Residents: Cities 8,483,

Metropolitan Region 35,

Commuterland

Today, some 40 million train and subway journeys are made each day in Tokyo. Without its extensive and efficient urban transit system, the Japanese capital would grind to a halt. But how has the system expanded since the first horse tramway in 1882? How bad is the transport system's legendary overcrowding? What measures have been taken to prepare it for a major earthquake? Bulletin looks into these and many other issues.

Text: Tony McNicol

At first glance, a map of the Tokyo public transport network looks not unlike one of the big bowls of noodles favored by hungry salarymen after a long day at the office – a dense tangle of subway, train and tram lines. The Japanese capital has probably the world's most extensive and efficient urban transit system; which is just as well, because with over 35 million residents in the Greater Tokyo area, the network has to serve the largest metropolitan area on the globe. And since Tokyo is the political and economic center of the nation, without a smoothly running Tokyo transport system the world's second largest economy would soon grind to a halt.

At the core of the system is the train and subway network. A government census in 2005 estimated that 40 million train and subway journeys are made daily in the capital. Reputedly the busiest station in the world, Shinjuku station alone deals with around 3.2 million passengers each day. About half of the rail network is run by JR East, one of two companies created when the national railways were privatized two decades ago; operation of the other half is shared between over 30 rail companies. The subway is run by the metropolitan government and two private companies.

The system is famed for its efficiency. Visit a Tokyo station in the morning or the evening and you will find commuters waiting in neat lines behind special markings on the platform. Carriages are generally clean and safe. On most lines, passengers rarely have to wait more than a few minutes for a ride. (On the Marunouchi subway line the gap between trains is around one minute and 50 seconds – just about enough time for passengers to clear the platform before the next train.) When trains arrive, they are almost invariably on time. In the event of significant delays – perhaps caused by a typhoon or other freak weather – station staff can be seen handing out little paper slips at the ticket gates. Salarymen give them to their bosses to excuse their tardiness.

Yet despite its efficiency, the Tokyo transport system faces serious challenges. Train crowding is a stubborn problem for the densely populated metropolis. In addition, transport companies have been striving to adapt their services for a rapidly aging population. And since Japan is one of the most earthquake-prone countries in the world, the network has the frightening task of preparing for transport chaos when the long overdue "Big One" finally arrives.

Tokyo's transport network dates back to the birth of modern Japan, and the early years after the nation first opened its doors to the West. The rapidly modernizing metropolis's first urban transit system was the Tokyo Horse Tramway in 1882. Electric trams arrived a few years later, and remained the main means of transport until well after World War II. Although the city's first subway was opened in 1927, it was only when the roads started to get too congested for trams in the '60s that construction began in earnest.

During the '50s and '60s, transport planners had their work cut out keeping up with Japan's spectacular economic and population growth. In 1950 there were just 14.3 km of subways in Tokyo; by 1970 there were 133.6 km. About 300 km of train line was built during the same period, mostly to transport workers to and from commuter towns springing up all around Tokyo. By the so-called bubble economy of the '80s and '90s the network was close to complete. In 1987 Japan National Railways was privatized and split into two companies: JR East and JR West. Now Tokyo has almost 2,000 km of train line and over 300 km of subway, while the once ubiquitous trams have been reduced to a single line.

