Shuichiro Yamanouchi

If there were no Shinkansen

High-speed rail experience from its birth to today in Japan

Springer

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Toyko, Japan

ISBN 978-981-99-8889-1 ISBN 978-981-99-8890-7 (eBook)
https://doi.org/10.1007/978-981-99-8890-7

Cover design and illustration: Mariko Utsunomiya

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd.
The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Paper in this product is recyclable.

Foreword

When I first met Shuichiro Yamanouchi, then Chairman of JR East, I immediately realized I was speaking with someone of immense presence, knowledge, and authority. Yet, he was kind and patient and answered my questions with care and consideration. The year was around 1998 and my queries concerned the Series 209 commuter train which had just been introduced on the Yamanote line around Tokyo. The strapline for this new model was *half the weight, half the cost, and half the lifetime.* I had just ridden on this vehicle and was immediately impressed by its clean and efficient lines. Yamanouchi expressed surprise that I knew something about the 209 and so started for me a much valued friendship.

This book is essentially an autobiography of Yamanouchi, and his life after graduating from Tokyo University and joining the national railway company JR in 1956, then subsequently with JR East following the privatization of JR in 1987.

Readers from other countries may be surprised learn that railway staff in Japan are highly trained on all the facets which go into running a railway and they usually stay with their company throughout their careers. Yamanouchi tells us of his extensive training, including driving a steam locomotive. During his career he espoused the philosophy of the railway as a system with people at its heart.

However, in the 1950s and 60s there was considerable strife among the railway workers. I well recall the so-called *spring offensive* which resulted in strikes as pay and conditions for the following financial year were vigorously negotiated. Yamanouchi describes how this deterioration continued that overmanning was rife and the financial position of JR declined in an unsustainable way. This prompted the privatization of the system in a manner which differed from that employed in many other countries. Vertical integration of trains, track, and operations, was retained and the system split on a regional basis, together with a national rail freight company. On the main island of Honshu, companies West, Central, and East were formed, and the islands of Kyushu, Shikoku, and Hokkaido had their own companies. The main island companies prospered, industrial relations were improved, while manning levels were reduced, but the island companies, lacking sufficient population density, together with ageing and further depopulation, struggled, and closures were made, a situation which continues to this day.

JR Central has been a success based on the profitable Tokaido *Shinkansen*, whilst JR East captured the huge commuting market in and out of Tokyo, making it one of the largest railway companies in the world. It's statistics are staggering; in 2019 JR East carried 18 million passenger every day of which 1.6 million passed through the busiest station, Shinjuku.

The title of Yamanouchi's book indicates its main thrust, the building, and evolution of the Japanese shinkansen network and its role in the economic success of the country. Particularly interesting are the debates and opposition to the construction of the Tokaido Shinkansen which way back in 1964 opened as the world's first high-speed line, linking Tokyo with Osaka. This is, of course, the most densely used high-speed railway in the world. But its birth was far from easy. JR East's high-speed lines are not as well used but have played a key role in shrinking the country north and west of Tokyo. Readers will find the details of the evolution and speed-up of high-speed rail in Japan particularly interesting, as are the details of the complexities of financing such mega projects.

After his retirement from JR East in 2000, Yamanouchi became involved in Japan's space programme, becoming President of the Japan Aerospace Exploration Agency (JAXA). He died, too young, from heart failure in 2008, aged 75. The editors of the present book have done a great service to the international community, by making available Yamanouchi's original manuscript to a wide audience. This volume is a tribute to the life of a remarkable railway man, a leader in Japan, and a fervent supporter of what he called the *important social capital of the shinkansen.*

May 2024

Roderick A Smith
Imperial College London
London, UK

Editing Notes

Introduction

The title of this book, *If there were no Shinkansen*, is a very sensational one. But the answer is simple: Otherwise, Japan would not be the prosperous country it is today, and the world's railways would not have attained the high speeds they have.

This book is written not only for railway professionals but also for the general reader interested in railways. For this reason, it was initially published in a hardcover edition by the Tokyo Shinbunsha and later in a paperback edition by the Asahi Shinbunsha. Although the number of copies is not disclosed, many copies of the book have been printed. The author, Mr. Yamanouchi, was an engineer with long experience working for Japanese National Railways in the field of train operation and safety. He also had a managerial perspective through working on the reform of Japanese National Railways and serving as Chairman of East Japan Railway Company. Thus, I am convinced that this is the best book to introduce Japanese railways to people overseas, as it is written from a broad perspective on both technical and management perspectives.

