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Series Railroad Car

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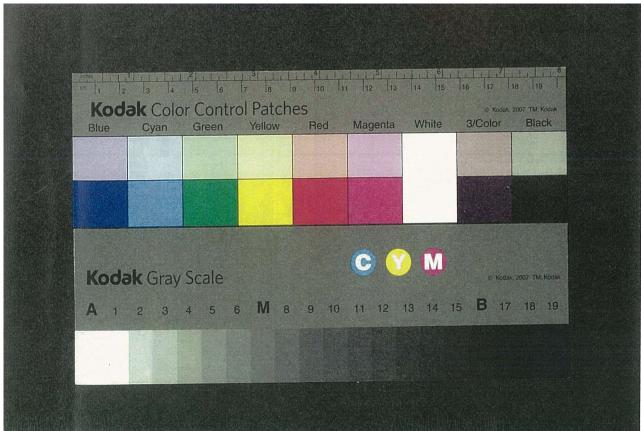
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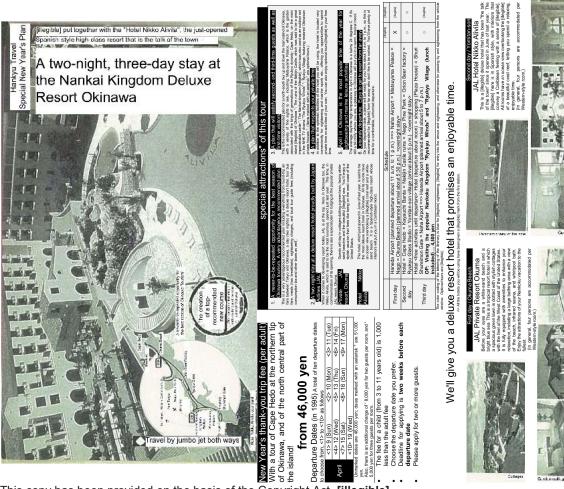
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APAN TRAIN OPERATION ASSOCIATION 429



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[Ear Day (a pun on "March 3")]

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Honorees
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Fuorispieces, Tobu Railway 9050 Series Public Corporation Model 9100 Railroad Car
Out: IKEDA, Morthoshi, YASUDA, Junichi

Cover: Freight Liner going through a field of rapeseed (honorable membron in cover photograph contest) Picture taken by. Kochi Endo (individual member, Sendai) Photo date and location: May 8, 1993, JR East Tohoku Main Line, between Kitashirakawa and Higashishiraishi Camera: Nikomat FT/Film: Fuji Chrome Belvia/Aperture: f4 to 5.6/ Shutter: 1/500



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(26)

New train car profile guide

Tobu Juuto Public Corporation

9050 Series Railroad Car **Tobu Railway** 

passengers, mainly for commutting to work or school in the morning and evening, and on the weekends for sightseeing trips to the city of Kawagoe and Mussathino Ridge Forest Park etc. Recently, with the opening of Ikebukuro station on the new line, the train schedule has been revised to provide greater transportation capacity, and we have introduced double 9050 series trains Through service between our Tojo Line and the Tokyo Metro Yurakucho Line began in August 1987, and straight-through operation is underway between the city of Kawagoe (in part, forest parks) on the Tojo Line and Shin Kiba on the Tokyo Metro Yurakucho Line. The Tojo Line is a section that is used by many with 20 cars. The following is an overview

### Basic concept

The 9000 series ralroad car, which was the prodecessor of the 9050 series rallroad car, was our first all-stainless-steal rallroad car, beginning in 1981 as a prototype single-car train, and it is curently in operation as an eight-car train. It is a rallroad car made for lighter weight, energy 9000 series railroad car, emphasizes the basic concepts of 'brightness' and 'urban feeling' along with the provision of modern services in a more-pleasant railroad car, with LCD in-car displays, automatic wheelchair etc. In addition, VVVF inverter controllers, IGBT SIV devices, AC compressors, and other devices have been adopted for further energy saving conservation, and improved riding comfort, notable as the foundation for the current plans for general commuting railroad cars. The 9050 series railroad car, which inherits design concept and knowhow of the broadcasting equipment, and space for a maintenance-free operation. the

