

Transportation Systems

Yùnshū xìtǒng 运输系统

As China expands its economy, increases its population, and opens up to the outside world, its political leaders and urban designers face increased pressure to create more efficient and environmentally friendly transportation systems.

China, with its enormous and increasingly urbanized population, faces unprecedented challenges and opportunities in the way in which it transports its people and goods. The country's recent rapid economic growth will continue for the foreseeable future, placing increased pressure on its political leaders and urban designers to create more efficient and environmentally benign transportation systems.

Roads

The main focus of upgraded transportation systems has been on China's road and vehicle network. China's light industry and agricultural sectors rely heavily on road-based transportation. China has roughly 88 motor vehicles per 1,000 people, compared with approximately 765 motor vehicles per 1,000 people in the United States. The number of motor vehicles in China more than tripled between 1985 and 2000; by 2007 some 118 million vehicles were traveling the nation's roads. As of early 2009, China is on the verge of surpassing the U.S. to become the world's largest vehicle market (Kurtenbach 2009).

More foreign automobile companies are entering China to meet the demand for new vehicles. Volkswagen began manufacturing automobiles in Shanghai in 1985. Other major companies have also begun manufacturing

In the last two decades China has built many super highways—but every Chinese wants to own a car and traffic is fierce. While China produces its own makes of cars, joint ventures with international car makers and foreign car-imports offer potential car buyers a choice. PHOTO BY TOM CHRISTENSEN.



for the Chinese market, including Daihatsu, Citroen, Peugeot, General Motors, and Daimler-Chrysler. Most vehicles are built in the Shanghai region and near Dalian in the northeastern province of Liaoning.

China has enlarged its road system such that now all towns can be reached via the highway system. Approximately 1.3 million kilometers of roads stretch across the country. In 1998 alone 37,000 kilometers of highways were built; of those, 1,487 kilometers were expressways. The central government's eleventh Five-Year Plan (2005–2010) calls for investing \$700 billion in highway infrastructure, with the goal of building 2.3–2.5 million kilometers of new roads, including 55,000 kilometers of expressway, which are being built to connect cities with populations of 200,000 or more.

A consequence of China's growth in motor vehicles is increased use of energy (mostly oil). If China achieved U.S. levels of vehicle ownership, it would have more than 900 million vehicles—nearly 50 percent more than the total number of vehicles in the world in 2001. China would need to consume more oil than is currently produced throughout the world.

Rail

China has an extensive rail network, with Beijing being the hub for the north-south line to Shanghai and Guangzhou (Canton). Rail lines also extend to the west and connect China to Europe. New lines are being built, particularly in southern China and other industrial areas. In 2006, China opened a new 1,100 kilometer railroad from central China across the high Tibetan plateau to the Tibetan capital of Lhasa.

China's first subway was constructed in Beijing in 1969. Many of the densely populated cities have developed or plan to develop commuter rail transportation systems involving subways and light rail. These include the cities of Shenyang, Changchun, and Harbin in the northeast and other major cities, including Shanghai, Guangzhou, Nanjing, Shenzhen, and Chongqing.

In April of 2008 China opened a new 120 km high-speed rail line linking the cities of Beijing and Tianjin in time for the Beijing Olympics; three trains initially operated at speeds of up to 300 km per hour, cutting travel time from 80 minutes to 30 minutes between the two cities. According to the Xinhua news agency, fifty-seven high-speed



Commuters wait for the train in a subway station. Many of the densely populated cities have developed or plan to develop commuter rail transportation systems involving subways and light rail.

PHOTO BY TOM CHRISTENSEN.

trains (reaching speeds up to 350 km per hour) are expected to be in commercial operation by the end of 2009.

In 2004 the length of China's rail system was approximately 75,000 kilometers. By 2020 it is expected that 100,000 kilometers of rail transit systems will have been built at a construction cost of more than 130 billion yuan (\$15.7 billion).

Air

Since 1970 China has constructed and expanded numerous airports, mainly to handle increasing tourist traffic and to link remote areas. As of 2007 there were 148 airports open to civil airplanes. Beijing is the hub of domestic air travel from which airlines reach all provinces, autonomous regions, and municipalities. The other two international gateway airports are in Guangzhou and Shanghai. Around thirty Chinese airlines serve the domestic market. China has a fast-growing fleet of Western aircraft and is one of Boeing's top three customers.



