

COMPARATIVE TESTING AND ANALYSIS OF PLASTIC COMPOSITES

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ABSTRACT

Polymers are being used in increasing amounts in everyday and technical life, and their markets have started to grow again after the economic crisis at the beginning of the decade. Besides unreinforced polymers, composites are getting more popular due to their relatively high density coupled with their low strength. The growing demand affects not only cross-linked matrix composites, but also thermoplastic composites, as from these materials with relatively little energy large quantities of various three-dimensional products can be produced by injection molding, the manufacturing accuracy of which can be better adjusted due to fiber content. Fiber-reinforced polymer composites are gaining ground in many industrial segments due to their extremely favorable mass-specific mechanical properties. In our research, we examined plastic composite specimens made with FDM 3D printing technology, the aim of which is to determine their mechanical and physical properties, and the obtained results could serve as a basis for their use in technical practice. The existing ABS as well as PLA based specimens were subjected to static, tensile strength and dynamic impact test methods on Galdabini Quasar equipment. Both the tensile test and the Charpy impact bending test were performed according to ISO 527 standards for plastic composites. A comparison was made between the measurement results of the ABS and PLA specimens, which show that there is no significant difference in the strength characteristics of the two materials under static stress, however, but in contrast to dynamic testing, ABS has twice the load-bearing capacity as PLA.

Key words: dynamic testing, 3D printing technology, tensile test, impact test