# The composition is fixed at ten cars, and as in the 9000 series, [the MT ratio] has 3. Main specifications

been set to 6M4T. VVVF controllers are aboard cars M<sub>5</sub> and M<sub>7</sub>. IGBT SIV devices, two of 140 kVA and one of 120 kVA, are aboard cars M<sub>6</sub>, M<sub>8</sub>, and M<sub>9</sub>, and three AC compressors are also installed on these same cars, for proper load balance. Tight

lock couplers (rotor type) are present between T<sub>3</sub> and M<sub>7</sub> and between M<sub>8</sub> and T<sub>4</sub> for scheduled inspections at the factory. The fron: coupler was made a rotor-type coupler, which under the train-changing agreement is not used by our company, so in order to allow cars that have an automatic coupler to be connected together in the event of an abnormality, a impler coupler is provided under the floor of both leading cars. In addition, to be ready for a case in which railroad cars that have different brake systems are to be operated joined together, an emergency brake conversion device and an emergency coupling plug are mounted on both so that continuous braking can be

has two areas to accommodate wheelchairs. Each such area is equipped with an interactive emergency information device for talking with the train crew, who

them from ordinary seats. And each train

# Structure of the car body

(pearskin finish) is applied to the surface of the side external plates, and a bead-formed worked material is used for the wainscot paneling and frieze beards. For the roof structure, 0,6-mm-tlick beadformed material is effectively used, so by 4. Structure v. ....
The frame is made mostly of stainless steel (SUS301L-H), And for rigidity and steel (SUS301L-H), and for rigidity concave lowering the center of gravity, concave material of a thickness 4.5 mm and a height 175 mm is used for the side beams. The structure is a stainless steel structure of reduced weight, a double finish process eliminating the vertical through material, the weight is reduced and the center of gravity is lowered. Providing a royal marcon strip on the external panels below. the windows, together with the use of considering the front field of view, as much of the front window area as possible is appearance that is asymmetrical left and right, and an accent strip is shown with the taken for the driver's seat, resulting in an same color as on the side, matching the angular headlights to convey a modern composition with a clean look. At the front, material, bead-formed

# Passenger compartment

decorative panels of a basically white tone and the matching brown tones of the flooring and bench upholstery combine to create a bright, soft feeling. The very The very compartment, passenger

in door pockets. seating pattern that gives each passenger a roomy width of 450 mm. The flooring is two color tones, with merble-like brown in the middle and solic-brown foot lines on the sides. To help passengers who have seats are delineated with a difficulty in getting around, the silver upholstery of priority seats distinguishes

when something abnormal happens will be able to correctly ascertain the situation and take prompt and proper action.

positioned in each car in the longitudinal videration of the care body, with a sweep fan egyll in the middle and, on its left and right. It wo grills that blow out cool air, so as to obtain an even distribution of air, coordinated with the fluorescent. The cooling equipment is of concentrated dispersion system in which four units of 10,500 kcal/h each are

type storage racks, for a clean look. The cooling equipment has roll filters, for better serviceability. By changing the height of the floor surface from the former 1,175 mm to 1,150 mm, the ceiling has been raised by 25 mm, giving the railroad car an open feeling. The side entrances were raised by accommodating the taller physique of today's passengers; also, better measures were taken to prevent drafts from the gaps mm to 1,830 mm, thereby lighting, the grab-strap bars, and the pipe-

constructon in which one pane is lowered, and the former schlieren methoc balancer type has been changed to a spiral balancer type for improved serviceability. Also, for safety, for the window in the wheelchair area, the window opening dimension was set to 1,400 mm from the floor level, to fit ä windows side

irrel-cage induction motor, model TM-102 A, 1430 rpm, frequency 48.8 -12

operability, and visibility, adopting an appearance in which the front window is larger, and asymmetrical left and right. Thus, to ensure a good field of view, a much large windshield wiper with a built-in washer has been installed. The various concentrated of the various equipment and the applied much as possible, thus improving the appearance, and oriental green was uniformly adopted for the color crew compartment, equipment was mounted the subway specifications.