One of the themes of this book is the mutually stimulating progress of the world's high-speed railways. The book also empirically demonstrates that new technologies emerge through various setbacks. It takes a lot of courage to move forward into an unknown new world. This book will be a great reference for those who are looking for a new challenge in the world of railways to see how their predecessors gained a foothold in the new world.

I have had long experience in assisting developing countries through ODA-related overseas railway technical cooperation. Through these experiences, I have learned that the knowledge of the railway professionals in these countries about railways is largely from a European viewpoint since few books on Japanese railways have been published in English. If they are going to use Japanese railway technology, we want them to learn about Japanese railways and fully utilize the technology that is available to them. In addition, the world's railways are not in competition with each other regarding railway operation business. Only through the mutual exchange of

experiences can each railway develop. These two thoughts inspired me to launch a project to publish a book about Japanese railways internationally. However, an English translation is required to publish a book in English. I did not know how many readers would buy a book about Japanese railways. Perhaps the first challenge is to accept a loss. Fortunately, this book has a private edition for distribution at the UIC. Although this book was originally written for Japanese readers, it can unexpectedly provide an introduction to Japanese railways for foreign readers, as it describes various scenes experienced by the author at JNR during those turbulent times. Mr. Yamanouchi must have been aware of this and chose it with the expectation that UIC members would welcome it. The book contains many stories of failure, and some people were anxious that it would disgrace Japan to the rest of the world. However, the exchange of experience is only meaningful if it includes failure. For this reason, we have selected this book as the first in a project to publish books on Japanese railways from an international publisher. Note that although this book was written by Mr. Yamanouchi more than 20 years ago, it deals with historical facts and still provides fresh inspiration to those involved in the railway industry. However, since it was written more than 20 years ago, we have decided to provide notes and recent information based on assumptions concerning what Mr. Yamanouchi would write in this book now.

We hope that many people will become interested in Japan's railways through this book.

Acknowledgements

The English version of this book was published through the generosity of Mr. Hideki Yamanouchi, Ms. Marie Nakajima, and Mr. Nobuaki Nakajima, family members of the late Mr. Yamanouchi, the author of the book.

The Tokyo Shinbunsha Publishing Bureau, which published the Japanese edition, has kindly agreed to publish the English edition. We would like to express our sincere gratitude to them.

We would also like to express our gratitude to the many people and organizations listed below who have supported us in various ways.

Dr. Roderik A Smith, Professor Emeritus, Imperial College London, President of the Japan Railway Society; Dr. Takashi Yamanouchi, Professor Emeritus, Institute of Polar Research; Dr. Anthony Robins, Professor, Aichi University of Education and Coordinator in Japan of the Japanese Railway Society of the United Kingdom, and Ms. Alexandra Lefebvre of International Union of Railways (UIC).

The cover of this book indicates that it is not just about the *Shinkansen* but also includes a diverse range of railway topics. The design, including Mr. Yamanouchi's silhouette, was created by Ms. Mariko Utsunomiya, a JR East/Japan International Consultants for Transport officer with design talent.

The Japanese version of this book contained monochrome photographs, but a policy was established to replace these with color photographs as much as possible

in the English version. The following people and organizations have contributed to this initiative.

Professional railway photographer; Mr. Masatoki Minami, Dr. Anthony Robins, and Keio University Railway Research Association alumni: Mr. Katsuji Iwasa, Mr. Tadashi Sumita, Mr. Keiji Musha, and Mr. Kuniaki Mori.

JR East, Japan Railway Construction, Transport and Technology Agency (JRTT), Kotsu Kensetsu, The Railway Museum, Kotsu Shinbunsha, Tokyo Shinbunsha, Tokyo Station Gallery, and Gala Yuzawa Corporation.

This book is based on an existing English translation for private use and was voluntarily brushed up by Professor Anthony. Furthermore, I am indebted to two of my senior colleagues, Mr. Katsuji Iwasa and Mr. Tadamasa Nagai, for their great help in preparing the footnotes already mentioned and scrutinizing the author's Japanese to convey precisely what he intended to say even in English. All three of us, including myself, have worked under Mr. Yamanouchi at JNR in the same field and know exactly what he means. This good team is what made this book possible.

