ABSTRACT

The Diploma Work: 102 pages, 37 figures, 11 tables, 40 sources.

The aim of the work: to investigate the variable-speed deformational load impact on the behavior of the BT22 and Ti-3Al-4,5Fe-7,2Cr alloys depending on their structural and phase state.

The methods of the investigation: microstructural analyses, mechanical stretching testing, electron microprobe analysis.

The object of the investigation: high-strength titanium β-alloys BT22 and Ti-3Al-4,5Fe-7,2Cr were chosen as the investigation materials.

The scientific novelty: Since the main purpose of high-strength titanium alloys of the BT22 type is their use in high-duty aerospace engineering parts, in addition to strength and ductility, their operative reliability in extreme conditions is also highly important. One of the factors that determine the reliable operation of such products is the peculiarities of their mechanical behavior at high deformation speeds and large applied loads. Since at the beginning of this investigation we could obtain information only on the LCB alloy mechanical behavior at high deformation speeds, obtaining similar data for other titanium alloys of that class has been an urgent task and the results obtained during the present investigation are certainly brand new.

The practical value: the practical value of the results consists in the fact that they enable to predict the high-duty products behavior under extreme conditions (high power loads application at high speeds). This data can be particularly useful for design of the new civil hypersonic aircraft (e.g. Concorde's new generation patented by Airbus).

TITANIUM ALLOYS, BT22, Ti-3Al-4,5Fe-7,2Cr, DEFORMATION LOAD, PHASE AND STRUCTURE STATES