

# Railroads: Leading Force in Land Transport

By Kengo Koga

At 6 a.m. on October 1, 1964, the Hikari 1, Japan's first bullet train, pulled out of Tokyo Station, the center of the country's railroad network, and headed swiftly along the brand-new Tokaido Shinkansen line for Shin-Osaka. The superfast train covered the 500-kilometer journey in just three hours, running at a maximum speed of 210 kilometers per hour. With the launching of this Tokaido Shinkansen, Japan's railroads, which had played an important role in helping the country pick itself up from the ruins of World War II, entered a new age.

Railroads had developed as the most efficient means of mass transportation in Japan, where more than 120 million people are crowded into a very small area, most of them living in towns built on the confined flat areas along the coast. Nevertheless, the construction of expressways beckoned an era of motorization. If the Tokaido Shinkansen had not gone into operation, railroads in Japan, as in the other industrial countries of Europe and North America, would definitely have gone downhill. It is thanks to the Shinkansen that railroads have been given an important role to play in the 21st-century Japan.

## Linking big cities

With the exception of Sapporo on the northern island of Hokkaido, all the major cities in Japan with a population of more than a million—including, of course, Tokyo, Osaka and Kyoto—are linked by the Shinkansen. Even today, when a nationwide expressway network exists, the Shinkansen and other railroads play a central role in the movement of people. This is the picture of transportation in Japan: Trains carry the bulk of people on journeys of up to about 500 kilometers, and airplanes take over for longer distances; most freight goes by truck or ship (Figs. 1 and 2).

Private cars, the number of which increased rapidly at one stage, are still the

main means of transport in the countryside, but in the cities they are reserved mainly for shopping and leisure. For commuting and business trips, people turn to the faster and more punctual railroads. "Sunday driver" has become a popular phrase that well describes this feature of land transportation in Japan.

The first railroad in Japan, running between Shimbashi in Tokyo and Yokohama, a distance of 29 kilometers, went into operation 120 years ago, in October 1872—exactly 92 years before the first Shinkansen run. The line, which was built under the guidance of the British engineer Edmund Morell, can be said to have marked the starting point of Japan's modernization. Construction of the Shimbashi-Yokohama line was put under the supervision of Masaru Inoue, who was called later the "father of railroads" in Japan. He studied about railroads in London while he was still a samurai of the Choshu clan.

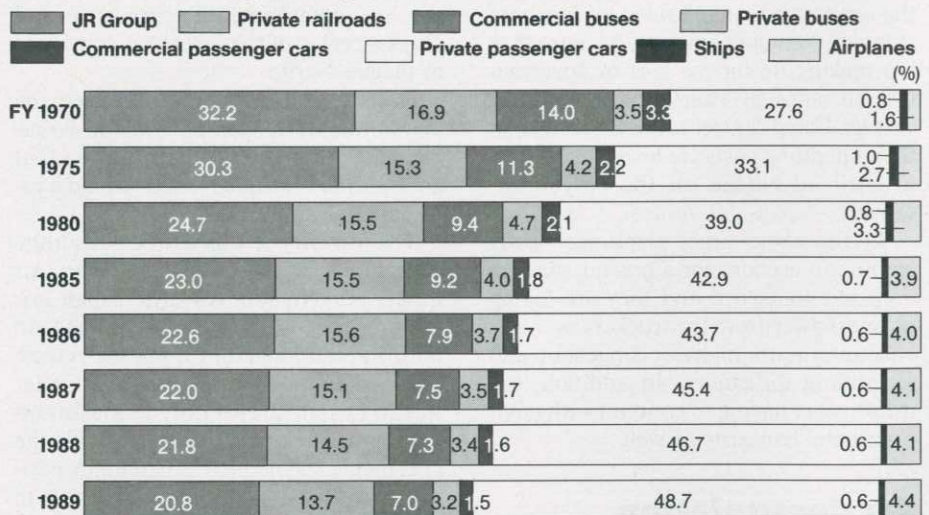
Quite naturally, foreign engineers, especially from Britain, played an important role in the early years of the railroad in Japan. Japan depended on Britain for

its locomotives, its train drivers, and the management of its railroad system, including timetables. Eventually Japanese took control, and over the years railroads became famous for their very Japanese punctuality. But there is a very interesting story to tell about the process.