Many more JR Group officials and retirees assisted in publishing this book. The following is a list of those not already indicated.

Dr.Tatsuhiko Suga, Dr.Tetsuo Shimomae, Mr.Takao Kubo, Mr.Kazutoshi Watabe, Mr.Toru Fukushima, Mr.Hiroyuki Nakamura, Mr. Yoshihiro Akiyama, Dr. Fumio Kurosaki, Mr. Fumihiro Araki, Mr. Hiroshi Komatsu, Mr. Hitoshi Saimyo, Mr. Shunzo Miyake, Mr. Takahiro Kikuchi, and Mr. Shunsuke Takagi.

At last, we would like to express our deepest gratitude to Springer for accepting this book for publication. We would also like to thank Mr. Smith Chae, Editor of Springer Nature Korea Limited, for his excellent management in preparing and publishing this book, and Ms. Saranya Devi Balasubramanian and Ms. Sangeetha Ganesan, Project Coordinators of Springer Nature India, for their direct assistance.

May 2024

Tetsuro Aikawa
Representative of Publishing Project
for the English version of 'If there were
no Shinkansen'

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About the Author

Late Shuichiro Yamanouchi

Photo provided by his family

Born in 1933
1956 Graduated from the Faculty of Engineering, The University of Tokyo
1956 Joined Japanese National Railways
1981 Director General, Tokyo Northern Railway Administration Bureau
1982 Director General, Head Office Operations Bureau
1985 Managing Director of Japanese National Railways
1987 Deputy President of East Japan Railway Company

1996 Chairman of East Japan Railway Company
Appointed to Vice Chairman of International Union of Railways (UIC)
2000 Chairman, National Space Development Agency of Japan
2008 Passed away.

Chapter 1
The Great Railway Nation of Japan

As Japan is known as a 'railway country,' railways are well developed in Japan and have considerably more passengers than in other countries. However, most of them were concentrated in metropolitan areas, mainly Tokyo, Nagoya, and Osaka, where the tracks were meter gauge. Why was a standard gauge Shinkansen born in such a Japan?

At the time, a number of steam locomotives were still in service in Japan. At the same time, electrification work was completed on the conventional line between Tokyo and Osaka, and the high-speed EMU train *Kodama* began to run; this was when the momentum for high-speed transit between major cities was beginning to build up.

1.1 Half of the World's Rail Passengers Are in Japan

About four years ago,[1] I found an article describing Japanese railways in a French railway magazine. Reading through it, I was surprised to see the statement: "Half the people who use rail transportation in the world on any given day are Japanese." I quickly looked into the matter and found that about 160 million people in the world use rail transportation on any given day. And indeed, 62 million of them are in Japan.[2]

When we talk about the whole world, we are, of course, including such countries as China, India, and Russia, and Japanese passengers account for not 50% of the total, but 40%. These figures include people who transfer among the JR, the private railways, and the subways, which are all owned by different companies and are

[1] From the time of publication of this English version, it was around 30 years ago.

[2] According to JR East's Annual Report and other sources, at least 200 million people use railways daily in the world today, of which the number of Japanese rail users has increased to 69 million.

S. Yamanouchi, *If there were no Shinkansen*,
https://doi.org/10.1007/978-981-99-8890-7_1

therefore counted two or three times, so the actual number is somewhat smaller. Even so, Japan is a great railway nation.

Here, I may need to provide some explanation.

Fifty-five million, or 88% of the passengers on Japan's railways, are actually in the three metropolitan areas centered on Tokyo, Nagoya, and Osaka. Most of these are people who buy monthly passes and commute to work or to school.

Yet China's railways carry almost no passengers of this type. It is not necessarily the case that since Beijing and Shanghai have subways, they don't have railways for urban transportation, but the majority of the trains of the Chinese National Railway, which owns the tracks in that vast nation, are medium- and long-distance trains similar to Japan's express trains. There are no tracks like those of the Yamanote Line or the Chuo Line that are used for urban transportation, and the daily passenger load of the Chinese National Railway is a mere 2. 6 million people.[3] Bicycles and automobiles, particularly minibuses, play the main role in urban transportation, and their routes cover China's cities in a net-like pattern.

