ISSN 2181-8622

SCIENTIFIC AND TECHNICAL JOURNAL OF NAMANGAN INSTITUTE OF ENGINEERING AND TECHNOLOGY

НАМАНГАН МУҲАНДИСЛИК-ТЕХНОЛОГИЯ ИНСТИТУТИ ИЛМИЙ-ТЕХНИКА ЖУРНАЛИ

НАУЧНО-ТЕХНИЧЕСКИЙ ЖУРНАЛ НАМАНГАНСКОГО ИНЖЕНЕРНО-ТЕХНОЛОГИЧЕСКОГО ИНСТИТУТА

The journal is included in the list of scientific publications recommended by the Higher Attestation Commission under the Cabinet of Ministers of the Republic of Uzbekistan for publication of the main scientific results of dissertations in technical sciences in 2019 (Technical Sciences - 05.00.00) №33.

DEVELOPMENT OF A NEW RESOURCE CONSTRUCTION AND CALCULATION OF PARAMETERS BAND CONVEYOR DIRECTORY ROLLER MECHANISM PARTS

Jumaev Akbarjon Sayfullaevich
Doctoral student of Navoi branch of the Academy of Sciences of the Republic of Uzbekistan
Tel: +99(893) 462 6547, Email: akbarjon.jumayev@mail.ru

Djuraev Anvar Djuraevich
Doctor of Technical Sciences, Professor of Tashkent Institute of Textile and Light Industry
Tel: +99(893) 181 3804, Email: anvardjurayev1948@mail.ru

Xudayqulov Shavkatbek Soyibjanovich
Doctor of philosophy (PhD)technical sciences, Namangan state university
Tel: +99(894) 179 0036, Email: j_alay@mail.ru

Abstract:

Objective. *Achieving economic efficiency in mining enterprises through the use of lightweight high-strength plastics and composite materials of flexible elements and the development of a new resource-saving design of parts instead of rolling bearings that provide basic planar rotational movement in mechanisms with guide rollers of a conveyor belt type*

Methods. *When creating new design solutions for a part that acts as a sliding base made of plastic and a composite flexible element for a composite guide roller mechanism, several detailed drawing methods are used in 2D, 3D programs to create an ideal structure view, modeling and calculation methods, optimization of performance characteristics, parts designs and synthesize.*

Results. *The main factors affecting the operation of belt conveyors used in mining enterprises; environment, temperature fluctuations and various loads. This leads to a significant increase in the exposure of the equipment parts. The parts of the idler roller mechanism associated with the main damage fall on this rolling bearing. When using a part made on the basis of the proposed new design project, the frequency and efficiency of the mechanism increases.*

Conclusion. *To increase the frequency of operation of belt conveyor guide roller mechanisms used in the mining industry, detailed blueprints have been developed to create new resource-saving parts designs to replace some of the mechanism parts. When we use a new design part instead of a rolling bearing, it is confirmed that the service life of the mechanism has increased by 0.28%. It should be concluded that the component of the composite roller guide mechanism is recommended for use in the production of parts made of high-strength plastic and composite materials of flexible elements.*

Keywords: quarry, mechanism, bearing, conveyor, rolling, flexible, graphitecapralone, parameter, roller, base, deformation, antifriction, research.

Introduction. One of the most convenient machine mechanisms in the mining industry and with an uninterrupted supply of products in various sectors of the economy are belt conveyors. In the mining industry, a set of several conveyor belts is used to transport ore from deep quarries, as well as ore from underground and open pit mining, to a specified location, the length of which reaches several meters. For example, the "Muruntau" quarry, which belongs to the Navoi Mining and Metallurgical Combine.

The main components of belt conveyors are the integral idler roller mechanism, the idler drum and the belt that surrounds them. (Figure 1). The conveyor also includes the following parts: belt compression and cleaning devices, handles, special roller mechanisms, elements providing automatic control and movement of the belt [1].

