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Synchronous Winches to Lift the Ship and Distributed Control System to Distribute the Motor Loads for Marine Using Can Protocol

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Abstract

A shiplift is a modern alternative for these older systems. It consists of a structural platform that is lifted and lowered exactly vertical, synchronously by a number of hoists. First, the platform is lowered underwater, then the ship is floated above the support, and finally the platform with ship is lifted and the ship is brought to the level of the harbor. The modern ship lifts use synchronous winches to hoist a ship.

Our project proposes a new method to construct an automated ship lifting installation. According to this, each hoisting winch is entirely controlled by a dedicated microcontroller. All such hoists on either side of the platform are networked via CAN. This result in a distributed control system that runs all the hoists synchronously, thereby achieving precisely distributed motor loads and assuring that ships cannot slip. The project uses four such hoists to raise and lower the platform. Hoists are driven by dc motors with the microcontroller controlling the winch rotational speed. Each hoist is a CAN node on the network. In order to safely operate any shiplift, all hoists must be perfectly synchronized. Winches operate at the specified speed, regardless of load, behaving as if they are mechanically coupled together. A fifth node on the network acts as the control and monitoring unit for the entire hoisting maneuver. It has switches to start and stop the process and LCD screen to display the distribution of motor loads. The Ship lifting speed is changes according to the weight of the ship.

Keywords: *CAN, LCD, Shiplift*

1. Introduction

A drydock is a narrow basin that can be flooded to allow a ship to be floated in, and then drained to allow that ship to come to rest on a dry platform [1-3]. These are used for the construction, maintenance, and repair of ships, boats, and other watercraft. Traditionally a ship is brought out to land using slipway dry dock or floating dry dock or graving dry dock is shown in the Figure 1.

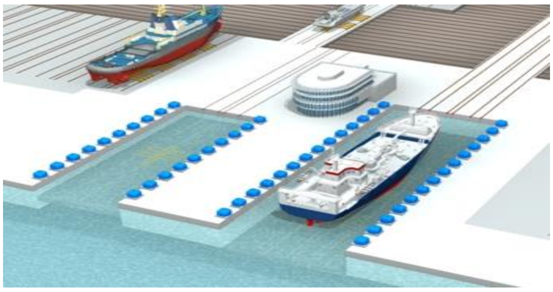

Figure 1. Marine ship lifting mechanism shown

Distributed control system consist many parts. Basic parts are communication control stations and communication busses [4-5]. We have to divide whole problematic to two parts. First part is modelling existing parts, which will use without change. In case of distributed control systems there are industrial nets and their protocols. Second part is modelling own behaviour of stations which determine behaviour of whole system. Study of Formazan Derivative Inhibitor

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Used to Prevent the Mild Steel Material Used in the Construction of Ship Material is explained in [10]. PLC based automatic control for onboard ship gangway conveyor system is discussed in [11].

2. Proposed System

Our venture proposes another technique to build a computerized transport lifting establishment. As per this, each lifting winch is completely controlled by a devoted microcontroller. Every single such crane on either side of the stage are arranged by means of CAN. This outcome in a conveyed control framework that runs every one of the lifts synchronously, in this manner accomplishing correctly appropriated engine stacks and guaranteeing that boats can't slip [5-6]. The venture utilizes four such lifts to raise and lower the stage. Lifts are driven by dc engines with the microcontroller controlling the winch rotational speed. Each lift is a CAN hub on the system. So as to securely work any shiplift, all cranes must be impeccably synchronized [7-8]. Winches work at the predetermined speed, paying little heed to stack, acting as though they are mechanically coupled together. A fifth hub on the system goes about as the control and checking unit for the whole raising move. It has changes to begin and stop the procedure and LCD screen to show the dispersion of engine burdens [9]. Send lifting speed changes as per the heaviness of the ship is shown in the Figure 2.

