MACHINES AND TOOLS MEKHANIZATSII

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RESEARCH INSTITUTE OF ENGINEERING AND TECHNOLOGY - ANALYSIS OF DEVELOPMENT AND PROSPECTS

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Powered basic indicators of science, technology and innovation research institute of engineering and technology over the past decade.

Science, research, development, innovation, institute.

Problem. In Ukraine in recent years there is a situation where the majority of highly qualified scientists began working at universities, including moving from academic research institutions. At the same time, one of the directions of solving problems in the preparation of specialists is expanding to attract students to conduct research and perform experimental development. Creating the structure of educational and scientific technical institute research institute engineering and technology contributed significantly to attract researchers and students to carry out research and development work in innovative areas of productionand this work requires constant improvement, especially the introduction of innovative products .

Analysis of recent research. Research institute of engineering and technology was established by order of the rector № 281 from 29.06.2001 g. To conduct fundamental and applied research on topical issues creating techniques and technologies for agriculture and introduction of their results into production in close contact with the educational process; academic training through the postgraduate training, training of scientific and teaching staff, research staff appraisal; issue of scientific and industrial publications and others. In the years engineering and technology research institute led by Professor V. Dubrovin (2001-2005 gg.), V. Kozyrskyy (2005-2009 gg.), VS Loveykin (2009-2011 gg.). Since 2011 is the director of the Institute PhD, Professor GA Golub [1].

Analysis of the research institute of engineering and technology over the past decade is based on the statistical data of a scientific publication "Results of research and innovation activities of the National University of Life and Environmental Sciences of Ukraine" for 2002-2012 years. [2-12].

The purpose of research - To analyze the performance of the

Research Institute of engineering and technology in the last decade.

Results. Defining the work of the Institute is its theme and funding. During the same period, the number of executable topics tends to decrease (Fig. 1), while the average amount of funding per one thread increases (Fig. 2).

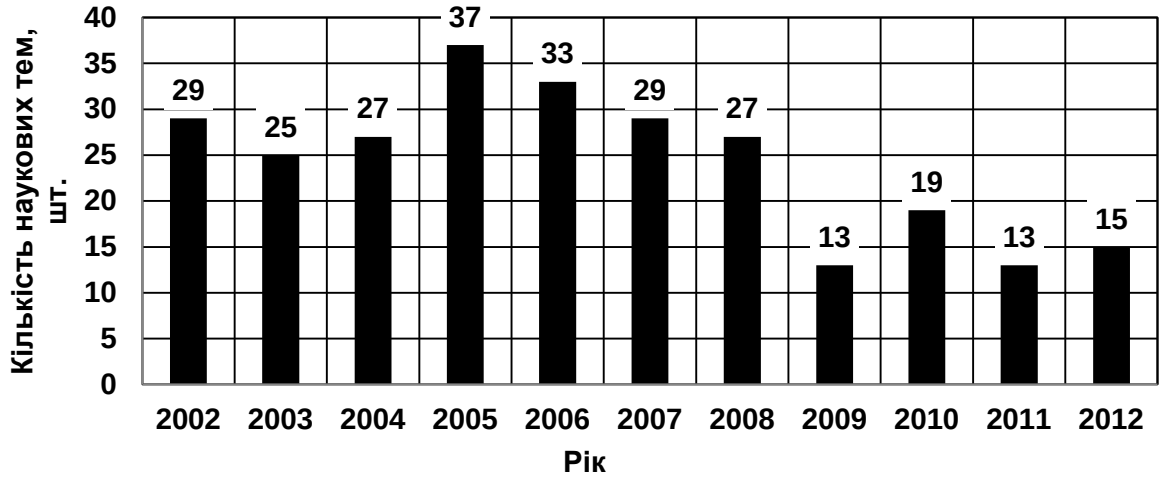

Fig. 1. The annual number of topics that were performed at the Institute.

