CONCLUSIONS

Despite the high physical and mechanical properties of composite materials that make for them a completely independent niche in which they have no competitors among known materials, their use has not yet emerged from semiwork-scale trial stage.

This happens due to inadequate study of manufacturing technology and the complexity of control of components interaction that determines the stability of the physical and mechanical characteristics of composites, and the high cost of most reinforcing fillers.

Significant factors that limit the sphere of application of the powder steel is a lack of systematic studies of some tribological characteristics, residual porosity and low level of mechanical properties, due to defects of structure. Therefore among the complex of problems to be solved in this work great attention was paid to the development of technological scheme of creating iron – matrix composite powders. It was established that small additions of titanium diboride to traditional iron powders significantly change their microstructure and properties.

When reinforcing iron with titanium diboride, TiB refractory phase precipitates, which strengthens the metal matrix. Therefore, such strengthening holds much promise to improve the mechanical properties of cutting tools. Given that the size and number of phase components of the composite formed by the impact of high-speed melting and short-term exposure to electron beam depends on the concentration of initial components, temperature and time, it was important to study the concentration dependence of microstructure formation and mechanical properties of the finished compacts of iron powders mixture and titanium diboride.

The results show that titanium diboride reinforcement of iron matrix contributes to obtaining composite with the required mechanical propertizes (high hardness,strength, durability).

The mechanical properties analysis and comparison with the standard indicators showed that the resulting composite should be used for the manufacture of cutting tools.

The working capacity of the cutting tool, its reliability exercise significant influence on the economic efficiency of the production process. Economic feasibility of this work was grounded; the planned estimated cost of work taking into account thecosts of all resources was calculated.

Security facilities and measures aimed at eliminating hazards while performing the work were developed.