Chapter 6 – Caption Translations (Kato Japan N Gauge 50th Anniversary Book)

Fig.6-1 A drawing table needed for handwritten design.

Fig.6-2 The reproduction of the front shape for the Odakyu Electric Railway HiSE limited-express train “Romance Car” via the application of wireframe and 3D surface modeling in CAD.

Fig.6-3 The model of the JR East E7 “Shinkansen” designed 3D CAD solid modeling.

Fig.6-4 Front shapes reproduced by CAD data for the model of the Odakyu Electric Railway Type 3100 NSE “Romance Car” for limited-express trains.

Fig.6-5 Caving machine.

Fig.6-6 General purpose milling machine.

Fig.6-7 Electric discharge machine.

Fig.6-8 Formed grinding machine.

Fig.6-9 Wire-cut electric discharge machine.

Fig.6-10 NC (Numerical Control) milling machine for engraving of molds.

Fig.6-11 High-speed machining center.

Fig.6-12 The undercut front shape observed in the body of the EF200.

Fig.6-13 An electrode and a workpiece of mold before electric discharge machining.

Fig.6-14 The state after the completion of electrode discharge machining.
(a) The electrode inserted in the workpiece.
(b) The relation between the cross section of the electrode and an engraved shape in the workpiece on the X-Y plane.

Fig.6-15 The relationship between the electrode and an engraved shape where the electrode was moved around the central axis on the X-Y plane.

Fig.6-16 Electric discharge machining with the movement of the electrode.
(a) The feed of the electrode in Z-direction is adjusted to be similar to the shift of the electrode on the X-Y plane.
(b) The circular motion of the electrode and the shape of groove in the workpiece.

Fig.6-17 The instance at which the displacement of the electrode is at its greatest.
(a) The eccentricity of the moving electrode from the central axis of the groove.
(b) The corresponding location of the electrode on the X-Y plane.

Fig.6-18 The method to create sharp corners in the groove.
(a) The movement of the electrode towards the corner.
(b) The electrode moved at the maximum leaving a clearance for the electro discharge.
(c) The finished corner with a remaining small radius curve corresponding to the gap needed for the electric discharge.

Fig.6-19 The electric discharge machine CHARMILLES Super D-10 made in Switzerland introduced in 1973.

Fig.6-20 AGIE CHARMILLES SA, Roboform 35P, a CNC (Computerized Numerical Control) electric discharge machine with an automatic exchanger of electrode and of workpiece.

Fig.6-21 From front to back, a mold for the front of KIHA82, an electrode for electric discharge machining, and a molded body.

Fig.6-22 From front to back, molded body of a Series 700 "Shinkansen" body and the electrode for the mold.

Fig.6-23 Engraving via an electric discharge machine.

Fig.6-24 The spark and the generation of gas during electric discharge machining.

Fig.6-25 The plunger-type injection molding machine C4/S by ARBURG in Germany.

Fig.6-26 SUMITOMO HEAVY INDUSTRIES Neomat 28t, an inline-screw-type injection molding machine.

Fig.6-27 NISSEI PLASTIC IDUSTRIAL injection machine PS10, where the nozzle for the melted plastic supply is connected to the sprue located at the parting line of closed molds.

Fig.6-28 The arranging machine for molded parts developed by our company.

Fig.6-29 NIIGATA ENGINEERING MDV50 electric vertical injection molding machine. Used to produce double crossovers, 15° and 90° crossings via insert molding.

Fig.6-30 TOSHIBA MACHINE EC100N II electric injection machine for molds using high-density plastic material.

Fig.6-31 An in-house developed machine designed for the removal of N-gauge bodies from their molds.

Fig.6-32 Rotating head design.

Fig.6-33 The stocker of molded parts with an automatic box exchanger.

Fig.6-34 An example of a common base block of a mold with component parts sliding in four different directions.

Fig.6-35 SUMITOMO HEAVY INDUSTRIES Neomat 120t injection molding machine which was the main machine for molding UNITRACK ballast parts.

Fig.6-36 SUMITOMO HEAVY INDUSTRIES Neomat 75t injection molding machine.

Fig.6-37 SUMITOMO HEAVY INDUSTRIES Neomat 45t injection molding machine.

Fig.6-38 SUMITOMO HEAVY INDUSTRIES- NESTRAL SG150U Sycap injection molding machine.

