

# Kyushu Shinkansen and Background to Establishment

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## Background

The Kyushu Shinkansen (Kagoshima Route) extends about 257 km, connecting Fukuoka City (in Fukuoka Prefecture) to Kagoshima City (in Kagoshima Prefecture). Based on the 1970 the National Shinkansen Network Law, the Kagoshima route was agreed in the development plan for 1973. Work started on the super-express line between Yatsushiro (later changed to Shin-Yatsushiro) and Nishi-Kagoshima (currently Kagoshima-Chuo) in September 1991, while construction of the line between Funagoya and Shin-Yatsushiro started in March 1998. In April 2001, permission was granted to add a line between Hakata and Funagoya as well as to change all lines to full shinkansen specifications with construction on the Kagoshima route kicking off with the start of work on the Hakata to Funagoya section in June 2001. The first section

was the Shin-Yatsushiro to Kagoshima-Chuo section opened on 13 March 2004, massively slashing the fastest travel time between Hakata and Kagoshima-Chuo from 3 hours 40 minutes to 2 hours 12 minutes. The train service running on this section is the *Tsubame*, a name synonymous with modern shinkansen as well as a historic limited express from the past.

## From Line Opening to Now

At present, Kyushu Shinkansen *Tsubame* services run 70 times a day between Shin-Yatsushiro and Kagoshima-Chuo. The Series 800 six-car sets are based on the sleek Series 700 design. The popular interior using traditional Kyushu craftsmanship is well liked by passengers.

With the fastest time between Shin-Yatsushiro and Kagoshima-Chuo now at 35 minutes, the fastest *Tsubame*



Shinkansen *Tsubame* and Conventional Line *Relay Tsubame* Cross-Platform Transfer at Shin-Yatsushiro Station

(T. Utsunomiya)

connects to the *Relay Tsubame* from the conventional line between Hakata and Shin-Yatsushiro with a 3-minute stopover to link Hakata and Kagoshima-Chuo in just 2 hours 12 minutes. Shin-Yatsushiro Station is the first in Japan to provide a cross-platform change between shinkansen and conventional limited express trains at the elevated platform. To achieve this 3-minute change, simulations were run prior to line opening and cabin attendants provide guidance on the platform to facilitate fast smooth changes.

Furthermore, various other techniques are used to ensure that travellers are not anxious when changing at Shin-Yatsushiro Station. For example, one ticket covers travel on both *Tsubame* and *Relay Tsubame*. There are also detailed information displays and announcements throughout the network. *Relay Tsubame* is displayed at Hakata Station on the down line to Kagoshima-Chuo instead of separate display of *Relay Tsubame* and *Tsubame*. These novel approaches won JR Kyushu its third Japan Railway Award in 2004.

To ensure centralized control of the shinkansen business, the Shinkansen Railway Operations Dept. operating organization is part of the Railway Operations Headquarters; the main location is at the Sendai Depot, and the Sendai Shinkansen Center is the base for everyday inspections. The Shin-Yatsushiro Shinkansen Engineering Center handles maintenance and control of shinkansen facilities, while the Kagoshima Shinkansen Transportation Center is the crew base. For servicing stations, buildings and equipment, in addition to managing the Kumamoto and Kagoshima branches, the Kagoshima General Rolling Stock Maintenance Depot is responsible for regular inspections of shinkansen carriages and trucks and other general inspections, while the Operating Control Division is responsible for dispatching. In addition, the infrastructure includes JR Kyushu group companies, assuring safe, stable shinkansen services.