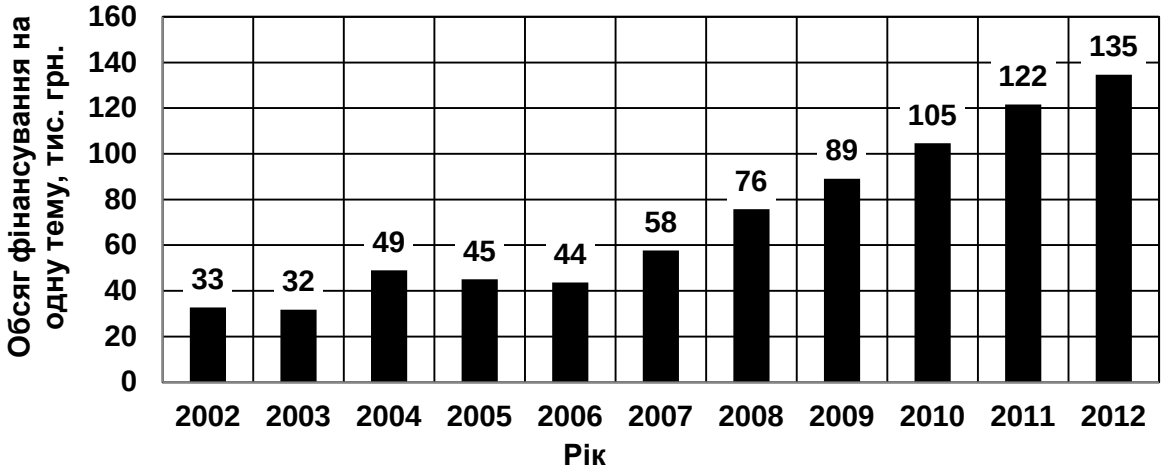

Fig. 2. The average amount of funding per one topic.

Currently, the average amount of funding per one thread is 135 thousand. USD. Achieve significant innovation results in these difficult levels of funding. For research activities with innovative direction requires implementation design development, participation in exhibitions, the introduction of high-tech research facilities in farms, etc. Resolving this issue is possible through the introduction of the institute of complex topics with bringing the average amount of funding per one topic to the value of 400 to 500 thousand. USD.

The amount of funding scientific research for years and cumulatively shown in Fig. 3 and Fig. 4.

Fig. 3. The amount of funding over the years.

Fig. 4. The amount of funding accrual basis.

Average annual funding of scientific research on the state budget in the Institute of Technology and Technology is 1.5 mln. USD., But in recent years, funding has stabilized at 2 million. USD. The average funding cost accounting topics ranges from 250 to 300 thousand. USD. Over the last decade, the Institute received total public funding on an accrual basis in the amount of 16.6 million. USD. For extrabudgetary funding, the figure is 3 million. USD. Thus, the proportion of extrabudgetary funding is 15% of the total financing institution, or about 20% of public funding.

Research Research Institute of engineering and technology in the last decade has focused on the development of resource-saving technologies and production, storage and processing of agricultural products, improve the reliability and efficiency of agricultural machinery, its modernization and improvement.

Under the guidance of professors DG Voytyuk and LV Aniskevycha at the department of agricultural machinery and systems engineering them. Academician PM Vasilenko, studies on optimization of mechanized technology and improvement of agricultural machines for precision farming system (TRS). There are technical means for monitoring parameters mistsevyznachenyh soil phytosanitary status fields and crop yields. Commissioned by the Ministry of Agrarian Policy and Food of Ukraine defined and reasonable design parameters calculated technological modes, power and traction and grip ultralight mobile power tools, studied the dynamics of motion, reasonable design parameters of process modules to it using statistical dynamics. Employees of the department developed spraying of crops with adjustable dispersion of droplets and air deposition system drops fluid, and spraying of crops with self-adjusting application rate, which took place in UkrNDIPVT them. L. Pogorelogo state testing. Spraying allow selection of spray nozzles for a given quality implementation process for the various process conditions. Institute scientists pay much attention to the study of history in agricultural engineering, agricultural engineering, philosophy of technology, the science and scientific heritage of Ukrainian scientists and engineers. Thus, under the direction of Professor DG Voytyuk analyzed the history of design plow investigated the activities of prominent scientists in the fields of agricultural mechanics, agricultural mechanization, agricultural machinery.