Fig.6-39 The cylinder bore in this ARBURG C4/S injection mold machine was enlarged in order to increase the injected volume of molten wax required for making lost-wax casting patterns for targeted parts.

Fig.6-40 The machine for the production of wax pellets composed of a heated plate and a cold pulley with a large heat capacity developed based on an idea from Yuji Kato.

Fig.6-41 The holder base structure developed by our company, which enables the exchange of component parts without removing the main body of the relevant mold from the injection machine.

Fig.6-A1 In 1980, the Sakado factory was constructed and it became a new center of production to meet the increased demand at that time. Today, the factory supports the N-gauge market by the dedicated production of UNITRACK items.

Fig.6-42 The composition of parts around a leading wheel of a JNR C12.

Fig.6-43 The method of electrical pickup from the leading wheel as implemented in the previous model of the JNR C50.

Fig.6-44 A common leading wheel.
(a) The appearance around the drive cylinder of a JNR C57 4th style.
(b) A common spoke leading wheel composed of a plastic core and a metal wheel.

Fig.6-45 Usual methods for electrical pickup.
(a) A power collector contacts the inside of leading wheel. A larger contact time per revolution of each wheel causes additional wear on the collector in addition to adding friction to the wheel's rotation.
(b) A power collector incorporated into the truck contacts only the tip of the axle. This design cannot be utilized with open leading wheels supported from the inside.

Fig.6-46 The new design of a spoke wheel with electrical pickup capacity. The point contact of the thin wires to the axle of the leading wheel solves simultaneously the problems of the wear of collectors and the excessive increase in rotational resistance on the wheel.

Fig.6-47 In a new design of leading wheel adopted by the 50th Anniversary N-Gauge JNR C50, the tire and the core are cut out in one single piece to reproduce the spokes by the presswork in the successive process.

Fig.6-48 A schematic view for the machining of a wheel via lathe

Fig.6-49 An array of cutting tools with various blade edge shapes for finishing different surfaces of a wheel.

Fig.6-50 Numerically-controlled lathe.

Fig.6-51 A schematic view of presswork to make a metal spoke wheel in a one unit body with a tire.

Fig.6-52 A part which controls a wire in a WC EDM (wire cut electric discharge machining).

Fig.6-53 The electrode to make a punching tool for the presswork of metal spokes. The electrode is made by the WC EDM.

Fig.6-54 The shape of punching tool for the presswork of metal spokes integrated in the press die device.

Fig.6-55 The state of a wheel after the reproduction of spokes via press punching.

Fig.6-56 Semi-glossy metal plating was applied to the surface of the relevant spoke wheel designed for electrical pickup (right in the picture), which is different from the existing wheel with glossy plating (left).

Fig.6-57 After spoke punching and semi-gloss plating, blast processing is applied to the wheel. The wheel surface changes from the semi-gloss finish (left) to become matte (right).

Fig.6-58 The spoke wheel with electrical pickup capability was first developed in 2015 for the small steam locomotive JNR C12 to help provide stable operation, where the wheel design was used for both leading and trailing wheels.

Fig.6-59 A trial sample of a leading wheel incorporated onto an existing model pf steam locomotive.

Fig.6-A2 The first spoke leading wheel was developed for an N-gauge model in 1994, when the export model of the BR86 was produced. In the early design stages, see-through driving and leading wheels were planned, however, this was canceled because of the difficulty in maintaining accurate assembly of axle and wheels.

Fig.6-A3 The JNR C57 was the first domestic prototype model with spoke-type leading wheels. However, the wheel was the same as that developed for the BR86 with high flanges designed to European specifications and with a plastic core of seven spokes instead of the prototypical eight.

Fig.6-A4 In 1997, see-through driving wheels were developed and applied to the JNR C55. A modified leading wheel with lower profile flanges and eight spokes (but not with a see-thorough core) was attached when a variety of C55 with Witte-type smoke deflectors (referred to as "Montetsu" deflectors in Japan) was released.

Fig.6-A5 In 2014, improved leading wheels with a see-thorough core and finely shaped spokes were introduced to the 4th style JNR C57, which was designed as a wheel that could provide the stable power collection required for the newly developed small JNR C12 locomotive.

Fig.6-60 A punching machine assembly for manufacturing spoke driving wheels for the JNR C55.

