Application Analysis of Electric Automation Technology in Power Dispatching

Zhuohong Liu

Shandong Vocational College Of Industry Department of Electrical Engineering, Zibo, Shandong, 256414, China

Keywords: Electrical Automation Technology, Power Dispatching, Computer Technology, Internet Technology, Technical Standard

Abstract: with the Continuous Improvement of the Intelligent Level of Power System, Power System Automation and the Integration of Power Grid Regulation and Control Require More and More Power Dispatching. with the in-Depth Development of Computer Technology and Internet Technology, a Large Number of New Technologies Are Integrated into the Power Dispatching Automation System. At the Same Time, the Rapid Development of Electrical Automation Technology Also Makes the Function of Power Dispatching System and Security Has Developed by Leaps and Bounds. in Order to Obtain a More Reliable and Secure Power Dispatching Automation System, This Paper Will Take a Substation as an Example, Based on the Electrical Automation Technology, Put Forward a Set of Upgrading Scheme for the Existing Dispatching System. in Terms of Technical Support, This Paper Mainly Involves the Selection of Relevant Technical Standards, the Selection of Master Station Operating System, and the Selection of Database and Functional Modules. At the Same Time, This Paper Also Fully Considers the Security Requirements of Master Station Dispatching System Data.

1. Introduction

With the Development of Electrical Automation Technology, the Intelligent Automation System Plays an Increasingly Important Role in the Substation System. Traditional Substation Dispatching Technology Has Been Unable to Meet the Current Trend of Power Grid Intelligence, and Integrated Automation Substation Has Become the Trend of Development in the World [1-4]. as the Core Department of Power Supply System, Power Dispatching is Mainly Responsible for the Monitoring, Dispatching, Control and Corresponding Abnormal Accident Handling of Power Grid Dispatching. with the Rapid Development of Internet Technology and Computer Technology, the Introduction of Integrated Electrical Automation Technology Makes the Power Dispatching Automation Develop Rapidly, and the New Automatic Dispatching System Can Provide Effective Help to Improve the Reliability and Security of Power Dispatching [5-9]. However, the Further Development of the Intelligent Power Grid System Puts Forward the Deeper Requirements for the Regulation and Control Automation, So the Research of the New Power Dispatching Strategy Becomes Important and Meaningful.

Based on the Current Development Trend of Power Grid Intelligence, a Large Number of Scholars and Related Power Companies Have Conducted in-Depth Research and Analysis on Its Power Dispatching Automation Technology. There Are Three Types of Early Electric Power Dispatching Automation System, Which Are Cae System, Spider System, Valmet System and Spectrum System Developed by German Siemens Company. the Corresponding Technical Standards of These Four Types of Systems Are Unix System [10-13]. Scada Automation System is the Main Dispatching System in China's Power System Dispatching Automation. It Has Realized the Power Dispatching in Various Scenarios. Its Main Advantage Lies in That It Has Realized the Collection, Sorting and Analysis of the System Data between the Power Plant and the Main Station, and Realized the Human-Computer Interaction of Relevant Data and Information [14-15].

Based on the Above Discussion and Analysis, the Following Conclusions Can Be Drawn: the Continuous Improvement of the Intelligent Level of Power System Makes the Requirements of Power System Automation and the Integration of Power Grid Regulation and Control Higher and

Copyright © (2019) Francis Academic Press, UK DOI: 10.25236/ISMHI.2019.045

Higher. with the Development of Computer Technology and Internet Technology, a Large Number of New Technologies Are Integrated into the Power Dispatching Automation System, and the Rapid Development of Electrical Automation Technology Rapid Development Also Makes the Function and Security of Power Dispatching System Develop by Leaps and Bounds.

