Abstracts of articles

MODERN TECHNOLOGIES AND MEANS OF PLANT GROWING MECHANIZATION

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DESIGN OF UNIVERSAL PNEUMATIC DRILL FOR GRAIN, SMALL SEEDS AND DIFFICULTLY SOWING CROPS

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Keywords: row, sowing, drills, device, seeds, quality, design.

The purpose of the research is the universal drill efficiency improving by its constructive-technological scheme designing. In modern plant growing energy saving technologies play the extremely important role. Such one of the major perspective and priority directions demands using of new generation farm machines providing high quality of activity for all technological operations, including sowing. The design of machines has to be developed taking into account the requirements of multifunctionality, power consumption and resource-saving, and layout schemes of these machines have to correspond block modular to functioning. For sowing grain, tiny seeds and difficulty sowing crops the mounted universal pneumatic group dosing drill with width of 4.5 m and modular principle of functioning is developed. The coefficient of intervals variation between seeds for the experimental sowing amounted to: \( \nu = 87\% \) (goat's Rue East, seeds soaked); \( \nu = 68\% \) (goat's Rue East, seeds dry), \( \nu = 75\% \) (buckwheat), \( \nu = 73\% \) (wheat), and for crops serial seeder this figure is the average for the above-mentioned crops amounted to 112%. When the seeding rate up to 15 kg/ha, reel-to-reel machines drill SZT-3.6 does not provide soaked seeds seeding . The quantity of grains embedded in the soil by experimental drill with combined openers in given horizon depth is 83%. Disc openers drills SZT-3.6 laid in the given horizon 65% of seeds. It is established that the experimental machine ensures the implementation of the technological process drill seeding of crops with different physical-mechanical seeds properties with the necessary operational and agronomic performance.

Bibliography


THE INTERACTION OF TITANIUM AND NICKEL WITH CARBON BY PROCESSING OF SPARK DISCHARGES IN CARBON CONTAINING MEDIA

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Keywords: spark discharges, alloying, phase, diffusion.

Research objective is interaction of metals and gaseous and liquid environments initial covering metals under the influence of spark categories. Methods layered radiometric analysis of micro-, macro - and electron microscope of autoradiography, x-ray, x-ray spectrum and microdynamical analyses phase composition were formed by electric-spark alloying coverage and diffusion zone between the coating and the substrate, the length of diffusion zone and localization of alloying atoms when machining Titanium and Nickel in environments containing carbon. The role of the density and the physical state of the environment in the penetration and dissolution of carbon atoms is shown. Mechanical properties of the processed materials are defined. The work was carried out using three environments in different states of aggregation, containing various amounts of carbon. Diffusion alloying element (carbon) and atoms of basic metals (Nickel, titanium), and phase composition of the formed coating were considered by metals subjected to ESA in gaseous media: methane CH₄ and carbon dioxide CO₂ in the chamber pressure of 0.1 MPa, and carbon-containing liquid environment glycerine. For galvanic coatings electrolytes and modes of application, allowing to receive layers gloss, with good adhesion, constanting thickness and composition throughout the treated surface. Processing of samples spark discharges and coating was carried out at the installation of Elitron-22. In experiments contactless method of doping was used, which ranged value of the interelectrode gap lₑ from 0.5 to 2 mm. Experiments were performed in a special chamber where we put the appropriate environment. It is established that the application of the original multicomponent coatings and use of liquid and gaseous media with high contenting of carbon in combination with carbon anode in the process spark alloying metals allows to give the near-surface layers of Titanium and Nickel new properties that provide the necessary performance.

Bibliography
INTENSIFICATION OF POTATO HARVESTERS BAR ELEVATORS SEPARATING ABILITY BY PRELIMINARY DEFORMATION OF TUBER BEARING

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Keywords: stalk, elevator, separation, soil, biter, apron, trajectory.