In conjunction with the initial startup of the Kyushu

Shinkansen, we developed products to meet tourism and business demands, such as the *Shinkansen-Tsubame-Nimai-Kippu* (Shinkansen-*Tsubame* Pair Ticket) special campaign rail ticket, the *Tsubame* Excel Pass season ticket for business and school commuters, the *Kirishima-Ibusuki-Nonbiri-Kippu* (Kirishima-Ibusuki Slow 'n' Easy Ticket) tourist special campaign ticket, and the *Ibusuki-Chiran-Sansaku-Kippu* (Ibusuki-Chiran Strolling Ticket). In addition, from February 2005, to meet the diverse needs of travellers, we introduced a *Gentei-Tsubame-Shumatsu-Nimai-Kippu* (Limited *Tsubame* Weekend Pair Ticket) available only for early morning and late night *Tsubame* and *Relay Tsubame* trains on Saturdays, Sundays and national holidays for ¥10,000 (¥5000 one way) covering travel between Kumamoto and Kagoshima-Chuo as well as within the cities of Kitakyushu and Fukuoka.

To help develop the conventional network centred on the Kyushu Shinkansen, we introduced new sightseeing trains called *Hayato-no-Kaze*, *Isaburo Shimpei*, *Kyushu-Odan-Tokkyu*, and *Nanohana DX*. Stations at popular tourist spots (like Kirishima-Jingu Station, Hayato Station and Ibusuki Station) have been refurbished along with operation of rental car services, buses and tourist taxis. These secondary transport feeders help access to the Kyushu Shinkansen and increase ridership.

Beyond the above, concerned parties from the worlds of public administration, local stakeholders, tourism, travel industry and Tokyo publishers, etc., formed the South Kyushu Tourism Study Development Committee in July 2003 to stimulate tourism in south Kyushu. The aim is to propose effective action plans that offer specificity and take into consideration the need for medium-to-long-term approaches to what tourism should be across the widespread area of Kumamoto, Miyazaki and Kagoshima prefectures.

Drawing on cooperation from local government bodies, facilities such as station-front plazas and free passageways have been provided at each shinkansen station, and facilities



Series 800 *Tsubame*

(T. Utsunomiya)



*Isaburo Shimpei* tourist train

(T. Utsunomiya)



New Series 800

(T. Utsunomiya)

such as tourist shopping precincts have been established within stations. Furthermore, park-and-ride car parks have been set up under the elevated shinkansen tracks to make efficient use of space; parking discounts for railway customers promote shinkansen usage.

As a result of these efforts, the number of daily passengers has risen from about 3900 before the shinkansen opened to about 8600 in 2009—a 220% increase that is still increasing today. In addition, more commuters are using the shinkansen to get to work and school as shown by the 260% increase in commuter passes from 500 in 2004 to 1300 in 2007. Clearly, the shinkansen has taken root in the region.

## Readiness for Opening Entire Kyushu Shinkansen

### Outline of Hakata to Shin-Yatsushiro section

The as yet unopened Hakata to Shin-Yatsushiro section of the Kyushu Shinkansen is about 130-km long and will link up with Fukuoka in Fukuoka Prefecture and Yatsushiro in Kumamoto Prefecture. The line travels through urban locales like Kurume and Kumamoto, as well as across the Chikugo Plain, meaning that some 70% of the track is elevated while the remaining 30% is in tunnel. The new section has six stations: Shin-Tosu, Kurume, Chikugo-Funagoya, Shin-Omuta, Shin-Tamana, and Kumamoto. The longest tunnel

is the Chikushi Tunnel (12,115 m); the longest bridge is the Chikugogawa Bridge (411 m); and the steepest grade is 35‰. The total construction cost was about ¥892 billion.

The rail fastening ceremony was held in Kumamoto Station on 22 March 2010 to celebrate joining of all tracks in the entire network. After wayside inspection, a test train was used to test the facilities (overall monitoring and inspecting) from 31 August. Ceremonies were held by local governments at each shinkansen station to welcome the test train on both 31 August and 2 September. Testing is going smoothly and crew training runs started from late November to prepare for the opening on 12 March 2011. At the same time, a promotion campaign to spark interest in the line has been put into full swing.