Based on the Above Analysis and Discussion, in Order to Improve the Recognition of Online Public Opinion of Tourist Attractions and Enhance the Image of Tourist Attractions, This Paper First Focuses on the Importance of Online Public Opinion to the Image of Tourist Attractions. Then, According to the Specific Social Cases, This Paper Puts Forward the Relevant Means and Measures to Improve the Image of Tourist Attractions, and Provides the Corresponding Solutions for Tourist Attractions in the Face of Adverse Network Public Opinion. in Order to Obtain a More Reliable and Secure Power Dispatching Automation System, This Paper Will Take a Substation as an Example, Based on the Electrical Automation Technology, Put Forward a Set of Upgrading Scheme for the Existing Dispatching System. in Terms of Technical Support, This Paper Mainly Involves the Selection of Relevant Technical Standards, the Selection of Master Station Operating System, and the Selection of Database and Functional Modules. At the Same Time, This Paper Also Fully Considers the Security Requirements of Master Station Dispatching System Data.

The Structure of This Paper is as Follows:

The Second Section of This Paper Analyzes the Application of Electrical Automation Technology in Power Dispatching and the Corresponding Development Direction.

In the Third Section of This Paper, the Corresponding Dispatching Automation System Will Be Designed for a City Level Substation.

Finally, We Will Make a Summary of This Paper.

2. Application Status and Development Direction of Electrical Automation Technology in Power Dispatching

Based on the comprehensive analysis of the current application status of electrical automation technology in power dispatching, it can be summarized as the following two aspects: the composition of hardware equipment of dispatching automation system and the information communication and monitoring function of dispatching automation. The corresponding detailed block diagram is shown in Figure 1:

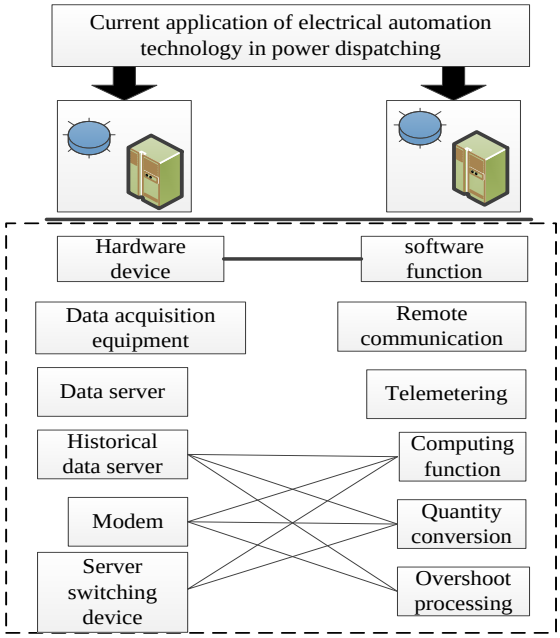

Fig.1 Detailed Block Diagram of Current Application of Electrical Automation Technology in Power Dispatching

From the diagram, we can see that the hardware devices include data acquisition devices, real-time data servers and historical data servers. In the actual operation, the modem is mainly responsible for converting real-time information transferred from the substation into RS-232 related information, and the corresponding server switching device is mainly responsible for parallel running servers for main standby. Change.

The corresponding dispatching automation information communication and monitoring function level mainly involves remote signaling and telemetry functions. The corresponding current power dispatching automation system's telemetry function has integrated a variety of functions such as acquisition module, engineering quantity conversion, calculation function, voltage qualification rate calculation and over limit processing. The corresponding remote signaling function can realize RTU and network form Three kinds of data acquisition modes.

With the further development of intelligent power grid integrated system, power dispatching automation technology also tends to the direction of information digitization and intelligent development. In the aspect of information digitalization, as the central management and control link of power system, power dispatching automation system is of great significance for the realization of digitalization of power system. At the intelligent level, the centralized analysis and processing of dispatching data in the process of power dispatching can not be separated from the intelligent operation mode. The intelligent power dispatching technology is conducive to further enhancing the safety protection capability of dispatching automation, and promoting the rational layout of the power grid mode and promoting the reasonable regulation of the voltage.

3. Design of Dispatching Automation System

This section will take a prefecture level city substation as an example to design the power dispatching automation system.

First of all, in the selection of the overall scheduling framework, the scheduling framework selected in this paper is an integrated bus framework with CORBA component technology as the core. In fact, all the application contents and other parts of the system are taken as modules, and then each module is finally superposed and interconnected to form the final automation system. The corresponding overall framework is shown in Figure 2.

