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# **SCIENCE AND EDUCATION: PROBLEMS, PROSPECTS AND INNOVATIONS**



**ABSTRACTS OF V INTERNATIONAL  
SCIENTIFIC AND PRACTICAL CONFERENCE  
FEBRUARY 4-6, 2021**

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# **SCIENCE AND EDUCATION: PROBLEMS, PROSPECTS AND INNOVATIONS**

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## STORING GRAIN IN METAL SILOS

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**Abstract:** The article describes the importance of grain crops for humans, shows the characteristics of metal silos, which are used for storing grain, legumes and oilseeds. Their advantages and disadvantages are presented. It is shown how the process of unloading grain is carried out.

**Key words:** metal silo, storage, requirements, grain.

Food is one of the most important resources of life. The level of food supply is the first indicator of its quality assessment. From cereal grains, you can get such products as: cereals, flour for pasta and bread. The importance of manufacturing these products for people cannot be overstated. Do not forget that grain is the same essential source of protein and carbohydrates for animals. Up to 75% of grain crops are part of the compound feed for most animals and birds. Thanks to the grain of cereals, livestock and poultry farming is successfully developing, and the production of milk, meat and other animal and poultry products is increasing.

Our country holds the first place in the world in terms of its territory, which means that the issue of expanding arable land is not so acute for us, unlike other countries.

The paradox is that increased production volumes are not always pleasing to farmers, since it is not enough just to harvest grain, it is necessary to create conditions for its long-term storage using modern technologies based on a scientific approach to the problem. It is necessary to preserve grain without quantitative and qualitative losses.

Therefore, today one of the preferred and widespread storage methods is grain storage in metal silos.

Metal silos are a relatively new trend in grain storage. To promote their goods on the market, sellers often use the factor of little awareness of customers, which does not allow optimizing and even planning the costs of building grain silos. In this article, the authors have shared their experiences and insights that will be useful to investors and industry professionals.

At present, active construction and reconstruction of grain storage and processing enterprises is underway, an integral part of which are grain storage facilities. Despite the fact that there are various designs of granaries, metal silos are the most demanded in terms of cost and construction time. Today, dozens of companies in the world produce grain storage silos with a fairly similar design. However, when choosing silos for grain storage, there are many factors to consider that affect cost, structural stability, silo durability and grain safety. As a result of the analysis of numerous information in the public domain and our own experience in the construction of grain storage and processing facilities, a methodology and sequence for the selection of metal silos for various tasks has been developed, which are advisable for investors, designers and specialists in the bakery industry.

Modern silos are made from aluminum, steel and various alloys. In our country, such silo systems have become quite popular. This is not surprising: they are quickly erected, accommodate a large volume of products, all types of grain processing are used.

**We also note separately the advantages of metal silos with a conical bottom:**

- quickly assembled;
- occupy a small area;
- mechanized loading and unloading operations;
- fireproof;
- protect grain crops from rodents;
- additional ventilation and disinfection of grain;
- quickly pay off.

**Like grain storage and other grain storage silos, silos also have some disadvantages:**

- condensation moisture is formed in the grain layers close to the walls, when there are sharp changes in air temperature;
- limiting the diameter of hopper bottom silos (maximum diameter is 9 meters).

Their capacity reaches 1000 tons.

Flat-bottomed silos are much more spacious, with a diameter of 15 meters or more and a capacity of over 6,000 tons.

The grain mass is discharged through a funnel, which is located in the center of the bottom. The process is carried out using a chain conveyor, which is placed under the bottom. The rolling auger feeds the remaining grain, and the silo bottom is cleaned manually or using a pneumatic unloader. The level of mechanization of the process of unloading a metal silo with a flat bottom is inferior to the level of mechanization of elevators and silos with a hopper bottom.

Thus, the safety of grain crops in metal silos without quantitative and qualitative losses is an important task for the elevator industry.