The purpose of research is separating ability of potato-harvesters stalk elevators increase due to preliminary destruction of tuberiferous layer. For this it is necessary to intensify the process of separation with steam elevators sweepers. This problem can be solved by breaking soil clods in repositories tuber bearing to separability sizes. Due to insufficient activity space core elevator is not able to solve this problem completely. In this regard, the article discusses the use of additional devices used for deformation of tuber bearing layer at the stage of exit from the working parts of undermining sections of potato harvesters. The best way to destruct soil clods is dynamic impact for them with the working parts of such devices. The design of active beater with flexible rods, which are planted with spherical strikers having an elastic surface is suggested. This allows to provide the destruction of soil clods with the least effort and strains that minimizes the defectiveness of potato tubers. To maximize the effective surface area of bar elevator the graph-analytical method of location installation of rubberized apron serving to dampen the kinetic energy of tuber bearing layer by elements with active beater is based.

Bibliography

PHASE FORMATION FEATURES AND Nb, Mo AND Ti INTERACTIONS WITH STEELS DURING PLASTIC DEFORMATION

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Keywords: phase formation, metal, radioactive, isotopes, plastic, deformation.

The purpose of research – to improve the quality of welded joints based on refractory metals. Experiments were carried out on 10 mm diameter cylinder samples 10 mm in height, made of pure metal. Saturation of the samples used as the carbon source, carried out in solid carburizer BaCO₃, further comprising radioactive ¹⁴C, at 1253 K for 2 hours. Deformation process was realized with the help of impact falling load up to two pre-heated samples. Penetration of Metals atoms into steel and refractory metals were fixed using radioactive isotopes ⁴⁴Ti, ⁵⁵Fe, ⁹⁵Nb, ⁶⁰Ni. The results of experimental researches for phase formation...
and interactions of metals with steel under plastic deformation with deformation velocity 250 s$^{-1}$ are presented. It is shown that during plastic deformation with pulse welding metals with refractory steels there are milliseconds partial decomposition of cementite steel and redistribution of carbon in solid solution. It was found that carbides formed niobium, molybdenum and titanium under pulsed exposure, have different morphology. The solid solution of carbon in metals uniformly distributed in the plane parallel to the surface, while the interstitial phase are located near the grain and interphase boundaries.

Bibliography


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UNIVERSAL DISK AND BRUSH SOWING DEVICE OPERATING TECHNOLOGICAL PROCESS THEORETICAL JUSTIFICATION

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Keywords: device, disk, roller, screw, particle, seeds.

Research objective – theoretically proving of universal disk and brush sowing device operation technological process. On the basis of universal sowing devices analysis on «Mechanics and Engineering Graphics» chair of the Samara SAA the disk and brush sowing device was developed for seeding of seeds with various physicomechanical properties. The description of the constructive and technological scheme and process of operation of the universal disk and brush sowing device is presented in article (the patent Russian Federation for the invention No. 2452166). For ensuring steady transportation of seed material from the bunker to the seedputting roller process of seed material transportation by sowing disk is investigated and expression allowing to establish dependence of angular speed of sowing disk rotation for constructive and technological parameters at which steady transportation of seed material from the bunker to the seedputting roller will be provided is received. As process of movement of seeds by elastic elements of the seedputting roller for surface of sowing disk in funnel seed pipe was investigated. As a result of theoretical researches the analytical expression establishing functional dependence of angular speed of rotation of the sowing disk from constructive and technological parameters at which steady transportation of seed material from the bunker to the seedputting roller and the differential equation, movement of seed material particle by screw surface of the seedputting roller by sowing disk in funnel seed pipe was investigated. As a result of theoretical researches the analytical expression establishing functional dependence of angular speed of rotation of the sowing disk from constructive and technological parameters at which steady transportation of seed material from the bunker to the seedputting roller and the differential equation, movement of seed material particle by screw surface of the seedputting roller for sowing disk in funnel seed pipe will be provided was received.

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ONIONS TOPS REMOVING PROCESS MODELING BY HAULM REMOVING MACHINE OPERATING ELEMENT

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Keywords: haulm removing, machine, leaf and stalk, mass, haulm, onion.

