

## ABSTRACT

**Report of pre-graduation practice:** 36 pages, 14 figures, 2 tables, 29 references.

**The object of the research:** the formation of structure and phase composition of surface layers on alloys of iron after the electric-spark alloying with tungsten (W), graphite and titanium (Ti) anodes.

**Subject of research:** strengthened surface layers of iron alloys after electro-spark alloying by tungsten, titanium and graphite anode using various alloying schemes.

**Objective of the research:** to investigate the microstructure and properties of surface layers of strengthened steel samples from 45 steel after electro-spark treatment using anodes from tungsten, graphite and titanium.

**The methods of the research:** gravimetric, microstructural, microhardness analysis and tests on wear resistance.

**Practical use:** the results have practical importance for the development of new electro-spark alloying modes to strengthen the surface of steel products. Developed modes of electro-spark alloying can improve physical and mechanical properties of 45 steel, which allows its use in terms of sliding friction.

**Scientific novelty:** A complex treatment that combines electro-spark alloying using graphite anodes and carbide forming alloying elements (W, Ti) opens the possibility of a significant improvement in wear resistance and microhardness of the sample that may be associated with the formation of W and Ti carbides, and with the release of free graphite as a solid lubricant.

ELECTRO-SPARK ALLOYING, TUNGSTEN, GRAPHITE, TITANIUM, 45 STEEL, MICROSTRUCTURE, MICROHARDNESS, COATINGS, ALLOYED LAYER.