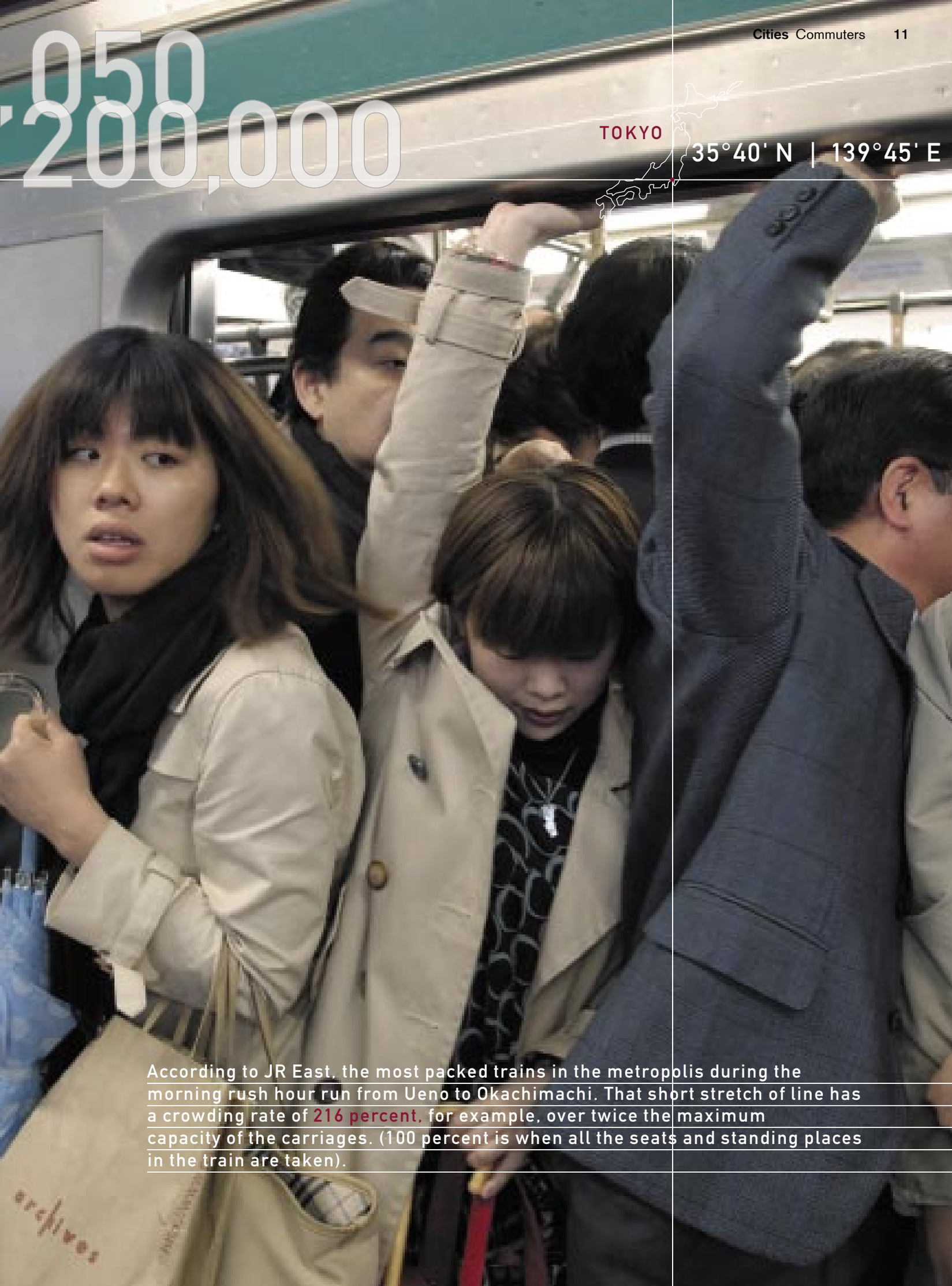
But through much of the network's history, one problem has remained the bane of Tokyo's long-suffering commuters – overcrowding. According to JR East, the most packed trains in the metropolis during the morning rush hour run from Ueno to Okachimachi. That short stretch of line has a crowding rate of 216 percent, >

Photo: Tony McNicol

250 200,000

TOKYO

35°40' N | 139°45' E



According to JR East, the most packed trains in the metropolis during the morning rush hour run from Ueno to Okachimachi. That short stretch of line has a crowding rate of 216 percent, for example, over twice the maximum capacity of the carriages. (100 percent is when all the seats and standing places in the train are taken).

