

Live maintenance of electrical equipment in urban rail transit systems



TENG DA JIE

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01

Importance of
Electrical
Equipment for
Urban rail transit





Development of Urban Rail Transit in China

With the development of modern cities, the road traffic situation has gradually changed from the simple characteristics of single vehicle types, small traffic volume, and fixed periodicity to complex changes in the complex characteristics of multiple types of vehicles, large traffic volume, and irregular periodicity. What has come is that the time spent by the urban population on road transportation has increased year by year, and the pressure on urban road traffic has continued to increase. Therefore, local governments focus on the development of three-dimensional transportation modes, seek underground space, and actively participate in rail transit construction and urban rail transit information systems.

The scale of the market has also expanded. As of the end of 2015, a total of 116 urban rail lines have been put into operation in my country, with a road network length of 3,618 kilometers. The compound growth rate of urban rail mileage from 2005 to 2015 was 24%, and the annual urban rail passenger capacity reached 14 billion passengers. Especially after 2009, thanks to the advancement of urbanization, urban rail transit has developed rapidly, with total passenger traffic increasing by 3.8 times, in line with a growth rate of more than 30%; mileage increased by 126% year-on-year, with a compound annual growth rate of 17.74%. According to the survey of China Rail Transit Network, as of October 31, 2017, China includes Beijing, Shanghai, Shenzhen, Guangzhou, Nanjing, Chongqing, Wuhan, Tianjin, Chengdu, Xi'an, Hangzhou, Ningbo, Suzhou, Kunming, Shenyang, Harbin, 29 cities including Wuxi, Changsha, Changchun, Zhengzhou, Dalian, Dongguan, Nanning, Nanchang, Qingdao, Hefei, Foshan, Fuzhou and Shijiazhuang have all opened rail transit lines. The total mileage is as high as 3,792.19 kilometers, with 2,536 stations and 128 lines.

It is our thinking to ensure safe operation and reduce hidden dangers of equipment.

Urban rail transit system divided into scenarios according to maintenance entities



**Power system
Maintenance**

**Power monitoring system
Maintenance**

**Fasteners and connectors
Maintenance**

Urban rail transit system divided into scenarios according to maintenance entities

1. Catenary and traction substation scenarios

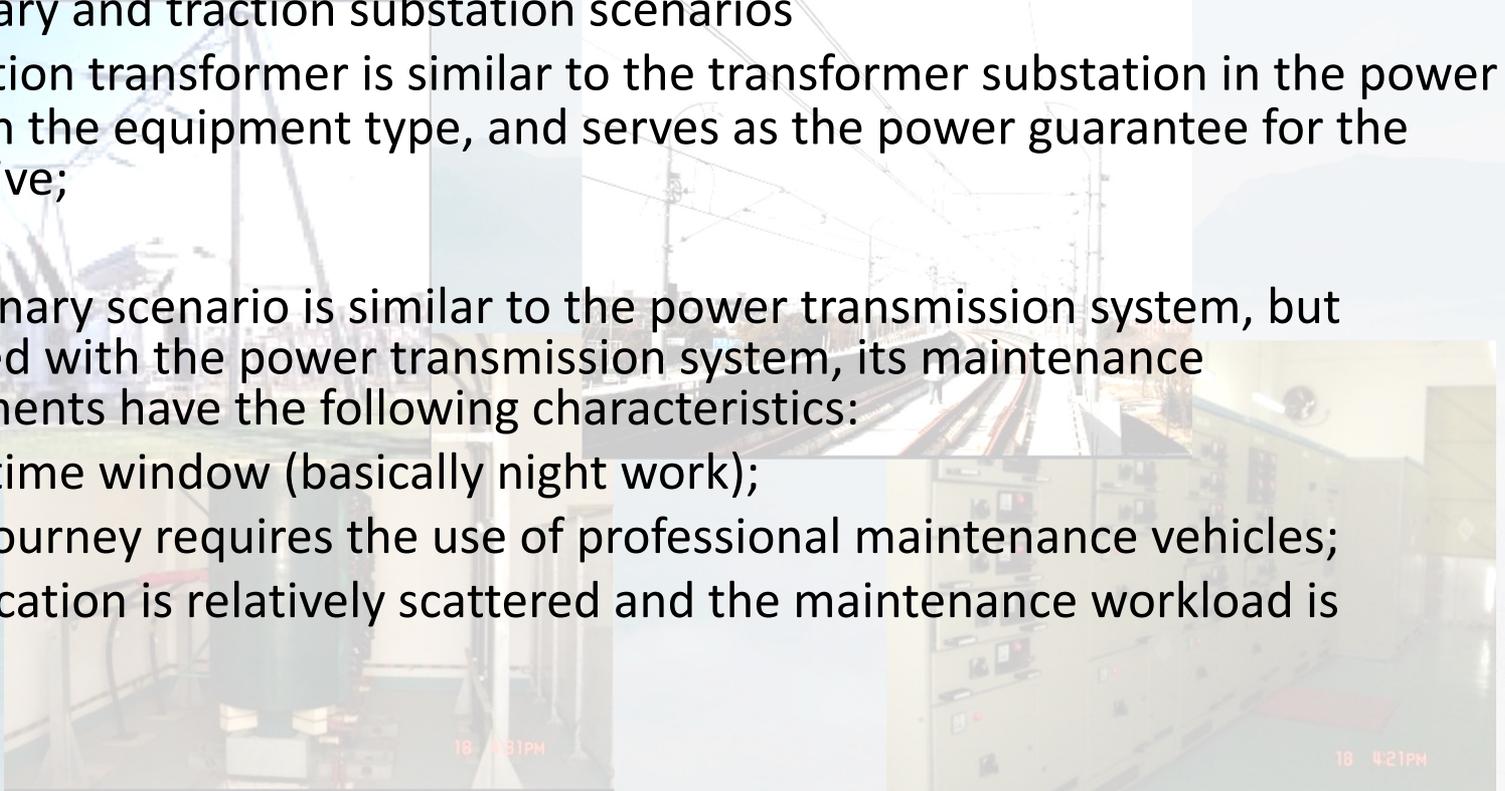
The traction transformer is similar to the transformer substation in the power system in the equipment type, and serves as the power guarantee for the locomotive;

