INTERNATIONAL MULTIDISCIPLINARY JOURNAL FOR RESEARCH & DEVELOPMENT
SJIF 2019: 5.222 2020: 5.552 2021: 5.637 2022:5.479 2023:6.563 2024: 7,805
eISSN :2394-6334 https://www.ijmrd.in/index.php/imjrd Volume 12, issue 05 (2025)

PEANUT HARVESTING MACHINE STUDY OF THE KINEMATICS OF THE SHIFT ARRIVE

Mansurov Mukhtorjon
Namangan State Technical University
m_mansurov_1978@mail.ru

Khojiyev Bakhromkhon
Namangan State Technical University
bahromxojiyev1985@gmail.com

Khasanov Majidkhon
Namangan State Technical University
majidxon_hasanov19930@mail.ru

Abstract: In this article, the kinematics of the peanut harvester conveyor is investigated, in which the speed of the belt conveyor depends on the forward speed of the machine and the coefficient of slippage of the belt, the speed of the point of view of the scraper blades is variable, acceleration is constant and it is stated that the tendency to the center is equal to the acceleration.

Keywords: peanut harvester, scraper, belt conveyor, shovel, belt, stalk, grain, separation, sorting, sliding coefficient, kinematics, speed.

Аннотация: В данной статье исследуется скребковый механизм машины для уборки урожая арахиса, в частности, зависимость скорости ленточного транспортера от поступательной скорости машины и коэффициента скольжения ленты. Рассмотрено изменение скорости точки контакта скребкового механизма: скорость этой точки является переменной, а ускорение остается постоянным и равно центростремительному ускорению.

Ключевые слова: Машина для уборки арахиса, скребковый механизм, ленточный транспортер, лопатка, лента, стебли, сортировка, коэффициент скольжения, скорость.

INTRODUCTION. It is known that, in recent years, great attention has been paid to the cultivation of oilseed crops such as sesame, peanuts, sunflower, soybeans, and safflower in our republic. Because they are widely used in the manufacture of confectionery products, in medicine and industry, and their seeds are widely used in animal husbandry. Based on the above, the Namangan Institute of Engineering and Construction developed a multi-functional (digging, de-stalking, sorting and loading) peanut harvesting machine [1-14].

METHODS AND MATERIALS. In exploring the kinematics of the peanut harvesting machine's scraper were used the laws of higher mathematics and theoretical mechanics.

RESEARCH RESULTS. The speed of the belt conveyor also plays an important role in exploring the kinematics of the created peanut harvesting machine's scraper
During operation, the peanut balls, which are squeezed by the belt conveyor, are moved forward by the machine and up and back by the belt conveyor (Figure 1). We determine its absolute speed according to the following expression.

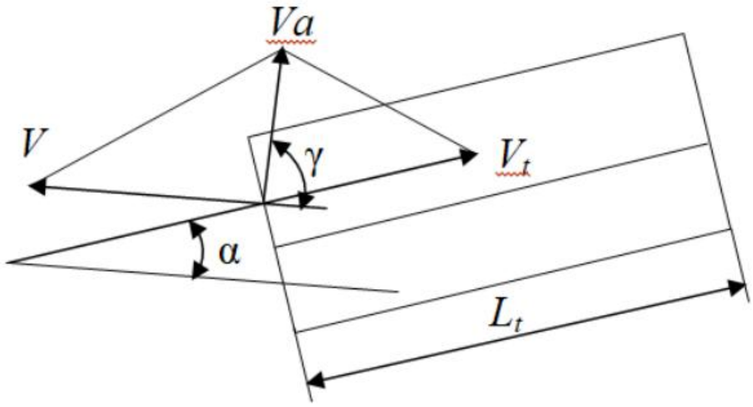

Figure 1. Scheme for determining the speed of a belt conveyor

$$V_A = \sqrt{V^2 + V_t^2 - 2VV_t \cos\alpha}$$

Here V - is the forward speed of the machine, m/s;
V_t- is the speed of the belt conveyor, m/s.
We determine the angle γ of the relative to the horizon of the absolute speed of the peanut's ball. According to the scheme shown in Figure 1

$$ctg\gamma = \frac{V_t \cos\alpha - V}{V_t \sin\alpha}$$

For the pods to be completely and easily dug out, the velocity Va must be directed vertically, as it were γ=90º. Taking this into account, from expression (2) we obtain the following expression

$$V_t \cos\alpha - V = 0$$

And from this

$$V_t = \frac{V}{\cos\alpha}$$

It follows that it should be.
Taking into account q, the slip of the tape takes the form of expression (4).

$$V_t = \frac{V}{\cos\alpha}(1 + \frac{q}{100})$$

(5) The speed of a belt conveyor for transporting goods depends on the forward speed of the machine and the slip coefficient of the belt.
The scraper moves in a complex manner during operation, i.e., it moves forward and rotates around its axis together with the machine [15, 16]. The equations of motion of its blades in the XYZ coordinate system have the following form
(Figure 2).

