BJMTR Pilots Substation Intelligent Inspection Robot to Improve Operation and Maintenance Level to Ensure Passenger Travel

【April 8, 2021】Recently, a black and white substation intelligent inspection robot with a "360-degree rotating arm" appeared in the BJMTR. It inspects the substation cabinet equipment through high-definition imaging cameras, infrared thermal imagers, ultrasonic sensors, etc., to improve the inspection efficiency and equipment reliability, thus further enhancing passenger travel experience.

Intelligent Robot Helps Inspection Work in "Energy Station”

Substation is the "energy station" of subway operation, mainly responsible for the supply and transmission of electric energy, providing electric energy for all electrical equipment and facilities of trains and stations. On weekdays, the staff carry out daily inspection work by way of " listen, look, experience", once every seven days, to ensure the good operation of all kinds of power supply equipment in the substation and the safe and reliable operation of metro electrical equipment.

In order to further improve the efficiency and accuracy of inspection work and the automation and intelligence level of substation monitoring, in early February 2021, Beijing-Hong Kong Metro piloted the use of intelligent inspection robots in the Majiapu depot substation of Line 4 to improve the inspection quality on the basis of ensuring the continuous and stable power supply of the substation.

The intelligent inspection robot will "walk" along the guide rail above the switch cabinet to the front of each cabinet according to the predetermined process every day to detect and read the status information of the voltage and current meters, indicator status, knob position, protection device status, temperature, humidity, noise, infrared temperature and partial discharge of the power supply equipment in the substation. Robots can also rotate up and down from multiple angles to ensure multi-directional coverage of inspection points, and realize real-time warning through intelligent data analysis functions to make inspection work more intelligent, enhance the level of operation and maintenance with technology, and guarantee passengers' quality travel experience.

Intelligent Technology Improves Efficiency and Patrol Inspection per 3 Hours Ensures Safety

After the pilot use of intelligent inspection robots in substation, the inspection frequency is changed from once every 7 days to once every 3 hours, which can find the abnormal situation of the equipment earlier and improve the reliability of the equipment; and the inspection robot can carry out more accurate data detection and information reading on the basis of manual visual inspection. At the same time, the collected data will be uploaded in real time and form an analysis report for the staff to view the current and historical inspection data at any time.

With the enrichment and improvement of the collected data, the robot can realize autonomous learning, and the precision and accuracy of data recognition will be continuously improved. Through data analysis, we can guide the maintenance of equipment, and assist the maintenance managers of BJMTR to continuously optimize the maintenance strategy.

In addition, if the inspection robot finds abnormal conditions, it will send the abnormal information to the background terminal in real time, and send out alarm information prompts to remind the staff to check and handle it on the spot. By doing so, it ensures the safe and reliable operation of power supply equipment timely and effectively, effectively improves the efficiency of inspection, further enhances the reliability of power supply in substation, so as to ensure the normal power supply of trains and stations, and guarantee the service quality and passenger travel safety.

BJMTR Applies Multiple Technologies to Create Smart Travel in the First Year of the "14th Five-Year Plan”

With the rapid development of science and technology, in recent years, BJMTR has gradually developed and used intelligent operation and maintenance platform and intelligent maintenance equipment, and is committed to providing passengers with better travel experience by actively introducing advanced technology. The northern section of BJMTR Metro Line 16 is the first metro line with full coverage of 5G signals in China. Passengers can enjoy the convenience brought by 5G network on their way to and from work, which further improves the passenger experience. BJMTR also promotes non-cash payment services in its lines and stations to make passengers travel more convenient and smooth; Pilot use of intelligent inspection robot for substation improves the level of operation and maintenance and ensures high-quality travel experience for passengers; research on the use of unmanned aerial vehicles for inspection in limited space improves work efficiency and personnel safety; pilot use of intelligent operation and maintenance system for signal system of Line 16, etc., to empower rail transit with technology, focusing on building intelligent and smart travel.

Wang Jiangtao, technical engineering manager of Beijing-Hong Kong Metro, said that BJMTR tried out intelligent inspection robots instead of manual work to carry out automatic inspection work in substations and other places, to achieve real-time early warning, intelligent data analysis, to improve the level of operation and maintenance with science and technology, providing high-quality services for passengers to travel safely and smoothly. This year is the first year of the "14th Five-Year Plan". BJMTR will further combine passenger demand with technological innovation to improve the capability and level of operation and management, enhance the reliability and convenience of rail transit operation, and help build a smart city.