The purpose of research – to prove the optimum parameters of vegetable onions tops removal process by operating element of the haulm removing machine in vitro. To resolve this problem, remove the weed to the cleaning of design and manufactured model of the haulm removing machine leaf-and-stalk mass removal devices before cleaning, laboratory studies which were conducted for the soil. For mathematical model of the process of removing the tops of onions, which takes into account the combined effect of the factors on the effective work of the cutter error is, and determine the optimal combinations of parameters, was used to plan the multifactorial experiment. In the study of the process of removing the tops of onions identified factors that influence the work process. Originally there were 12 more than that characterized design and operating parameters of a working body cutter error is, technological conditions of the process, as well as the physical and mechanical properties of onions. Experimental data processing started with their graphic representation on the original diagram. The degree of influence of factors was estimated by the difference in the median values of the pilot data of the upper and lower levels of the factors and the number of available points. On these soils was been allocated 4. When processing the results of the screening experiment got

Bibliography


RESULTS OF HERBS SEEDS PHYSICOMECHANICAL PROPERTIES RESEARCHES

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Keywords: dispensing, meadow grass, device, arch, flowability, seeding.

The research purpose is constructive and technological parameters optimization of disk dowel sowing device determination of physicomechanical properties of grass seeds. The self-propelled pneumatic mini-seeder equipped with the special sowing device for dispensing of hardly loose and coherent sowing materials is developed for crops of herbs in selection production, such as seeds of long-term herbs, in particular, seeds of meadow grass. The meadow grass thanks to climatic resistance and mechanical influences is applied as a part of the grass mixer majority fodder to formation of highly productive long-term pasturable grasses. However, meadow grass crops are difficult because of its seeds features. Quality of dosing and pneumotransporting systems of seeders significantly depends on the sizes and form of seeds. For constructive and technological parameters optimization of developed sowing device the physicomechanical properties of meadow grass seeds were investigated. Measurements results of longness, width and thickness of grain are given in article. The volume mass of bulk, and as average value of mass of 1000 seeds is determined. Researches of frictional properties of meadow grass seeds and grass mixer fodder which partly seeds of fescue meadow and red, meadow grass and ryegrass are conducted. The dynamic corner of natural slope, coefficient of flowability and collapse corner (static corner of a natural slope) are defined. Charts of tension in loose bodies on which average values of corners and coefficients of meadow grass seeds friction and grass mixer seeds fodder are established. The data obtained during laboratory researches on dimensional and mass characteristics and frictional properties of meadow grass seeds will be considered at the mathematical description of dispensing and of process constructive and technological parameters of the sowing device during laboratory researches of process.

Bibliography
SOIL CONSERVATION AGRICULTURAL TECHNOLOGY AND EQUIPMENT FOR CROP CULTIVATION

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Keywords: technologies, equipment, soil defense, stubble, moisture savings, drought.

The purpose of researches is proving analytical indicator of soil-protective technologies efficiency by stubble soil shelter and to develop technical means for the Strip-Till technology. In the article the soil-protective technologies of crops cultivation with use of stubble and the vegetable remains for solar radiation reflection and an overheat of the soil, reduction of unproductive loss of moisture are considered. For an assessment of soil-protective efficiency the coefficient of shelter Ku on the stubble surface and the vegetable remains is entered: by full shelter at least in one layer of Ku=1, in the presence of Ku's separate open sites 1, by surface shelter the vegetable remains in Ku's some layers 1. Repeating abnormal years for climatic manifestations (drought, lack of soil moisture, etc.) demand continuous improvement cultivation of the crops technologies reducing negative adverse weather circumstances. For effective use of the Strip-Till technology which is development for the No-Till technology, the adapter to all designs of grain harvesters – the simple design which isn't changing the basic device of harvester, and the adapter to crushing of straw and its scattering seeder is developed and tested for educated strips, for the soil and crops protection against an overheat and unproductive losses of moisture.

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EFFICIENCY AND OPERATIONAL RELIABILITY OF FARM MACHINERY

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IMPROVING METHODS JUSTIFICATION AND PERFORMANCE CRITERIA EVALUATION OF TRACTORS HYDRAULIC SYSTEMS

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Keywords: criterion, operability, hydraulic system, filtering, wear, resource.

