Feature

Railway Trends in China

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Railways worldwide are wondering what strategies they will need to thrive in the next century. This article summarizes the current situation of the railway industry in China, and examines future developments and several problems in railway innovation.

Current Situation of Chinese National Railways

Since 1978, the Chinese railway industry has achieved great development in parallel with the nation's rapid economic growth. Railway construction has peaked in the last 10 years with more than 1000 km of new construction each year. Presently, there are 66,000 km of track in operation, three times more than in 1949. In 1997, passenger traffic totalled 354.9 billion passenger-km, 27 times more than in 1949, and the second highest figure in the world after Japan. Freight totalled 1309.7 billion tonne-km, 72 times more than in 1949, and the highest figure in the world.

However, other transport modes are also growing rapidly as part of the economic expansion. This means that the railway industry faces keen competition and its market share in general transport is actually decreasing (Tables 1 and 2).

From the 1970s, the railway's share of both the passenger and freight markets has decreased by about 1% annually. This is similar to general situation of national railways worldwide.

Developments in Next 10 Years

Although the Chinese railway industry has made remarkable progress in the last 20 years, there are still big disparities between the nation's economic growth and railway development, which is still unable to meet demand. At the same time, since railways form part of the basic national infrastructure, they require huge investment. Additionally, railway construction is an effective method of increasing domestic demand and stimulating the economy.

Table 1 Total Passenger Traffic and Market Share in China

(Billion passenger-km)

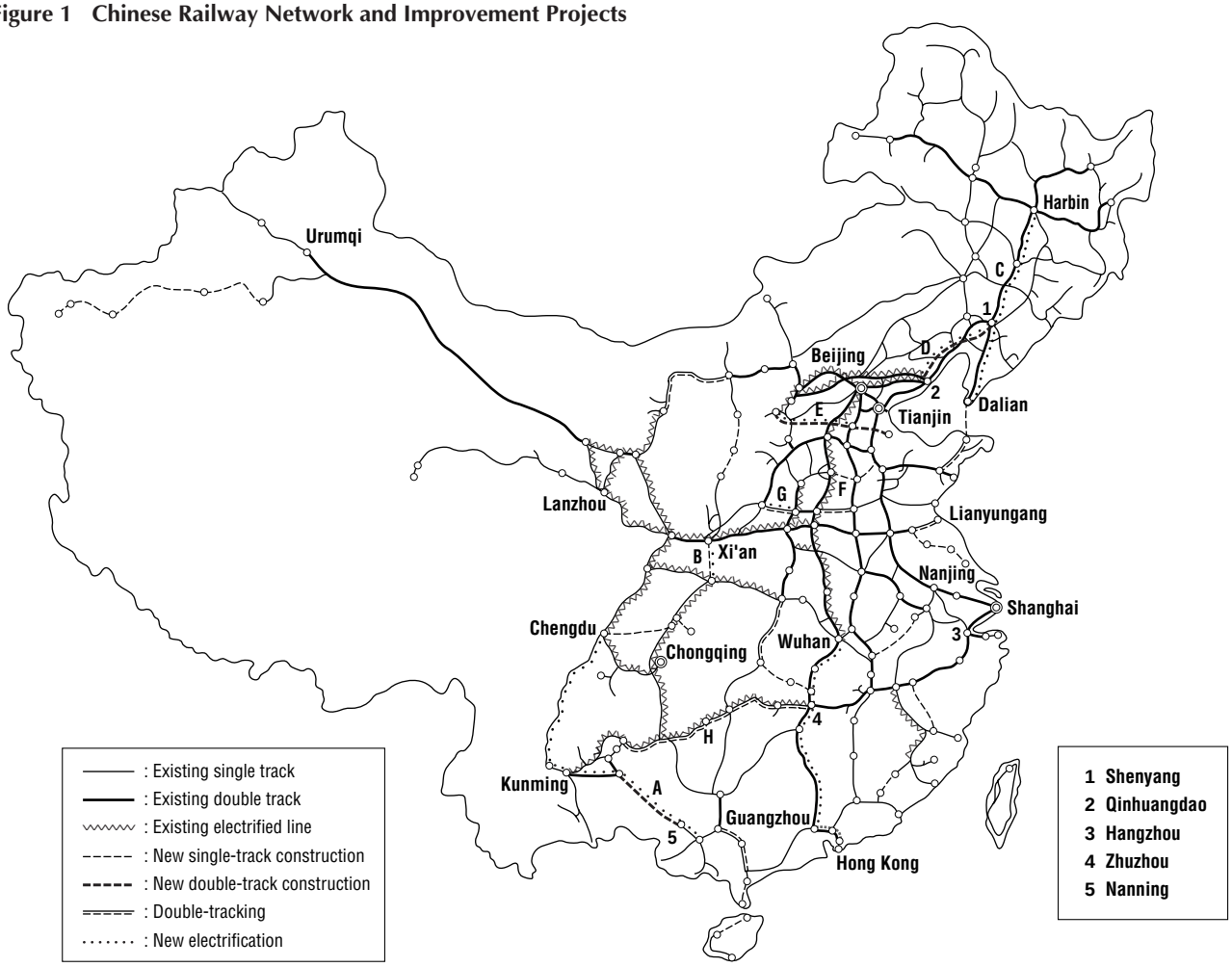
Year	Total	Railway		Road		Sea		Air	
		Total	Share (%)	Total	Share (%)	Total	Share (%)	Total	Share (%)
1957	49.655	36.130	72.76	8.807	17.74	4.638	9.34	0.080	0.16
1962	108.556	85.901	79.13	14.146	13.03	8.392	7.73	0.117	0.11
1970	103.105	71.819	69.66	24.006	23.28	7.101	6.89	0.179	0.17
1980	228.134	138.316	60.63	72.950	31.98	12.912	5.66	3.956	1.73
1990	562.864	261.263	46.42	262.062	46.56	16.491	2.93	23.048	4.09
1995	900.190	354.570	39.39	460.310	51.13	17.180	1.91	68.130	7.57
1996	914.257	332.537	36.37	490.879	53.69	16.057	1.76	74.784	8.18
1997	999.64	354.872	35.5	551.80	55.2	15.99	1.6	76.97	7.7

