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Investigation of Unwinding Speed Based on the Process of Separating the Thread from the Surface of the Cocoons

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ABSTRACT: The article, the process of separating the thread is studied, the image of rotation is determined, the appearance of an ellipsoid around the minor axis, the initial movement at one time of its fully immersed in the aquatic environment.

In which the thread selection is investigated when the vertical contour is directed along the outer part of a large ellipse, in the process of separating the packaging of the thread from the surface of the cocoon, on the basis of the interknit elasticity, the connecting equations and models in the zone of the transformation of raw silk are twisted in the process of unwinding.

KEY WORDS: Cocoon, aaqueous environment, cut the yarn on the cocoon, the velocity of the beams, raw silk, yarn rigidity, at the points, linear density of the cord line.

I. INTRODUCTION

The study of the movement of the cocoon in the aquatic environmental process of removing the cocoon in eron yarns supernatural. The process of removing the filament from the surface of the cocoon is considered provided in the rotational ellipsoid, fully immersed in the aquatic environment and at the same time performing translational motion and rotating around the minor axis. In this case, the filament occurs contour of the large ellipse in the vertical direction. To describe the removal process of elastic contact between the threads located on the surface of the cocoon and the yarn torsion zone formed is used. A system of equations has been compiled describing the rotation of a cocoon around a small axis and the translational motions of the center of its mass. In the process of winding a cocoon that is in an aqueous medium, the cocoon performs both translational and rotational around the center of gravity. When it leaves the aquatic environment in the direction of its major axis, the cocoon performs only one-dimensional movement in this direction. Consider the process of removing the thread from the surface, represented as an ellipsoid of rotation of the cocoon in the aquatic environment. (Fig-1)

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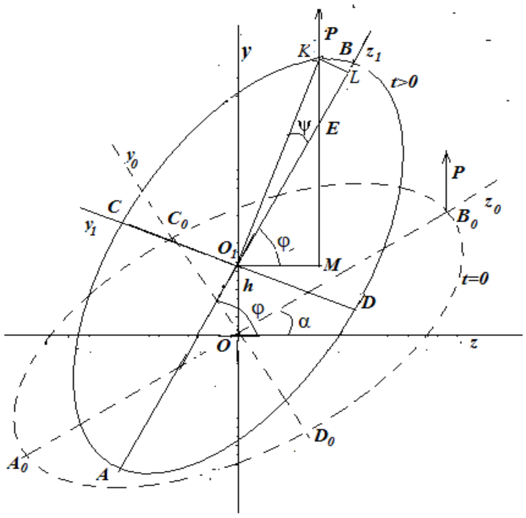

Turn Fig.1. The position of a section contour immersed in an aquatic environment: x = 0 ellipsoid at the time t > 0. The position of the contour of the ellipsoid in the coordinate plane: 0 at an arbitrary moment of time t > 0 is shown in Fig.1.

II. ANALYSIS OF EXISTING FILTERING MATERIALS AND RESEARCH RESULTS

The major semi-axis of the ellipsoid at the moment of time t = o is coal with the horizontal plane. We choose a fixed coordinate system xyz, where the origin of coordinates will be set at the center of gravity of the ellipsoid with coordinate 0 (0, 0, 0), the axis Oz will be directed horizontally, 0x and 0y time axis t=0 the center of the ellipsoid is at the point O with the axis of rotation $0z_0$ which makes up the axis 0x angle. The axis of the $0z_0$ is considered to be the semi-axis perpendicular to it. At the moment of the ellipsoid, and the axis perpendicular to it, Ox and 0y are small. The removal process takes place under the action of a vertical force P, directed vertically upwards and moving along the contour of an ellipse ADBC lying on the coordinate plane y0z. We assume that under the action of force P the center of the ellipsoid moves along the axis 0z rotates around the minor axis 0x.

Write the equation of the rotation ellipsoid in parametric form:

$$x = R\cos\lambda\sin u,\ y = R\sin\lambda\sin u,\ z = R_1\cos u \quad (0<\lambda<2\pi,\ 0<u<2\pi) \tag{1}$$

where: *R* and R_1 denote the minor and major semi axes of the ellipse lying in the x coordinate plane: *x*= 0:

$$z = R_1\cos u,\ y = R\sin u.$$

Let us write the equations of displacement of the center of mass of the ellipsoid and its rotational movement around the axis Ox

$$m\ddot{h} = P - mg + P_A - Q \tag{2}$$

where mg is the weight of the cocoon (m - is the mass of the cocoon), P_A - is the Archimedean pushing force and Q is the force of viscous resistance from the water , which depends on the shape of the ellipsoid direction of its movement. In the calculations, we take the form of an ellipsoid in the form of a ball with a reduced radius R_{np}, determined from the condition of equality of the volumes of the ball and the ellipsoid.

