Renewal of Power Supply Control System for Sapporo Power Supply Control Center of Hokkaido Railway Company

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Abstract

The central equipment of a power supply control system, used for 20 years at Sapporo Power Supply Control Center of Hokkaido Railway Company (JR Hokkaido), was recently upgraded with new equipment.

Major features adapted for the new equipment are introduced below.

(1) A large-screen LCD display unit was installed so that a power outage plan can be automatically displayed on the 70 inch LCD display. Formerly this information was indicated on magnet sheets clipped on a whiteboard.

(2) A mobile terminal linkage server was installed so that the start and stop of power outage (shutdown) work information can be received on a mobile tablet PC carried by a power outage work manager.

1 Preface

The power supply control system is used to provide the functions of remote monitoring of power supply systems the realization of a power outage (shutdown) work plan and power dispatch instructions.

This paper introduces the features of the central equipment of the power supply control system for Sapporo Power Supply Control Center (“Control Center” hereafter) of Hokkaido Railway Company (“JR Hokkaido” hereafter), a JR Group firm based in Sapporo, Hokkaido.

2 Equipment Configuration

Fig. 1 shows a system configuration. The central equipment is mainly composed of an operation desk, a large-screen Liquid Crystal Display (LCD) display unit, and a power supply control server. The operation desk and large-screen LCD display unit are installed in the control room and various servers are accommodated in the machine room. The control room and the machine room are combined through a duplex optical network so that redundancy and noise-tolerance characteristics can be secured.

2.1 Operation Desk

The operation desk is composed of three monitors and a computer is provided with a keyboard and mouse. The desk for the chief dispatcher is added with a monitor that can see the same TV monitor information that is shown on the other two operation desks. Fig. 2 shows the operation desk for the chief dispatcher.

Each operation desk is equipped with three TV monitors. Based on the current operation, the event list, feeder system diagram, distribution system diagram, main-circuit single-line connection diagram, and other related diagrams can be displayed at each respective monitor for efficient system operation. Fig. 3 shows a screenshot showing the main circuit wiring diagram.

2.2 Backup Operation Desk

The backup operation desk is provided with the same functions as those of the main operation desk. In the case of a failure of the main operation desk, this backup operation desk can function as an alternative operation unit.

2.3 Large-Screen LCD Display Unit

Fig. 4 shows the large-screen LCD display units. This equipment is composed of three sets of a 70 inch LCD monitor, a display controller, and

