

IMPROVING THE EFFICIENCY OF THE SEED DELINTING MACHINE THROUGH STRUCTURAL DESIGN OPTIMIZATION

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Abstract

This study investigates the improvement of seed delinting machine performance through the application of modified saw cylinders as an alternative to conventional metal brush drums. Experimental results indicate that the proposed design enables the recovery of 2.5–3.0% Grade B cotton lint from cottonseeds with an initial lint content of approximately 9.0%. The findings demonstrate that the modified saw-cylinder configuration enhances the efficiency of the delinting process while improving the utilization of residual fiber and reducing processing losses.

Keywords: Cottonseed delinting, modified saw cylinder, residual lint, cotton lint recovery, processing efficiency, fiber removal, machine optimization, brush drum replacement, lint content, cotton processing.

Introduction

Today, two methods of seed pollination are used, mechanical and chemical methods. The chemical method of hair removal has developed in the foreign countries, it is also used in some cotton-textile clusters of the Republic of Uzbekistan, but it has not found its development widely due to the fact that hair removal in this method depends on the conditions of Ecology and the cost of seed seeds. Basically, in the mechanical method of hair removal, the preparation of seeds is carried out.

Mechanically, de-hair removal machines are classified into two classes by their structure, hard working surface and elastic-flexible working surface, with a more accurate classification of mechanical de-hair removal machines and De-hair removal methods given in the work. In addition to the structure and materials of the working organs, the process of obtaining a fluff, the method of mixing the pollen, the processes of falling and exiting the pollen, the processes of fluffing out are also reflected here.

In the process of fluffing, de-Lint machines structures that form a tangle roller, a rotating layer of pollen, or this and this state, can act circularly in the process of work of a particular machine, without being pushed in lumps and in layers, or move along the axis outside the working organs.

Examples include 5LP saw linters to machines moving along the axis without being pushed, forming a tick roller on the machine, PKX-ring linters to machines moving as a ring layer of

seeds and pushed in the direction of the arrow. In the case of OS, OS-01 and other De-hair removal machines, both the pollen shaft and the layer of the hoop are characteristic and are directed along the axis to the exit hole according to the spiral movement.

The machines are divided into frontal and flanges according to the method of pollen intake. The reception of pollen in PMP-160, 5LP linters is carried out according to the length of the machine. It belongs to the method of frontal pollen intake. In 4-SOM, OS, UCHDM seed desulfurization machines, however, the seed is received from the front of the machine working organ, which falls under the FLANG Method.

The pollen receptacle may have been placed in the middle of the machine in length (Houfing, MC-Mata linters). The seeds are removed from the slit-specific slit, either from the colosniks (PMP-160, 5LP), or from the working body closing flange slit (OS, UCHDM).

The main goal during seed pollination is to reduce their fluffiness and maintain their main properties (tensile, mechanical damage, etc.). One of the main problems of mechanical lint removal is to maintain its biological properties to the fullest, without allowing it to be damaged in complete lint removal of the tick.

With its shape, dimensions, shell hardness, fluffiness levels, friction coefficient and other physical and mechanical properties, seed seeds affect the adjusting parameters of delinters machines.

By the decision of the Cabinet of Ministers of the Republic of Uzbekistan No. 604 of December 23, 2004 "on measures to improve the Organization of acetic seed production", 31 seed seed seed preparation cexs were launched by the Association "Uzpakhtasanoat", JSC "Pakhtasanoat scientific center" on the basis of the promising program for modernization of specialized enterprises in 2005-2006. Of these, 16 constitute seed seed pollination cexes.

In cotton ginning enterprises, the most often today is the introduction of preparation in the method of mechanical lint removal of seeds, mechanical lint removal, in turn, is carried out with one-stage and two-stage lint removal technology.

Of this, the one-stage threaded cexes with three-DM delinters Form 4, which are used in cotton ginning enterprises Chust, Rishton, Angor and Gijduvon, and in the remaining 12 cexs form the Hexa with 1LB colossless linter and OS-01 desiccation machines.

