

Funding Methods for Urban Railroad Construction and Improvements in Japan

DEREK DYLAN BELL

Research was conducted to inform transportation professionals worldwide about passenger railroad funding methods being practiced in Japan. The data presented were obtained largely through a literature survey and discussions with transport-related officials in Tokyo. The most common forms of rail transit funding were various types of loans, bonds, subsidies, and beneficiary charges. Other methods included public investments, fare increases, a national railroad improvement fund, and internal cross subsidization. Japan, unlike the United States, does not contribute any portion of its gas tax revenues to transit. As a result, cities in the United States may want to look in more detail at how Japan manages to construct and improve urban rail transit without relying on gas tax revenues. The most complete and up-to-date information on Japan's passenger railroad funding methods available in English is provided.

Before rushing into a detailed presentation about how railroad construction is funded in Japan, it is necessary to give the reader some knowledge about the important historical differences between Japan and the United States in the development of transportation and how these differences have shaped the current transportation environments in these two countries, particularly in Japan.

Urbanization trends in Japan and the United States, measured as the percentage of population living in urban areas, are illustrated in Figure 1. It is evident that the U.S. experience was one of steady growth in the cities whereas that of Japan was extremely rapid in recent decades, largely the result of urban migration in response to massive reconstruction efforts after World War II and Japan's desire to reach equal economic status with Western powers.

Figure 2 shows how the automobile developed in Japan and the United States. Considering that in 1970 both countries had the same level of urbanization yet very different levels of automobile ownership, as shown, one can assume that the late introduction of the automobile to Japan and the country's rapid urbanization combined with the government's long-standing policy of a rail-centered transportation system hindered automobile (and road) development and served to make rail transportation very attractive in this densely populated country.

Domestic transportation mode shares in terms of passenger kilometers per capita in Japan and the United States are shown in Figure 3. Clearly, travel by rail and bus is common in Japan—34.6 and 10.2 percent, respectively—combining for nearly 45 percent of total mode share versus less than 2 percent in the United States. Japan's pie is smaller in area than

that of the United States because the countries are proportional to one another in terms of passenger kilometers per capita. Therefore, in Japan people tend to travel shorter distances and less frequently by motorized transportation than in the United States. This deduction is reasonable since Japan is only 90 percent the size of California in terms of land area and has a population equal to one-half that of the United States, or more than four times that of California, indicating that mobility is indeed lower in Japan than in the United States.

Figure 4 illustrates how difficult it has been in Japan to reduce overcrowding on trains during the morning rush hour by increasing train capacity; the figure presents this trend for Japan's 15 major private railroads, concentrated in the Tokyo, Osaka, and Nagoya regions. Although train capacity has tripled since 1960, the average rush-hour overcrowding rate has only decreased from 230 to 180 percent capacity. In the case of Japan Railways (JR), capacity has increased by more than 250 percent since 1960, but the average rush-hour overcrowding rate has only decreased from 270 to 210 percent capacity (1).

Overcrowding is such a common situation that the East Japan Railway Company (JR East) has published an illustration portraying the ways in which overcrowding rates relate to rider comfort and discomfort. Once overcrowding reaches 200 percent capacity, the description states, "bodies touch firmly, pressure felt, possible to read a small book or magazine," and at 250 percent, "everyone leans in unison as the train moves, cannot move body or even hands" (2,p.9). Some trains in Tokyo are now equipped with folding seats that are to be used only during off-peak periods (i.e., if everyone stands, the practical capacity of the train is increased). Another example of overcrowding in Tokyo's Shinjuku Station, which processes about 2.8 million passengers per weekday.

The foregoing discussion and figures demonstrate the seriousness of the rush-hour overcrowding problem on railroads in Japan and consequently the reason that transportation authorities in Japan believe that they need to continually increase rail capacity and make large-scale railroad improvements. The following section explains the many ways in which railroad construction and improvement funds can be obtained in Japan.

