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USE OF SOFT WALL CONTAINERS FOR VEGETABLE TRANSPORTATION

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ИСПОЛЬЗОВАНИЕ МЯГКИХ СТЕННЫХ КОНТЕЙНЕРОВ ДЛЯ ОВОЩНЫХ ТРАНСПОРТИРОВКИ

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Annotation

The paper discusses the use of flexible containers (MC) for the transport of vegetables, especially root vegetables. Until recently, MC, simply put the bags have been used in agriculture for cargo weighing up to 100 kg. As the proportion of mechanization in the work becomes more relevant use of MK larger size because their advantage is obvious. The article deals with the pressure on the walls of the production of small and large size of the MC and compared with the strength polypropylene fabric. As a result, the calculation of the pressure on the walls of the MC shown the possibility of using PP fabric of different density

Аннотация

В работе рассмотрены вопросы использования мягких контейнеров (МК) для перевозки овощей, в частности корнеплодов. До последнего времени МК, проще говоря мешки, использовались в сельском хозяйстве для перевозки грузов весом до 100 кг. По мере увеличении доли механизации в работе актуальнее становится использование МК более крупного размера считается актуального проблема. В статье рассмотрено давление продукции на стенки малого и крупного размера МК и проведено сравнение с прочностью полипропиленовой ткани. В результате расчета давления на стенки МК показано возможность использования ПП полотна различной плотности.

Ключевые слова: контейнер, транспорт, эксперимент, дефект, транспортировка.

Keywords: container, transport, experiment, defect, transportation

The widespread use of soft containers in the world today is an advantage over other types of containers (metal, wood, plastic, small wooden boxes, iron barrels, etc.) due to a number of advantages.

The widespread use of soft containers in the world today has a number of advantages over them compared to other types of containers (metal, wood, plastic, small wooden boxes, iron barrels, etc.).

- small capacity coefficient of the transport scale (0.01 .... 0.02);
- small price (5-10 $ per 1 ton of cargo);
- impossibility of complex mechanization in loading, unloading, unloading, storage, when using a simple bag;
- achieving a high utilization factor of the storage area when using soft containers, especially when loading upwards.

In recent years, there has been a sharp increase in the transportation and storage of soft containers [1,2]. Experimental industrial soft containers designed to transport liquid foods such as pistachio oil are being produced. Then soft containers hermetically sewn from dense material are placed on a platform (1000x1200 mm) and provided with fasteners that are mounted at the corners. Filling of the soft container is carried out by means of a special valve using a pump. The platforms can be loaded onto closed railcars, large tonnage containers. The widespread and efficient use of soft containers is now a significant competition to traditional containers.

Figure 1 First made and modern soft containers
The Taykon soft container is on the left. In the middle are 95x95x130 four-striped, single-layer, bottom unloading knot.

Soft containers were first produced in 1919 by the Japanese firm Taiyo Kogro Co. This farm is designed to carry a small load on the head of a soft container called "Tycon" and to carry the scattered cargo by rail. Since then, cargoes have been used by the United States and Western European countries. For the first samples, natural fibers were used - cotton treads, tarpaulins and so on.

They did not have high strength and they rotted quickly and did not have a long service life, so the external support system, in which the supports are installed inside or outside, is made of stands with a right-angled carcass.

In the middle of the twentieth century, the development of the chemical industry in the 1950s and 1970s, synthetic polyamide and plywood fibers were used in the processing of cargo container edges. Polyamide fibers (nylon, kapron, perlon, etc.) are very strong and resistant to chemicals, water and forces. Its disadvantage is that it wears out under the influence of light and the coefficient of elongation is relatively high.

Polyester fabrics (teripen, tetran, diopen) are durable, resistant to sunlight and atmospheric influences, but have the property of collecting static electricity.

Fabrics from synthetic fibers (viscose, artificial silk) are also used in the assembly of cargo containers, as they are strong and durable, lose their initial 60% durability due to moisture and subsequent hydrolysis.

The cargo container (big-begs) is made of hook quality before and now hook quality, ring. In the CIS countries, cargo containers with the following characteristics are used:

- SPK-1.5 m is mainly designed for loading and unloading of two-layer, 4-hole perforated loader for polystyrene transportation;

- Superphosphate, made of granular polyethylene, pallet, made of rubber-added fabric, similar to the current belt material, volume 1.3 m3, length 910 mm, width 700 mm, height 180 mm, lifting capacity 1.5 t;

For various loads, visnoxa, kapron, kouchik (SKD brands), lifting holes from rubber-mixed fabrics, tape, iron ring in MkR.

Due to the addition of rubber as a fabric in the above types, the weight went up to 95 kg and was sometimes not folded. To date, more than 2,000 patents have been obtained for soft containers. Although the number of patents is large, their basic elements remain the same; Loading and unloading nodes, load elements, hanging lugs, pockets for documents.

The soft container is made of different fabrics according to the mass and purpose of the load for the top layer material, 1-2 layers are made after the load is filled, some soft containers have a cylindrical, sometimes parallelepiped shape. Big begs (soft containers, big begs–big bag) – is a widely used universal. The most commonly used dimensions of soft containers are:

- two stropes, one layer, two stropa, two layers;
- 75x75x125 double strop, single layer;
- •75x75x125 two stripes, two layers;
- 75x75x150 two-strip, single-layer;
- 95x95x130 four-strip, single-layer;
- 95x95x150 four-strip, single-layer;
- 95x95x180 four stripes, single layer.