Seed seed pollination is first cleaned and sorted in a single-step seed sorting aggregate, then seed pollination is done in a UCHDM seed pollination delinter machine with a hair removal of 8-9% to 0.5%, sorted by hyametric size, dorilized, packaged in a seed measuring plating machine, and the mouth of the bags is sutured in a bag sewing machine.

The seed seeds being prepared must meet the standards set out in the current standard for the indicators of germination, moisture, level of dirt, degree of fluffiness, mechanical damage to the seed and residual fiber content of the seeds.

To carry out the scraping of the mucus in the pollen shell, the first thing to do is to attach the pollen to the working surface, which will overcome the resistance force that occurs in the ratio of movement between them. These forces occur in well-known machines via brake inertia forces (e.g. mad delinteri) or by accelerating the tangled volume (in the saw-lattice linter of the classical scheme when the tangles in the tangle are adjacent to the saw), braking inertia forces, or accelerating certain tangles in addition to other reaction forces.

According to the preparation of the working parts of the lint removal machines of the seeds, that is, the operating times of the metal-brushed, saw cylinders also change. Table 1, which is presented below, lists the norms of the working parts of the seed Hair Removal Machine by their working life.

Table 1. Norms of the working parts of the seed desulfurization machine by working time

Desalination machines	Name of consumable spare parts	100 tons the standard of spending for pollination of seeds, pieces
UCHM, 1LB and OS	Metal brushed cylinders	1,1
	Sawtooth cylinders	0,9
	Metal Sets	0,8

As can be seen from Table 1 above, 1.1 metal brush cylinders, 0.9 saw cylinders are used by the norm when de-Lint 100 tons of seeds. From this, metal brushed cylinders show a high degree of absorbency. Metal brushed cylinders due to the unevenness of its surface due to wear (Figure 1), the diameter of the cylinder decreases from its alignment with sharpening its surface for reuse, and with a mesh surface, intermediate slits increase in size, and the chances of adjusting them also decrease.

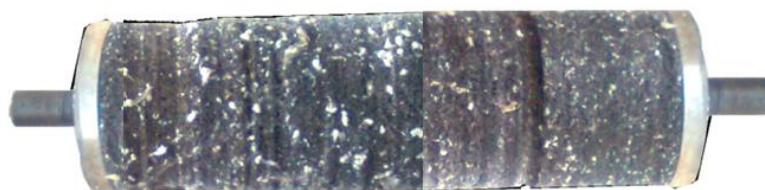


Figure 1. The ingestion of a metal brushed cylinder.

An increase in the distance between the cylinder and the sets leads to a decrease in the performance of the machine.

In the Republic, 1LB non-colosnik linters are 36 pieces, in which 72 metal brushed cylinders are used. 156 kg of Royal Wire is spent on 1 cylinder of 1LB Linter. For a total of 72 shafts, 11,232 kg of Royal Wire is spent.

When the distance between the cylinder and the set is 13 mm, the working productivity of the machine is 325 kg/hour, and as this distance increases to 14 mm and more, the working productivity is falling at 270 kg/hour.

From years of scientific research, it is known that the camera and torque absorption systems of delinters provide the opportunity to replace metal brushed cylinders with saws. Therefore, in both 1lb and UChDM deliners, it is recommended to use saw cylinders based on structural parameters instead of metal brushed cylinders.

If it is assumed that seed seeds with 9.0% hairiness from enterprises will arrive at the desulfurization tsexi, we can get a "B" - type fluff if they are collected in Aloxi by taking up to 3-4% of the hairs in the saw cylinders, in addition, the tan price of cylinders used for 1lb non-colosnik linters instead of metal brush cylinders in the That is, the metal brush cylinder

costs 32.0 million. in the case of soums, the price of the saw cylinder is 9600.0 thousand soums.

2.5-3.0% of the pollen being scraped from the pollen is collected in Aloxi and 1000 tons of seed from the "B" type fluff removal 229.08 mln.so 'm we get income. According to the plan for the Republic, 25 thousand tons of seed seeds will be de-pollinated in this case $229,08 \times 25 = 5727.0$ million. som means. Therefore, today research work is underway to determine their parameters for the use of saw cylinders instead of metal brushed drums in seed hair removal machines.

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