INTRODUCTION TO RAILROAD CAPITAL FUNDING METHODS IN JAPAN

Railroad construction and improvements are very expensive projects that require a great deal of capital investment. Because of the large amount of capital involved and the long-

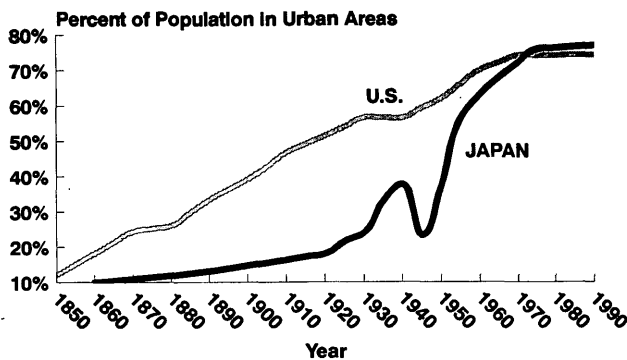


FIGURE 1 Urbanization trends in Japan and United States.

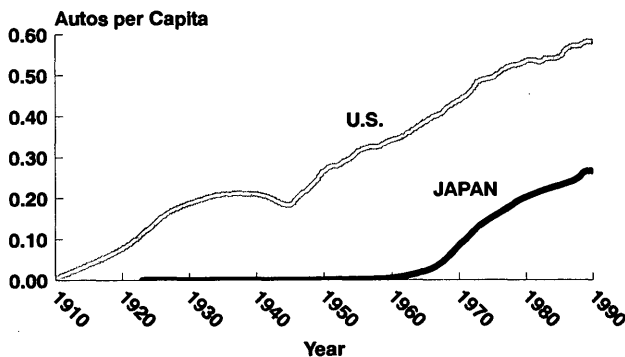


FIGURE 2 Automobile ownership trends in Japan and United States.

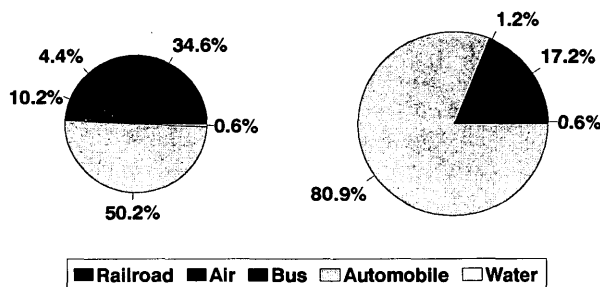


FIGURE 3 1990 domestic transport mode shares (percentage of passenger kilometers per capita): left, Japan; right, United States.

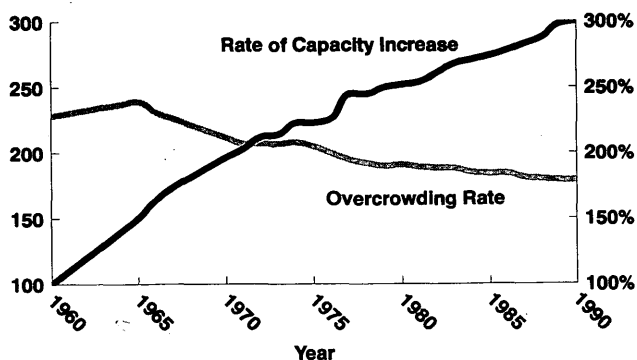


FIGURE 4 Trends since 1960 for rate of capacity increase (in terms of passengers; values normalized to 1960 level of 100) and average passenger overcrowding rate during rush hour in Japan, major private railroads.

term nature of such investments, usually only government bodies or very large and financially secure institutions or companies can afford it. Raising sufficient funds for railroad projects is often a difficult process that brings up issues such as public- versus private-sector responsibilities, burdens, and perceived benefits.

The national government's role in providing capital assistance for railroads is based on the following fundamental policies:

1. To ensure the improvement of transportation facilities that benefit the public,
2. To induce development by providing assistance to local governments through improved transportation facilities,
3. To assist local governments financially that are unable to pay fully for needed transportation improvements,
4. To provide a standardized transportation system nationwide,
5. To provide local governments with incentives to construct and improve transportation facilities, and
6. To redistribute income equally among all local governments nationwide.

Rail transit planners in large cities such as Tokyo and Osaka believe that further investment in railroad improvements is needed to relieve serious overcrowding on existing trains and road congestion. In medium-sized cities such as Sapporo and Fukuoka, which still have populations of more than 1 million each, the stated purpose of railway investment is to influence city structure and relieve road congestion.