Department researchers agricultural machine-building led by Professor V. Dubrovin developed combined cultivator for cultivation of energy crops sown. By order of "Kamenetz-Podilsksilmash" developed combined plow plowing General purpose syderalnyh cultures. Organized mizhinstytutsku educational, scientific and industrial laboratories saving technologies and alternative energy equipment for the production of biogas, environmentally friendly fertilizers, different types of hydroponic vegetable production. Developed the experimental biogas plant for biogas and liquid organic fertilizers. The technology options and research facilities for processing oilseeds for technical oil to produce liquid biofuels. The research results are implemented NUBiP of Ukraine "Agronomy Research Station" in creating a modern plant for biodiesel production.

The department of mechanization for livestock management professor II REVENKO founded and developed the basic principles of

resource kormopryhotuvanni and livestock production, with the participation of Associate Professor A. Pylypenko A new method of research process of grinding grain definition technology, energy and quality performance of crushers and proved their rational parameters, hammer crusher developed a design capacity of 2 tons / hr .; involving professors OO Zabolotka and SP Lishchynskyy developed a new structural and functional scheme and manufactured prototypes of milking machines combined-action pairs, which can reduce the length of the machine dodoyuvannya in 1,9-2,1 times, held their production tests, improved structural and wiring diagram and design solutions basic elements of milking systems that are embedded in the 3 farms of Kyiv and Mykolaiv regions; involving Associate Professor VS Hmelovskoho studies developed and improved decision making and distribution means the mixed feed on cattle farms, watering animals; founded and developed new technical solutions roller and hammer zernodrobarok, shredders stem feed, method of preparation and units combined feed, stryhalnoyi machines rotary type. Department researchers have also developed JMA 29.3-37-440: 2006 "Set of machines and equipment for industrial dairies. General specifications" and JMA 29.3-37-441: 2006 "bull-chain conveyor system from manure housing for animals. General specifications ".

The department of labor and environmental engineering led by Professor FI Goncharova camera designed for ultrasound (frequency of 25-30 kHz) irradiation of aqueous solutions of fine chemicals factions to intensify their dissolution in the preparation of feed. Led by Professor O. Voinalovych, commissioned by the Social Security Fund neschasnyh accidents and occupational diseases Ukraine, developed a prototype portable flaw detector for detecting cracks in critical parts and components of tractors and agricultural machines mobile. Based defectoscopic control the method of estimating the likelihood of an emergency condition tractors because of cracks in parts and components of different sizes. The three prototypes flaw received national reference certificates. Commissioned by Ukrainian research and production engineering center of safety in agriculture, led by Professor O. Voinalovych, the analysis of occupational injuries in the industry and formed the basis of data on occupational injuries in enterprises of all ownership forms of agriculture and led by Professor SD Lehmana developed Regulations on system safety management in the agricultural sector and Regulations on the system of self-control security and safety for farmers and sole entrepreneurs who do not use hired labor, implementation of which creates conditions for reducing accidents, industrial injuries and occupational risks, improves working conditions in the industry. The Department has always paid great attention to the

improvement of health and safety at the university. In this direction, led by Professor V. Hoe was substantiated scientific principles of operation safety management system (SMS) at the university, developed statement of SOUP university and recommendations for its implementation. Under the direction of Professor VG Department hoe scientists also developed a classification of risk of injury to major professions mechanized plant growing and livestock in agricultural areas where the basic methodology of calculation of risks and occupational risks in mechanized agriculture. This document has been implemented in the Ministry of Agriculture and Food of Ukraine. Commissioned by the Ministry of Agrarian Policy and Food of Ukraine, led by Professor V. Dubrovin a package of regulatory documents to ensure the quality and safety of biofuel production from raw agro origin in accordance with EU requirements (ISO 19, 2 JMA 6 TU) and commissioned by the State Agency for Energy Efficiency and Energy Saving of Ukraine developed ISO "gaseous fuel. Biogas. Methods of sampling for tests "and" Diesel fuel mixtures. Technical requirements and methods of control. "

Department researchers mechanics and the theory of mechanisms and machines, led by Professor V. Bulgakov the theory workflows beet harvester. Developed construction workers digging of hychkozbyralnyh and root crop machinery transferred to SCB of "Boreks." Commissioned by the Ministry of Agrarian Policy and Food of Ukraine developed universal vibration digging up your body for sugar beets and other root crops. Under the direction of Professor MG Chausova developed scientific basis of reliability and life of agricultural machinery.