A British engineer compiled a timetable showing exactly at which hour and minute a train should leave so that it safely passed a train coming in the opposite direction at a certain station, but he would not divulge to the Japanese how this was done. Today, of course, this method of timetable compiling is well-known as the train diagram. But to Japanese at the time it seemed like magic. So when the British engineer went away on a business trip, two Japanese stole into his room, discovered the diagram in his desk, and copied it. Since the timetable was actually very simple once understood, Japanese then began to compile timetables of their own.

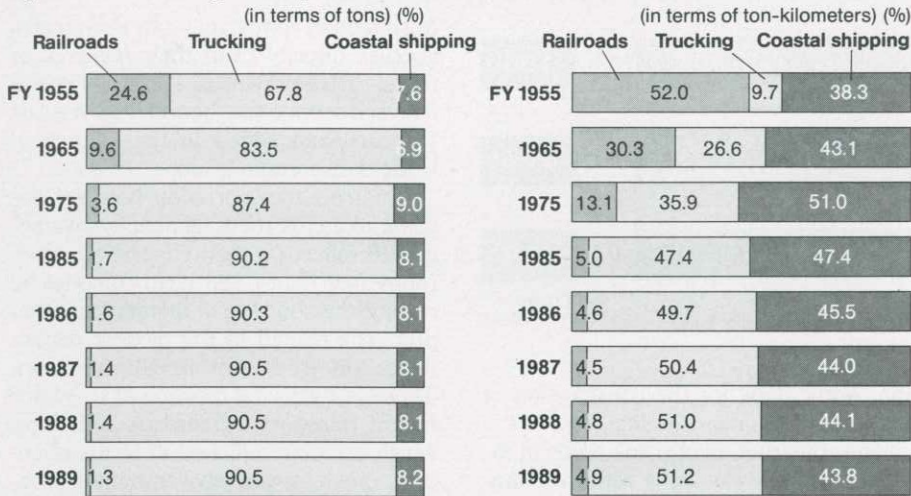
The story starkly reveals the characteristics of the Japanese, who lack originality but are adept at taking knowledge and techniques from foreigners and coming

Fig. 1 Domestic Passenger Transport Shares



Note: Figures for minicars are excluded. Shares are in terms of passenger-kilometers.  
Source: *Illustrated White Paper on Transport*, Ministry of Transport

Fig. 2 Domestic Cargo Transport Shares



Source: Yearbook on motor transport, Ministry of Transport

up with first-class products of their own. The Japanese displayed a propensity for finding practical uses for semiconductors and industrial robots that they show today in the infant stages of the railroad over a century ago.

When it comes to the rush hour, trains leave at intervals of two or three minutes at major stations in Tokyo and Osaka, and stations along the line control the departure of these trains in units of 30 seconds. The reason is that if a train does not run on time, it holds up the trains that follow. It is taken for granted in Japan that even superexpress trains traveling distances of more than 1,000 kilometers reach their destination without any delay.

Considering these high standards, the railroad system seems to have been tailored to the national characteristics of the Japanese, who place more emphasis on organizational strength than creativity. The history and present condition of the railroads throw a lot of light on this special feature of the Japanese.

## The rush-hour crush

One of the problems of transport in Japan that has arisen in the last 30 years and remains unsolved is commuting. Major cities like Tokyo and Osaka, which have been the metropolises of Japan for more than a century, underwent a large inflow of population from the provinces during the period of economic reconstruction af-

ter the war. In particular, the concentration of political, business, and cultural functions in Tokyo has led to an ongoing increase in population and expansion of the urban area there.