However, the capital costs of rail improvements in Japan are immense. Land acquisition costs are one of the biggest expenses for urban rail transit. Underground space, although cheaper, still costs 20 to 50 percent of the surface land price (3,p.41). According to the Japan Real Estate Institute, residential land in the six major cities (Tokyo, Osaka, Nagoya, Sendai, Sapporo, and Fukuoka) increased in real value by almost 39 times between 1955 and 1990. From 1980 to 1990, the real value tripled (4,p.86). Since 1990, however, it has declined by 20 to 30 percent.

DETAILS OF RAILROAD CAPITAL FUNDING METHODS IN JAPAN

The following discussion covers 20 ways in which railroad companies can try to obtain capital funds in Japan (5). A summary of these methods is given in Table 1. Of interest to many transportation professionals in the United States would be two items not included in this list: gas tax revenues and toll road revenues. Neither of these revenue sources goes toward funding transit in Japan; they are mainly dedicated to construction and improvements of expressways and other roadway infrastructure. This policy has significant implications, especially considering that Japan's current gas tax rate of ¥53.8/L (about \$1.63/gal) is one of the highest in the world. Furthermore, the standard toll rate for regular passenger vehicles on Japan's high-speed expressways is ¥23/km (\$0.30/mi); this is the same as a one-way drive from Oakland to Sacramento, Chicago to Milwaukee, or New York City to Hartford costing about \$25 in tolls. Nevertheless, the

TABLE 1 Revenue Supply for City Railroad Improvements in Japan

Classification	System
Loans	NTT-B No-Interest Loan Japan Development Bank Low-Interest Loan Commercial City Bank Loan
Bonds	Local Bonds
Subsidies	Subway Construction Subsidy New Town Railroad Construction Subsidy Interest Payment Subsidy for Private Railroads Interest Payment Subsidy for Large City Railroads
Investments	Japan Development Bank Investment Local Public Group Investment
Beneficiary Charges	New Town Development Charges Special Assessment Districts Negotiated Exactions Land Readjustment Projects Fee from Station Petitioners Beneficiary Taxes Connector Fees
Transit User Fees	City Railroad Improvements Special Reserve Fund
Others	Railroad Improvement Fund Internal Cross-Subsidization

gas tax and toll rate enable rail transit to enjoy heavy patronage due, in part, to the correspondingly high out-of-pocket cost of operating an automobile. This is the opposite of the situation in the United States, where the pump price of gasoline is about one-third of that in Japan and Interstates are toll-free.

Loans

Most railroad construction and improvement funds are raised through loans. Because commercial bank loans tend to have relatively high interest rates, no-interest and low-interest loan systems have been established. However, because of a high degree of competition for funds, it is very difficult for railroad companies to obtain the special no- or low-interest loans. Essentially all private railroad companies will obtain commercial bank loans to pay for a significant portion of construction costs, and the major private railroads will receive relatively low interest rates anyway because of their financial stability.

NTT-B No-Interest Loan

The national government uses the Industry Investment Account (*Sangyō Tōshi Kaikei*) to provide capital investment loans for developing industries and promoting trade. Until 1953 this account was used to repay the United States for assistance provided after World War II. This account is now being used to help expand the nation's economy, improve people's living conditions, and clarify accounting procedures.

The source of the previous funds was the sale of Nippon Telephone and Telegram (NTT) stock in 1987 and 1988. The income from NTT stock sales was first used to pay for the redemption of government bonds. However, the capital gains from selling stock were often more than enough to cover the

cash required for the bond redemption. The excess amount was then allocated to the Industrial Investment Account. Because of the decline in Japan's stock market and the plummeting of NTT stock over the past few years, the national government has allowed a transfer of some General Account funds to the Industry Investment Account.

The national government states that the funds from this account are used to provide no-interest loans to three types of business activities:

1. Type A: business loan. Funding is intended for public enterprises that can pay off the loan from business-generated income.

2. Type B: public assistance loan. The target here is for public enterprises that need general urgent improvements and those that help promote spatial development by potentially increasing a region's activities.