$$4\pi R_{np}^3/3 = 4\pi R_1^2 R/3$$

From where we define the radius of

$$R_{np} = \sqrt[3]{R_1^2 R}$$

The resistance force of the aquatic environment to the cocoon in the form of a ball is determined by the formula.

$$Q = 6\pi\mu R_{кел}\dot{h} \tag{3}$$

Therefore, we assume $P_A =$ mg. Then equation (1) taking into account (2) $m\ddot{h} = P - 6\pi\mu R_{np}\dot{h}$ (4)

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Takes the form Since all these forces are applied at the point O_1, then the rotational motion of the cocoon arises due to the action of the force P and thus, the equation of rotation of the ellipsoid can be represented as $J_x\ddot{\varphi} = cP$ (5)

where: J_x - is the moment of inertia of the ellipsoid relative to the axis Ox

$$J_x = \iiint \rho(y^2 + z^2)dxdydz = \frac{8\pi\rho R^2 R_1(R^2 + R_1^2)}{15} = \frac{2m}{5}(R^2 + R_1^2)$$

With is the distance from the center of mass of the ellipsoid to the line of action of force P.

III. LITERATURE SURVEY

Methods of statistical along the contour of the ellipse ADBC considering (z_p, y_p) $O_1L = z_{1p}$, $KL = y_{1p}$.

We establish these equalities we find $O_1E = \dfrac{c}{\cos\varphi}$, $EL = KLtg\varphi = y_{1p}tg\varphi$,

$O_1E + EL = O_1L = z_{1p}$ coordinates of the point of application of force P moving the equation of the ellipse ADC are parametrically represented.

$$c = z_{1p}\cos\varphi - y_{1p}\sin\varphi \qquad (6)$$

The speed of moving the point is expressed by the formula. $z_1 = R_1\cos\psi$, $y_1 = R\sin\psi$ form

If the speed is known, then from (6) we make an equation for the definition $v_p = \dot{\psi}\sqrt{R_1^2\cos^2\psi + R^2\sin^2\psi}$ (7) form

Solution equation (7) satisfying condition (0) 0 is represented through elliptic functions.

$$\dot{\psi} = \frac{v_p(t)}{\sqrt{R_1^2\cos^2\psi + R^2\sin^2\psi}} \qquad (8)$$

To determine the force P, we use the formula proposed in $P = k_1\dfrac{k_0}{k_0 + k_1}[x_0(t) - h]$ (9)

Where: $k_1 = k_1(t) = (k_{\max} - k_{\min})(1 + \cos\pi t / t_{np})/2 + k_{\min}$, k_0 , $k_{\min}$, $k_{\max}$ - the stiffness coefficients characterizing elastic properties of the formed thread and the resistance force when removing the thread from the cocoon surface, lap - the time of completion and removal of the thread in one cycle, determined experimentally, ho (1) - the law of reel movement. Equation (6) with (9) and)

$$J_x\ddot{\varphi} = (R_1\cos\psi\cos\varphi - R\sin\psi\sin\varphi)\frac{k_1k_0}{k_1 + k_0}[x_0(t) - h] \qquad (10)$$

reduces to the form Equalities (4), (8) and (10) form $h(t)$, $\psi(t)$ ва $\varphi(t)$ a system of differential equations for determining the functions.

In Fig. 2 graphs of displacement cocoon center removal rate for various values , filaments with cocoon surface system.