The catenary scenario is similar to the power transmission system, but compared with the power transmission system, its maintenance requirements have the following characteristics:

- Fixed time window (basically night work);

- Long journey requires the use of professional maintenance vehicles;

- The location is relatively scattered and the maintenance workload is heavy;



Urban rail transit system divided into scenarios according to maintenance entities

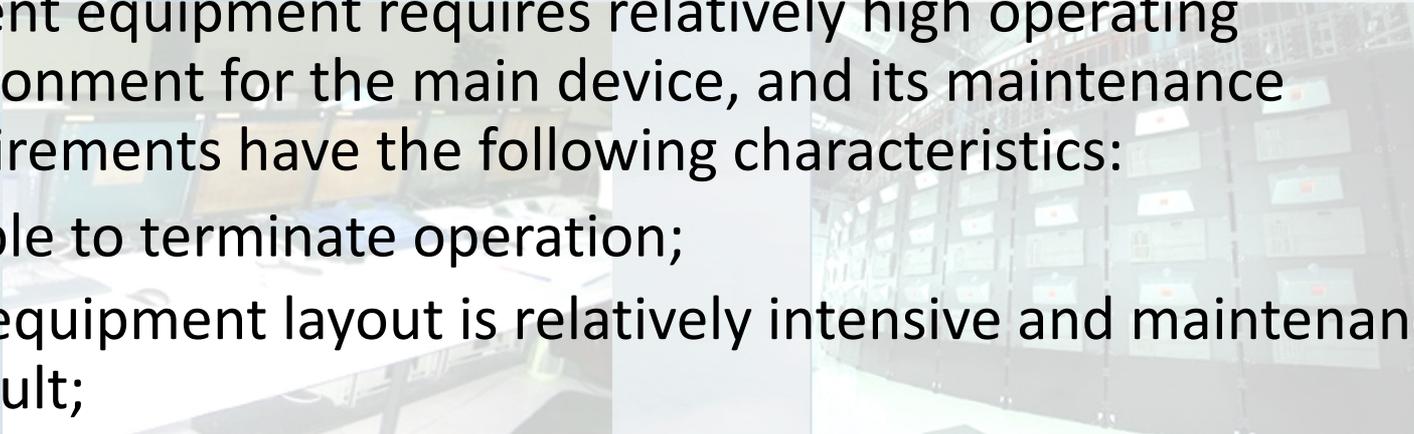
2. Data and signal monitoring scenarios

Data center and monitoring equipment scenes are very different from power supply systems. The main reason is that weak current equipment requires relatively high operating environment for the main device, and its maintenance requirements have the following characteristics:

Unable to terminate operation;

The equipment layout is relatively intensive and maintenance difficult;

Large number of equipment and heavy maintenance;

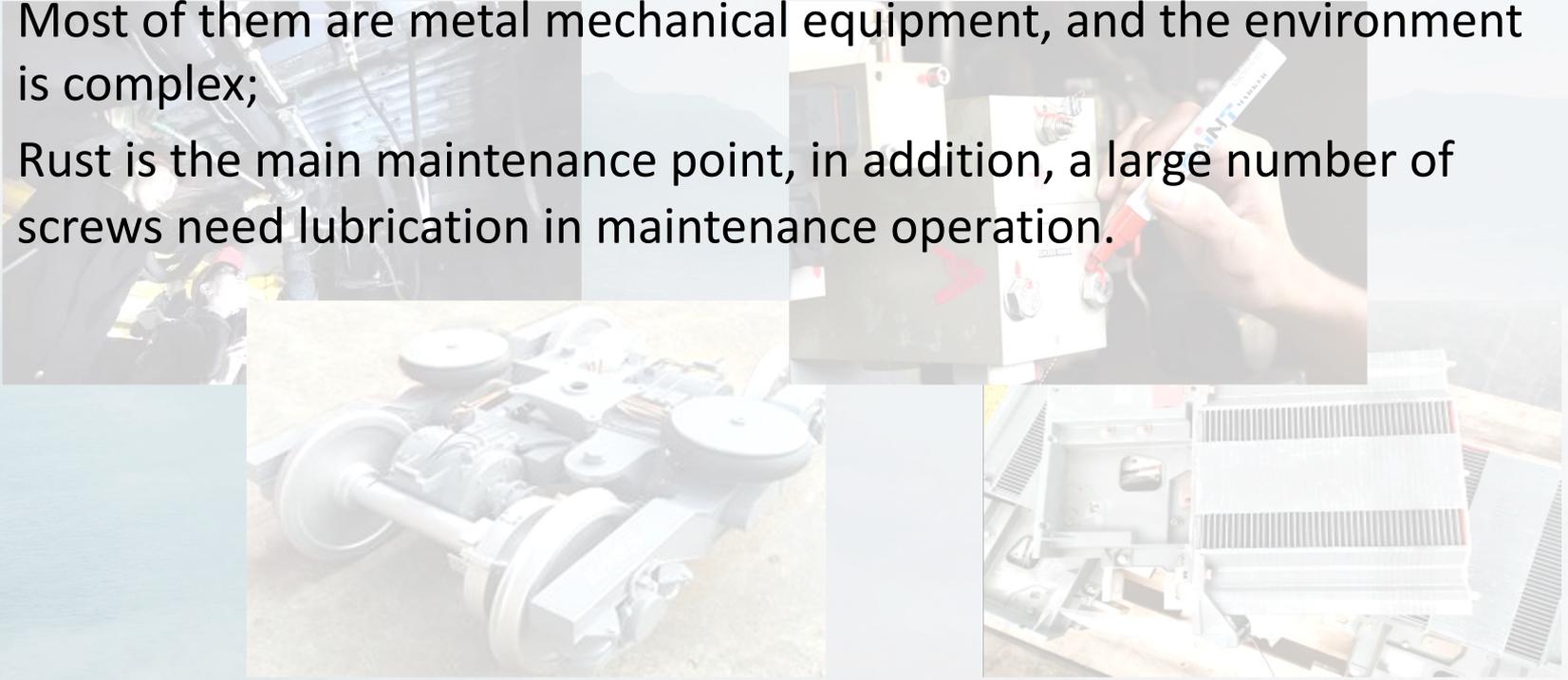


Urban rail transit system divided into scenarios according to maintenance entities

3. Maintenance scenarios of various fasteners and connectors

Most of them are metal mechanical equipment, and the environment is complex;

Rust is the main maintenance point, in addition, a large number of screws need lubrication in maintenance operation.