The aim of the article is tractors hydraulic system methodological justification of improving and performance criteria evaluation ways. Based on the goal of the study the following task was identified– to justify the methodological stages of the research criteria for assessing all system the main elements efficiency; to assess the efficiency of modernization of the tractor hydraulic system using centrifugal cleaner and alternative working herbal based liquid. The structure of hydraulic system was substantiated in the form of basic elements: the hydraulic fluid with bifunctional role of lubricant and hydraulic fluid, pumping, regulatory, power and connector elements. Additive component hydraulic efficiency and method of its determination was proposed. Analysis of the hydraulic system and a methodology to assess their performance elements are resented. The methodical questions of plant-mineral mixture as the working fluid use are considered, improving its filtering and improving hydraulic tightness. The rational alternative composition of the working fluid, the technological dimensions and modes of operation of the centrifugal fluid cleaner were defined. The analysis of the process of centrifugal cleaning hydraulic fluid to determine the basic structural and technological parameters on the basis of the finite element method made it possible to calculate the rational size of centrifuge rotor (diameter D=148 mm, height H=137mm). Taking into account the characteristic size of abrasive particles entering the working fluid, and the structure of ultradispersed additives was improved the tribological properties of plant-mineral mixtures. Annual economic effect of hydraulic modernization can be up to 7.0 thousand rubles per tractor MTZ-82 type.

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LEAKTIGHTNESS INFLUENCE FOR RESORT DETERMINATIVE PARTS' WEARING IN TRANSMISSIONS OF TRANSPORT AND ENGINEERING MACHINERY

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Keywords: reliability, operability, leaktightness, tribological system, abrasive.

Methods of machines' transmissions leaktightness improving by using efficient seals and leaktightness canceller, assuring decrease of abrasive wear rate are shown in this article. The purpose of the study – decreasing the rate of parts' abrasive wear and augmenting working life of transmission oil by the method and the transmission’s air exchange mode with environment. The interactions of main tribological characteristics are augmented and the measures aiming to decrease abrasive wear rate are proposed. The ways of improving transmission leaktightness are shown in this article. The features of leaktightness canceller for transmissions of main agricultural tractors are defined. Efficient capacities of leaktightness canceller for tractors are: for MTZ-80 – 22.4∙10^{-3} m^3, for T-4A – 20.9·10^{-3} m^3, for DT-75M – 18.6·10^{-3} m^3, for K-701 – 17.1·10^{-3} m^3, for T-150 – 15.2·10^{-3} m^3. Bench and field tests of T-4A tractor's transmission revealed that using leaktightness canceller enables to increase transmission oil working life by 1.4-1.7 times and to decrease parts' abrasive wear rate by 7-9% as compared with basic transmission. Using the centralized lubrication system with centrifugal purification assures of parts wear rate by 1.5-1.8 times and augmentation working life of transmission oil by 2-3 times as compared with oil bath lubrication are decreased. Effective measures of improving transmissions lubrication mode are increasing leaktightness of unit by mounting efficient seals, cups, tightenings, gaskets and using leaktightness canceller. Combination and qualitative implementation of these measures and taking account of structural features and working conditions are proved to be efficient.

Bibliography


DEVELOPING AND RESEARCH OF ANTIFRICTIONAL AND NON-WEAR DISK-LIKE MESOGENE ADDITIVES FOR PLASTIC GREASINGS OF MACHINES AND EQUIPMENT

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Keywords: carboxylates, wear, lubricant, friction, additive, mesophase.

