

INVESTIGATION OF THE MECHANICAL PERFORMANCE OF THE UNSATURATED POLYESTER/CENOSPHERE SYNTACTIC FOAMS USING ACOUSTIC EMISSION TECHNIQUE

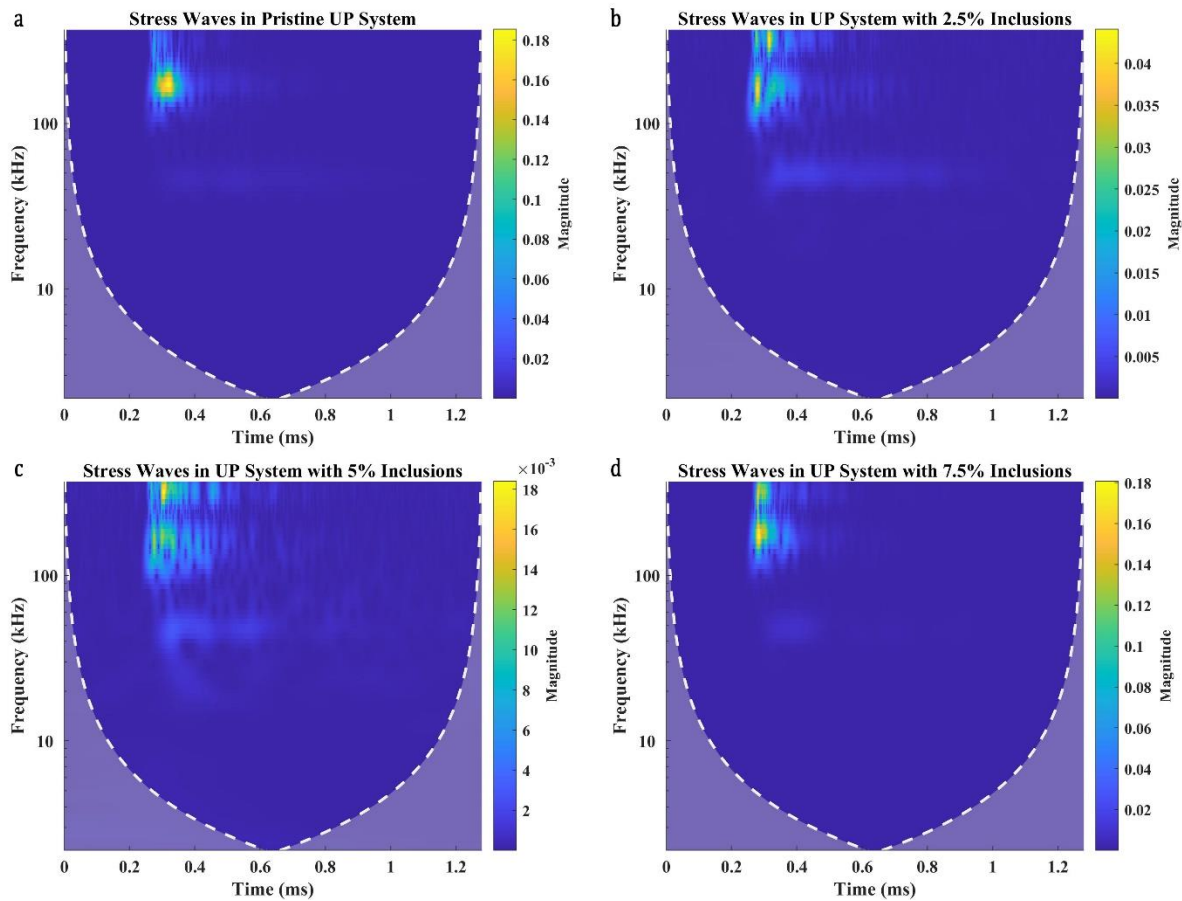
Claudia Barile^{1*}, Giovanni Pappalettera¹, Vimalathithan Paramsamy Kannan¹, Caterina Casavola¹, and Carmine Pappalettere¹

¹Dipartimento di Meccanica Matematica e Management, Politecnico di Bari, Via Edoardo Orabona 4, 70125 – Bari, Italy

* Presenting Author email: claudia.barile@poliba.it

Abstract

Cenospheres are special class of filler materials, commonly used in preparing lightweight structural composites. They are hollow and thin-walled microspheres which entraps inert gas inside them. Composite materials filled with thin-walled microspheres are known for their energy absorption properties and improved mechanical performances. Such class of materials are known as syntactic foams. In this study, unsaturated polyester composites are prepared by adding different compositions of cenospheres as fillers. The influence of cenospheres on the mechanical performance of unsaturated polyester syntactic foams are investigated. The acoustic emissions due to the failure of the syntactic foams under mechanical loading are studied. Acoustic emission signals are recorded using a piezoelectric transducer and are analysed in their time domain, frequency domain, and time-frequency domain. Different acoustic emission features of the recorded signals are compared with the mechanical test results. The fracture behaviour of the syntactic foams is, thus, investigated using the acquired acoustic emission signals.



Time-Frequency Analysis of Acoustic Waves propagated through Unsaturated Polyester Resin System with different percentages of Cenosphere Inclusions