

Railway Operators in Japan 7

Southern Kanto Region

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Overview of Region

Tokyo Bay stretches south from Tokyo. There are bedroom communities on both sides of the Bay, as well as in the neighbouring prefectures of Kanagawa to the southwest and Chiba to the southeast. Kanagawa is far more developed than Chiba, with a population density of 3488 per km² in an area of about 2400 km². Yokohama, the prefectural capital, quickly became the nation's most important port after Japan opened its doors to foreign trade in the 19th century. Yokohama is a large city with its own centre of gravity, but it has also developed into a major bedroom community for Tokyo. The city's population of about 3.5 million makes it the largest municipality in the country. The bayside area slightly south of today's Yokohama Station was developed first,

and roads and railways were improved and constructed at a rapid rate when the economy expanded after WWII. As a result, new housing spread through much of the prefecture and many residents now commute from Kanagawa to Tokyo on a daily basis.

Across the Bay in Chiba Prefecture, bedroom communities and coastal industrial zones began developing in the 1950s. At about 5200 km², the prefecture is larger than Kanagawa but it has a lower population density of 1148 per km². Many commuters live in Chiba City, the prefectural capital in the northern part of the prefecture. The southern Boso Peninsula is sparsely populated. Some trains from the extremity of the peninsula offer direct connections to Tokyo but not many commuters travel that far.

The two prefectures face each other across Tokyo Bay. Ferries take people across and

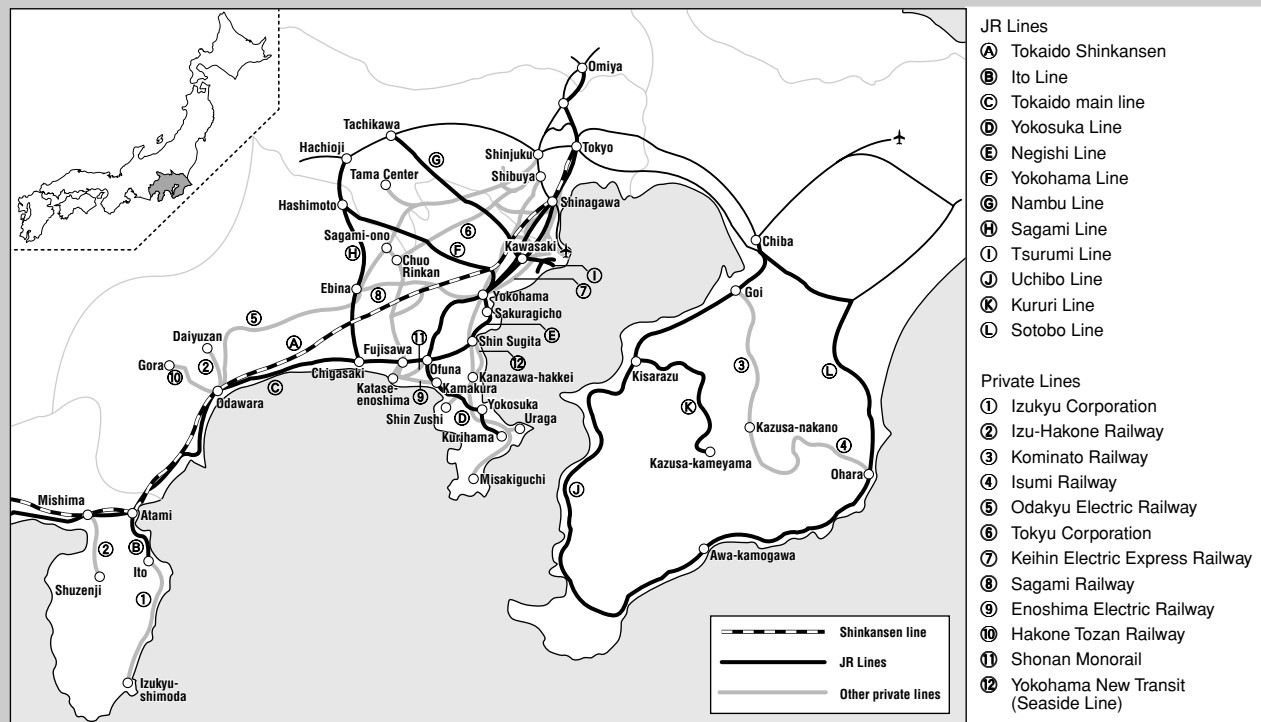
motor vehicles can take a short cut under and over the Bay via the 15.1-km Tokyo Bay Aqua Line combined bridge and tunnel opened in 1997. However, all rail traffic must take the long way around the Bay through Tokyo.

Overview of Rail Network

The configuration of Kanto's rail network is basically major lines radiating from Tokyo to suburban satellite cities, and secondary lines linking different parts of the radial lines.

In Kanagawa Prefecture, the most important of these radial lines run from Tokyo to Yokohama fairly close to the Bay. This rail corridor is heavily used—just the JR East tracks alone make up three lines. Keihin Electric Express Railway (Keikyu) also operates in this corridor with tracks

Railway Lines in Southern Kanto Region



running parallel to the JR lines. The northern end of Keikyu's line begins at Sengakuji near Shinagawa in south Tokyo and passes through Yokohama to terminate on the Miura Peninsula in southern Kanagawa Prefecture. The Tokyu Corporation (Tokyu), operates the Toyoko Line from its Shibuya terminal in south Tokyo to Yokohama, serving more inland areas than the other lines.

Some other lines from Tokyo, such as the Odakyu Electric Railway, run through the middle of Kanagawa Prefecture. It begins at Shinjuku and runs southwest, bisecting the prefecture. Another line, the Den'en Toshi Line operated by Tokyu, begins at Shibuya and terminates at Chuo Rinkan in central Kanagawa.