China thus has a relatively small amount of railway tracks in proportion to its huge land area. Japan has 27,000 km of rail lines, while China has only 60,000 km. China is building 1,000 km of new rail lines each year, but that is still a small amount for a land mass twenty-five times the size of Japan.[4]

It is inappropriate to compare the scale of railways merely by the number of passengers. That is because the same person may ride from Tokyo Station to Yurakucho Station, which is also within the city, or from Tokyo Station to Shin-Osaka Station, several hours away. The unit usually used for comparing the passenger loads for various means of transportation is 'passenger kilometers.' This represents the distance that the passengers travel by train or airplane. When we calculate these numbers, we find that Japan has the largest passenger load in the world.

Let's see how that compares to the situation with European railways.

The passenger load of JR East is larger than those of France and Germany combined. The combined passenger load of the six JR companies corresponding to the old Japanese National Railways is greater than that of ten nations of the European Union. If we add Japan's privately owned railways, the total passenger load is greater than in all of Europe, excluding the former Soviet Union. This is despite the fact that Japan's land area is only one-sixtieth that of Europe.

Until just recently, JR East was the world's largest transport company. I say 'was' because the recent depreciation of the yen has allowed the American package delivery service United Parcel Service (UPS) to take first place. Even so, JR East is the world's

[3] As the author states, China's railways used to be mostly intercity lines operated by China National Railways. However, in 1969, the first subway system opened in Beijing. In 1978, the modernization policy based on the reform and open-door policy led to the rapid construction of urban railways such as subways, trams, and monorails in significant cities. As a result, as of 2022, urban railways operate in about 40 cities, covering about 250 routes and 8,700 operating kilometers.

[4] In China, the operating kilometers of high-speed and urban railways developed over the next two decades have increased to 146,000 km, approximately 2.4 times that of that time. In particular, the high-speed railway network covers approximately 38,000 km throughout China.

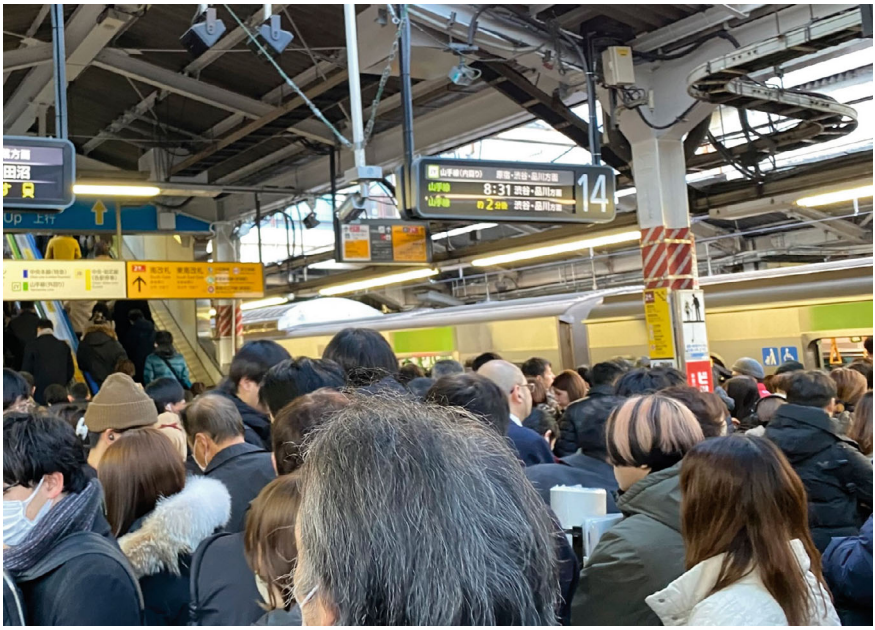

Fig 1.1 Shinjuku Station, shown in 2022, which serves more passengers than any other station in the world. *Photo* provided by Tetsuro Aikawa

largest railway company, larger than German Railways, and its sales are far greater than those of the world's largest airlines, American and United.

Looking at the items related to railways in the Guinness Book of World Records, I found that Japan is mentioned twice.

The first record is for the railway passing through the lowest elevation, and this honor went to the Seikan Tunnel, which runs 240 m under the straits between the islands of Honshu and Hokkaido.

The other record is for the world's busiest railway, and it informs the reader that JR East carries an average of 16.3 million passengers per day.[5]

JR East moved its headquarters from the Marunouchi area of central Tokyo to Shinjuku Ward in the fall of 1997. In addition to JR East, ten rail lines run in and out of Shinjuku Station, including the Odakyu, Keio Teito, and Seibu private commuter lines and subway lines. 3.2 million people get on and off trains here in a single day, and Shinjuku Station alone has more passengers than all of China. There is probably no other station like it in the world (Fig. 1.1).

