

Chap. 4 : developing an independent transportation technology (1910-1921) : policy

著者	青木 栄一
権利	Copyrights United Nations University
journal or publication title	Technological Innovation and the Development of Transportation in Japan
page range	72-83
year	1993
URL	http://doi.org/10.20561/00051026

Developing an Independent Transportation Technology (1910–1921)

Policy

Eiichi Aoki

A period of regionalization in transportation started during the years 1910–1921. In the quarter of a century from the late 1880s, government and private companies made great strides in constructing a national railroad network, and there emerged an increasing popular demand for the building of roads and railroads that would connect into that network. The 1910s, then, was an era in which the building of a transport infrastructure changed from the building of lines to that of interfaces.

Expansion in the railroad network stimulated the building of roads. However, the major means of road transport at that time were the rickshaw, horse-drawn coach, and ox cart. The road network being built consisted of roads that were just wide enough for rickshaws and horse coaches to be able to pass each other; their surfaces were gravel and the roadbeds were sufficient to support the weight of horse-drawn coaches. Road pavement of concrete or asphalt had not yet appeared, but there were roads in some parts of large cities paved in brick. The motor car had already appeared by this time, but its numbers were small and its role as the main force in road traffic was still far off in the future.

Ranking on a level with the railroads in transportation power was coastal shipping. The Western-style sailing-ships that plied these routes were in their heyday. Scheduled routes covered by steamships were developing in the coastal regions, but the Western sailing-ship was still widely used for carrying general cargo, most importantly coal and lumber. Small harbours throughout the country were being improved and equipped to handle these ships.

Establishment of the Railway Agency

The purchase of the Kansai and Sangu railroads on 1 October 1907 brought railroad nationalization near completion and turned the National Railways into a large organization. Although immediately prior to nationalization at the end of fiscal 1905 the National Railways operated a track length of only 2,562 km, it was operating 2.8 times that, or 7,153 km, by the end of fiscal 1907. Of that 4,591 km increment, 4,563 km were obtained through the purchase of private railroads.

Each of the 17 nationalized private railroads had its own management and engineering practices. If those differences were not ironed out and brought into a unified whole, the new National Railways would be nothing more than a hugely bloated organization unable to perform adequately. The National Railways had to be remoulded into an institution able to unify the administration of transport in Japan.

The Communications Ministry was the overseer of railroad and ship transport at that time. One of its agencies, the Railroad Operations Bureau, was delegated to manage the National Railways, while the Railway Bureau was to administer private railroads. On 1 April 1907, the Railway Operations Bureau was reorganized as the Imperial Railway Agency, a bureau external to the Ministry of Communications. On 22 June 1908, tramways previously controlled by the Home Ministry were placed under both the Home and Communications ministries and supervised by the Railway Bureau. That unified the control of railroads and tramways in the hands of the Railway Bureau.

The new Railway Agency was established on 5 December 1908 directly under the prime minister's purview. Not only was the agency charged with supervising and operating the National Railways, it was organized as one overall agency that would take under its wing the departments of railroad management and administration, which were controlled by the Ministry of Communications' Railway Bureau. This shows how important the nation's railways were considered to be. Establishment of the Railway Agency created a base for the National Railways to function as one unified organization and expanded the administration of land transport with the railway as its most important part. The Railway Agency took under its administration not only railroads within Japan but those controlled by the Japanese government in Korea (railroads operated by the Korea Residency-General Railway Control Agency, such as the Keifu, Keigi, and Bazanho railroads) and the South Manchurian Railway.

The first person appointed to the position of director-general of the Railway Agency was Goto Shimpei, who also held the post of communications minister.

Making the Railway Agency independent removed railroad administration from the Communications Ministry and limited ministry authority to sea transport and postal affairs. The system had become one in which the Home Ministry was mainly responsible for roads, while tramways were con-

trolled by both the Home Ministry and the Railway Agency. Thus, railroads, roads, and sea transport were each controlled by a different ministry.