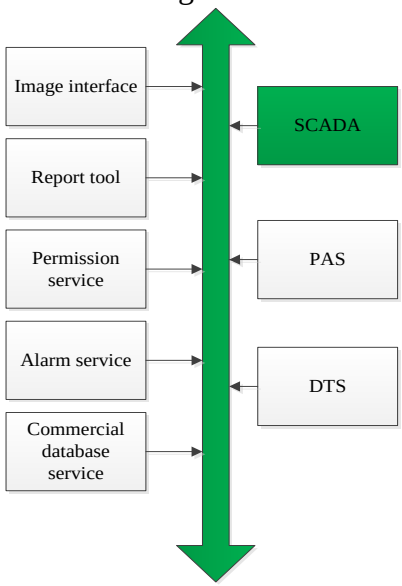

Fig.2 Overall Architecture of Power Dispatching Automation System

Compared with the traditional power dispatching system, the framework has the following three advantages:

1) Realize the general use of software and hardware, which can focus on the development and use of public modules, so as to effectively reduce the construction cost of the whole power dispatching system.

2) Each module of the whole system remains independent, so as to realize the independence of module operation and maintenance, so as to ensure the stability of the whole system when the system is abnormal.

3) The portability of the whole system is very strong. Compared with customers, all of its customer components are just like local components. Users themselves do not know the actual location of the corresponding components, so it is easy to migrate objects from one platform to another without affecting the work of other users.

At the level of typical logic structure, the typical logic structure corresponding to OPEN-3000 system is mainly selected, including LAN subsystem, commercial data server, application server, workstation, database and communication subsystem.

In the front part of power dispatching automation, it mainly includes commercial host server. Modem and communication equipment. The front-end device is mainly connected to the system through the dual network trunk network, and the relevant network segments are set up for the two relatively independent data acquisition servers, so as to ensure that all kinds of data in the whole system can flow according to the specifications, so as to achieve the function of no impact on each other. In the pre automation part, it mainly includes the application of interface duty system, remote terminal unit, dual channel dynamic monitoring application, system undisturbed switching and intelligent interface.

In order to realize the support of power dispatching automation system for multi state tasks, this paper adopts multi state design, and its corresponding system architecture is shown in Figure 3. From the figure, it can be seen that multi state task support runs through the overall framework of technical level and data level, which means that no matter what state the operator operates and analyzes, the data and content displayed by the system are one To the same, this can provide users with correct and reliable data support.

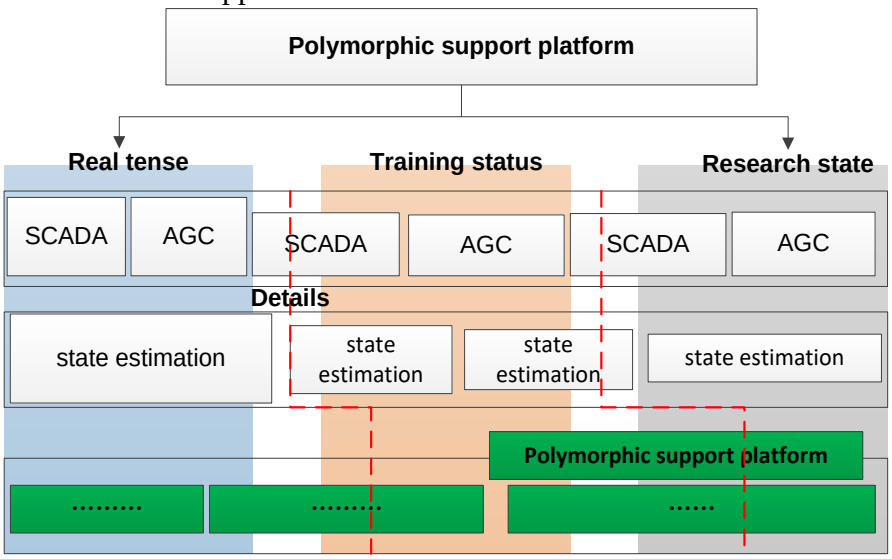

Fig.3 Framework of Multi State Task Support System for Power Dispatching Automation System

4. Conclusion

This paper first analyzes and studies the current situation and future development trend of power dispatching automation system. Based on the analysis, the following conclusions are drawn: the continuous improvement of the intelligent level of power system makes the integration of power system automation and grid regulation more and more demanding for power dispatching. With the development of computer technology and Internet technology, a large number of new At the same time, the rapid development of electrical automation technology also makes the function and security of power dispatching system develop by leaps and bounds. Based on this, this paper designs the power dispatching automation system for a city level substation system and analyzes the corresponding key structure.