Furthermore, Japan has 190 railway companies. There is probably no other nation like it in the world.

[5] As of 2019, JR East had an average of 17.8 million passengers per day.

Viewed in terms of passenger load, the private railways, including the subways, carry 50% more passengers than the JR Group. The major private railway companies have also branched out beyond their core business of the railway to venture into hotels, department stores, real estate, and recreational facilities and have become some of Japan's foremost corporate groups.

Japan is also known as the 'kingdom of the private railways.'

1.2 If There Were no *Shinkansen*[6]

Recently, a French railway executive visiting Japan made an interesting comment.

> When I stay at a hotel in Europe, I can often see train tracks from my window, but hardly any trains come by. When I came to Japan and stayed in a hotel in Kyoto, there seemed to be a *Shinkansen* running past whenever I looked out the window.

At its busiest times, the Tokaido *Shinkansen*, which runs from Tokyo to Shin-Osaka, has as many as eleven trains running every hour.[7] If you take the round trips into consideration, twenty or more trains are running at any one time, so they come through Kyoto every three minutes. No wonder the Frenchman made that remark.

I may safely say that there is no railway like this anywhere in the world. In any case, the total passenger kilometers of the Tokaido *Shinkansen* are equivalent to 70% of the passenger load of the entire French National Railway system.

The line with the highest passenger load on the TGV, the French counterpart to the *Shinkansen*, is the line running between Paris and Lyon. It carries 48,000 passengers per day, about 1/7 the number for the Tokaido *Shinkansen* and about the same as the Joetsu *Shinkansen*, which runs from Tokyo to Niigata.[8]

Despite this, the Paris-Lyon TGV seems to be a money maker for the French National Railway. President Louis Gallois, who visited Japan in 1997, told me, "If we could keep just the TGV between Paris and Lyon and get rid of all our other rail lines, that would be the best thing that could happen."

What would have happened if Japanese National Railways had not created the Tokaido *Shinkansen*?

The *Kodama*, the fastest limited express train before the *Shinkansen* was built, took six-and-a-half hours to run between Tokyo and Osaka. The old Tokaido Line, with its many sharp curves and turnouts, made it difficult to increase speeds any further.

---

[6] *Shinkansen* trains are also called bullet trains, but in this book, they are referred to as *Shinkansen* (which means new truck line in Japanese)

[7] Currently, the maximum number is 12 per hour.

[8] As for the route between Paris and Lyon, SNCF began operating the low-cost TGV "OUIGO" in 2013 in order to strengthen its competitiveness not only with airplanes but also with automobiles. In addition, Trenitalia (Italian Railways) newly entered this section in December 2021, and although the details are not clear since SNCF does not currently publish the number of passengers transported by section, it is believed that the number of passengers on the 'Paris-Lyon' route has grown considerably since then due to these factors.