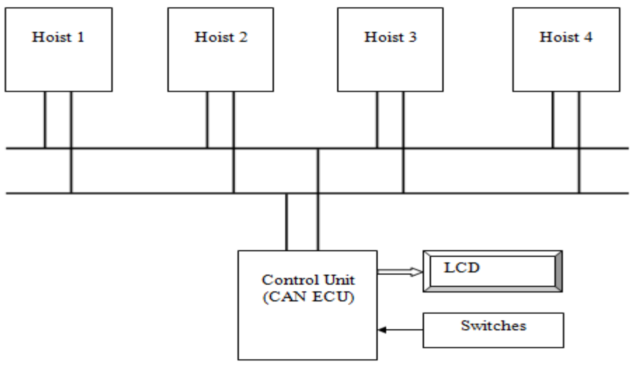
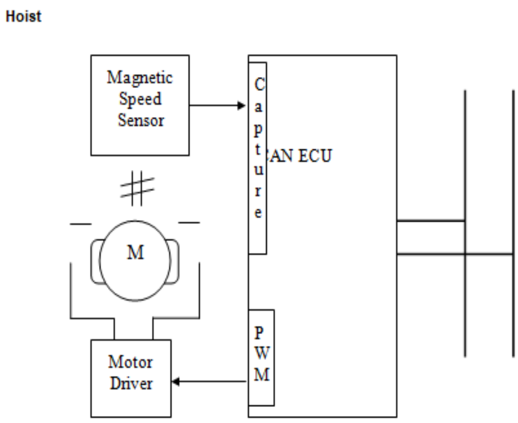


Figure 2. Automated Ship Lifting Installation using Distributed Control over CAN Block Diagram



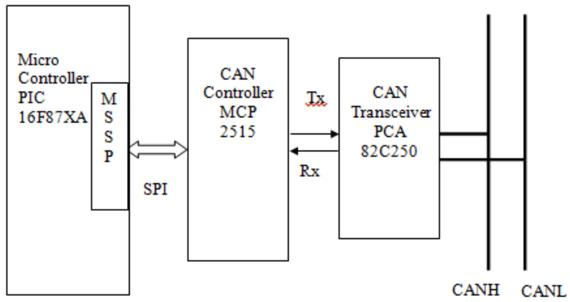


Figure 3. Block Diagram of Hoist

Figure 4. Block Diagram of Control Unit

The product permits finish control over all winches. Amid lifting the product precisely takes after each derrick. The product likewise continually screens which raise encounters the most noteworthy and least load and whether these are still inside the set resiliences. On the off chance that a remedy must be connected, the significant crane gets a summon through CAN to modify the winch speed. The control hub issues the orders which are to be trailed by the derrick hubs. There must be a high level of coordination between crane hubs and the control hub in lifting the ship. The control is circulated more than five CAN hubs and henceforth the venture is an ideal exhibit of a CAN based appropriated control framework (DCS).

3. Implementation and Results

This new idea to build a computerized deliver lifting establishment is finished. As indicated by this, each lifting winch is altogether controlled by a devoted microcontroller. Every single such crane on either side of the stage are arranged through CAN. The venture utilizes four such lifts to raise and lower the stage. Derricks are driven by dc engines with the microcontroller controlling the winch rotational speed. Each crane is a CAN hub on the system.

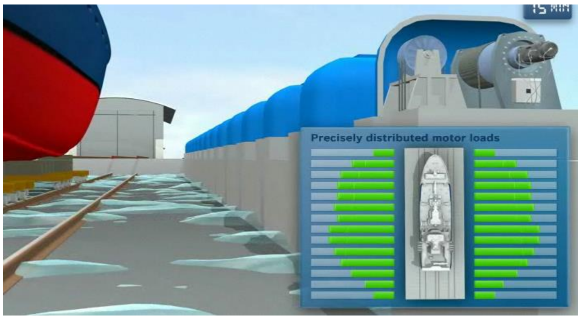


Figure 5. Precisely distributed motor loads

4. Conclusion

This work is dealing with problems of designing parts of distributed control systems which using industrial nets. Main result of this work is methodology of designing distributed control systems and its realisation based on this model. Within the methodology was created sample model of distributed motor control based on load using CAN bus and controlling part of distributed control system. We have used PIC microcontroller to implementation for embedded systems in product distributed motor control system for ship using Embedded C.

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