The Tokaido Shinkansen (operated by JR Central) also runs through the interior of the prefecture with stations at Shin Yokohama and Odawara. An increasing number of commuters are taking shinkansen trains, expanding Tokyo's commuting zone as far as Shizuoka Prefecture in the west.

As mentioned above, the radial lines are linked by other lines. The postwar economic period was a time of massive housing projects, with residential districts spreading rapidly westwards from central Kanagawa Prefecture. New lines were built and existing ones improved to serve this burgeoning population.

The Hakone-Izu region—one of Tokyo's most popular tourist destinations—is located at the southwestern tip of Kanagawa Prefecture and the eastern part of neighbouring Shizuoka Prefecture; trains to these areas are also used for tourism. Limited expresses offer frequent services from Tokyo, and other local railways have been constructed to serve the tourist business.

Other radial lines stretch from Tokyo into Chiba Prefecture, following the coast of the Boso Peninsula, and spur lines have also been built. However, there are far fewer workers and students commuting

to Tokyo compared to Kanagawa and the southern part of the peninsula has only local rail services.

Suburban Rail Links to Tokyo

JR East

The 589.5-km Tokaido main line from Tokyo Station to Kobe (Hyogo Prefecture) is the most important rail link in the southern Kanto region. JR East operates the 104.6-km section from Tokyo Station to Atami. The JR East section connects with other heavily used lines some operated by JR East and others by private railways. Commercial districts and suburbs have spread further and further west along these lines and it is not unusual for commuters to travel more than 50 km to Tokyo.

JR East's 23.9-km Yokosuka Line between Ofuna and Kurihama is considered a branch of the Tokaido main line. Before WWII, it was used mainly to transport supplies for the navy at Yokosuka Port. After the war, it took on a new role, carrying workers and students. Even before the war, trains from Yokosuka offered direct services to Tokyo on the Tokaido main line, but increasing traffic led to the construction of a parallel line, and since 1980 all trains on the Yokosuka Line have been using the new track. This explains why the track between Ofuna and Tokyo is considered part of the Tokaido main line despite the separate tracks; the 70.4-km section between Tokyo Station and Kurihama is generally called the Yokosuka Line. There are also some direct connections beyond Tokyo Station on the Sobu Line to Chiba Prefecture with a few services ending at the tip of the Boso Peninsula.

The Tokyo–Yokohama section of the Tokaido corridor also accommodates the Keihin Tohoku Line, another JR East service. Although the line has its own track, it is also considered part the Tokaido

main line. Local trains stop at many stations not served by express services on the Tokaido main line. Although the majority of passengers on the Keihin Tohoku Line are not travelling long distances, most trains offer through services to Omiya in Saitama Prefecture, north of Tokyo. When running south, they switch from the Tokaido main line to the coastal Negishi Line at Yokohama and then link up with the Tokaido main line again at Ofuna.

Keihin Electric Express Railway (Keikyu)

Keikyu's main line runs from Shinagawa through Yokohama to the Miura Peninsula in southeast Kanagawa Prefecture. The line has a few short spur lines. The 22.2-km Shinagawa–Yokohama section runs parallel to (and competes with) the other JR East tracks. On the Miura Peninsula, it competes with JR East's Yokosuka Line. Keikyu's northern terminus at Sengakuji is fairly close to Tokyo's inner city and Keikyu began offering through services to the inner city on the Asakusa Line subway tracks belonging to the Tokyo Metropolitan Government (TMG) in 1968.

Keikyu was the first electric railway in the Kanto region and began operations using electric trams in 1899. Services were slow but incremental improvements to both infrastructure and rolling stock kept the line competitive with the parallel Tokaido main line. Today, the fastest rapid limited express takes around 17 minutes from Shinagawa to Yokohama, almost exactly the same as trains on JR East's Tokaido main line.

One of Keikyu's spur lines offers access to Tokyo International Airport (Haneda Airport) in southeast Tokyo. The competing Tokyo Monorail opened in 1964, and became the most important carrier for airport users (for more details, see *JRTR* 30, pp. 42–53). Although Keikyu's early Kuko Line offered services

Size and Financial Status of non-JR Private Railways in Southern Kanto

	Headquarters	Route-km	Number of Employees	Capital (¥million)	Operating Revenues (¥million)		Operating Expenses (¥million)		Operating Profits/Losses (¥million)		Ordinary Profits/ Losses (¥million)
					Railway	Non-railway	Railway	Non-railway	Railway	Non-railway	
Keihin Electric Express Railway	Tokyo	87.0	2,390	31,999	72,112	79,373	57,810	75,311	14,302	4,062	6,845
Tokyu Coporation	Tokyo	102.1	3,105	107,543	127,990	164,509	95,628	150,538	32,362	13,971	18,444
Odakyu Electric Railway	Tokyo	120.5	3,519	60,360	110,337	63,859	86,024	49,099	24,313	14,760	21,509
Sagami Railway	Kanagawa	35.9	1,138	31,162	34,265	113,025	27,800	104,732	6,465	8,293	6,330
Yokohama City Transport	Kanagawa	40.4	951	483,034	28,309	27,982	29,623	31,192	-1,313	-3,210	-18,249
Enoshima Electric Railway	Kanagawa	10.0	156	300	2,385	5,806	1,989	6,040	396	-234	-55
Hakone Tozan Railway	Kanagawa	15.0	167	2,000	2,802	9,087	2,701	8,351	101	735	530
Shonan Monorail	Kanagawa	6.6	104	8,000	1,715	223	1,504	138	211	84	261
Yokohama New Transit	Kanagawa	10.6	133	7,600	3,439	102	3,384	91	55	11	-597
Izu Hakone Railway	Shizuoka	29.4	96	640	3,375	16,284	3,071	16,625	303	-341	-472
Izuky Corporation	Shizuoka	45.7	187	4,348	5,660	4,129	5,263	3,146	397	983	325
Kominato Railway	Chiba	39.1	86	203	743	4,477	741	3,739	2	738	275
Isumi Railway	Chiba	26.8	34	269	132	3	264	2	-132	1	-119