One of the main factors determining the reliability of a belt on a conveyor belt is that its components are handled with precision and strength. One of such important mechanisms is roller mechanisms with a part, the share of equipment work is 20-25%.

The maintenance cost of the roller mechanism is 40%. The service life of the roller mechanism on the conveyor is 2-2.5 years, and the rollers operating in the places of operation of the loading devices are reduced to 1-3 months compared to those installed in other places. The reason is that the frequency of the roller mechanism decreases as a result of external shocks, constant dustiness, moisture in the places where ore is received.

Figure-1. Belt conveyor

The reliability of the belt conveyor is largely determined by the frequency of operation of the roller mechanism. That is why the roller mechanisms of the structure are changed several times during operation. Improving the design of its parts and increasing their reliability to increase the service life of roller mechanisms is becoming one of the main urgent tasks.

Methods. The main rotary mechanism of the belt conveyor is a roller, and its base rotational movement is performed by rolling bearings. As a result of external influences, the bearings of the roller mechanisms become stiff, resulting in an increase in the load on the belt, which leads to its rupture. To prevent this, it is recommended to use a roller bearing instead of a rolling bearing as a sliding base made of high-strength plastic and flexible element materials with variable parameter composition [2].

To do this;

Study of various parameters affecting the detail that acts as a sliding base under static and dynamic loading on the roller mechanism;

Development of a new design of the part acting as a sliding base and determination of its performance parameters;

Carrying out a comparative analysis of the part, which acts as a sliding support, mounted on a roller mechanism, in relation to the rolling bearing;

It consists of substantiating the technical and economic indicators of the reliability of the roller mechanism.

Among the factors that determine the life of the belt conveyor, it should be noted that its main supporting parts will be improved on the basis of new designs. One of these mechanisms is composite roller guide mechanisms, which increase the frequency of operation by improving some of its parts. It is necessary to consider ways to reduce the dynamic loads on the mechanism when the composite guide roller interacts with the load current of the mechanism. In particular, the reliable movement of the roller mechanisms in the loading area determines the performance of the belt conveyor. Continuous movement (between the belt and the composite guide roller) causes the roller members to wear out due to friction. This, in turn, will affect the tape [3].

Results. As a result of scientific research, design work was carried out and it was recommended to use a flexible element material as a coating on the outer side of the roller mechanism cover.

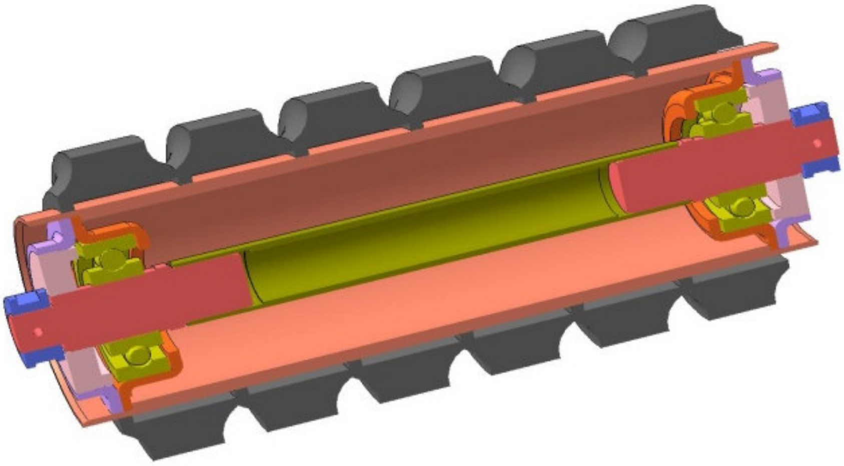


Figure-2. Roller mechanism (Belt conveyor)

This, in turn, as a result of external loads, the presence of a composite elastic element between the belt and the roller mechanism led to an increase in the periodicity of operation of the mechanisms in return for the deformation extinction.

