LYRD098

Lancashire & Yorkshire Railway
London Midland & Scottish Railway
British Railways

Diagram 98 54' 9 compartment non-corridor third

Prototype Information

By Barry C Lane with additions by 51L

The Lancashire & Yorkshire Railway introduced elliptical roof corridor coaches in 1906. The first orders were placed on 7 November of that year for 10 tri-composite brake corridor coaches (Diagram 84) and 90 non-corridor composites (Diagram 86). Previous arc roof carriages had two rows of large torpedo vents on the roof and the first of these new vehicles had the same size and arrangement (see end diagram A). Because this put the coaches foul of the Midland Railway loading gauge, (the brake compos being for through carriage services) the arrangement was changed after 69 D86s had entered service. The remaining 21 were fitted with smaller torpedo vents along the centre line of the roof, one on either side of the gas lamp at 21" spacing. Some of the earlier carriages were altered to match. The corridor composites retained the two rows of vents but all were changed to the smaller pattern in due course. The original incandescent lamps had tall flues which were also reduced in height for all future coaches. All subsequent stock to the diagrams covered by this series of kits had the smaller vents and lamps along the centre line of the roof.

The stock was built to the extreme of the loading gauge with 9' wide bodies. To avoid the guard's ducket exceeding the body width, it was made the same width but the van side was tapered inwards to allow sighting along the train. The end windows of the van had a white panel in the centre where the tail lamp would be placed after dark (end diagram B), this being superseded by a fixed gas lamp on non-corridor stock from around 1910 (end diagram F). Corridor van ends had the white panel to the right (end diagram D).

The first vehicles had wooden ends with strips of beading from buffer to roof level (end diagrams A-E). From about 1910, most carriages were built with three panel steel ends and the handrails changed to straight rather than curved (end diagrams F and G).

Rodding and emergency flag positions were present at one end of every vehicle and in the case of brakes these were at the non-brake end. The brakes had end steps on both sides of the non-brake end. In contrast the non-brake carriages had steps at the left hand side of both ends.

All the stock covered in these kits was mounted on 8' wheelbase bogies. The first ones were the traditional (LYRC044) type but new vehicles from 1908/9 received the 'wide bearing' bogies with the leaf springs within the side frames (LYRC045). As the years went by, bogies were swapped about indiscriminately.

Those compartments built as second class were redesignated third in 1911/12.

Almost all the stock was gas lit as built but conversion to electric lighting commenced about 1920 though the task was never completed. Vehicles built with electric lighting in 1918 had a simple sling to support the batteries but conversions received a substantial structure of angle iron for the battery boxes. These were placed either side and probably centrally. On adoption of the Wolverton lighting system by the LMS one battery box was used with a control box again probably situated centrally on the opposite side of the carriage. Much of the stock lasted to BR days with gas lit stock being the first to be withdrawn.

Many coaches were dual fitted for running onto the Caledonian and North Eastern Railways which used the Westinghouse brake system. However, apart from the existence of the extra hoses on the carriage ends, there was no outward sign of the extra system, everything being tucked up between the solebars out of normal sight. Probably some of every type would have been fitted with both braking systems, though the compartment stock would have fewer examples than the corridor stock, which was planned to run through to distant destinations. For example, all the brake composites of Diagram 84 were dual fitted.

After Grouping, some of this stock saw service in other parts of the country, notably in Scotland as new LMS built carriages displaced the older LYR stock on its native routes. Despite their age, when painted in LMS livery the LYR carriages were not unlike the late 1920s carriages built by the LMS.

Possibly for this reason, many vehicles continued in service well in to the 1950s.

The continuous footboards on carriage stock of the Edwardian period were generally reduced after 1920 to the suspended step between the bogies on the corridor stock. Only the end bogies under guard's vans were supplied with a short step. The funnels and down pipes on the carriage ends were soon removed by the LMS and in much later years, even the wooden and metal sheeting on the sides was not renewed and thus revealed the boarding behind it.

Diagram 98 was first ordered on 9/5/1908, with the first deliveries being in 1909. Newton Heath built a total of 54, mainly between 1909 and 1912, with another batch of 12 in 1914, and three stragglers in 1918. Early builds had curved hand rails on the ends and standard 8' bogies but the hand rails fitted by 1910 would be straight and the wide bearing 8' bogie was also fitted by that date.