The research objective – the indications tribological serial plastic lubricant on the basis of lithium improvement, used in knots of friction of agricultural machines. This work is devoted to the results of experimental researches antifrictional and non-wear properties plastic greasing with liquid crystal additives – carboxylates of copper, forming in mesophase the column form over molecular structures. The choice of additives for researches is caused by the sizes of their molecules. Synthesis of additives was carried out by various methods (fusion and mechanical activation method in crasher of shock-reflective type). Tribological researches have been executed by friction machine. Researches have shown that introduction as additives to greasings on the basis of lithium the investigated carboxylates of copper allows to lower friction coefficient in 1.5-3.45 times that as a whole allows to reduce losses from friction in tribological connection. Wear of friction pairs elements decreases in 1.4-4.8 times, that allows to increase further the resource of details friction pairs of agricultural machines and the equipment. Tribological characteristics Improvement is connected with the fact that at transition in amorphous condition the given connections collected in hexagonal domains, are occupy certain position concerning the friction surface, having thus lowered durability at shift deformation. It is revealed that for investigated carboxylates of copper at their additive in lubricant on the basis of lithium is obviously observed dependence on concentration of an additive in a range from 1 to 20 weights %: if above its concentration it is more decrease in coefficient of friction and wear. The received results show perspectivity copper carboxylates at use as antifrictional and non-wear additives to plastic lubricant on the basis of lithium.

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ASSESSMENT OF FRICTIONAL DISKS MODE INFLUENCE FOR THE FRICTION CLUTCHES RESOURCE

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Keywords: wear, friction clutch, vodorozhivaniye, lubricant, disks, transmission.

The research purpose –the friction clutches resource increase of transmissions couplings with hydraulic management improvement of frictional disks mode by combination of friction disks surfaces modification and the tribology properties of mineral and vegetable lubricant composition. Influence of frictional disks mode for the friction clutches resource of couplings was estimated: by means of the additive criterion characterizing complex influence of friction surfaces quality and the lubricant environment and indicators, estimating influence of positive gradient of hardness of friction surface when using mineral and vegetable lubricant composition. For improvement of frictional disks mode the friction clutches of couplings modification of friction disks surfaces by means of FABO in combination with application of mineral and vegetable lubricant composition (50% of M-10G: + 50% rape oil) is offered. The presented results of researches and their analysis testify that realization of considered constructive actions for modification of friction surfaces in combination with rational structure of the mineral and vegetable lubricant composition, friction of frictional disks improving mode without any additional changes of mechanical transmission with hydraulic management, will allow to raise the friction clutches resource of couplings by 1,7 times.
THE BASIS OF TRACTORS’ TRACK ROLLERS EFFICIENT LUBRICATION MODE

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Keywords: resource, roller, mode, friction, wear.

This article deals with the research results of uprated tractors’ track rollers lubrication system. The purpose of the study is increasing bearing resource of tractors’ track rollers by developing lubrication system using rape-mineral lubrication composition and improving lubrication mode. Efficient compound of plastic lubrication composition, including rape oil, additives A-22 and T-43, grease «Litol-24» and lithium stearate is grounded. On the basis of theoretical research, there defined the ratings of auger device for tractor DТ-75М track rollers (external diameter – 93 mm, helix lead – 13 mm) that provide circulation feed of grease in friction areas. As a result of uprate of tractors’ track rollers lubrication system it was succeeded to reduce the content of iron in lubricant by 14,3%, the wear-and-tear of bearings’ outer races by 23,3%, the rate of endplay by 16%, the wear-and-tear of bearings’ friction areas. As a result of uprate of tractors’ track rollers lubrication system it was succeeded to reduce the content of iron in lubricant by 14,3%, the wear-and-tear of bearings’ outer races by 23,3%, the rate of endplay by 16%, the wear-and-tear of bearings’ friction areas. As a result of uprate of tractors’ track rollers lubrication system it was succeeded to reduce the content of iron in lubricant by 14,3%, the wear-and-tear of bearings’ outer races by 23,3%, the rate of endplay by 16%, the wear-and-tear of bearings’ friction areas. As a result of uprate of tractors’ track rollers lubrication system it was succeeded to reduce the content of iron in lubricant by 14,3%, the wear-and-tear of bearings’ outer races by 23,3%, the rate of endplay by 16%, the wear-and-tear of bearings’ friction areas.

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THE DIAGNOSTICS SYSTEM OF TRACTOR DIESEL AIR SUPPLY

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Keywords: engine, system, air supplying, turbocompressor, diagnosing.