* Sources: *Tetsudo tokei nempo* (Railway Annual Statistics), Ministry of Transport Railway Bureau, 2001

Passenger Volume and Density by Railway Company

		1991	1992	1993	1994	1995	1996	1997	1998	1999
JR East Tokaido Line (Tokyo–Hiratsuka, 81.6 km)	No. of Passengers (1,000)	1,335,510	1,366,118	1,371,247	1,359,795	1,336,102	1,385,604	1,377,878	1,378,788	1,386,827
JR East Yokosuka Line (Ofuna–Kurigahama, 23.9 km)	No. of Passengers (1,000)	72,915	73,830	73,786	72,658	72,322	72,279	70,401	69,545	68,479
JR East Negishi Line (Yokohama–Ofuna, 22.1 km)	No. of Passengers (1,000)	208,443	213,049	220,765	224,066	223,587	224,110	223,313	224,766	224,281
JR East Yokohama Line (Higashi Kanagawa–Hachioji, 42.6 km)	No. of Passengers (1,000)	228,029	239,903	243,381	246,002	250,460	254,848	257,522	258,183	261,789
JR East Nambu Line (All lines, 39.6 km)	No. of Passengers (1,000)	229,863	236,204	242,713	244,290	243,716	244,383	240,662	238,255	238,582
JR East Sagami Line (Chigasaki–Hashimoto, 33.3 km)	No. of Passengers (1,000)	23,943	26,880	28,269	28,903	29,756	30,332	30,964	30,717	30,049
JR East Tsurumi Line (All lines, 9.7 km)	No. of Passengers (1,000)	16,771	17,190	17,940	17,459	16,823	16,137	16,065	15,729	15,421

		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Keihin Electric Express Railway	No. of Passengers (1,000)	445,254	439,131	437,835	435,876	430,112	417,105	406,480	406,520	408,261	410,747
	Passenger Density*	207,321	205,933	205,041	205,153	202,500	198,903	193,437	191,459	189,170	191,654
Tokyu Corporation	Volume	974,068	967,526	961,094	955,162	956,429	950,779	946,807	935,990	935,069	946,854
	Density	244,452	243,036	240,346	238,296	237,026	266,621	235,851	235,288	235,734	237,930
Odakyu Electric Railway	Volume	711,702	711,277	710,575	707,285	703,946	697,141	686,933	683,038	672,179	667,221
	Density	253,197	250,890	249,044	247,559	244,061	242,839	236,962	235,773	235,827	237,360
Sagami Railway	Volume	246,947	247,182	247,957	248,147	251,412	245,785	241,931	240,579	238,166	233,129
	Density	230,735	233,275	234,952	235,774	239,619	235,868	232,788	232,082	212,256	206,754
Yokohama City Transport (subway)	Volume	93,881	94,083	113,293	115,519	116,883	119,633	123,564	125,685	137,082	150,454
	Density	74,606	74,733	71,634	75,037	77,244	80,256	83,485	86,090	84,121	86,953
Enoshima Electric Railway	Volume	16,351	15,868	15,682	15,258	15,169	14,631	14,399	13,958	13,815	13,762
	Density	17,023	16,348	16,065	15,549	15,367	14,775	14,344	13,913	13,693	13,584
Hakone Tozan Railway	Volume	10,291	9,981	9,834	9,550	9,577	9,463	9,111	8,817	8,536	8,443
	Density	13,592	13,189	13,125	12,851	12,910	12,796	14,045	12,087	11,538	11,442
Shonan Monorail	Volume	10,772	11,298	11,346	11,165	11,073	11,107	10,939	10,848	10,663	10,429
	Density	15,250	15,951	16,184	15,878	15,729	18,664	15,499	15,358	15,043	14,740
Yokohama New Transit	Volume	14,553	15,046	19,077	18,238	17,487	17,477	17,038	18,621	17,583	16,761
	Density	17,101	17,720	23,265	22,174	20,753	20,790	20,250	21,515	19,990	19,152
Izu-Hakone Railway Daiyuzan Line	Volume	9,371	9,467	9,247	9,162	9,179	9,229	8,889	8,851	8,729	8,561
	Density	15,305	15,566	13,125	14,934	14,886	15,118	14,460	14,434	14,189	14,017
Izu-Hakone Railway Sunzu Line	Volume	15,318	15,287	14,603	14,399	14,345	14,263	13,513	13,278	12,822	12,365
	Density	18,642	18,565	17,766	17,467	17,008	17,041	16,328	16,113	15,591	14,995
Izuky Corporation	Volume	10,014	9,509	8,929	8,620	7,982	7,985	7,338	7,000	6,759	6,289
	Density	12,855	12,426	11,428	11,087	10,056	10,073	9,225	8,828	8,485	7,899
Kominato Railway	Volume	3,367	3,404	3,412	3,320	3,228	3,069	2,792	2,559	2,352	2,216
	Density	2,716	2,804	2,812	2,747	2,642	2,502	2,308	2,124	1,953	1,851
Isumi Railway	Volume	1,006	962	924	898	869	804	768	714	676	630
	Density	1,179	1,150	1,076	1,045	1,018	936	894	830	825	794

* Passenger Density = Daily passenger-km/route-km

* Sources: *Tetsudo tokei nempo* (Railway Annual Statistics), Ministry of Transport Railway Bureau and *Tetsudo yoran* (Railway Directory), Ministry of Land, Infrastructure and Transport Railway Bureau

to Haneda Kuko (Haneda Airport) Station, the name was a misnomer because the line did not even terminate on airport property. The situation was corrected in 1998 when a major construction project to extend the line underground into the airport terminal was completed. Keikyu's fares were lower than those of Tokyo Monorail and the latter's passenger share declined. However, after JR East bought 70% of the shares in the Tokyo Monorail Company in February 2002, it increased the competition by introducing discount fares for passengers transferring to and from the Monorail from JR East lines.

