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MAIN DIRECTIONS OF SCIENTIFIC ACTIVITY AND SAFETY ENGINEERING ENVIRONMENT

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The effectiveness of scientific activity and safety engineering environment of the National University of Life and Environmental Sciences of Ukraine in recent years. Outlined promising areas of research, including the development of complex engineering ahrobiosystem the production and use of biofuels justify measures and security measures in agriculture.

Safety, energy, industrial hazards and hazards, engineering ahrobiosystem, occupational hazards, agriculture.

Problem. Given the substantial depletion of fossil fuels, biomass for the production of solid, liquid and gaseous fuels becomes important. Now the task of development of modern efficient means of production of biofuels in Ukraine the priority [1]. However, attention should be given to scholars measures prevention of emergencies due to fires and explosions, accidents, improvement of working conditions in technological processes and use of biofuels. You can use scientific research on general issues relating to the improvement of safety in agricultural production. In particular, can be applied probabilistic logic-simulation models onset emergencies during the operation of complex engineering systems [2]. In this context, the structural elements of the means of production of biofuels should play the role of technical security measures that reduce the likelihood of erroneous actions of the operator and pratseohoronni measures should be viewed as a warning system to manage the production process, where the crucial role has control of the safety and prevention of occupational injuries and disease [3]. Research in these areas was carried out employees of the Department of Labor and the National Environment Engineering

University of Life and Environmental Sciences of Ukraine in recent years. Determining these studies is to develop a risk-based approach to the introduction of new technologies in the field of agriculture.

Analysis of recent research. Analysis of scientific publications on research occupational hazards [4-7] gives reason to believe that the issue of occupational hazards agricultural machine now drawn attention both abroad and in our country. The problem of estimating occupational

hazards is complex and still not found a universal way to solve it. Actual developments is deepening the problems of assessment and risk management to implement practical mechanisms to reduce levels of occupational injuries and diseases [8]. Therefore, the methodology of assessment and risk management in manufacturing has become a central element of safety management.

Agricultural sector mainly uses energy produced from renewable resources. At the same time use about 30% of the biomass for energy purposes will allow agricultural producers to achieve energy independence. Complete Solutions Engineering ahrobiosystem the production and use of biofuels will partially or completely replace traditional energy sources. The use of complex technological and environmental activities "Clean production" to agricultural enterprises will help improve their competitiveness by reducing waste and emissions of harmful gases, saving production costs, etc. [9-12]. Efficiency pereroblyannya biomass in energy production is achieved only rational parameters of processes and machines for agriculture, which converts biosyrovyny.

Purpose Research. To analyze the effectiveness of scientific activity and safety engineering environment of the National University of Life and Environmental Sciences of Ukraine in recent years.

Results. In recent years, the department of labor and environmental engineering completed a number of research and development activities, the results of which were implemented (proposed for implementation) in agriculture Ukraine. Funding of this work by the Ministry of Agriculture and Food of Ukraine and executive directorate of the Social Insurance against accidents at work and occupational diseases Ukraine. Next, a brief description of the results of the research topics.

The study occupational (industrial) risks - one of the varieties of man-made risks, now has become particularly important. First of all, it is connected with the development of insurance mechanisms of compulsory state social insurance against industrial accidents and occupational diseases in the near future formation of occupational pension schemes, development of sectoral and regional programs for improving the safety and health.

Department researchers during 2010-2012. Classifier developed risk of injury to major professions in mechanized plant growing and livestock sectors of agricultural production. In a paper to the implementation of the recommended solution used agricultural mechanization and Scientific Expert Council of the Ministry of Agrarian Policy and Food of Ukraine (report of 18 December 2012 № 6), presented pratseohoronnu characteristic production of tractor-driver of

agricultural production. Shows the main hazards and methodology for calculating occupational risks for mechanized agriculture.

The influence of certain dangerous and harmful factors on the level of occupational risks obtained from the combination of expert assessments of risk calculation method for the method of "fault tree". The changes in the production risks of occurrence of the most dangerous accidents while performing basic mechanized processes in crop and livestock production (due to transfer of agricultural units nayizhdzhannya, collision, etc.) In the presence of certain hazards (lack of protective covers or other safety means, neglect staff safety standards, cracks in critical parts and components units, etc.). Calculations are performed according to the criteria of relative and absolute significance (importance) of basic events.