References

[1] Rodica Loisel, Guzay Pasaoglu, Christian Thiel. Large-scale deployment of electric vehicles in Germany by 2030: An analysis of grid-to-vehicle and vehicle-to-grid concepts[J]. Energy Policy, 2014, 65(3):432–443.

[2] Z. Zeng, X. Li, M. Li. Analysis of Power Consumption on Laser Solder Joints of Electric Connector [J]. Chinese Journal of Electronics, 2014, 23(4):666-668.

[3] Zhu Zhenghui. Analysis of Isolation Transformer in the Power Grid Application[J]. Electrical Engineering, 2013, 14(8):80-81.

[4] InChun Chung, Hyehyun Kang, Jinil Park. Fuel Economy Improvement Analysis of Hybrid Electric Vehicle[J]. International Journal of Automotive Technology, 2019, 20(3):531-537.

[5] Seyda Ipek. Perturbative analysis of the electron electric dipole moment and CP violation in two-Higgs-doublet models[J]. Physical Review D, 2014, 89(7):1-8.

[6] Cunku Dong, Xin Li, Wei Zhao. Theoretical Analysis of Built-in Interfacial Electric Dipole Field in Dye-Sensitized Solar Cells[J]. Journal of Physical Chemistry C, 2013, 117(18):9092-9103.

[7] Hamou Nouri, Hakim Ait Said, Youcef Zebboudj. Analysis of electric field and current density in an electrostatic precipitator[J]. IEEE Transactions on Dielectrics and Electrical Insulation, 2016, 23(2):665-670.

[8] Michele De Gennaro, Elena Paffumi, Harald Scholz. GIS-driven analysis of e-mobility in urban areas: An evaluation of the impact on the electric energy grid[J]. Applied Energy, 2014, 124(1):94–116.

[9] Jonas Norpoth, Stephanie Mildner, Malte Scherff. In situ TEM analysis of resistive switching in manganite based thin-film heterostructures[J]. Nanoscale, 2014, 6(16):9852-9862.

[10] Huiling Gong, Xiaohui Wang, Shaopeng Zhang. Grain size effect on electrical and reliability characteristics of modified fine-grained BaTiO3 ceramics for MLCCs[J]. Journal of the European Ceramic Society, 2014, 34(7):1733–1739.

[11] Mehnaz Akhter Khan. Performance Analysis of Bidirectional DC–DC Converters for Electric Vehicles [J]. IEEE Transactions on Industry Applications, 2015, 51(4):3442-3452.

[12] Shrikant Maury, S. Balaji. Geoelectrical method in the investigation of groundwater resource and related issues in Ophiolite and Flysch formations of Port Blair, Andaman Island, India[J]. Environmental Earth Sciences, 2014, 71(1):183-199.

[13] Wei Li, Zhijie Jia, Hongzhi Zhang. The impact of electric vehicles and CCS in the context of emission trading scheme in China: A CGE-based analysis[J]. Energy, 2016, 119:800-816.

[14] Pengyu Pan, Student Member, IEEE. Impedance Measurement of Traction Network and Electric Train for Stability Analysis in High-Speed Railways[J]. IEEE Transactions on Power Electronics, 2018, 33(12):10086-10100.

[15] Xu Boyan, Jiang Longlong, Sun Chaodong. Numerical Analysis of the Mixture Formation in a Two-Stroke Wall-Guided LPG DI Engine for Extended-Range Electric Vehicle[J]. International Journal of Automotive Technology, 2018, 19(2):313-321.650.