Tokyu Corporation (Tokyu)

Tokyu began developing its network in southwest Tokyo in the 1920s. It was the first railway company in Tokyo to adopt the typical Japanese business model pioneered in Osaka and subsequently embraced by many private railways in Japan. The model promoted development of housing projects along new sections of track. Today, Tokyu is a huge group of more than 400 businesses with interests in transportation, development, distribution and other sectors. Rail operations are just one part of the group's many activities, although they are its key business. The Tokyu railway network consists of 100.7 km of lines; the two major ones are the Toyoko Line (Shibuya–Sakuragicho in Yokohama) and the Den'en Toshi Line (Shibuya–Chuo Rinkan).

The Toyoko Line was opened in stages from 1926 to 1932. At that time, the company started developing housing projects along the track, and today's population densities are near saturation levels. Over the years, infrastructure and rolling stock have been improved to boost capacity, and one section of track was recently quadrupled.

Part of the Den'en Toshi Line opened before WWII. From 1966, the line was extended further into Kanagawa

Prefecture, opening up sparsely populated hilly areas. The company subdivided lots, constructed retail outlets and encouraged construction of schools along the track. In many cases, it has near monopoly control over other nearby transportation modes, housing developments, distribution and commercial facilities. This has created an almost captive market for Tokyu and its affiliates. The line also offers through services from Shibuya to the Hanzomon subway line operated by the Teito Rapid Transit Authority (TRTA).

The few spur lines in Tokyu's network were all opened before WWII. They offered an early taste of rapid transit services, but today most fall far below normal standards with slow trains and minimal capacity. Some sections have been improved in recent years and are discussed later in this article.

Odakyu Electric Railway (Odakyu)

Odakyu's 120.5-km network is composed of three lines: the Odawara Line from Shinjuku through the interior of Kanagawa Prefecture to Odawara City in the southwest; the Enoshima Line, which branches from the Odawara Line at Sagami-ono between Shinjuku and Odawara and runs south to Fujisawa and Katase-enoshima on the Pacific coast; and the Tama Line, which branches from the Odawara Line at Shin Yurigaoka and runs to Tama New Town, a relatively new housing project in western Tokyo. The Odawara Line opened first in 1927, followed by the Enoshima Line in 1929. Except in the area close to Shinjuku, the first track was laid through sparsely populated country areas, but population densities rose quickly after the mid-1950s when large apartment complexes were built for Tokyo commuters. The Tama Line was built as part of a strategy to develop suburban housing. The company also encouraged the establishment of universities near its

stations to boost student commuters who follow the reverse traffic patterns of commuting workers, thereby keeping trains full in both directions (see *JRTR* 32 pp. 42–53).

Odakyu has energetically promoted travel to the popular destinations of Hakone and Enoshima at two of its termini. *Romance Car* limited expresses with special rolling stock make frequent runs, attracting revenue through express surcharges.

Changing Commuter Patterns

More long-distance commuting

Japan enjoyed good economic growth in the latter 1980s, leading to further expansion around Greater Tokyo. New housing sprang up in suburban areas even 50 km from central Tokyo, making one-way commuting for 1 or 2 hours quite common.

In 1986, the year before Japanese National Railways (JNR) was privatized and divided, it introduced Series 211 EMUs for long-distance services on the Tokaido main line as a way to 'cram in' more passengers. Following the interior of cars for short runs, the new cars had more seats along the sidewalls, creating a wider central corridor and reducing the dwell time for passengers to get on and off. Of course, the cars offered less seating during off-peak times too, prompting complaints. But JNR had decided its most important task was to make commuting easier and it ran the new rolling stock at 3-minute headways during the morning rush hour, using sets with up to 15 cars. This design has become standard for commuter trains and the more-recent JR East's Series E217 and Series E231 EMUs feature four doors per side instead of three.

Longer commuting times led to less-crowded first-class cars because some commuters were willing to pay an extra surcharge. In some cases, two first-class cars were coupled to trains on the Tokaido



JR East's Series 209 Keihin Tohoku EMU train running near Yokohama. This section has huge passenger capacity with JR East's Tokaido main line, Yokosuka Line and Keihin Tohoku Line, running parallel to each other. In addition, the Keikyu main line runs parallel to JR lines, just on the right. (Author)



Tokyu's limited express train on Toyoko Line (right) and local train on Meguro Line (left) running parallel on quadruple-track section. The Meguro Line started operation to reduce congestion by improving the infrastructure. (S. Tominaga)

main line and Yokosuka Line. However, ridership continued to rise until even first-class had no vacant seats at the most congested times. Therefore, in 1990, JR East began manufacturing double-decker cars to increase seating space. The double-decker cars cannot be used for crowded second-class cars but they are popular with passengers.

JR East also satisfied demand for commuter seating by introducing liner commuter trains with fully reserved seating obtained by purchasing a liner surcharge ticket. Liners were introduced in 1984 for some services to Saitama and Chiba prefectures, and the *Shonan Liner* began running on the Tokaido main line to Tokyo Station in 1986. The *Shonan Shinjuku Liner* began direct runs from Kanagawa Prefecture to Shinjuku in 1988, and commuter liners began running on the Yokosuka Line in 1990.

Interestingly, these trains do not stop at Yokohama Station. Yokohama and Tokyo stations are only about 29 km (under 30 minutes) apart, and the liner schedules are designed for commuters travelling to destinations beyond Yokohama Station. This has created new commuting patterns and shortened travel times for long-distance runs.

