

DISTRIBUTED CONTROL SYSTEM FOR MACHINING PROCESS OPTIMIZATION IN DRILLING MINERAL COMPOSITES REINFORCED BY 3% GLASS FIBERS

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Abstract: *Development of mineral composites has been continuous while the last decades, due to their impressive characteristics and, therefore, application to various constructions, such as bridges, buildings, pavements, etc. This article is aimed at evidencing aspects of the drilling process of mineral composites reinforced by 3% glass fibers. The focus is on drilling experiments for determination of regression models of force and moment, as well as on the decentralized and distributed control system for monitoring force and moment values.*

Keywords: *mineral composite, glass fiber, regression model, control system, decentralized.*

1. Introduction

The high impact of products made of mineral composites is, mainly, in construction industry where glass fiber reinforced mineral composite materials have successfully been used in bridge building or civil building (see Fig. 1) due to their key features [3] that are: environmentally friendly; products reduce loadings on buildings leading to significant savings in superstructures and foundations; excellent for reproduction and renovation.



FiberlineBridge, using the pultruded profiles [1]



Wall panel of glass fiber reinforced mineral matrix[2]

Figure 1: *Application of glass fiber reinforced mineral composites*

Reinforcing elements of mineral composites can improve the mechanical characteristics of these materials from the point of view of tensile strength, hardness, rigidity, dimensional stability, etc.

Still, high attention should be given to the nature, type and orientation of the reinforcing element as, if not appropriate, it can induce significant increase in material fragility, brittleness and viscosity. Also, high expenses in production are also possible.

Strictly from the economical point of view, based on the above mentioned aspects, there has been estimated and, not the least, noticed the requirement for optimizing the machining processes of glass fiber reinforced mineral composites. The machining process optimization in drilling mineral composites apply the virtual projection method, known as Vladareanu-Munteanu method [4, 5, 6], in order to develop real-time control system. It is based on statistical methods for experimenting and data processing, as well as on decentralized and distributed control system for monitoring force's values by optimization of process parameters.