Department researchers Technical Service and Engineering Management University. MP Mamotenka with Professor II Miller took significant both within public procurement and commissioned by the Ministry of Agrarian Policy and Food of Ukraine, to develop a comprehensive methodology (multi) evaluation of machine units; of technical and operational characteristics of machine units for growing and harvesting crops; reasonable rational processes and systems of machines for growing and harvesting of crops in farms of different ownership; The scientific and methodological basis for forming the depreciation policy for renovation of agricultural machinery; program to compute the workload standards, fuel consumption and cost of implementation of mechanized operations in crop justified the creation of a common information technology marketing center monitoring of agricultural production, market machinery and spare parts; The normative and methodological foundations of agricultural machinery fleet optimization and determination of the need for crop farms of different organizational forms zone steppes of Ukraine; set of technical and

operational performance in the various types of machine units depending on the conditions of use; reasonable rational technological machines to perform complex manufacturing operations growing and harvesting crops, taking into account the structure of crop rotation; calculated rational composition tractor fleet typical farms and farms with different volume production of major crops with the use of domestic and foreign technology. Based on the rational structures of machines and tractors calculated ratios technological needs in technology, created a database of energy means agricultural land leading domestic and foreign firms. Commissioned by the Ministry of Agrarian Policy and Food of Ukraine Department researchers led by Professor VD Voytyuk by energy-performance fleet of agricultural machinery, developed the concept of reasonable structure and organization of technical service energy-agricultural machinery in Ukraine under market conditions developed regulations "Procedure for consideration and satisfaction of claims about the quality of agricultural machines" and "Work to assess the residual disability agricultural machinery "; method of calculating the needs of farms in agricultural technology and in accordance with technical experts. It has also developed a diagnostic system and a mobile laboratory for diagnosing and monitoring the technical condition of mobile agricultural machinery. The research results are introduced in diagnosing transmissions and engines of tractors and combine harvesters in the research facilities of the university.

The department of technology of structural materials and materials led by Professor KG Lopatko and Professor EG Aftandilyantsa developed technology of nano and ultrafine materials (colloidal solutions). Designed and manufactured prototype installation for metal nanoparticles by bulk electric-dispersion, a study of the structure and properties of nanomaterials, the estimation of effectiveness of these enzymes to stimulate plant growth and use of nanomaterials in veterinary medicine. Led by Professor AA Kotrechko recovery technology of cylinder liners.

Department researchers designing machines with Professor VS Loveykin developed energy efficient means and methods of optimization of motion of lifting equipment in agriculture for kinematic, dynamic and complex criteria. On the basis of researches the structure of the mechatronic system of the crane, which allows optimal modes of movement in production. The research results are introduced in LLC "Prime-divelopment", as well as engineering and Novokramatorsk Nizhynsky repair plant. By initiating topics, led by Professor V. Yaroshenko has developed a new design stars, hinges and automatic tensioner chain transfer, and proposed a new method of calculation chain drives.

The department of transportation technology and in agribusiness led by Professor SG Frysheva technology of moving grain from harvesting in farms and collective farms based on the processing chain "grain harvesters, trailers reloaders-road vehicles." For active subjects, with Professor SG Frysheva generalized domestic and international experience with the use of modern technologies to combat spring frosts in crop.

Commissioned by the Ministry of Agrarian Policy and Food of Ukraine academics department processes and equipment processing of agricultural products under the supervision of Professor A. Datsyshyn developed Shelling machine with vibroaktyvnymy working bodies and fulfilled its parametric optimization. They have also developed JMA 73.1-37-413 "Energy. Method of determining the energy consumption of agricultural products during storage and processing" and proved resource-processing of cereal crops in the agricultural industry.

Total number institute staff monographs, articles and patents obtained cumulatively shown in Fig. 5, 6 and 7.

Every year the staff of the Institute vydayutu average of 6 to 8 scientific monographs published about 400 scientific articles and receive about 100 patents and utility models. Research contained in monographs dedicated to solving scientific problems of innovative development of natural resources.

Priority Research Institute scientists confirmed receipt of patents and utility models. But despite the considerable number of received patents and utility models, the number of licenses sold their use is critically low level, needs serious improvement inventive work, strengthening its relationship with the release of machinery and equipment in the workplace.