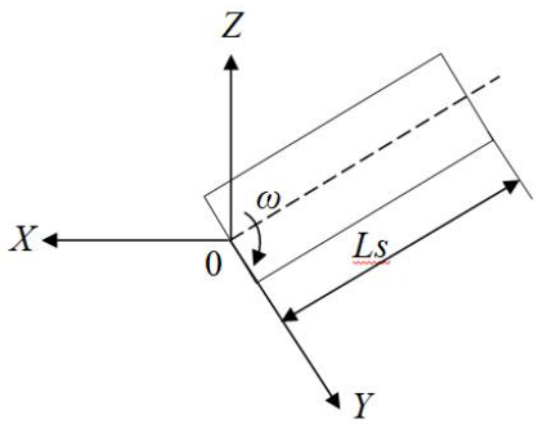

Figure 2. Scheme for the study of the kinematics of the slider

-

$$x = Vt - R_i \sin\beta \sin\omega t - L_S \cos\beta,$$

$$y = -R_i \cos\omega t$$

$$z = -R_i \cos\beta \sin\omega t - L_S \sin\beta,$$

Here t is the car's travel time, s;
β – the angle of installation of the damper relative to the horizontal, º;
R_i - the radius of the point of view of the wiper blade, m,
ωt – the angle of rotation of the scraper (this angle is measured clockwise from the axis OX), º.
Using expressions (6) – (8), we find the velocities and accelerations of the point in question along the X, Y, and Z axes.

$$V_x = \frac{dx}{dt} = V - R_i\omega \sin\beta \sin\omega t,$$

$$V_y = \frac{dy}{dt} = R_i\omega \sin\omega t,$$

$$V_z = \frac{dz}{dt} = -R_i\omega \cos\beta \cos\omega t,$$

$$W_x = R_i\omega^2 \sin\beta \sin\omega t,$$

$$W_y = R_i\omega^2 \cos\omega t,$$

$$W_z = R_i\omega^2 \cos\beta \sin\omega t,$$

The absolute velocity and acceleration of the point in monitoring

$$V_a = \sqrt{V_x^2 + V_y^2 + V_z^2}$$

And

$$W_a = \sqrt{W_x^2 + W_y^2 + W_z^2}$$

will be.
Taking into account the expressions (9) - (14), these expressions have the following form.

$$V_a = \left\{ \left(V - R_i \omega \sin\beta \cos\omega t\right)^2 + \left(R_i \omega \sin\right)^2 + \left(R_i \omega \cos\beta \cos\omega t\right)^2 \right\}^{\frac{1}{2}} =$$

$$= \left\{ V^2 + R_i^2 \omega^2 \sin^2\beta \cos^2\omega t + 2VR_i \omega \sin\beta \cos\omega t + R_i^2 \omega^2 \sin^2\omega t + R_i^2 \omega^2 \cos^2\beta \cos^2\omega t \right\}^{\frac{1}{2}} =$$

$$= \sqrt{V^2 + R_i^2 \omega^2 - 2VR_i \omega \sin\beta \cos\omega t} =$$

$$= V\sqrt{1 + \frac{R_i^2 \omega^2}{V^2} - \frac{2R_i \omega}{V} \sin\beta \cos\omega t} = V\sqrt{1 + \lambda^2 - 2\lambda \sin\beta \cos\omega t}; \quad (17)$$

$$W_a = \left\{ \left(V - R_i \omega^2 \sin\beta \sin\omega t\right)^2 + \left(R_i \omega^2 \cos\omega t\right)^2 + \left(R_i \omega^2 \cos\beta \sin\omega t\right)^2 \right\}^2 = R_i \omega^2,$$

In this

$$\lambda = \frac{R_i \omega}{V}$$

It is clear from expressions (17) and (19) that the velocity of the point of view of the impeller vanes is variable, while its acceleration is constant and equal to the centripetal acceleration.

