

# Communication-based Train Control(CBTC) System

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Contributor: Haoxuan Yu

Nowadays, the communication-based train control(CBTC) system is commonly used in the urban rail transit system all over the world, and the CBTC systems currently operating worldwide are the "Products" of advances in Internet of Things and Artificial Intelligence.

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It is characterized by the use of communication network to realize the two-way communication between train and ground equipment, and the use of real-time reported train position and calculation of mobile authorization to replace the fixed track section block to achieve train operation control.

CBTC outstanding advantages are that it can realize two-way communication between vehicle and ground, and can transmit large amount of information, fast transmission speed, easy to realize mobile automatic block system, greatly reduce interval laying cable, reduce one-time investment and reduce daily maintenance work. Flexible organization of two-way operation and one-way continuous departure, easy to adapt to different speed, different volume, different types of traction train operation control and so on. CBTC can not only realize train operation control, but also can be integrated into operation management, because two-way communication system can not only have two-way transmission of security information, but also two-way transmission of non-security information, such as vehicle number, crew group number, vehicle number, running time, locomotive status, fuel consumption parameters and a large number of locomotive, public works, electrical and other related information. Using CBTC can not only realize fixed automatic block system (CBTC-FAS), but also realize mobile automatic block system (CBTC-MAS). A key technology in CBTC application is two-way wireless communication system, train positioning technology, train integrity detection and so on. Among two-way wireless communication systems, it is applied in Europe, but GSM-R other kinds of wireless communication technologies such as spread spectrum communication are used in America. Train positioning technology has a variety of ways, such as vehicle equipment speed- ranging system, global satellite positioning, induction loop and so on.

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