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That's why JR has to employ station staff to push unfortunate commuters into the trains, cramming in baggage and limbs impeding the closing doors. "It's like the whole of the inside of the train is one big rugby maul," says one employee of a Tokyo trading company. He recalls how as a young worker his daily commute was a three-hour round trip, some of it on the busiest stretches of line. "I could take out my cellphone, but there wasn't space to read a newspaper," he remembers. "Sometimes your feet end up facing one way, and your head in the opposite direction. There are probably young women with both feet off the ground." He relates frightening stories of commuters toppling out of carriages with broken ribs, or their umbrella bent into an L-shape in the crush.

That's not to say, however, that train operators aren't trying to deal with the problem. In fact, crowding is getting slightly better. Where possible, more trains are run. More powerful engines enable longer trains, and carriages have even been widened to fit in more people. To prevent bottlenecks as passengers pour in and out of stations, commuters now use contactless rechargeable smart cards. By April 2007, JR East had issued over 19.5 million cards and 340,000 e-money chips imbedded in mobile phones.

But apart from the general discomfort of commuters, there are other serious sideeffects of overcrowding too. One is that the transport system is a veritable obstacle course for the disabled and elderly. Stations that serve 5,000 or more passengers a day (which means almost all in Tokyo) are legally obliged to install escalators or elevators. But few workers with disabilities can brave the morning and evening crushes. And the problem is only likely to get more severe as Japanese society ages. "There are only 300,000 people with disabilities, but already 25.6 million old people in Japan," points out Toshiyuki Sawada, executive director of the Barrier Free Association in Tokyo. He says that transport companies need to make signs easier to read and ticket machines easier to operate.

Another notorious sideeffect of overcrowding are "chikan" – men who sexually molest young women on packed commuter trains, taking advantage of the fact that their victims can't escape. According to a spokeswoman for the Metropolitan Police Department, there were 2,137 reported chikan cases in 2005. The worst affected are the crowded Chuo and Saikyo commuter lines. Up to now women had tended to suffer in silence, but train companies and police have launched campaigns to encourage victims and other passengers to report incidents. The penalty for chikan offences has been increased to a maximum of 10 years imprisonment, and Women Only train carriages are now common in the capital.

Ensuring safety on complex and busy networks is another major challenge. The reputation of the nation's rail system was shaken by a horrendous crash that happened near Japan's Western second city of Osaka in 2005. A commuter train was going too fast around a bend and slammed into an apartment block killing 106 passengers. The driver, who also died, had overshot the platform at a previous station, and may have been trying to make up lost seconds; he had recently been disciplined by his company for running late. The tragedy provoked a national debate on the balance between speed and safety. Some questioned whether fierce competition for passengers between competing rail companies had been a factor. It was Japan's worst rail crash since 1963.

A safety issue of an altogether different kind is how to prepare for the already overdue day when a major earthquake strikes Tokyo. The capital's rail system is designed to automatically shut down if an earthquake of five or more on the Japanese intensity scale hits. If the quake is small, the system can restart within hours, but in the event of serious damage, repairs can take weeks or months. After the 1995 Kobe quake it was up to a year before some rail services resumed. Even a relatively small quake could cause major disruption. A 2005 study by the government's Cabinet Office simulated the effects of a magnitude 7.3 earthquake striking at 6 p.m. on a weekday and predicted that 3.9 million Tokyo commuters would have to find their way home without public transport. 600,000 people who live too far away to walk would congregate at major stations in the capital after a major quake, including 140,000 at Tokyo station alone.