Tickets are sold on a first-come-first-served basis. However, the liner services are so popular that it is not uncommon for people to line up at the station the night before monthly liner tickets are issued in

order to buy a 1-month supply.

JR East's liners proved so popular that private railways decided to introduce similar services. Keikyu now operates full-reserved seating trains called *Keikyu Wing* during weekday evening rush hours. The schedule is designed for passengers living far from Tokyo so the trains do not even stop at Yokohama Station. For its part, Odakyu runs some *Homeway* trains from Shinjuku for homeward-bound commuters. The trains run every 30 minutes during the evening rush and are very popular.

Private railways boost carrying capacity

During the economic-growth period in the 1960s and 1970s, the numbers of workers and students commuting to Tokyo from nearby suburbs increased greatly. JNR answered the need for greater capacity by constructing new lines and quadrupling existing ones. Although this construction boosted costs and pushed JNR's debt to astronomical levels, it also created valuable assets for the new JR companies to profit from after the privatization and division of JNR in 1987.

Reducing congestion was also a constant challenge for private railways with limited financial resources, making it almost impossible to invest in massive track projects. In any case, the private railway companies knew that reducing congestion would not lead to direct increases in

revenues, explaining why they generally lagged well behind JNR's efforts to reduce congestion. Even now, projects by private railways to quadruple lines and elevate track are moving ahead only very slowly. Tokyu is taking congestion-reduction steps by quadrupling part of its Toyoko Line, which suffers from a maximum congestion rate of 185%. Another Tokyu line targeted for congestion reduction is the Meguro Line (previously called the Mekama Line running between Meguro and Kamata). When the line opened in the 1920s, it was the first to offer rapid transit services. The old infrastructure could only accommodate four-car train sets, seriously limiting capacity. The old line connected with the Toyoko Line and terminated close to the city centre at Meguro Station, but the track could not properly fulfill its key function as a part of the Tokyu network. Therefore, Tokyu launched a two-pronged approach. First, in order to permit through services from the Toyoko Line to the Mekama Line, it changed the basic configuration of the Mekama Line section adjacent to the quadrupled Toyoko Line. Second, to make commuting more convenient by permitting through services across the inner city on two north-south subway lines, it connected its track at Meguro Station to TRTA's Namboku Line and TMG's Mita Line in 2002. New trains on the rebuilt section of the Meguro Line use driver-only operation and the company has introduced new technology

like platform doors. Tokyu plans to extend the new technology to other sections and to introduce express services as too. A huge sum—rumoured at ¥280 billion (¥100=\$0.80)—was needed to finance the construction, but the debt has been lightened by various public assistance, including classification as a metropolitan improvement plan eligible for municipal support.

Some local residents have rallied against these types of railway improvement. Odakyu was sued for alleged damages incurred by the company's decision to boost carrying capacity by quadrupling some track sections and elevating track. In 2001, the Tokyo District Court ruled that Odakyu's permit from the national government to construct elevated track was illegal. This has stirred up more controversy and construction is currently in abeyance. Although one section is completed, it is not operational and various legal issues must be resolved before Odakyu can finish the project.

JR East rebound and competition with private railways

Before JNR was privatized, its position in the urban railway sector was obviously weaker than that of the private railways. In an effort to deal with huge deficits, it introduced one large fare increase after another, until JNR fares were far higher than those of the private railways. But since the 1987 privatization and division, the private railways have gradually seen their advantageous position eroded. Their investments in new infrastructure have forced them to raise fares, while JR East has managed to keep fares stable. Today, fares are very similar, and in some cases JR East's fares are actually lower. For example, a Keikyū single ticket for travel between Shinagawa and Yokohama costs ¥290 while the same journey on JR East costs ¥280. In addition, unlike JR East's passengers, Keikyū's passengers must either transfer at Shinagawa for inner city

destinations, or take the slow through service on the Asakusa subway. In this case, JR East clearly holds the advantage both in terms of convenience and price. JR East has improved the timetable recently. The opening of JR East's Shonan Shinjuku Line in late 2001 contributed greatly to efforts to make Tokyo's rail network more convenient. Previously, JR East trains from Kanagawa all had the same destination—Tokyo Station on the eastern side of the inner city. Passengers therefore had to transfer if their destination was a station on the western side, such as Shibuya or Shinjuku. This made little sense, especially since the western side has rapidly developed over the last few years. The Shonan Shinjuku 'Line' has eliminated the need for an inconvenient transfer. Trains on the Tokaido main line and Yokosuka Line can now switch to track leading to Shibuya, Shinjuku and Ikebukuro (another major terminal, north of Shinjuku), then on to through services using the Tohoku main line and Takasaki Lines in the north. Actually, the project did not involve constructing a new line, but simply making it possible to use existing track. Travel time from Yokohama to Shibuya and Shinjuku with a JR East ticket has been greatly reduced, giving the private railways a strong competitor.

Until recently, express trains on Tokyu's Toyoko Line left Yokohama at 15-minute intervals for Shibuya, taking 31 or 32 minutes. A one-way ticket was ¥260. Travel time for a JR East passenger was about the same, but a transfer was required and the fare was ¥380. In this case, Tokyu held the advantage. However, the new Shonan Shinjuku Line gave JR East the advantage in terms of speed. Tokyu rose to the challenge by introducing limited express services in March 2001, reducing the Yokohama–Shibuya travel time to 27 or 28 minutes, about the same as trains on the Shonan Shinjuku Line. Tokyu has launched a massive publicity campaign for its new

special express trains, plastering Shibuya and Yokohama stations with advertisements and even advertising in JR East trains.

