Available online at www.sciencedirect.com

ScienceDirect

Procedia - Social and Behavioral Sciences 138 (2014) 350 – 357

Procedia Social and Behavioral Sciences

The 9th International Conference on Traffic & Transportation Studies (ICTTS'2014)

Research on Urban Rail Transit Network Command Center Information Platform

Li Bai*, Fu-zhang Wang, Ming Zhang

China Academy of Railway Sciences, No.2 Daliushu Road,Haidian District, Beijing 100081, P.R. China

Abstract

Drawing lessons from the constructions of domestic and foreign urban rail transit network operation coordination platform, the paper puts forward the structure of network command center information platform with the full life cycle management idea and the open architecture. Besides, it designs the main platform functions and explores key technologies such as the information fusion mechanism, real-time monitoring with GIS technology, equipment alarm monitoring and intelligent emergency decision. The network command center integrated information platform which has important functions in the operation coordination, resource sharing, and emergency decision is the main technical support system of urban rail transit network operation and management.It can grasp the real-time operation situation of each rail transit line, use for the daily operation supervision,and especially unify coordination control during emergencies to implement emergency linkage by organizing relevant departments and assembling the rescue resources.The running effect of the network command center information platform suggests that the system can effectively improve the urban rail major accident or emergency rapid response capability and scientific decision so as to ensure the safety of urban transportation.

Peer-review under responsibility of Beijing Jiaotong University(BJU), Systems Engineering Society of China (SESC).

Keywords: urban rail transit; network command center; information platform; comprehensive monitoring; operational decision; emergency disposal

1. Introduction

With the rapid development of urban rail transit, it has formed the network structure and become the backbone transport mode of the city passenger corridor. It puts forward a great challenge to improve the safety management

* Corresponding author. Tel.: +86-(0)10-5187-4576.
E-mail address: baili@rails.cn.

Peer-review under responsibility of Beijing Jiaotong University(BJU), Systems Engineering Society of China (SESC).
doi:10.1016/j.sbspro.2014.07.213

and accident rescue force because that the urban rail transit is professional, timeliness, sophisticated technical equipment, and large guest flow (Zhang et al., 2007).

At present, the specialized field of the integrated monitoring system is limited to a subway line which is low in data integration, lacks interoperability and information sharing of the whole line subway network and does not have the emergency command functions of coordinating each control center, operation main body, multiple line operation coordination, and multiple traffic systems (Wang et al., 2004).

So it is necessary to establish a network command center comprehensive information platform which uses advanced GIS technology, communication technology and network technology based on a single line comprehensive monitoring system;and has functions of comprehensive supervision, operation coordination, resource sharing, emergency command and so on.

2. Research status

Urban rail transit development in western developed countries is relatively early and very high in informationization level (Xu et al., 2010). They have built an integrated operation management system using for traffic control, safety monitoring and early warning, and resource allocation; and further developed towards humanity, multifunction and intelligence. New York Metro builds a command center in Manhattan and transformates the original Brooklyn control center as a back-up in order to train better according to the map and improve the failure scheduling response ability. Madrid metro network command center can control 14 rail lines and has functions of train dispatching, power dispatching, equipment dispatching, emergency command and decision (Gan et al., 2012).

Along with urban rail transit network system increasingly expanding in china, the developed rail transit areas taking Beijing, Shanghai as the representative have started building network operation coordination centers based on the existing metro information systems (Xu et al., 2010). At present, Beijing rail transit network command center accommodating 28 lines has been put into use, mainly including functions of network operation monitoring, emergency command, assistant decision, and emergency notification.Shanghai metro operation management (emergency) center has completed comprehensive emergency platform development work and has been put into use, mainly using for operation monitoring and coordination, emergency disposal, information services and other aspects. And the second phase of COCC emergency platform is under construction.

3. Construction of the network command center information platform

As a comprehensive coordination role of multiple railway lines operation, urban rail transit network command center is not only responsible for the coordination of each line control center and each operation main body but also useful for comprehensive monitoring, multiple line operation coordination, emergency command, and information sharing with external relevant units. It mainly provides services such as data acquisition, integrated monitoring, information exchange, statistical analysis, emergency management and maintenance for all the rail lines supervision.

The system relies on rail transportation enterprise operation management planning, introduces the lifecycle safety management philosophy and covers four stages" prevention, preparation, response, recovery".Its daily business includes operation state monitoring alarm, network operation evaluation, and comprehensive coordination. Its emergency business accomplishes the whole process closed loop management of three stages: emergency duty, risk monitoring and early warning before the event; emergency command in the event; and evaluation after the event.

3.1. Platform construction principles

- Coordination principle

Urban rail transit network command center is an operation management center based on the network level, which provides services to government supervisors and related departments, the rail transit operators, and the city citizens. System designs in accordance with the national emergency standard; involves many functional departments such as the operation, construction, and centers; and has different business including passenger flow, comprehensive monito