Every day several million commuters travel from their homes in the suburbs to their offices in the center of the city. There are main roads running from the suburbs into the center, but these are jammed with freight-carrying trucks and commercial vehicles, so few people use the roads for commuting. If they used their cars, they would be guaranteed a seat, but there would be no telling when they would reach the office, and they would not be able to go for a drink after work. So most commuters in Tokyo and Osaka use the trains, with the result that every morning sees a rush-hour crush.

Ten-carriage trains operate at intervals of two to three minutes, but they are still overcrowded to around double their capacity. Some commuters have to put up with the crush for more than an hour (Fig. 3). In winter, thick clothes add to the squeeze. Part-time shovers still lend a hand in pushing passengers onto the trains and getting the doors closed.

Since this situation has been going on for three decades, the government has taken up alleviation of the rush-hour crush as one of its policies; its target is to reduce the crush by 25% by the year 2000. The government and railroad companies have built new routes, increased the num-

ber of lines, and made trains longer. Annual investment has reached around ¥300 billion in Tokyo alone. By the time such measures become effective, however, the number of commuters has increased further, so there has been no real improvement at all.

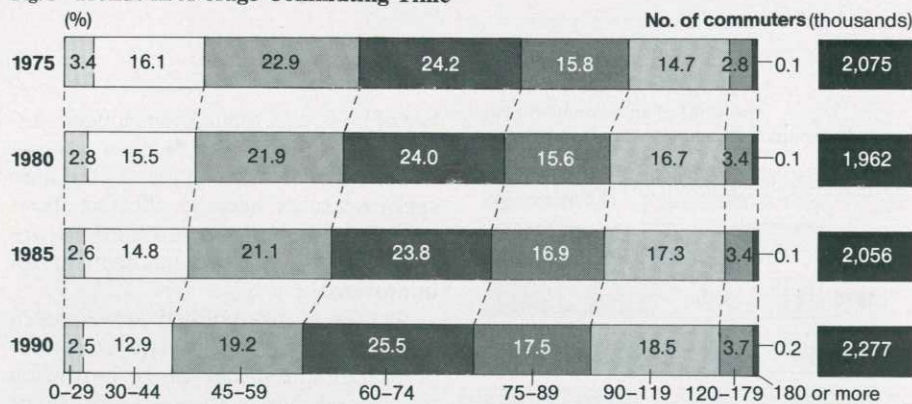
At present, five railroad companies in Tokyo have sought to alleviate future congestion in an unusual way by borrowing up to a quarter of the necessary funds from passengers, in the form of increased fares, to ameliorate facilities on eight routes, with the promise that fares will be reduced when the work is completed. Also, the government, companies, and labor unions have joined forces in an attempt to make the time at which workers go to work in the morning more flexible and thereby reduce the pressure of the rush hour.

Japanese businesspeople, who have come under fire internationally for living in dwellings that resemble rabbit hutches, commuting on crowded trains, and working until late at night, have at last become aware of the need to improve the quality of their lives, which includes more comfortable commuting. The trouble is that actual alleviation of the rush-hour crush on trains—a kind of symbol of Japan's rapid economic growth—will take a few more years in coming.

As described above, railroads have taken the lead in land transportation in Japan. Trains still show their mettle when it comes to moving people around, and this role is expected to increase further in the future. Three new Shinkansen lines have been completed, and the superfast train is now approaching an era of speeds of up to 250 kilometers per hour. Moreover, there is a plan to link Tokyo and Osaka by a magnetic levitation train, or maglev, that will whiz along at a speed of 500 kilometers per hour; a project to build a test line along the route is under way.