In recent years, the department developed a methodology and software bezavariynosti travmobezpechnosti mobile agricultural machinery on the basis of assessment of operational risk in the presence of defective parts. The methodology was the thesis that attsinennya risk operation of mobile agricultural machinery is useful information concerning the availability of parts and structures not only large cracks, but also those which at this stage are not on the immediate threat of sudden destruction detail specific host, but can spread to parts (design elements) to critical variables.

Value defectoscopic control significantly increases with the duration of stay of tractors, combines and self-propelled agricultural machines (CCM) operation, especially after 10-12 years. Quantitative data on the increase in the risk of accidents involving agricultural units, threatening the lives and health of workers, should be a warning to managers and executives of middle management-level agricultural enterprises, allowing operation technically faulty mobile technology. Guidelines for the maintenance and repair of mobile agricultural machinery necessary to make demands on the tool (using portable flaw) cracks dangerous proportions in parts and components, and visual inspection deemed inadequate.

To monitor the integrity of the parts and components and structural tractors and other agricultural machinery mobile suggested to use a computer system diagnostics of surface and sub-surface defects was developed by the Department and the Institute for Problems of Strength of the NAS of Ukraine [13]. The implementation of such a computer system diagnostics provides para. 4 State social programs for improving safety, health and environment in the years 2014-2018, approved by the Law of Ukraine on April 4, 2013 № 178-VII.

The system is based on the use of virtual Eddy current flaw detector that belongs to the control device defectoscopic second-

generation (Fig. 1). Its high-LC oscillator, where L is the sensor element flaw through conciliatory enabled device to the PC sound card, which serves as a virtual ADC and TsAP'a flaw.

Using LabView graphical programming environment created a program that allows you to process incoming signals to adjust the sensitivity of the sensor and adjust for controlled material. Powered negotiation product that operates from USB-port of a personal computer (PC) that allows to perform when using the laptop Eddy current control laboratory, factory and field conditions.

Application defectoscopic instead of the standard PC sound card device with appropriate software, ie virtual Eddy current analyzer defects:

– reduces technological and material costs for manufacturing flaw;

– allows to significantly increase the feasibility and metrological characteristics NDT nesutsilnosti material elements of metal;

– makes it possible to create digital images trischynopodibnyh parameters given vyokremivnosti defects, which is important for further documentation of the data for their analysis defectoscopic.

Fig. 1. General view of a computer system diagnostics trischynopodibnyh defects (virtual flaw).

According to the proposed registration method trischynopodibnyh defects in metal constructions using computer systems diagnosing sensor scanning system moved over the surface of the controlled object in the area of structural changes (the area of the crack), adding probing electromagnetic field in the subsurface layers of the vortex currents, which interact with trischynopodibnym defect changing the amplitude and phase parameters of the secondary field. After their conversion to analog comparator signal PC sound card identifies, records and processes

these signals as useful, informing about the location trischynopodibnyh defects forming a digital sensor signal codes for further analysis and reflection on the PC screen in logical, understandable form.

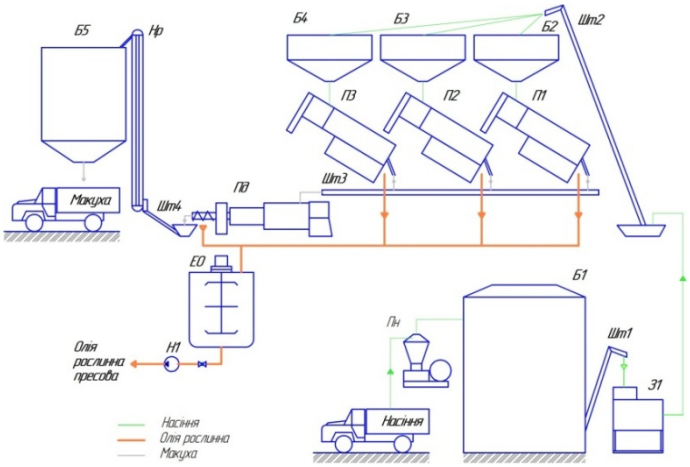
In order to implement scientific and technical potential of bioenergy directly by the department conducted research and made a number of scientific and technological developments, the results of which set the stage wide highly efficient use enerhokonversiyi in agricultural production and the energy sector of Ukraine.