Fig.6-61 An outline of a mechanism for sorting the obverse and reverse of wheels before the punching from the desired direction.
(a) The wheel can pass through the discrimination block if the flange surface is facing up.

(b) On the other hand, if the flange surface is facing down, the wheel cannot pass through the discrimination block. The position of the wheel is moved by the block as much as the height of flange. The small difference of the wheel position is then detected and the wheel is returned to the bowl.

Fig.6-62 Trial samples of a high-flange spoke wheel with a tire diameter of 5.5mm before and after punching.

Fig.6-63 From left to right, a leading wheel of a C12, a driving wheel of a C12, a driving wheel of the U.S. steam locomotive FEF, and a one-yen coin with a diameter of 20mm.

Fig.6-64 The caramel-type motor produced by an outside company was employed in the drive unit of MOHA103 in the Series 103 commuter electric train released in 1966, the second motorized model of N-gauge in Japan.

Fig.6-65 The "Midget" motor, developed by Sekisui Kinzoku in 1966, was used for early models such as the later productions of the early C50 and MOHA103.

Fig.6-66 To increase locomotive power, a large elongated motor with three poles was developed by Sekisui Kinzoku and applied to the JNR EF70 in 1967. The motor, together with an improved drive unit structure, was used also for the first export model, the ALCO PA-1, developed later that same year.

Fig.6-67 N-gauge motors have been developed internally to this day. The FM-5 motor with five poles developed in 1969 was introduced to later production EF70's with a new drive unit whose high-performance was verified already in the PA-1. The motor was widely used for various models including steam locomotives, electric cars and diesel cars during a ten year period before being replaced by the smaller GM-5.

Fig.6-68 The development of a drive unit combining the FM-5 and a die cast frame drastically improved the operational performance of electric and diesel cars. As seen in an example of the MOHA103, however, the see-through windows could not be realized owing to the protruding shape of the die cast block covering the motor.

Fig.6-69 In the small JNR C11 locomotive released in 1971, the "Midget" motor developed in 1966 occupied the entire volume of the tender as shown in the picture. The C11 was improved later with the application of a smaller SM-5 motor developed for the JNR D51 in 1973 along with modifications to the drive and body structures. As a consequence, an empty volume was left by the reduction of motor size inside the tender of the modified C11.

Fig.6-70 The model of the JNR C62, the largest Japanese passenger steam locomotive, was released in 1971. The cab of the locomotive allowed for the size of a powerful FM-5 motor by modifying it to use a single drive shaft.

Fig.6-71 The small empty volume inside the cab of the JNR D51 released in 1973 required the development of a motor far smaller than FM-5, the SM-5. The cross section of it was rectangular in the original and an oval in the later production, respectively.

Fig.6-72 The comparison of motor sizes between the FM-5 (left) and the later production SM-5 (right) with an oval cross section.

Fig.6-73 The comparison of motor sizes between the FM-5 (left) and the GM-5 (right). The GM-5 was developed in 1979 to increase torque and to allow for see-though bodies in motorized electric and diesel cars.

Fig.6-74 The motor GM-5 was first applied to the EF65 1000 direct-current electric locomotive where the empty volume in the die cast block, resulting from the change from FM-5 to GM-5, was filled with a spacer.

Fig.6-75 JNR Series 201 commuter electric train was the first example of an electric car which had a drive unit using the SM-5. There were five different colors including those which did not actually exist in prototype.

Fig.6-76 To further reduce the motor size and increase operational stability from the GM-5 (left), a new motor GM-3 (right) was developed in 2007. Because of smaller size of the GM-3, a rotor with three poles was selected. To maintain the strong level of torque despite the reduction from five to three poles, powerful neodymium magnets instead of the ferrite ones used for the GM-5 were used in the GM-3. To reduce the cogging effect resulting from these strong permanent magnets and small number of poles, the angle of the poles were skewed.

Fig.6-77 The GM-3 was introduced with the KIHA80 in the JNR series KIHA82 diesel limited-express trains. With the addition of two flywheels to both drive axes of the GM-3, stable operation at scale velocities were made possible compared to the KIHA80 with the GM-5.

Fig.6-78 Motor size was significantly reduced by the development of a 7mm diameter coreless motor in 2010.

Fig.6-79 A coreless motor can fit into a boiler even with two flywheels connected to it, leaving the entire volume inside the cab empty. This freedom gives greater potential for molded details around the fuel hatch in the cab.

