

Research on Quality Control Technology of Electrical Products

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Abstract

Aiming at the quality control of problem of assembly process of Electrical products, this paper proposes a dynamic process quality control mode for the assembly process of Electrical products based on the analysis of the assembly process characteristics of Electrical products. This paper analyzes the quality information perception platform of assembly process, the online quality optimization expert system of assembly process dynamic process based on radio frequency identification technology, key technologies such as visualizing on-line operation instruction mode based on component technology.

Keywords

Electrical products, quality control, online optimization.

1. Introduction

With the development of aviation equipment technology, modularization, integration, and miniaturization have increasingly attracted attention from all quarters. In particular, the combination of air transmission/electricity integration brings a wide range of applications to equipment [1]. Due to the integration of sensors, signal conversion and acquisition processing, its production process, especially the electrical installation technology, will directly affect the quality and reliability of the product, because the electrical installation technology is the process from product design to manufacturing. For avionics, the function of the circuit design product, the structure of the product design, and the process of designing the product. In the design, development and production of the product, the technology of the electrical installation process should be the prerequisite for the realization of the product's function targets. The technology of electric equipment is multi-disciplinary and multi-field electronic engineering manufacturing technology, and modern avionics constantly pursue high performance and multifunction. The rapid development of electric equipment technology is bound to be promoted in the light, thin, short and small directions. Therefore, we should control the quality of the products and improve the efficiency of the products in terms of the technology and production technology of the products. Therefore, we must strengthen the technology of electric loading in the production and manufacture of products.

2. Definition of Electric Loading Technology

Denso process technology, referred to as electrical equipment. The implication is that modern enterprises, in large-scale scientific research or production, organize many people to jointly and electronically assemble and electrically connect electronic and electrical products, thereby designing and formulating electronic assembly regulations that are mutually adhered to. And regulations. It is a technical process for rationally designing, interconnecting, installing, and debugging various electronic components, electromechanical components, and substrates according to design drawings and documents, making them suitable and manufacturable electronic products. It is a multi-disciplinary

engineering discipline involving multiple disciplines in which circuits, processes, structures, components, devices, and materials are closely combined [2].

3. Research and Development of Quality Control System of Electric Assembly Products

In order to improve the assembly quality of electrical products, it is necessary to collect and upload information on the real time quality condition of the products in order to improve the assembly stability of the whole machine. The optimum assembly strategy of the current process quality control points is given, and the dynamic compensation of online quality optimization and error accumulation in the assembly process is realized. By means of various methods of quality statistical analysis and control, real time monitoring and analysis of key quality characteristic fluctuation trends are carried out to detect the abnormal quality of the assembly process in time. According to the system level, the dynamic control and global optimization of the quality of each process of assembly of electric products are realized, thus eliminating the influence of uncertainty of assembly process on the stability of assembly quality. The basic framework of dynamic process quality control system for assembly process of electric assembly products is shown in Fig. 1.