On 15 May 1920, towards the end of the period of regionalization, the Railway Agency was converted into the Railway Ministry. The Railway Agency was directly under the office of the prime minister, and since its director-general was not a member of the cabinet, despite the increase in workload that accompanied the expansion in the railroad network, he could not attend cabinet meetings and had no authority to issue ministerial decrees. Administrative procedures, such as the issuing of light railway licences, required a decision by the prime minister. The elevation of the Railway Agency to the Railway Ministry was made partially to handle the rapid progress in expansion of the railroad network, but it also reflects the priority given to railroads in transportation policy.

Conflicts in Railway Policy and the Policy on Light Railways

A major bone of contention in party politics during this period was between the policies that emphasized improvements in trunk railroads and those that sought to put the greatest energies into expanding the railroad network. Typical of the former was the plan to re-lay standard-gauge tracks and of the latter, the policy on light railroads. With every change in cabinet, Japan's railroad policy would swing between one or the other, with railroad expansion ultimately being given priority.

With the great strides in domestic heavy industry made from the beginning of the century through the Russo-Japanese War, demand for railroad transport increased and this in turn brought increases in the number of operating trains and in train weight.

After nationalization, the Railway Agency advocated rebuilding all tracks from the existing 1,067 mm narrow gauge to the 1,435 mm international standard as a basic means of improving trunk railroad carrying power. Goto Shimpei, the director-general of the Railway Agency, was particularly active in pushing for this standard gauge. A rapid succession of proposals for basic surveys and reconstruction were made beginning in 1909. Opposition gradually increased, and standard-gauge reconstruction became the most hotly debated railroad plan of the decade.

The political party in power at that time was the Seiyukai, and one of its most important programmes was the rapid building of a railroad network throughout Japan, for which it advocated the building of new railroads in all parts of the country. The Seiyukai opposed the plan to rebuild tracks to the standard gauge because the enormous expense involved would delay the expansion of the railroad network to all outlying regions. The government maintained that priority should go to building the trunk railroad network, which would benefit the entire nation, and felt that it must say no to limited financial resources being dispersed to construct local railroads throughout the country. But the government could not ignore what the Seiyukai wanted, because the party held the majority of seats in the House of Repre-

sentatives. So what it did was devise a light railroad policy, from which the government could gain some advantage from projects by providing aid and creating an environment that was hospitable to private investment for constructing small local lines. With this policy the government could keep its expenditures (from the entire railway account) for local lines as grants-in-aid only and at low priority.

The light railroad policy had formerly been described as necessary for its simple set of laws on directing small, privately owned railroads after the large ones were eliminated by nationalization. However, it should be understood basically as a compromise between the opposing policies of giving priority to improving trunk lines and to constructing regional railroads.

It was in this situation that the Light Railway Law was enacted in April 1910 (going into force in August) and the Light Railway Assistance Law in March 1911 (going into force in January 1912).

The Light Railway Law was brief, containing a total of 8 articles. (Another 7 articles from the Private Railway Ordinance of 1897 were also included in the actual application of the law.) Licences for light railroads were not granted in two stages – first a temporary and then a permanent licence, as with private railroad licences; when the licence was issued it was permanent and construction could start within the designated time limit immediately after getting the licence. Status as a joint-stock company was required for applicants under the Private Railway Ordinance, but in the Light Railway Law any organization could apply for a licence no matter whether it was a general partnership, limited company, or even an individual. There were no restrictions on the gauge that was selected for track use; the restrictions on curve and gradient were loose, and the railroad owner could use just about whatever he wanted in terms of route, stations, signals, and rolling-stock. If necessary, and if the operator had permission, he could also lay track on public roads. There were also no maximums placed on fares. Regulations concerning the building of light railroads were based on directives that depended greatly on the peculiarities of each railroad. Even former private railroads and tramways could apply under the Light Railway Law.

The Light Railway Assistance Law applied to railroads with a gauge of 762 mm or greater; in Article 1 of the law it is stated that “if a five per cent rate of profit to construction costs is not reached in each operating fiscal year, the government shall subsidize the deficient amount to five per cent for no more than five years from the day that said railroad starts operating.” A 1914 amendment extended the subsidy period of the law from five to ten years. Later, when the Light Railway Law was reorganized into the Regional Railway Law of 1919, the Light Railway Assistance Law was changed to the Regional Railway Assistance Law (1921). The subsidies for a fiscal year increased to “an amount equivalent to five per cent of construction costs in a fiscal operating year,” but the amount of subsidy was restricted, “if the profits in each operating fiscal year exceed the amount equivalent to two per cent of construction costs, the amount of that excess shall be removed from the previous amount” (Article 1).