Fig.6-80 A schematic of the progress in motor sizes for roughly 40 years from 1969 to 2010. The picture shows, from left to right, FM-5, SM-5 with an oval cross section, GM-5, GM-3, and the 7mm diameter coreless motor.

Table 6-1 Representative motors used in N-gauge models by Sekisui Kinzoku/ KATO.

Fig.6-A6 A sample drawing showing the drive parts assembly for JNR C12 released in 2015. Most component parts were finished with an accuracy of 0.01mm-order. All dimensions inserted in the original drawing have been removed for the present citation.

Fig.6-81 The painting of a part for the front of a JR East Series E7 "Shinkansen" train.

Fig.6-82 To realize the sharp division between different colors on the front of the EF66 direct-current electric locomotive, a separate part, which was painted in advance, is assembled.

Fig.6-83 A revolutionary paint procedure for the two tone color bodies on TEE trains RAe II in Switzerland was attempted by using vertically divided body parts. There are a set of original models delivered by Hobbytrain and a set of improved models sold under KATO branding.

Fig.6-84 A tampo printing machine and the printing for the roof of a JR West Series 281 limited-express train "Haruka" for the access to Kansai Airport.

Fig.6-85 A beautiful Series 201 commuter electric train "Shikisai" (color of four seasons) by JR East was produced through the use of multiple printings.

Fig.6-86 Cherry petals dispersed on the body of "Shikisai" were expressed by color gradation.

Fig.6-87 The comparison of trademarks on the surface of a tanker finished by multiple tampo printings (left) and by an inkjet printer (right) after improvement.

Fig.6-88 Comparison of silver decorations on the front of a Seibu Railway Series 101 commuter electric train expressed by hot stamps (left) and by printing (right) after improvement.

Fig.6-89 The body of KUMONI83 in a series of IIDA line trains, cf. Section 1.8, Chapter 1, is painted in a two tone color of ivory and dark blue. Reproducing the sharp color boundary is quite difficult for this model, because the boundary is curved on the front of body, and there are deep concave baggage doors in addition to the usual doors on the side which disturbs the masking of paints along the entire length of the body. Today, the reproduction of the sharp paint boundary is possible using precise plastic masks which are fabricated by the application of technologies accumulated so far for the machining of metal molds. The areas of dark blue at the top of the front are reproduced by tampo printing instead of painting, which requires another technology to match colors regardless of the material, i.e., ink or paint.

Fig.6-90 The commuter diesel car JNR KIHA35 900 has a body of corrugated stainless plate that characterizes stainless cars. Even though they are made of plastic, the metallic paint emphasizes the beauty of corrugated surfaces on the side to the roof by using fine engraved molds. The corrugated stainless bodies for dual-current electric locomotives such as JNR EF30 and JNR EF81 300 were reproduced in a similar fashion.

Fig.6-91 The surfaces of stainless railway cars is not uniform, and different surface finishes are applied on each part of the body resulting in a variation of brightness, gloss and tone of silver color depending on the view angle. The delicate variations in the texture of metal surfaces are reproduced precisely also in the model by the availability of materials and by the development of modern painting and printing technologies.

Fig.6-92 The printing of a display screen for the train type and the destination is not easy because white, black and blue colors must be printed on the small concave surface without misalignment. The quality of printing is high so that the magnified characters can be clearly read.

Fig.6-93 For a JNR SUYU13 post car, five characters representing the car operation are printed on the display board area of 1.2mm in width. The small display of a Japanese postal symbol as well as one on the window glass are printed with red ink on the white background. By current technologies, the printing of multiple colors in a small area is possible with minimal misalignment.

Fig.6-94 The smooth body of JNR Series 50 passenger cars for local trains is pained in a monotonous red color. To derive the atmosphere of the actual train by the production of stereoscopic feeling, white lettering, silver lines, and gray lines are printed on the red body, along the door rails and sills, and around windows, respectively, in addition to the silver color on the window sashes.

