

**OVERVIEW OF INDIVIDUAL RESEARCH
OF AGRICULTURAL PRODUCTION DEVELOPMENT
POLISK REGION OF UKRAINE**

PNU

*An overview of some works of young scientists
of Polissya National University is presented*

**1. Development of the design of the modernized bucket of the scraper
"Hitachi-ZW310" for loading of fodder beets**

Birsky Alexander Ruslanovich

It is most expedient to store root crops near livestock farms in burrows, trenches or special storages. The roots are laid for temporary and long-term storage. Those that are planned to be used until January are stored in ground piles covered with straw. If a sharp cooling is expected, they are also covered with a layer of peat, sawdust or other bulk materials that do not complicate opening.

The roots are well preserved dry, unfrozen and not affected by disease roots. The length of the sides, their size depends on the daily need for roots. At low temperatures, it is desirable to select the entire collar in one day to prevent losses from freezing. For long-term storage, the roots are laid in deep pits or burts, as well as capital storage. In the conditions of Ukraine the common way of storage of root crops is kagatatsiya.

Kagati should be placed in high dry places - from north to south. Kagatu base width - 2.5–3 m, height - 1.2–1.5 m, length - 30–50 m. For ventilation equipment, a groove 30–40 cm deep and wide is made along the kagat and covered with a lattice. Every four to five meters, vertical ventilation pipes should be installed with the level of kagat exceeded by 10–15 cm. Root kagats should be covered with 30–40 cm thick straw and a layer of earth (15–20 cm) should be poured. Before the onset of frost, based on specific economic and weather conditions, kagati should be additionally covered with earth, peat or dry manure. Keep the temperature in the kagats at 1 ... 3 ° C. It should be measured once a week by lowering the thermometer into the ventilation pipes. If the temperature is high, the pipes should be opened, in case of cooling they are covered with straw

Kagats in areas with severe frosts deepen. They also store roots dried during harvesting. Under such conditions, the trench is moistened in advance and only then loaded. Initially, the kagats cover a layer (20-30 cm) of earth, and with

cooling - and straw (15-20 cm) and earth. If necessary, the thickness of the soil layer can be increased. On the ridge, the layer of earth should be twice as thin. Ventilation of the kagats is lower, along their entire length, and vertical exhaust chimneys are installed every 3-5 m. Before severe frosts they are covered with straw. Thermometers are inserted into the hearths or in the middle of the kagat to systematically monitor the temperature. Optimal conditions for storage of root crops at a temperature of 0-2 ° C.

Storage in warehouses is more economically advantageous due to mechanization of loading, cleaning, grinding and selection, regulation of temperature, humidity. Loss of nutrients is insignificant. The storage with a capacity of 2000 tons is served by the unloader TZK-30 with the sorter TPK-30 and the system of conveyors STX-30 or THB-20, it is equipped with lines for sorting, washing and grinding of root crops.

An important element in the feeding chain is the regular unloading of beets from kagats and storages with the least loss of quality of beets. To do this, standard loaders such as the scraper "Hitachi-ZW310" must be upgraded. Modernization means a change in the design of the bucket, which will reduce the physical loss of roots.

2. Substantiation of landscape parameters and development of structural and topological organization of sanitary protection zone of PSP "Zirka" of Yemilchyn district of Zhytomyr region

Voynalovich Vladimir Antonovich

Industrial, agricultural and other facilities that are sources of environmental pollution by chemical, physical and biological factors, when it is impossible to create waste-free technologies, should be separated from residential buildings by sanitary protection zones.

Sanitary protection zones for livestock and poultry agricultural enterprises are established in accordance with the State sanitary rules of planning and construction of settlements, approved by the order of the Ministry of Health of Ukraine of June 19, 1996 №173, State building codes of Ukraine 360-92 * "Urban planning . Planning and Development of Urban and Rural Settlements "and State

Construction Norms of Ukraine B.2.4-3-95“ General Plans of Agricultural Enterprises ”.

Livestock enterprises are understood as animal and breeding farms of cattle, pig farms and pig farms, sheep farms, rabbit and animal farms, horse farms, etc. Poultry enterprises include commodity and breeding poultry farms and poultry farms, enterprises for the production of eggs and poultry meat, enterprises for the cultivation of hybrid poultry for commercial farms and hatcheries for the production of young poultry, etc.

Placement of agricultural enterprises is not allowed: in the first and second zones of sanitary protection of resorts; on lands of green zones of cities, including lands of urban forests; - on land plots contaminated with organic and radioactive substances before the expiration of the term established by the sanitary-epidemiological and veterinary services; on the lands of reserves, sanctuaries; in the protection zones of historical and cultural monuments in the settlement zone of settlements.

