The Application of FCS Control System in Petrochemical Automation is Analyzed

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Abstract: With the rapid development of China's economy, China's petrochemical industry is gradually developing towards a large-scale trend. The use of automatic control technology in the petrochemical industry can continuously improve the production level and meet the actual needs of production development. The previous control system is gradually being replaced. Therefore, at present, it is necessary to analyze how the FCS Control System is further applied, understand the overall characteristics of the petrochemical industry, and clarify the unique advantages of the FCS Control System, which will have a positive impact on the further development of the petrochemical industry.

Keywords: Petroleum Chemistry; FCS Control System; Automation; Application

1. Introduction

The petrochemical industry has a large amount of funds, perfect technology and relatively sufficient energy, which has become an indispensable part of social development. However, one of the characteristics of petrochemical enterprises in the development process is that the industrial process is relatively complex. In addition, most of the environments are high temperature and high pressure, and most of the industrial raw materials are flammable, explosive or toxic materials. This also makes it extremely important to choose good protective measures and unique control systems in the production process of petrochemical enterprises, which not only ensures people 's life safety, but also achieves the quality and quantity of production development itself.

2. FCS Control System

*T*he FCS Control System is a fieldbus control system, which is an emerging industrial control technology. It has gradually emerged in the 1990s, and through the integration of fieldbus control systems with modern network technology and communication technology, it can achieve automated management, ensure the improvement of the quality of petrochemical enterprise development, and use fieldbus to connect intelligent network sites. Automated management technology can achieve bidirectional transmission of information, improve the quality of information transmission, and set up more mature and stable technologies that can perfectly explain how to centralize information and do a good job in information control and decentralized management. Secondly, the selection of the FCS Control System can effectively connect multiple different distributed instruments and control devices in the production process of chemical enterprises, summarize all data through the system, achieve two-way communication between the control room and field equipment, and ensure improved data transmission and sharing quality, replacing the previous single information transmission mode. The FCS Control System can also be used with virtual distributed control stations, which can better save the space consumed by production itself in a short period of time and improve production efficiency. The addition of computer microprocessors to the FCS Control System ensures that all the obtained work data information is more accurate, and has the ability to calculate and communicate. Using the network for information network queries anytime and anywhere improves the effectiveness of information retrieval, and also achieves a double benefit.

3. Present Situation of Petrochemical Automation

The petrochemical industry has a strong dependence on resources in the production process, among which the common resources include water, oil, minerals and materials. According to the analysis of China's social

development at this stage, these resources are very important and serious or lack in China's social development. The main reason for this problem is that in the process of exploitation and resource utilization, the way is too extensive, there is obvious waste, and the level of comprehensive utilization is relatively low. It is necessary to combine these factors to solve the current situation of poor use of resources. Through the current exploration of the production environment and production mode of the chemical industry, it can be found that the chemical industry is in a long-term continuous production state in the production process. Therefore, combined with the current production state of petrochemical enterprises, it is found that it is relatively dependent on foreign technology. For the development of chemical enterprises, the most important thing is to accurately grasp the direction of the development of the times and understand the development prospects of a field. However, at this stage, the development speed of China's chemical products is relatively slow, which also affects the overall construction quality of the whole industry during construction. In most cases, China's chemical enterprises adopt typical and continuous large-scale production, which makes the raw material cost account for a relatively large proportion in the production process. In the production process of chemical enterprises, the automatic workshop has relatively high requirements for instrument reaction devices and equipment. If the technical project is not transformed, it cannot realize the effective utilization of resources and the construction of a resource-saving society. As the production cycle of chemical products is relatively long and the price fluctuation of raw materials is relatively large, the price of some products is relatively unstable. In the production process of operating products, the production process is relatively special. The raw materials of chemical products need to be separated and combined through the raw material mixing equipment, which will lead to a variety of different chemical reactions. In each process, appropriate and new raw materials need to be added to derive a variety of different products. The equipment of petrochemical enterprises is relatively specialized. Its storage equipment commonly includes barrels, boxes, tanks, etc., and the storage quantity can be counted by sensors. These equipment shall be maintained. In case of failure, permission is required to stop, and permission is required to stop work.

4. The Characteristics of FCS Control System Applied In Petrochemical Industry

The characteristics of applying FCS Control System in petrochemical industry include the following two points: easy maintenance and strong anti-interference.

4.1 Easy Maintenance

Easy to maintain because when using the FCS Control System, the field staff can use the self diagnosis function of the FCS Control System to monitor the actual situation in the production process, check the equipment status, analyze different information, quickly find out the cause of the problem of the equipment, repair the problem, and shorten the repair time. When the FCS Control System connects the equipment, its connection status also significantly reduces the number of cable connections, ensuring that the production cost can be continuously reduced in the production process.