Fig.6-95 Glossy black is often painted on the model of preserved steam locomotive after they finish operation on active service. On the one hand, depending on the type of steam locomotive, several black colors with different tones are used on the parts of the relevant model which was painted in matte black color expressing the age of active operation. In other word, to reproduce the atmosphere of the prototype, different black paints, e.g., reddish black and bluish black, are used for the models of steam locomotive according to the engine depot and operated lines where its prototype was assigned. At the same time, many conspicuous colors are painted on the small parts, which characterize the impression of the locomotive. For example, the white color on the side of the running board gives a strong impression, while silver color on the front periphery of a shield beam increases the presence of a small headlight. Furthermore, copper color along the air piping fixed by black bands on the boiler cover provides a very strong accent. All of these colors are expressed by printing in high accuracy. The actual impression of number plates is realized by hot stamps. Even in a black steam locomotive, the procedure of PPS (Painting, Printing and hot Stamp) is unavoidable when giving it a high quality finish.

Fig.6-96 The Seibu Railway Series 5000 "Red Arrow" limited-express train attracted much attention because of its fresh design, cf. Section 2.2 (2.3), Chapter 2. To produce models of this train, the application of various technologies for designing and finishing was necessary to express the characteristic shape of the front and the difference of surface materials used there. The ivory body color and red stripe are reproduced with paint. The convex light cases installed on the front are expressed by the insert of separately molded red parts because of the difficulty in the masking needed for leaving thin ivory lines around them. The decorative boards of light frames in their molded state are inserted into the light cases. Matte silver is stamped on the sash frames and the front windshield wiper, molded in clear blue, while glossy silver is painted on the surface of the decoration board shining brightly under the front window. The company emblem in gold color located at the center of the decoration board is reproduced by a hot stamp process. The head signs are printed using a four color method on the individual parts. It can be said that the "Red Arrow" is a representative example for the application of state-of-art technologies of painting and printing in the production of N-gauge models.

Fig.6-97 Difference in body structures between old and new models of the JNR D51.
(a) In the new D51 model, the smoke deflector is affixed to the upper part without using glue. The running board is assembled to the bottom part of the locomotive.
(b) In the old D51 model, the smoke deflector was glued to the upper part of the model, while the running board and the main part of the body were molded together.

Fig.6-98 Various means of attaching trucks by screws and various other methods observed in early models.
(a) In the early JNR OHA31 passenger car, the upper part was composed of four body walls, one roof and one floor board which are assembled with glue. The trucks were attached to the metal weight plate by screws which go through the floor board.
(b) In the early JNR Series 103 commuter electric train, the body was molded with a top board internally referred to as a "Roof body structure". The floor board was fixed to the body with glue except in the case of motorized cars, and the trucks were attached to the floor board by screws. The roof was affixed to the top board of the body with glue.
(c) The early models of JNR Series 20 sleeper cars for limited-express night trains had a "Floor body structure" where the body and floor including the underframe equipment were molded as one unit. The roof and windows were also molded integrally by using transparent blue plastic material, and the bottom of windows had thin protrusions

to push a metal weight plate on the floor. The trucks were attached to the floor by screws.

Fig.6-99 The truck was attached to the floor board by using a plastic center pin pressed into the "Floor body structure" where the interior is integrally molded with the body.

Fig.6-100 On the "Floor body structure", the inside of the body can be revealed by the removal of the roof. The floor and side panels are integrally molded with the body although though the colors were different between them.

Fig.6-101 A screw was used again to attach the truck to the separated interior part through the floor board on the "Roof body structure". The "Roof body structure" was adopted again to avoid issues with the small clearance between the body and the roof observed in the "Floor body structure".

Fig.6-102 In "Roof body structure", the interior part, molded in a different color, is fixed to the floor board by fitted tabs. The interior part has female screw ports to fix the center screws for trucks, and was the structure adopted from 1985 to 2006.

Fig.6-103 In the "Snap-on truck" method introduced in 2006, the center axis corresponding to the center pin or the center screw is integrally molded with a floor board. This design was able to increase the efficiency of assembly.

Fig.6-104 The center axis under the floor is pinched by the part of the truck with a flexible structure.

Fig.6-105 An example of a JR East E233 commuter electric train with a suspension structure where a leaf spring for power collection is supported by two points.

Fig.6-106 An example of a JR East E5 "Shinkansen train with a pendulum mechanism in addition to the suspension. The shape of the leaf spring has an inflection point which lifts the body by a small rotation of the truck.