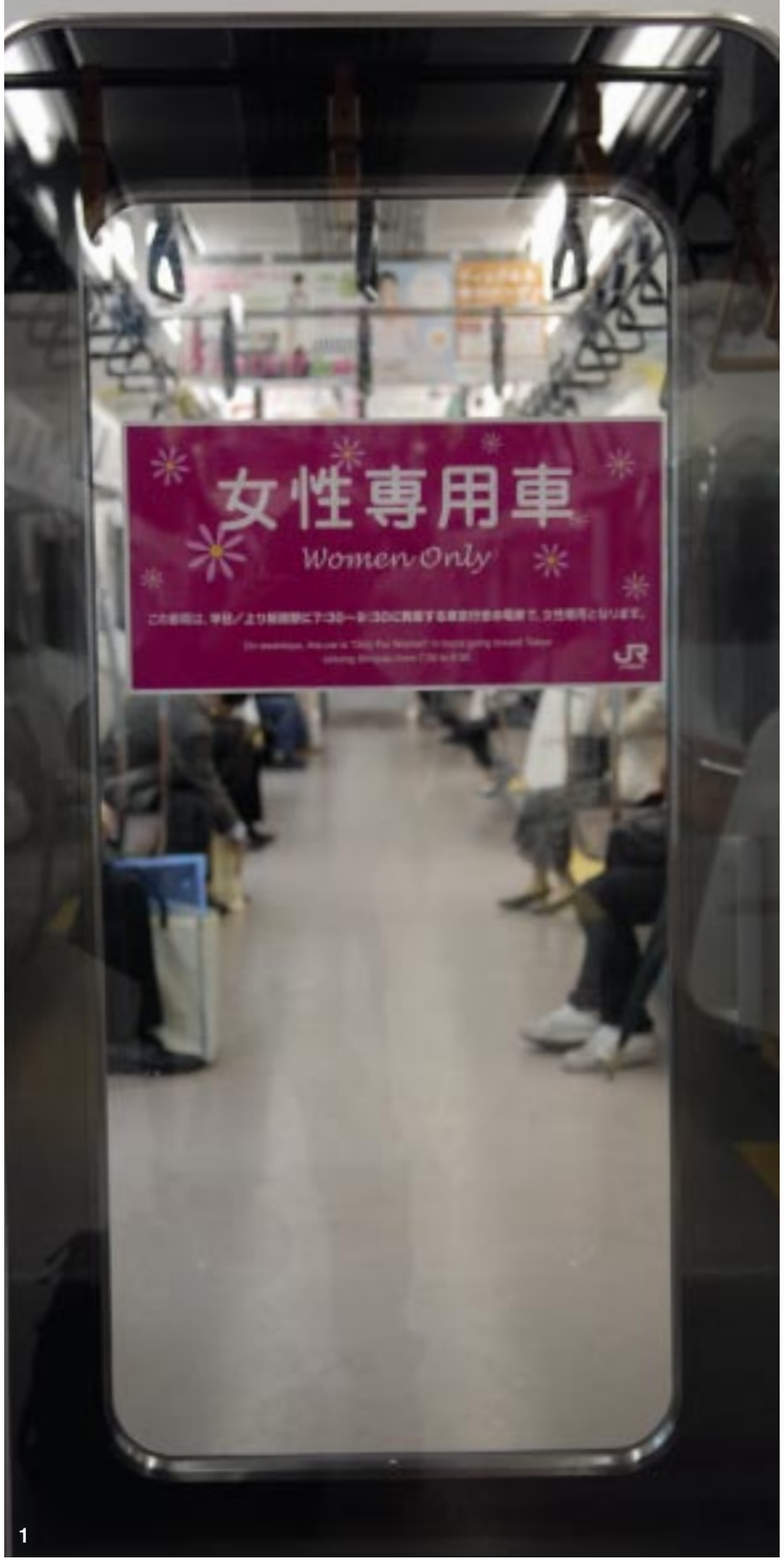
A large earthquake is also predicted to cause 950 billion dollars of economic damage. "The biggest obstacle to economic activity will be the disruption to commuting. If businessmen can't get to the office, they can't work," points out Itsuki Nakabayashi, a special adviser to Disaster Prevention Committee of the Metropolitan Government. He predicts that commuters will have to sleep at their workplaces for several nights at a time to spread the load on the disrupted rail system.

