Design of Creeping Property of Wood Control Experiment System Based on STC12C5A60S2

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Abstract. Describes a control experiment system of creeping property of wood based on MCU. The upper and lower computer of the system use RS485 interface for communication. Lower computer is constituted by 32 fault-tolerant data acquisition which is consisted by STC12C5A60S2, and upper computer use Borland C++ Builder to achieve control experiment system for creeping property of Wood in order to access the creep curve in various stages and analysis of data to obtain creep property of wood. This system is strong anti-interference, higher overall stability, long time running and so on.

Keywords: Control Experiment System, creeping property, upper and lower computer.

1 Introduction

Creep properties of wood is related to time, nonlinear and can be represented in different ways by the chart or curve within a certain limits [1]. Because of the different species and differences in methods, nonparametric method make relatively difficult to make the comparison between the creep properties of wood. In order to reasonable choose and use, it is urgently needed in engineering how to make creep rates to be invariable. In the research of creep of wood, that create a interdependent relationship between crop rates and timel is essential.

The experiments of creep properties of wood have began to develop from 1980s in china, but the long time of creep properties’ experiments were in few studies. The experiments in this regard is currently not mature enough, in this paper, Control Experiment System Based on STC12C5A60S2 is Described, the system contain 32-channel cycle detection, data storage system, image analysis system, intelligent control, and has a strong versatility and applys to a variety of industrial applications[1].

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2 System Design

Control Experiment System of wood is designed and must be considered several issues: First, real-time data acquisition, that is designed to lower computer’s capabilities for high speed of data acquiring and data processing; Second is how the 32-channel data acquisition to work, namely 32 data acquisition cyclic collect sensor data in what way. Although multi-collector are in the event of failure, it has a strong fault tolerance (other collectors work); Third is PC software to receive data in time to show the validity of data and intelligent control.

The system real-time data acquire by the composition of the lower computer based on STC12C5A60S2 and carry data transmission between the upper and lower computer by RS485, and through the PC software for image mapping, image analysis, data storage.

![System composition diagram](image)

The lower computer system’s serial port is completed through STC12C5A60S2 by the MAX232, and serial communication was used between the host computer and the slave computer through Communication port with photoelectric isolation RS232 to RS485 converter P-51. With respecting to the problem of data loss in complex environments, this paper introduces a kind of data protection circuit by AT24C64 after a sudden power-down. Power module LM2596 is high-efficiency step-down (buck) regulator. The LM2596 series of regulators are monolithic integrated circuits that provide all the active functions for a step-down(buck) switching regulator, capable of driving a 3A load with excellent line and load regulation. These devices are available in fixed output voltages of 3.3V, 5V, 12V. Other features include a guaranteed ±4% tolerance on output voltage under pecified input voltage and output load conditions, and ±15% on the oscillator frequency[2]. Digital sensors are imported from Japan, and each channel’s shortest sampling time is at 7-10ms, it can be completed within an overall data collection in 3s. For the large of data, storage capacity and PC reasons for the higher memory requirements in this system and the requirement of system response capability, the control system during the experiments store 12000 data to fulfill analysing data and drawing figures.