Application of RFID System for Managing Repair Parts of Underground Power Cables and Accessories

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Abstract

Once underground power cables break down, a long time is needed to repair them and a rapid repair is required to build trust with the customer. It takes about six months or more to manufacture some repair parts. Therefore, more than 28,000 repair cables and accessories are stocked in Chubu Electric Power Company (CEPCO). Inventory checks, quality checks and part replacement are carried out regularly. These tasks take a lot of time.

Radio-frequency identification (RFID) technology was focused on as a way to reduce the time and cost of regular checks and part replacement. RFID technology has been used widely in recent years. An RFID system is composed of an integrated circuit (IC) tag, reading device, device control system and database (DB). The RFID reading device can get information on multiple IC tags in one go and in a non-contact manner by using ultra high frequency (UHF) electromagnetic (EM) waves. The IC tag does not require a battery. The prototyped RFID system in this study was given compatibility. It supports multiple manufacturers' IC tags and reading devices. In addition, it can be used for various tasks (e.g., warehousing management, shipping management, inventory management, object search). A log of all tasks is stored in a cloud DB. All users who are allowed to access the DB can see the latest data. In this study, we investigate the amount of time saved when an RFID system is applied to manage repair parts of underground power cables and accessories.

First, the effect on inventory management was verified by using RFID systems for 567 samples. Conventionally, all items were checked one by one against an item list. In the case of one operator working, 78 minutes and 39 seconds was spent on this work. This time was reduced to 4 minutes and 59 seconds by using an RFID system. Here, the operating time was almost the same for various operators.

Second, we proposed a way to reduce the amount of parts stored by applying RFID systems. Conventionally, consumable parts (e.g., repair tapes and adhesive bond) were stocked excessively because it was time-consuming to manage them individually. In the case of using the RFID system, all individual items are managed by the system accurately and easily. Therefore, redundant consumables can be reduced.

From the above, it has been confirmed that applying RFID technology can improve the work efficiency for managing repair cables and accessories.