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# Dynamical Properties of Polymer Composites Subjected to Effecting of Environmental Conditioning

**Marek Borowiec[1], Ewelina Kosicka[2]**
[1]Department of Applied Mechanics, Lublin University of Technology
Nadbystrzycka 36, 20-618 Lublin, Poland
m.borowiec@pollub.pl;
[2]Department of Production Engineering, Lublin University of Technology
Nadbystrzycka 36, 20-618 Lublin, Poland
e.kosicka@pollub.pl

## Extended Abstract

The external environments have significant influence on the materials, especially for its structures exposed on harmful conditions. The main goal of this work is the determination of environmental factors which influenced on the dynamical behaviour of composite structures. In the paper is discussing the effects of UV and temperature on amplitude – frequency responses of analysed material. The dynamics is experimentally tested on polymer composites based on a thermosetting matrix of epoxy resin, reinforced by high-strength R-type glass fibres. There was provided series of cantilever beam samples consisting of 11 plies layer at different stacking sequence, which secured both, symmetric (+/+) and anti-symmetric (+/-) configurations of beam samples. In the experiment were applied the composite samples with fibres configuration at 30º, 45º and 60º angles. For each angel set the amplitude – frequency responses were recorded within the first three base translational resonance zones from 10Hz to 320Hz at sweep up frequencies.

The experiments have been carried out on electro-dynamical shaker TIRA Vib which assured the conditions of vibration. The measurements were repeated after the conditioning processes which simulated the separate time range corresponded to two-month periods. The first test was limited directly to the beams after manufactured in autoclave system. Then the initial results of amplitude – frequency responses were compared to the next tests of the same beams but conditioned by UV lights and temperature influence. It turned out the significant differences of results are visible between the beams with symmetric and anti-symmetric fibres configurations. Additionally the dynamics of conditioned composite beams varied from each other in both cases of fibres layout. Both conditioning, UV lights and temperatures caused the resonance zones moved from the origin position, significantly changing the dynamic properties of composite structures into softening or hardening features.

***Keywords:*** composite; vibrations; resonance zone; conditioning.

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