A contract was placed with the Metropolitan Carriage & Wagon Co. of Saltley for a further batch of 50 (with small detail differences, including electric lighting), these being delivered in 1921, giving a grand total of 104. Apart from 10 D106 firsts and two railmotors, these latter were the only L&Y carriages not built "in-house".

L&Y numbers were 98, 418, 538, 725, 1077, 1150, 1425-36/97, 1505, 1650, 1764, 2077/82-3, 2254/63, 2452/85-6/8/90/7-8, 2552/4/60, 2610/88-90, 2709, 2983, 3276-86, and 3315-64. LMS 1923 numbers were 11795, 12035, 12120, 12234, 12550, 12606, 12840-51/97, 12902/46/67, 13094-6, 13174/7, 13301/8-9/11-2/14-5/67-8/70/90, 13467-9/83, 13800-10/39/41-87, 13923, 14453/7. LMS 1933 numbers were 15123-35 and 15142-229. Three carriages (1427/9, 3281) were converted for motor train use, becoming LMS 12842/4, 13805; and then 15854-6 respectively. This was a long-lived diagram, with many (particularly from the 1921 batch) surviving to the late 1950s. The last withdrawal was M15191M in January 1961. None were preserved.

Most of these vehicles were built to the 'Replacement Account' and thus were allotted random numbers. 'Capital Account' stock is identified by blocks of numbers. To save space, all L&Y numbers are given in ascending order, and this order was not necessarily maintained on renumbering, which was generally in order of build date. Full information is given in R W Rush's book.

References

LYR Association, Flyer No1, 1989
LYR Association, Flyer No2, Spring 1990, pp6-15
Platform no.59, pp4-15, Lancashire and Yorkshire Railway Society, ISSN 0143 8875
Lancashire & Yorkshire Passenger Stock, R W Rush, Oakwood Press, 1984, ISBN 0 85361 306 0
The Illustrated History of LMS standard coaching stock, D Jenkinson, R Essery, OPC
Historic Carriage Drawings, Vol. 2, LMS and Constituents, D Jenkinson, pp112-113, Pendragon, 1998
Lancashire & Yorkshire Railway Carriage Stock after the Grouping, Barry C Lane, LMS Journal No.2, Wild Swan, 2002, pp71-80

Construction notes

Parts list

Underframe, sides, ends, vents and hinges/steps, wrapped in paper.

<u>Packet 1 – underframe castings, door handles</u>
Vacuum cylinder
Lever links x2
Gas tanks x2
Westinghouse pipes x2
Steam pipes x2
Westinghouse cylinder, reservoir and lever
Door tee handles x18
Vacuum pipes x2

<u>Packet 2 - fixings</u>
M1x6 cheesehead screw x4
M1 nut x4

<u>Packet 3 – roof details</u>
Torpedo vents x18
Gas lamps x9

<u>Loose in box</u>
Roof extrusion
Sprung elliptical buffer pack
Bogie pack
Seating strip x5
0.020" plasticard x2 strips
Plastiglaze x2 strips
0.3mm brass wire
0.5mm brass wire x2
0.45mm nickel silver wire x5
Microstrip x3 (roof rainstrips)

The kit requires 14mm disc carriage wheels, bearings, screw couplings, door grab irons, paint and transfers to complete.

General

Please read these instructions with care before starting to build your model. Examine all the parts and familiarise yourself with their assembly. Remove any moulding flash or etch attachment points and ensure all parts fit correctly. We suggest wet fine emery paper (1200 grit) to clean up flash marks. Carry out a dummy run before assembly. Assembly is best carried out using ordinary solder for etched components or low melt solder for white metal. An epoxy resin such as Araldite and glues like UHU, Multibond or Thixofix can also be used. For small parts use superglue. To obtain the best results a combination of several techniques will be needed.

Most sharp bends are given by a half-etched line, which is always on the inside of the bend. In order to achieve a third layer of rivet detail on some components, dimples are etched into the reverse side of the sheet. Before assembly these should be raised. It is sufficient to press onto a piece of solid card with, for example a slightly blunt dart point; attention is drawn to this procedure by the phrase “raise rivets”.