Odakyu, too, is threatened, because the Shonan Shinjuku Line cuts into what was its monopoly market between Shinjuku and Fujisawa, and between Shinjuku and Odawara. Odakyu's response was to introduce significant schedule changes in March 2002, and to reduce travel time by introducing new services called 'Shonan Express,' with fewer station stops between Shinjuku and Fujisawa. Each Shonan Express train has 10 cars, to ensure more seating. The Shinjuku–Fujisawa travel time on Odakyu's Shonan Express is a little under 1 hour (ticket price: ¥570), while that on JR East's Shonan Shinjuku Line is about 50 minutes (¥950).

Shonan Shinjuku Line services began only recently and a number of negative factors have become evident, particularly infrequent trains (about every 20 minutes) and no morning or evening rush-hour services. If JR East addresses these issues, it will become an even stronger competitor. (JR East will start services from December 2002.)

Kanagawa's Local Suburban Networks

So far, I have discussed the radial lines from Tokyo. Now I will turn to local lines that have facilitated commuter travel to Tokyo from many parts of Kanagawa Prefecture.

JR East

JR East's Nambu, Yokohama and Sagami lines all link the Tokaido main line with the Chuo Line. All three lines were constructed in the early 20th century by private companies, mainly to transport freight. They were nationalized later, and after the 1970s rapidly gained importance as commuter lines. JR East took them over when JNR was broken up.



Sagami Railway's Series 7000 on Izumino Line. The large apartment complex in the background is typical of Tokyo's bedroom communities. (Author)

The Yokohama Line is a good example showing how the focus changed from freight to commuter transit. The line begins at Higashi Kanagawa, one station north of Yokohama Station, and stretches 42.6 km to Hachioji in western Tokyo. It was established as a private railway by influential merchants who wanted to transport raw silk, a major export product, to the port of Yokohama. The line opened in 1908 and was nationalized in 1917. The local population has increased greatly since the early 1970s. The line connects with the Tokaido, Tokyu and Odakyu radial lines, and as development spread toward the south along these lines, the Yokohama Line was recognized as a convenient way to get to them. Improvements begun in the 1980s include: newly built stations; through services to the Keihin-tohoku Line; and rapid services. Ridership increased, and the Yokohama Line became one of the few JNR lines able to make a profit, according to a study done in the last days of JNR.

The Nambu Line (35.5 km) links Kawasaki with Tachikawa. The track was laid in the 1910s, in order to transport limestone to cement factories near the port of

Yokohama. At this time, Japan was establishing one heavy industry after another. The line was nationalized in 1943, and after the war it again became an important route for the transport of limestone. But at the same time it gained importance as a commuter line, carrying workers and students to and from their homes near the stations. Freight operations were dropped in 1998, and today the line is used exclusively for transit.

The Sagami Line runs parallel to the Sagami River, and was constructed between 1915 and 1931 in order to transport gravel from the river. The line was nationalized during WWII. Although electrified in 1991, it still has only a single track, reflecting its distance from Tokyo. Trains run at intervals of about 15 to 20 minutes, so it is not as convenient as other lines in the region.

The Tsurumi Line and part of the Nambu Line were constructed in the Yokohama-Kawasaki industrial zone that sprang up after WWI. The Tsurumi Line was constructed by the private sector to satisfy industrial demands, and was nationalized during WWII. Freight trains still use the line, and passenger trains carry workers to nearby factories. Housing density is

not high near the track, so passenger train frequencies are very low, except for the morning and evening commutes. At some stations trains stop only once every two hours or so, during daytime hours.

Sagami Railway

Sagami Railway track carries trains from Yokohama Station westerly into the interior of the prefecture. The 24.6-km track from Yokohama to Ebina was laid to transport gravel and was opened in sections between 1926 and 1933. Houses began spreading along the track during Japan's postwar economic boom and around that time, the railway wasted no time developing services for commuting workers and students. The entire line was double-tracked between 1951 and 1974. This was followed by construction of a branch, the Izumino Line, to meet growing demand from new housing developments. This line opened in 1976. The two lines have a total length of only 38.1 km, but transport density is high and the company enjoys extremely efficient operations.

Another reason for the company's growth was its development of the area around Yokohama Station's west exit. The station was built a few kilometers from the commercial centre of the time. Sagami Railway decided to develop the entire area into a commercial district. After buying up the land in 1952, it constructed a department store and underground shopping concourse. The increase in population near its stations, and the development of a commercial centre at its Yokohama Station terminus, provided the multiplier effect needed to transform the west exit of Yokohama into the city's commercial centre in the 1970s. With these successes, the company was listed as a major private railway in 1990.

However, there are problems ahead. Like many other urban railways, the company serves residential districts that are no longer expanding, and the population

near stations is peaking. In today's Japan, where the birth rate is low and the population is aging, these factors point to a decline in users. Extensions to the Izumino Line were opened in 1990 and 1999 on land where there is a potential for new housing, but the railway did not purchase the land so it would gain little by promoting development. Another problem is that the company was unable to qualify for subsidies for construction of the Izumino Line, and it therefore has a very heavy debt load. The second new section, linking Izumi Chuo with Odakyu's Shonandai (3.1 km), opened in 1999, and cost the company about ¥45 billion to construct. It is said that it would take more than 50 years to pay off the loan with fare revenue alone.

