

Developments and Onboard Services on Odakyu's *Romancecar* Type 50000 (VSE) Limited Express on Hakone Sightseeing Line

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Introduction

Odakyu Electric Railway operates the *Romancecar* Limited Express between Shinjuku in the heart of Japan's capital Tokyo and Hakone and Enoshima, both internationally noted Japanese tourist spots. The *Romancecar* ticketing system uses a capacity control system, meaning all seats are reserved, to carry some 12.8 million passengers annually to these two sightseeing destinations.

Since the first unveiling back in 1957 of the Type 3000 SE (*Super Express*), eight streamlined models—reflecting the times—have served day in and day out right through until today.

By making continued efforts to reduce onboard equipment weight and by using a monocoque body design to lighten the rolling stock with a low centre of gravity and streamlined nose for less resistance, the Type 3000 even held the world speed record (145 km/h) for a narrow-gauge railway before it was retired finally in 1999 after an illustrious career.

Following the Type 3000, Odakyu Railway introduced various designs of *Romancecars* as partners to the joys of railway holidays, and March 2005 saw the Type 50000 VSE (*Vault Super Express*), take to the tracks for the first time while boasting world-class design and technological innovations.

Rolling Stock Design and New Technologies in Type 50000

Design outline

The Type 50000 design concept is based on the idea of 'Exciting Travel'. Odakyu Railway commissioned an architect to coordinate a total high-quality design enabling passengers to 'slip' into holiday mode from the moment they board. Of course, an observation deck, which is synonymous with the *Romancecar* image, is incorporated into the front of the train while interior comforts include unprecedentedly high carriage ceilings, concealed lights, and larger windows.

Passengers enjoy dynamic views through the 3D-curved front window on the observation deck with four rows of four seats in the front section of the lead car.

The aluminium, double-skin structure supports an interior carriage width of 2.66 m (despite being narrow gauge) and a separate-type air-conditioning system secures a ceiling height of 2.55 meters.

By fitting 4-m panoramic windows with seats angled at 5° to them, the observation deck offers supreme uninterrupted views of Tokyo's cityscape as well as the burgeoning natural scenery of Odawara and Hakone.

Concealed interior lighting spreads a gentle glow across the white vaulted ceiling, while two rows of LED lamps under the luggage racks create linear sharpness.

To give the impression of running through from city centre to suburban areas in natural bounty, the carriages are painted in silky white with a line of vermilion orange, the traditional *Romancecar* livery.

Technology

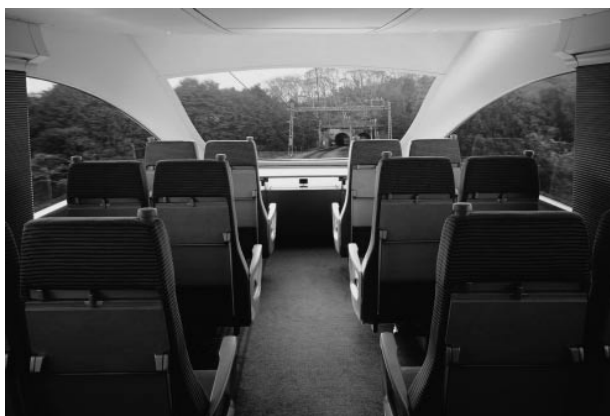
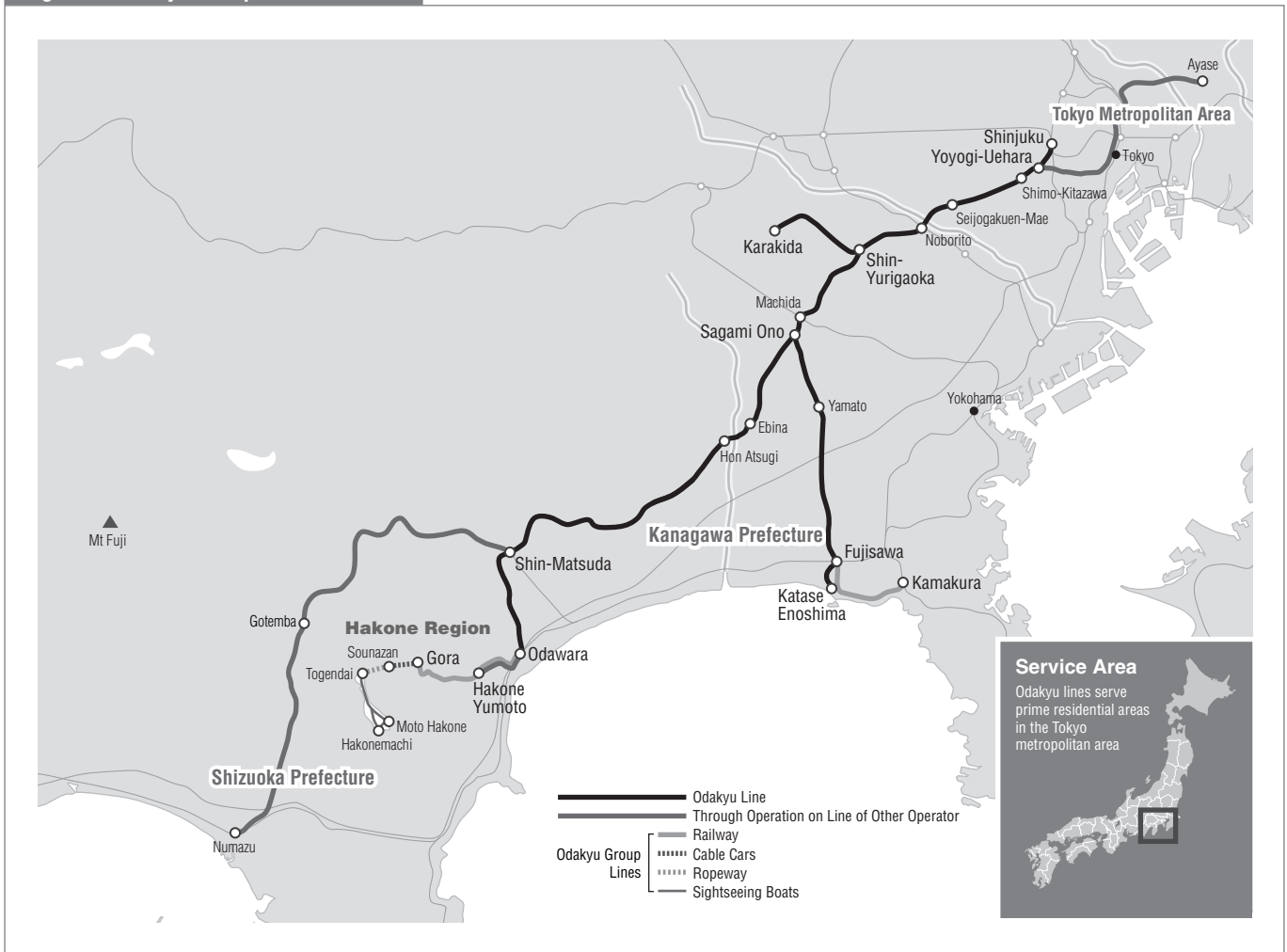
Other than the lead-car observation deck, the Type 50000 body is a simple, rigid, double-skin structure, providing excellent sound and heat insulation. One trainset is composed of 10 cars in an articulated truck configuration of 5 cars each at the back and front ends; the lead cars are 18.2-m long and intermediate carriages are 13.8 m. There are buffet bars and toilets in carriages 3 and 8. Onboard LCD TVs provide destination guides and



Type 50000 VSE exterior

(Odakyu)

Figure 1 Odakyu Group Services Area



Seats with panoramic views in lead car of VSE50000 (Odakyu)



Interior of VSE50000 with vaulted ceiling (Odakyu)

food menus in Japanese, English, Chinese and Korean, ensuring passengers get the information they want.

During the 1960s and 1970s, Odakyu tested pendulum and truck steering systems, but never put them to practical use. However, as better safety and greater travel comfort became design goals for the Type 50000 concept, Odakyu incorporated an air suspension system with car-body tilt control and truck steering.

The new technologies in the Type 50000 are explained below.

Articulated trucks with air suspension are used to tilt car bodies and enhance running stability. To reduce centrifugal force for better ride comfort on curves, the carriage bodies are tilted by up to 2° using position data from trackside sensors and distance information calculated by the Train Information Odakyu Management System (TIOS).



