

High-Speed Trains Worldwide

Opening of Tokaido Shinkansen

The idea of the "bullet train", a standard-gauge new railway between Tokyo and Shimonoseki (the western end of the main island, Honshu), was conceived before the Pacific War. Some land was purchased for the Tokyo-Osaka section and some tunnelling even started during the war, but the whole plan was abandoned with Japan's defeat.

The post-war economy recovered from the serious damage fairly quickly. Industrial production surpassed the highest pre-war level in the mid-1950s, and the capacity of the existing rail network proved insufficient to cope with growing demand. With the main rail lines threatened by saturation, a massive road construction programme

started, and the growth of other transport modes became inevitable.

In the late 1950s, the Japanese National Railways (JNR) also launched a massive investment programme to increase its trunk line capacity, including construction of the Tokaido Shinkansen which was opened on 1 October 1964. It was the world's first high-speed passenger railway between Tokyo and Osaka (515 km). With smartly-dressed EMU trains running at 210 km/h, the shinkansen opened a new page in world railway history by demonstrating the inherent advantage of high-speed rail transport.



■ Test Shinkansen Train leaving Tokyo station in September 1964
(Transportation Museum, Tokyo)



■ New Centralised Traffic Control in Tokyo 1964 (JNR)



■ First Generation Series 0 Shinkansen Train (JNR)

Expansion of shinkansen network

The success of the Tokaido Shinkansen prompted its extension to western Honshu and northern Kyushu. The Sanyo Shinkansen was opened to Okayama on 15 March 1972, and to Hakata on 10 March 1975. In the meantime, the Diet (Japanese parliament) passed the Law for the Construction of Nationwide High-Speed Railways in May 1970. The Transport Minister issued a directive to start construction of the Tohoku and Joetsu Shinkansen lines in 1971.

The ambitious expansion programme suffered serious delays due to strong opposition from local residents fearing noise and vibration caused by the shinkansen, and due to the serious economic recession after the energy crisis.

On 23 June 1983, the Tohoku Shinkansen was opened from Omiya (30 km north of Tokyo) to Morioka, and the Joetsu

Shinkansen was opened from Omiya to Niigata on 15 November 1983. As both lines run through snowy regions in northern Japan, a new type of rolling stock (Series 200) was introduced. The Omiya-Tokyo (Ueno) link was opened on 14 March 1985, and the Ueno-Tokyo (Central) link was finally opened on 20 June 1991.

The shinkansen network today consists of four lines, totalling 1,800 km. It carries nearly 300 million people every year (810,000 every day). The busiest line is the Tokaido between Tokyo and Osaka carrying 362,000 passengers per day, followed by the Tohoku (188,000 passengers), Sanyo (187,000) and Joetsu (73,000) Lines.



■ Sanyo Shinkansen Train passing Fukuyama Castle 1975 (JNR)



■ Joetsu Series 200 Shinkansen Train in Heavy Snow 1982 (H. Morokawa)



■ Latest Generation Series 300 *Nozomi* Shinkansen Train (H. Morokawa)

For faster and quieter services

The maximum speed of the shinkansen remained at 210 km/h for a long period mainly because of noise problems. The basic design of the rolling stock also remained the same, until JNR introduced the Series 100 for the Tokaido and Sanyo services in 1985. The Series 100 is popular with its two double-deck cars, and the maximum speed was raised to 220 km/h in 1986. After the privatisation of JNR, the new JR companies became so keen that they built various new trains for better services. Today, the maximum speed on the Tokaido and Sanyo Lines is 270 km/h using Series 300 *Nozomi* super express trains. The maximum speed on the Tohoku and Joetsu Lines has been 240 km/h since 1985, but there is a short section on the Joetsu Shinkansen where trains run at 275 km/h. JR East converted

the Fukushima-Yamagata section of the existing Ou Line to standard gauge, and put Series 400 Mini Shinkansen trains into service on 1 July 1992.

JR West and JR East built the WIN 350 and STAR 21 test trains, respectively, to carry out a series of experiments for faster and quieter shinkansen services. The former reached 350.4 km/h on 8 August 1992, and the latter attained 425 km/h, the world's second fastest record after the French TGV, on 21 December 1993.



■ Series 100 passing Maibara Station on Tokaido Shinkansen (H. Morokawa)



■ Series 400 *Tsubasa* coupled with Series 200 (H. Morokawa)



■ JR West WIN 350 Test Train (JR West)



■ JR East STAR21 Test Train (Japan Railfan Magazine)