Roller mechanisms must be installed in the same size range to ensure uniform movement of the conveyor belt. In each measuring range of the mechanism, three rollers are mounted on the top and one roller mechanism on the bottom. The rollers mounted on the top are mounted at an angle to each other. The installation of the guide roller mechanisms on the basis of clear standards leads to a uniform movement of the belt conveyor. The roller mechanisms placed at the top of the mechanism must be placed at a precise angle to each other so that the loads applied to each roller mechanism during the operation of the belt conveyor must be the same.

Deformation of the elastic support occurs as a result of impulsive action on the lightweight plastic grid on the sliding support of the guide roller mechanism. In this case, it is very important to determine the vibration frequency of the plastic grilles with a flexible element that affects the rotational motion. To determine the deformation value of the grid supports, we convert the roller mechanism to the potential energy of the flexible element base, which is deformable under the influence of kinetic energy [4].

$$T = \frac{mV_y^2}{2} \quad \Pi = \int_0^{x_{max}} (c_1 x + c_2 x^3)dx \tag{1}$$

where: T - is the kinetic energy of the base of the guide roller; t - is the total mass of the roller support mechanism; $V_y -$ external forging affecting the speed of the roller mechanism; $c_1 -$ linear component of the basic stiffness coefficient of the composite elastic element; $c = \frac{c_2}{\mu} -$ nonlinear component of stiffness coefficient; Π- is the potential energy of the deformed flexible element base.

From the accepted conditions of interaction:

$$V_y = \sqrt{\frac{2}{m}\int_0^a c_1 x dx + \int_0^a \frac{c_2}{\mu} x^3 dx} \qquad (2)$$

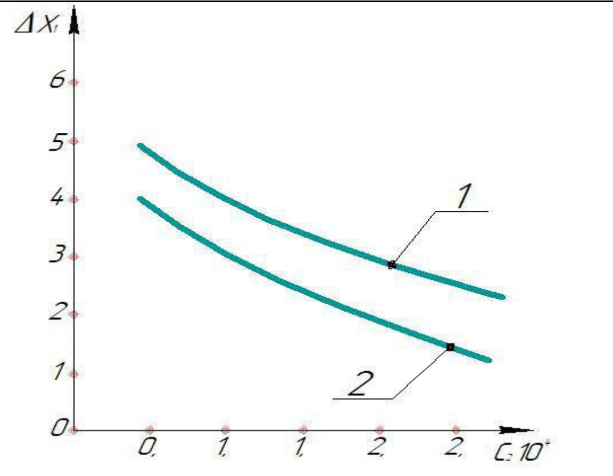
where, a – maximum deformation value.

According to research, the plastic grid of the system will have a single mass vibration system under conditions ranging from the nonlinear stiffness of the elastic element material to $x = 0$ to $x = a$ vibration [5, 6].

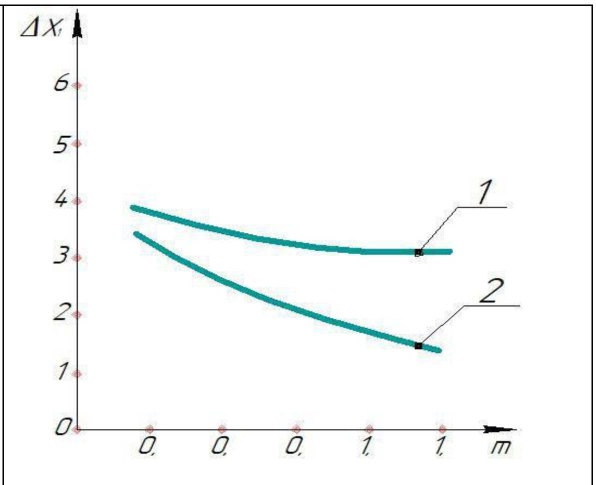
$$t = 4\sqrt{\frac{n}{\alpha}} \cdot \frac{1}{\alpha^{n-1}} \int_0^1 \frac{d\xi}{\sqrt{1-\xi^{2n}}} \qquad (3)$$

where, α and n – constants, $n - 1,2...,$; $\xi = X / a$, equal to the boiling force αx^{2n-1}.