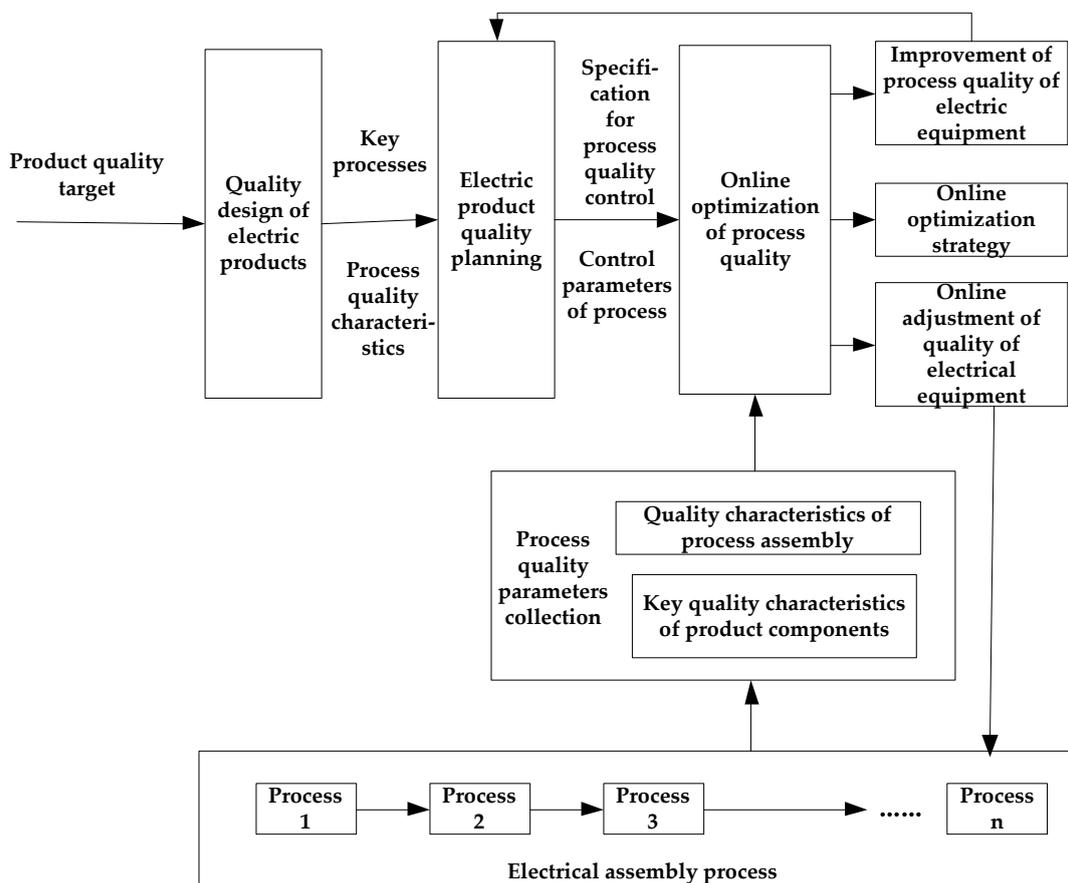


Fig 1. Basic framework of dynamic process quality control in assembly process of electric equipment

4. Integration of Quality Control System and MES System

According to the basic framework of dynamic process quality control, this paper proposes an architecture and functional model of dynamic process quality control system for assembly process. The system mainly includes basic management module of quality information, process quality control point management module, quality data acquisition module, process quality online optimization module and operation online instruction module. Communication and data sharing with other systems

of the enterprise, such as manufacturing resource planning, enterprise resource planning, product data management system, supply chain management, system functions and structure as shown in Fig.2.

