

Improvement of Urban Railways

Yasuo Wakuda

Development of Three Major Conurbations

The Japanese population grew steadily from 99 million in 1965 to 112 million in 1975 and to 121 million in 1985. In the process, there was heavy concentration of the population in the Tokyo, Nagoya, and Osaka regions. The population of metropolitan Tokyo, the political and economic hub, increased sharply from 21 million (21% of the national population) in 1965 to 27 million (24%) in 1975, and 30 million (25%) in 1985. Nearly half the entire population now lives in the Tokyo, Nagoya, and Osaka regions.

The government adopted a policy of suppressing industrial concentration in these regions and promoting balanced development in all areas of the nation. This policy was successful to some extent in that large plants were built in scattered coastal industrial zones. However, government, management and information functions became even more centralized in the metropolitan Tokyo area, creating

serious transportation problems. Motor transport grew rapidly from the 1960s; the number of vehicles rose from 8 million in 1965 to 23 million in 1975, and to 48 million in 1985. In the 1990s, one in two persons owns an automobile. However, there is a limit to road expansion in large cities. Even with the current popularity of passenger cars, people still have to rely on railways for commuting and other transportation needs, explaining why continued efforts have been made to build new railways and improve existing ones.

Suburban JNR Improvements

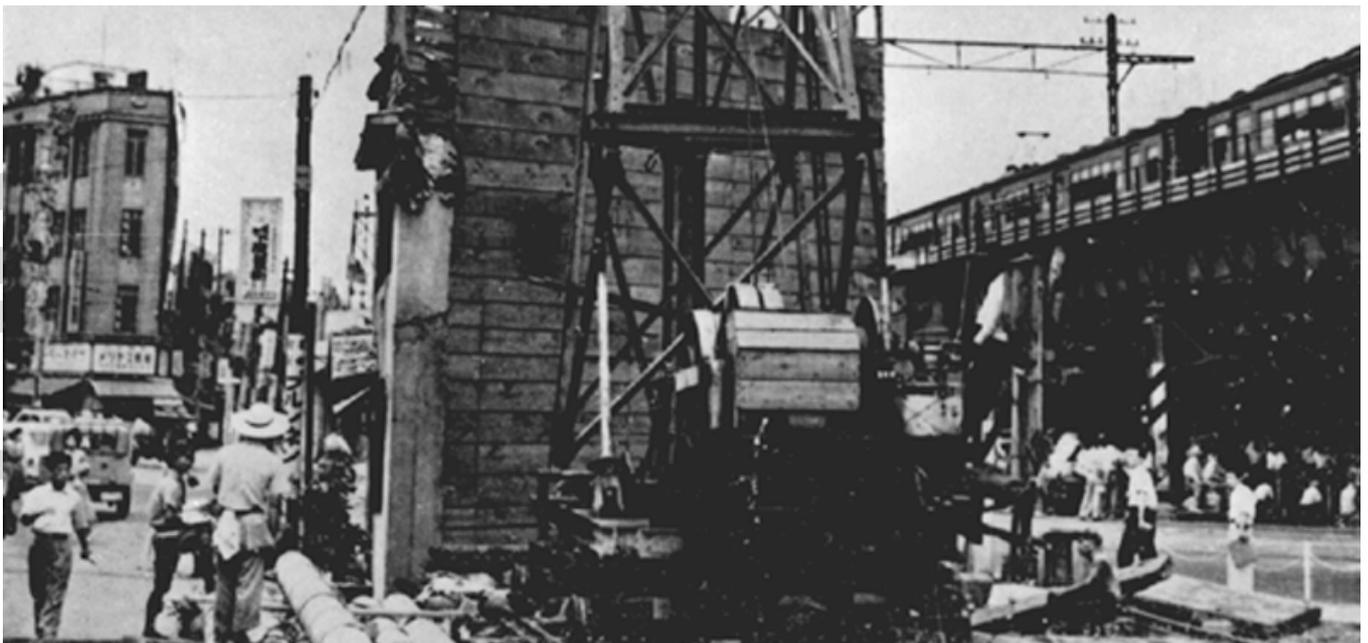
Before World War II, the government railways served mainly for inter-city transport with a national network. However, in metropolitan Tokyo, regional transport by JNR electric trains had also been consolidated. Residential areas in Tokyo sprawled along the national lines that ran radially leaving areas between them relatively undeveloped, resulting in a starfish-

like development. Only national railways ran directly from the suburbs to the central business district.