This is the suggested order of assembly but there are many ways of assembling this or any other model. The part numbers quoted are those etched on the frets.

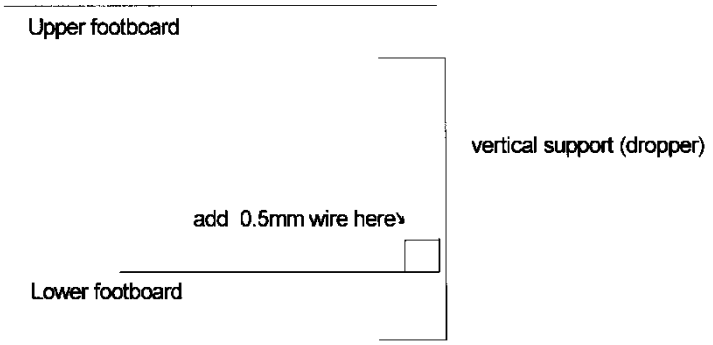
Bogies

Assemble the bogies according to the instruction sheet enclosed in their pack.

Underframe

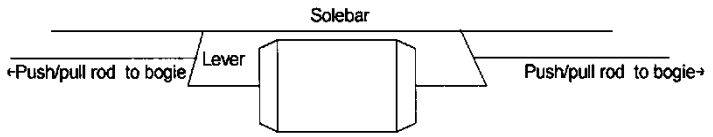
Read in conjunction with the drawing. Remove the floor plate (1) from the fret and fold down the solebar support plates. Fold the bolsters (2) to a U shape (there is no need to solder these folds) and solder an 8BA nut to the inside of the bolster. Solder the bolsters in place. Remove the headstocks (3) and their support plates (4) from the fret and raise the rivets on (4). Sweat (3) and (4) together and add the coupling hook pockets (5). Check that the buffer holes are opened out sufficiently to take the buffer bodies – a nominal 2mm diameter. Attach the headstock assemblies to the underframe position using the locating tab on (4) for correct positioning. Attach the buffer bodies ensuring that the rear slot is vertical. Support the buffer heads in a vice and file the head surfaces flat prior to soldering on the oval front plates. Put the heads to one side for fitting after painting.

Raise the rivets at the ends of the solebars (7). Solder the solebars to their underframe support plates – the solebars may need trimming to length. Attach the queen posts (6) to the floor. Thread lengths of 0.45mm wire through the support slots, and bend the ends upwards to meet the floor at the inside edges of the bogie bolsters. Solder them in place.



Carefully raise the rivets on the upper footboard (8) attachment tags, then bend them by 90°. Solder a length of 0.5mm wire to the rear edge of each lower footboard (9), on the side without the half-etched indentations. Bend the footboard supports (10) to a U shape and solder them into the indentations on the lower surface of each footboard. The footboard assemblies are now attached to the solebars, working from the tab at one end. The short footplates (11) are not used on this diagram.

Temporarily fit the bogies to the underframe with the 8BA screws. Add shims from the bogie frame fret as required to adjust the ride height so that the distance from rail head to buffer centre is 14mm. Remove the bogies and put them aside for painting.



Attach the vacuum cylinder to the centre of the carriage with the lever links pointing at 10° towards the cylinder. Viewed side on, a slight gap should be apparent between the solebar and the cylinder. Attach 0.5mm wire push/pull rods from the lever midpoints towards each bogie.

For a gas-lit carriage: Attach the gas tanks in place. These are found in various locations: they could be at the centre or at one end but most often at one end. In either instance they would be either side of the centre line between the underframe longitudinal member and the solebar. There should be clear daylight between tank and solebar, but again the height of gas tanks varied - see photographs.

For an electrically-lit carriage: No components are supplied. For early conversions, a battery box (8' long, 1'10" high, 10½" deep) should be fitted to either side, usually at the carriage centre, and with about a 6" gap between the box top and the solebar. They were supported by a substantial steel structure and you will need to study photographs, as there were many variations. Later conversions were undertaken using the Wolverton single battery box system in which case a regulator box (LNWC055) should be fitted to the opposite side of the carriage. A dynamo should also be fitted adjacent to one bogie.

