

THE MAIN CRITERIA OF SELECTING MEANS FOR REMOVING MANURE FROM LIVESTOCK FACILITIES

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Manure removal is an important part of the technological process in animal husbandry, which directly affects the maintenance of an optimal indoor climate, and, as a consequence, the health and productivity of animals. Therefore, the best option is a prudent choice of manure removal system at the design stage of livestock facilities.

Criteria for choosing a manure removal system are formed on the condition of obtaining the greatest efficiency of its use. Among them are the criteria of price, reliability, productivity, quality of work, operating costs. [1, 2]

The efficiency and expediency of using a particular manure removal system is also influenced by the characteristics and size of agricultural land, the method of keeping and feeding animals.

Technological schemes of manure removal include requirements, compliance with which will qualitatively affect the final result. Among the requirements:

1. Ensuring the most complete preservation of the manure quality as fertilizer.
2. The absence of the negative impact on humans and animals.
3. Simplicity of a design, efficiency, reliability, flowability.
4. Ensuring minimum labor costs.
5. Ensuring the maximum level of automation.
6. If there is a slotted floor, it must be made of materials that are not capable of harming the animal.
7. Ensuring minimum water consumption
8. Prevention of environmental pollution.

Mechanical and hydraulic means are used to remove manure. [1]

Hydraulic systems are based on the removal of manure by fluid flow, pressure or self-flowing method (under the action of gravity). Used by tethering without litter.

But the most effective way of environmentally friendly production, reducing energy, labor costs, as well as operating costs – is to reduce the output of the mass of wastewater, which can be realized by reducing the flow of water into the manure removal system. Therefore, the improvement of manure removal systems is aimed primarily at the use of anhydrous methods of its collection.

As a result, the most common in animal husbandry are mechanical methods of manure collection, among which are stationary and mobile. [2, 3]

The stationary mechanical means include conveyors of circular (chain-scraper) and reciprocating action (rod), screw conveyors (screws), scraper installations.

TSN circular conveyors are used to automate the cleaning of livestock complexes with tethered animals on small bedding with simultaneous unloading of manure into vehicles.

The main disadvantages are the non-optimized path of the manure mass to the unloading point, small cleaning area, starting overloads, and relatively low reliability, which is currently significantly increased due to the use of rolling and heat treatment of chain components.

Conveyors of reciprocating action differ from conveyors of circular action by the increased technical and economic indicators, ability to transportation of various types of manure, reliability, the optimized movement of manure weight to an unloading point. [2]

Scrapers are used for loose housing of animals, on farms where rough bedding is used. Depending on the amount of manure and the length of the farm they are equipped with two or four sets of scrapers. Simple in design, they are of high reliability and are most effective when used at the rate of 1 kg of bedding per head per day.

Mobile vehicles include bulldozers, wheel loaders, devices mounted on tractors or self-propelled chassis.

Bulldozers are mainly used on livestock farms. To increase the performance of the bulldozer, it is equipped with side movable or fixed flaps. Mobile means of manure removal and transportation are used for tethered and untied keeping of animals for removal of solid and semi-liquid manure. They have high reliability and high productivity.

For example, in the case of loose housing of cattle, the removal of deep bedding from livestock facilities is carried out by tractor loaders PE-0.8B, PFP-1.2, PU-0.5 in transport through the loading platform or directly into transport. The thickness of the bedding layer together with excrement per year reaches 0.5-0.9 m. Removal is carried out by bulldozer once a year. [1-3]

Summing up, we can say that under certain conditions, each of the existing means of manure removal can be used with high efficiency. However, to get the best result, it is necessary when designing livestock facilities to competently approach the choice of a tool, taking into account all indicators (volumes and specialization of the livestock enterprise, method of keeping animals, climatic conditions, etc.) that may affect the final result. [1]

References

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