6. Crew compartment
For the crew compa attention was cosmetic color. together as

that are For clear are attached to a console table, and arranged in the middle of the table are a visibility, the front clock face and display lights are painted with a matte dark-gray The main controller and brake controller and switches by the crew. nsed stand frequently clock

## Main equipment

A VVVF inverter has been adopted as the controller for better riding comfort due maintenance-free operation due to the constituent parts include an inverter, a line breaker box, a filter reactor, and a control relay box and the like. In the main control voltage-type, which uses 4,500-V, 4,000-A high-voltage-resistant, large-current GTO efficiency regenerative brake. The main eight induction motors are Cooling of the semiconductors to smooth acceleration and deceleration, and lower power consumption due to highabsence of contacts, improved reliability a PWM inverter for

Electric couplers

TRS GAMISS KI Type reading surface single brine system
TRS-GAMISS KI Type reading surface single brine system
TRS-GAMISS KI Type reading surface system
TRS-GAMISS KI Type caution to the system of th coupling planes) x 2800 mm (width of carl x 4040 mm (height) DC 500 V, contensative top.

CO 5160 V, contensative top.

CO 516 No. Ton M7 NR. 14 M7 NB TC4 Total

S0 075 85 80 975 80 975 86 975 86 90 94

H 152 TG5 12 162 TG5 12 TG5 12 TG5 12 NM NB A 

EXCHANGE TO 51 NM NB A 

EXCHAN ordinary relited passenger car, DC 1500 V, control car, motor car, add-on car TC3 Ms. Mel. TC3 Ms. Mel. TC3 Ms. Mel. TC4 A 1510 9250 9350 94519 + 550 950 950 9750 9800 9590 9050 odor type light lock automatic coupler rod type coupler. bolsterless air spring platform :ar (SU type axle box suspension 20000 mm (distance between couplir 4145 mm (pantograph-folded height) 2878 mm (distance between side ligh Acceleration and deceleration and Train composition (10 cars fixed, 6M4T) Electrical system Weight (tons) number of persons)

solid-shaft parallel cardan system (TD coupling type) model TD-88 gear ratio: 87.14 = 6.21, cog width 85 mm, modules 7, pressure angle 26 degrees, helix angle 18.5 far-infrared heater 500 W x 1 unit (near conductor) Multi-information variable frequency continuous track circuit type, ATC system (interactive and preventive), inductance wireless (for Tokyo Metro lines), (misracine and preventive).

Dispersed amplification type it deal with background mose, speakers within car, 352P.
With automatic broadcast equipment, outside-of-car speakers 4 unitistical, door-dooring buzzees 8 units/car. sympt style, with premutate (IRDE 381) splann with declaration of the style of the Lead car. 23 lamps (including 4 lamps in each compantment that also serve as spare lamps and 1 lamp through expension compantment).

More to expension compantment that also serve as spare lamps headilights sealed-beam lamps. The 100 V, 200 W/150 W, 2 lamps, with non-contact controller. légeres.

We finenter contri spalem (with regrenative bake, with variable loud)

And finenter contri spalem (with regrenative bake, with variable loud)

all-destir contrant play electronagents catalogues (with play that was not services to the contract of the contract o obor closing device Lights inside the carr alternating current fluorescent lamps, AC 220 V-43 W, or direct current fluore lambs DC 100 V-40 W 4 lampsios L. (Dispose with 2 lamps on one side (ora side lamps and energency indication lat.) Eld degly layer SMC control spears. It can expeny type SMC control spears. It suit found to expeny type SMC oyears, a lambidiar including the control spears of the spear of the control spears of the control spears and it control size spears and it control size spears and it control size spears. Middle cars. AC 220 V-900 W x 16 units Car with wheelchair: AC 220 V, 900 W x 12 units, 1300 W x 3 units Crew compartment, far-firliarez heater 250 W x 1 unit, sheath heaters 510 W x 2 units concentration-dispersion type, 10500 kcalifucini (incoel RPU-3002A), B), 4 unitsicar with combined switching circuit for heating and cooling, with roll filter Passenger compartment low-tollage reflecting type sheath heater Microcomputer control system with matrix display pushbutton system, interactive system (wheelchair area only) monitor display linkage esponsive integrated type triple system Train radio: space wave wireless system Headlights: sealed-beam Rear lights: LED type equipment
Display lamps at side of car
Displays for type and destination in-car displays Current-collecting equipment Electric sir compressor Auxiliary power source Broadcast equipment Wireless equipment Cooling equipment ighting equipment eating equipment ATC/S equipment Controller Brake devices

for the main circuitry is done with a heat pipe cooling system that makes use of the wind caused by the motion of the train,