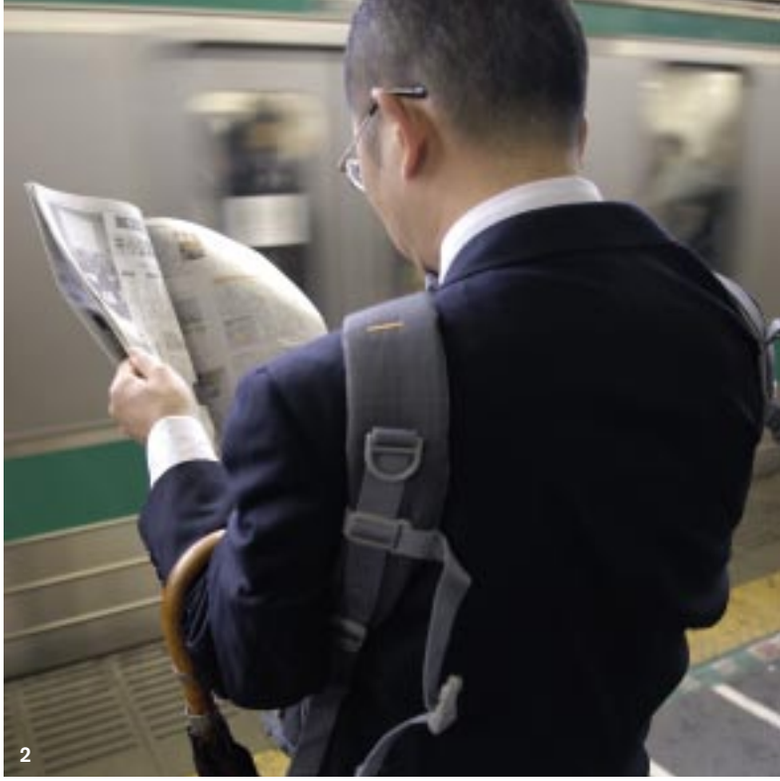
But despite such challenges, by and large the Tokyo transport system has been highly successful, says Makoto Itoh, a research fellow at the Institute for Transport Policy Studies in Tokyo. Not just that, it has also been remarkably profitable, says Itoh, and relied far less on public subsidy that many other nations' transport systems. "The Tokyo rail system was developed on the basis that it would be funded from fares, without government subsidy," says Itoh. That was made possible in part by Tokyo's high population density and income from a phenomenal number of passengers as the network grew.

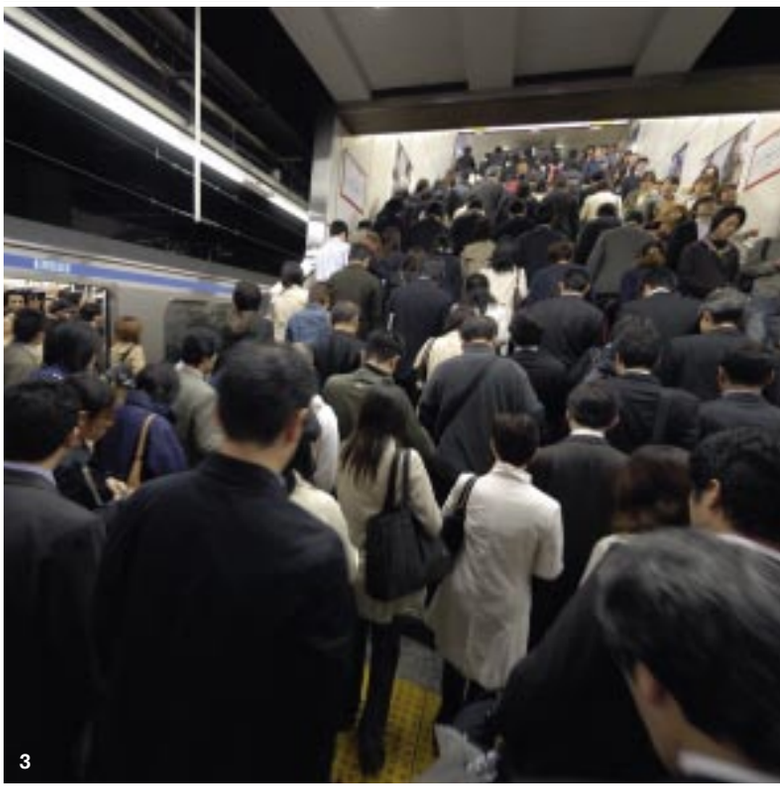
On the whole, the reputation of Japan's railways is high, both abroad and at home. Japan has legions of avid trainspotters and transport fans who can be seem most sunny weekends photographing trains on Tokyo station platforms. Visit one of Japan's many amusement arcades and you are likely to find a trainsimulator; complete with driver's seat and controls. Steady improvement of the network also keeps commuters satisfied. Rail companies are expanding routes from two to four lines where they can, and gradually making trains longer, faster and more frequent.