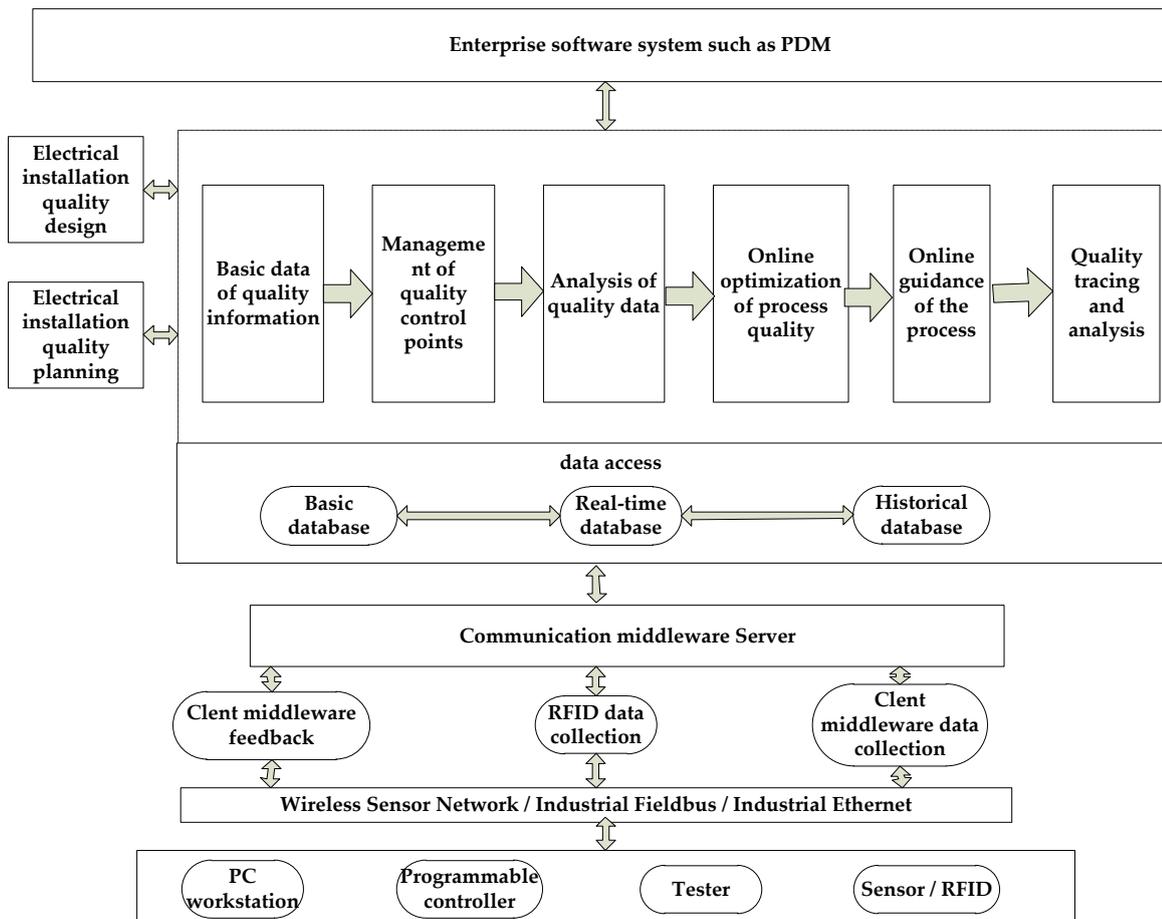


Fig 2. Functional structure of the dynamic process quality control system for the assembly process of electrical products

5. Implementation of Key Process Parameters Feedback Control

The core idea of quality information sensing technology of assembly process based on RFID technology is in the process of assembly. To realize the perception of key component quality characteristic value and the perception of product key assembly quality characteristic value using RFID technology, the purpose of these two functions is to provide accurate data sources for online optimization of process quality.

The quality control points of the installed product are scattered in the assembly process, and there are dynamic and nonlinear interactions between them. The calculation is based on the optimization algorithm to realize the dynamic compensation of error accumulation and the active control of assembly quality.

Based on the above theory, an expert system for online quality optimization of dynamic process is designed as shown in Fig.3. The system combines on-line optimization of operation quality in stable mode and quality diagnosis and control in fault mode. And control, mainly including the following four parts: (1) The information fusion module obtains a composite representation of the current process quality status by inputting and processing information on the quality data of the electrical equipment, the process quality data of the assembly process, and the state data of the equipment, as an input to the inference engine; (2) Density process quality knowledge base, storing qualitative expert experience and knowledge represented by fuzzy rules, and quantitative knowledge using parameter definition methods, including rule base and case base, etc., the corresponding theoretical model of expert system

to optimize assembly quality online and The corresponding optimization algorithm is transformed into the knowledge rule and stored in the knowledge base. (3) The inference engine adopts the fuzzy production rule, and matches the corresponding product matching strategy according to the current work-in-process information, and matches the corresponding quality information in the basic quality information configuration or the expert rule base. The information provides technical support for the current work activities; (4) the knowledge learning module, the process type information is learned by active input, and the quality abnormal diagnosis type is obtained by self-learning.