The article considers the possibility of carrying out operations system diagnostics of gas turbine pressurization of diesel internal combustion engines, which are based on the principles of system parameters of gas-turbine supercharging and operating parameters of internal combustion engine mobile energy tool. The aim of the study was determined as improvement of methods and means of air supply system engines diagnosis of mobile agricultural machinery. On the objectives basis the study was defined the following tasks: to study the conditions of air supply system of automobile and tractor diesel engines; to define settings that are appropriate as diagnostic tool in assessing the technical condition of the gas-turbine system supercharging in operating conditions; to develop diagnostic tools for the indiscriminate assessment of the gas-turbine systems technical condition supercharging engines mobile power tools for fixed and operational conditions. One of the directions in solution of the effective use problem of agricultural machinery mobile is its maintenance in operating state due to timely carrying out diagnostic actions. The most labor-consuming and knowledge-intensive still have process of diagnosing of the internal combustion engines (ICE) mobile power means. Malfunctions of the engine conduct to decline in production, deterioration of profitability and environmental friendliness of the machine and tractor unit (MTU). During studying of working conditions systems of mobile agricultural machinery engines pressurization are installed the emergence reasons in operation of turbocompressors (TKR) refusals and engine. The carried-out analysis of existing methods and diagnostic devices of autotractor diesels airgiving systems allowed to define ways of their improvement due to optimization of layout decisions and development of the software. Information integrating complex (IIC) with providing program, allowing to diagnose pressurization system on input and output parameters, to define efficiency engine pressurization system, to display results in the form of analytical and graphic information is developed.

Bibliography
RESEARCH OF TRIBOLOGICAL MINERAL AND VEGETABLE LUBRICATING COMPOSITIONS PROPERTIES

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Keywords: wear, friction clutch, greasing, disks, tribology, transmission.

The research purpose is improvement of rapeseed oil as a lubricant composition alternative to use of mineral oil for mechanical transmissions with hydraulic control tractors «Kirovets». Tribological properties of the mineral and vegetable lubricating compositions were evaluated by a number of indicators which together describe the efficiency of its application in gearboxes driveline high horsepower tractor «Kirovets» production company CCS «Petersburg tractor plant». Efficiency of mineral and vegetable lubricating compositions application were evaluated in such parameters as: the wear of the friction surface during studies; assessment of kinematic viscosity, temperature of friction. It is established that kinematic viscosity at 100°C explored mineral and vegetable lubricating compositions with concentration of rapeseed oil from 0 to 100% by volume meet required to mineral oils requirements, and is within 8.0-10.5 cSt and their use allows to reduce the wear of the friction surfaces and attributable to their thermodynamic load. As a result, the analysis of the obtained data, rational recognized mineral and vegetable oil composition with the following composition: 50% mineral oil M-10G + 50% rapeseed oil. The application of this lubricant composition, possessing the best tribological properties, alternatively, mineral oil M-10G will reduce thermodynamic load and wear of the friction surfaces of structural elements (friction discs), determine the resource gears with hydraulic control tractors «Kirovets».

Bibliography

THE MAIN DIRECTIONS OF DIESEL CYLINDERS HEAD DECREASE IN THE THERMAL DEFORMATIONS

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Keywords: thermal, tension, deformation, fatigue, crack.
The purpose of researches is decrease of diesel cylinders head in thermal deformations by definition of various factors influencing extent emergence and development. The general tension of cylinders block heads (HBC) is considered. Its main parts are defined and analysed. The major factor causing damage of the fire bottom of GBTs are the thermal tension reaching the maximum in intervalvate crossing points. Emergence of this tension is caused by action of high temperatures of fuel burning and their great unevenness of distribution on surface and thickness of the cylinders block head fire bottom. The difference of temperatures in zone intervalvate crossing points and the periphery of the bottom can reach considerable sizes. Is the reasons of these temperatures difference design features, heat conductivity of material and way of heated surfaces cooling. Existence of temperature detail differences will lead to unequal lengthenings of fire bottom various GBTs parts. These lengthenings (deformations) cause the thermal tension of compression corresponding to them. At low-cyclic thermal loading gradually there is a relaxation of thermal tension in the presence of already formed residual deformation. It will lead to emergence of tension of stretching. Tension of stretching is especially dangerous to gray cast iron of which the head of the block of cylinders is made. The side-altar of durability of this material on stretching several times is less, than on compression. With each thermocycle of tension of stretching will increase as gray cast iron possess small plasticity. Residual deformations will increase and finally will lead to emergence of thermostatic cracks. As a result of the conducted theoretical researches dependence of residual deformations on various factors defining durability of GBTs is received. On the basis of this dependence, probably to define the directions of further researches of decrease in thermal tension and residual deformations.