Developed Project of biodiesel production from 300 to 10,000 tons / year. By completing the following lines of modular technology of "cold" method of pressing oil can be effectively used in the production of 30,000 tons / year biodiesel. On a more powerful (industrial) oil-producing plants for production schedules oil-extraction plants. Together with domestic engineering plants, in particular of "TAN" (c. Chernigov) Appropriate equipment production lines (purification of biodiesel to European standards).

Put into operation a plant for the production of biodiesel educational and scientific purpose in NUBiP of Ukraine "agronomic research station." The structure of this company has three production lines: production of oil LVRO-ECO-BIO; preparation of oil to the esterification LPRO-ECO-BIO; biodiesel production LVDB-ECO-BIO (Fig. 2). Hardware Factory has successfully passed the state acceptance trials in UkrNDIPVT them. L.Pohoriloho and put on production at domestic enterprises. Quality biodiesel output line LVDB-ECO-BIO meets current SOU 24.14-37-561: 2007 and ISO 6081, entered into force on 1.03.2010 p.

Along with domestic engineering plants developed production and use of solid biofuels (wood pellets and briquettes). Now the NUBiP of Ukraine "agronomic research station", a project biosyrovyny granulation plant capacity of 300 kg / h. (Fig. 3). Buildings University equip boilers and boiler with a biomass.

Completed design work on creating a new generation of biogas plant to produce biogas and organic fertilizer because of the multi-substrate fermentation, which was developed in cooperation with Austrian colleagues BOKU University and companies BauerTech and Heat Bioenergy. 3500 m3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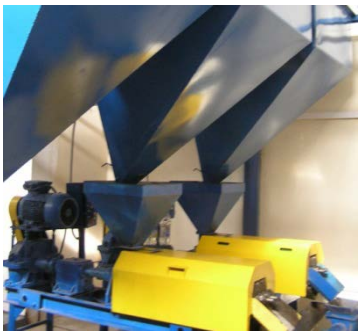