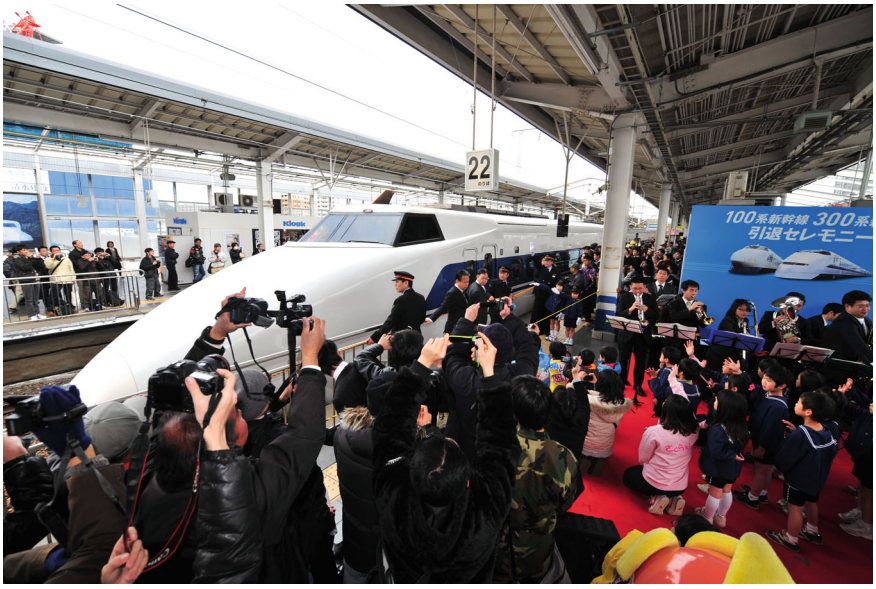

Fig 1.2 A crowded Tokyo Station platform for the retirement ceremony of the Series 100 *Shinkansen*. The Tokaido *Shinkansen* is undergoing a generational shift with the original Series 0, Series 100, Series 300, Series 700, and Series N700. *Photo* provided by Kotsu Shinbunsha

At that time, airfares were still far more expensive than train fares, so a lot of passengers still rode the trains, but now that there isn't such a great difference between the two fares, there would undoubtedly be hardly any passengers taking the six-and-a-half-hour trip by train. And, of course, the Sanyo S*hinkansen* to Hakata in Kyushu, the Tohoku *Shinkansen* to Morioka, and the Joetsu *Shinkansen* to Niigata would never have been built.

If we continue thinking along those lines, we can imagine that if we had not made the bold decision to build the *Shinkansen* about forty years ago, the Japanese railway system might now consist almost entirely of money-losing local lines, except for lines in large cities such as Tokyo and Osaka. Or it might have disappeared altogether. That one decision saved Japan's railways (Fig. 1.2).

But that's not all. The success of Japan's *Shinkansen* provided a shock and a stimulus to European countries, which had well-developed rail systems, and it gave rise to France's TGV and Germany's ICE systems. If Japan had not built the *Shinkansen*, then Europe's high-speed railways would never have come into being, and railway passenger service would undoubtedly have gone into decline.

Furthermore, in Asian countries such as South Korea, as well as China and Taiwan, plans are underway for high-speed rail services like the *Shinkansen*.[9] The decision to build the *Shinkansen* was one that determined the future of the railway industry worldwide.

[9] High-speed rail is now in operation in these countries.

If the *Shinkansen* had never been built, would it have been possible to move the same number of passengers by airplane? The Tokaido *Shinkansen* is mostly made up of sixteen-car trains running at intervals of five minutes.

I tried calculating the number of airplanes that would be needed if we were to experiment with transporting the Tokaido *Shinkansen* passengers by air.

I suppose that the *Shinkansen* passengers who were traveling short distances would switch to car travel, so I assumed that those passengers traveling more than 300 km would travel by air.

I came up with the answer that we would need about a hundred jumbo jets. The passenger load between Tokyo and Osaka would increase by a number corresponding to half the passenger load of all of Japan's domestic airlines. The route between Tokyo and Sapporo is the air route with the greatest number of passengers in the world,[10] at about 20,000 people per day, but without the *Shinkansen*, the domestic carriers would have to transport nine times that number of people. That would probably be quite impossible.

Then what would happen if we moved all these people by bus instead of by *Shinkansen*?

Shinkansen trains are made up of sixteen cars and can carry 1,300 passengers, and at the busiest times, eleven[11] trains leave every hour. To transport the same number of people in 40-passenger buses, we would have to run buses at intervals of every ten seconds. Actually, we would probably end up using both buses and airplanes, but even with that, it would be impossible to transport the same number of passengers as the *Shinkansen.*

The February 21, 1998 issue of the famous British economics magazine *The Economist* contained an article, 'A New age to Railways,' which stated, "If the hundreds of millions who travel on these *Shinkansen* express lines each year switched to car travel, there would be at least 1,800 extra deaths and 10,000 serious injuries each year."

If the *Shinkansen* had not been built, Japan's current economic growth might have been impossible. This one decision may have controlled the future of the nation's economy.

1.3 How Did the *Shinkansen* Come to Be?

Formal planning for the construction of the Tokaido *Shinkansen* began in 1956. In May of that year, Japanese National Railways set up the Tokaido Line Augmentation Investigative Conference to begin looking into means of enhancing the transportation capability of the Tokaido main line, which had already reached the limits of its capacity.

[10] Currently, the busiest air route in the world is Seoul-Jeju with 39,700 passengers per day (IATA, 2018).

[11] Now it is twelve.

