Research on Life Cycle Data Acquisition and Sharing Technology Based on Transformer Equipment

Xiaolong Zhao, Xin Ji, Tongxin Wu, Ting Yu, Fan Zhang

Big Data Center of State Grid Corporation, Beijing 100052, China

Keywords: Main transformer equipment; Full life cycle; Data collection; Sharing

Abstract: Aiming at the problems of long traditional data collection time and sharing time, the research on the technology of data acquisition and sharing of the entire life cycle of the main transformer equipment is proposed. Based on the equipment manufacturing stage data, operation and maintenance stage data, and scrap stage data, a total-point deployment scheme is used to build a data collection and sharing platform, strictly observe the security environment, and determine whether there is any abnormality in the data, thereby completing the data collection. Based on the networked intelligent sharing communication protocol, a sharing constraint mechanism is constructed to promote effective data sharing within the main transformer device. The sharing mode is screened, and the consistency index of the complementary judgment matrix is obtained to obtain the best sharing result. From the experimental results, it can be seen that the technology has a short collection time and can prevent abnormal data sharing in time, providing technical support for the full life cycle analysis of the main transformer equipment.

1. Introduction

At present, the full life cycle optimization design and data collection and sharing of main transformer equipment is a hot topic, which mainly involves agile manufacturing research. The production quantity of a single device or a small batch of equipment is small, but it is expensive and has a long life cycle. Power users often need to master the operation of the main transformer equipment in real time [1]. Under the background of big data, study the life cycle data management architecture of the main transformer equipment to provide a basic model for the collection and sharing technology. However, under the background of big data, the main transformer equipment Internet of Things can provide a large amount of equipment parameter information. How to integrate data information becomes the key [2]. There is no unified standard for traditional data collection and sharing, and only full life cycle data collection can be achieved for some main transformer devices, and all life cycle devices for main transformer devices cannot be collected [3]. In order to improve the situation, research on data collection and sharing technology based on the life cycle of the main transformer equipment is proposed. It integrates the data collection and data sharing of the life cycle of the main transformer equipment to facilitate the management of power equipment, provide a basis for improving the reliability of equipment, and provide guarantee for the stable operation of power enterprises.

2. Main transformer equipment full life cycle data

At present, there is no unified standard for the full life cycle management of the main transformer equipment. The comprehensive life cycle management of the integrated main transformer equipment includes the entire life course of decision-making, planning, assembly and maintenance until the scrapping is eliminated [4-6]. The purpose of real-time status monitoring of the whole life process of the main transformer equipment is to coordinate and optimize the related services of the whole process of the equipment, integrate the interests of users and the environment, and support seamless interaction with the main transformer equipment at any stage under any circumstances, so as to realize the social ecology of the main transformer equipment Value maximization

  DOI: 10.25236/iwmecs.2020.040

The main life cycle data of the main transformer equipment mainly includes three parts, namely the equipment manufacturing phase data, operation and maintenance phase data, and scrap phase data [7-8].

Among them: equipment manufacturing stage data mainly includes equipment manufacturing parameters, assembly records, etc., according to the management system statistics of the entire manufacturing and assembly process, in order to achieve data addition, deletion, query functions; operation and maintenance stage data mainly includes equipment operating parameters, status information And maintenance instructions [9]. The data at this stage can complete the identification of the operating conditions of the equipment, so as to realize the pre-maintenance of the equipment and improve the production efficiency of the main transformer equipment; Able to understand equipment utilization in real time [10-11].

3. Main transformer equipment full life cycle data collection and sharing architecture

The data collection and sharing of the main transformer equipment throughout its life cycle are mainly divided into data collection and sharing platforms.

The data collection and sharing platform adopts a total-point deployment scheme, which is mainly responsible for processing the data on the platform and sharing the data results to the upper-level applications [12-13].

3.1. Data collection

In the process of data collection, all life cycle characteristic data including decision-making, planning, assembly and maintenance until the elimination of scrapping should be managed according to the life cycle management of the main transformer equipment, and the data collection situation in a safe environment should be strictly followed.

According to the needs of the main transformer equipment, manage the data on the data collection and sharing platform and determine whether there are any abnormalities in the data. If so, you need to directly collect the full life cycle data; otherwise, you need to stop the collection[14].

3.2. Data sharing

The life cycle data sharing of the main transformer equipment mainly follows the networked intelligent shared communication protocol. Within the main transformer device, the data can be shared in real time to meet the following conditions: the sender and receiver of the information have the same purpose, and in the entire data sharing process, the sharing results can achieve the desired effect [15]. Therefore, to improve the subjective and objective factors of the main transformer equipment, effective management should be carried out and a shared constraint mechanism should be constructed.

The internal information transmission of the main transformer device needs to go through three steps of data integration, data transmission and data reception. Therefore, a constraint mechanism needs to be built to promote the effective sharing of data within the main transformer device. Through the data sharing constraint mechanism, the main transformer devices can be analyzed from a common cognitive point of view, and they can be reasonably transmitted. After accurate data transmission, the main transformer device can successfully receive the complete data, and then realize the life cycle data sharing of the main transformer device. [16].

The complementary judgment matrix, that is, the optimal weight vector is output, and the safe sharing mode of the life data of the main transformer device is sorted according to the vector to obtain the best sharing result.

4. Conclusion

Data collection and sharing of the life cycle of the main transformer equipment is the basic work for power operators to promote data development and application. Given the large amount of data, power operators can collect data in steps according to the degree of demand. At the same time, because the device data involves multiple privacy data such as the location of the power, the full life cycle data security of the main transformer device should be fully considered when sharing externally, in compliance with national regulations. The project research includes the implementation of data collection and sharing for the entire equipment life cycle, providing a practical path for integrated automatic collection. From experiments, we can see that this method has high collection efficiency and strong practicability.

In the future research process, the data collection and sharing time should be optimized as much as possible to avoid the tedious steps of on-site debugging, so that the data collection and sharing technology can realize automatic data collection and sharing in a wider range.

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