

Summary

Doctoral dissertation "The study of the impact of welding parameters aluminum alloy AW 5754 by TIG on the quality of the weld", is devoted to the determination of the appropriate welding parameters that allow obtaining the weld with the least amount of welding incompatibilities and the best strength parameters. The necessity to take up the topic appeared as a result of the analysis of operational failures of welded joints occurring in the elements of aircraft and the conclusions resulting from the literature recognition of the topic of welding aluminum alloys.

In the first chapter - the introduction describes the properties of aluminum alloys and their application in technology. The importance of welding technology of aluminum alloys in the process of repairs and overhauls of machines and devices is presented. The second chapter provides a comprehensive critical analysis of the knowledge contained in literature in the field of analysis of welding quality of aluminum alloys and the reliability of welded maneuvering plane components. In the third chapter, it was justified to take up the topic and put forward the thesis:

There is a possibility of modernizing the welding process of aluminum alloy by TIG method through such a selection of parameters that will ensure minimization of the weld microstructure defects, and increase its resistance to static stretching. Therefore, the utilitarian and scientific purpose of the dissertation was defined. The fourth chapter presents the results of experimental research on the selection of welding parameters for samples made with the TIG method. Preparatory activities and accepted research methodology have been described. Based on the conducted tests, a modernized Welding Technology Instruction was proposed. The fifth chapter presents the results of microstructure research by computed tomography and digital radiography. Welding incompatibilities for individual samples were presented and nonconformities were analyzed in particular welded joints and the reasons for their formation were determined. In addition, a comparison of the results of weld testing with the tomographic method was made with the results of radiographic examinations. The sixth chapter presents the results of welding samples for static stretching and microhardness. The results were analyzed and conclusions regarding the resistance of welds to static tension were presented. In the seventh chapter, summarizing the dissertation, final conclusions resulting from the conducted research were presented, the degree of realization of the dissertation goals was assessed and evidence confirming the thesis is presented. In addition the original scientific achievements resulting from the dissertation were compiled.