At the outset of the conference, Shinji Sogo, president of JNR, stated, "In my opinion, if we are going to enhance the Tokaido Line, the answer is standard gauge tracks. We must resize the gauge, increase speeds, and transport larger amounts of passengers and cargo."

At that time, 120 trains per day ran each way on the Tokaido Line, near the limit for a double-track line. The roads, too, were still in a terrible state.

In fact, the situation with roads was so bad that the Watkins Economic Fact-Finding Group from the United States, which visited Japan in the same year, pointed out, "Japan has designated places where it plans to build highways, but it doesn't have the actual highways yet."

The year 1956 was a great turning point for Japanese society. That was the year when the famous words, "We will soon move out of the postwar period," appeared in the Economic White Paper, as well as the year when Japan joined the United Nations.

That was also the year when the Japan Highway Public Corporation was launched. It may be said that this was the era when setting up a transportation network became the central focus of national development plans. In the following year, the Law on Constructing Automobile Roads Across the Country for National Development was enacted, and in 1958, construction began on the Meishin Expressway between Nagoya and Kobe.

On the world scene, 1956 was the year of the Suez crisis and the Hungarian uprising. Incidentally, it was in the previous year that the Liberal Democratic Party and the Social Democratic Party of Japan were launched, and the so-called fifty-five-year system was put in place.[12]

In the fall of that year, the electrification of the entire length of the Tokaido Line was finally completed, and it became possible for people to travel without being bothered by smoke. The fastest train at that time, the JNR's flagship limited express train, the *Tsubame*, shortened the time required to travel between Tokyo and Osaka from eight hours to seven-and-a-half hours for the first reduction in twenty-two years (Fig. 1.3).

It was also in that year that experiments began on changing the power supply systems to alternating current (AC), one of the essential technologies for creating the *Shinkansen.*

It was precisely that year that I began working for Japanese National Railways (JNR), but in Europe and the United States, the sun seemed to be setting on the railways as we moved into the age of aviation and automobiles.

The university professor who advised me on finding a job commented, "Isn't it a bit late in the day to be getting into the railway business?".

Most of my friends headed for large companies in growing industries such as heavy electrical equipment, automobiles, and shipbuilding. Textile companies were another popular choice. SONY didn't yet exist, although people had heard of its

[12] The '55-year regime' was the system under which the ruling Liberal Democratic Party (LDP) maintained a continuous majority in Japan while the combined opposition parties, including the Japan Socialist Party (JSDP) and other non-LDP parties, held more than one-third of the seats in the Diet, thus preventing LDP from holding two-thirds of the seats, which is a requirement for constitutional reform.

Fig 1.3 Limited express *Tsubame* with an electric locomotive hauling newly green repainted coaches introduced after the electrification completion of the Tokaido Line. At Nagoya staiton Nov 1956. *Photo* provided by Katsuji Iwasa

precursor, Tokyo Telecommunications, but it still wasn't a very large company, and Matsushita Electric[13] was still just a manufacturer of household electrical products, with no one aspiring to a position there. Even Toyota was nothing more than a plant in Aichi Prefecture, and no one tried to get a job there.

At that time, JNR was still a company that one could be extremely proud of. It enjoyed much larger sales than NTT and Toyota, and it made a profit. It did not issue individual private job offers to students. Instead, applicants had to pass through a full day of written exams, group discussions, and individual interviews in order to join the company. No one could have imagined that the world's fastest train would come into being a mere eight years later and that thirty-one years after that, JNR would be privatized after having descended into bankruptcy.

To be frank, I met with a series of disappointments after joining the company.

Soon after my generation entered university, we participated in part of the May Day incident,[14] and since we held strongly negative feelings about war and mistrusted the national system, the old-fashioned, overly formal, and rule-ridden corporate culture didn't agree with us.

[13] Now it has been changed to "Panasonic.".

[14] On May 1, 1952, the 23rd May Day, demonstrators opposing the San Francisco Peace Treaty and the Japan-U.S. Security Treaty clashed with police in Tokyo, resulting in two deaths and more than a thousand people seriously injured, in what is also known as the 'Bloody May Day incident.'.

The managers' lectures were nearly devoid of content and consequently boring, and we reacted against the corporate culture that looked down on technicians. This was an era when technology was mostly centered on steam locomotives, so it didn't arouse any interest at all. And that was the time when the idea of building the *Shinkansen* was born, and we were able to have big dreams.

The idea of the *Shinkansen* arose out of one dream and one reality. The dream was that of President Shinji Sogo and other executives from the pre-war era of building a high-speed railway that would be equal to any in Europe or the United States. The reality was that the Tokaido Line had already reached the limits of its capacity.

It was only natural that the dreamers would have insisted on building new tracks of the gauge that was standard in Europe and the United States (a width of 1,435 mm between rails) and that the realists insisted on building quadruple meter gauge tracks, starting with the sections that ran the most trains and continuing on down in order. They wanted to increase the number of trains running as soon as possible.

For this reason, the Tokaido Line Augmentation Investigative Conference began deliberations to compare a proposal for parallel meter gauge tracks, a proposal for dedicated meter gauge tracks, and a proposal for new, standard gauge tracks. However, it was nearly impossible for even JNR to bring about such a large project on its own. There would have to be coordination with the plans for the expressways. Plans for the construction of the expressways had made substantial progress, and work began on the Meishin Expressway, Japan's first expressway, in 1958.

In response to requests from JNR, the government set up the Japanese National Railways' Trunk Line Investigative Conference in August 1957, and in July of the following year, the Investigative Conference presented its findings to the Minister of Transport. The report emphasized that JNR needed to construct a new line as soon as possible. It asked that the new system be "the most modern means of transportation at the world's highest technological level" and specified that "a dedicated standard gauge line would be appropriate."

During these deliberations, there were not only disputes within JNR between the advocates of a new standard gauge trunk line and the advocates of quadruple meter gauge tracks but also fierce disputes with the advocates of highways and airplanes.

The mass media criticized the idea of investing massive amounts of money in railways, which were in decline in Europe and the United States, and building a new trunk line. They even referred to it as one of the three great follies of the world, along with the Great Wall of China and the battleship Yamato.

The construction of a new trunk line was approved because it would have much greater transport capacity than a highway, would yield sufficient profit, and because the necessary funds could be procured without raising fares. For that reason, the estimate for total construction costs was low, at 197.2 billion yen. That estimate later led to major problems.

JNR set up an internal Trunk Line Investigative Office parallel to the government's Trunk Line Investigative Conference and began looking at specific routes for the line and technological standards.

Previously, in May of that same year, the Railway Technical Research Institute held a lecture meeting to commemorate the fiftieth anniversary of its founding at

Fig 1.4 Dr. Takeshi Shinohara, the General Manager of the Railway Technical Research Institute, at its fiftieth anniversary lecture meeting, May 30, 1958, at Tokyo's Yamaha Hall. *Photo* provided by Kotsu Shinbunsha

Yamaha Hall in the Ginza area of Tokyo. It was announced that a railway with trains running at speeds of up to 250 km/h and linking Tokyo and Osaka in three hours was mostly technologically feasible (Fig. 1.4).

Preparations were moving along at the pace desired by the dreamers, but the realists also had some reasonable points to make.

In 1957, JNR started making its first Five-Year Plan with total construction costs of 597 billion yen, but the plan centered on the replacement of worn-out, facilities improvement of safety measures, and enhancement of transport capacity. During the war, both railcars and facilities had been used under harsh conditions, and even afterward, it had not been possible to repair or replace enough of them, so the JNR's facilities had fallen into a pretty terrible situation.

There were also many major accidents. In 1954, a ferry between Aomori and Hakodate, the Toya-maru, sank in a typhoon, with the loss of 1,430 lives, and in the following year, 168 people died when the Shiun-maru, a ferry on the Uko Line, sank.

The railways, too, had their share of accidents. In 1956, forty people died in a train collision on the Sangu Line.

The commuter lines were horribly crowded, and the long-distance trains didn't run often enough. There were mountains of projects on hold: building new rolling stock, converting the single-track sections to double tracks and electrification.

At this time, the entire length of the Tohoku main line north of Utsunomiya was only a single track, and there were still no super express trains. The ordinary expresses

Fig 1.5 Handing over the tablet token. *Photo* provided by the Railway Museum

made only five round trips per day, and the entire section from Tokyo's Ueno Station to Aomori was served by steam locomotives. The trip took fourteen hours.

The Chuo Line running west out of Tokyo was also single-track beyond Takao, and while working as a driver's assistant, I was assigned the job of handing over and receiving the tablet token that served as a voucher for the block system, between