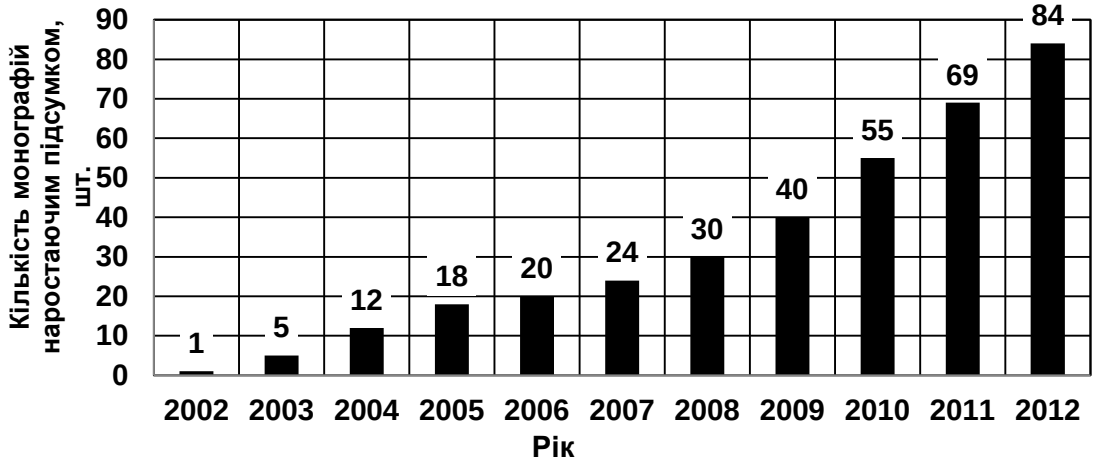

Fig. 5. Number of published monographs on an accrual basis.

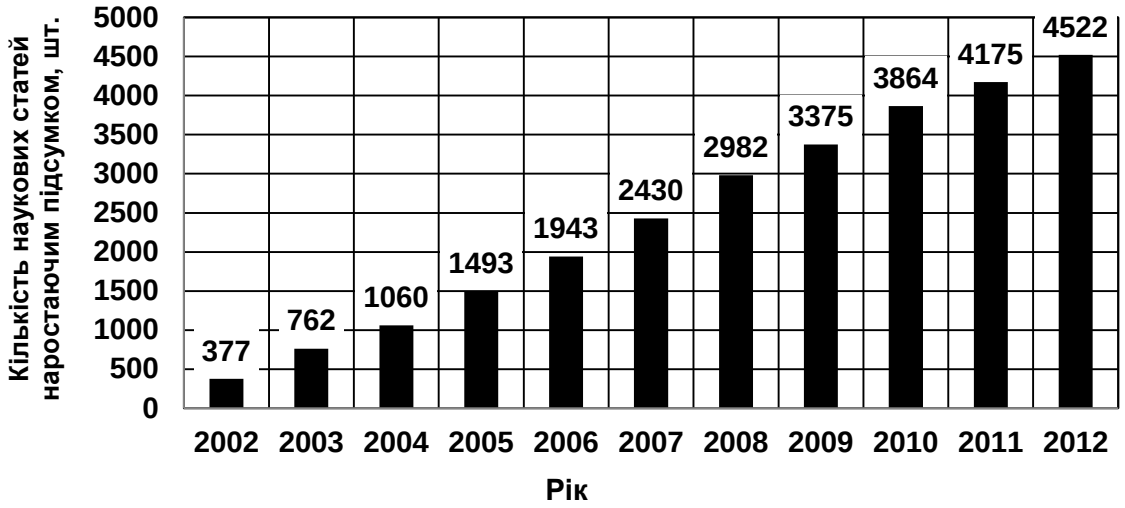

Fig. 6. Number of published scientific papers on an accrual basis.