3. Type C: private investment loan. In this case, funds are spent on private investments. The income generated by these investments is then used to fund public enterprises that may contribute to increasing a region's activities through spatial development.

Of these three types, only the Type B loan has been used for investment in railroads. As a result, funding from the Industry Investment Account is commonly known as the NTT-B loan. The account is considered temporary and may last for only another 20 years. This no-interest NTT-B loan was provided to the Kansai High-Speed Railway Company in 1989. Currently, these loans are being used primarily to fund capital improvements of passenger terminal facilities.

Japan Development Bank Low-Interest Loan

The Japan Development Bank provides low-interest loans to railroad companies for construction that improves safety, capacity, or service. This has been used recently for large-scale improvements to existing Shinkansen (bullet train) lines. A summary of how this funding works is provided in Table 2.

Commercial Bank Loan

As a last resort, private railroads will obtain financing from a commercial bank. Because of tight government fiscal constraints and a high degree of competition for funds, borrowing from a commercial bank is not uncommon for railroad companies in Japan.

Local Bonds

Railroads with a high level of government involvement, such as subways and new town railroads, receive a large portion of their funding through bonds, depending on local financial law. These bonds are also used as a method of debt repayment on construction loans. Six types of bonds can be used:

1. Construction bonds,
2. Subway business special bonds,

TABLE 2 Japan Development Bank Low-Interest Loan Rates

Type of Construction	Funding Rate %	Interest Rate ^d %
Safety Improvements ^a	50	5.15
Capacity Increases ^b	50	5.15
Service Improvements ^c	35	5.50

^aIncludes elevated crossings, safer at-grade crossings, accident prevention, and track reinforcement.

^bIncludes rail into city center, new lines, double and quadruple tracking, adding more cars, extending platforms, car storage facilities, transformer substations, transfer station improvements, and multi-purpose passenger terminals for new lines in large cities.

^cIncludes air-conditioned cars, new stations, passenger facilities, and coordinated transportation facilities.

^dAs of November 2, 1992.

3. Capital burden relief bonds,
4. Loan bonds,
5. Tokyo Rapid Transit Authority transportation bonds,
- and
6. Japan Public Railroad Construction Corporation bonds.

Construction bonds are used specifically for obtaining construction funds for subways and new town railroads. The subway business special bonds are corporate bonds issued to assist with subway construction costs and construction loan interest payments. The capital burden relief bonds are issued to help relieve some of the costs associated with interest payments on subway business special bonds. Loan bonds are newly issued local bonds used to enable the redemption of corporate bonds (e.g., subway special business bonds) issued in the past. The Tokyo Rapid Transit Authority (TRTA) issues transportation bonds to raise up to 10 times the amount of its own capital needed for subway construction. The Japan Public Railroad Construction Corporation also issues bonds for railway construction, often for the six passenger JR companies (JR East, West, Central, Hokkaido, Shikoku, and Kyushu).

Subsidy System

Four types of government subsidy provide funding for new line construction and large-scale improvements: subway construction subsidies, new town railroad construction subsidies, interest payment subsidies for private railroads, and interest payment subsidies for large city rail lines.

Subway Construction Subsidy

The subway construction subsidy is used to cover 70 percent of the construction costs of subways. The national and local governments share these costs, paying 35 percent each. In 1991 a new formula was set, so that payments would be made over 5 years at 7 percent a year for each party. The previous year's formula called for payments over a period of 10 years with the following annual layout per party: 1, 2, 3, 4, 4, 5, 5, 4, 4, and 3 percent. However, the actual subsidy rate, determined after considering deductions for rolling stock expenses, interest on loans, and others, has fallen from 53.2 to 44.0 percent. In the past 10 years, the total layouts for this subway construction subsidy system have varied from ¥40 billion to ¥145 billion (\$320 million to \$1,160 million) per year, but because of Japan's recent economic decline the total amount

of budgeted subsidies has not been realized in the past 2 years. To make matters worse, construction costs have continued to increase.

