

## STUDY AND APPLICATION OF CABLE NETWORK OPERATION MONITORING SYSTEM IN BEIJING

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### ABSTRACT

*In this paper, power cable operation and monitor system hardware, platform system structure, system security protection construction built by Beijing power grid was introduced. The function model integrity interface, style status monitoring data, control signal communication protocols were presented in detail. The operation mode and effect of the monitor system was summarized and analyzed, including the contribution of power cable operation and management in power supply guaranteeing during the Olympic Games. Based on technical supporting of monitor and control platform, the high active, formal, ordered power supplying system was established, which exchanged the conventional management state at power supply which is high-intensive and low efficiency. Finally, we achieved an important conclusion that to construct a uniform power cable grid operation and monitor platform is the only way to realize modern the modern power cable network management.*

### KEYWORDS

High voltage power cable net, operation and monitoring, manage modle, state mersuring, state examine and repair Instructions.

### INTRODUCTION

In the recent years, high voltage power cable in Beijing and the electric power tunnel equipments grow quickly. 110kV power cable increased 100 kilometers annually and electric power tunnel increased 40 kilometers annually. In the next 5 years, the length of 500kV, 220kV and 110kV power cables in Beijing will reach 12 kilometers, 449.1 kilometers and 782.4 kilometers, respectively. The electric power tunnel will reach 698 kilometers. Because of the quick growth of equipments, the pressure of maintenance is growing fast. First of all, personnel's amount is limited. Therefore, under the traditional management way, the amount of equipments under the management of each personnel will increase largely. Secondly, the system for the power cable tunnel monitoring is insulated. Therefore, Beijing power cable company built a monitoring platform that can monitor the service state of the power cable network.

### STATUS QUO OF THE POWER CALBE NETWORK MANAGEMENT IN BEIJING

At present, most of the cable network is extensive management. Network inspection and maintenance work is carried out periodically. During the interval of inspection, few information about the service state could be obtained. The lack of information on the service conditions mean terrible disaster, such as power cable tunnel collapse, fire and malfunction. In the past few years, several accidents happened in Beijing, for example, a fire

accident occurred in the power cable tunnel in Beijing in 2005 (see Figure 1),



Figure 1. Photo of the power cable tunnel scene



Figure 2. Photo of the cable malfunction accident



Figure 3. Photo of the cable tunnel collapse scene

a serious malfunction caused a failure in the high voltage cable network (see Figure 2) in 2004, and an accident of tunnel collapse happened in 2003 (see Figure 3).

The periodic inspection and preventive maintenance on the cable network has been used for over 40 years in Beijing power grid. The disadvantage in this management is obvious: