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"CAD in Machinery Design. Implementation and Educational Issues"

Conference in memory of Professor Jerzy Wróbel

Department of Computer Aided Systems

Lviv Polytechnic National University

Faculty of Mechanical Engineering

Bialystok University of Technology

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CONTENT

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AUTOMATED DESIGN OF THE FIRE DETECTION DEVICES ENCLOSURE COMPONENTS

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ABSTRACT

The master model of fire detector enclosure components was designed and produced using CAx. The 3D model of the fire detector enclosure components was developed and improved by adding fasteners for the Ardoinomini board, simulation modeling was carried out, and the lower cover of the fire detector was produce using the 3D printer. This will allow in the future to carry out full-scale experiments of the fire detector and system.

KEYWORDS: **heat detector, computer added design, microcontroller, 3D-model, 3-D print.**

I. INTRODUCTION

The creation of new parts of a technical device using CAx is a promising direction of designing, improving and manufacturing devices [1]. Such devices include fire detectors (FD), which are part of the fire detection system (FDS) [2]. Generally FD consist of enclosure components and theelectronic control board [3]. The speed and efficiency ofignition detection using the FDS depends on various factors:the type of fire, the location of the FD, the FD selected type,the FDS operation algorithm, etc. Improving the efficiency ofthe fire detection system is possible by improving thealgorithm of the hardware part of the fire detection systemand implementing it on the Ardoinomini board. For this, it isnecessary to improve the FD enclosure components design forthe possibility of attaching the Ardoinomini board [3].

The improvement process involves the development of a 3D model of the FD enclosure components, simulation modeling and the master model production for further full-scale experiments of both the FD enclosure components and the FDS.

II. MAIN RESULTS AND THEIR DISCUSSIONS

This article presents a 3D model of the FD enclosure components (fig. 1). Also carried out simulation of the temperature effect on the FD enclosure components, and based on it, a corresponding master model (fig. 2) containing a new fastening element for the Ardoinomini microprocessor

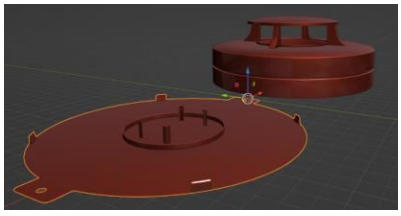

Fig. 1. The 3D model of the FD enclosure components was developed

Ardoinomini was used to implement a new hardware controller with fuzzy logic control algorithm [2].

Fig. 2. The master model of the lower cover with new fastening elements is made

The Ender 3 Max printer was used for 3D printing of the master model to obtain an improved design of the lower cover of the PS (fig. 2).

III. CONCLUTIONS

As a result of the computer aided automated design, a 3D model of the FD enclosure components was developed, the design of the lower cover of the FD was improved due to the fastening elements for the Ardoinomini board, and a corresponding master model was made. Simulation modeling was carried out as the initial stage of the tests. The implementation of the innovation intelligent algorithms for hardware control the part of the FD will improve the efficiency of the FDS control system.

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