In addition to the Series 800 carriages now running between Shin-Yatsushiro and Kagoshima-Chuo, 18 new cars will be introduced. This train design is unique to Kyushu, incorporating curved and convex surfaces, traditional gold leaf lacquer work on interior walls, and Kyushu crafts and materials, such as *Hakata-ori* (weaving) and *Kurume-kasuri* (textiles) in seats. Moreover, eighty N700 trainsets (JR West is also introducing 152 such train sets) will be introduced for through operations. All N700 carriages are motorized to handle the steepest 35‰ grades. Since the new shinkansen links the culturally rich Kansai and Kyushu regions, the N700 Series 800 is designed to express the Japanese



New Series 800 interior

(T. Utsunomiya)



Series N700

(T. Utsunomiya)

concept of *rin* (dignity), expressing beauty, strength and gallantry. A nationwide name contest for the train gathered 168,951 entries and *Sakura* proposed by 7927 entrants was selected.

## Benefits of Opening Entire Network

The opening of the full Kyushu Shinkansen will greatly reduce travel times. For example, the current time for the fastest Hakata to Kagoshima-Chuo service will be cut from 2 hours 12 minutes to about 1 hour 20 minutes, and the time for the Hakata to Kumamoto service will drop from 1 hour 13 minutes to about 33 minutes. In conjunction with the opening, through operations on the San'yō Shinkansen will cut the fastest travel time from Shin-Osaka to Kumamoto from 3 hours 57 minutes to about 2 hours 59 minutes, and the time from Shin-Osaka to Kagoshima-Chuo from 5 hours 2 minutes to about 3 hours 45 minutes. Generally, a one-way journey of 3 hours is said to be the limit for a day trip, so the opening will extend day-trip destinations from Kumamoto to Shin-Osaka, and from Kagoshima to Okayama. Conversely, Kyushu will become familiar territory to the people of Kansai and Chugoku, hopefully stimulating more mutual interactions.

In addition, the 2010 opening of the Dondaegu–Busan section of the South Korean KTX high-speed rail service, coupled with the *Beetle* jetfoil ferry between Busan and Hakata will create a high-speed transport axis between Japan and Korea.

## Outline of Stations and Kumamoto General Depot

### Shin-Tosu

Shin-Tosu Station 2.7-km west of Tosu Station on the Kagoshima Line and close to the junction with the Nagasaki Line, has a double-island platform serving four tracks, and is scheduled for extension to accommodate the Nagasaki Line in a station alongside the shinkansen station. The station building intentionally echoes the feeling of a bird's nest (*tosu* means rookery) and is designed to blend with the surrounding mountain-dominated skyline through a gently curved roof redolent of a giant wing, exuding a sense of speed to express the strategic importance of Tosu as a transport hub. In front of the station, construction of the Kyushu Heavy Ion Beam Therapy Center is scheduled (opens 2013), bringing the latest radiotherapy using a heavy ion carbon beam to treat cancer in the west of Hyogo Prefecture. Furthermore, to cope with the expected influx of school groups from Honshu, the station-front plaza is scheduled to have a bus pool for handling up to 20 tourist buses. There is also a plan to build a 650-lot car park for park-and-ride services.

### Kurume

The new Kurume Station is an extension on the west side of the current Kurume Station accommodating the Kagoshima Line. This station consists of two opposing platforms for two tracks. The station building is based on Kurume's culture and art and the design harmonizes with the east–west free connecting passageway constructed by Kurume City. The central external glass curtain wall gives the image of an art gallery space. The free passageway and conventional station building have been linked since April 2010. Presently, a tourist walking route is being prepared on the west side for easy access to sightseeing spots such as Suitengu shrine, Bairinji temple and the birthplace of the artist Hanjiro Sakamoto (1882–1969).