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(Japan Train Operation Association Magazine, March 1995)

(Japan Train Operation Association Magazine, March 1995)

noise timbre caused during pulse mode modulation upon startup. This makes it system without a pulse transformer, for smaller size and lighter weight, and for microprocessor amplifier, optical fiber is better reliability. A modulation pulse number switchover system is adopted in possible to suppress the transient torque and a [CFC-free] cooling medium is used in order to deal with environmental problems. The GTO drive device adopts a insulation and high-voltage insulation, for the unpleasant electromagnetic sounds and changes in fluctuations that occur when pulse mode switching is done, and produces better offers superior transmission to reduce which signal used, order

speed on our company's lines. Also, by choosing the same VVVF devices and main motors as in the 20050 series, it has been possible to reduce the need for spare consideration of the high acceleration on the Tokyo Metro lines and the high travel Used for the main motor is a 150-kW motor, induction riding comfort as well. high-output

parts.
(2) Brake equipment
What is adopted for the brakes are all-

non-contact type, which improves operability, and a brake command unit is provided under the floor as the output unit. and suppression brakes. They are made up of parts such as a brake controller, a device, an electropneumatic amplifier, and a brake relay. The brake controllers are of electromagnetic straight-through air brakes with supplementary air brakes also used for regenerative braking. Four types of brakes are provided: off valve type ordinary brake command unit, a brake control brakes, emergency brakes, safety brakes command straight-through

in the ordinary brake, normally three pressure-applying command lines are controlled by a digital command with a pure binary ON-OFF choice, providing seven levels of braking. In the emergency brake, normally two pressure-applying detection of of failure to reciprocation, to prevent touching together and to improve reliability. The safety brake, a backup brake. For improved reliability, as brake monitoring circuitry, various circuits are provided for detection of is impossible after operation of the emergency brake does it operate + and -, are pulled through in which normally is made up of pressureordinary and emergency brake systems, and only if this automatically independently in each car as <u>.s</u> failure, detection independently of the circuitry, emergency

release the brake, a function for forcibly detection of reduction in basic air pressure, releasing the brake if it fails to be released

(3) Motor-driven air compressor

air compressor is a low-noise air compressor that runs on an AC 220 V power source and employs a shim-type three-phase induction motor having easy startup control. Using a shim-type motor is meant to improve reliability and serviceability. Reliability is also improved are both provided, and the brake is supplied with compressed air, without a because an after-cooler and dehumidifier What was adopted for the motor-driven

(4) Auxiliary power unit
Adopted for this device is an IGBT
(insulated-gate biplar transistor) type SIV
device that uses an IGBT as its main
control element. It is made up of an inverter, a starter, a reactor transformer box, etc. The inverter part can be made smaller, lighter, and simpler because with the IGBT element being of the voltage drive type, the gate control power is low and the circuitry can be simplified, it can be turned on and off at high frequency and thus the output waveform is nearly a sine wave, allowing the waveform rectification circuitry to be simplified, and being a molded element, it can be built in to easily make a cooling structure. The starter is of the type in which the job of cutting off the current in an accident is done by a thyristor, so the circuit breaker is no longer responsible for blocking large currents, and therefore a small electromagnetic contactor can be used, allowing a smaller magnetic noise of the for inverter output waveform rectification in a prior stage of the output transformer transformer is reduced by inserting a filter The

A power receiving and supplying device is a device that supplies power only to the important loads from the normal side when due to a breakdown of an SIV device; power is supplied semi-automatically by operating a power receiving and supplying switch that is provided behind the power generation becomes impossible inside the reactor and transformer box. operator's seat.