4.2 Strong Resistance to Interference

Because the FCS Control System has a two-way wireless transmission function, it reduces the number of lines itself, and significantly improves the anti-interference performance of the system. These are the key contents of the digital signal in the transmission process, which greatly improves the work efficiency and facilitates the first-time processing of all difficult signals. At present, the FCS Control System can be used to quickly collect and process all the data on all kinds of equipment on the site, and change the problem that the field instrument cannot be controlled in the production process in the past.

5. Application of FCS Control System in Petrochemical Automation

5.1 Reliability and Sustainability

In petrochemical enterprises, the advantages of FCS Control System include reliability and sustainability, which are extremely important advantages. Through the automatic monitoring system, the bus or single line i/o connection can be realized to ensure the reliability can be improved. After diagnosis, problems found can be reported, recorded and handled separately in the first time to improve the reliability of

problem handling and recording. The FCS Control System can realize the remote control of all equipment in the field, and the parameters can be preset before the control. Once the parameters are found to have problems, the parameters can be replaced at the first time, fully reflecting the characteristics of sustainability in the use process.

5.2 Interchangeability and Operability

FCS Control System has a series of advantages such as interchangeability, operability and inheritance in the use of petrochemical enterprises. However, in the use of the system, since different manufacturers may be used, the product production should maintain the same standard. Different manufacturers can introduce more advanced control technology according to their own professional knowledge. For example, the general control algorithm or process flow has a positive impact on the development of the petrochemical industry, realizing the common application of a variety of different monitoring systems to ensure that their use effect can be improved.

5.3 Controllability

The FCS Control System also has strong controllability. It strengthens the collection and processing of field information in the field of Petrochemical Automation. The controllability of the automation system can be improved through fieldbus. Fieldbus can obtain a large number of valuable information in the equipment. The collection of these data can further meet the needs of the current factory in the implementation of automation management. The FCS Control System can process and convert all data at the first time. Due to the relatively large number of field buses and the fact that this type of digital communication network and automation equipment can enter the working state at the first time, it is necessary to detect the error in time, realize the statistics and transmission of all parameters at the first time, and help petrochemical enterprises realize automatic remote control and remote backup. Combined with the principle of analysis and reform, petrochemical enterprises can find the best development path in the process of production management. The emergence of remote control technology can also improve the accuracy of data, making the impact on production interference declining. This is because in the petrochemical industry, most of its raw materials are flammable and explosive substances, and the risk of fuel is relatively high. In the process, the process is relatively complex and changeable, and the requirements for production conditions are more stringent. Therefore, at present, the control system is required to have better use conditions, and the chemical industry needs to improve its analog quantity in the production process. Due to the large number of devices used for switching quantity, which are scattered in different regions, the dispersion range of the overall equipment is very wide. At present, a large number of other devices can be used to cooperate to ensure that the quality of remote control, data acquisition and use can be further improved.

5.4Enhance Anti-interference Performance

At present, the FCS Control System is mostly used in two-way radio mode for communication transmission, which reduces the emergence of a large number of wires and greatly improves the anti-interference performance of the system itself. At present, in the automatic control production of petrochemical enterprises, digital signals are used to improve work efficiency. The FCS Control System is used to effectively process the signals that are originally difficult to process. It can also perform advanced control on some field instruments through remote control, so that all instruments have self-diagnosis and self-processing capabilities, and improve the effect of fault handling. The staff can also monitor and check the working status of the equipment through the machine, analyze the equipment and instruments, find out the cause of the fault, and reduce the time spent in the past in the maintenance of the fault. The connection mode contained in the FCS Control System also greatly reduces the connection amount of the cable itself and reduces the cost in the early stage.

6. Conclusion

In summary, since the application of FCS Control System, it has been widely used in the field of petrochemical industry in the world, and the time of introducing FCS Control System technology in China is about 3 ~ 4 years, mainly used in tobacco, machinery, manufacturing, metallurgy and other fields. It is relatively late to choose FCS Control System in chemical industry and other industries. Choosing this

system has brought a lot of benefits to the automation of petrochemical enterprises. It can realize the real-time and automatic control of network communication and ensure the quality of communication network.

References

[1] Zhang Haitao, Qi Xinhua. Application Analysis of FCS Control System in Petrochemical Automation [J]. Petrochemical Technology, 2023, 30 (07) : 21-23.

[2] Jiang Bo. Research on the application of FCS Control System in petrochemical automation [J]. Scientific and technological innovation, 2022, (23) : 39-42.