Bibliography
MACHINES IN SPECIALIZED TECHNOLOGIES OF AGRARIAN AND INDUSTRIAL COMPLEX

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JUSTIFICATION OF THE CABLE SCRAPER CONVEYOR PARAMETERS

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Keywords: conveyor, transportation, friable, materials, fodder, productivity.

The purpose of the study is the reduction of bulk livestock fodder energy transportation with the substantiation of cable scraper conveyor rational parameters. For movement and distribution of the concentrated forages in animal husbandry cable and scraper conveyors with cablewasher or chainwasher working body widely are used. Considering bigger traction ability of cable in comparison with the chain, the first working body has essential advantages. Wearing of washers and formation of material blocking belongs to shortcomings of the specified working bodies against moving washer. If the first defect can be eliminated only by corresponding materials use, decrease of contacting surfaces roughness, etc. (manufacturing techniques improvement), the second defect can be eliminated by washer design optimizing. For optimization of cable scraper conveyor working body design of continuous action with 50 mm internal diameter of experimental installation was used. The article provides the technique of performance and pipeline transporting feed energy ratio determining. The article gives the results of comparative experimental researches of conveyor with cable-collar and cable-bowl mechanism. The article shows the expressions describing the performance of conveyor and energy ratio transportation, depending on the working body design, step of scraper elements installation and the length of the loading area. The graphs describing two-dimensional surface response of device performance and energy transportation are provided. On the basis of the received results analysis the conveyor parameters are proved: the volume of the bowl 0.1-0.15 cm³, step installation of scraper elements (bowls) 0.1-0.15 m, the length of the loading area of 0.2 m and the speed of the body 0.6-0.8 m/s.

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MIXER WITH COMBINED WORKING BODIES TECHNOLOGICAL PARAMETERS OPTIMIZATION

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The purpose of the research is the substantiation of a continuous mixer with combined working body technological parameters at the lowest energy intensity of concentrated feed (fodder concentrates) and zootechnical requirements mixing respecting the quality of the prepared mixture. The research tasks are setting the functional relationship between technological parameters of preparing mixture and indicators compounding process; identifying optimal or rational values of the mixer technological parameters, which are observed when mixture is the desired quality and lower energy intensity of mixing. Increase of compound feeds economic efficiency using, consists in their cost and improvement of their quality decrease. Farm enterprises seek to use industrial fodder, mixing it with purchased BVD. However not all mixers are capable to prepare mixes of appropriate quality. Essential restriction for using of this or that mixer is its zone of working capacity on observance of zootechnical requirements to quality of mix hashing depending on share of control component as a part of mix according to the recipe. For mixing dry components mixers with bladed working bodies are most effective. Authors developed the mixer for compound feeds of continuous action with the combined working body. Such combined working body consists of loop-like blades and spiral conveyor. The given method results during experimental studies by continuous mixer for substantiation of its technological efficiency zone. Expressions describing the unevenness of the mixture, its energy consumption and stirring, depending on the device performance and controlling the proportion of the component are given. Two-dimensional sections of response surfaces are constructed. Based on graphs mixer parameter analysis s are justified: optimum performance about 8 t/h, the proportion of rational control component of the mixture – not less than 10%.