The size of sanitary protection zones (SPZ) from agricultural enterprises to housing and similar facilities should be taken according to Table 1. The size of the sanitary protection zone for different livestock farms is set directly from the boundary of the territory in which the buildings and facilities for keeping animals.

The specified size of sanitary protection zones can be tripled if agricultural production complexes, as well as individual enterprises are located in relation to housing, children's and medical institutions, as well as in the absence or insufficient treatment of harmful emissions into the atmosphere, in the presence of unfavorable conditions for scattering of harmful substances in the air and adverse aerological conditions in the area of future construction. The size of sanitary protection zones may also be reduced or tripled on the basis of laboratory studies of pollutants, provided that they do not exceed the established maximum permissible concentrations and the relevant justifications. The territory of the sanitary protection zone should not be considered as a reserve for the expansion of enterprises, residential area and similar facilities.

3. Landscape substantiation and development of territorial planning of the sanitary protection zone of LLC "ECOMYASO POLISSYA" of Zhytomyr district of Zhytomyr region

Dubinsky Alexander Alexandrovich

One of the dangers to the environment is the release of pollutants into the atmosphere, the sources of which are the chimneys of the smoking chambers of the sausage shop, the boiler room pipe.

From the conditions of the projected activity on the absence of excessive emissions, discharges of production activities, possible serious emergencies, the degree of environmental risk is defined as minimal.

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The main danger to the environment, first of all, is wastewater from the production of meat and sausage products, the most aggressive of all wastewater from the food industry.

Factors of negative impact on the environment are also:

- emissions of pollutants into the atmosphere from the smoking chambers of the meat and sausage shop and the boiler room pipe;
- production waste generated during the operation of the sausage shop and the head of the slaughterhouse.

On the territory of the slaughterhouse with a sausage shop and a refrigerator, a combined system of industrial and domestic sewerage is used. Domestic wastewater by gravity enters the external internal networks of industrial and domestic sewage and enters the existing treatment facilities.

The water used in the production process is contaminated with organic waste, fat, blood, pieces of animal tissue, bone fragments. In addition, significant amounts of table salt and nitrates enter wastewater.

In wastewater, all pollutants are mainly in the form of suspensions, emulsions, colloidal and molecular solutions. Each type of pollution is determined

from the organic and mineral parts. Wastewater is also characterized by a high content of chlorides and organic pollutants in soluble and insoluble state, their temperature varies from 12 to 27 °C depending on the season.

The facility uses equipment that has a low level of vibration, so industrial noise has no impact on the environment. But the location of the enterprise in the construction zone, when both vegetable gardens and houses with outbuildings enter the SPZ, requires some adjustment and arrangement of the sanitary protection zone.

4. Development of the design of the mobile storage module for storage of sugar beets

Zaets Alexey Alexandrovich

Trends in modern technology are aimed at increasing specific loads, reducing weight and size characteristics, expanding functionality, improving the reliability of products manufactured at modern enterprises. Thanks to the creation of high-strength fiber materials, it has become possible to apply new approaches to solving current issues of engineering design. The use of the physical properties of simple building materials such as water or air has opened up access to new projects using advances in physics, chemistry, mechanics and cybernetics. Such projects include the use of prestressed soft shells, including for building structures.

As a result of changes in voltage, overpressure and volume, such structures are able to withstand external force loads and other environmental factors, as well as perform mechanical work.

The operational properties of such structures depend on the type of working environment (the most available are air or water), the capabilities of the structural material, the shape of the shell, the overall dimensions. During operation, such shells are subjected to mechanical, physical, chemical and biological stress. They can be used for short-term or long-term external influences, in static, quasi-static or dynamic modes of influence, in conditions of concentrated or distributed load.

Such constructions are based on soft materials. Soft materials are those that have low flexural strength and are able to withstand only tensile loads. Such materials do not accept bending, torsion or compression.

The main structural element in such structures are elastic shells, which are filled with an elastic (working) environment, which under the influence of internal or external forces constantly and continuously seeks conditions of energy equilibrium or evenly stressed state.

Pneumatic structures can be used in almost any operating conditions. Areas of application of such structures are energy, transport, construction industry, mining, agriculture, rescue equipment, entertainment and recreation industry.

Depending on the operating conditions, elastic structures are divided into protective, load-bearing, power shells and soft drives. The degree of protection of such structures should increase as the accumulation of factors that affect them - mechanical, physical, chemical, biological and nature.

The working medium in pneumatic structures is designed to pre-tension the closed soft shell and give it the specified geometric shapes. Indicators and design features of pneumatic structures depend on the specific operating conditions, types of load, the nature of the work performed, working pressure, operating time or storage. The performance properties of these structures are selected at the design stage and depend on the materials used and methods of assembling the structure.

5. Substantiation of parameters of the pneumatic propulsion with an elastic cover for the floor vehicle in multi-span industrial greenhouses.

