

MATERIAL TESTS AND ANALYSIS OF AIRCRAFT MATERIALS

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Abstract

The payload is only 20% of a presently used cargo aircraft's take-off weight, the circa half of the rest 80% is the empty weight. So it is obvious that reducing the empty weight improves significantly the economy, hence there is a huge demand in the aircraft industry for light structural materials with advanced parameters. Choosing a material is based on the following features: allowable stress, fatigue limit, crack-spread, corrosion, heat-resistance, accessibility and machinability, material cost and process resource demand. Our investigations focused on the tests of materials applied in aircraft's wing structure that can be made of wood, metal, plastic and composite materials. We made tensile tests by the QUASAR 100 tensile strength-testing machine of University of Szeged, Faculty of Engineering. The standard test specimens were manufactured from different wing samples (steel, aluminium, plastic, composite) received from the Airport of Szeged. During the tests we analysed the upper and lower yield points, tensile strength, elongation at rupture which features are essential from the point of view of their application.

Key words: material tests, aircraft, tensile strength, yield point, elongation at rupture

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