

COMPOSITE MATERIALS USED FOR DECREASING THE NOISE LEVEL INSIDE THE CABINS OF THE MOBILE TECHNOLOGICAL EQUIPMENT

DRĂGAN Nicușor

¹Research Center “Mechanics of Machines and Technological Equipment MECMET”
Engineering Faculty of Brăila, “Dunărea de Jos” University from Galați

²Research Institute for Construction Equipment and Technology - ICECON S.A.
e-mail: ndragan@ugal.ro, dragannicu64@yahoo.com

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Abstract: The article presents some experimental data of composite materials with noise absorption and insulation characteristics. The experimental research were made in the Research Center of Machines, Mechanic and Technological Equipments – MECMET with the help of specialists from Vibration and Acoustic Laboratory of the Research Institute for Construction Equipment and Technology - ICECON S.A. from Bucharest. There it is also one case study of global level noise reduction and absorption coefficient inside the cabin of the Romanian frontal loader MMT45.

1. INTRODUCTION

The main scope of using composite structures in the phonic treatments of the cabin of public work equipment is to decrease global level of noise and vibrations into cabin. These properties can be assured if the structure of sandwich composites is made up of one layer of material in order to insulate the low frequency noise, one layer of porous material in order to absorb the medium and high frequency sound and one layer of antivibratile material.

Table 1. Requiring sound absorption and insulation performances for the composite materials

Acoustic property	Den.	Unit	Frequency range [Hz]	
			400-1000	1000-4000
Sound absorption coefficient	α	-	0.15÷0.20	0.20÷0.50
Sound transmission loss	ΔL	dB	10÷20	20÷30

Taking into consideration the EU Directives [2] [3] [4] and national legislation [5] in force requests and the usual noise levels of different types of civil work equipment used in Romania [1], the acoustic performances of phonic treatments of the cabins must be characterized by the values from table 1.

2. COMPOSITE MATERIALS - NOISE ABSORPTION AND INSULATION FEATURES

The project “Modular protective systems from sound absorbent and sound insulation composite materials for civil works equipment” developed within the Programme V “Innovation” of [6] proposes some types of composite materials in order to assure the required values for the acoustic properties (table 3). The base materials used to build the composite structures with their physic and mechanic properties are done in the table 2.

Table 3. Base materials properties

Material	Description	Structure	Thick. [mm]	Density [kg/m ²]
PC10	Cork	composite	1	0,360
PC30	Cork	composite	3	1,200

