

## ABSTRACT

**Report on research practice:** 78 pages, 29 drawings, 15 table, 44 literary sources.

**Purpose of the work:** to study the properties of coatings after electric-spark alloying by titanium, chromium and carbon.

**Research methods:** microstructural, microhardness, X-ray, mass transfer kinetics analysis and tests for wear resistance.

**Research subject** strengthen the surface layers of the steel 45 after the electric-spark alloying by titanium, chromium and graphite anodes in different sequences.

**Scientific novelty:** it was established that the alloying of steel 45 with titanium, chromium and carbon leads to the formation of coating thickness of 30 microns - 60 microns with increased to 13.7 GPa – 14.7 GPa and microhardness increased in 4 times - 12 times for durability, which is due to the dislocation mechanism of strengthening and the formation of carbide.

**Practical value:** obtained results are of practical importance for the development of new modes of electric-spark alloying to strengthen surface of steel products. Developed modes ESA can improve physical and mechanical properties of steel 45, which allows to use it in conditions of sliding friction.

ALLOYING SURFACE, ELECTRIC-SPARK ALLOYING, STEEL 45,  
FORMATION OF CARBIDES, DISLOCATION MECHANISMS FOR  
STRENGTHENING, SURFACE STRENGTHENING