Bibliography

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OPTIMIZATION OF SPIRAL MIXER-PIPELINE CONSTRUCTIVE-TECHNOLOGICAL PARAMETERS

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The purpose of the study is reduction of mixing concentrated feed (fodder concentrates) energy, respecting the zootechnical requirements for quality of the mixture by using mixers-conveyors. The tasks of the study are to set the functional dependence between the structural and technological parameters of the mixer and process indicators to identify optimal or rational values of mixer parameters providing the required quality and the lowest power consumption of carburetion mixture. The description, constructive scheme and photo of continuous action mixer-conveyor with volute working body are given. The author describes the method and results of experimental studies of continuous action mixer-conveyor. The article deals with the expressions describing the unevenness of mixture and energy stirring consumption depending on the length of the mixing zone, the device performance and the proportion of the controlling component. There are constructed two-dimensional sections of the second order response surfaces. Mixer parameters are justified based on the analysis of mixture unevenness graphs and energy justified options mixer: optimal device performance is about 3.6 t/h; mixer-conveyor is able to prepare dry mix with share of the mixture component - not less than 13% and the length of the mixing zone – not less than 1 m.

Bibliography

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THEORETICAL THESIS OF ANIMAL INJURY PREVENTION

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Keywords: injuries, livestock, prevention, theoretical, thesis.
Results of traumatism prevention theoretical provisions researches are given in the animal husbandry, man-animal-car-technology-media systems based on the analysis. The purpose of researches is justification and development of preventive actions of multidimensional character. Research problems is developing the nomenclature of components striking factors pre called system and counteraction to opportunities of potential dangers realization of the specified factors in injuries and diseases of workers. Novelty of thesis problem and way of its decision are many-sided and quite real to what results of extensive scientific researches of St. Petersburg GAU sciences testify labor protection school. The attention, as to striking factor taking into account its functions in system is paid to each of system components. The need prevention attention to potential danger inherent realization in factors in the kinetic energy promoting under certain conditions traumatizing of the working is paid. Methods of researches were based on man-animal-car-technology-media system studying in the conditions of real livestock complex of dairy herd for 1125 heads.

Bibliography


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RESULTS OF SECURITY, ITS DEVELOPMENT AND PREVENTION DYNAMICS FOR FREIGHT TRANSPORT WAYS

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Keywords: security, status, dynamics, development of prevention, cargo, transport.

The article presents information for the security situation and the dynamics of its development of goods transportation, issues of quantitative data, the picture given in the dynamics of data in relation to the country, the Volga Federal District and the Samara Region. The comparative dynamics of the passengers carriage by public buses. The dynamics of roads length is shown. Information and analysis for accidents dynamics is provided when using road transport on the dynamics of fatalities number and injuries resulting from accidents when using road transport, the dynamics for the traffic violations, their consequences and punishment of those responsible. The comparative dynamics of road accidents the number and fatalities in their country, the Volga Federal District and the Samara Region data is investigated. Attention is drawn to the develop effective prevention needs, appropriate situations. Reasons, the circumstances, the accidents in transport sources and consequences, different great diversity is substantiated. Range of preventive measures and the selection of the most efficient in the implementation of this requirement is substantiated. Novelty of thesis problem and way of its decision are many-sided and quite real to what results of extensive scientific researches of St. Petersburg GAU sciences testify labor protection school. The attention, as to striking factor taking into account its functions in system is paid to each of system components. The need prevention attention to potential danger inherent realization in factors in the kinetic energy promoting under certain conditions traumatizing of the working is paid. Methods of researches were based on man-animal-car-technology-media system studying in the conditions of real livestock complex of dairy herd for 1125 heads.

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DYNAMICS OF TRANSPORT INCIDENTS AND DEATH TOLL AND WOUNDED IN THEM

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Keywords: analysis, incident, dynamics, number, death.

The agro-industrial complex is characterized by large volume of transport transportations. The last are carried out by cars, tractors, autotractor trains. The considerable part of freights is transported by railway and water transport. Transportation of goods and air transport takes place. Unfortunately transportation by all means of transport is accompanied by various incidents as a result of which there can be victims. The purpose of researches is decrease in death toll and wounded in transport incidents. The comparative analysis of transport incidents dynamics with a rolling stock for goods transportation by various transport during 1994-2012 and death tolls and wounded is provided in them, and also comparative dynamics of transport incidents during 2000-2012 about the country both to Volga Federal District as a whole and to their subjects.

Bibliography