$v_0 = 0.01m/s$ $\qquad$ $v_0 = 1m/s$

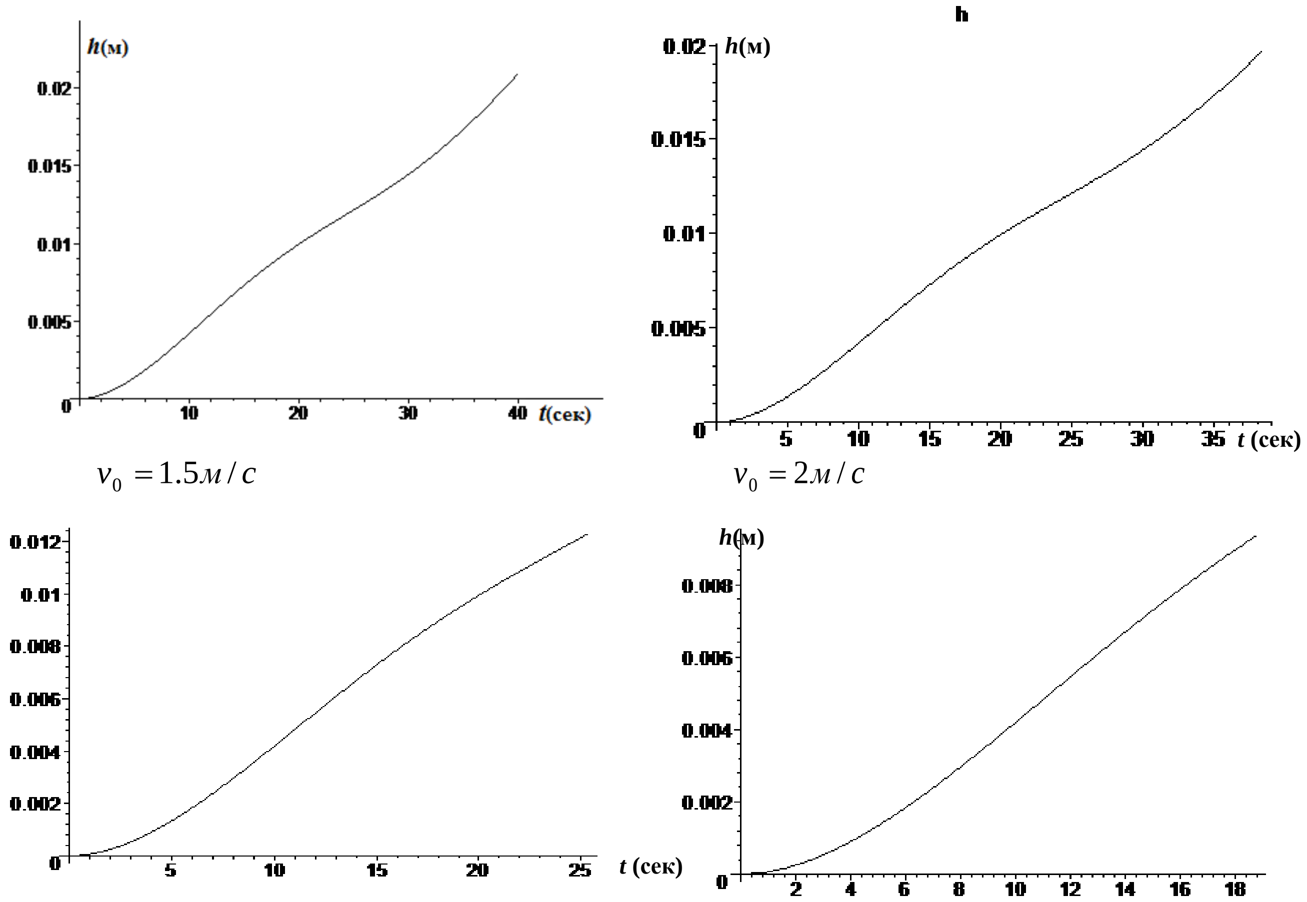

Fig.2. the dependence of the movement of the center of the cocoon for $\alpha = 45^0$ and various values of the speed of the displacement of the point M1 Analysis of the curves presented | x in Fig. 2. Shows that for small values of the velocity vo of the motion of the point M1 along the arc of the ellipse, the displacement of the center of the cocoon reaches its greatest value and with increasing this velocity it begins to decrease. In this case, an intensive removal of the filament from the surface of the cocoon takes place when the center of the cocoon is lifted and its original position is maintained relative to the horizontal plane.

$\alpha = 0^0$ $\alpha = 15^0$

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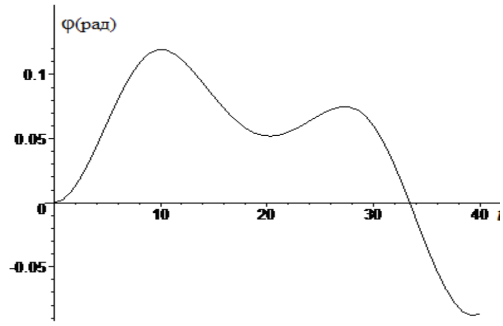
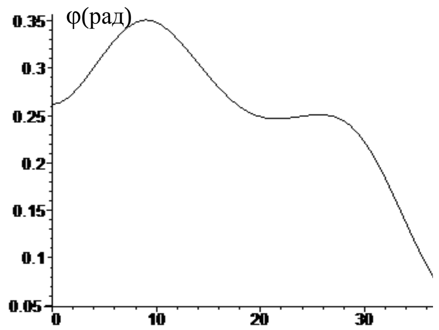
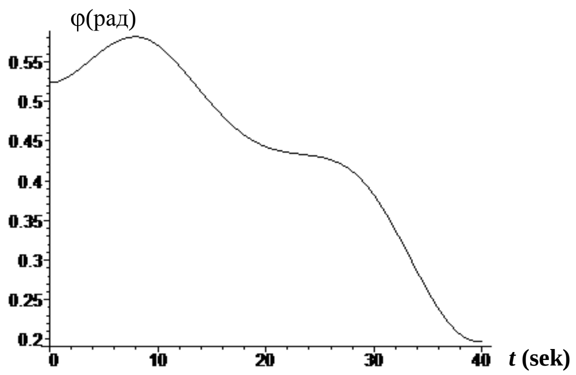




