and technological parameters of the working bodies of the granulator and properties of feed raw materials, were received.

Feed, pelleting, power, pressure, screw.

UDC 631,363

ANALYSIS OF THE DISTRIBUTION OF PRESSURE AND LEAKAGE KORMUZ LAWS BUNKER

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The analysis of the pressure distribution of the material in the hopper and the equations for determining the law outflow of feed from the hopper.

Dispenser, vertical axis vichkovyy drum leakage, pressure distribution.

Formulation of the problem. Entering the maximum animal performance is not always depend on a sufficient number of harvested forage and its high quality. In addition, it is necessary that the animal diet was balanced enough for a number of indicators. Adherence to the principle of balanced diet by feeding the main elements enables a 10-20% increase technological impact of feed [1]. Rationing and accurate dosing concentrates on the basis of individual milk production of cows positive effect on their milk production, helps reduce the total cost of feed per unit of production, and save feed.

Analysis of recent research. Review designs dosing and dispensing means indicates widespread use in livestock bulk and weight distribution means for the dosed combined feed. Analysis of existing metering shows that doses extensive operation simple and reliable in operation, and energy-intensive metal. Dispensers engaged by weight dosing principle structurally difficult to maintain. Regardless of the method and type of dosing dispenser ultimately controlled feed by weight or by weight deviation from the specified dosage of food standards within the established livestock admission requirements. Under the influence of the working feed dispenser with unloading rising layer of variable section with varying bulk density, because of what feed is probabilistic in nature [2, 3, 4].

The purpose of research clarification is pressure distribution and reception of differential equations to determine leakage process feed from the hopper.

Results. Form hopper device issuing animal feed [5] based on design features take the form of a truncated cone segment. When choosing a bunker should determine its shape, volume and capacity of handling windows. According to the design of the dispenser discharge hopper window taking in a segment (Fig. 1), which provides increased load time of dosing drum cells to ensure their desired filling. Space hopper should contain the maximum amount of food required to meet at a cycle of continuous distribution condition on the front row for one feeding the animals or be a multiple of a certain number of rows.

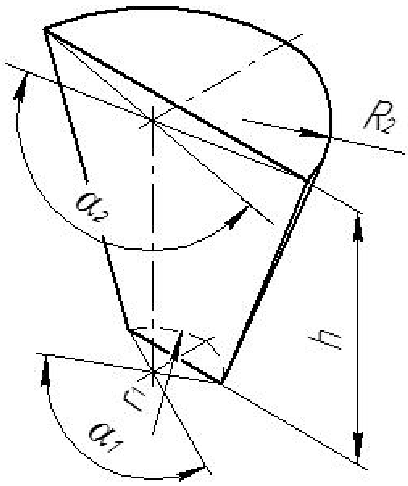

Fig. 1. Construction scheme hopper unit issuance feed.

Hopper volume can be determined by the expression:

$$V = \frac{1}{3}h\left(S_1 + \sqrt{S_1 S_2} + S_2\right), \qquad (1)$$

where: h - the height of the bunker, m; S1 - area vygruznogo hopper windows, m2; S2 - square windows boot bunker, m2; Dimensions vygruznogo hopper windows due to construction and feeder area as S1 remain unchanged. Square boot S1 and S2 vygruznogo windows are:

$$S_1 = \frac{1}{2}r_1^2\left(\frac{\pi\alpha_1}{180} - \sin\frac{\pi\alpha_1}{180}\right), \qquad (2)$$

$$S_2 = \frac{1}{2}R_2^2\left(\frac{\pi\alpha_2}{180} - \sin\frac{\pi\alpha_2}{180}\right), \qquad (3)$$

where: r1 and R2 - radiuses and segments vygruznogo boot holes, m; α1 and α2 - central viewing segments of windows degrees.

The above formula shows that the volume of bunker depends on its height and radius R2 and central angle α2 boot opening. To determine the leakage process feed from the hopper to be obtained differential equations of the process.

Suppose that the flow of feed when you move from top to bottom has a removable section [6] under the scheme "hydraulic" leak (Fig. 2). In a fixed time of moving in the hopper feed stream that is treated as a continuous medium, we distinguish two close horizontal element thickness. In it, the following external forces: - gravity applied to the center of mass C selected item, and - vertical force applied to an element of the feed layers located above and below; - Reaction bunker walls, divided by the area of contact with the walls of the element. Since the projection of the vertical wall on the X axis is "0", it did not consider.$t = const dx d\bar{G} \bar{P}\ \bar{P} + d\bar{P} d\bar{R}$

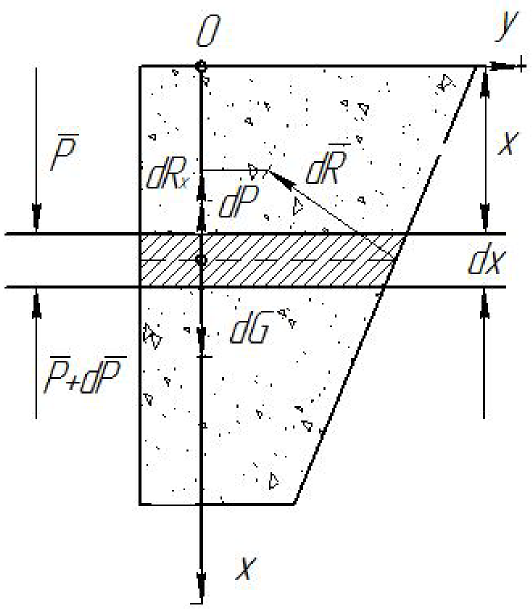

Fig. 2. Scheme of the forces on the moving elementary volume continuous "loose" environment.

The elements in the infinitely small thickness has a finite size in the horizontal direction and can be considered as a mechanical system of material points.