(5) Displays and automatic broadcasting

given the function of automatically turning off their display between stations, where the need for such display is questionable. side that display the type of train and the destination have changed from the former The destination displays on the front and prolong useful life, the destination displays on the side have been motor-wound type to the high-brightness LED type, for better visibility.

reinforced plastic (FRP), and tilting it at an angle of 30 degrees from the vertical.

The broadcast device is of automatic broadcast type; besides the basic the train will stop at, and other information. Consideration has been given to making this monitor easy to see from the seats as well, by mounting on the lintel inspection cover, which is formed from fiberside doors in each car; visually, they provide improved service by displaying the destination, the type of train, the stations As an in-car guidance device, a nine-inch

ure enrengency prake operates. Also, the for attaching the equipment.

Broadcast device adopts an automatic (e) Emergency reporting device volume control system that can vary the Besides putting two emergency reporting loudness to correspond to changes in the devices of the same buzzer type as background noise, making it possible to previously in each car, an interactive make announcements at the right volume emergency reporting devices has been put for the noise inside each car. The opening in the wheelchair area, making it possible and closing of doors is given a relatively to communicate with the crew. In this large weight among matters concerning operation method, upon pressing a the safety of passengers and the railroad reporting button (with a clacker plate) in car, and consideration has been given to the reporting device, an energency further reducing accidents when doors are reporting buzzer sounds in the caller's car functions have been and in the crew compartment. Then, upon broadcasting of announcements about the destination, the stations where the train stops, and information about changing trains, it also broadcasts warnings when the emergency brake operates. Also, the further reducing accidents when doors are opened and closed; functions have been added with which, when the doors are

the conductor's voluntary operation of a the announcement, from a speaker outside the car, that the doors are about to close, and a corresponding chime is sounded from when the doors are about to open or close, departure signal switch departure signal buzzer

A combined control system from the display device command unit is used for the destination display devices, the in-car ic passengel guidance devices, and the automatic broadcasting devices. In addition, the display device command unit and the train information device command unit are made compact, to improve operability and to ensure [adequate] space the door speakers.

pressing a confirmation button on the report receiving device in the crew two-way communication can be conducted. Resetting when the conversation has ended can be done from the crew communication display light lights up, and the buzzer compartment,

(7) Platform cars

A bolsterless platform car having no bolsters was made, to lighten the weight A Z-link type pulling device was adopted, and provide maintenance-free operation. to improve riding comfort.

In the axle-box suspension, two horizontal flat springs are attached above and below between the axle-box and the platform car frame, and with the proper the front-rear rigidity, excellent properties can be maintained. In addition, U-shaped shock absorbing rutber can suppress front-rear and left-right rocking while degree of left-right rigidity, with respect to maintaining high-speed stability

8. Conclusion

continue to favor us with their patronage. Finally, we wish to express our gratitude December of last year. We expect that providing passengers with these pleasant cars will enhance the image of Tobu Railway. And we hope that everyone will car was <u>...</u> 9050 series railroad o ntroduced

to everyone in the supervisory agencies and in related positions for their guidance

and unstinting efforts in the design and

 Lear body
 Except for the front part of the lead car and part of the frame, a lightweight all-stainless-steel structure was adopted (SUSSOTL, SUSSOS steel) for the train body. The outer plates are given a dull finish that suppresses gloss, and there is a (Toshiya Yoshino, Car Section, Operation Car Department, Tobu Railway (Ltd.))

# Housing and Urban Maintenance

blue stripe on the hairline material in the edge on the side. The front peat has a black and a silver metallic paint coating, and the paint on the side doors is blue in the wheelchair area and yellow in the crosssat part, with the color of the door indicating the functions that that car has, between Chiba-Newtown Central station and Inse Makindara station), has created a new type of railroad car, the model 9100 (double 8 car train, totaling 16 cars). The new car is affectionately called the "C-Flyer". The C is the first letter of Chiba-Newtown, Comfortable, Clean, and Culture and the like, and "Flyer" means a Public Corporation, together with beginning operation on part of the corporation's second-period line in spring of 1995 (planned) (a 4.7-km stretch) The Housing and Urban Maintenance

so as to give a vivid impression.