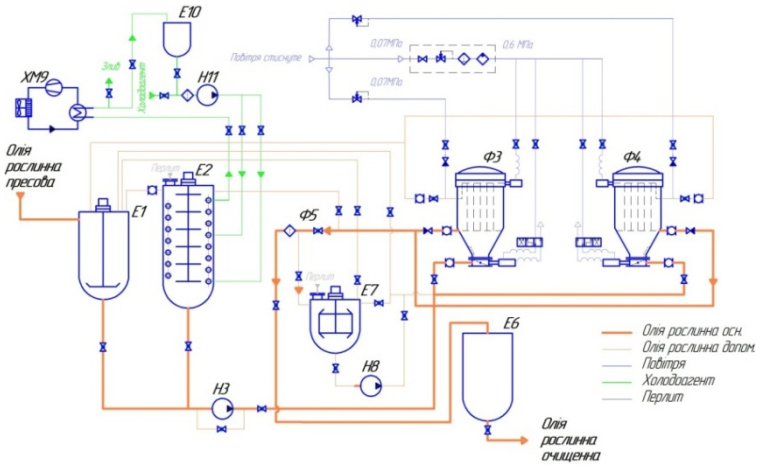
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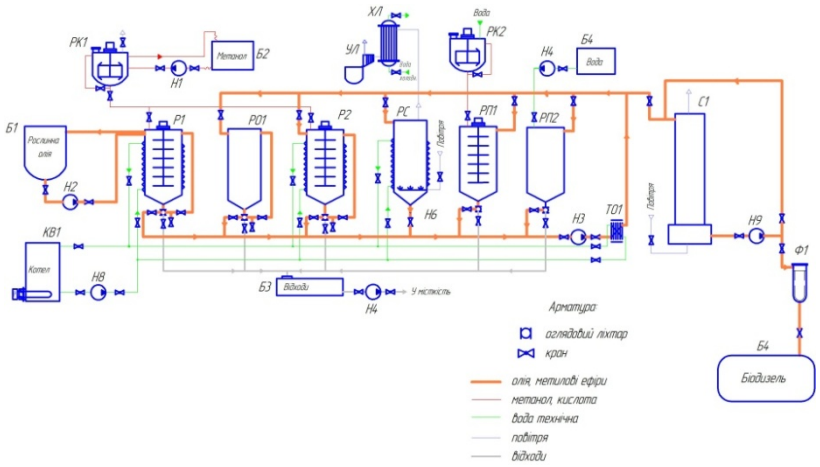
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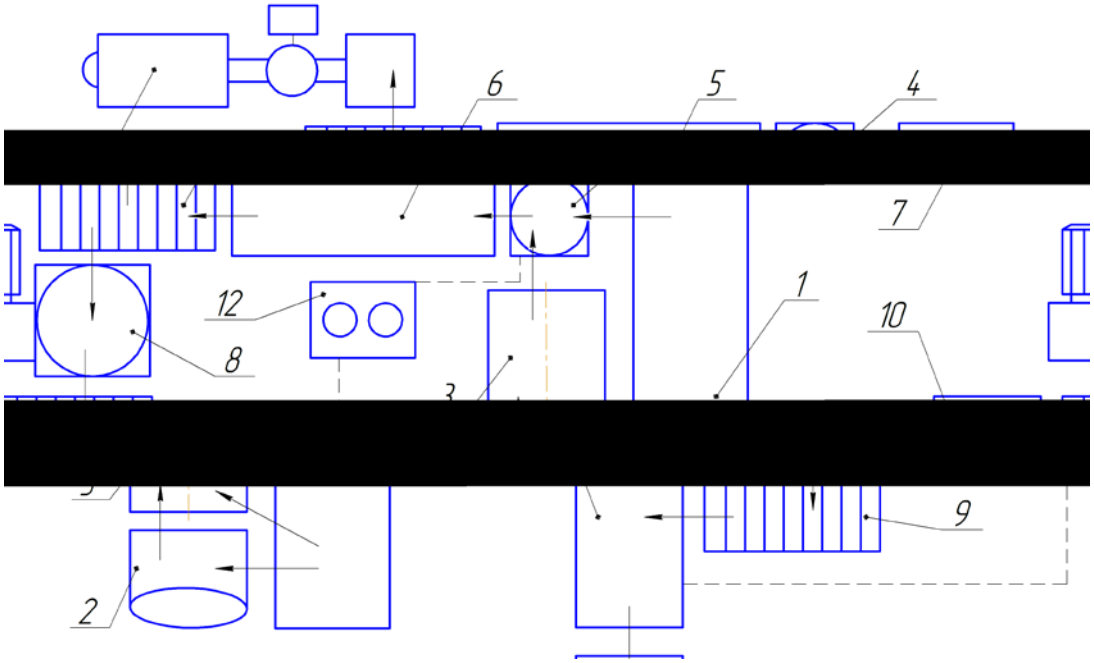

Fig. 3. granulation plant flowsheet biosyrovyny 1 - biosyrovyny platform; 2 - straw bale shredder; 3 - aerodynamic drier biomass; 4 - Biomass; 5 - storage hopper; 6 - transporter of raw materials; 7 - mini-biomass pelleting line ECO BIO 100; 8 - Biomass Pellet-PH200; 9 - carrier granules; 10 - separator; 11 - finished product platform with weights; 12 - dust collection system.

Commissioned by the Ministry of Agriculture and Food Ukraine has developed a package of regulatory documents to ensure the quality and safety of biofuel production from biomass of agricultural origin in accordance with EU requirements (ISO 19, 2 JMA 6 TU). In 2012 under the orders of the State Agency for Energy Saving of Ukraine is drafted ISO "gaseous fuel. Biogas. Methods of sampling "and the ISO" Diesel fuel mixtures. Technical requirements and methods of control "that Blended apply to diesel fuel,which is obtained from diesel fuel and methyl esters of fatty acids, esters of volume fraction of 30% to 50% and used as fuel for it in adapted diesel engines.

Production of biogas, biodiesel and solid types of biofuels from plant material advisable to coordinate with relevant technological and environmental measures in the framework of the strategy CP (cleaner production), proclaimed by UNIDO. By using these approaches achieved constant increase efficiency and reduce their impact on the environment protection. This concept is used for the pilot project with UNIDO "cleaner production" in the field of bioenergy based NUBiP of Ukraine "agronomic research station."

