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DESIGN AND IMPLEMENTATION OF AN INTELLIGENT CIRCUIT ANALYZER

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Summary. This paper designs a smart socket based on microcontroller and WIFI module. The socket can measure the voltage information and grounding of the connected circuit, display the measurement results and voice broadcast, and the user can also view the measurement results in real time through the cell phone APP, and design a transparent waterproof box for it to enhance its waterproof performance, which has certain significance to the safe use of electricity.

In recent years, electrical fires have occurred frequently in China, and it is difficult to detect various hidden dangers of electrical circuits in time by traditional detection means, making it difficult to implement the prevention of electrical fires in place. With the widespread use of WIFI technology in life, intelligent WIFI sockets have been widely studied for the advantages of reliable detection, convenient control and flexible application.

For this reason, it is imperative to design an instrument with circuit information collection function, which can voice broadcast relevant information and upload the detection results to the network side for managers to view and manage. The use of wireless networks to unify the management of circuit system information is conducive to the construction of circuit system safety platform, which can eliminate potential electrical fire safety hazards and avoid unnecessary economic losses, and can achieve prevention before it happens.

Based on this, this paper designs an intelligent instrument that can measure the line voltage and detect whether it is grounded, display and voice broadcast the measurement results, and allow users to view the detected circuit information in real time through a cell phone app. This design can be networked to meet the current pace of the times and market-oriented.

The multi-functional WIFI smart socket designed in this paper consists of four parts: power module, data acquisition, broadcast display and APP view. The whole circuit system is based on the microcontroller module as the core, the microcontroller processing the collected circuit data and then the display module and voice module display and broadcast the corresponding results. the WIFI module can connect the circuit data information processed by the microcontroller to the WIFI wireless network for users to view the socket circuit information in the cell phone APP terminal. The power supply module provides power for the whole circuit system.

In this paper, the system software is designed in a functional modular way, including data acquisition module, voice module, display module and wireless communication module. The main software program regulates each module to realize various functions of the smart socket. After the socket is started, the smart socket system terminal will be initialized, then the data acquisition module will collect data from the circuit connected to the socket, and the microcontroller will broadcast the corresponding voice information through the voice module, the display module will display the corresponding voltage value, and the WIFI module will make the WIFI connection between the cell

phone and the smart socket. If the WIFI connection is unsuccessful, it will continue to identify the connection until it is successful and then upload the circuit information of the connected circuit to the client via WIFI for the user to view and understand the circuit in time.

In this paper, a transparent waterproof box is designed for the instrument to guarantee its waterproofness. The design of the transparent waterproof box makes its waterproof performance more excellent, prolongs the service life of the socket, increases the application scenarios in various situations such as outdoor, and has certain significance for the prevention of electrical fires and the safety of users' electricity use.

The instrument designed in this paper uses a wireless communication module to transmit information about the circuit. It can collect the voltage value and grounding condition of the connected circuit and can display the voltage value and voice broadcast the relevant information, and can also upload the test results to the user side, so that the user can understand the circuit information in real time, which is more practical and convenient. In the instrumentation research, domestic and foreign have been pursuing digitalization, intelligence, networking, miniaturization, the design to meet the current pace of the times, for the international market.

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CALCULATION OF A REINFORCED CONCRETE CONSTRUCTION WITH FINITE ELEMENT MODELING LOCATED IN SOIL

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Summary. In this article there is a completed description of a calculation of a reinforced concrete construction with finite element modeling located in soil. The calculation was carried out on an electronic computer complex using software. Physical and mechanical properties of soil and reinforced concrete construction were taken into account.

Properties of soil were determined by averages of interval data and characteristics of soil at normal condition. Properties of the reinforced concrete were provided by the SP 5.03.01-2020. Upper girder was loaded with equally distributed load in 60 kN/m. On the figure 1 geometry of the calculated construction is presented.

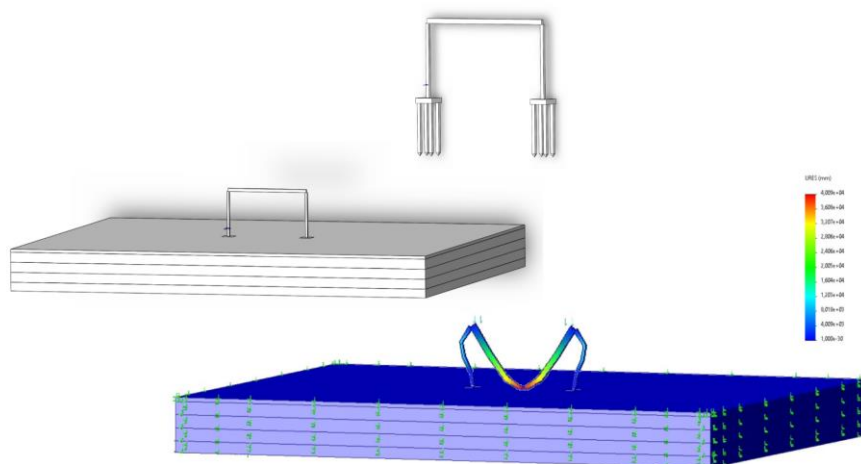


Figure 1 – Geometry of the reinforced concrete element, joint geometry of soil types, deformation diagram construction under load