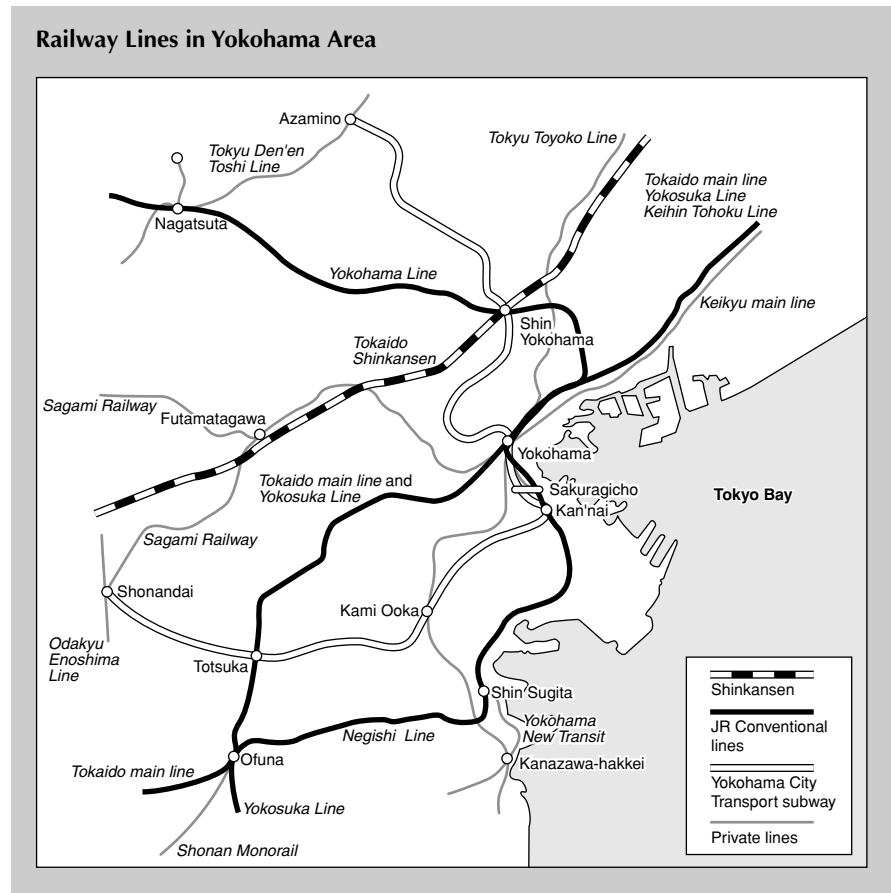
Yokohama City Transport subway

Yokohama's municipal subway opened in 1972, and was later extended in stages. The line (40.4 km) currently stretches from Azamino on Tokyu's Den'en Toshi Line in northern Yokohama to Yokohama Station in the south, then via shopping and residential districts to Shonandai on Odakyu's Enoshima Line. The subway connects with many railway lines, adding to the rail network.

Many trackside areas were underdeveloped when the line first opened, but new homes and retail outlets are being built at a fairly rapid pace. As a result, ridership is increasing yearly, unlike the experience of almost all other railways. Even so, the subway operates in the red, and more than 40% of its expenses go to pay just the interest on its massive construction loans. Financial obligations cannot be met through fare revenues alone, and this realization has led to calls for restructuring efforts.

Yokohama New Transit (Seaside Line)

The Seaside Line uses an automatic guided transit (AGT) system, and was built



to provide key public transportation services on reclaimed land in southern Yokohama. The company is a public-private partnership, 51% financed by the city of Yokohama and 49% by Keikyu and other local companies. The 10.6-km line opened in 1989 and stretches from Shin Sugita (on JR's Negishi Line) to Kanazawa-hakkei (on Keikyu).

The AGT technology is typical—small cars with rubber tyres running automatically without a driver on a concrete guideway. In many cities, the AGT support structure is built over roadways and paid for by the road owner as part of road improvements. In this case, Yokohama City built much of the guideway.

Shonan Monorail

The 6.6-km Shonan Monorail was built to demonstrate the qualities of the Safage

(suspended) monorail system and was financed by a group of companies affiliated with Mitsubishi, the manufacturer and Keikyu, the land owner. The line runs from Ofuna to Shonan Enoshima, connecting with the Tokaido main line at Ofuna. It opened in 1970 and is now used mainly by residents from surrounding suburbs in this part of Kanagawa Prefecture.

Tourism and Railways

Hakone in southwest Kanagawa is a cluster of steep mountains that are popular with tourists for natural beauty and hot springs. The neighbouring areas of Atami and the Izu Peninsula in east Shizuoka Prefecture have also been a favourite tourist destination for centuries with many



The suspended Shonan Monorail (Safage) was constructed as a technology demonstration by Mitsubishi. (Y. Kato)



Hakone Tozan Railway's Series *Kumoha* 1000 running through one of Japan's most popular tourist spots. There are many sections with 80 per mill, which is the highest grade that can be handled without using a rack-and-pinion system. (Y. Kato)

Japanese inns, hotels and recreational spas. Tokyo dwellers have a number of options to get there by rail—JR's Tokaido main line, the Tokaido Shinkansen, and the Odakyu Line.

JR East's *Odoriko* limited expresses offer through services to Izu. They depart from Tokyo and Shinjuku stations, and pass through Yokohama on the Tokaido main line. The shinkansen is the fastest service but not all trains stop at Atami or Odawara, the closest place where a connection must be made. Odakyu runs many *Romance Car* limited expresses from Shinjuku to Hakone Yumoto where passengers transfer to the Hakone Tozan Railway (described below). Odakyu's services are cheaper than JR East's, which may explain their greater popularity. JR East has recently begun selling *Odoriko* discount tickets in an attempt to compete with Odakyu.

Hakone Tozan Railway

Hakone Tozan Railway is affiliated with Odakyu. The line begins at Odawara, and soon climbs the slopes of Mt Hakone. The railway was established long in 1919. Passengers wishing to see the sights on Mt Hakone first disembark at Gora, the railway's terminus and then take a cable car and finally a ropeway. Hakone Tozan Railway also operates both the cable car and the ropeway.

The railway track climbs steep mountain slopes. Although only 15-km long, the

line has 12 tunnels, 31 bridges and three switchbacks. The minimum track radius is 30 m and the maximum gradient is a steep 80 per mill. Trains take about 1 hour to make the laborious climb.

Odakyu trains from Shinjuku offer through connections to Hakone Yumoto in the foothills of Mt Hakone. Odakyu trains have a 1067-mm gauge while the gauge of Hakone Tozan trains is standard gauge (1435 mm). Consequently tracks between Odawara and Hakone Yumoto have a third rail to handle both types of rolling stock.

