the screw press is inspected for foreign objects. At the same time, they check the correct assembly of the press assemblies and the connection of the phases to the electric motors of the press and the feeder, which ensures the correct direction of rotation (the screw shaft must rotate counterclockwise when viewed from the exit side of the cake, and the feeder shaft should rotate clockwise when viewed from the input side pulp) also check the grounding of the press, the presence of oil in the gearbox. Before starting, the cone of the press is removed completely. After turning the drive of the press and the feeder by hand, they are convinced of the smoothness of the movement. Before starting, the press shaft is heated, for which steam is fed into the cavity of the channel for 20...25 minutes. The start-up is carried out initially at idle speed, the actual switching on is carried out after warning all those workers who are near the press. At idle, ammeter readings are monitored, as well as the operation of all press mechanisms. Having made sure of the normal operation of the press, they begin to feed a small amount of pulp into the feeder.

When starting the press, before feeding the pulp into it, the cone is moved two or three times to the extreme position to clean the thread, after that the cone is set to the maximum open position.

The frequency of rotation of the screw shaft of the press feeder must be adjusted according to the technological mode of production and the oil crop being processed. At the same time, the feeder must first be tested at minimum and maximum revolutions.

The pulp is fed to the press under conditions of increased load according to the power device (in kilowatts). At the same time, pulp addition is carried out no more often than after 4...5 minutes with an increase in load during this time by no more than 2...3 kW.

The transition to the working supply of the pulp is carried out after heating the screw shaft and the zeer, at the same time the temperature of the cake is reached +60...+65oC and the juice (oil) is squeezed out at all stages. After that, proceed to the gradual clamping of the cone, which is performed while carefully observing the readings of the ammeter. If the load on the press has exceeded the norm, the supply of pulp to the feeder is immediately reduced and, if this is not enough, the cone is removed. If this does not give results, the press is stopped to identify a possible defect.

After the press warms up well, partially reduce the supply of pulp to the press and gradually press down the cone, continuously monitoring the load. If necessary, reduce the supply of pulp to the normal load [6, 7].

After the press is heated, the supply of steam to the inside of the press shaft is stopped.

Systematically remove the fuzz that accumulates under the press.

At least twice per shift, the zeer press is cleaned of debris, while observing all safety rules.

After wringing out the cone, press the lever of the cone with a key in the direction of its opening and, keeping it pressed, start the electric motor of the press.

During the operation of the unit, carefully monitor the indications of the devices on the control panel for the loads of the electric motors.

Permissible press loads when changing the shaft rotation frequency from 19 to 32 rpm range from 18 to 32 kW.

Once a day, the supply of pulp to the press is stopped, and after the pulp from the press is activated, the cone of the press is moved to the extreme position two or three times to clean the thread.

The operation of the press is especially closely monitored in the case of overdried pulp and high flaky pulp. When the load increases beyond the norm, the supply of pulp to the press is reduced, the pulp is moistened in the sixth tank and, in the last resort, the cone is squeezed and the supply of pulp to the press is stopped.

If it is necessary to stop the press in order to prevent clogging of the seepage gaps, 50...70 dm3 of raw material is fed into the press through the loading belt.

The pulp temperature in the roaster is monitored by manometric thermometers on the 1st, 2nd, 3rd, 4th, and 5th tanks and by the remote thermometer of the 6th tank on the control panel.

The process of wet-heat treatment of the pulp in the tanks is regulated by changing the amount of steam supplied to the jacket of the tank, as well as by increasing or decreasing the opening of the dampers in the aspiration system of the roaster.

The normal operation of the unit is achieved mainly due to the uniform supply of the pulp to the roaster and its correct moisture and heat treatment.

A siren beeps to warn of a press or roaster stop if the safety pins are cut. At the same time, you should immediately find out the reasons for the stoppage and take the necessary measures to eliminate them.

If it is necessary to clean the loading belt and the feeding screw of the press, the feeder must be stopped. Cleaning should be done only with a wooden spatula.

Stopping the press for more than 10 minutes is accompanied by disassembly and cleaning of the cylinder and screw shaft. With a shorter stop, start-up is possible without disassembly and cleaning, but with a fully retracted cone with all the specified requirements.