To convey mellowness with a feeling of speed, the front of the lead car, with

ordinary steel [...

to provide functions as a railroad car in the pursuit of conventence and confrort. Since the public corporation railway began operations in 1984 between Komuro and Chiba-Newtown Central (4,0 km), we have worked to ensure transportation for the residents of Chiba-Newtown, and in rapid train or express train. It was designed and produced to November 1992 we are beginning construction of a new line between the sections that are now in operation. enhance the image of Chiba-Newtown and

2. Basic design concept
The model 9100 railroad car was designed with the following points in mind.

(1) Enhancing the image of Chiba-Newtown

(2) Because maintenance and other operations will be entrusted to the Hokuso Development Railway, the underfloor and other equipment will be shared with the Hokuso model 7300.

(3) Nonstop service will become possible among the Hokuso, Keisei, Toei Asakusa, and Keihin express lines.

(4) Labor and energy will be saved, and high reliability will be achieved.
(5) Riding comfort will be improved, and noise will be reduced.

(6) Passenger service will be improved. 3. Train composition and main

composition, the performance is as

With an eight-car 6M2T fixed train

(1) Acceleration: 3.5 km/h/s (2) Deceleration: 4.0 km/h/s normally, 4.5 km/h/s in an emergency

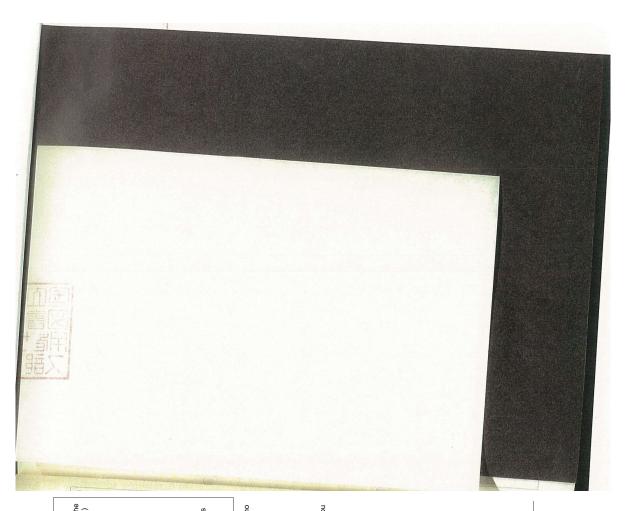
Designed maximum speed of

(3) Desi 120 km/h

(Japan Train Operation Association Magazine, March 1995)

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field in regions	ular Erripio)	Number of Regular Employees (current at February 1st)	ordary ist)
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		bre	previous month)
- Total	25, 578	+ 552	-23
- Breakdown			
뚝	7,628	-22	+
Private Rail	17,651	+576	-27
Others	299	-5	
- Top 5 companies			
JR: (TO) F	leadquarter	JR: (TO) Headquarters/Tokyo district, (KAN)	AN)
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district, (KYU) Headquarters/Kitakyushu district, (HO)	dquarters/K	itakyushu district, (	( 연
Headquarters/Sapporo district	oro district		
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SEIBU RAILWAY, Keihin Kyuko Rail, Kintetsu Railways	Keihin Kyuk	o Rail, Kintetsu Ra	ilways

We pray for the earliest possible recovery for the companies and the employees impacted by the Kansai earthquake on January 17th.

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January 10: 141st planning committee meeting held in Aoyama Metro Hall. Decision about the works for the 1994 excellent technical paper prize and excellent essay prize; 17

\* Association news \*

(25)

people in attendance.

2. January 17: March number discussion held at Tokyo Marunouchi Selyoker; Beople in attendance.

3. January 17: Editoral committee for the April number held in the conference room of the Eukakawa general gymmasium of the Teilo Rapid Transit Authority; 14 people in attendance.

4. January 27: Holding of ceremony commemorating the 36th anniversary of the founding, at Hotel International Tourism in Yassu, Tokyo.

5. January 31: Combined funeral (Nippon Shingo (Ltc.) and Japan Ralinoad Operation Association) for former chairman Takeji Hayashi, who died earlier; held at Semichidanikadou in Shinjuku-ku, Tokyo.