Enactment of the Light Railway Law and the Light Railway Assistance Law had enormous repercussions in every locality, causing many regions to start their own railroads.

The government proposed widening the trunk railroad gauge beginning in fiscal 1911, but the plan ran into opposition from Seiyukai Diet members, who had the funds removed from the budget. The Seiyukai's Saionji cabinet formed in August 1911 cancelled the standard gauge reconstruction plan. From then on, every change in cabinet meant either the resurrection or shelving of the standard gauge reconstruction plan, although the cancellation of February 1918 was the final one. During this time, though, there were bitter arguments over revising the gauge and many proposals to build a new system and abolish the old one, but the standard gauge reconstruction plan was eventually buried.

Whatever government intentions were, however, the light railroad policy developed in its own way. Table 1 shows the trends in the construction of light railroads by private capital from 1910 to 1926 as indicated in number of light railroad (after 1919, regional railroad) licences and kilometres operating. These figures show a peak for licences/kilometres in the period fiscal 1911-1913, followed by a period of sharp decline, then another increase around fiscal 1918. In number of kilometres opened for operation in a year, too, the highest figure is in the 1913-1915 period, with a subsequent standstill, and then an increase in fiscal 1921 and after. However, all these figures are lower than the peak in the first half of the 1910s, and there is an increase in licences and operating mileage during the 1920s for the large cities and mining and heavy industry. The only peak for regional railroads is the first one. This shows that the period in which the policy for local railroad development was continued as government agencies had intended was an extremely short period. We can see quite clearly the effects of World War I in this period, but the light railroad policy contained factors that are responsible for its own demise.

First were the ways of procuring capital to construct the light railroads and of managing them after they began operation; the burden on society in the outlying regions was excessive. Much of the capital to construct the light railroads was procured from the areas the railroad was to serve. The prevailing poverty led to a strong tendency to underestimate the costs of railroad construction and to provide insufficient levels of capital. Increases in the costs for materials frequently rendered insufficient the funds first budgeted, and the local people did not have the surplus in funds with which they could cover the deficit. This is why most of the light railroads were forced to carry a very heavy debt, and after they started operations they had a difficult time paying the loan interest. The accounts of many of the light railroad companies often show that the amount of subsidy money received was about the same as the interest payments, thus indicating that government subsidies were used to pay loan interest. A certain amount of profit from revenues was planned for, but with the payments on interest going higher than profits, the entire debit-credit picture was one of loss. In

Table 1. Kilometres licensed, lapsed, and in operation for light and regional railways (1910-1926)

Fiscal year	Licensed	Reclassified ^a	License lapsed	Nationalized	Operating ^b
1910	633.0	769.2	—	—	(374.0)
1911	1,762.0	289.1	24.4	—	143.2
1912	1,629.6	182.4	86.6	—	(7.3)
1913	1,468.0	36.4	385.5	—	255.3
1914	456.0	10.1	439.0	—	521.4
1915	136.0	—	910.9	—	487.6
1916	326.6	40.7	478.9	—	469.6
1917	283.3	407.6	415.9	—	143.9
1918	495.2	—	509.9	—	(37.1)
1919	1,009.5	—	194.1	—	91.1
1920	785.2	—	85.6	—	(321.9)
1921	594.3	—	59.6	130.4	230.2
1922	1,350.1	—	105.9	—	129.4
1923	954.6	—	112.3	—	108.4
1924	597.5	—	730.6	35.0	250.6
1925	421.2	—	260.3	—	372.8
1926	933.4	—	230.3	23.8	487.4
				11.9	332.8
					330.9
					480.2

Source: Harada Katsumasa, Aoki Eiichi, *Nihon no tetsudō - 100 nen no ayumi kara* (Japanese railways - 100 years), p. 152.

Note: The mile-chain indication is converted to kilometres (1 mile = 1,609 m, 1 chain = 20 m). From the *Tetsudōin nenpō* (Railway Agency yearbook) (1910-1915) and the *Tetsudōin (shō) tetsudō tokai shiryō* (Railway Agency [Ministry] statistical data) (1916-1926).