In lattice systems with a nonlinear stiffness of the composite elastic element, there is a certain relationship between period and amplitude. Therefore, the term "natural frequency" should be avoided in relation to such systems, as the frequency of free oscillations ceases to be a specific parameter of the system.



1-for $\omega = 65c^{-1}$ 2-for $\omega = 40c^{-1}$, ,
$C_1 = 1{,}5 \cdot 10^4$ Н/м; m=1,20 Нс²/м
Fig.3. Dependences of the change in the range of vibrations of the plastic grate as a function of the stiffness coefficient of the elastic support of the roller cleaner



1-for $\omega = 65c^{-1}$ 2-for $\omega = 40\ c^{-1}$
Fig.4. Dependences of the change in the range of vibrations of the plastic grate depending on its mass

In this case, the recovery force $c_1 x + \frac{c_2}{\mu} x^3$ and therefore the quantity n take the values 1 and 2, then the period of oscillation with nonlinear stiffness of the plastic grid to the flexible base is determined from the following expression:

$$t = 4\sqrt{m}\left[\sqrt{\frac{1}{c_1}}\int_0^1 \frac{d\xi}{\sqrt{1-\xi^2}} + \sqrt{\frac{2\mu}{c_2 a^2}}\int_0^1 \frac{d\xi}{\sqrt{1-\xi^4}}\right] \qquad (4)$$

where μ- is the coefficient taking into account the linearity of the material properties of the elastic element, m^2.

In the resulting expression (3) we combine the expressions in parentheses, then calculated (integrated) using tables of special functions on the case, and we get the following expression [7]:

$$t_k = 4\sqrt{m}\left[6{,}28\sqrt{\frac{1}{c_1}} + \frac{1{,}8541}{\alpha\sqrt{c_2^2/\mu}}\right] \tag{5}$$

For the frequency of free oscillations, taking into account the following $\rho_2 = 2\pi/T$:

$$\rho_k = \frac{0{,}25\,a\sqrt{c_1 c_2/\mu}}{\sqrt{m}\,(2\pi\alpha\sqrt{c_2/\mu} + 1{,}85\sqrt{c_1}} \tag{6}$$

Analysis of the resulting formula (6) showed that the frequency of natural vibration decreases nonlinearly with increasing bullet mass of the plastic structural grid. As the amplitude of vibration and the stiffness coefficient c^1 and c^2 increase, the frequency of natural oscillations changes in a nonlinear relationship. It is very important to provide structural lattice vibrations up to the resonance zone, because the natural frequency of structural lattice oscillations also varies depending on the reduced mass, amplitude, and nonlinear stiffness properties of the flexible base.

Discussions. Physical and mechanical properties of the materials used in the work of the sliding tank in the guide roller mechanism with a belt conveyor were studied. When studying the physical properties of materials - studies the physical aspects of the interaction during the relative motion of contact surfaces. When studying the mechanical properties of a material - studies the mechanics of the interaction of friction surfaces in friction. He studies the distribution of energy and momentum, mechanical similarity in friction, relaxation vibrations, reversible friction, hydrodynamic equations, and others in relation to friction, wear, and lubrication. Surface quality affects the wear resistance of the part to corrosion, corrosion and erosion, the strength of the tight joint and the reliability of the movable and immovable bonded density.

The rolling bearing is the part that makes the roller mechanism rotate and acts as a support relative to the axle. As a result of external influences (dust, water, high humidity), the roller mechanism stops due to uneven movement or hardening of the grooves and balls of the rolling bearing [8].

In order to prevent this, instead of a rolling bearing, we use a flexible element and plastic (graphytocaprolone) material, which acts as a sliding base relative to the axle.