$\alpha = 30^0$ $\alpha = 45^0$



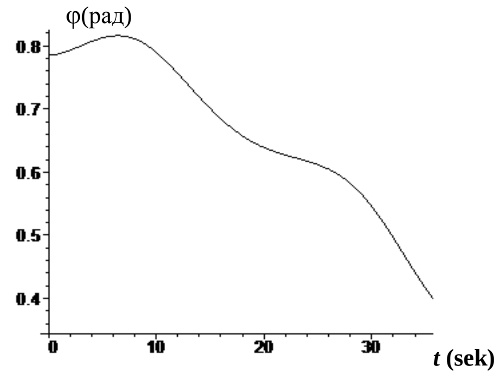
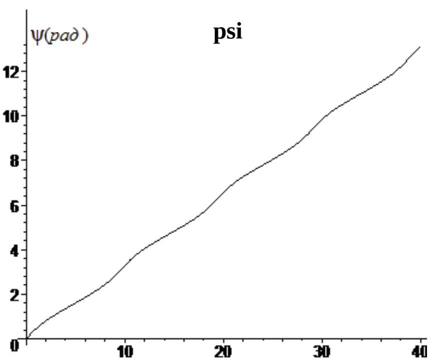


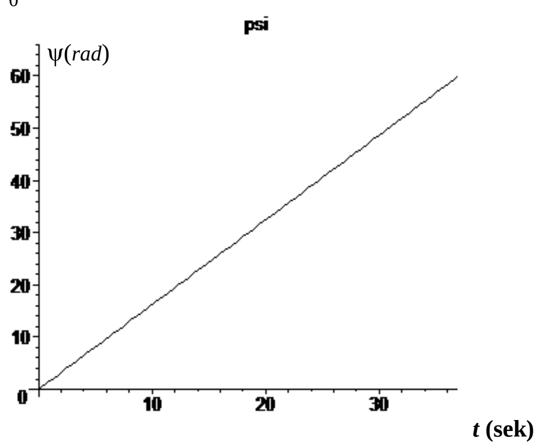
Fig.3, Changing the angle of rotation of the cocoon with time for different values of the angle of inclination when the pickup point M1 moves along the contour of the ellipse at a speed v, -0.01 - m / s calculations show that a change in the angle of rotation of the cocoon.

IV. EXPERIMENTAL RESULTS

Relative to the horizontal plane occurs at small values of the velocity vo (vo <0.05m / s) of the removal point M1, and the rotation of this angle counterclockwise occurs at small initial angles of inclination. With an increase in this angle, the cocoon rotates clockwise about the 0x axis. At values of velocity v,> 0.1.m / s, the cocoon practically does not make a turn about the axis of rotation, and the center of the cocoon moves in the vertical direction according to the hv law. (Fig.4)

$v_0 = 0.01 m/s$ $v_0 = 0.1 m/s$





$v_0 = 0.5 m/s$ $v_0 = 1 m/s$

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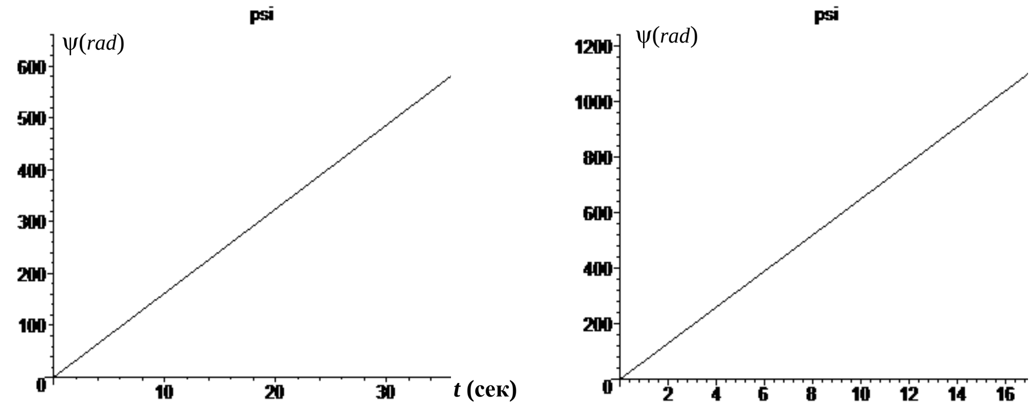