6. Individual in-person guidance based on railroad personnel safety measures educational guidance (event with the assistance of the Ministry of Transport), carried out with the following schedule.

(2) December 6: Cakrunan Railway, participation by 5 people (2) December 8: Tenryuhamanako Railway, participation by 23

December 13: Arita Railway, participation by 4 people December 14: Kishu Railway, participation by 4 people

# \* Editorial Office \*

The damage caused by the 'Southern Hyogo Prefecture Earthquake" (magnitude 7.2), which struck the Kinki region in the early hours of January 17, was found to increase as rescue efforts proceeded, and proved to be an unprecedented major disaster with a death toll of 5,300 people.

According to an amouncement by the Ministry of Transpot, the damage to ralindsate seached a total of about 350 billion yen for the cost of recovery by 13 railroad companies, including JR West and Hanshin Electric Railway.

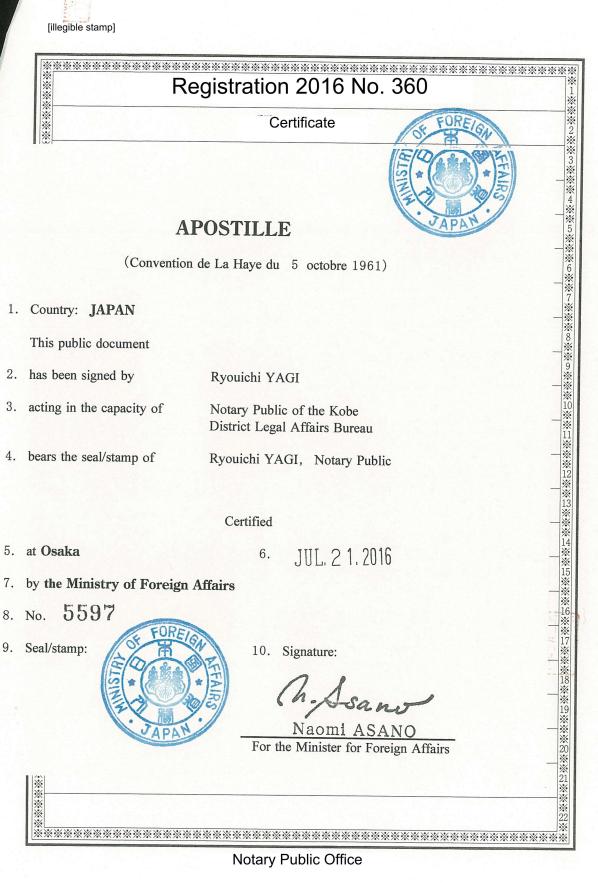
Our wishes for recovery go out to remembers who have suffered in this disaster, and our graittude goes out to all those who have been working in the recovery efforts without rest or

When in planning this special edition on through service we asked for an article from Sanyo Electric Railway, we were relieved to learn from newspaper reports that their special express train that came onto the Kobe Rapid Transit Line with this earthquarke brank escaped change at Okai Station, which had collapsed, and that passengers and crew took refuge safely. (Takashi Ogawa, head of editorial department)

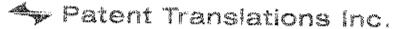
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1700 Seventh Avenue, Suits 2100 — nail@PatentTranslations.com Seattle, WA 98101, US3 — http://www.PatentTranslations.com Fax: 206-289-3862 — Tel: 286-357-8608

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Translator's Declaration: September 7, 2016

I, Mark Spahn, hereby declare:

That I possess advanced knowledge of the Japanese and English languages. My qualifications are as follows:

- over 35 years as a Japanese-English translator, focusing primarily on technical and legal documents, including four years in-house at the law offices of Baker & McKenzie in Tokyo
- Master's degree in Electrical Engineering/Computer Science from the University of Utah
- computer programmer at Computer Task Group
- co-author of "Japanese Kanji & Kana: A Complete Guide to the Japanese Writing System," Tuttle Publishing, 1981, 1997, 2011, 2012
- co-author of "The Kanji Dictionary" (a 47,000-entry bilingual dictionary, well-known as the Spahn-Hadamitzky dictionary) Tuttle Publishing 1996, 1998, 2002.

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