Influence of power supply and distribution equipment failure



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Safety
accident

Blackout
accident

Equipment
damage

Potential
risks

One more guarantee for safe
operation is our pursuit.

Ensuring safe
operation is
our biggest
challenge

User demand

Subway as a special industry, it only can short time
cut off power for inspection during operation

On the premise of ensuring safe operation

**Is there a product or service that can solve contamination and avoid the harm
caused by contamination to equipment!**

**Non-
Corrosion**

**Non-Toxic
Harmless**

**Safe
Reliable**

**Strong
Detergency**

TDJ maintenance service



Complete new & safe equipment maintenance method



Live cleaning maintenance service

No corrosion
Non-corrosive to
equipment components

Non-toxic harmless
Volatile without
residue

Safe reliable
Dynamic insulation is relatively
close to static insulation

Good detergency
All-round removal of oil
and dust pollution



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02

Live
Maintenance
Solution





Core of TDJ live maintenance





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Maintenance service safety guarantee Qualifications



Invention Patents



Utility Model Patents



Live Maintenance Personal
Certificate
Safety Officer Certificate



ISO9001
ISO14001
OHSAS18001

TDJ maintenance method

Customer self service
(Product sale)



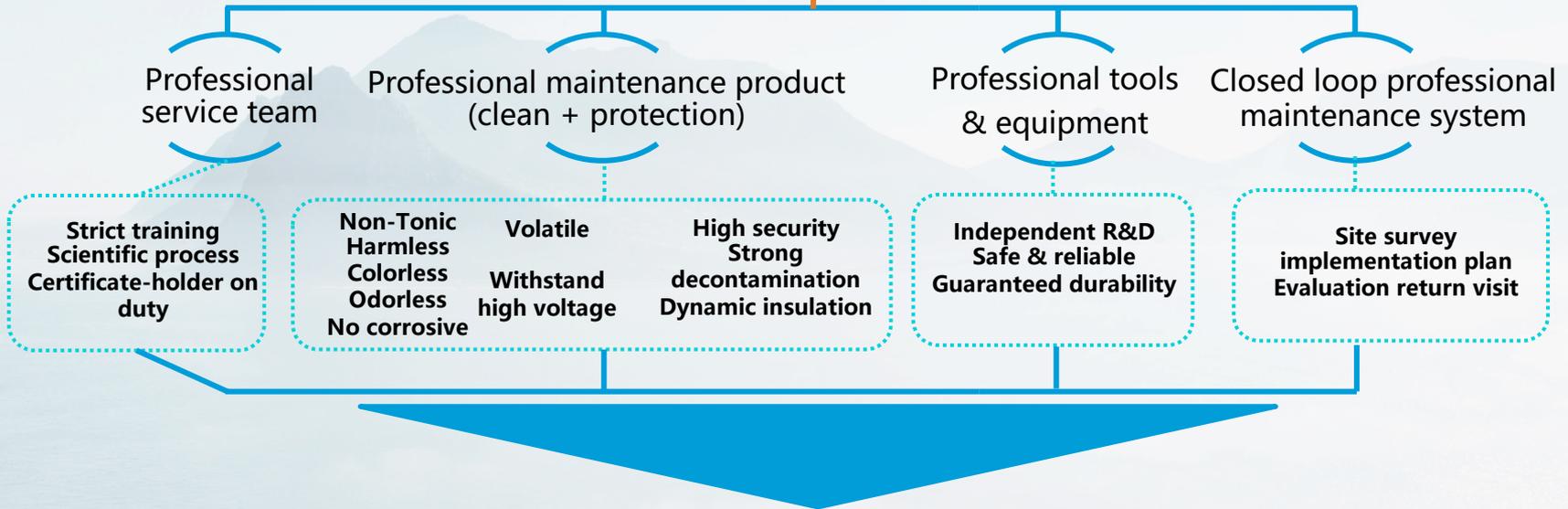
TDJ Regular on-site service
(Project implementation)

Project implementation method: Provide customers with comprehensive solutions for new materials technology application products, and provide professional on-site service in the form of projects.

Canned sales method: Canned package new material technology application products, improve the practicability and ease of use of the products, unify the product use standards, and improve the self-maintenance ability of end users.