^aPrivate railroads and tramways reclassified under light railroads.

^bFigures in parentheses are for private railroads and tramways reclassified under light railroads.

this sense, then, the money from government subsidies was money used to subsidize interest.

Most dividends were either unpaid or paid only in preferred stocks, and the capital that local people had worked hard to accumulate either lost its profitability or could not be converted into hard money. Railways were profitable investments in the 1890s and 1900s, but the light railroads laid no golden eggs in the 1910s.

But the light railroad construction that was flourishing at this time was that undertaken by the government, and the budget for light railroads swelled every year after fiscal 1911. The government itself undertook the construction of light railroads "in cases where the transportation situation did not require the standard level of railway, there was no one there who would construct those railroads, or the railroads were necessary as feeder lines into the national railways."¹ The major feature of government-constructed light railroads is that the decision to construct could be made in the Railway Agency without resorting to the Railroad Construction Law. Only the budget had to be approved by the Imperial Diet. These construction decisions completely abrogated the authority of both houses of the Diet and its Committee on Railways and formed a pattern that became the political line of later years.

The use of private capital to construct light railroads placed an excessive burden for capital procurement on regional society and was a great problem for the managers of those railroads. It was natural then for local governments to gradually shift towards dependence on the national government for the construction of light railroads. If local citizens worked through their locally elected Imperial Diet members and succeeded in getting the national government to construct the light railroads, it would reduce the problems in procuring capital, management would have fewer problems after it began operating, and the local citizenry would greatly benefit as railroad users.

We should give particular attention to those instances where the provisions of the Railroad Construction Law were gradually whittled down by taking a railroad planned under the Construction Law and using the regulations for light railroads to speed its construction. Some examples are the construction of the Miyaji and Inukai lines on the Trans-Kyushu Railway (now the Hoho Main Line) between Kumamoto and Oita and the Okoku Light Railroad (between Yokote and Kurosawajiri, now the Kitakami Line) that crosses the Ou mountain range. This ran directly counter to the spirit of the Railroad Construction Law. Through the selfishness of members of the political parties and the Imperial Diet, the construction of light railroads was pushed forward without benefit of any long-term plan. Forces within the government itself eventually came to the realization that it was wrong to construct light railroads without any basis in long-term planning, which provided the motivation for enacting a new Railroad Construction Law in 1922.

After the Light Railway Law came into force, railroads constructed under the provisions of the former Private Railway Ordinance continued to change their designation to light railroads, and only a few railroads received licences under the Private Railway Ordinance. The number of railroads

subject to the Private Railway Ordinance declined year by year, until there were none – all of them having either been nationalized by 1918 or changed in designation to light railroads. This led the government to abolish on 9 April 1919 the Private Railway Ordinance and the Light Railway Law and officially announce the new Regional Railway Law. This law contained standards that were somewhat higher than those in the Light Railway Law; it had in its articles all conditions that had been prescribed by orders up until then and may thus be regarded as an improved version of the Light Railway Law. It provided government subsidies at better terms than previously and gave a stronger push to policies that encouraged local private railroads.

Independence in Transportation Technology

This period should be noted as one of great progress for Japanese heavy industry and one in which Japanese transportation technology became able to stand on its own. The country had started to manufacture its own steam locomotives and large steamships of the several-thousand-ton class in the 1900s. Most passenger and freight vehicles, wooden sailing-ships, and small steamships in use were domestically built. Moreover, by this time most rolling-stock and steamships, including locomotives and large ships, were being built domestically.

In the domestic production of transportation equipment, the Railway Agency, for railroads, and the navy, for shipbuilding, provided technical instruction and engineers, a steady flow of orders, and worked to maintain and improve technical standards – all of which contributed greatly to the development of manufacturing. World War I was an added, and unprecedented, stimulus to the Japanese economy that provided high levels of demand to support a very actively growing production. That and the difficulties of importing goods from the United States and Europe worked to encourage domestic production and create many new manufacturers.

However, the production of rolling-stock and ships requires a supply of parts from a wide range of related manufacturing sectors, and not all those sectors were in existence domestically. Japan still had to rely largely on imports for parts that required precision machining. The country's manufacturers were able to produce the boilers and reciprocating engines for ships, but could only make some of the parts for turbines, internal-combustion engines, and other equipment that had to be built to much more exacting specifications. Domestic manufacturing had not yet reached the level where it could produce electric motors and adequate controllers for electric cars.