Officials at the Ministry of Transportation stated that there are two basic problems with this subway construction subsidy. First, these subsidies are provided to neither private nor public-private (third-sector) systems, which have been increasing in number and relative importance in meeting travel needs over the past few years. Second, the subsidy rate for subways in Tokyo and other cities is the same, although depending on the city, subway systems experience far different levels of patronage and, therefore, far different profit-making capabilities. Subways in Tokyo can easily earn enough fare revenues to cover operating expenses, but many subways in other cities cannot meet operating expenses without some form of operating subsidy from the local or national government. As a result, the national government is considering lowering the subsidy rate for Tokyo's subways and increasing it for systems in other cities. Such a change would be more in line with the government's stated policy regarding income redistribution.

New Town Railroad Construction Subsidy

The purpose of the new town railroad subsidy is to construct or improve rail lines to connect new towns in suburban areas of a big city to the city center. Generally, patronage is very low in the early stages because few houses are occupied in the new town. This system was established to decrease the capital burden on the new town rail system and is usually applied with value capture schemes mentioned later.

This system subsidizes 36 percent of the construction costs, with the national and local governments paying 18 percent each. It is allocated over 6 years at 3 percent per year per party. Total allocations over the past 10 years for this subsidy have varied from ¥216 million to ¥655 million (\$1.7 million to \$5.2 million) per year. Clearly, these funds are very small in comparison with the subway construction subsidies, largely because of the more expensive nature of subway construction.

Interest Payment Subsidy for Private Railroads

The aforementioned subway construction subsidies were established for TRTA and municipal subway construction, but private railroads were left out. Consequently, financially strapped private railroads after World War II only increased

the number of cars per train and reduced headways to improve service. Only four new lines were constructed at that time.

The Japan Public Railroad Construction Corporation, which was initially established to construct rail for the former Japan National Railroads (JNR), allowed in 1972 an interest payment subsidy for private railroads that provided service between suburban area and city centers. According to this system, these private railroad companies as well as public railroads can receive assistance with interest payments on construction loans. The national and local governments each pay 50 percent of any interest expense that exceeds a 5 percent rate for a period of 25 years. New town lines receive such assistance for 15 years. However, this system is being used only for major lines in the three large cities of Japan (Tokyo, Osaka, and Nagoya). Local lines are unable to use such a system, and this is unfortunate.

Interest Payment Subsidy for Large City Railroads

The interest payment subsidy for large city railroads also provides assistance for construction loan interest payments over a rate of 5 percent, but the period is for 40 years. These long-term subsidies are granted only to large city railroads and main trunk lines that the Japan Public Railroad Construction Corporation constructs. The national government is fully responsible for this extended assistance. The combined layouts of the interest payment subsidies for both the private and large city railroads over the past 10 years have varied between ¥1.7 billion and ¥3.6 billion (\$14 million and \$29 million) per year. It is clear from these allocation figures that subway construction in Japan receives the bulk of government capital subsidies.

Investments

Private railroad companies often raise construction funds by selling stock, a form of "self-investment." This section discusses how national and local public bodies may invest in railroads.

Japan Development Bank

The Japan Development Bank occasionally invests in railroad companies that need to make urgent improvements to relieve severely overcrowded trains and congested bottlenecks. In 1990 the Japan Development Bank invested in the Kansai High-Speed Railway Company and the Hiroshima High-Speed Railway Company.

Local Public Group Investment

For construction of new municipal subway lines, local public bodies commonly invest some funds from their general accounts. The subway then uses this money as so-called self-capital. Local governments previously supplied a standard rate of 10 percent of the construction funds needed, but in 1990 they uniformly increased the rate to 20 percent.

As for third-sector railroads, the regional government and one or more companies join forces and establish their own company. JR East, the largest of the six JR group companies, believes that this is the best method for obtaining funds. JR East and the respective local government each contributes equal amounts, up to 50 percent of the total construction costs, and JR is not required to repay the local government for its share of the costs. Two completed third-sector projects are the Yamagata Shinkansen and the Narita Express. The New Joban Line and the Tokyo Bay Area Commuter Line are third-sector projects currently in the planning stages.

Beneficiary Charges

The development or improvement of public infrastructure commonly generates benefits not only to the users of the system but also to landowners and businesses in the surrounding areas. Assessing a beneficiary charge to these landowners and businesses is an accepted method of value capture practiced in Japan.