TDJ regular maintenance

TDJ regular maintenance plan



The best safe efficient market choice

TDJ regular maintenance procedure

High and low voltage power distribution equipment:

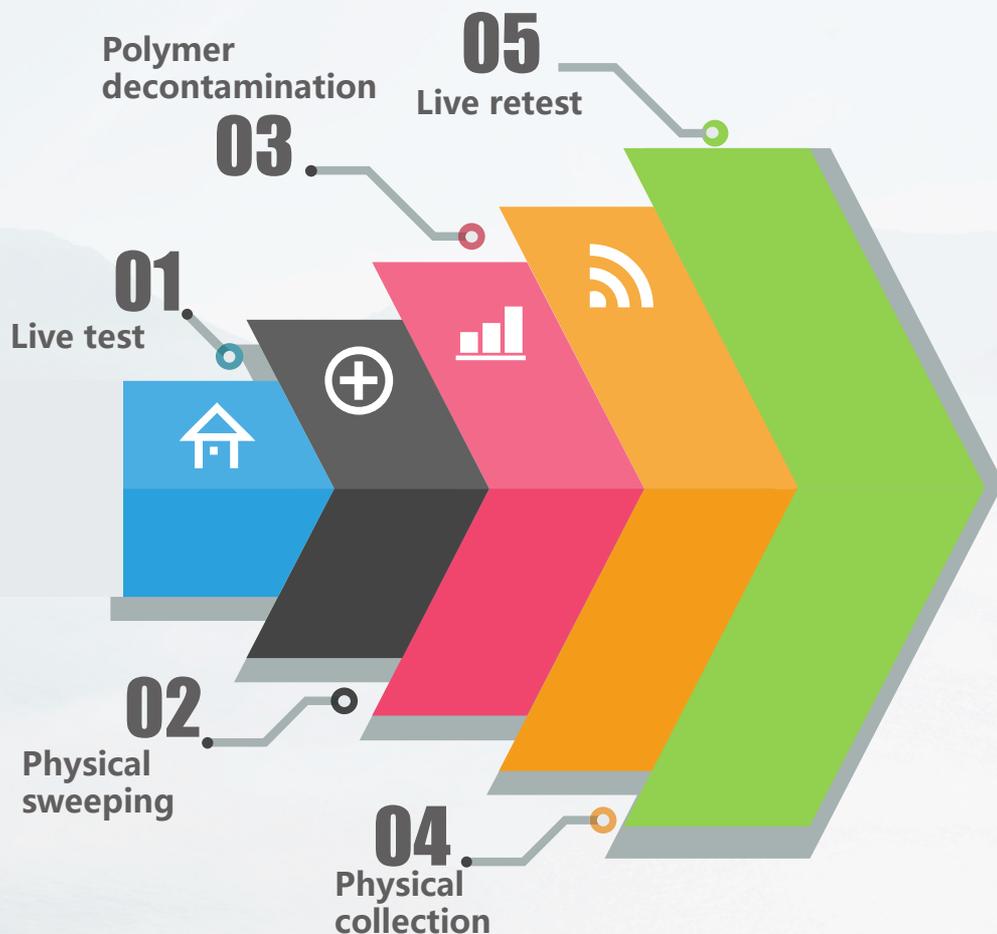
- Live test
- Physical sweeping
- Polymer decontamination
- Physical collection
- Live retest

Power transmission and transformation equipment:

- Live test
- Physical sweeping
- Live maintenance
- Live retest

Network communication equipment and automatic control equipment:

- Live test
- Electrostatic balance
- Polymer decontamination
- Physical collection
- Live retest



Benefit to equipment

High and low voltage distribution equipment, transmission and transformation equipment, control equipment

1

Dust removal

Removal of surface and deep contaminants from equipment

3

Restore insulation

Restore to **90%-95%** of original insulation value

5

Slow down corrosion

Anti-corrosion protection of equipment, slow down corrosion speed after equipment cleaning

