

## **Modification of the stiffness properties of beam structures filled with aluminum foam.**

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The beam constructions can be classified as the most important constructions in the field of mechanical engineering and civil engineering industry. In many cases, current modern trends in these areas of industry lead to the design and creation of beam constructions that meet the required economic savings, are light-weight and especially material-saving. A necessary condition imposed on new approaches in the creation of such constructions is the achievement of the required stiffness parameters and strength properties. One of the design approaches which could meet the mentioned requirements is the use of the material with specific structure, which fills the inner space of the closed cross-section beam element. So-called aluminum foam appears to be one of the suitable filling materials [1], [2] that meets the given requirements. In this application, the technological process of creating aluminum foam is extremely important. The structure of aluminum foam and its material properties depend on the conditions and parameters of the technological process. It is obvious that the distribution, dimensional size and shape of cavities is clearly a stochastic phenomenon. Then, the computer simulation for determining stiffness properties is very complicated when all the mentioned facts are to be taken into account.

The bending stiffness properties of the beam structure filled with aluminum foam are investigated in this paper. The stiffness properties of the beam structure filled with aluminum foam are investigated in the paper. The deterministic structure of the cavities the aluminum foam in the entire interior space of the beam filling is considered. The effect of dimensional size of the cavities with a precisely specified position in the filling on the beam structure stiffness properties is investigated and analyzed.

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