### Chikugo-Funagoya

Chikugo-Funagoya Station is a two-platform, three-track station about 550-m south of Funagoya Station accommodating the Kagoshima Line. The east side of the station houses a passing track accessed by both up and down line trains. In conjunction with the start of shinkansen on this line, the current Kagoshima Line Funagoya Station



Kumamoto General Depot covering about 200,000 m<sup>2</sup>, with 13 marshalling tracks

(T. Utsunomiya)

will be moved to the west side of the new shinkansen station. To change between the shinkansen and conventional trains, travellers will have to pass out the exit ticket gates, across the station plaza, and in through another ticket gate to board the train. Work is under way to move the station within the prefectural Chikugo Wide Area Park (200 ha), making it the first station in Japan inside a park. In addition to rail travel, the surrounding road network is being developed to offer access to Yanagawa and Yame. Since the station is in a park, consideration has been given to harmonizing the design with the park and surrounding countryside, so vertical louvres and window frames in wood have been used to express a sense of change and rhythm whilst maintaining a sense of openness.

### **Shin-Omuta**

Shin-Omuta Station is about 6-km northeast of the Kagoshima-Line Omuta Station on Route 10 (Nankan–Omuta) leading from the heart of Omuta to the Nankan junction of the Kyushu Expressway. The station has two opposing platforms servicing two tracks, and the actual building has been designed from the basic concept of ‘zephyr to the future’ to symbolize ‘new Omuta’. The glass walls surrounding the platforms provide a panoramic view and a design that speaks of a bright tomorrow. Land reallocation is underway around the station, with a station-front plaza, access road, and residential development. A maintenance yard is scheduled to be built on the south side of the station.

### **Shin-Tamana**

Shin-Tamana Station has two opposing platforms for two tracks. The station is about 3-km northeast of the Kagoshima-Line Tamana Station. The station building design consciously reflects the station area development concept of ‘forest’ to offer an intimate feeling of ‘a station in woodland’. The central part of the station is walled with glass to let in natural light, and the pillars are placed rhythmically to create the image of a forest grove. Planned facilities include a tourist interaction amenity called Kanko-Hotto-Plaza-Tama-Rara to the side of the station, a station-front plaza and a car park. It is hoped that this station will become the gateway to not just the Tamana hot springs but also to the northern area of Kumamoto Prefecture, including places like Yamaga and Kikuchi.

### **Kumamoto**

Kumamoto Station—like Kurume Station—is a new station built adjacent to the existing station. It has a double-island platform serving four tracks. The entrance has large gateposts to give the feel of a Japanese castle entrance, as well as a glass wall with weatherboard design. In addition,

the massive roof projects toward the station-front plaza to symbolize the history, character and natural splendour that makes up Kumamoto. The new West Entrance has been named the Shinkansen Entrance and the existing East Entrance has been named the Shirokawa Entrance, which connects with the underground passageway. Land reallocation on the west side and redevelopment on the east side of the station will redevelop the town area, relocate the government buildings and create residential areas, etc., with the aim of making the area an information hub offering a fresh city life. The Kumamoto section of about 6 km including Kumamoto Station is being elevated to eliminate level crossings. There also are future plans to elevate the existing Kumamoto Station.

### **Outline of Kumamoto General Depot**

Located in Kumamoto City, the Kumamoto General Depot functions as a rolling stock yard, as a workshop for routine inspections (daily and scheduled) and as a place for truck and general inspections. After the JR West Hakata General Depot and JR East Shinkansen General Depot (in Sendai on Honshu), Kumamoto is the third biggest depot in Japan, covering about 200,000 m<sup>2</sup>, with 13 marshalling tracks, train inspection shed, truck inspection and repair workshop, body inspection and repair workshop, livery workshop, and general office, etc. At present, carriages used on the Shin-Yatsushiro to Kagoshima-Chuo section are held and inspected daily or regularly at the Kyushu Sendai Shinkansen Center, and trucks and car components are inspected at the Kagoshima General Depot. However, all these routine, truck and other general inspections will be transferred to the Kumamoto General Depot once the entire shinkansen network is open. ■

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