

Application of controlled joining beams in adaptive designs

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The article considers the application of the automatic control theory principles for adaptive designs and the disturbance-stimulated control principle in particular. Relying on the pilot design analysis we construct an informational and mathematical model or a system with reference to which we can create an artifact (an artificial material complex along with the signs of its action) by means of changing the perturbation and control actions. The mechanism changing the perturbation actions vector in the artifact can be treated as an actuator analyzing the design state during its exploitation and able to change the critical or off-design state of the artifact using external effects. The article offers two types of actuators for the systems of framed and girder types. We introduce an actuators design based on the nearly instantaneously changed systems containing quasimechanisms in the form of load-bearing structures and implementing the disturbance-stimulated control principle. The development of the universal actuator of the girder type based on the metal-composite sandwich slab with the elements of nearly instantaneously changed system is discussed.

Keywords: quasimechanism, adaptive design, controlled joining beam, nearly instantaneously changed system, actuator, stress-strain state

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