The Rise of Urban Transit and the Greater Use of Municipal Transportation

Japan's economy began to progress dramatically during and after the Russo-Japanese War and to draw population toward the cities. This led to the formation of what came to be known as the four major industrial belts

and the six great cities of Tokyo, Yokohama, Nagoya, Kyoto, Osaka, and Kobe. As the population concentrated further into the big cities it encouraged an outward movement of people to the urban vicinity and rapidly expanded the demand for transportation.

Electric trains were already providing transportation in the cities, and the electric railroads increased in number during this period and began to transport passengers between cities and to the suburbs. Most of the tracks for these railroads were gradually moved off the road and their rolling-stock made larger in size and capacity, providing the prototypes for the later high-speed electric trains.

The number of urban transit users also increased at this time, and in view of the social role these trains played, a growing public opinion was opposed to the operation of these railroads as private business. Many city governments agreed with the widely held belief that all urban transit operation should be unified. City governments purchased the railroads and combined the operation of electrical generation with the operation of urban trains.

Japan's first municipally owned and operated transportation project was an electric tram operated by the city of Osaka. Osaka began constructing its port in 1897, and in 1903 started operating an electric train on the wide road between the port and Hanazono-bashi, Kujo-cho, to promote the use of the port and the reclaimed land.

A plan had been devised to construct an electric railroad in the city of Osaka backed by private capital, but Osaka's mayor, Tsuruhara Sadakichi, proposed that all electric trains running in the city be city-owned and -operated, a policy that the city assembly adopted in November 1903: "All city railroads built in the future in the city of Osaka shall be directly operated by the city of Osaka. Any construction of electric railroads in the city streets of Osaka by an individual or private company shall be removed."² The mayor gave the reasons for these rules as follows:

1. Eliminate the pursuit of selfish interests by profit-seeking companies and give utmost attention to the convenience and benefit of the public.
2. Use the profit from the city's trams to expand the roads and develop the city.
3. This profit will be a new and good source of funds for the city and will help when annual expenditures expand in the future.
4. Since the trams are more profitable and simpler in terms of their technology and operation than other municipal enterprises, it is best that the city continue to operate these trams and to gradually expand their scale of operation.

Thus, besides being a public-supported enterprise, the electric railroads made a substantial contribution to city finances. We should note here that the laying of tracks for electric trams on vehicular roads increased the road width. Osaka's main east-west streets before track construction were 7.8 m wide; the main north-south streets were only 6.0 m wide. Not only did the laying of tram tracks widen the streets, it also played an important part in reconstructing the city.³

Table 2. Start of operation and municipal management of urban railways in major cities

Name of city	First corporation	Began operations	Year taken over by city	Remarks
Tokyo	Tokyo Electric Train Railway	1903		In 1906, these three companies were consolidated into Tokyo Railway, which was eventually taken over by the city
	Tokyo City Railway	1903	1911	
Yokohama	Tokyo Electric Railway	1904		
	Yokohama Electric Railway	1904	1921	
Nagoya	Nagoya Electric Railway	1898	1922	
	Kyoto Electric Railway	1895	1918	
Osaka	Kyoto City	1912	—	The trams were both municipally and privately operated from 1912 to 1918
	Osaka City	1903	—	
	Kobe Electric Railway	1910	1917	
Kobe				Municipally controlled from its inception Amalgamated with Kobe Electric in 1913 and then municipally operated

Osaka's policy of municipally controlled urban trams had important ramifications for every city in the country, but it did not lead to an immediate take-over of all urban tram companies by the cities; private capital was used to construct most urban transit, and most of it was privately operated. The idea that cities should operate urban transit began to spread throughout the country in 1911. A picture of the municipal operation of urban trains can be gleaned by looking at table 2.

Examples of municipal tram take-overs can be found in Tokyo and Nagoya, where the direct motivation came from an opposition to fare increases imposed by the private railroads and the concomitant radical action of tram burning. Another example comes from Kyoto, where city agencies wanted to use public-project funds to operate urban trams. They devised a plan for purchasing the private electric railroads, although the plan failed, and the city constructed its own tram that ran in direct competition with the private trams.