For a Westinghouse fitted carriage: Add the Westinghouse cylinder, reservoir and lever. These components are fitted to the floor at the centre of the carriage equispaced between the longitudinal frame member and the solebar. The reservoir was adjacent to the solebar and the cylinder next to the frame. As viewed from the side the cylinder actuator push rod was in line with the push/pull rod to the bogie. The reservoir body was probably just visible. This equipment would have been removed in the 1930s.

Sides

Some preparatory work is required on the sides, and this is best done before forming the tumblehome. Firstly, open out the door handle and the grab iron holes to 0.45mm. The lower grab iron holes have not been pre-etched, and should be added 3.75 mm directly beneath the upper ones. If the carriage is to be lined we suggest grab irons and door handles are fitted after painting.

The tumblehome may be formed by gently pressing against a rounded surface such as a kitchen worktop. Use the ends as a guide to the profile. Fold the side along the length to form the roof and underframe supports.

You will note two half-etched horizontal lines along the carriage side, almost level with the top and bottom of the windows. Solder pieces of 0.31mm wire into the lines to represent the beading. Fit a vent above each passenger door. Next fit the door hinges. In common with other carriages with a tumblehome the lower door hinges were a prominent feature when viewed from the end. The stub end of the lower door hinge should be inserted from behind and soldered in place. (Some kits have a fret of pre-etched hinges, whereas others contain a set of long etched strips which should be cut to length after soldering in place.) Such is the small size of the upper and middle door hinges that they are best represented by fine wire or left off altogether and the hole filled with solder.

Ends

Fold up and solder the body/underframe brackets (12 from the underframe fret) onto the ends, ensuring they are centrally placed. Solder the end steps in place; note that the top step is longer than the others. At one end add the emergency brake rodding and lighting control gear from wire according to the various end drawings.

Handrails were present adjacent to the steps and the holes should be opened out to 0.45mm to suit the wire supplied. The handrails should be curved for carriages built before 1910 or straight thereafter.

Body assembly

You should now have a set of sides and ends ready for assembly. Fold the tabs on the ends of the sides across and solder the sides and ends together.

Bring the underframe and body together. These may be soldered or screwed together (M1x6 screws and nuts supplied), but if soldered, use the screws first for alignment purposes. Note that the holes in the side brackets and the underframe do not match up, so you will need to drill holes in the underframe to suit.

Roof

Cut the roof exactly to length; it is meant to fit within the ends and on the horizontal fold of the sides; it may require packing to bring it up to the level of the ends and/or slightly filing down.

Now add the roof details. Gas lamps should be added along the carriage centre line over the centre of each compartment. A torpedo vent should be placed 10.5" (3.5mm) either side of the lamp again along the carriage centre line. Add gas piping from 0.45mm wire, referring to the sketches at the end for the general layout, and one or two short transverse handrails at the step end. Finally, add the two long rainstrips from the supplied microstrip. If you are modelling the L&Y or early LMS periods, further rainstrips should be added over each door. These tended to be removed in later LMS days.

Interior

Cut and fit a floor from the supplied 0.020" plasticard. Cut compartment walls from 0.020" plasticard and add the seating.

Painting

Paint the body, underframe, roof, interior and bogies as separate units and fit together on completion.

Lancashire & Yorkshire Railway

The LYR livery of deep tan upper parts and carmine lake below the window line level was finished with a fine orange line along the joining of the two colours and just above the inward step of the body. Below waist level all windows and doors were also bordered with the orange lining. Droplights were Indian red.

The beading around the glass in quarter lights was painted carmine lake, as were the carriage ends. Underframes and all metal parts like steps, lamps, handrails etc. were black. Roofs were white when ex-works but this would rapidly reduce to a dirty grey within weeks of service. Insignia was gold outlined in black and vermilion. Class designations appeared on every compartment door. The company letters L.Y.R appeared near the left hand end and the running number in the equivalent position at the other end. Below each of these was a 10" company crest.