Izuky Corporation

Izuky is affiliated with Tokyu. Its 45.7-km line between Ito and Izuky-shimoda opened in 1961, making it possible to travel the full length of the Izu Peninsula by rail. Before then, only JNR's Ito Line ran beyond Ito, which is situated at the base of the peninsula.

Izuky carriages are designed especially for tourist travel. The company's *Resort 21* series has large panoramic windows with seats oriented to give good views of the sea. JR East's *Odoriko* limited-express trains from Tokyo offer through services on the Izuky tracks.

Izu-Hakone Railway

Izu-Hakone Railway is affiliated with Seibu Railway. Its 9.6-km Daiyuzan Line begins at Odawara and serves that area, while its 19.8-km Sunzu Line begins at

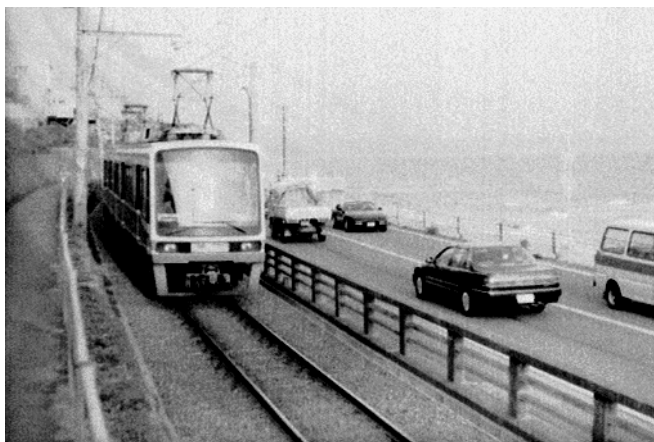
Mishima in Shizuoka Prefecture on the Tokaido main line and runs south to Shuzenji on the west side of the Izu Peninsula. The former line is used by local residents for their everyday needs, while the latter caters more to tourists. JR East's *Odoriko* limited expresses offer through services on this track too.

The company also operates buses throughout the Hakone area, a pleasure cruise ship, and the cable car system. At one time, it was locked in a bitter struggle with the Hakone Tozan Railway Company, which observers called the 'Mt Hakone War.' This was actually a proxy war between Odakyu and Seibu, and reflected the strong desire of the companies to maintain a monopoly over their own turf. The past extremism has faded considerably.

Enoshima Electric Railways

Another famous Kanagawa tourist spot is Kamakura on Kanagawa's Pacific coast. Kamakura was the seat of government from the 12th to the 14th centuries and its ancient sites draw many tourists. The Shonan area around the nearby Enoshima Island was once a favourite place for summer homes and is now a popular spot for swimming and surfing.

Enoshima Electric Railways is affiliated with Odakyu. Its 10.0-km line from Kamakura to Fujisawa opened in stages between 1902 and 1910. In those days, Enoshima was a haunt for people escaping



Enoshima Electric Railways' Series 2000 running along shore. Kamakura and Enoshima are famous tourist destinations for Tokyo dwellers; the popular line is nicknamed 'Enoden' by many users. (Author)



Kominato Railways' Series 200 (left) and Isumi Railway's Series 200 standing side-by-side at Kazusa-nakano Station. The two operators suffer poor profitability due to low passenger numbers. (Author)

the summer heat. Today, tourists come throughout the year and many have a special place in their hearts for the company's 'Enoden' trains. The charming short line offers a variety of scenery as it wends its way past rustic houses and then runs close to the shore. Recently, Tokyo's bedroom communities have even reached this far and many local workers and students use the trains to commute.

Rail Network in South Chiba Prefecture

JR East

JR East's Uchibo and Sotobo lines begin in Chiba City, the prefectural capital, and then proceed along the coasts on each side of the Boso Peninsula to encircle it. *Sazanami* limited expresses leave Tokyo for Tateyama on the Uchibo Line, while *Wakashio* limited expresses leave Tokyo for Awa-kamogawa on the Sotobo Line. Local trains to Kisarazu (Uchibo Line) and Kazusa-ichinomiya (Sotobo Line) offer relatively frequent services in the northern part of the peninsula, but few trains run in the south. Some trains join the Sobu Line at Chiba Station, pass through Tokyo, and then provide through services to the Yokosuka Line.

JR East's 32.2-km Kururi Line, which is oriented generally east-west across part of the peninsula, only carries local traffic. The line branches from the Uchibo Line at Kisarazu. It is still a single-track

unelectrified line. The other terminus at Kazusa-kameyama is near Awa-kamogawa (a station on the Sotobo Line) but there is little chance that the line will be extended there.

Kominato Railway and Isumi Railway

The line operated by Kominato Railway joins the line of Isumi Railway at Kazusa-nakano to extend from one side of the peninsula to the other. The original plans called for the two lines to cross the peninsula, intersecting each other part way. Neither plan was realized, and instead, the track ends were joined to make one set of tracks. In any case, there is little demand for a cross-peninsula route. The two lines are both single track, and are not electrified.

Kominato Railway's line stretches 39.1 km from Goi to Kazusa-nakano. It opened in stages in the 1920s. It connects with JR East's Uchibo Line at Goi, an advantage for local residents needing to commute to Chiba for work or study. The company is funded by Keisei Electric Railway.

Isumi Railway's 26.8-km line between Ohara and Kazusa-nakano was built by the government railways in the 1930s. Later, the line's deficit was so large that JNR planned to abandon it. This prompted local municipalities and corporations to finance operations and Isumi took it over in 1988. The line does not pass through any large communities, and Ohara, where it connects with the Sotobo Line, is located too far from Tokyo or Chiba to attract many users. ■

Further Reading

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