Fig.4. The dependence of the polar angle of the ellipse (1) (pad) on time, (sec) for 45 ° and different values of speed v, movement of point M1 From the analysis of the graphs shown in Fig.3, it follows that for large values of the speed of movement of a point, the change of polar angle from time is linear.

It is well-known that the L rows of complex ropes and their filling are randomly generated, each of which causes defects, as there is a lack of cord length of a certain C length.

$$S=\vartheta \cdot t_{к} \qquad (11)$$

where n is the number of inserted threads; L-length of the passage, m; ly·y - continuous length of the cord length, in m; The sum of the total yarn of the equation (12) is given below.
The sum of the total yarns in the equation is as follows:

$$L=\vartheta \cdot t_{к} \cdot \frac{T_{x.u}}{T_{n.u}} \qquad (13)$$

To ensure the linear density of the raw silk, in order to add the missing thread, there is a need for removal of the missing cladding in the decanting tube for time, which is expressed as:

$$n_3^{"}=\frac{L}{l_{n.u}}=\frac{\vartheta \cdot t \cdot T_{x.u}}{T_{n.u} \cdot l_{y \cdot y}} \le [n_n] \qquad (14)$$

where: $\frac{T_{x.u}}{T_{n.u}}$ - he number of threads to be added; $T_{x.i}$-linear density of crude silk, tex; $T_{p.i}$ - linear density of cord yarn, tex; - speed of decay, m / min; t - time, p; [nm] is the number of strokes removed by calculation. From the equation (14) we can write the following expression:

$$V_{\max} \le \frac{n_з^{"} T_{n.u.}}{t \cdot T_{x.u}} \cdot l_{yy} = [n_м] \cdot \frac{T_{n.u}}{T_{x.u}} \cdot l_{y \cdot y} \qquad (15)$$

The formula is determined by the following formula:

$$\left([n_м] = \frac{n_з^{"} \max}{t} \right)$$

It is possible to detect the speed of cocoons from the equation, and to limit the amount of coagulation to a certain amount of time.

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V. CONCLUSION AND FUTURE WORK

The process of separating the filament from the surface of the cocoon was investigated, and also the rotation of the ellipsoid around the small axis of it during the initial spreads of the fully immersed state in the aquatic environment was determined, this is a study of the vertical direction of the process in the external outlet contour of the ellipse.

Investigating the process of using the model is connected between the thread elasticity's twisting them in the zone of transformation of the raw silk in the process of unwinding for images of the process of selected threads taken from the surface of the cocoon. Delano activity prevented flaws in many practice points of the image of rotation around the minor axis and composed them with the center of gravity during the initial movement of the cocoons.

REFERENCES

1. Akhmedov J.A. "Creation of technology manufacturing of sewing and embroidery threads of new structures" Doctor of science (DSc) on technical science 2018 y.
2. Islambekova N.M. "Perfection of technology of preparation of cocoons to unwinding with use of surface-active substances" Doctor of science (DSc) on technical science 2019 y.
3. Jiang, X., Xu, J., Ge, G., Zhang, H., Xie, G.A comparative study on sericin content in fresh cocoon raw silk and dried cocoon raw silk. Journal of Silk, 2017 54(7),71102.
4. Yu, H., Hou, J., Yu, S., Jiang, J., Nie, S. Comprehensive understanding of the non-productive adsorption of cellulolytic enzymes onto lignins isolated from furfural residues. Cellulose 26(5), pp. 3111-3125. 2019 y.
5. Wongkasem, S., Aksornpim, P. The development of a carding machine and a twisting silk machine for eri silk. 2015. 801-806 c.
6. Kukin G.N., Soloviev A.N. "Textile Materials" (Original textile materials) –M "Legprombytizdat", 1985.
7. Zaetta, A., Bernardin, B.,Vanier, M., Tommasi, J.,Varaine, F. Generation IV sodium fast reactor: Feedback reactivity coefficients to optimise safe natural core behaviour during accident transients, International Congress on Advances in Nuclear Power Plants 2009, ICAPP 2009