The roller mechanism will need to create new types of details that act as a sliding base for the composite flexible element, as well as develop methods for their structural, kinematic and dynamic calculations. To do this, it is necessary to see the effectiveness of research on the design, modeling and calculation of new schemes of machines and mechanisms, optimization of operational characteristics, analysis and synthesis of mechanisms, creation of new designs of flexible joints and flexible element roller mechanisms.

Conclusion. The operating conditions and characteristics of belt conveyors in the mining industry were considered, special requirements were set for the design of their main components. Constructions of guide roller mechanisms with a belt conveyor structure, a detail acting as a sliding support and a protective cover and sealing devices have been developed on the basis of design designs. The importance of lubricants in order to increase the periodicity of the workpiece, which acts as a sliding base, was considered. Many factors have been analyzed for the rapid repair of parts that act as a sliding support in a guide roller mechanism.

REFERENCES

1. Shpakunov I.A. Issledovanie osnovnyx sostavlyayushchix koeffitsienta soprotivleniya dvijeniyu na dlinnyx horizontalnyx lentochnyx konveyerax. // Diss. on soisk. three step. kand. techn. science. - Dnepropetrovsk, IGTM, 1968, -160 p.

2. Djuraev A., Kenjaboev Sh. «Development of constructive schemes and scientific bases of analysis and synthesis of lever mechanisms with uprugimi and gibkimi links of technological machines». –T. «Namangan», 2019, 268 pages

3. Grigorev E.T. Calculation and construction of rubber shock absorbers. M., MashGIZ, 1960, p.157.

4. Atabaev M.E. Ergashev M. Issledovaniya deformatsiy, voznikayushchix pri poperechnom udare po niti pri nalichii treniya. DAN UzSSR, 9, 1986. –p..19-21.

5. Djuraev A., Murodov O. Groundation of the parameters of grate bar on elastic support with non-linear hardness. The european science review. № 7–8 2017. July – August. Vienna • Prague 2017. page-109-111.

6. Djuraev A., Davidbaev B.N., Melamedov R.Yu., Mirzaxonov Yu.U. "Natyajnoy rolika plosko-remennoy peredachi". Patent №50, FN. Res. Russian Bulletin №2, 1996 Useful model GM.GI 950020 1 / GF.

7. Djuraev A. et al. Theory of mechanics machines. Izd. G. Gulom 2004 s. 582.

8. Djuraev A.J., Davidbaev B.N., Jalyaev A.A., Mirzaxanov Yu.U. Ploskoremennaya peredacha with natyajnыm roller. // Patent Uz. Res. UZIAP 4228, 31.03.97. № 1

9. Barkova N.A. Vibration diagnostics of bearings kacheniya: Methodical instructions for laboratory work / Barkova N.A., E.I. Krapivskiy, A.V. Shalygin, V.V. Shornikov // SanktPeterburgskiy gornyy in-t. SPb, 2010. 38 p.

10. Djuraev A., Mirzakhanov Yu.U. "Dynamics of a machine unit with a mechanism of transporter disassembly of a bunting cotton" Collection of scientific articles, TTESI, part II, 1998, p.94-99.

11. Abdullaev A.V., Djuraev A., Miraxmidov Dj. Analiz kolebaniy kolosnika na uprugom osnovanii s nelineynoy gestkostyu, J. Izvestiya VUZ, Technology tekstilnoy promыshlennosti, №5, 2008

12. Kodnir D.S. Reshenie neizotermicheskoy kontaktnogidrodinamicheskoy zadachi pri chistom kachenii i uchete teplootvoda vdol i poperek smazochnogo sloya / D.S. Kodnir, V.N Vasin // Thesis dokl. vsesoyuznoy konferentsii treniya i iznos v mashinax. - Chelyabinsk: 1979. -S. 154-156.

13. Shaxmeyster L.G. Theory and calculation of lentochnyx conveyors / L.G. Shaxmeyster, V.G. Dmitriev // M .: Mashinostroenie, 1987. 336 p.

