

ABSTRACT

Master's dissertation: 96 pages, 33 figures, 18 tables, 47 references.

ELECTRIC-SPARK ALLOYING (ESA), LIQUID MEDIA, POWDERS, ALLOYING LAYER, STEEL, TITANIUM, CHROMIUM.

The object of study – the process of forming of the structure and composition of the surface layers on steel 40X13 after electric-spark alloying by titanium and chromium in liquid media with powder inclusions.

The objective: to study the influence of the composition of the liquid media with powder inclusions during successive ESA by titanium, chromium on the structure and properties of the surface layers of steel 40X13.

Methods of investigation: microstructural, X-ray diffraction, X-ray spectral, microdurometric analysis and electron microscopy.

The complex influence of the liquid medium with powder components (graphite, carbide TiC or Cr₃C₂) and anode metals (Ti and Cr) on the structure and microhardness of the 40X13 steel surface area after ESA was revealed. Such treatments lead to the formation of alloyed layers with the thickness that equals (20 – 35) microns and microhardness of (8,2 – 12,43) GPa.

A study of steel 40X13 after electric-spark alloying acquire properties that serve to lengthen the lifetime of cutting tools, machine parts and mechanisms, especially those which work under difficult conditions.