Table 2 Total Freight Traffic and Market Share in China

(Billion tonne-km)

Year	Total	Railway		Road		Sea		Air	
		Total	Share (%)	Total	Share (%)	Total	Share (%)	Total	Share (%)
1970	408.41	349.60	85.6	13.81	3.4	44.96	11.0	0.04	0.01
1980	797.34	571.69	71.7	76.40	9.6	100.01	12.5	0.14	0.02
1990	1806.53	1062.24	58.8	335.81	18.6	344.96	19.1	0.82	0.05
1995	2359.56	1287.02	53.5	469.49	19.9	541.82	23.0	2.23	0.09
1996	2518.91	1297.06	51.5	501.12	19.9	659.74	26.2	2.49	0.1
1997	2292.79	1309.67	57.1	527.34	23	396.65	17.3	2.29	0.1

Figure 1 Chinese Railway Network and Improvement Projects



4 North–South Projects
A. Nan–Kun new line (Nanning–Kunming)
B. Xi-Kang new line (Xi'an–Ankang)
C. Harbin–Dalian electrification
D. Qin–Shen passenger by-pass (Qinhuangdao–Shenyang)

4 East–West Projects
E. Shuo–Huang new line (Shuozhou–Huangye)
F. Han–Ji new line (Handan–Liaocheng-bei)
G. Hou–Yue Line double-tracking+electrification (Houma–Yueshan)
H. Zhu–Liu Line double-tracking+electrification (Zhuzhou–Liupanshui)

5 Most Important Lines
Jing–Hu Line (Beijing–Shanghai)
Jing–Ha Line (Beijing–Harbin)
Jing–Guang Line (Beijing–Guangzhou)
Zhe–Gan Line (Hangzhou–Zhuzhou)
Long–Hai Line (Lanzhou–Lianyungang)

Therefore, increasing railway construction is an official government policy for the next 10 years.

The construction schedule from 1998 to 2002 is as follows:

- New construction 5340 km
- Double-tracking 2580 km
- Electrification 4400 km

By 2002, the railway network will be 70,000 km and should be able to accommodate demand. By 2010, the network will have reached 90,000 km, 40% of which will be double-tracked and 40% electrified. At this stage, the development of the railways should match the national economy and social development.

Our present goals are to increase capacity for both passengers and freight, and to promote technological development. The most important point in achieving these goals is to strengthen the five main arteries serving north–south, south–west, north–east, and north–west corridors, as well as coal transport from Inner Mongolia, Shanxi, and Shaanxi to other parts of China. In concrete terms, this means constructing four north–south lines: Nan–Kun new line, Xi–Kang new line, Harbin–Dalian Line electrification, and Qin–Shen passenger by-pass, and four east–west lines: Shuo–Huang new line, Han–Ji new line, Hou–Yue and Zhu–Liu lines double-tracking and electrification (Fig.1).

Other important points are accelerating the development of passenger and bulk transport, and containerization.

