

## 0. Development of methods for structural optimization of thin-walled aerospace structures

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3. **Results**

Design of thin-walled metal tubes are becoming more common in the construction of modern light aircraft, both manned and unmanned due to its exceptional workability, durability and long service life. However, the mass efficiency of thin-walled structures made of metal tubes is still relatively low compared with traditional aircraft designs. This is due to the symmetry properties of the round tubes on the perception of stress, while in aerostructures magnitude of the forces acting in different directions may differ by tens of times. We addressed and resolved the issues of development of methods of calculating the stress-strain state of aerospace structures made of thin metal tubing, and structural optimization of such structures. Proposed, justified and the methods of reducing the weight of the structural elements of thin-walled tubes, provided solutions to one of the biggest problems of such structures - the presence of large inefficient structural mass. In the framework of established laboratory facility to study the deformation of structural elements of thin-walled tubes, created a finite-element model of thin-walled tubes and proved by carried experiments of their adequacy. According to the work methods designed and fabricated a thin-walled tubular element reduced weight, were investigated by the numerical model and by the natural experiment of the stress-strain state, confirmed the effectiveness of the proposed methods for reducing the weight of such elements.

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