The department initiated research to establish the causes of fires and explosions on the production of fuel pellets and the development of

preventive measures and means. Established that explosions and fires technological equipment causing dust and hot pressed wood particles moving inside arteries production of fuel pellets.

Is dangerous disruption furnace to obtain products of incomplete combustion (gas generator) that after filling system could ignite in the presence of sparks. Especially dangerous is hot particles with a temperature over 470 o and more than 40 MJ of energy that can be sources of ignition. Sometimes it can even share without bright luminosity ("dark" particles).

To identify these sparks of highways set detectors operating in the infrared region (Fig. 4). The detector sensors is based on sulfite lead. Their advantage on silicon photodetectors that react to light from the sparks are insensitivity to daylight. That implementation of comprehensive fire prevention solutions for the production of fuel pellets should provide timely detection of sparks, effective suppression and control system of the security situation.

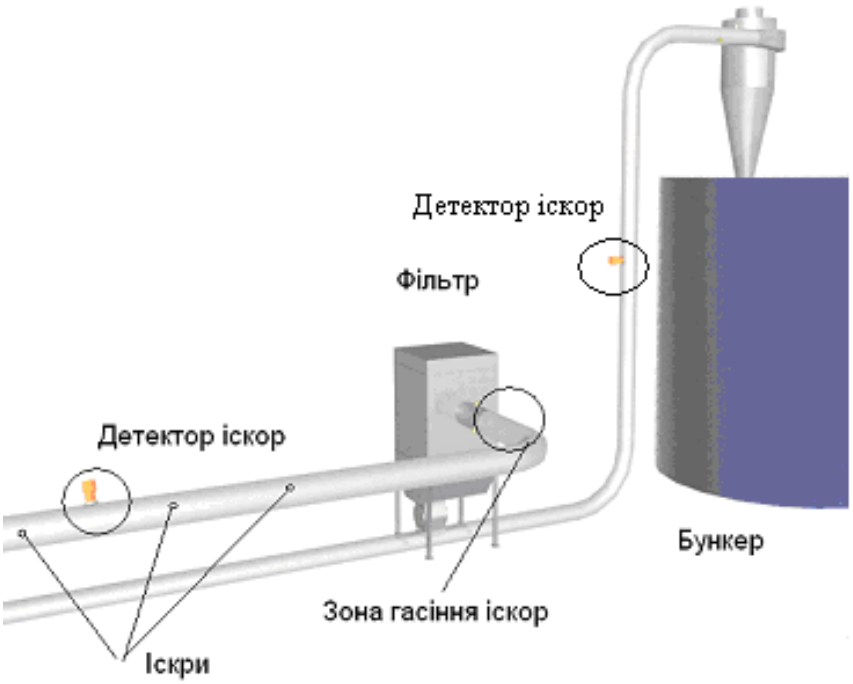

Fig. 4. Scheme detection and extinguishing sparks in the production of pellets.

Conclusions

Areas of scientific activity and safety engineering environment is relevant, reflecting the range of prospective problems in production and use of biofuels in the field of labor. Research findings are implemented in agricultural production in the form of recommendations, as well as a structural design for basic needs of agricultural sector.

Perspective is initiated at the Department of scientific research in the field of solid biofuel production, providing developing measures to prevent fires and explosions in the production of fuel pellets.

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Proanalyzyrovana Efficiency nauchnoy activities for Recent Years ohranы the department of labor and environment ynzheneryy National University byoresursov of nature and Ukraine. Ochercheno perspektyvnыe nauchnыh direction of research, in particular kasayuschyesya development kompleksnыh ynzhenernыh ahrobyosystem in production and in Using byotoplyv, justification meropryyatyy funds and security in selskohozyaystvennom production.

Safety of labor, byotoplyvo, proizvodstvenny'j hazards and hazard, ynzheneryya ahrobyosystem, professyonalnыe risk, selskoe economy.

The effectiveness of science activities of the Department of labor protection and environmental engineering in National University of Life and Environmental Sciences of Ukraine in recent years is analyzed. Promising research areas, including the development of complex engineering agrobiosystem for production and usage of biofuels, the substantiation of agricultural production safety applications and tools are defined.

Labor safety, biofuel, production dangers and hazards, agrobiosystem engineering, occupational risks, agriculture