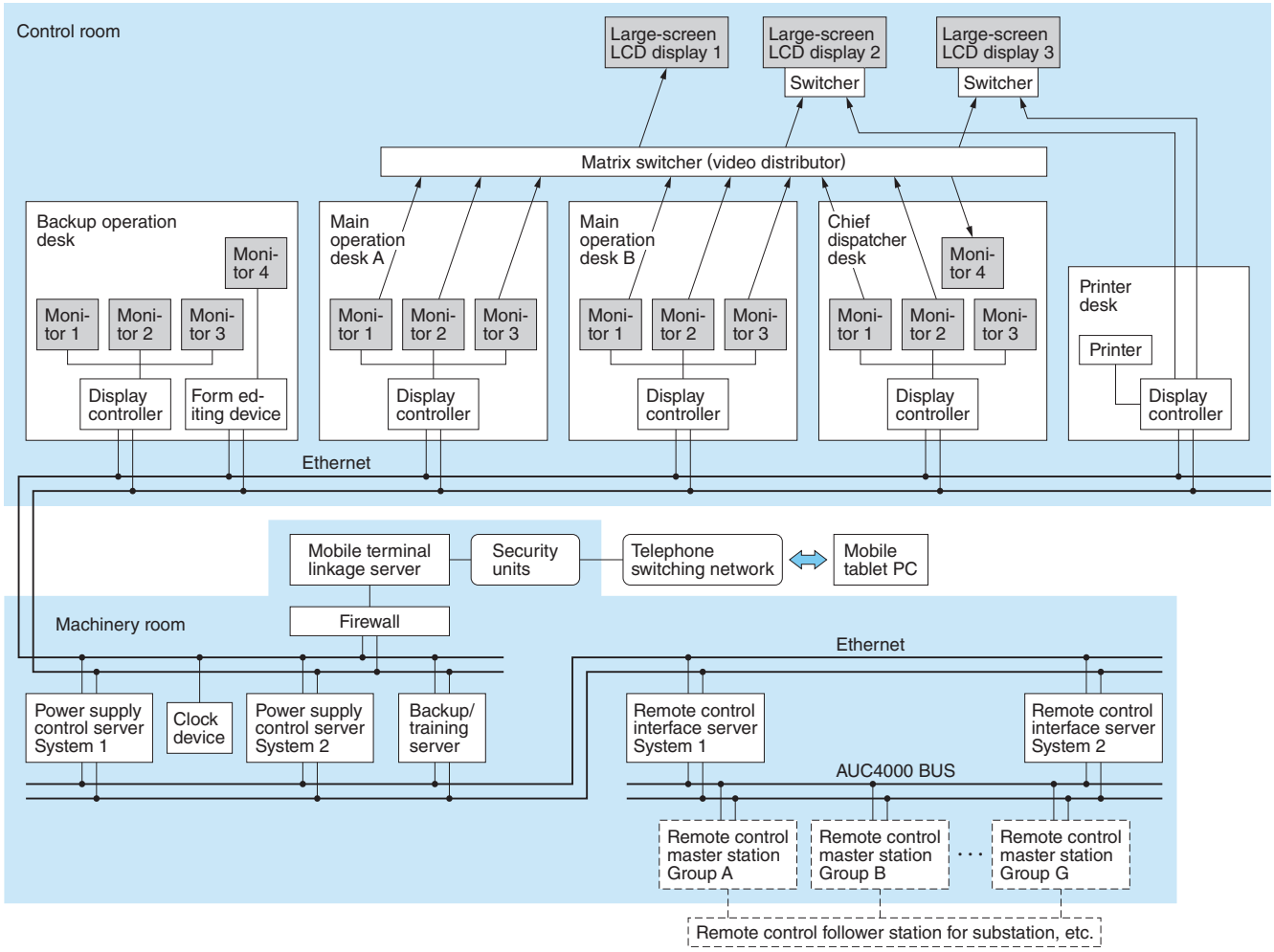

Fig. 1 System Configuration

A configuration of the power supply control system is shown. The solid lines indicate the objectives for current renewal and the dotted lines are for existing facilities.

Fig. 2 Operation Desk for Chief Dispatcher

Using the matrix switcher located beneath the monitor, the same TV monitor information shown in three monitors of other two operation desks can be displayed at the three large-screen LCD monitor and the chief dispatcher's desk LCD monitors (at the far left).

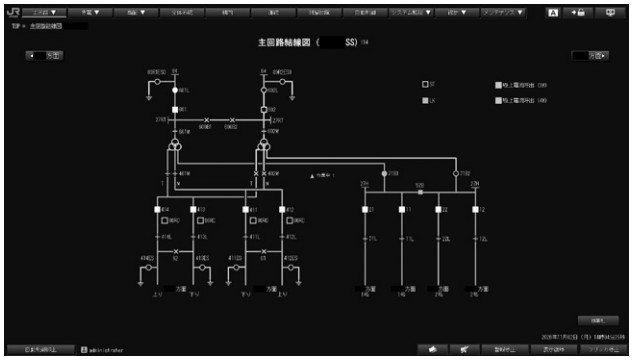

Fig. 3 Screenshot Showing Main Circuit Wiring Diagram

An example of main circuit wiring diagram for power distribution substation is shown.

a matrix switcher. It can show the same TV monitor information shown in the monitors of any of the other three operation desks. It can also show a screenshot of a power outage work plan.

Fig. 4 Large-Screen LCD Display Units

An example of display units where information about power outage work plan is displayed at the screens is shown.

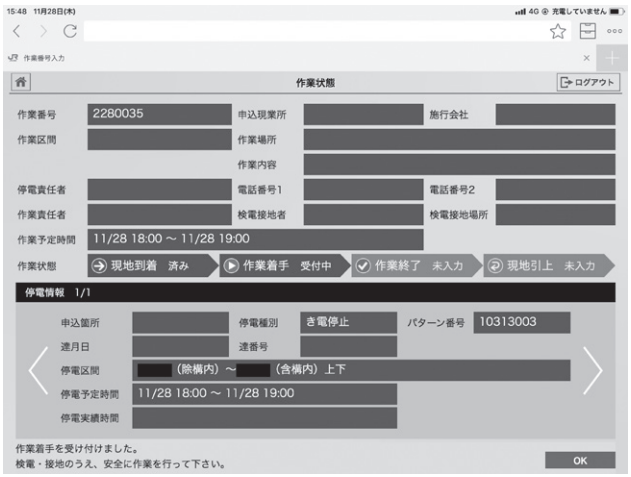

Fig. 5 Screenshot of Work Communications

A screenshot of a mobile tablet PC is shown, through which information about the start of work is transmitted. Work status information is indicated at the top and power outage status is shown at the bottom.

2.4 Mobile Terminal Linkage Server

The mobile terminal linkage server is used to accept information about the start and stop of power outage work (“work communications” hereafter) from a mobile tablet PC carried by a work manager for power outage work. Fig. 5 shows a screenshot of work communications.

3 Postscript

The power supply control system introduced in this paper began operation in January 2020.

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