

Experimental stand design for an automatic wiping board concept

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Keywords. load cell, data acquisition, functional testing, working hypothesis, experimental stand

Abstract.

The current research aims to develop an experimental stand for functionality testing of an automatic wiping board and to establish its' optimal working parameters. Amongst the specific objectives the following can be mentioned: OS1. Understand the working principle of a CNC machine; OS2. Understand the working principle of a load cell; OS3. Connect the load cell to a data acquisition Arduino board; OS4. Mount the load cell-board subassembly onto a CNC machine; OS5. Measure the pressure with which the sponge is pressing onto the board while performing the wiping function; OS6. Test the sponge functionality while applying different force values. The conducted research started with the conceptual design of experimental stand and main component identification. Within this stage a comprehensive bill of materials was done, ensuring that the specifications of each component were in accordance with its' function within the main assembly. Next, the load cell was fitted with the Arduino board and with a designated computer. The Arduino board was initiated with a programming sequence recommended by the manufacturer and the data acquisition software was programmed using LabView. An initial test of the load cell was undertaken to determine the reading directions and the final experimental stand was assembled. Four tests, each with two travels, were used to analyze the working hypothesis of the wiping board. Results interpretation led to selecting the optimum working parameters of the proposed wiping board concept. Future research includes the integration of a Wi-Fi and an infrared sensor, to enable remote operation of the system.