«Research of weight and linear wear from resource indicators of cultivator paws hardened by combined method»

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Problem statement

Presents the results of theoretical and experimental studies of weight and linear wear from resource indicators of cultivator paws hardened by the combined method. It is established that in order to achieve an increased resource of cultivator legs, world manufacturers use special alloying materials, design features and technological methods of hardening, namely heat treatment, application of wear-resistant materials. The most commonly used methods for strengthening the working surfaces of parts are conventional hardening of medium-carbon, high-carbon and alloy steels. The hardness of the metal can be obtained in the range of 45 HRC for steel 45 and up to 65 HRC for steel 65G and alloy steels. To determine the change in the geometric parameters of the blades of cultivator legs during production tests recorded linear wear, weight wear and the radius of rounding of the cutting edge of the working bodies with an operating time of 8, 23, 42 and 54 ha. According to the results of linear wear of the wings of experimental cultivator paws during production tests, the materials that provide the best performance against abrasive wear were determined. As a result of the analysis of cultivator paws with a yield of 54 ha, it was found that the working bodies do not have visible damage and extreme wear and are suitable for further use. At the same time, measurements showed that the amount of wear on the width of the blade is 5.3–11.9 mm.
**Solution methods**

Figure 2. Cultivator with the strengthened paws.

Figure 3. Reinforced cultivator legs.

![Graph showing linear wear of the blade of the cultivator paw from the working time of the cultivator paw](image)

**Figure 4.** Linear wear of the blade of the cultivator paw from the working time of the cultivator paw:

1. PS-12NVK-01 + T-590;
2. PG-10K-01 + T-590;
3. FCB-1 + T-590;
4. PG-10K-01 + Graphite;
5. sormite + T-590;
6. PS-12NVK-01 + graphite;
7. FCB-1 + graphite;
8. sormite + graphite;
9. EDM treatment;
10. serial cultivator paws KPE-410.

![Graph showing wear of cultivator legs by weight from operating time](image)

**Figure 5.** Wear of cultivator legs by weight from operating time.
Conclusions

Results, implementation

- The best indicators of wear resistance showed powder material PS-12NVK-01 applied by the electrode T-590 after electrocontact treatment of the part, after 55 ha the amount of wear on the width of the blade is 5.3 mm, which is 43% less than electrocontact treatment.

- The results of comparative tests of hardened and serial legs showed that for the production of 54 ha the average weight wear of serial legs is 635 g, and reinforced by the developed technology is 33% less and is 425 g. Achieving weight wear of 635 g of reinforced legs is will be 40% larger than serial.
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