The issues of launching the production of big-bags, which are widely used in the world market in Uzbekistan, research, calculation of pressure in bags, finding fabrics that can withstand this pressure and sewing soft containers should be considered.

To determine the magnitude of the pressure of the product on the wall of the soft container, consider the structure of the container (Figure 2).

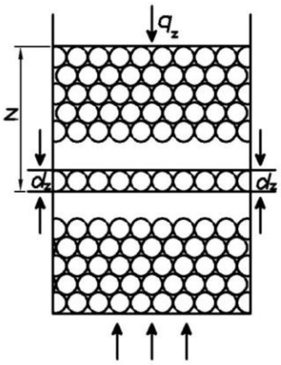

Figure 2. Diagram for calculating the magnitude of the forces acting on the walls of soft containers in the layer qx at depth Z

From the upper surface we separate the elementary layer dz at a depth Z, and if the mass of the product in the layer is affected by the force qz directed from the top and *qz + dqz* from the bottom, and the frictional forces from the wall. The force acting on the load from the top is negative.

The equation of forces is expressed as follows:

$$\gamma_z S d_z + S q_z - S q_z - S d_z - f E q_z S = 0$$

Thus, if we consider the horizontal layer for the product (potatoes, apples, pears, carrots, etc.) to be kept in equilibrium conditions, and calculate the impact forces, we can find the qz pressure at depth Z.

As an example, the pressure qz acting on the container wall and the pressure qx on the product are calculated relative to the potato and carrot product. Soft containers of 500-1000 kg are used on an industrial scale. The density of potatoes is 650 kg / m3, the density of carrots is 550 kg / m3. Here is a calculation method for a simple bag. At a depth of container radius R = 0.25 m Z, the friction angle of the product is 250.

Assuming S = 2, S = 0.196m2 U = 2 Assuming U = 1.57 m

The coefficient of internal friction of the product is equal to the tangent of internal friction:

$$f = tg\alpha = tg25^0 = 0{,}4663$$

Side pressure coefficient

$$E = \frac{1 - \sin\alpha}{1 + \sin\alpha}, \ \sin\alpha = \sin 2\,5^0 = 0{,}4226$$

then E = 0.4 and we find qz and qx from formulas (2) and (3).

Table 1

Table for calculating the pressure of potatoes on the bottom and wall of the container

Characteristics	Depth of placement of the measurement area, m									
Z, m	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
$q_{z,\text{Па}}$	4600	8490	12020	15560	18740	20160	22280	24050	25460	26880
$q_{x,\text{Па}}$	1840	3390	4810	6220	7500	8060	8890	9620	10180	10750

Assume the size of the container is 95x95x1300 cm and in the next table we calculate the effect of the potato on the wall

Table 2

Calculate the effect of potatoes on the wall

Characteristics	Z, m depth	The width of the container a, м	Container length б, м	$q_{x\,\text{МПа}}$
Indicator	1,3	0,95	0,95	0,85

The relationship between the pressure on the walls and bottom of a small-volume and a large-volume soft container and the weight of the product inside the container is shown in the following graph (Figure 3).

The graph shows that the wall pressure in a large container did not exceed 1.5 MPa. In recent years, soft containers have been produced from PP. PP can withstand pressures up to 40 MPa [4]. Such high-strength PP fabrics are used to produce very large containers of 3-4 tons [4].

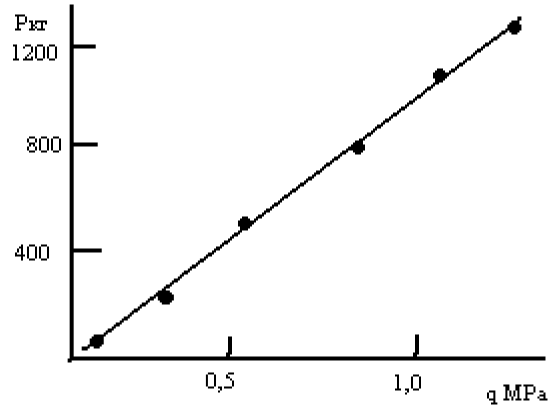

Figure 3. Pressure on the walls of the soft container and the heavy connection of the product

This means that small soft containers for agricultural products can be made from thin P P fabric and large bags from thicker fabric, and orders can be made according to the technical specifications of PP fabric.

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PERSPECTIVES OF BIOGAS PRODUCTION FROM DIFFERENT TYPES OF BIOMASS AND ORGANIC WASTE

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ПЕРСПЕКТИВЫ ПРОИЗВОДСТВА БИОГАЗА ИЗ РАЗЛИЧНЫХ ВИДОВ БИОМАССЫ И ОРГАНИЧЕСКИХ ОТХОДОВ

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Abstract

The present study reveals the environmental consequences of the use of conventional fuels and perspectives for the production of biogas (BG) from different types of biomass (BM) and organic waste (OW) by fermentation have been investigated. For this purpose, a comparative analysis of the effectiveness of the suitable BM and OW types is carried out. A comparative analyzes about the chemical composition of BM and OW, as well as heat transfer ability (HTA) were performed. Detailed information about the importance of the production of biogas from sewage waste is also provided.