New Town Development Charges

The Ministry of Transportation, in consortium with the Ministry of Construction, has created a system whereby new town developers pay a construction fee and a site fee that go toward funding rail construction. This system is designed to improve private railroads that connect the new town to the city center, commonly located 30 to 40 km (18 to 25 mi) away. The railroad is constructed by a local public body and the Japan Public Railroad Construction Corporation. The housing developers and land improvement companies that own land where the private railroads are going to operate must sell the portion of land that the railroads need at a reasonable price and pay for half of the railway construction costs associated with their previously owned property.

Special Assessment Districts

When the Kobe municipal subway was extended to Suma new town, the local government set up administrative guidelines to obtain contributions from the new town developers for the railroads. The new town developers were required to give land to the railroads for free and pay for all of the railway construction costs. The fees were charged according to special assessment districts set up around the rail stations by the municipal government. The specific development charges were determined by a formula that mainly considered the distance of the development from the station. The developers were also expected to make large-scale developments in the areas around the stations. This system is unusual in that such a heavy burden was placed on the developers.

Negotiated Exaction

Negotiated exaction is different from the preceding two beneficiary charges in that a predetermined fee is not forced on

the developers through laws or regulations. Developers and railroad companies work together in making an official and binding financial agreement that the developers should pay for a portion of the railroad operating, not construction, expenses. These negotiated exactions were performed between the Nose Railway Company and Nissei new town as well as between the Hokusio Development Railway Company and Chiba prefecture. In the case of Nose Railways, the developer also supplied half of the construction funds for an extension to Nissei new town and helped pay for an increase in the line's capacity.

Land Readjustment Project

Land readjustment projects are initiatives that try to improve the design of transportation and land use developments by rearranging existing structures where new rail systems are to be constructed. First, the project must be designated in a city plan or approved by a two-thirds vote of the landowners and renters in the area. Thereafter, the project can be carried out by a private developer or a public body such as a prefecture, municipality, or the Housing and Urban Development Corporation.

One good example of how this scheme can be successfully implemented is the Tokyu Den'en Toshi Line, also discussed later with respect to internal cross subsidization. The Tokyu Railway Corporation was able to solicit the voluntary participation of landowners to improve their properties through land use readjustment and public facility construction (e.g., roads, parks, sewers). These landowners were willing to have their properties rearranged because they believed that land values would increase with a new rail line.

According to Tokyu's system, Tokyu, which was the largest landowner along the proposed rail line, performed all readjustment projects for other landowners in return for small plots of "reserved" land expected to increase in value after the new rail line was in operation. With this system, Tokyu was able to secure the right of way necessary for the rail line and offset readjustment costs through resale or development profits of the reserved land (6,p.22). For an illustration of how this looks, see Figure 5. This entire process, from preparation of the initial development plan to the completed construction and opening of the last section of the rail line, took 30 years (1953–1984).

Station Petitioners

When there is no station near an existing section of rail, sometimes the nearby residents, developers, and local self-governing bodies will petition to the railroad company to build a new station. In this case, the petitioners often pay for the construction of this new station. There were many examples of this with the former JNR, and the method for charging the petitioners varied by case. Sometimes only the developers were burdened. Other times a new station fund was created by a local union that was then responsible for collecting money to meet construction expenses. Today there are very few cases of station petitioning.

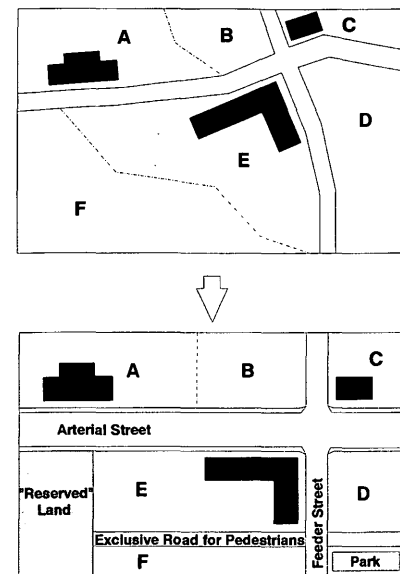


FIGURE 5 Land readjustment project: before (top) and after (bottom) execution.