Kupriychuk Vladislav Sergeevich

In modern engineering, aviation, shipping, the task of motion is considered as a physical body that has resistance, and an engine that creates forces to overcome this resistance. Mankind is constantly faced with the problem of finding new sources of energy and increasing the efficiency of the sources used.

Highly efficient and high-potential (in terms of energy efficiency) modern sources (nuclear and thermal power plants, internal combustion engines) use fossil non-renewable resources, the number of which is constantly decreasing. Renewable sources (wind generators, solar panels, wave energy converters) have relatively low efficiency or low energy recovery potential.

Total low-potential energy - the energy of the environment (heat of the atmosphere, earth and water, the energy of electromagnetic waves) scattered

around us, is environmentally friendly and by today's standards inexhaustible or renewable. However, when it is used, there is a complex problem of energy transfer from low-potential sources to the consumer, or the problem of accumulation and storage of such energy.

Low-potential energy of the environment can be extracted by vortex, cavitation, oscillatory and wave and other processes. The medium and energy can be any: mechanical, thermal, electromagnetic, gravitational, gradient of known and as yet unknown physical fields.

One of the sources of low-potential energy is the gradient energy of the compressed medium (gas), which is in a closed elastic shell. The mobility and strength of soft elastic shells are used in a variety of elastic mechanisms and soft drives.

Depending on the type of use, soft drives are divided into:

- Propellers driven by wind;
- Drives that directly affect the air;
- Drives that directly affect water;
- Jet propulsion;
- Elastic muscle force transducers;
- Pneumatic movements that use the difference in shell tension;
- Elastic elements of mechanical converters.

According to the type of construction, soft drives are divided into shell constructions of closed and non-closed volume. Their common elements are elastic shells and fluid (gas, which is compressed or uncompressed liquid), as well as air flow or hydraulic pressure.

According to the layout and direction of the applied load, the engines are divided into:

- Gradually - vertical (lifting above or below the load);
- Horizontal (pushes or pushes);
- Rotating;
- More complex designs of mixed action.

Thus, in general, soft drives include elastic mechanisms that are controlled by a system of control and actuators.

6. Development of the design of a mobile hangar for technological maintenance of the rolling stock of the Rimbogdan fleet in the winter.

Yanchetsky Andrey Alexandrovich

The company "Rimbogdan" is a road carrier that deals with passenger traffic on urban routes and long-distance transportation, usually within the region. To ensure transportation, the company has a fleet of buses of various classes and sizes. With a large fleet of diesel suburban and city buses, the company is constantly faced with their launch and maintenance in the winter.

At negative ambient temperatures, starting the same engine creates great difficulties. These circumstances are due to the design of the internal combustion engine and the peculiarities of its working process, as well as significant changes in the physical properties of fuels, oils and materials used in the engine, under the influence of negative temperatures. The frequency of rotation of the engine crankshaft when starting in conditions of negative ambient temperatures is much lower than when starting in conditions of positive ambient temperatures.

At low speeds of the crankshaft of the vehicle engine sharply reduces the injection pressure of the injectors, which together with increasing the viscosity of the fuel, impairs its spraying and mixing, disrupts normal ignition conditions of the working mixture due to heat loss due to cylinder walls and insufficient compression. Each start of the engine of the vehicle at a negative temperature without preheating leads to a very intensive formation of wear of the main parts: cylinders, piston rings, crankshaft necks and others.

It is possible to consider that during amortization service life of the engine of the vehicle about 70% of wear of its details is caused by start of the cold engine. In the case of starting and running an unheated engine, especially under load. Cold air entering the cylinders (cools the fuel and oil and thus increases the intensity of resinous deposits, which significantly reduces the service life and often leads to the destruction of the main parts of the engine.

When the temperature difference between the outside air and the fuel in the tank of the vehicle, the moisture contained in the air settles in the form of frost on the fuel-free walls of the tank, which, getting into the fuel, causes a sharp increase in water content. In the conditions of winter operation of vehicles the working conditions of mechanisms and details of transmission and a suspension bracket also worsen. The heating of the oil in the transmission mechanisms during the

operation of cars in winter is often carried out due to the heat released from friction when working under load.

Starting a cold engine in addition to internal problems has an increased negative impact on the environment. An unheated engine does not burn fuel completely, the exhaust gases do not meet any requirements and have an increased content of all contaminants. This becomes especially dangerous in the presence of dense buildings and infrastructure around the enterprise.

In some cases, the engines do not start and need immediate maintenance or repair. Therefore, it is necessary to provide conditions as close as possible to the conditions of storage and repair in hangars. It is also important to ensure the timely readiness of vehicles for flights in winter, especially in the morning.

In this paper it is proposed to use for night storage, heating and repair special quickly built inflatable structures in the form of a garage or hangar. Thus, special structures can be used to reduce air pollution, heat storage or repair.