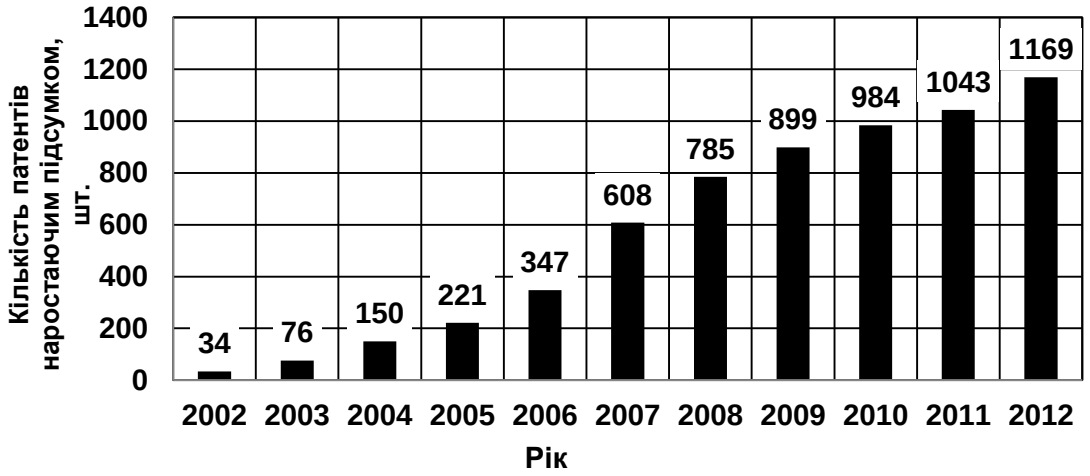

Fig. 7. The number of received patents and utility models accrual basis.

Scientific research scientists Research Institute of engineering and technology is a significant contribution to the development of agricultural science and practice. Total introduced the scientific developments in production cumulatively shown in Fig. 8.

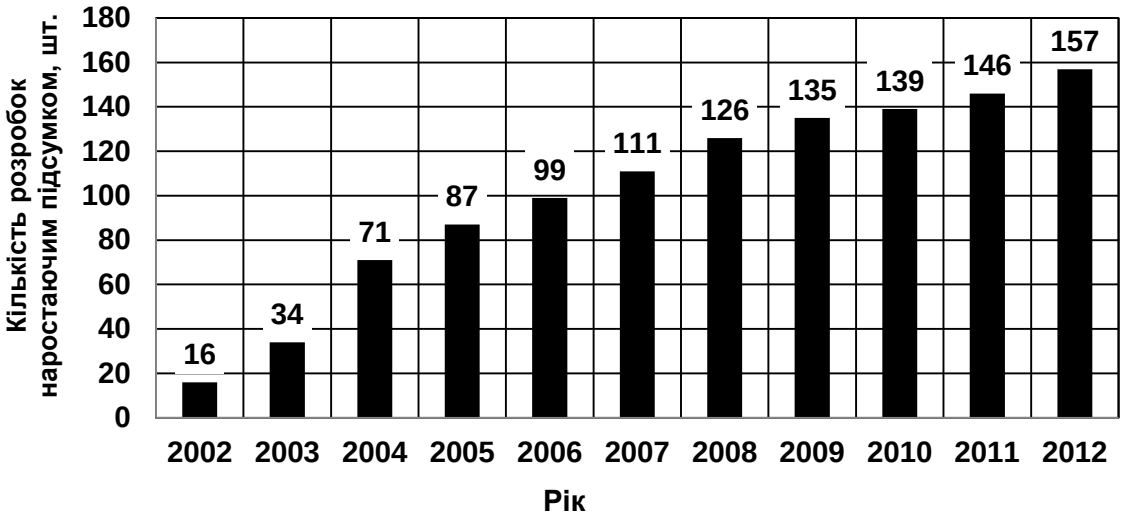

Fig. 8. Number of implemented scientific research institute on an accrual basis.

Each year, employees of the institute introduced in production from 10 to 20 scientific research. More scientific research institute completed acceptance testing machines and equipment.

