

CONCLUSIONS

Over the course of completing this diploma thesis, there have been researched the technological parameters of the free hot forging of powder pellets obtained by pressing iron powder and mixtures based on it.

The influence of technological regimes and carbon content on the structure, phase composition and mechanical properties of the material was studied. According to the research, the following conclusions can be made:

- it has been found that the addition of graphite significantly affects the porosity of the samples based on iron. When the graphite content is below 1.5% the porosity range is 13-17%. By increasing the graphite content ~~content~~ up to 4% or over, the porosity reduces to 8-9%. The second compaction after annealing reduces the porosity up to 3-4%;

- it has been found that the hot forging of powder pellets based on iron causes increase in hardness up to 92-94 HRB, which is the result of the material strain hardening and carbonation of the prototype;

- it has been shown that increasing of carbon content in powder pellets composition leads to the processes which reduce hardening during forging deformation, stipulating the reduction of samples hardness and strength;

- it has been established that the hot forging of pellets containing 1.7 % of carbon allows to obtain hardness approximately 40 HRC at high values of crushing and flexing strength (1280 MPa and 1100 MPa, respectively);

- materials containing 1.7% carbon have the highest resistance to wear in dry friction and have a relatively low friction ratio of 0.075-0.08;

- free hot forging of powder pellets having high content of brittle materials (for example, the mixture of 12.0 % by weight of carbon) is ineffective and needs to be improved;

- the perspectiveness of applying hot forging technology for making antifriction powder materials that work under high dynamic tensions and abrasive wear has been proved;

- the scientific and technical relevance and economic feasibility of the work done has been justified;

- the measures ensuring healthy working environment and principles of safety in an emergency situation have been developed.