

DESIGN AND CONSTRUCTION OF A 3-AXIS CNC-BASED WATER CONTENT MEASUREMENT SYSTEM IN ANIMAL FEED RAW MATERIALS

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ABSTRACT

This research aims to design and build a 3-axis CNC-based water content measurement tool for animal feed raw materials to improve the accuracy of water content measurements. This tool uses an Arduino Mega 2560 as the main controller, stepper motors to drive the X, Y, and Z axes, and a resistive soil moisture sensor to detect water content. The tool frame is made from V-slot aluminum and designed using Autodesk Inventor. The research method used is Research and Development (RnD), with the stages of design, manufacture, and testing the tool. The analysis results show that the frame has a Von Mises Stress value of 9.743 MPa, which is still below the safety limit for aluminium materials and is considered safe for use. The designed tool is capable of automatically measuring water content at several measurement points, thus it is expected to help improve the accuracy of water content measurements for animal feed raw materials.

Keywords : water content measurement tool, 3-axis CNC, Arduino Mega 2560, moisture sensor.