14. Sheshko E.E. Gorno-transportnye mashiny i oborudovaniya dlya otkrыtyx rabot: Ucheb. posobie. M: Izd. MGGU, 2003. 260 p.

15. Dmitriev V.G. Osnovy teorii lentochnyx konveyerov / V.G. Dmitriev, A.P. Verjanskiy // «Gornaya kniga»., M., 2017. 592 p.

16. Shaxmeyster L.G. Theory and calculation of lentochnyx conveyors / L.G. Shaxmeyster, V.G. Dmitriev // M .: Mashinostroenie, 1978. 392 p.

17. Titov A.A. Issledovanie i sozdanie rollikov s dolgodeystvuyushchey smazkoy dlya lentochnyx konveyerov gornodobыvayushchey promыshlennosti: Dis. … Kand. techn. science. Kiev, 1975. 209 p.

18. Malaxov V.A. Analysis pokazateley эксплуатационных svoystv plastichnyx smazok rollikoopor lentochnyx konveyerov gornyx predpriyatiy. // Gornyy informatsionno-analiticheskiy bulletin, M .: 2014. C. 78-90

19. Djuraev A., Khudaykulov Sh.S., Jumaev A.S. Development of the Design and Calculation of Parameters of the Saw Cylinder with an Elastic Bearing Support Jin.

'International Journal of Recent Technology and Engineering (IJRTE), ISSN: 2277-3878, Volume-8 Issue-5, January 2020. Page No. 4842-4847

20. Djuraev A.D., Jumaev A.S. Study the influence of parameters of elastic coupling on the movement nature of support roller and rocker arm crank-beam mechanism. International Journal of Advanced Research in Science, Engineering and Technology, Vol. 6, Issue 6, June 2019 Copyright to IJARSET www.ijarset.com 9795

UDC 677.021

RESEARCH OF THE INFLUENCE OF THE DENSITY OF A RAW ROLLER ON THE VALUE OF BENDING OF THE SHAFT OF THE SAW CYLINDER OF JIN

Ergashev Jamoliddin Samatovich
Associate professor of Namangan institute of engineering and technology
Tel: +99(897)727 1964, E-mail:jamoliddin_ergashev@mail.ru

Mirzaumidov Asilbek Shukhratjonovich
Senior teacher of Namangan institute of engineering and technology
Tel: +99(890)223 8883, E-mail:bek_mirzaumidov@mail.ru

Dadamirzayev Baxromjon Baxtiyor o'g'li
Assistant of Namangan Institute of Engineering and Technology
Tel: +99(894)157 3812, E-mail:mr.bahrom91@mail.ru

Abstract:

Objective. *When creating machines for the cotton ginning industry, the issues of developing and refining methods for calculating drives and shafts of high-performance machines are especially relevant. In the article, the problem of reducing the mass of the shafts of the main working body of the saw cylinder of the genie is solved by the formation of grooves and the design features of the lightweight shaft.*

Methods. *Research of the influence of the density of a raw roller on the value of bending of the shaft of the saw cylinder of gin the methods of calculating the study were also calculated theoretically and practically. Theoretical research The results were obtained based on the modern program of Solid works. Experimental studies, on the other hand, found a tensometric method*

Results*. According to the results, It is necessary to pay attention to the fact that with an increase in the mass of the seed shaft from 60 kg to 90 kg the value of the forces of the cross section also increases, respectively, from 2565 N to 2869 N and the bending moment of the shaft, respectively, from 112 N/m to 170 N/m.*

Conclusion. *Based on the results of the analysis, that the power consumption in the set mode of the saw cylinder 12-12,5kWt. The inertial mass of the saw cylinder is large and requires 7-12 seconds to stop the saw cylinder completely. This negatively affects product quality. It is proposed to reduce the inertial moment (mass) of the saw cylinder. The main method of reducing mass is to lighten the shaft itself or reduce the number of saws and shims, which will reduce the length of the shaft.*

Keywords: Gene, saw cylinder, shaft, raw roller, deflection, weight reduction, grooves, design features, bending.