Differential equations of motion of center of mass (element) in the projection on the axis Ox (Fig. 2) becomes:

$$dm \cdot a = dG + dR_x - dP, \quad (4)$$

where: - the mass element; - The projection of the center of mass acceleration C OX axle element (acceleration element); - The amount of projection walls elementary reactions on the axis OX; - Increase vertical force F, the appropriate reporting element.$dma = a_c dR_x d\bar{R} dP = Q - P$

Mass and weight are important elements:

$$dm = \gamma F dx; \quad dG = \gamma g F dx, \tag{5}$$

where: F - cross sectional area of the hopper horizontal plane perpendicular abscissa X;γ - Bulk density granular medium.

The reaction of the walls of the bunker on the element continuum unknown. However, if we imagine an environment in the form of crushed granular material (the aggregate particles feed), then in the indicative evaluation forces can come to the conclusion that as the compressive force P will proportionally increase Spreaders force, and therefore the reaction of the walls of the bunker and their Oh projection on the axis. Then:

$$dR_x = -kPdx, \tag{6}$$

where: k - coefficient of proportionality.

The coefficient k characterizes the resistance to progress of loose material in the hopper while it is largely washer and properties of the medium. Considered factor is the unknown function of the shape, size and arrangement of grains, internal friction coefficient and the walls of the bunker, shape and size of the cross-section of the bunker. When given parameters bunker and loose material it depends on the depth of the x-section:

$$k = k(x).$$

The coefficient k can be called coefficient of resistance. Substituting the values (5) and (6) in equation (4) and divide the resulting expression. The equation becomes:dx

$$\frac{\partial P}{\partial x} + kP = \gamma F(g + a). \tag{7}$$

Sign partial derivative raised here because the allocation volume element (Fig. 2) the strength increment obtained only by changing the abscissa intersection at a fixed time.$P = P(x,t) dP = \ d_x(P) t = const$

Power P in equation (4) can be expressed in terms of vertical pressure$\sigma = \frac{P}{F}$

$$\begin{cases} P = F\sigma = F(x)\sigma(x,t); \\ \dfrac{\partial P}{\partial x} = \dfrac{dF}{dx}\sigma + F\dfrac{\partial \sigma}{\sigma x}. \end{cases}$$

Then equation (4) will look like:

$$\frac{\partial \sigma}{\partial x} + \left(k + \frac{F'_x}{F}\right)\sigma = \gamma(g - a), \tag{8}$$

Where:.$F'_x = \frac{dF}{dx}$

Practical use of equations (7) and (8) is complicated, however, because the acceleration element and not expressed through law outflow - dependent volumetric flow of time. This expression can be obtained using a known ratio between the volume flow rate q, flow rate V and the cross-sectional area of the bunker F:$q = q(t)$

$$q = FV,$$

which is valid for an environment that is not compressed.

Then:

$$V = \frac{q}{F} = \frac{q(t)}{F[x(t)]},$$

where - law of motion element in the bunker; - The variation of the influence of time cross-sectional area hopper, which holds the rolling element.$x = x(t)F[x(t)] = F(t)$

Prodyferentsiyuvavshy rate moved item on time, find its acceleration:

$$a = \frac{dV}{dt} = \frac{qF - qF_x' \cdot \dot{x}}{F^2}.$$

Since then:$\dot{x} = V = \frac{q}{F}$

$$a = \frac{1}{F}\dot{q} - \frac{F_x'}{F^3}q^2, \quad (9)$$

Given the (9) Differential Equations (7) and (8) will look like:

$$\frac{\partial P}{\partial x} + kP = \gamma\left(gF - \dot{g} + \frac{F_x'}{F^2}q^2\right), \quad (10)$$

$$\frac{\partial \sigma}{\partial x} + \left(k + \frac{F_x'}{F}\right)\sigma = \frac{\gamma}{F}\left(gF - \dot{g} + \frac{F_x'}{F^2}q^2\right). \quad (11)$$

Using equation (10) or (11) can be found leakage laws and laws of distribution of vertical pressure in the silo.

Conclusion. The proposed differential equations will find laws leakage of feed from the hopper and clarify the distribution of pressure on the walls of the bunker.

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Conducted analysis apportionment pressure of the material in the hopper and poluchenы equation for definitions law Leaks IZ feed hopper.

Batcher, Vertical behold, vychkovыy drum Leaks, ALLOCATION pressure.

The analysis of pressure distribution of material in hopper and equations for determining the law outflow feed from the hopper.

Weigh, vertical axis, drum leakage, pressure distribution.

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RESEARCH METHODOLOGY EXPERIMENTAL SETUP FOR PRODUCTION OF PROTEIN FRACTION Pellets MAKUHYNASINNYA OILSEED

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The method of experimental research installations for the production of pellets with protein fractions cake oilseeds.

Oilseeds meal, pellets, protein fraction, installation.

Formulation of the problem. Increased production and improved quality protein feed as one of the most important tasks in increased productivity of animals and birds can be achieved by improving the technology for processing oil cake, which is currently limited to grinding followed by introduction of the feed.

Today, the main method of processing cake is crushing with subsequent introduction of the feed. Advanced Institute oilseed cakes processing technology through the introduction of additional mechanical operations fractionation crushed cake and husk the protein fractions can provide more than

40% protein powder protein content of at least 38%. The content of protein powder in 8-12% oil promotes rapid oxidation, which leads to lower quality protein supplement. To increase the travel time of the oxidation process proposed to produce a protein fraction in the form of pellets [1-4].

Also avoid rapid oxidation due pelleting process, volumes will be reduced in the preservation of pellets warehouse and reduced the cost of their transportation. Therefore, issues of mechanical processing cake by improving the technology and equipment for the separation of the protein fraction in the form of pellets is very important.