The Lancashire and Yorkshire Railway used a painting cycle of 5 to 6 years and so the LYR livery survived to around 1930.

The following Precision Paints are suggested:

Carmine lake	P554
Tan	P555
Roof white	P976

For transfers use HMRS sheet 19.

Third class interiors had plum or dark red patterned upholstery. Walls above seats in non-corridor stock were white tongue and groove boarding. Ceilings were white.

London Midland & Scottish Railway

Carriage sides were painted crimson lake, identical to the Midland Railway shade. Ends were painted crimson lake until 1936 (black afterwards) with detail work such as gangways, steps and pipework being black. In 1946 the LMS changed the name to maroon although it is doubtful if the colour actually changed too. Roofs were generally painted in the Midland style of light grey between the rain strips and black between the rain strips and cantrail. From 1933 onwards to the outbreak of WWII, the roof was specified to be a metallic aluminium type finish. The roofs quickly became dirty in service and more often than not were a muddy grey colour. Underframe and running gear should be painted black.

Prior to 1934 all carriages were lined in Midland style. The fact that the LYR stock was smooth made no difference, and the panel lining ignored the beading that was already there. Panel outlines were painted black and edged with a 3/8" gold line. These lines were edged each side with a 1/16" vermilion line. The end beading was also painted black, but not lined.

From 1934 onwards a simplified lining system was adopted. This consisted of a 1/2" yellow line just below the cantrail, and a similar line above the tops of the windows. Two further 1/2" yellow lines separated by a 1" black line were positioned just below the windows. During WWII lining was discontinued on the few carriages to be repainted. Lining was reintroduced in 1946, with yellow being changed to straw.

We suggest the following Precision Paints:

Crimson lake	P30
Carriage roof grey	P40
Carriage roof aluminium	P41
Lining gold	P35
Lining yellow	P36
Vermilion	P37

Lettering such as LMS etc. was applied in serif characters 4" high to the side waist panels, as near to the centre of the carriage as possible. The colour was gold until 1934/5 after which chrome yellow was used. The lettering was shaded in pinkish white to the left blending to dark red/brown below the characters; the shading in turn was shadow shaded to the right and below in black. The class type was marked on the doors in 8" high numbers rendered in gold. The LMS roundel was placed on the lower side panels, near to the centre of the carriage. We suggest the use of HMRS sheet 1 for the early period and sheet 2 for the later period.

British Railways

Non-gangwayed carriages were unlined crimson. Ends, underframe and running gear were black, with a grey roof. Given the withdrawal dates, it is probable that BR did not repaint many carriages, and extremely unlikely that any received the 1956 maroon livery. However, Precision Paints numbers are given for completion:

Carriage crimson red	P116
Carriage cream	P117
Roof grey	P131

Maroon	P108
Roof grey, maroon carriages	P130

Transfers are on HMRS sheet 14.

Final assembly

Add grab irons and tee handles to each passenger door. Fix the glazing in place, noting that trimming may be necessary to clear the door handles. Fit your choice of couplings, and add the vacuum, steam and Westinghouse pipes. The vacuum pipes will need bending to suit. To prepare the buffers place a spring on the buffer head tail end and insert it into the body. Ensure the buffer head springs and returns smoothly. Align the head and bend the tail through 90° so that it runs in the slot.

Finally, assemble the vehicle. The roof may be glued in place, or secured by screws or a magnet. This can be achieved by attaching two sections of brass across the body, soldered to the underside of the horizontal fold, in line with the centre of two compartments. The screw head can be disguised using a gas lamp. If magnets are used these should be embedded in either the roof or attached to the cross member. A section of shim steel will be required on the opposite surface. In either case the interior will need to be inserted into the carriage prior to attaching the cross members.