After the post-war recovery, Tokyo started growing rapidly, resulting in extreme congestion on the pre-war network. Some people argued that JNR's mission was to provide more national inter-city services rather than make large investments in local urban transport. Nevertheless, because the terrible congestion during the rush hours could not be left unsolved, a project was promoted to increase capacity on the five major lines radiating from the heart of Tokyo. A new outer-loop line was also opened after the 1970s.

Initially, commuting was generally limited to a 40-km radius around Tokyo, served by trains consisting of up to ten 20-meter EMU cars with four doors and longitudinal seating. But the commuting zone gradually expanded to more than 50 km, necessitating medium-distance EMUs consisting of up to fifteen 3-door cars with bench and booth seating, running under a fairly tight schedule.

Japanese regulations set the capacity of



Building new double track in Central Tokyo in 1950s to separate JNR's suburban Yamanote and Keihin-Tohoku services

(Transportation Museum)



Through operation of TRTA underground and Tobu private railways at Kitasenju Station

(S. Ogihara)

a 20-meter commuter car at about 140 passengers. Assuming a 10-car commuter train leaving a station every 2 minutes, a total of 42,000 people can ride each hour in one direction. However, as many as 100,000 passengers ride per hour on certain sections of the Chuo Line, the most heavily-used line in Tokyo. This represents approximately 240% of the legal capacity, a condition under which passengers cannot even move their hands. To reduce the congestion to less than 200% (bodies touching but possible to read magazine), JNR made large year-on-year investments, but the population grew faster and the situation remained far from improved.

JNR had a relatively low profile in the Nagoya and Osaka regions where private railways played a more important role, but EMU trains were also introduced on JNR lines as urbanization developed.

Construction of Underground and Withdrawal of Trams

At the end of WWII, underground railways stretched only 14.3 km in Tokyo and 8.8 km in Osaka. Electric trams

played the major role in intra-city transport with approximately 200 km of lines in Tokyo, and 100 km each in Osaka and Nagoya. In Tokyo, where the private railways had no direct connections to the central business district, most passengers had to transfer to either JNR trains or trams to reach their destinations. This situation presented a need to expand the



(Tokyu Corporation)

■ Keita Goto (1882–1959)

Keita Goto, the founder of the Tokyu Group, was a prominent figure in Japan's private railways during the 1940s and 1950s. After graduating from Tokyo Imperial University, he worked for the Ministry of Railways until 1920. Goto then joined a private railway owned by a company developing urban residential areas under the influence of the garden city idea in the UK. Goto soon obtained control of various private railways in SW Tokyo. He merged them in 1942 by founding Tokyu Corporation and became its first president. During WWII, he served for a short period in the Tojo Cabinet as Minister of Transport and Communications. Three private railways unified during the war were hived off in 1948, after that he returned as chairman to Tokyu Corporation, and started a nationwide network of tourist businesses. His main rival during the 1950s was Yasujiro Tsutsumi, head of the Seibu Group, another powerful railway conglomerate based in NW Tokyo.



Linear-motor underground train on Tsurumi Ryokuchi Line in Osaka

(Osaka Municipal Transportation Bureau)



Tokyo Monorail (opened in 1964) running along Tokyo Bay coastline to Haneda Airport (Tokyo Monorail Co., Ltd.)



Housing development surrounding Aobadai Station, Tama Garden City (Tokyu Corporation)

underground railways. Construction of new lines was started in the 1950s in both Tokyo and Osaka. The immediate goal was the Tokyo Olympic Games in 1964 and the Osaka International Exposition in 1970. In Nagoya, the first underground line was opened in 1957 and was extended step-by-step.

In Tokyo, the expansion involved two new methods. First, the Tokyo Metropolitan Government (TMG) was given permission to build underground railways in addition to the Teito Rapid Transit Authority (TRTA), which was running the existing systems, so the network could be completed faster. Second, unified specifications permitted the new underground trains to be operated through to the existing suburban private railways and the JNR lines, thereby increasing utility and easing congestion. Through running with private railways has also been introduced on some lines in Osaka and Nagoya.

Construction of underground railways requires huge funding that cannot be met by fares alone. Government subsidy was introduced for this purpose and was improved gradually. As a result, the total combined length of the underground lines operated by the TRTA and TMG reached 100 km by 1968 and 200 km by 1986. Osaka marked 100 km in 1990. Some of the latest lines feature smaller-cross-section tunnels aimed at reducing construction costs. This is made possible by using linear induction motors to lower car floors.