The Tokyo-Osaka route is also a money-earner for airline companies, but because access to airports takes time, the Shinkansen, which links the two cities in three hours, has become so popular that it is difficult to book seats on morning and evening trains. Since the Shinkansen increased its speed and improved other

Fig. 3 Trends in Average Commuting Time



Note: Figures are of commuting time of workers and students to three wards in central Tokyo.  
Source: Statistics compiled by Management and Coordination Agency

services a few years ago, the number of passengers choosing to fly between Tokyo and Osaka has declined. This goes to show that as long as certain conditions are met, railroads are a more suitable means of transportation in Japan than either airplanes or cars.

In business terms, the formerly state-owned part of the railroad network, known as the Japanese National Railways, has turned in a profit and increased the number of its passengers since 1987, when the JNR was privatized and broken up into seven private companies—the JR Group—and its accumulated debts for the most part were taken over by a separate organization. The public's belief that services have improved since privatization seems to have given the government confidence in the country's railroad network.

## Trucks for freight

Railroads became the leading force in land transportation in Japan because the government, keen to promote the modernization of the country, made the construction of railroads one of its national policies. From the military and industrial points of view, railroads became one of Japan's strategic industries.

For this reason, Japan's road network came to lag a long way behind those of other industrial countries. An allied mission that visited Japan after the war to survey the standards of roads was astonished to find them in such an awful state—so awful that Japan was subsequently considered a backward country in its need for expressways and received funds from the World Bank for their construction. Actually, Japan received a loan from

the World Bank for the construction of the Tokaido Shinkansen line, too.

The construction of trunk roads in Japan made headway along with the country's economic growth, and the full-scale building of expressways serving and linking major cities began after the Tokyo Olympics in 1964. Today, nearly three decades later, almost all of Japan's main cities are linked by expressways. As a result, the transport of freight shifted from railroads to trucks, which began to ply along the highways with their wares at night (Fig. 2).

When the transport of freight by trucks, which do not require much arrangement of their cargo, became common, distribution in Japan changed considerably. In particular, the distribution of fresh food underwent a revolutionary change. Using the expressways, fresh foodstuffs can be hauled from producing areas by truck at nighttime to reach the main cities by the following morning so that they are on the dining table in the evening. So places as far as 1,000 kilometers or more away from the main cities can now grow vegetables and fruit or cultivate fish especially for the big-city market, while consumers in Tokyo can purchase fresh food at all times regardless of season. Some people complain that the Japanese are losing their sense of season, because instead of apples in winter and strawberries in spring, they can now buy apples and strawberries all year round. Be that as it may, the change in distribution has been made possible by the construction of the expressway network and the consequent increase in truck transportation.

Not only can city dwellers purchase

fresh food in stores, they can also receive goodies directly from their relatives or friends in the provinces. This small-parcel delivery service has boomed in the last 15 years—and added to the volume of truck transportation, too.

This truck transportation, however, has come to a crossroads as people have begun to reflect on road congestion, environmental issues, the need to conserve energy, the shortage of drivers and other problems related to the present dependence on trucks for freight transport. There is a growing movement to switch freight transport to railroads and ships, which are more efficient in terms of energy, create fewer environmental problems, and have less of a worry about labor shortages.

One method, which has already begun, consists of using trains to carry trucks between cities and then letting the trucks operate on roads within the city. In this way, truck drivers are relieved from the irksome task of driving along expressways at night, and there is not so much worry about delays in delivery because of road congestion. To encourage this method, and to reduce dependence on trucks for freight transport, the government has introduced tax incentives for railroad containers.

In place of trucks, the expressways now seem to be being taken over by highway buses, especially nighttime buses from cities like Tokyo and Osaka to places that have been left out of the Shinkansen network. These highway buses have greatly increased their business in the last five years, especially among younger people. Fares are cheaper, services have been improved immensely, and new routes seem to be appearing every month.

Land transportation in Japan is changing little by little as the lifestyle of the nation becomes more diverse. In step with this diversification, each means of transport seems to be entering a period of competition over new services.

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