In-seat service 'travelling cafe'

(Odakyu)



Aisle-trolley service

(Odakyu)



Cafe counter

(Odakyu)



Autumn special lunchbox

(Odakyu)



Romancecar VSE Lunchbox

(Odakyu)



Romancecar-Bowl for kids

(Odakyu)

By making full use of articulated trucks where one truck supports two carriages, with electromagnetic lock dampers between each carriage body and truck frame, truck rotation on curves is smoothed out, reducing lateral force on the outer rail and absorbing yaw to improve safety.

Implementation of TIOS with transmission of electronic commands reduces fittings and wiring. Furthermore, to deal with changes in braking power force caused by external

factors such as rain, we have developed and installed a brake control system incorporating train-braking control and anti-slip control. In this system, TIOS calculates the braking force required for the entire train and any inadequate braking at one car is covered by the other cars.

To reduce running noise, Odakyu Railway developed a fully sealed self-ventilated cooling traction motor that does not leak cooling fan noise externally when the rotor is turning.

To add a touch of class to the trip to Hakone, instead of conventional aisle-trolley sales, a wireless LAN system speeds up sales by allowing passengers to place orders with attendants who input the details into a handheld terminal. These orders are relayed to the buffets in the third and eighth cars, so the orders are ready when attendants come to pick them up. In addition, purified water for coffee makers and drinking water helps provide higher quality service.

Onboard Service Changes and In-Seat Service

In general, there are two types of sales and dining on trains: the dedicated space type where passengers go to a dining or buffet car to make purchases or eat; and the mobile sales type where attendants move through the cars carrying merchandise and food on trolleys. Odakyu has adopted the latter type, because of several factors including lack of space caused by short trainset, and short maximum travel time (1 hour 30 minutes).

Odakyu's onboard sales date back to the postwar era in 1949. In 1948, we launched 'weekend spa limited express' services from Shinjuku to Hakone Yumoto (a major spa area) using Type 1910 limited expresses that had just entered service. On these services, waitresses took and served orders without passengers needing to move from their seats. It was nicknamed a 'travelling café'.

During the postwar period, the number of tourists visiting Hakone grew annually and Odakyu's special onboard sales service, adding to the 'specialness' of the trip became very popular. With the Type 3000 debut, onboard sales became part of the *Romancecar* trademark image right up to the modern day. However, the role of the *Romancecar* has evolved over time. First, the idea was to simply carry tourists to Hakone and Shonan (Enoshima), but by the 1990s, people commuting to work and school as well as long-distance shoppers had increased. To accommodate this passenger diversity, Odakyu increased the number of stops and added more cars to limited expresses. With these changes, it became difficult to provide the leisurely waitress service of the 'travelling café' and it was stopped in 1995.

Nevertheless, onboard sales of *bento* lunchboxes and drinks continued. This was followed by an aisle-trolley service where passengers make purchases from their seats. The service has changed but the line of products remains much the same, right through until today. As well as staples like coffee and beer, the contents of popular items like lunchboxes are reviewed and updated regularly.

With the Type 50000 debut, to distinguish services from other trains, Odakyu restarted the 'in-seat service' where attendants take orders and serve each seated passenger. Based on the bygone 'travelling café' idea, we are improving and adding ideas to make journeys to Hakone

more satisfying for passengers. Even the lunchboxes are tailored to customers' tastes and the unique train-shaped '*Romancecar* VSE Lunchbox' is very popular. In September this year, we launched the '*Romancecar*-Bowl' meal for kids. The bowl is a traditional Japanese *donburi* in a train design that can be taken home as a souvenir; it is a hit product.

At present, this onboard sales service is provided on the *Hakone* and *Super Hakone* trains running between Shinjuku and Hakone Yumoto. Odakyu Railway looks forward to spa-bound passengers choosing its Type 50000 to enjoy wonderful scenery and unique carriage interiors over lunch onboard.

Conclusion

Over its long history, the *Romancecar* limited expresses have offered diverse services matching the era. With its groundbreaking technologies, the new Type 50000 VSE has returned to the 'in-seat service' of the previous era. The crew and attendants try hard to ensure every customer feels like they have just entered a high-class hotel from the instant they step onboard, making their trip to Hakone even more enjoyable. Odakyu Railway started a limited express through service to and from subway lines in 2008 and currently has six types of trains dedicated to limited express service alone, an outstanding number for a private railway in Japan. From here on, we will continue to relentlessly adopt the latest technologies and passenger-catching charisma to offer attractive trains and services. ■



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