Travelers in the 1980s wait in Shanghai Airport. In the period since 1970, China has constructed and expanded numerous airports, mainly to handle increasing tourist traffic and to link remote areas.

PHOTO BY JOAN LEBOLD COHEN.

In 2009, China hopes to launch new airport hubs in Chengdu, Xi'an, and Guangzhou, and plans to invest over 200 billion RMB Yuan (about 28.6 billion USD) into the building of over forty regional airports.

Water

Because China has a coastline of more than 18,000 kilometers and 110,000 kilometers of navigable inland waterways, it is easy to understand why water transport has a long history in the country. Countless boats transport goods along rivers and the coast. The major inland navigable rivers are the Yangzi (Chang) (known as the “golden waterway” of China’s inland river transport, and much altered by the new Three Gorges Dam, expected to be fully operational by 2009), Huang (Yellow), Pearl, Heilongjiang, Huai, Qiantang, Minjiang, and Huangpu, as well as the Grand Canal between Beijing and Hangzhou. The volume of passenger transportation is approximately 12 billion trips per year. Around seventy major inland river ports have more than five thousand berths. China has twenty large ports for international shipping, with Shanghai Harbor being one of the largest in the world.

Historical illustration of junks on a river. Water transport has a long history in China, which has a coastline of over 18,000 kilometers and 110,000 kilometers of navigable inland waterways.

Transport Options

China is presented with enormous dilemmas concerning the most appropriate mode of development as the country continues its economic growth. The mode it chooses will significantly affect numerous countries. China’s transportation policies will increasingly influence the world energy market and transboundary environmental deterioration, particularly a reduction in regional air quality and an increase in greenhouse gases if there are



Young men ride bicycles along a sun-dappled street. Cars are quickly replacing bicycles as the preferred mode of personal transportation.



increased emissions of gasoline-driven vehicles. China's transportation policies will also affect the health of its citizens because the emissions from gasoline-driven vehicles are detrimental to people's health. However, China can focus on less environmentally harmful alternatives, such as vehicles powered by natural gas or batteries, as well as electric hybrids and fuel-cell vehicles powered by nonpolluting and renewable hydrogen. China is relatively unhindered in developing these options because the country is not heavily dependent on oil. It has few petroleum vehicle-related investments, such as are common in many Western countries, and it can base its transport infrastructure on cleaner fuels. China is particularly interested in vehicles powered by natural gas because natural gas is abundant in several provinces.

China is investigating cleaner fuel technologies through institutions such as the Institute of Natural Gas Vehicles in Beijing. Currently China's transportation policy is focused both on developing "cleaner" vehicles and on increasing investment in mass transportation systems in the cities. China's latest Five-Year Plan focuses on coordinating economic development among different regions and between urban and rural areas. The plan increases the priority given to environmental protection and indicates that China will attempt to pursue less environmentally harmful transportation systems than were favored by

many Western countries at a similar stage of economic development.

Warwick GULLETT

Further Reading

- Cannon, J. S. (1998). *China at the crossroads: Energy, transportation, and the 21st century*. New York: Inform.
- China unveils its fastest train. (12 April, 2008). Retrieved February 27 from 2008http://www.thaindian.com/newsportal/health/china-unveils-its-fastest-train_10037229.html
- Kurtenbach, E. (2009, February 10). China tops U.S. in monthly auto sales for 1st time. Retrieved February 11, 2009, from <http://www.manufacturing.net/News-China-Tops-US-In-Monthly-Auto-Sales-For-1st-Time-021009.aspx>
- MacArthur, P., & Low, J. (1994). *Tapping into China's transport infrastructure market*. Canberra: Australian Government Publishing Service.
- Research Report on China's Civil Airport Industry, 2008-2010 (November 2008). China Research & Intelligence. Retrieved February 27, 2009 from http://www.researchandmarkets.com/reportinfo.asp?report_id=687112
- World Bank. (1985). *China: The transport sector*. Washington, DC: International Bank for Reconstruction and Development, World Bank.