The first priority is passenger transport, especially high-speed passenger transport

between major cities. The Jing–Hu Line, Jing–Ha Line, Jiang–Guang Line, and part of the Zhe–Gan and Long–Hai lines (Fig. 1) already satisfy the conditions for constructing high-speed dedicated passenger lines.

The second priority is development of bulk transport. Major coal lines should be able to handle train loads of more than 10,000 tonnes while general freight trains should haul loads of more than 5,000 tonnes.

The third priority is containerization which has advantages of safety, speed, convenience, and diversity, and which will certainly replace other rail freight methods early next century. At the same time, railway containerization will form an important part of an intermodal freight system connecting roads, air, and ships.

Problems of Current Reforms

Management

In the past, many countries nationalized their railway industries. The management policy was decided by government and was highly centralized. However, economic and social development led to the emergence of many problems. As a result, the late 1980s and 1990s saw a sweeping range of structural reforms and privatization in countries like Sweden, Japan, the UK, and Argentina.

Chinese national railways are facing very similar problems and in early 1998, the central government instructed the Ministry of Railways to draw up reforms for separating the railway business from government, reducing labour levels, and changing from loss to profit. These targets were to be achieved within 3 years and the necessary reforms are already well underway.

The most important problem is still reforming the management organization. The railway has started a temporary system for managing railway assets, with the final aim of becoming a modern business enterprise.

The management reform targets are as follows:

- To reorganize railway into company system
- To diversify ownership
- To organize railway transport based on market principles
- To modernize management and administration
- To establish modern corporate system suitable for market economy
- To separate government and railway business
- To operate independently without government subsidies using profit and loss accounting
- To be competitive in transport market

Investment

Before the Chinese economic reforms and open-market policy, the railways depended entirely on government investment. Since the reforms, the government has made a positive and serious study of the railway investment system, leading to major changes such as loans from national banks and issuance of railway construction bond.

Since 1984, the government has permitted loans from the World Bank and the Asian Development Bank, as well as government loans from Japan, Germany, etc.

However, on the whole, the needed level of funding was not achieved and the tight money position further exacerbated the existing problems. This has led to further and important reforms in railway funding and investment, particularly as follows:

Diversified investment

- Establish new mechanisms to attract more investments and loans
- Clearly define role of investors
- Clarify investment scope and method, source of funds, and obligations and benefits of all parties
- Improve investment environment to encourage joint ventures, project loans, leasing, build-operate-transfer (BOT), etc.

Investment management

- Establish separate management system for each railway construction
- Establish effective risk control mechanism
- Establish effective decision-making and responsibility system

New passenger station at Tianjin *(Authors)*

Chinese railways largest freight yard on the Beijing–Kowloon Line *(Authors)*

Project classification

Railway construction projects can be classified into public service obligations (PSOs), general transport, and commercial transport markets.

Non-profitable PSOs for regional development, national defence, etc., are decided by government policy, so they should be funded directly by the government or through low-interest government credits, etc.

General transport means services with both social and economic benefits, so the government should be the main investor with a supplementary role played by the private sector. In this case, all the investors, both government and private, should share the benefits. At the same time, the government can provide preferential treatment such as low-interest loans and subsidies, which will help to attract private-sector investment.

Commercial transport markets in developed regions can be left to market forces, because they offer good potential profits, and can easily attract private investors.

Reform of fares and tariffs

Except for local lines and joint-venture operations, Chinese national railways has had a single fare and tariff system since 1954. The average tariff is 0.0756 yuan/tonne-km, including a 0.0330 yuan/tonne-km surcharge for the railway construction fund. Joint-venture operations had different price structures for newly constructed lines, because their construction costs were different from the past. For example, the Lan–Xin Line adopted a 'new-line-new-tariff' system that was 2.5 times higher than the national average. In February 1999, other national lines adjusted their tariffs to reflect the difference. For this reason, at present, there is no line using this 'new-line-new tariff' system.

However, the huge differences in regional development across China create completely different traffic levels and costs on different lines. Therefore, some lines will never break even when operated under a single fare and tariff structure, making fare and tariff reform an urgent necessity.

The core concept is to allow railways to determine fares and tariffs themselves based on the following policy:

- Freedom to set fares and tariffs on newly constructed lines
- Freedom to set higher fares and tariffs for better services
- Freedom to offer seasonal and regional discounts
- Freedom to negotiate fare and tariff discounts with customers depending on goods and delivery requirements

This policy will allow the railways to respond to the market mechanism.

Summary

If Chinese national railways continues their development based on recent progress and future reforms, early in the next century, it seems set to become a world leader not only in terms of passenger and freight traffic levels, but also in terms of technology, rolling stock, infrastructure, profits, and national development goals. ■

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