Beneficiary Taxes

Local public bodies usually need to keep funds on hand to be able to grant subsidies for improvements to existing railways. This is normally done by levying beneficiary taxes, which can be easily administered for annual collection. The different types of beneficiary taxes used in Japan are corporate, enterprise establishment, real estate, and real property acquisition taxes. As business profits and land prices increase due, in part, to the railroad improvements, these taxes are used as a form of value capture. Beneficiary taxes have been set up in the cities of Sapporo, Sendai, Kitakyushu, and Fukuoka. In Sendai, half of the income from enterprise establishment taxes is channeled directly to a fund for railroad improvements.

Connector Fees

Many underground passageways connect subway stations and nearby buildings in Japan. Tokyo has numerous large-scale underground pedestrian corridor networks, which are very convenient during bad weather. Often one can go straight from a subway station to one's office or a major department store without stepping outdoors. Because the building owners benefit directly from these connectors, they are required to pay for part of the construction cost. The individual building owner's share of the cost is determined on a case-by-case basis through negotiations with subway officials.

Transit User Fees

In Japan, transit user fees, or fares, are established not only to cover some portion of operating expenses, but also some-

times to contribute to a fund specially created to help pay for future rail construction and improvements. This fund is called the City Railroad Improvements Special Reserve Fund and is used to pay for large-scale metropolitan railway improvements such as doubling existing double track. Passenger fares are a major source of revenue for this fund.

Initially, the railroad operator who would like to set up this fund should make a 10-year large-scale railroad improvement plan that explains specifically how it intends to increase capacity. Assuming that these improvements cost more than the current annual fare revenue minus operating costs, the operator needs to obtain authorization from the Ministry of Transportation to carry out the plan.

Once authorized, the operator can collect railroad improvement funds by increasing fare levels at a rate designated by the Ministry.

<i>Investment Ratio</i>	<i>Fare Increase (%)</i>
Under 2	3
2-3	4
3-4	5
Over 4	6

In this table, investment ratio is determined by dividing the city railroad total construction cost by the previous year's total fare revenue. It is evident that as the construction cost increases, the fare surcharge increases as well. The accumulated amount of this extra fare revenue is limited to 25 percent of the total construction cost called for in the plan. In annual financial statements and with respect to tax law, these newly generated funds are treated as a construction expense, are classified as a loss, and become tax exempt.

The authorized rail operator then must use the generated funds within 2 years to pay for construction costs associated with carrying out the improvements. In addition, the authorized operator is required to match these funds with some form of self-capital (e.g., loans, stock sales, investments) in paying for the improvements. The extra fare revenue should be used only to create this city railroad improvement fund, and according to law any unused amounts are to be returned to the users through fare reductions.

Clearly, many merits are associated with this system. Money can be raised before land purchases and construction efforts. The operators can claim the extra fare revenue as a monetary loss for future construction expenses. The amount of capital needed in the form of a construction loan is decreased, and therefore burdensome interest payments are reduced. Often, the new fare levels can be maintained as more improvements are approved and carried out. After several years, fares can be increased again to replenish the reserve fund and pay for further improvements. Thus, a cyclic pattern of continuous capital improvements can be established. For the past 2 years, this system has been widely used by private railway companies such as Tobu, Seibu, Keio Teito Electric, Odakyu Electric, and Tokyu Electric Express.

There are, however, two problems with this system as it stands today. First, JR, which still operates in a relatively restricted administrative and operational environment, is excluded from participating. Second, this method can only be used for construction that can be completed within 10 years.

Others

This section covers two other methods employed to obtain capital funding: the Railroad Improvement Fund and internal cross subsidization.

Railroad Improvement Fund

The main objective of the Railroad Improvement Fund (*Tetsudō Seibi Kikin*) is to promote improvements in city railroads, main trunk lines, and Shinkansen lines. It was also created to fund facility improvements that would improve railroad safety, plan for advancements in the area of passenger convenience, and increase operating efficiency.

The fund is created from corporate taxes, enterprise establishment taxes, developer charges, the General Account, and others. The contribution of beneficiary charges to this fund is based on local ordinances. Because railroad improvements are desperately needed in many urban areas, the Ministry of Transportation is investigating ways to maintain and increase the monetary flow into the Railway Improvement Fund.