2

Decrease temperature

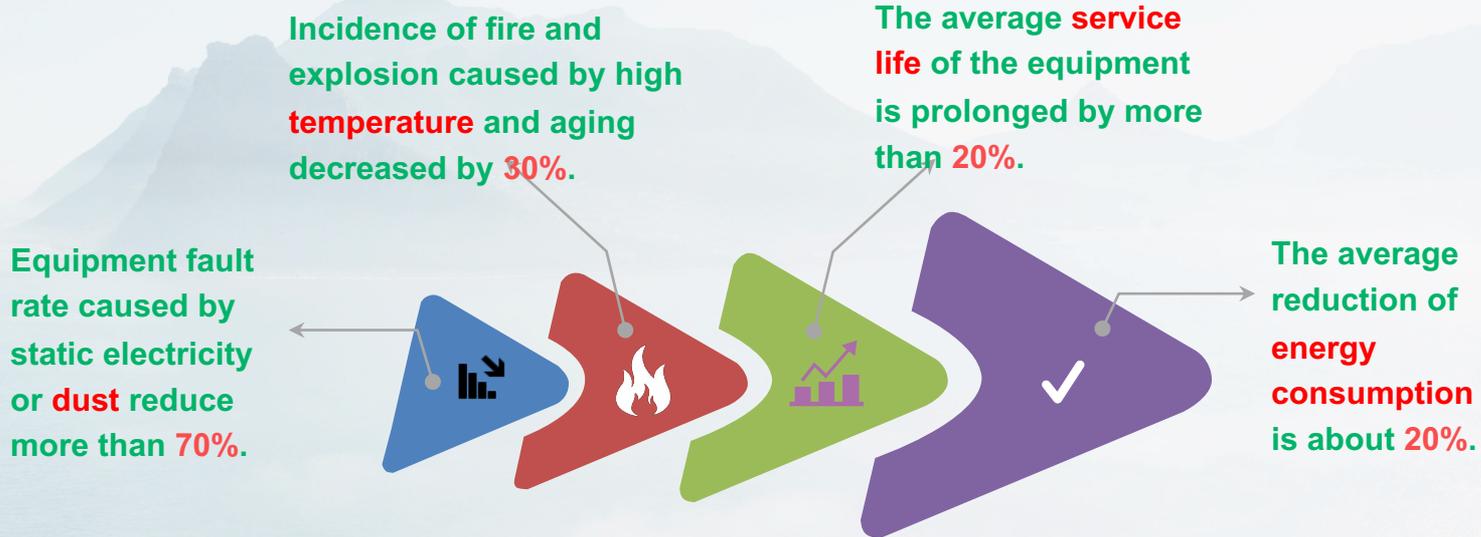
Maximum decrease internal temperature **15%-40%**, internal average temperature **10%-30%**

4

Insulation protection

Protect equipment against leakage
Eliminate leakage basically

Economic benefit



Customers



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Power Grid

State Grid Anhui Co., Ltd.
State Grid Shandong Co., Ltd.
State Grid Shandong Co., Ltd.
State Grid Luoyang Co., Ltd.
East China Power Grid Dispatching Center

Manufacturing

EATON
Robert Bosch GmbH
Dalian Jiecheng Industrial Development Co., Ltd.
Anhui China Tobacco Industry Co., Ltd.

Real Estate

Merlot City, Shanghai
Portman Ritz Carlton Hotel Shanghai
Kaide Land China Holding Co., Ltd.

Power Plant

Shenwan Anqing Wanjiang Power Generation Co., Ltd.
Huaneng North United Power Co., Ltd.
Huaneng Hainan Power Generation Co., Ltd.

Steel & Cement

China Baowu Iron and Steel Group
Ma'anshan Iron and Steel Co., Ltd.

Transportation

China Railway Group
China South Car Co., Ltd.
Shanghai Shentong Metro Group Co., Ltd.
Shanghai Maglev Transportation Development Co., Ltd.
Shanghai Airport (Group) Co., Ltd.
Nanjing Lukou International Airport Co., Ltd.

Oil & Chemical

China Petrochemical Co., Ltd.
China Petroleum and Natural Gas Co., Ltd.
Tongling Chemical Industry Group Co., Ltd.

Communications operators (including Internet companies)

China Union Network Communication Co., Ltd.
China Telecom Group Co., Ltd.
China Mobile Communications Corporation
National Network Information Communications Co., Ltd.

Education

Shanghai Jiaotong University
The Fifth Branch of the Party School of the Shanghai Municipal Committee of the Communist Party of China
Songjiang University Town



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