JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 14 Issue 09, September 2024
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

# Trial the colosnik covered by welding for wear
# Проверить на износ колосник, покрытый сваркой

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***Аннотация.*** *В данной статье рассказывается об определении износа джин-колосников, рабочая поверхность которых покрыта специальными электродами, с помощью специального прибора.*
***Annotation.*** *This article talks about determining the wear of gin colosnik, whose working surface is covered with special electrodes, using a special device.*

***Ключевые слова:*** *Колосники джина, крышка под сварку, электроды, степень износа, эксперимент на износ.*
***Key words:*** *Gin colosniks, cover by welding, electrodes, amount of wear, experiment for the wear.*

Separating the fiber from the seed is the process of ginning, and it is considered the first technological process of obtaining a finished product from raw cotton, and its quality and productivity determine the efficiency of the technological processes that follow [1]. Separation of fiber from seed is carried out using two main roller ginning and saw ginning devices [2]. Due to the fact that the sawing method is more efficient than the rolling method, it is preferred and used by modern enterprises.

Saw ginning is the separation of fiber from the seed as a result of the technological communication between these two main working parts, the main working parts of the machine consisting of a saw cylinder and a grid formed by installing colosniks on the support burs. Since the seed does not fit between the bars, it does not pass through the bars [3].

Colosnik is a detail made of СЧ 15-35 cast iron with a complex shape, and is used to trap seeds by creating a slot of a certain diameter during the work [4].

In the process of separating the fiber from the seed, the working surface of the colosniks is eaten due to the influence of several factors, such as friction of the fiber, failure of the saw disc to be located in the center of the slot, and vibration of the saw. As a result of eating, the gap between the colosnik fence widens and the seed pod passes through it together with the fiber, which leads to a deterioration in the quality of the fiber. Observations carried out at cotton ginning enterprises showed that the average service life of saw mills is 3-4 months. In this case, the working surface of the colosniks is rendered unusable if it is eroded by more than 1.0 mm. This amount is up to 2% of the colosnik volume. It is unreasonable to replace such eaten colosniks with new ones due to factors such as the waste of the remaining multi-part metal and the economic damage [5].

Many scientists and researchers worked on increasing the work resources of the Colossians.

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E. N. Avazovich carried out scientific work on improving the construction of the existing coulters in chain saw machines and recommended the use of 65G alloyed replaceable element plate for the working part of the coulter to increase the service life of the coulters [6].

R.H. Mustafin studied the working life of colosniks and the wear and tear in their working part. In order to increase the service life of the colosniks, it is recommended to install a hard alloy plate on the working part of the colosnik [7].

Sh.Sh.Shonasirov proposed a plasma coating method to restore the eaten working parts of colosniks [8]. But due to the lack of necessary materials and technological equipment for the implementation of the method, it was not widely introduced into production.

The main solution to this problem is to increase the working resource of the corroded colossians by welding them with materials with high mechanical properties such as hardness and resistance to corrosion. Their surface was coated using T-590, Z408, Cv-08G2S, UONI-13/45 electrodes. In this case, the welding mode: welding current 90-110 A, arc voltage 24-28 V, current polarity reversed, electrode diameter 3-4 mm. To ensure at least 90% contact of the coated surfaces, the samples were smoothed by special mechanical processing on a grinding machine.

**Figure 1. Molten coated gin colosnik.**

The "Saw Gin Colosniks Erosion Testing Device" was used to test melt-coated colosniks. Each sample melt-coated with the selected welding materials was subjected to a 30-minute corrosion test in a homogeneous mode. In order to create a colossal wear on the working surface, the saw disc was pressed against the colossal with a force of 5, 10 and 15 N, and the disc was rotated at 730 rpm.

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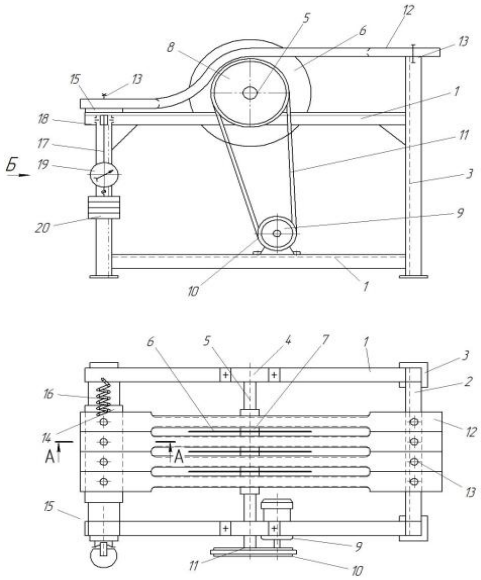

**Figure 2. General view of the device for testing sawed gin colosnik.**
1- cross beam, 2- crossbar, 3- column, 4- support bearing, 5- horizontal shaft, 6- disk saw, 7- bushing, 8- pulley, 9- electric drive, 10- drive pulley, 11- belt, 12-colossal grid, 13-bolt, 14-guide, 15- 16- tension spring, 17- traction wire rope, 18- blocker, 19- dynamometer, 20- stone.