Internal Cross Subsidization

When a company or public agency is both a developer and a railway owner it can very easily transfer development or other business profits to fund railway construction. There are three good examples of this: the Tokyu Railway Corporation, the Kobe municipal government (6), and JR East.

Besides its railway business, the Tokyu Railway Corporation owns and operates buses and has a real estate department that develops department stores, supermarkets, shopping plazas, hotels, and recreational facilities. Profits from the real estate business were used as working capital to put these other businesses in the newly developed areas (Den'en cities) where the rail line (Tokyu Den'en Toshi Line) was being constructed. Tokyu made these areas very attractive places to live, and consequently people moved there. By using profits from its real estate business and from the newly placed Den'en businesses, Tokyu made improvements to the rail line and it subsequently received patronage.

It is important to note that the real estate business of the Tokyu Railway Corporation is separate from that of Tokyu Realty, its affiliated company. Tokyu Realty specializes in real estate, and its annual revenues are about 50 times those of the Tokyu Railway Corporation's real estate department. These two companies are allowed to hold significant numbers of shares of each other's stock, but because of antitrust laws, it is illegal for one of them to transfer (cross-subsidize) funds to the other.

This system was also easy to implement for the Kobe municipal government, mentioned earlier with respect to residential developer fees. The Kobe City Development Bureau was the main developer of new towns in the area, and the Kobe City Transportation Bureau was responsible for regional rail operations. The municipality simply transferred profits from the City Development Bureau to the city's general fund, which was then used to cover some of the initial investment costs and operation losses of the railway.

JR East even has the capability to cross subsidize profits from its other businesses. JR East owns and operates shopping centers, hotels, information services, kiosks, restaurants, sports and leisure facilities, travel services, advertising agencies, and so on. Such examples are rare in the United States (mainly due to legal restrictions) but commonplace in Japan. JR East plans to expand in areas of finance, real estate, resort development, and leasing. By 2000, JR East expects these related businesses to make up 50 percent of total company revenues and railway operations to contribute the other 50 percent.

CONCLUSIONS

Loans, bonds, and government subsidies contribute a large portion of urban rail transit funding in Japan, but many other funding methods are available. Some of the more interesting ones include a special fund set up through fare increases, a variety of beneficiary charges, and a rail provider's ability to cross subsidize internally. These latter strategies take the burden of funding rail projects off the government and place more responsibility with the railroad companies and appropriate landowners. U.S. cities wanting to build new or improve existing rail lines may find it useful to take a look at Japan's experience with funding passenger railroads, especially since gas tax and toll road revenues are not a part of the equation.

Because raising fares on rail lines in the United States may have adverse impacts on ridership, a phenomenon not observed in Japan because alternative modes are relatively high priced, adopting some of the beneficiary charges practiced in Japan may provide a better financial climate for constructing urban passenger railroads in the United States. But as long as the alternative modes are perceived by potential users as superior (e.g., cheaper, faster, more convenient), U.S. rail systems in general will continue to suffer low patronage and the associated financial losses.

REFERENCES

1. *Railway Statistics 1992* (in Japanese). Transportation Economic Research Center, Railway Bureau of the Ministry of Transportation, Tokyo, Japan, Nov. 1992, pp. 42–47.
2. Y. Arimori. JR-East Strives To Ease the Commuter Crush. *Developing Metros 1991*, 1991.
3. Y. Hayashi. Issues in Financing Urban Rail Transit Projects and Value Captures. *Transportation Research*, Vol. 23A, No. 1, 1989.
4. *An International Comparison: Japan 1992*. Japan Institute for Social and Economic Affairs, Tokyo, Dec. 1991.
5. *Transportation Improvement System: Structure and Subject* (in Japanese). Transportation Facilities Improvement System Research Sectional Committee, Civil Engineering Society of Japan, Tokyo, Nov. 1991, pp. 33–42.
6. *The Review of Integrated Urban Rail and Land Development in Japan*. Working Paper 3. Padeco, JARTS, and PCI, Tokyo, Japan, July 1991.

Publication of this paper sponsored by Committee on Public Transportation Planning and Development.