For further help or information please email: info@wizardmodels.ltd

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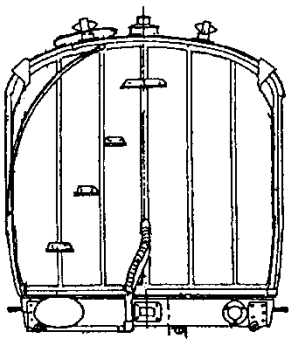
Version: 3.01 Issued: March 2026

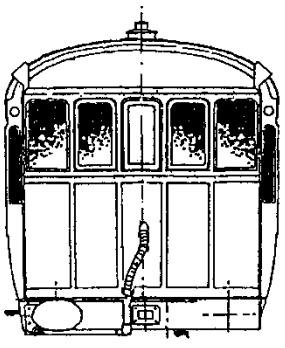
THESE DIAGRAMS ILLUSTRATE THE VARIOUS END AND ROOF DETAILS FOR L&YR ELLIPTICAL ROOF VEHICLES COVERED BY THE '51L' RANGE OF KITS.

4mm scale

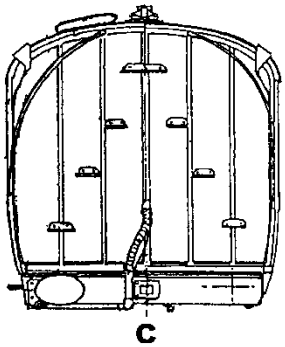


A

THE FIRST PROFILE DIAG.86 ORDERED IN 1906 AND THE BRAKE COMPOSITES OF DIAG 84 HAD LARGE TORPEDO VENTS TO EITHER SIDE OF THE LAMPS.
ALL FURTHER ORDERS HAD SMALLER TORPEDO VENTS ALONG THE CENTRE LINE EXCEPT LATER D.84 COMPOS WHICH STILL ARRANGED SMALL VENTS TO EITHER SIDE OF THE GAS LAMPS.

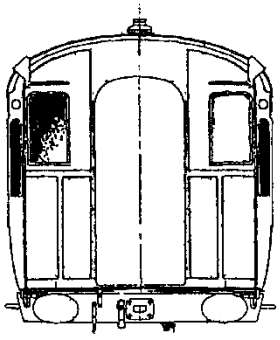


B

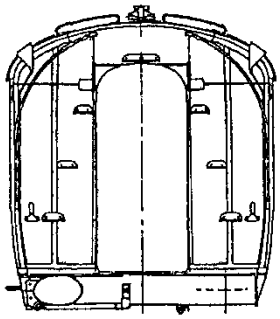


C

ENDS OF ALL NON-CORRIDOR BRAKE THIRD STOCK 1906 TO 1910.

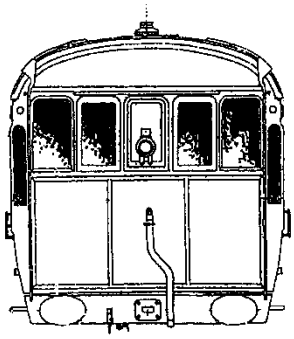


D

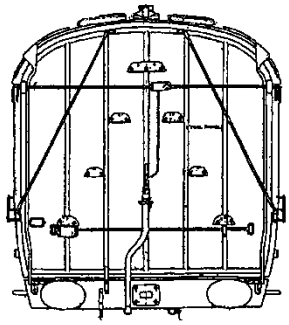


E

THE BRAKE END AND OPPOSITE END OF A TYPICAL ELLIPTICAL ROOF CORRIDOR VEHICLE OF THE 1906 TO 1910 PERIOD.
A FULL COMPARTMENT COACH WOULD HAVE A SINGLE ROW OF STEPS AT BOTH ENDS..... TO THE LEFT SIDE ONLY.
ALL HAD THE LAMPS AND TORPEDO VENTS ALONG THE ROOF CENTRE LINE EXCEPT FOR THE BRAKE COMPOSITES OF D.84 WHICH HAD THEM AS *Diagram.A* DIAG. 86
COMMUNICATION GEAR APPARATUS WAS ON ONE OF THE ENDS ONLY.

