

Researches regarding modeling, simulation and tensile testing for polymeric composites products

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Abstract.

Composite materials are obtained by combining two or more materials with different physical properties, which maintain their properties at the macromolecular level, thus retaining their identity, to obtain a resulting material with characteristics clearly superior to the constituent elements, comparable to conventional materials in terms of performance. The specimens are made either by injection molding, machined from the center sections of a standard test sample (see ISO 20735: 2018), processed from semi-finished, finished, rolled or extruded products. The main mechanical tests performed usually are tensile, compression, bending, shear and fatigue to determine the material characteristics, behavior of the structure, validating/invalidating some calculation theories, fulfillment of the conditions imposed by the working conditions classification of materials in relation to mechanical properties. In this sense, the article briefly presents the activity of creating a modeling, simulation and tensile testing software program that can acquire control and process data, taken from an experimental stand or from a software simulation. Thus, the following elements were realized: software for retrieving data from the software equipment of the Zwick / Roell Z020 traction test machine; taking data from an experimental stand (which was not physically performed); simulation of tensile testing; creating reports, management of the production logistics chain of the benchmark. The experimental and theoretical results were further input in the design of the presented software.