In engineering and technology research institute established and productive work 8 scientific schools. This scientific school "Mashynovykorystannya" - based PhD, ProfessorKirtbaya JK, the current leader - PhD Voytyuk VD .; "Recovery vehicles" - based doctor of technical sciences, professor, corresponding member of the Academy of Agricultural Sciences KRAMAROVA VS, the current Head - PhD, professor Boyko AI., "Friction and wear in machines" - based PhD, Professor Kostetsky BI, current Head - PhD, professor Kindrachuk MW .; "Agricultural mechanics" - based doctor of technical sciences, professor, corresponding member of the USSR Academy of Sciences, Academician of Agricultural Sciences, Academician of Agrarian Sciences, Academician RAAS Vasylenko PM, current head - Ph.D., professor, corresponding member of the Academies Ukraine Voytyuk DG .; "Physical metallurgy and heat treatment of metals" - based PhD, Professor Brown MP, the current Head - PhD, Professor AS Opalchuk .; "Bioengineering systems in livestock" - based PhD, Professor O. Omelchenko, the current Head - PhD, Professor Revenko I.I., "Agricultural Engineering" - based PhD, Professor, AcademicianAgricultural Sciences, AcademicianAgrarian Sciences, Academician RAAS was burnt LV, current Head - PhD, professor Dubrovin VO .; "Applied Geometry and Engineering Graphics" - based PhD, Professor VS Obukhov, current Head - PhD, professor Pylypaka SF

Every year, replaced the techniques and technologies finish graduate school from 10 to 12 people. Mean number of graduate students who successfully complete graduate school is 25.9%.

Number of theses defended in special council for years and cumulatively shown in Fig. 9 and 10.

Fig. 9. Number of theses defended in special council for years

Average number of protected theses is: candidate - about 4 Doctor - about 1. The same annual number of trained at the Institute of theses defended in the specialized councils of other universities and research institutes.

Achievements team of scientists SRI engineering and technology recognized and appreciated by the State. Thus, employees of the institute Dubrovin VA and Myronenko VG, as part of the Authors awarded the State Prize of Ukraine in Science and Technology for the scientific work "system using advanced biotechnology Life in obtaining alternative fuels." NAAS Ukraine Award "for outstanding achievements in agricultural science" was awarded Dubrovin VO part of the Authors. Diploma of Ministry of Agrarian Policy of Ukraine noted Melnychuk MD, VA Dubrovin, V. Polishchuk, Drahneva SV Gryshchenko OM Mironenko VG, Mishchenko VI, Brahidu M .In. - In line with the development of biodiesel. Achievements of young scientists also remain unaddressed. Prize of the President of Ukraine in the field of science and technology for young scientists awarded Candidate of Science Brovarets OO

The invention "Device for treating contaminated water electrical coagulation" (co-author of the Institute is Professor Chausov MG) won the nationwide contest "Invention 2011" in the category "resource conservation, energy efficiency, environmental friendliness".

SRI techniques and technologies takes part in exhibitions.

Fig.

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Conclusion.A decade of its existence, engineering and technology research institute has marked significant achievements in the research and implementation of innovative products. In the future, we will focus efforts on building scientific foundations of the transition from intensive agriculture based on the use of pesticides to organic farming production of environmentally safe products on the basis of precise machinery, logistics development methods for conservation of soil fertility, study agrophysical and microbiological properties of soils as a scientific basis to influence the formation of working groups on the ground, reducing the negative impact of cars on the field fertile soil, rationale for upgrading existing livestock farms, their equipping with modern biogas installations and sites for mechanized composting manure and litter, the development of processing industry in terms of agricultural production with the standards of quality products, the development of modern methods of maintenance, diagnosis and repair of machinery and equipment. Researchers of the near future, and that 25 doctors and 70 candidates, should focus on the development of innovative scientific direction and execution of experimental development in the design office, enhance participation in exhibitions, increase enacted in high-tech research facilities farms; increase the share of extra-budgetary funding, including grants; increase the sale of licenses for use of patents by strengthening ties with enterprises for the production of machinery and equipment; increase the number of scientific developments that are completed

acceptance testing machines and equipment, and develop algorithms academic training in graduate school in order to increase the number of graduate students who successfully complete graduate school.

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Pryvedeny Basic Indicator scientific-technical and ynnovatsyonnoy activities yssledovatelskoho Institute for Scientific-Technics and Technology for Latest ten years.

Science, Studies, Development, Innovation, Institute.

A basic science, technology and innovation activities indicator Scientific Research Institute of Techniques and Technologies along ten years is adduced.

Science,research, development, innovation, institute.