Trams had been planned to be replaced by underground lines but they lost their passengers due to the road congestion in the 1960s, creating big deficits. As a result, their withdrawal was hastened and they disappeared from Osaka in 1969, and Nagoya in 1974. Most tram lines in Tokyo disappeared between 1967 and 1972 but there is still one 12.2-km line that continues to operate on a reserved right of way.

Buses were substituted for trams in areas

without rapid transit systems. Trolley buses had only a very short life from 1952 to 1968 in Tokyo and from 1953 to 1970 in Osaka. Monorails and other new types of guided transport have been introduced as medium-capacity transit systems. Tokyo Monorail opened in 1964 over the 13.0-km section between central Tokyo and Haneda Airport. It is one of the few monorails in the world with a genuine mass-transport function carrying airline passengers and commuters rather than just sightseers.

Role of Private Railways

A unique feature of urban railways in Japan is that many are entirely privately financed and maintain sound business results. They are successful for two reasons. First, because they are more efficient than the former JNR and municipal railways. Second, because they diversified their businesses, including development of residential areas and retailing, which helped them to gain profits from developments along their lines. There are seven major private railway companies in Tokyo, one in Nagoya, and five in Osaka. They all play an important role in urban transport in their respective regions. Some are engaged in tourism and other businesses on a national scale. The head office of the 'railway' company also functions as the core of a group of closely affiliated companies engaged in the diversified businesses.

During the early post-war years, their efforts were directed towards increasing capacity rather than building new lines. They were discouraged from making large investments in their railway operations by the government's policy of suppressing fare increases, and because the government refused to give subsidies on the grounds that their rail operations were well cross-subsidized from their non-railway profits. Improvement efforts mainly

took the form of remodelling stations and other facilities to accommodate longer trains rather than the earlier 2- to 3-car trains. Finally, their capacities reached the JNR level with some 10-car trains.

A remarkable case of success was the new Tokyu Den-en-toshi Line completed between 1966 and 1984 serving Tama Garden City southwest of Tokyo, a rural area developed by Tokyu Corporation into a high-quality residential area (see page 4, JRTR 10).

Development of large-scale residential areas was also promoted by public bodies. However, in such cases, the private railway companies could see no incentives for constructing new lines because they could not expect profits from land development. For this reason, a new policy was introduced from the 1970s involving subsidy measures provided through the Japan Railway Construction Public Corporation (JRCP). The policy encouraged the private railway companies to build new lines to new towns built by public bodies. Examples are the lines to Tama New Town west of Tokyo, and Chiba New Town east of Tokyo.

Similar public support through the JRCP was also granted to add tracks to existing lines, and to construct new direct connections to underground lines. Moreover, many sections of both the JNR and private railways running at ground level were elevated to eliminate level crossings. Most of the upgrading costs were borne by the road authorities, because grade separation contributed to smooth safe road traffic.



(Tokyu Corporation)

■ Noboru Goto (1916-1988)

Noboru Goto, the son of Keita Goto, graduated from Tokyo Imperial University in 1940. He joined Tokyu Corporation shortly after the war and became its president in 1954. Izukyu Corporation, an affiliate of Tokyu Corporation, won the heated competition with the Seibu Group to build the 45.7-km Izukyu Line along the east coast of the Izu Peninsula, a popular tourist spot about 100 km west of Tokyo. When completed in 1961, it was the longest private railway built in post-war Japan.

Suburban Tama Garden City, developed by Tokyu Corporation, attracted many people commuting to Tokyo using the Tokyu Den-en-toshi Line. The area along the old Tokyu lines had been fully built up, but Tokyu's rather stagnant business was revitalized by the new town, which is now a highly-ranked residential area. Goto led the Tokyu Group into a series of new businesses including distribution, hotels and aviation. He served as head of the Japan Chamber of Commerce and Industry and was a top figure in the Japanese business world.



Yasuo Wakuda

Mr Wakuda graduated from the University of Tokyo, Faculty of Law, in 1957 and worked for the Ministry of Transport until 1984; he served as a board member of the Japan Non-Government Railways Association, and the Japan Railway Construction Public Corporation, and as president of the Japan Transport Economics Research Centre. He is currently the Executive Vice-chairman of Japan Air Charter Co. As a specialist in the history of railways, he is author of *100 Years of Japanese Private Railways through Men and Events*, *Private Railways of Japan—Their Networks and Fleets*, and other works.