In the specified period, the sample was removed from the device and the amount of linear erosion was measured using a micrometer.


**Figure 3. Electronic micrometer.**
In order to ensure the accuracy of the results, each experiment was repeated 3 times, the average values of the obtained results are presented in Table 1.

***Table 1***

**Average consumption of tested samples**

| № | Welded material | The force pressing the coulter to the saw disc is N | | | Average amounts of food (mm) |
|---|---|---|---|---|---|
| | | 5 | 10 | 15 | |
| 1 | T-590 | 0.01 | 0.02 | 0.025 | 0.018 |
| 2 | Z408 | 0.016 | 0.032 | 0.04 | 0.022 |
| 3 | Св-08Г2С | 0.02 | 0.04 | 0.05 | 0.036 |

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| | | | | | |
|---|---|---|---|---|---|
| 4 | УОНИ-13/45 | 0.026 | 0.053 | 0.06 | 0.046 |
| 5 | Available colosnik | 0.04 | 0.08 | 0.1 | 0.073 |

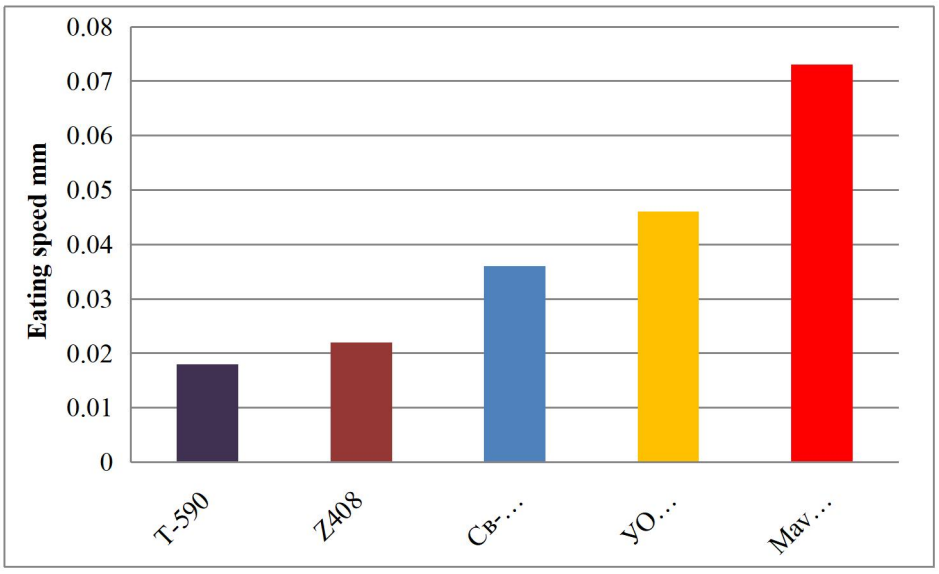


**Figure 4. Average eating speed of samples**

When analyzing the results in the table, if we consider the average corrosion rate of the existing colosnik to be equal to 1.0, compared to it, the sample coated with the T-590 electrode is 4.0 times, the sample coated with the Z408 electrode is 3.3 times, Cv-08G2S we can see that the sample coated with the electrode of the brand 2.0 times and the sample covered with the electrode of the brand UONI-13/45 is eaten 1.6 times less. It can be seen from the results that the corrosion resistance indicator increased significantly when welding with T-590 brand electrode. This can be explained by the formation of carbides of hard alloys in the weld layer. It is known that the greater the amount of ferrite in the weld layer, the lower its mechanical properties. The greater the amount of pearlite and carbides in the welding layer, the higher its strength and hardness. The presence of alloying elements such as C, Cr, Si, Mn and hard alloys in the coating of T 590 electrode ensures that the welding layer has a large amount of pearlite and carbides and creates a heterogeneous structure during welding. The particles of the alloy of these elements, which melt at a much higher temperature, serve as centers of crystallization in the liquid metal bath of the weld layer, which grinds the structure of the weld metal to form a heterogeneous structure and increases the corrosion resistance of the weld layer.

**Conclusions and suggestions**

1. The working surface was covered with special electrodes by welding the eaten gin colosniks, and the materials with the most optimal physical and mechanical properties were determined to increase their working resource.
2. The technology of covering the corroded colsniks by welding the working surface has been developed.
3. A technological process was developed for corrosion testing of welded samples and results were obtained using a device capable of providing realistic conditions.

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4. Corrosion resistance has been proven to increase by 4 times by welding the corroded colossians with T-590 brand electrode. This leads to a decrease in the cost of colosniks and the reduction of machine downtime in the process of replacing them with new ones. As a result, the performance of the machine increases significantly.

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