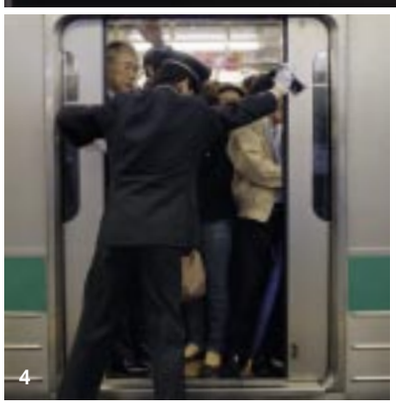
Though overcrowding is still a big problem, there is a surprising lack of protest from commuters, something perhaps explained by the history of the network. Imagining trains more packed than those of today might be difficult, but crowding actually used to be much, much worse. Pity the commuters of the '50s and '60s. Then, the average rush hour train was packed to over 300 percent capacity. "There were injuries when the carriage windows broke," says Itoh.

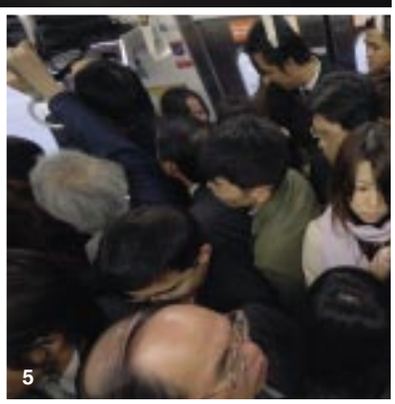
Perhaps Tokyo's long-suffering commuters' best hope – apart from asking to work flexitime – is a drop in the metropolitan population. The birth rate in Japan is close to an all-time low, and there is almost zero immigration. The population is already falling. If things go on as they are, Japan is expected to lose 20 million people by the middle of the 21st century. Not such good news for the economy, but maybe Tokyo's hard-pressed commuters will get a little breathing space at last. <

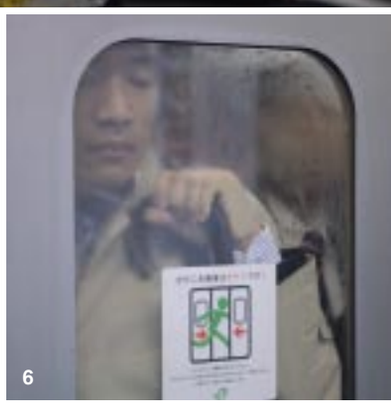












Photos: Tony McNicol

1 Women Only train carriage **2** Queuing in the morning **3** A station **4** A pusher **5** "Sometimes your feet end up facing one way, and your head in the opposite direction. There are probably young women with both feet off the ground." **6** In a cramped train carriage