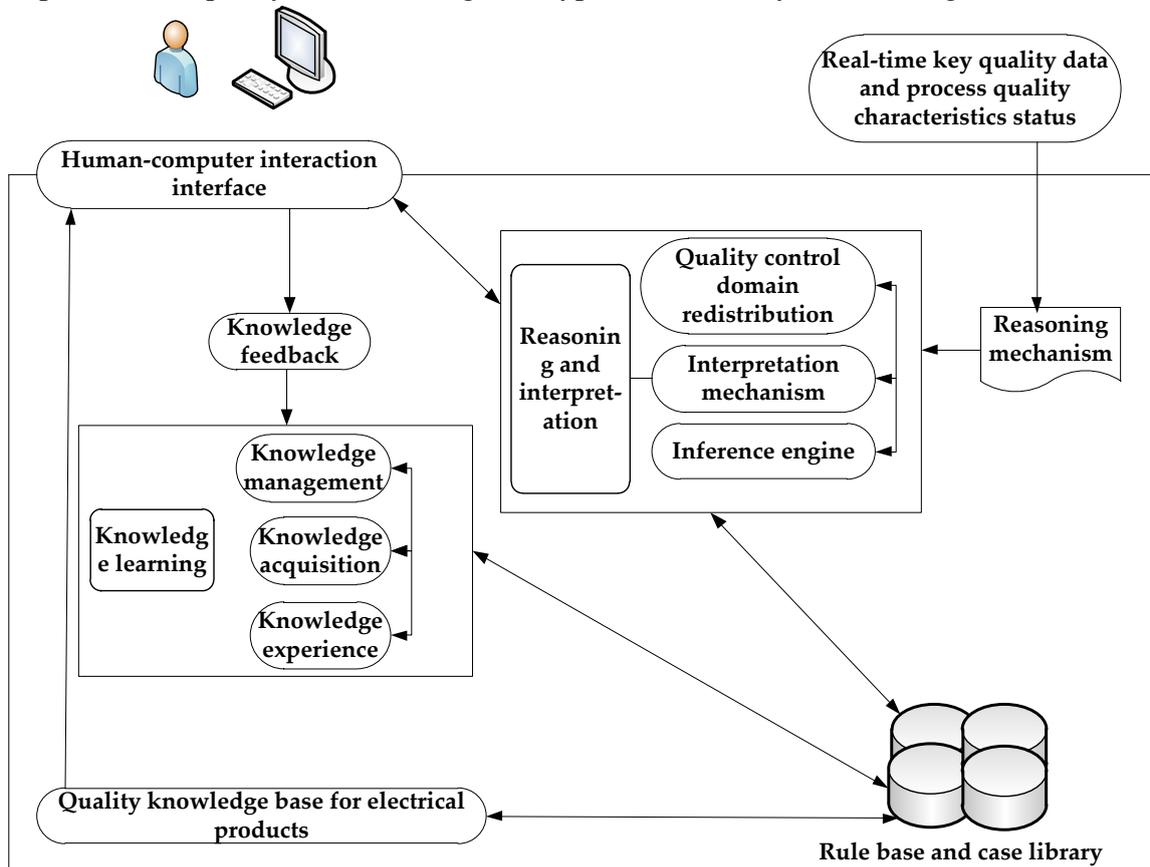


Fig 3. Dynamic process quality online optimization expert system structure

6. Conclusion

In this paper, a dynamic process quality control system for the assembly process of electronic assembly products is constructed. The introduction of knowledge rules enables the system to have the ability of self-organization and coordination, and can make corresponding adjustments to the current assembly operation activities of products in accordance with real-time quality working condition information, thus ensuring the assembly accuracy and quality stability.

References

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