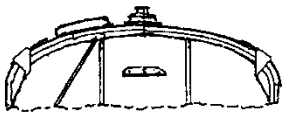


F



G

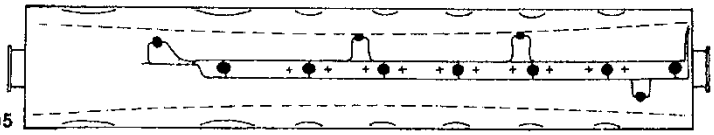
STRAIGHT HAND RAILS WERE APPLIED TO NEW VEHICLES FROM C1909



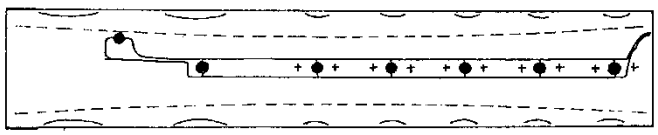
LATER BUILT COACHES FROM 1910 HAD METAL END PANELS ALTHOUGH *Diagram G* DOES SHOW THE SIX PANEL END PERPETUATED ON A FEW LOTS BUILT UP TO THE GREAT WAR. THE GUARDS END SHOWS THE FIXED GAS TAIL LAMP AND THE OTHER SHOWS THE EMERGENCY APPARATUS AND SHUT OFF LEVER AS FOUND ON ONE END OF ALL ELLIPTICAL ROOF STOCK.

SAMPLE ROOF DIAGRAMS - NOT TO SCALE

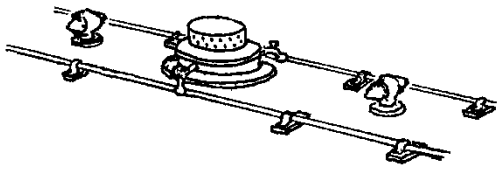
D84
CORRIDOR BRAKE COMPOSITE



D105
CORRIDOR BRAKE THIRD

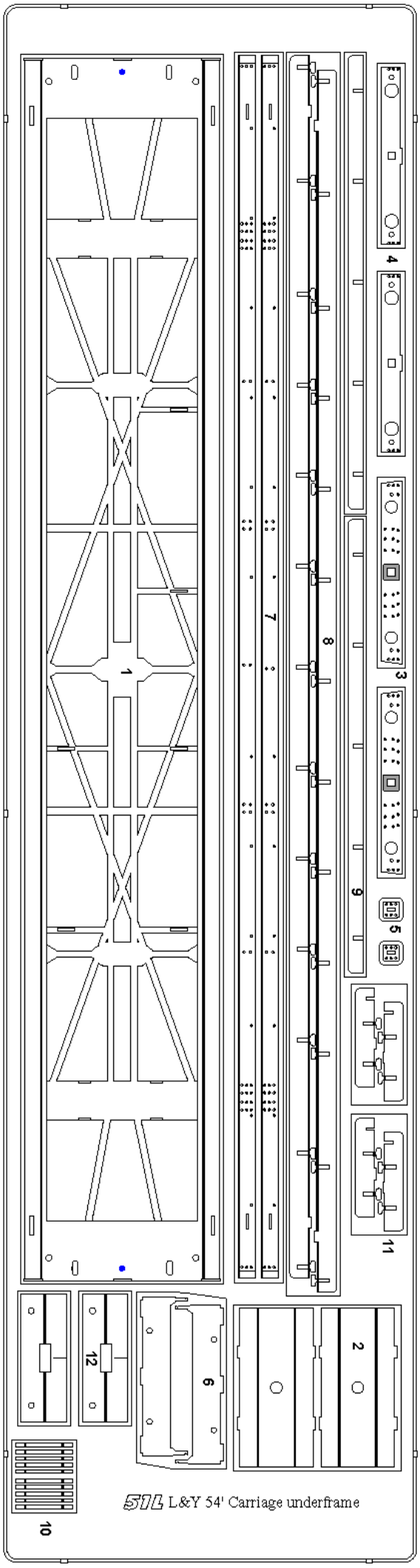


D94
NON CORRIDOR BRAKE THIRD



ABOVE - ARRANGEMENT OF PIPING FOR GAS LAMPS, WOODEN MOUNTING BLOCKS AND TORPEDO VENTS.

LEFT - SAMPLE LAYOUTS OF GAS LAMPS, FEED PIPES AND VENTS ON CORRIDOR AND COMPARTMENT CARRIAGES. MAIN RAINSTRIPS ARE SHOWN AS DOTTED LINES.


1
2
3
4
5
6
7
8
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10
11
12
L&Y 54' Carriage underframe