

ABSTRACT

Lamps are lighting devices that are widely used by humans in everyday life, for example for lighting at home. Many factories produce lamps for home lighting needs with various types, types, power, and shapes. Lamps that have been produced must go through testing first before they can be circulated in the market. Testing is done to ensure that the lamp is suitable for marketing to consumers. One of the tests carried out is the bending moment test of lamp fittings. Bending moment testing on lamp fittings is an important procedure to ensure that lamp fittings and lamp feet are not damaged and change the shape of the thread in accordance with the safety requirements of SNI Self-Ballast lamps IEC 62560: 2015. For the East Java region, this test was carried out at the Surabaya Standardization and Industrial Services Center (BSPJI), where the measuring instruments used previously still used analog tools with various limitations, such as calibration difficulties and no data storage features. This research aims to design and develop a digital bending moment measuring instrument for lamp fittings based on Load Cell sensors and ESP32 microcontrollers equipped with data transmission features to Google Sheets to facilitate the process of data storage and analysis. This system is designed using a Load Cell sensor to measure the applied force, an HX711 module to convert the signal, and an ESP32 microcontroller as a data processor and connector to Google Sheets via Wi-Fi connectivity. The test results show that this digital tool has a good level of accuracy with an average measurement error below 5%, close to the measurement results of analog tools. It is also able to transmit test data efficiently with an average transmission time of about 2.62 seconds. With this system, bending moment testing can be done more quickly, accurately, and well documented, so it is expected to improve the efficiency and quality of testing at BSPJI Surabaya. This tool also has the potential to be widely applied in testing lighting products in industry.

Keywords: *Load Cell, ESP 32 Microcontroller, Bending Moment, Google Spreadsheet, Digital Test Equipment, Swaballast Lamp.*