

Chapter 28

Experimental Investigations of Failure of Sandwich Specimens with Composite Facing Layers Under Four-Point Bending Conditions



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Abstract A series of experimental studies on the four-point bending of sandwich specimens with facing layers made of a unidirectional fiber-reinforced composite with specified geometric and physico-mechanical characteristics with varying geometric and physico-mechanical characteristics of the core was carried out. It is shown that when using a honeycomb core made of polymer paper, the implementation of the shear buckling mode in the facing layers is impossible, and the failure of the sample occurs due to the failure of the core. Specimens with stiffer cores are fail due to the failure of compressed facing layers in the vicinity of the loading roller at stresses comparable to the critical stresses of their buckling mode in a purely transverse-shear form. It was established that during the loading of the specimen, a significant increase in the multomodularity of the material is observed, apparently, mainly due to the implementation and continuous change of the internal micro- and mesoscale buckling modes of fibers and fiber bundles in areas with weakened physical and mechanical characteristics of the binder composite in compressed facing layer.

Keywords Sandwich specimen · Four-point bending · Honeycomb core · Rigid core · Failure · Shear buckling mode

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