Introduction. The creation of machines for the cotton ginning industry with effective parameters can be carried out only on the basis of a deep knowledge of the physics of the processes occurring in machines under different loading conditions and the development of

GROWING, STORAGE, PROCESSING OF AGRICULTURAL PRODUCTS AND FOOD TECHNOLOGIES

B.T.Abdullaeva, M.I.Soliev, O.R.Qodirov. Scietific and statistical analysis of the production of semifinished meat productьіsin Uzbekistan………………………………………………	113
A.N.Khudayarov, D.A.Abdullayev, M.A.Yuldasheva, D.O.Khudoynazarov. Results of theoretical and experimental investigations on base of the softener corner entering the soil…..	117
E.V.Bekbulatova, O.K.Ergashev, E.V.Tadaeva. Micobiological safety of ready-to-eat dry breakfast from grain crops…………………………………………………………………	124
Sh.Z.Hakimov, U.M.Askarov. Production technology of “canned vegetables in tomato sauce”…………………………………………………………………………………......	129
A.M.Arifjanov, N.R.Xodjiyev, Sh.Sh.Jurayev, K.M.Kurbonov, S.S.Sultonov. Analysis of the resource-saving method for calculating the heat balance of the installation of hot-water heating boilers……………………………………………………………………………..	134
B.M.Khudoyberdiev, N.N.Muradillaev, N.M.Kurbanov. Automation of the technological process of obtaining essential oils from the mint plant………………………………………..	140
Kh.M. Qanoatov, Z.K.Vakkasov, G.S.Aliyeva, A.M.Yunusov. Technology of fortification of consumer flour with iron…………………………………………………………………	144

CHEMICAL TECHNOLOGIES

A.M.Khurmamatov, O.T.Mallabaev, K.O.Ismailov. Results of researches of softening and reduction of hardness of technical waters……………………………………………………..	151
F.B.Soddiqov, M.I.Boqijonova, A.B.Jaloldinov, X.Ch.Mirzakulov. Investigation of the process of preparing a saturated solution for the process of calcining soda from low-grade sulvinites of tyubegatan………………………………………………………………………	155
G.A.Ikhtiyarova, L.U.Abdulahatova, A.S.Mengliyev. Antibacterial properties of thickeners based on carboxymethyl starch and chitosan *apis mellifera*…………………………………….	163
G.A.Ikhtiyarova, O.Sh.Qodirov, Sh.M.Tursunov. Creation of the technology of the extraction of brucite and alabastry from local raw materials…………………………………..	168
A.B.Abdikamalova, N.N.Mamataliev, A.M.Kalbaev, I.D.Eshmetov. Investigation of physical, chemical and textural properties of natural aluminosilicates………………………..	172
H.A.Otaboev, A.R.Seytnazarov, D.Sh.Sherkuziev, Sh.S.Namazov, R.Radjabov. Composition and properties of fertilizers based on simple superphosphate, potassium chloride and ammonium nitrate……………………………………………………………………	179
A.M.Khurmamatov, G.B.Rakhimov. Calculation of heat transfer and heat transfer in a pipe apparatus in heating gas condensate……………………………………...	187
N.S.Sarimsakova, N.I.Fayzullaev, Kh.A.Bakieva. Mechanism and kinetiks of the reaction for producing ethyl ester from acetik acid……………………………………………………..	192

MECHANICS AND ENGINEERING

R.Rosulov, Kh.Rosulov. Theoretical determination of the grid’s positioning in the grids line..	201
N.N.Juraev, A.Dj.Juraev. Methods for calculating the parameters of screw conveyors with a two-way wave surface…………………………………………………………………………...	205
A.S.Jumaev, A.Dj.Djuraev, Sh.S.Xudayqulov. Development of a new resource construction and calculation of parameters band conveyor directory roller mechanism parts………………	211