CONCLUSIONS

In the work four AlCoNiFeCrTi; $AlCoNiFeCrTiB_{0,25}$; $AlCoNiFeCrTiB_{0,5}$ and AlCoNiFeCrTiB high entropy coatings were obtained by electron beam melting on padding (steel 45). Analysis of coatings structures was carried out by SEM, chemical composition was determined, x-ray research and durametrical measuring were made.

1. The high entropy coatings on padding (steel 45) were obtained by electron beam melting from multicomponent mixtures of $Al\text{-}Co\text{-}Ni\text{-}Fe\text{-}Cr\text{-}Ti\text{-}B_x$ (x = 0; 0.25; 0.5; 1) powders and the influence of boron on the structure, phase composition and microhardness of coatings was researched.

2. It was established that $AlCoNiFeCrTiB_{x=0-1}$ high entropy coatings consist of two bcc substitutional solid solutions, which content all original powder mixtures components and differ in crystal lattice periods. With boron content increasing to x = 1 phase composition changes and in AlCoNiFeCrTiB coating the formation of single bcc solid solution and the borides Cr_2B; TiB_2; $BCr_{0,2}Fe_{1,8}$ was observed in the result of boron atoms superfluity being present, that don`t solve in cavity of crystal lattice bcc solid solution.

3. It was established that in the $AlCoNiFeCrTiB_x$ multicomponent coatings a dendritic crystal structure is observed. The microstructure of the melting coatings change according to distance from padding to surface, moreover at padding is formed smaller structure, that is explained by different cooling rates: the padding is better conductor of warmth then air, and so averts it quicker. It was shown, that chemical components distribution in the volume of coatings differs from nominal content and is assorted.

4. The essential influence of boron content on microhardness of $AlCoNiFeCrTiB_x$ coatings was established: without boron the microhardness of $AlCoNiFeCrTiB_x$ coating is 8,7±0,13 GPa, the microhardness of $AlCoNiFeCrTiB_{0,25}$;$AlCoNiFeCrTiB_{0,5}$and AlCoNiFeCrTiB coatings is increased to 12,8±0,12 and 14,2±0,13 GPa, correspondingly. The boron, as a penetration element,

additionally distorts the crystal lattice of solid solutions coatings, moreover, the increasing of boron content to 1 mol causes formation of borides, as result, the hardness of coatings increases.

5. It is shown that with the addition of boron to the coating the yield strength value of $\sigma_{0,2}$ increases from 2.94 to 4.54 GPa, due to the addition of boron. It is found that when testing coatings on fracture toughness with a load on an indenter from 2 N to 10 N, no cracks are formed, which indicates the ability of the coating material to counteract brittle fracture, namely, to inhibit the development of brittle cracks.

6. Planned cost of research works was calculated with consideration of all types of identified resources. Scientific and technical relevance and economic feasibility of these works were explained.

7. The measures to ensure healthy working conditions and principles of safety in an emergency were developed.

8. A marketing analysis of the start-up project was carried out to determine the fundamental possibility of its market introduction and possible directions for the realization of this implementation.