Fig.6-107 The drawbar was employed again after 20 years from the early model of JNR Series 103 commuter electric cars with a straight drawbar (cf. Seection 1.3., Chapter 1 and Section 9.2 (2.1.3), Chapter 9). In 1986, a new type of drawbar was developed to apply it to the model of Izukyu Series 2100 "Resort 21". The same drawbar was used for the model of the JNR Series 211 electric train. Because of time-consuming coupling, the drawbar was used only for the first production of these trains.
(a) In the Izukyu Series 2100 "Resort 21", the application of the drawbar was welcomed in the initial stage.
(b) In the JNR Series 211, not all types of car have the drawbar even in the original production.

Fig.6-108 The "KATO coupler N B" was developed in a short period to replace the draw bar applied to the Series 211 of original production. Despite of the circumstances of its origin, the "KATO coupler" sold also as parts was welcomed in the market because there had been no operating coupler with a realistic appearance similar to the automatic coupler widely used in the prototypes in Japan.

Fig.6-109 The "KATO coupler N A" was released to replace Arnold-type couplers on existing trucks.

Fig.6-110 The "KATO coupler N B2" was the first coupler with the shape of the tight coupler whose prototype had been widely used mainly in the private electric railways in Japan. The coupler with dummy jumper wires was applied to the model of the JR West Series 681 "Thunderbird" limited-express electric train. However, the coupler was not released as parts.

Fig.6-111 Reflecting the requirement for using "KATO coupler N B2", "KATO coupler, tight coupler type B" with improved productivity was applied to new models and was also sold as parts.

Fig.6-112 The "KATO coupler, tight coupler type A" was prepared to replace Arnold-type couplers. However, the opportunity to apply Arnold-type couplers was gradually decreased by the change of the coupler pocket.

Fig.6-113 The "KATO coupler N JP B" has the same coupler as "KATO coupler N B" but with dummy jumper wires.

Fig.6-114 The "KATO coupler N JP A" has the same coupler as "KATO coupler N A" but with dummy jumper wires.

Fig.6-115 The "Knuckle coupler" was developed to replace the Arnold-type coupler for U.S. prototype models. The coupler is able to couple with Kadee magnetic couplers.

Fig.6-116 The Arnold-type coupler became the de facto standard for N-gauge trains worldwide. Despite its superior operational performance, the coupling distance is a great deal larger, and many trials for "short coupling distance" have been attempted by European manufactures. The improvement of couplers has been one of the most important issues to be solved also in Japan. Even today, the Arnold-type coupler is frequently applied to locomotives, passenger and freight cars.

Fig.6-117 The "KATO coupler, tight coupler type B" was used many electric trains newly released such as JR West/ JR Central Japan Series 285 "Sunrise" limited-express sleeper electric train, reflecting the good reputation of the similar coupler applied initially to Series 681 "Thunderbird".

Fig.6-118 The "KATO coupler N JP" with the appearance of an automatic coupler was developed for the release of

"The imperial train formation with an emperor car No.1. The picture shows the application of the relevant coupler to the JNR Series 20 sleeper cars. The realistic coupling distance emphasizes the beauty of the Series 20 passenger cars.

Fig.6-119 The body-mount coupler that would be used on Elecric and Diesel locomotives was applied firstly to JR Central Japan Series 313 electric cars. It made it possible reproduce equipment hanging from the edges of a body as well as made for a more realistic coupling appearance.

Table 6-2 Truck-mounted couplers of realistic shape and short coupling distance developed by KATO.

Fig.6-A8 The release of Japanese-prototype structures began with an elevated station and platforms. The station, released initially as an assembly kit and afterwards as a completed model, was colored by molding the different pieces such as a roof and walls in different colored plastics.

Fig.6-A9 "The local structure series" which began in 1994 with the station was expanded to include an engine depot. For the station, a freight platform and an agricultural warehouse were prepared to accompany the station building and the passenger platform. These structures, which reproduce the prototypes precisely even on the inside, maintain a high quality in both appearance and in design being suitable for installation adjacent to the detailed trains produced today. The concept and the specification developed for such structures were reflected in the frames of the overpass and the brick wall surface of the oil warehouse.

Fig.6-A10 "The local structure series" were developed from railroad structures towards those one might find in town. A wide variety of classic buildings and facilities located in front of the station and along town streets were released as N-gauge models. As a result, various structures for the reproduction of a town in the "Showa" period (1926-1989) in addition to those used for railroad scenery became available. Taking the release of various classic structures as an opportunity, many N-gauge users started to construct their own original scenic layouts.