Stopping the loaded press is not allowed. In case of an emergency stop of a loaded press, the latter should not stand for more than 10 minutes. If the duration of the stop is more than 10 min. it is necessary to open the cylinder of the press and clean it from the pulp.

When the loaded press is idle for no more than 10 minutes, the cone of the press must be brought to the extreme open position with the help of a special key by turning the intermediate gear counterclockwise at the middle position of the adjusting lever.

Maintenance and adjustment of the press takes place during the main working mode.

Dismantling of the meal thickness adjustment unit. In this case, the thickness is adjusted in the following order: stop feeding the pulp to the press, release it from the pressed material and stop. The cone gear is jammed and the pulley on the press gearbox is turned in the desired direction (increasing or decreasing the thickness). The position of the cone nut on the thread is fixed with the locking screw (the thread is cut in advance and the locking screw is installed).

They eliminate the possible jamming of the grill gate and ensure its free movement.

Turn the turns of the screw shaft around the axis in order to eliminate the reverse movement of the pulp in the press.

A pressing zone is created before the meal exits the press.

In order to reduce the yield of return material, pressure cones are removed from the turns of the screw shaft of the press.

Water is supplied to the sprayer of hot steam of the sixth vat of the roaster to soften the pulp in case of its drying out.

The sector valves in the roasting tanks are replaced with valves of domestic design.

Strengthen the fastening of the lower screw turn of the feeder to the shaft (for example, with the help of a locking key).

Unexpected opening of the lower hatch of the feeding chamber is eliminated.

Moist-heat treatment of mint in the auger in front of the roaster is unsatisfactory - it is desirable to install an inactivator instead of this auger [7].

Conclusions.

The proposed structure and the two-circuit principle of controlling the operation of the adaptive vibratory mill with the spatial circulation movement of the loading ensure minimal energy consumption for the vibratory drive due to the constant resonant mode of operation at the predetermined technologically optimal parameters of the vibration field of the vibratory mill's grinding chamber.

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ПРАКТИЧНІ РЕКОМЕНДАЦІЇ ЩОДО ЕКСПЛУАТАЦІЇ КОМПЛЕКСУ ТЕХНІКО-ТЕХНОЛОГІЧНОГО ЗАБЕЗПЕЧЕННЯ ЕНЕРГО- ТА РЕСУРСООЩАДНОГО ВИРОБНИЦТВА ПРОДУКЦІЇ ТВАРИННИЦТВА НА ПІДПРИЄМСТВАХ АГРОПРОМИСЛОВОГО КОМПЛЕКСУ

В статті наведено практичні рекомендації щодо експлуатації комплексу техніко-технологічного забезпечення енерго- та ресурсоощадного виробництва продукції тваринництва на підприємствах агропромислового комплексу. Приведені рекомендації, щодо експлуатації тепломасообмінного обладнання в процесах фракційної переробки багаторічних бобових трав, обладнання для пресування у технології приготування концентрованих кормів та адаптивного вібраційного млина у технології приготування концентрованих кормів.

Тому визначені рекомендації обумовлюють важливу роль ремонтних служб підприємств у забезпеченні випуску їх продукції, але, рівень технічної оснащеності цих підрозділів, їх організації і керування на сьогодні нижче, ніж в основному виробництві. В результаті збільшується трудоємкість ремонтів, особливо непланових і комплексних, при яких відбувається відновлення різних частин технологічного обладнання (механічної, електричної та електронної), підвищуються ремонтні витрати і відбувається значна перевитрата різних видів ресурсів. Це є наслідком традицій, що склалися, коли ремонтній службі машинобудівних підприємств, що відноситься до допоміжного виробництва, приділяється менша увага, ніж основному виробництву.

Також у статті розглядаються загальні рекомендації, що виконуються під час експлуатації обладнання для виробництва продукції тваринництва на підприємствах агропромислового комплексу. Термін служби обладнання багато в чому залежить від чіткого дотримання обслуговуючим персоналом правил експлуатації, дбайливого поводження та зберігання в чистоті машин і апаратів. Встановлено, що від 50 до 80% усіх аварій відбувається в результаті порушень правил експлуатації.

Ключові слова: *практичні рекомендації, тепломасообмінне обладнання, фракційна переробка бобових трав, концентровані корми, вібраційний млин.*

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