CONCLUSION. The conducted studies have shown that the speed of a belt conveyor depends on the forward speed of the machine and the belt slip coefficient, showed that the speed of the point of view of the blades of the shovel is variable, and the acceleration is constant, and the tendency to the center is equal to the acceleration.

REFERENCES

1. Rustamov, R., Xalimov, S., Otaxanov, B. S., Nishonov, F., & Xojiev, B. (2020). International scientific and scientific-technical conference" Collection of scientific works" on improving the machine for harvesting walnuts.
2. Mansurov, M. T., Otahanov, B. S., Xojiyev, B. R., & Nishonov, F. A. (2021). Adaptive Peanut Harvester Stripper Design. *International Journal of Innovative Analyses and Emerging Technology*, *1*(4), 140-146.
3. Mansurov, M. T., Otahanov, B. S., & Xojiyev, B. R. (2021). Advanced Peanut Harvesting Technology. *International Journal of Innovative Analyses and Emerging Technology*, *1*(4), 114-118.
4. Mansurov, M. T., Nishonov, F. A., & Xojiev, B. R. (2021). Substantiate the Parameters of the Plug in the" Push-Pull" System. *Design Engineering*, 11085-11094.

5. Рустамов, Р. М., Отаханов, Б. С., Хожиев, Б. Р., & Нишанов, Ф. А. (2021). УСОВЕРШЕНСТВОВАННАЯ ТЕХНОЛОГИЯ УБОРКИ АРАХИСА. *МЕХАНИКА ВА ТЕХНОЛОГИЯ ИЛМИЙ ЖУРНАЛИ*, (3), 57-62

6. Мансуров, М. Т., Отаханов, Б. С., Хожиев, Б. Р., & Нишонов, Ф. А. (2021). Адаптивная конструкция стриппера для уборки арахиса. *Международный журнал инновационных анализов и новых технологий*, *1*(4), 140-146.

7. Toxirjonovich, M. M., & Rakhmatullaevich, X. B. (2022, May). THE RESULTS OF A STUDY ON THE SELECTION OF THE WORKING PART THAT SEPARATES THE NUT PODS FROM THE HUSK. In *Conference Zone* (pp. 14-18).

8. Мансуров, М. Т., Хожиев, Б. Р., Нишонов, Ф. А., & Кидиров, А. Р. (2022). МАШИНА ДЛЯ УБОРКИ АРАХИСА. Вестник Науки и Творчества, (3 (75)), 11-14.

9. Мансуров, М. Т., Абдулхаев, Х. Ғ., Нишонов, Ф. А., & Хожиев, Б. Р. (2021). ЕРЁНҒОҚ ЙИҒИШТИРИШ МАШИНАСИНИНГ КОНСТРУКЦИЯСИ. МЕХАНИКА ВА ТЕХНОЛОГИЯ ИЛМИЙ ЖУРНАЛИ, (4), 39.

10. Хожиев, Б. Р., Абдумажидов, М. А., & Эргашхўжаев, Қ. К. (2023). ЕРЁНҒОҚ ЙИҒИШТИРИШ МАШИНАСИ ПАЛАГИДАН ДУККАКЛАРИНИ АЖРАТИБ ОЛАДИГАН ИШЧИ ҚИСМИНИ ТАНЛАШ БЎЙИЧА ЎТКАЗИЛГАН ТАДҚИҚОТ НАТИЖАЛАРИ. *"Qurilish va ta'lim" ilmiy jurnali*, *1*(2), 311-315.

11. Хожиев, Б. Р., & Нурмухаммадов, Р. М. (2023). ЕРЁНҒОҚ ҲОСИЛИНИ БИР ЎТИШДА КОВЛАШ ВА ДУККАКЛАРИНИ ПОЯСИДАН АЖРАТИШ МАШИНАЛАРИНИНГ ТАҲЛИЛИ. *SO 'NGI ILMIY TADQIQOTLAR NAZARIYASI*, *6*(12), 334-342.

12. Khojiyev, B. R. (2023). THE METHODS OF DEVELOPING THE STRUCTURE OF THE PEANUT HARVESTING MACHINE. *Scientific Impulse*, *2*(16), 800-813.