Nevertheless, construction of privately operated suburban electric railroads flourished outside the cities up until around 1920. Since the areas in which these trams operated were outside municipal jurisdiction, municipal take-over of these railroads was not an issue during this period.

Road Maintenance and River Reclamation

Road conditions in the Meiji period had not progressed much from what they were at the end of the Edo period, even though parts of the trunk roads had been widened and macadamized to allow travel by rickshaw and horse-drawn coach. This situation remained basically the same after 1910. The roads were frequently damaged by heavy flooding, and it took large amounts of money to rebuild them. There were very few bridges crossing the larger rivers, and in most places passage had to be made by ferry (or pontoon bridge in winter when the water-level was low). This made for a close connection at that time between road maintenance and river reclamation, and it was necessary to acquire wide strips of land adjacent to rivers and build dykes to prevent floods.

The River Law came into force in 1896 and designated large rivers as "important rivers," with any reclamation projects on them being under the direct control of the Home Ministry. The first reclamation projects based on this River Law were those begun on the Yodo and Chikugo rivers in 1896, but by 1910 construction had begun on the Oi, Kiso, Tone (including the Edo and Naka), Sho, Kuzuryu, Onga, Yoshino, Takahashi, Shinano, Watarase, and other rivers. A number of major floods throughout the country in 1910 caused the government to set up a Flood Control Commission, which was placed in charge of starting reclamation projects on the above-listed rivers and 65 others.⁴ The resulting increase in the number of the nation's rivers reclaimed through the use of flood-control construction and the success of these projects eventually helped make it easier to maintain roads.

The spread of flood-control construction throughout the nation meant the end of the construction policy that sought to maintain rivers as transporta-

tion routes. This went hand in hand with the expansion of the railroad network, with railroads being set up everywhere as trunk or sub-trunk railroad transportation routes and roads being part of transportation systems that consisted of feeder roads radiating out from the railroad stations. Most river transport was being phased out throughout the Meiji period, its place being taken by the newly opened railroads. The last of the river transport routes on the Tone and Yodo rivers began to rapidly decline around 1910.

The import of motor cars to Japan began at the beginning of the twentieth century, and there was a rapid increase in the import of American-made cars from World War I on.⁵ The operation of internal-combustion-engine buses began to increase around 1910, and the greater use of these motor vehicles brought on needed reform in road policy, supervision, and the technical structure of roads and bridges.

The Road Law went into force in April 1920 and demanded a large amount of the central government budget for the repair of roads that had previously been the responsibility of the prefectures, counties, and municipalities. In that same year the Home Ministry devised a 30-year plan for the improvement of national and prefectural roads, and, accordingly, began paving roads and building large, permanent bridges. However, the new policy on roads would not begin to show any results until the next period under consideration.

Notes

1. *Nihon tetsudō shi* (History of Japanese railways), vol. 2 (Railway Ministry, 1921), pp. 73–74.
2. *Ōsaka-shi Kōtsūkyoku gojū-nen shi* (Fifty-year history of the Osaka Metropolitan Transit Agency), "Deliberation Papers," p. 15.
3. *Ibid.*, and *Ōsaka-shi Kōtsūkyoku nanajūgo-nen shi* (Seventy-five-year history of the Osaka Metropolitan Transit Agency).
4. Sanada Hidekichi, *Naimushō chokkatsu doboku kōji ryaku shi – Okino hakase den* (Brief history of civil engineering construction projects directly controlled by the Home Ministry – Tribute to Dr. Okino) (Kyukokai, 1959), p. 9.
5. The first motor car in Japan is said to have been an electric car for which Japanese people living in the United States raised \$3,000 to purchase and send as a wedding present for Crown Prince Yoshihito (later the Emperor Taisho), who was married in May 1900. Okamura Matsuuro, ed., *Nihon jidōsha kōtsū jigyō shi* (History of motor-vehicle transport operations in Japan), vol. 1 (Jiyukai, 1953), p. 2.

Railroads

Eiichi Aoki

The Plan for a Change-over to Standard Gauge

The proposal to reconstruct tracks to "wide" (i.e. standard) gauge¹ was started in 1909 by Goto Shimpei, director-general of the Railway Agency